

# **A STUDY ON COSTUMER SATISFACTION OF JIO IN IRITTY AREA**

## **A PROJECT REPORT**

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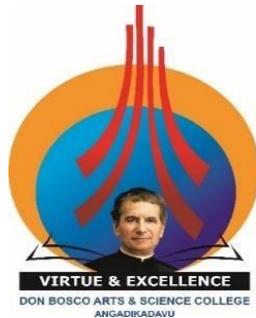
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**In partial fulfillment for the award of the degree in**

**BACHELOR OF BUSINESS ADMINISTRATION  
OF KANNUR UNIVERSITY  
DON BOSCO ARTS & SCIENCE COLLEGE**

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# **KANNUR UNIVERSITY**



## **BONAFIDE CERTIFICATE**

Certified that this project report “**A STUDY ON CUSTOMER SATISFACTION OF JIO WITH SPECIAL REFERENCE TO IRITTY AREA**” is the bonafide work of “**Mathew Abraham, Bhagyalakshmi E Abhin Sai C P and Abhijay Ragesh**” who carried out the project under my supervision.

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## **DECLARATION**

We, “**Mathew Abraham, Bhagyalakshmi E, Abhin Sai C P and Abhijay Ragesh**”, hereby we declare that the project work entitled “ **A STUDY ON CUSTOMER SATISFACTION OF JIO IN IRITTY TALUK**” has been prepared by us and submitted to Kannur University in partial fulfilment of requirements for the award of Bachelor of Business Administration, is a record of original work done by us under the supervision of **Mrs. Sunitha K S**, Assistant Professor, Department of Management Studies, Don Bosco Arts & Science College, Angadikadavu.

We also declare that this project report has not submitted by any one in full or partial for the award of any Degree, Diploma, Title or Recognition before.

Place: Angadikadavu

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**MATHEWABRAHAM**

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**CHAPTER I**  
**INTRODUCTION**

## **INTRODUCTION**

Any Business starts and ends with the customers and hence the customers should be treated as the king. The profit, status, image etc., of the organization depends on its customers. Hence it is important that organizations meet the customers' expectations. Customer satisfaction becomes a measure to modify the product and adopt a strategy which can serve the need of the customer. It can be attained only if the customer has good relationship with the supplier. In today's business market, customer satisfaction is important performance factor. Hence more the customer satisfaction better is the business and bonding with the customer. Today the telecommunication sector is very important in India. There is very tough competition between various companies.

Now a day's telecommunication companies offering various plans or benefits to customers to outstand the competition in the market. The telecommunication industry, in a way, creates employment for people. After the liberalization of the Indian telecom sector in 1994, the Indian cellular market witnessed a surge in cellular services. By 2018, some of the major players in the market are Airtel, Bharat Sanchar Nigam limited (BSNL), Jio, Vodafone Idea Limited, Vodafone, Aircel, Reliance India Mobile, Tata DoCoMo, Mahanagar Telephone Nigam limited and MTS India. The field of telecom sector has taken a giant leap at the twentieth first century. Communication has become an integral part of life of man all over the globe. The proverb 'Need is the mother of invention' is providing equally correct in case of communication. Telecom sector has already had a considerable impact on many aspects of our society.

This project "customer satisfaction of JIO network" deals with the automation of various activities done in telecom sector especially the JIO network, like how JIO is doing their business, what is the future of that company, its major problems and the customer satisfaction level of JIO services.

### **1.1 STATEMENT OF THE PROBLEM**

A study has been conducted in order to understand the customer satisfaction of JIO in Don Bosco College, research title "Customer Satisfaction of JIO in Iritty Area" has been conducted. The customer satisfaction is the main goal of every organization.

In this competitive business scenario, each activity starts and end with the customers. In the present situation telecommunication has become the life blood for every business activity there is heavy competition among the service providers in the industry. In sight of a well-established network and supporting infrastructure certain service providers couldn't compete in the market due to lack of quality consumer service and satisfaction. The research will help to know the satisfaction levels of JIO and what are the features that attract the customers to subscribe to JIO etc. of with reference to Irritty area where the study is carried out.

### **1.3 SIGNIFICANCE OF THE STUDY**

The scope of study is confined to customers in Irritty area. Its highlights the satisfaction of customers in using JIO. The quality of services may reflect the characteristics of JIO. Due to technological upgradation in the market JIO is forced to adopt changes according to changes in technology and competition. The study therefore has made a humble attempt to cover the customer's satisfaction with specific references to JIO.

### **1.4 OBJECTIVES OF THE STUDY**

- To analyse the satisfaction level of customers with respect various service provide by Telecom Company in general.
- To study the profile of the JIO company.
- To identify the major problems faced by JIO.
- To analyse the customer opinion and satisfaction with specific reference to JIO.

### **1.5 SCOPE OF THE STUDY**

This study is mainly conducted among customers in Irritty area to study the customer's satisfaction of JIO. The study covers various services provided by JIO such as JIO fiber services, Broadband services and mobiles.

## **1.6 RESEARCH METHODOLOGY**

This study is descriptive and analytical one. The methodology consisted of interview, surveys, research, diagnosis and research technique. The past and future information include through the study. Methodology has different methods and dimensions to constitute the research that solve the problem in the study if there is any.

### **1.6.1 SOURCE OF DATA**

Both primary sources and secondary sources are used for the smooth conduct of study.

#### **Primary data:**

Primary data was collected from various people and their opinion and information for the specific purpose of study help to run the analysis in essence the questions asked were tailored to elicit the data that will help for study. The data was collected through questionnaire to understand the customer's satisfaction towards JIO services.

#### **Secondary data:**

To make secondary more specific, secondary data will help to make it more useful. It helps to improve the understanding of the problem. Secondary data was collected from various sources such as different websites, published papers, internet, magazines, case studies, journals, article etc.

### **1.6.2 SAMPLE SIZE**

The responders are selected from IRITTY area, 100 people are selected for the study. The data is collected in the month of January as per schedule. The sample size is determined as 100 for analysis

### **1.6.3 SAMPLE DESIGN**

Convenient sample design is used in the study. Sample design is the frame or blueprint for conducting the research. Sample design is the arrangement of condition for collection and analysis of data in a manner that to combine relevance to the research purpose.

The sample design refers to preplanning of what a researcher does in this study. The study designed as an empirical one based on the survey method. The collected data were presented in tables and these tables were analysed systematically.

#### **1.6.4 TOOLS FOR DATA ANALYSIS**

- **RANKING METHOD**

Ranking is a non quantitative method of comparing different alternatives. In statistics "Ranking" refers to the data transformation in which numerical or ordinal values are replaced by their rank when the data are stored. Ranks are placed on various factors such as 1, 2 and 3...in the order of their importance based on the questions.

- **LIKERT SCALE**

Likert scale is of the most widely used attitude scaling techniques. In this approach, the responders are asked to indicate his degree of agreement or disagreement with each of statements that related to the objects in questions.

- **PERCENTAGE ANALYSIS**

The percentage analysis method is used to collect data. Percentage analysis is method to percent raw streams of data as a percentage for better understanding.

#### **1.7 PERIOD OF STUDY**

The duration of study from 15 December 2022 to 31 March 2023

#### **1.8 LIMITATIONS OF THE STUDY**

1. Study had time constraints and is limited to a small area.
2. Analysis was done based upon opinion of respondents individually, not from any focus groups or experts.
3. Taking the sample of respondents from Iritty area does not represent the problem of JIO in India

## **.1.9 PRESENTATION OF THE PROJECT REPORT**

The project is divided into five chapters.

**1. Chapter 1- Introduction and design of the study:** The chapter deals with introduction, statement of the study, significance of the study, objectives of the study, scope of the study, research methodology, sample design, source of data, data collection method, tools used for data collection, period of the study, limitation of the study.

**2. Chapter 2-Review of literature:** Following the introductory chapter, the second chapter deals with review of literature on this area.

**3. Chapter 3- Theoretical framework:** This chapter involves theoretical background and other relevant information's to study.

**4. Chapter 4- Data analysis and interpretation:** In connection of the objectives the presentation of the data for analysis and interpretations were done in a systematic manner with necessary tables.

**5. Chapter 5- Findings, suggestions and conclusion:** This chapter provides a brief summary of findings, suggestions which drawn based on the result of the study and conclusions.

**CHAPTER II**  
**REVIEW OF LITERATURE**

## REVIEW OF LITERATURE

Extensive literature survey is an integral part of every research work. Review of literature is necessary for the exact understanding of the topic under study. As the present topic is related to mobile phone services, an attempt is made here to review a few important studies conducted by various management researchers and professionals on these services. The analysis on the mobile phone service is of recent origin. A separate chapter is allotted for the review due to this reason. The present study concentrates on the available literature, on Indian level in the world and the study related data are collected from the various sources from the point of view of consumer awareness, consumers attitude, level of satisfaction, factors influencing, factors affecting and opinion of the consumers.

**1. Assaari and Karia (2000)** in their paper titled, "Churn Management towards customer satisfaction; A Case of Cellular operations in Malaysia" have viewed that customer satisfaction and customer service have been critical factors of the cellular industry. Cellular service providers need to ensure about the technology that provides customer service best in the industry. It is stated that investment in people and in technology helps in providing best customer service for today and for the future. One common ground that most carriers and customers agree on is that good customer service can have a key impact on how a customer views firm's services and company.

**2. Bepko (2000)** in his article entitled, "Service intangibility and its impact on customer Expectations of service Quality" has pointed out that among the areas which needed to be addressed in service quality research is the nature of consumer expectations across the range of intangibility. Previous research has compared consumers service quality expectations across services, but different groups of subjects have been evaluated for each different service. The problem of using different subjects for each service is that the subjects' demographic characteristics may be responsible for the significant differences in expectations of quality.

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**1. Assaari and Karia (2000)** in their paper titled, "Churn Management towards customer satisfaction.

**2. Bepko (2000)** in his article entitled, "Service intangibility and its impact on customer Expectations of service Quality".

The paper has used a controlled and repeated measure of design, where subjects have been asked to evaluate three services, varying in their degree of intangibility.

**3. Carsten Fink, Aaditya Mattoo and Randeep Rathindran (2001)** in their study titled, "Liberalizing Basic Telecommunications: The Asian Experience" have found that despite the move away from traditional public monopolies, most Asian governments are still unwilling to allow unrestricted entry, eliminate limits on private and foreign ownership, and establish strong independent regulators. A comprehensive reform including privatization, competition and regulation has been implemented and there are significantly higher levels of main line availability, service quality and labour productivity.

**4. David M. Szymanski and David H. Henard (2001)** in their study entitled. "The new marketing Developing Long-term interactive Relationships" have said that the growing number of academic studies on customer satisfaction and the mixed findings they report complicate the efforts among managers and academics to identify the antecedents to, and outcomes of businesses having more against less-satisfied customers. The mixed findings and the growing emphasis by managers on having satisfied customers point to the value of empirically synthesizing the evidence on customer satisfaction to assess current knowledge. To achieve this aim, the authors conducted a meta-analysis of the reported findings on customer satisfaction. They have documented that equity and disconfirmation are most strongly related to customer satisfaction on average.

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**5. Jonathan, Lee, Janghyuk, Lee, Lawrence and Feick (2001)** in their article titled, "The impact of Switching costs on the customer satisfaction-loyalty link:

**3. Carsten Fink, Aaditya Mattoo and Randeep Rathindran (2001)** in their study titled, "Liberalizing Basic Telecommunications.

**4. David M. Szymanski and David H. Henard (2001)** in their study entitled. "The new marketing Developing Long-term interactive Relationships.

**5. Jonathan, Lee, Janghyuk, Lee, Lawrence and Feick (2001)** in their article the customer satisfaction- titled, "The impact of Switching costs on loyalty link: mobile phone service in France".

mobile phone service in France" have analysed that moderating role of switching costs in the customer satisfaction -loyalty link and to identify customer segments and to retain them. Thus, the purposes of this paper are to examine the moderating role of switching costs in the customer satisfaction-loyalty link to identify customer segments and then analyse the heterogeneity in the mobile phone service market in France indicates support for the moderating role of switching costs. Managerial implications of the results are discussed.

**6. Robert C. Ford, Cherill P. Heaton and Stephen W. Brown (2001)** in their article titled, "Delivering Excellent service lessons from the best firms" have stated that many companies see investment in complaint handling as means of increasing customer commitment and building customer loyalty. However, firms are not well informed, on how to deal successfully with service failure or the impact of complaint handling strategies. They have supported a quasi "brand equity" perspective-whereas satisfaction with complaint handling has a direct impact on trust and commitment, to a limited extent, on the efforts of poor complaint handling. Implications for managers and scholars have also been discussed.

**7. Wilska(2001)** in his paper titled, "New Technology and young people's consumer identities: A Comparative study between Finland and Brazil" has found that among young people aged 16-20, it was found that mobile phone choice and especially usage is consistent with respondent's general consumption styles. The research has indicated that addictive use is common among females and is related to trendy and impulsive consumption styles. Instead, males have been found to have more technology enthusiasm and trend-consciousness. These attributes have been then linked to impulsive consumption. The study concludes that genders are becoming more alike in telecom service choice because individual differences in consumption patterns are obviously identifiable

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**6. Robert C. Ford, Cherill P. Heaton and Stephen W. Brown (2001)** in their article titled, "Delivering Excellent service lessons from the best firms".

**7.Wilska (2001)** in his paper titled, "New Technology and young people's consumer identities: A Comparative study between Finland and Brazil".

**8. Balasubramanian, Paterson and S. L. Jarvenpaa (2002)** in their article entitled, "Exploring the implications of M-convenience for markets and marketing" have identified that the unique intrinsic attributes mentioned by the end user are unhindered time and space attributes of the mobile phone. The extrinsic attributes are divided as direct and indirect network. Direct network is the effect of the size, speed and capacity of the network, whereas indirect network is the effect originating from the information, transaction, or machine interactive services.

**9. Bhave and Ashish (2002)** in their article entitled, "Customer satisfaction Measurement" have found that the opinion that customer's perception towards service and quality of a product determines the success of that product or service in the market. With better understanding of customer's perceptions, a firm can determine the suitable actions to meet the customers. Firm can identify their own strengths and weaknesses in comparison with their competitors. Major attributes that influence customer satisfaction are product quality, packaging, delivery commitments, price, responsiveness and ability to resolve complaints and overall communication, accessibility and attitude failing short creates dissatisfaction. Customer loyalty is an important strategic objective for all organisations.

**10. K.E. Lommeruda and L. Sorgard (2003)** in their study on "Entry in Telecommunication: Customer Loyalty, price Sensitivity and Access Price" have stated that telecommunication services are like undifferentiated products. Therefore, customers are not price sensitive all the time and sometimes brand loyalty takes a dominant part in brand preferences. This is because some consumers are retained with old monopolists. They have pointed out that substantive role of price fairness and quality service with customer satisfaction existing in the communication sector.

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**8. Balasubramanian, Paterson and S. L. Jarvenpaa (2002)** in their article entitled, "Exploring the implications of M-convenience for markets marketing".

**9. Bhave and Ashish (2002)** in their article entitled, "Customer satisfaction Measurement".

**10.K.E. Lommeruda and L. Sorgard (2003)** in their study on "Entry in Telecommunication: Customer Loyalty, price Sensitivity and Access Price".

**11. Michael Draganska and Dipal Jain (2003)** in their article titled, "Consumer preferences and product line pricing strategies: An Empirical Analysis" have analysed that India is having 752.19 million mobile subscribers and informant mobile intelligence reports claim that in Average Minutes Per User (AMPU) in India is 25 to 30 minutes per day of active time on voice calls and almost 15 to 20 minutes per day of the active time on messaging. Bharati the major mobile service provided in India claimed as on November 2010 that Indian monthly Average Revenue Per User (ARPU) is 202 rupees which is reduced at 20 per cent on a year base and it is expected to decrease further. As there is an increase in mobile subscribers and increase in AMPU at the same time there is decrease ARPU mobile service providers who are planning to attract Mobile subscriber to their service with less affordable price.

**12.J. Pakola. M. Pietila and Svento (2003)** in their article titled, "An Investigation of customer Behaviour in Mobile Phone Markets in Finland" have indicated that price and properties are the major influential factors affecting the purchase of new Mobile phone, whereas audibility, price and friends are regarded as the most important in choice of the Mobile Phone operators. Customers have certain amount of self-knowledge about telephone features, connection fee, access cost, mobile-to-mobile phones rates, call rates and free calls which are related to mobile phone purchasing respondents. He has stated that customers with prior experience about a product can be able predict their choices relatively well but tend to overestimate the importance of a monthly access fee, mobile-to-mobile rates and connection fees.

**13. Stephen Y. Walters (2003)** in his study on "The New Telephony- Technology, Convergence, Industry Collision" has viewed that the telecommunication industry is

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**11.MichaelDraganska and Dipal Jain (2003)** in their article titled, "Consumer preferences and product line pricing strategies.

**12.J. Pakola. M. Pietila and Svento (2003)** in their article titled, "An Investigation of customer Behaviour in Mobile Phone Markets in Finland".

**13. Stephen Y. Walters (2003)** in his study on "The New Telephony- Technology, Convergence, Industry Collision".

being rocked by change fuelled by the advent of the tremendous success of the internet and its technologies. For quite some time there has been competition in the telephony business. Long distance rates have seen continuous decreases for two decades as new carriers seek to capture greater and greater market share. Local carriers have seen competition for interconnecting the networks of large corporate customers and for providing them access to long distance services. So, competition and change are not new issues in telecommunications. But the internet has forced an entirely new set of changes on the phone business. There are new carriers, new business scenarios, new technologies, and new ways of thinking about end users and the services they seek.

**14. S.Krishnan (2004)** in his survey titled, "Net Profit Surges 123 per cent in Q3" has stated that Bharathi had 31.9 million mobile users at the end of 2006 compared to 16 million at the end of 2005. Its broadband and telephone subscribers base grew from 1.2 million to 1.7 million over the one-year period. The revenues and net profit for the nine months was 13126 crores and 12904 crores, a growth of 59 per cent and 84 per cent respectively compared to the year 2004.

**15. K. Maran, C.Madhavi and K.Thilagavathi (2004)** in their article titled, "Customer's perception on Telephone: A Study with Special Reference to Chennai City" have indicated that the consumer perceptions about fixed telephone lines in Chennai. The objective of the study is (1) to find the most influencing factor in selection of service provider, and (2) to measure customer perception and satisfaction as regards the service provided.

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**14. S. Krishnan (2004)** in his survey titled, "Net Profit Surges 123 per cent in Q3" has stated that Bharathi had 31.9 million mobile users at the end of 2006 compared to 16 million at the end of 2005.

**15. K. Maran, C. Madhavi and K. Thilagavathi (2004)** in their article titled, "Customer's perception on Telephone: A Study with Special Reference to Chennai City".

The study on a sample of 550 telephone users indicate that some problems exist that deserve the attention of the company. The company needs to bridge the gap between the services promised and services offered. And to conclude, "Delivering service without measuring the impact on the customer is like driving a car without a windshield".

## **CONCLUSION**

Through many studies have been conducted India and few studies in Irritty covering certain aspect of perception and customer satisfaction of mobile phone services, a comprehensive study covering the multi-dimensional aspect of consumers awareness attitude, level of satisfaction, factors influencing, factors affecting, and opinion of these studies have made any effort to analyse the customer satisfaction of JIO mobile phone services in the Irritty Taluk. To cover this research gap in the rural areas of Irritty, we choose this vibrant topic for our research study.

**CHAPTER III**  
**THEORETICAL FRAMEWORK**

### **3.1 INTRODUCTION**

Reliance Jio is a telecommunications company in India, owned by Reliance Industries Limited, one of India's largest conglomerates. The company was launched in 2016, and quickly became one of the leading mobile network operators in India, with a subscriber base of over 420 million as of March 2021.

Reliance Jio offers 4G LTE services, as well as a range of digital services, including digital content, mobile applications, and various other digital platforms. The company also offers a range of smartphones and other devices, including routers and dongles, that are compatible with its network.

One of the main reasons for Reliance Jio's rapid growth is its aggressive pricing strategy, which offered low-cost data plans and free voice calling to customers. This disrupted the Indian telecom industry, forcing other operators to lower their prices and improve their services to remain competitive.

Reliance Jio has also invested heavily in building a robust network infrastructure, including a high-speed fiber optic network and a nationwide 4G LTE network. The company is also actively exploring the development of 5G technology and is expected to be a major player in the Indian 5G market when it becomes available.

Overall, Reliance Jio has transformed the Indian telecom industry by offering high-quality, low-cost services, and driving innovation in digital services and technology. In August 2018, Jio began to test a new triple play fiber to the home service known tentatively as Jio Giga Fiber, including broadband internet with speeds ranging from 100 to 1000 Mbit/s, as well as television and landline telephone services.

In August 2019, it was announced that the service would officially launch on 5 September 2019 as Jio Fiber, in honour of the company's third anniversary. Jio also announced plans to offer streaming of films still in theatres ("First Day First Show") to eligible Jio Fiber subscribers. In the year 2015, the company has a network of more than 250,000 km (160,000 mi) of fiber optic cables in the country, over which it will be partnering with local cable operators to get broader connectivity for its broadband services.

the incumbent operators had previously approached the country's PMO to reiterate their stance they "are in no way obliged or in any position to entertain Jio's requests for interconnection points as they do not have either the network or the financial resources to terminate the latter's humongous volumes of potentially asymmetric voice traffic." Responding to this,

Mukesh Ambani, owner of Jio, said, "All operators have publicly said last week that they will provide this (interconnect and MNP). So, we are waiting. These are all great companies. They have their own reputations to protect. I am confident they won't violate the law." Commenting about number portability, he added, "The number belongs to the consumer. No operator can cause trouble if they want to change operators." However, on 12 September 2016, Idea Cellular agreed to allow Jio to use 196 of its interconnection access points. Jio Phone is a line of feature phones marketed by Jio. The first model, released in August 2017 (with public pre-orders beginning 24 August 2017), was positioned as an "affordable" LTE-compatible feature phone. It runs on the kaiOS platform (derived from the defunct Firefox OS), and includes a 2.4-inch display, a dual-core processor, 4 GB of internal storage, near-field communication support, a suite of Jio-branded apps (including the voice assistant Hello Jio), and a Jio-branded application store. It also supports a "TV cable" accessory for output to an external display.

In July 2018, the company unveiled the JioPhone 2, an updated model in a keyboard bar form factor with a QWERTY keyboard and horizontal display. Jio also announced that Facebook, WhatsApp and YouTube apps would become available for the two phones.

### **3.2 CUSTOMER SATISFACTION**

Customer satisfaction (often abbreviated as CSAT, more correctly CSAT) is a term frequently used in marketing. It is a measure of how products and services supplied by a company meet or surpass customer expectation. Customer satisfaction is defined as "the number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (ratings) exceeds specified satisfaction goals.

The Marketing Accountability Standards Board (MASB) endorses the definitions, purposes, and constructs of classes of measures that appear in Marketing Metrics as part of its ongoing Common Language in Marketing Project. In a survey of nearly 200 senior marketing managers, 71 percent responded that they found a customer satisfaction metric very useful in managing and monitoring their businesses.

It is seen as a key performance indicator within business and is often part of a Balanced Scorecard. In a competitive marketplace where businesses compete for customers, customer satisfaction is seen as a key differentiator and increasingly has become a key element of business strategy. Reliance Jio Infocom Ltd.'s Customer Satisfaction (CSAT) score was rated **80%** according to Asian or Pacific Islander users and customers.

### **3.2.1 THEORITICAL GROUND**

In literature antecedents of satisfaction are studied from different aspects. The considerations extend from psychological to physical and from normative to positive aspects. However, in most of the cases the consideration is focused on two basic constructs as customers' expectations prior to purchase or use of a product and his relative perception of the performance of that product after using it.

A customer's expectations about a product tell us how he or she anticipates how that product will perform. As it is suggested in the literature, consumers may have various "types" of expectations when forming opinions about a product's anticipated performance. For example, four types of expectations are identified by Miller (1977): ideal, expected, minimum tolerable, and desirable. While, Day (1977) indicated among expectations, the ones that are about the costs, the product nature, the efforts in obtaining benefits and lastly expectations of social values. Perceived product performance is considered as an important construct due to its ability to allow making comparisons with the expectations.

It is considered that customers judge products on a limited set of norms and attributes. Olshansky and Miller (1972) and Olson and Dover (1976) designed their research as to manipulate actual product performance, and their aim was to find out how perceived performance ratings were influenced by expectations. These studies took

out the discussions about explaining the differences between expectations and perceived performance."

In some research studies, scholars have been able to establish that customer satisfaction has a strong emotional, i.e., affective, component. Still others show that the cognitive and affective components of customer satisfaction reciprocally influence each other over time to determine overall satisfaction.

Especially for durable goods that are consumed over time, there is value to taking a dynamic perspective on customer satisfaction. Within a dynamic perspective, customer satisfaction can evolve over time as customers repeatedly use a product or interact with a service. The satisfaction experienced with each interaction (transactional satisfaction) can influence the overall, cumulative satisfaction. Scholars showed that it is not just overall customer satisfaction, but also customer loyalty that evolves over time.

### **The Disconfirmation Model**

"The Disconfirmation Model is based on the comparison of customers' [expectations] and their [perceived performance] ratings. Specifically, an individual's expectations are confirmed when a product performs as expected. It is negatively confirmed when a product performs more poorly than expected. The disconfirmation is over the positive when a product performs expectations (Churchill & Suprenant 1982). There are four constructs to describe the traditional disconfirmation paradigm mentioned as expectations, performance, disconfirmation and satisfaction." "Satisfaction is considered as an outcome of purchase and use, resulting from the buyers' comparison of expected rewards and incurred costs of the purchase in relation to the anticipated consequences. In operation, satisfaction is somehow similar to attitude as it can be evaluated as the sum of satisfactions with some features of a product." "In the literature, cognitive and affective models of satisfaction are also developed and considered as alternatives (Pfaff, 1977). Churchill and Suprenant in 1982, evaluated various studies in the literature and formed an overview of Disconfirmation process in the following figure:"

### **3.3 History**

The idea of Jio was first announced by Mukesh Ambani, the chairman of Reliance Industries, at the company's annual general meeting in 2014. Ambani envisioned Jio as a way to bridge the digital divide in India and provide affordable internet access to millions of people.

Jio's journey began with the acquisition of Infotel Broadband Services Limited in 2010. Infotel had won a pan-India license for 4G broadband services in a government auction, which became the foundation for Jio's network. Jio initially launched its services on a trial basis in late 2015, offering free voice and data services to a limited number of users. This helped Jio test its network and iron out any issues before launching its services on a commercial scale.

In September 2016, Jio launched its commercial services, offering a range of affordable data plans and devices. The company's disruptive pricing strategy, which offered free voice calls and data at incredibly low prices, led to a significant increase in internet penetration in India. Jio's rapid growth has been fuelled by several factors, including its aggressive pricing strategy, its focus on digital services, and its massive investment in infrastructure. The company has invested billions of dollars in building a state-of-the-art network of towers, fiber-optic cables, and data centres across India.

Jio has also expanded into other areas such as e-commerce, media, and entertainment. In 2020, Jio Platforms, the digital services arm of Reliance Industries, raised billions of dollars in funding from several global investors, including Facebook and Google. Today, Jio is one of the largest telecom operators in India, with a customer base of over 400 million. The company continues to innovate and disrupt the market with new services and products, driving digital transformation across the country.

Reliance Jio is a telecommunications company in India, owned by Reliance Industries Limited, one of India's largest conglomerates. The company was launched in 2016, and quickly became one of the leading mobile network operators in India, with a subscriber base of over 420 million as of March 2021.

Reliance Jio offers 4G LTE services, as well as a range of digital services, including digital content, mobile applications, and various other digital platforms. The company also offers a range of smartphones and other devices, including routers and dongles, that are compatible with its network.

One of the main reasons for Reliance Jio's rapid growth is its aggressive pricing strategy, which offered low-cost data plans and free voice calling to customers. This disrupted the Indian telecom industry, forcing other operators to lower their prices and improve their services to remain competitive.

Reliance Jio has also invested heavily in building a robust network infrastructure, including a high-speed fiber optic network and a nationwide 4G LTE network. The company is also actively exploring the development of 5G technology and is expected to be a major player in the Indian 5G market when it becomes available. Overall, Reliance Jio has transformed the Indian telecom industry by offering high-quality, low-cost services, and driving innovation in digital services and technology.

### **3.4 EVOLUTION OF TELECOMMUNICATION INDUSTRY IN INDIA**

During British Raj & Rajdhani of East India Company was at Calcutta and then the capital got shifted to Delhi in 1911 by Lord Harding and gradually the power centre was shifted to Delhi and continued to be capital of India and after independence, New Delhi became the capital of India. When telecom operations were first started, PWD ran the business with headquarters at New Delhi. Then, the control of telecom operations was gradually transferred from Public Work Department (PWD) to General Postal and Telegraph (DGP&T), from DGP&T to Department of Telecommunication (DOT), from DOT to Department of Telecom Service (DTS) and finally landed in Bharat Sanchar Nigam Limited (BSNL).

India's telecommunication network is the second largest in the world by number of telephone users (both fixed and mobile phone) with 1179.49 million subscribers as on 31 January 2021. It has one of the lowest call tariffs in the world enabled by mega telecom operators and hyper-competition among them. India has the world's second-largest Internet user-base with 747.41 million broadband internet subscribers in the country

Major sectors of the Indian telecommunication industry are telephone, internet and television broadcast industry in the country which is in an ongoing process of transforming into next generation network, employs an extensive system of modern network elements such as digital telephone exchanges, mobile switching centres, media gateways and signalling gateways at the core, interconnected by a wide variety of transmission systems using fibre-optics or Microwave radio relay networks. The access network, which connects the subscriber to the core, is highly diversified with different copper-pair, optic-fibre and wireless technologies.

DTH, a relatively new broadcasting technology has attained significant popularity in the Television segment. The introduction of private FM has given a fillip to the radio broadcasting in India. Telecommunication in India has greatly been supported by the INSAT system of the country, one of the largest domestic satellite systems in the world. India possesses a diversified communications system, which links all parts of the country by telephone, Internet, radio, television and satellite.

Indian telecom industry underwent a high pace of market liberalisation and growth since the 1990s and now has become the world's most competitive and one of the fastest growing telecom markets. Telecommunication has supported the socioeconomic development of India and has played a significant role to narrow down the rural-urban digital divide to some extent. It also has helped to increase the transparency of governance with the introduction of e-governance in India. The government has pragmatically used modern telecommunication facilities to deliver mass education programmes for the rural folk of India.

According to London-based telecom trade body GSMA, the telecom sector accounted for 6.5% of India's GDP in 2015, or about ₹ 9 lakh crore (US\$110 billion), and supported direct employment for 2.2 million people in the country. GSMA estimates that the Indian telecom sector will contribute ₹ 14.5 lakh crore (US\$180 billion) to the economy and support 3 million direct jobs and 2 million indirect jobs by 2020.

In today's period of progress and wealth, technological modernization is increasingly seen as a foreseen necessity for every country. With better technology and more rivalry from established businesses, telecommunications have entered a new era of

development. The continuous rise of the mobile industry is linked to technological advancements in the telecommunications sector.

The service providers' primary goal is to build a loyal customer base by measuring their performance and maintaining existing consumers in order to profit from their loyalty. The purpose of the paper is to address these concerns.

### **3.5 TELECOM SCENARIO IN INDIA**

The Telecom industry in India is the second largest in the world with a subscriber base of 1.17 Bn as of August 2022 (wireless + wireline subscribers). India has an overall tele-density of 85.15 %, of which, the tele-density of the rural market, which is largely untapped, stands at 58.44% while the tele-density of the urban market is 134.71%.

The industry's exponential growth over the last few years is primarily driven by affordable tariffs, wider availability, roll-out of Mobile Number Portability (MNP), expanding 3G and 4G coverage, evolving consumption patterns of subscribers, Government's initiatives towards bolstering India's domestic telecom manufacturing capacity, and a conducive regulatory environment. To further expedite digital connectivity, the Government has approved the auction of IMT/5G spectrum for deployment of 5G services within the country. This auction was successfully held by the end of July 2022 and grossed \$18.77 Bn.

The Telecom sector is the 3rd largest sector in terms of FDI inflows, contributing 6.24% of total FDI inflow, and contributes directly to 2.2 Mn employment and indirectly to 1.8 Mn jobs. 100% Foreign Direct Investment (FDI) has now been allowed in the Telecom sector under the automatic route. The number of mobile towers increased from 400,000 in 2014 to 660,000 in 2021. Similarly, the number of Mobile Base Transceiver Stations have grown rapidly by 187% and increased from 800,000 in 2014 to 2.3 Mn in 2021. Rural tele-density jumps from 44% in March 2014 to 58% in October 2022.

The DoT is targeting a combination of 100% broadband connectivity in the villages, 55% fiberisation of mobile towers, average broadband speeds of 25 mbps and 30 lakh kms of optic fibre rollouts by December 2022. Broadband connections rise to 816 Mn

in September 2022 from 61 Mn in March 2014, growing by 1238%. By December 2024, DoT is looking at 70% fiberisation of towers, average broadband speeds of 50 Mbps and 50 lakh kms of optic fibre rollouts at a pan-India level.

### **3.6 RELIANCE JIO**

**Abstract-**Reliance Jio Infocomm Ltd (popularly known as Jio), is an Indian mobile network operator launched commercially on September 5, 2016. Owned by Reliance Industries, the entry of Jio revolutionised the telecommunication sector. In this project the success story of this recent entrant and management principles adopted by the company were analysed based on research and studies conducted in these fields. The organisational structure, planning and marketing strategy, staffing and recruitment, SWOT analysis, PEST analysis, promotional strategy, the impact of Jio launch, Government policies, controversies surrounding Reliance Jio, its ventures, collaborations and future projects were also discussed in detail.

Reliance Jio Infocomm Limited, doing business as Jio, is an Indian telecommunications company and a subsidiary of Jio Platforms, headquartered in Navi Mumbai, Maharashtra, India. It operates a national LTE network with coverage across all 22 telecom circles. Jio offers 4G and 4G+ services all over India and 5G service in many cities. Its 6G service is in the works. Jio soft launched on 27 December 2015 with a beta for partners and employees,[9][10] and became publicly available on 5 September 2016. It is the largest mobile network operator in India and the third largest mobile network operator in the world with over 42.62 crore (426.2 million) subscribers.

In September 2019, Jio launched a fiber to the home service, offering home broadband, television, and telephone services. As of September 2020, Reliance Industries has raised 1.65 lakh crore (US\$21 billion) by selling nearly 33% equity stake in Jio Platforms. The 4G services were launched internally on 27 December 2015. The company commercially launched its 4G services on 5 September 2016, offering free data and voice services until 31 December, which was later extended until 31 March 2017. Within the first month, Jio announced that it had acquired 1.6 crore (16 million) subscribers and has crossed 5 crore (50 million) subscriber mark in 83 days since its launch, subsequently crossing 100 million subscribers on 22

February 2017.[26] By October 2017, it had about 13 crore (130 million) subscribers. On 5 October 2022, it has launched 5G services to Delhi, Mumbai, Kolkata and Chennai. Varanasi, Siliguri, Bangalore, Hyderabad and Nagpur.

### **3.6.1 VISION**

- to transform India with the power of digital revolution - to connect everyone and everything, everywhere – always at the highest quality and the most affordable price.

### **3.6.2 MISSION**

- to digitally transform India.
- We believe in making dreams a reality by bringing out the creativity and innovation in our employees. We have a host of initiatives through which we care for our employees throughout their life at Jio.
- Becoming the most trusted preferred and admired telecom brand.

### **3.6.3 PRESENT STATUS OF JIO IN INDIAN TELECOM MARKET**

Reliance Jio held the highest share of subscribers, at around 36.6 percent, in the wireless network market across India as of September 2022. The company had over 403 million subscribers during the same time period. The number of mobile subscribers across the south Asian country amounted to over a billion in 2022.

The Indian telecom industry registered strong growth in the recent years and became the second-largest telecommunications industry in the world. The country also ranked second in terms of total internet users worldwide in 2022. The gross revenue from the industry amounted to around 1.2 trillion Indian rupees in fiscal year 2020.

### **3.6.4 PROFILE OF JIO IN FUTURE INDIAN TELECOM SCENARIO**

The future of Telecomm industry in India seems to have a massive growth especially in terms of the revenues from the telecom equipment sector, several internet subscribers, and overall IP traffic along with the Indian Government's plans to

develop 100 smart city projects, where IoT would play a vital role in the development of those cities. Reliance Jio, the nation's biggest telecom firm, will expand 5G telephony services offering ultra-high-speed internet connectivity to every part of the country by December 2023

### **3.7 SERVICES OF JIO**

Jio offers the best and the widest range of entertainment services as demonstrated below: games across genres.

Allows the user to set and check top scores and get featured in the leader board.

#### **Jio Chat – Chatting, calling and more:**

Provides users with audio and video calling feature including audio and video conference calls.

Allows the user to create random doodles while chatting and other features of rich communication services.

Provides features such as group chatting, voice notes, 'do not disturb' mode, sharing of files up to 100MB, 1000+ fun stickers etc.

Provides various entertainment and infotainment related channels.

Has recently conducted one of India's largest play-along games on an application.

#### **My Jio – Customer Experience and more:**

Offers a user-friendly and intuitive design for customer support and self-care.

Allows user to check balance and validity of recharge plan, link and manage multiple Jio accounts, install and access Jio Apps, buy, store and transfer voucher in digital format etc.

It also provides an option for delivering Jio SIM to users at their doorstep.

Extends help and support to users by providing FAQs, helpful tips and troubleshooting features.

Provides free entertainment and gaming content.

Has recently conducted one of the largest play-along games on an application.

## **Jio Health Hub**

Book tests, consult doctors, manage your weight & much more.

Access reports & securely shares them with your doctor

In addition to the above applications and services, RJIL also facilitates provision of various other applications, including Jio Switch (rapid media sharing), AJIO (fashion and shopping), Jio Money (mobile wallets and loyalty points) and Jio Security (cyber security) which complement and enable users to experience wholesome and fulfilling entertainment, always.

Jio has attained multiple awards globally for content and apps. Attaching one list for the month of February 2018 alone.

Some other services provided by JIO to its customers are:

- **ioPages** – a web browser for ANDROID devices
- **JioCinema** – online HD video library
- **JioCloud** – cloud-based backup tool
- **JioMeet** – video-conferencing platform
- **JioMoney** – online payments/wallet app
- **JioSaavn** – for online and offline music streaming in English and Indian languages
- **JioSecurity** – security app
- **JioTv** – TV Channels streaming service
- **JioVoice** – VoLTE phone simulator
- **Jiomart** - Online shopping app

### **3.7.1 JIO INITIATIVES**

Jio, short for Reliance Jio Infocomm Limited, is a telecom company in India that offers a range of digital services. Here are some of Jio's initiatives:

**4G Services:** Jio's primary initiative is to provide affordable 4G services to Indian consumers. It launched its services in September 2016, and within months became the largest 4G network in the country.

**JioPhone:** Jio launched a low-cost feature phone called JioPhone, which is aimed at bringing millions of Indians online. The phone is priced at Rs 1,500 (\$20) and comes with free voice calls, data, and other digital services.

**Jio Fiber:** Jio offers broadband services under the brand name JioFiber. The service offers high-speed internet, voice calls, and a range of digital services like OTT apps, video conferencing, and more.

**Jio Mart:** Jio has launched an online grocery delivery service called JioMart, which allows customers to order groceries and other household items through an app.

**Jio Meet:** Jio has also launched a video conferencing app called JioMeet, which allows up to 100 participants in a single call. The app is free to use and has gained popularity due to its ease of use.

**Jio Health Hub:** Jio has launched an app called JioHealthHub, which provides users with access to a range of healthcare services like online doctor consultations, lab tests, and medicine delivery.

**Jio Saavn:** Jio acquired the music streaming service Saavn and rebranded it as JioSaavn. The service offers a vast library of Indian and international music.

**Jio Money:** Jio has a digital wallet service called JioMoney, which allows users to make payments, recharge their mobile phones, and transfer money to other users.

These are some of the major initiatives taken by Jio in recent years, and the company continues to innovate and expand its digital offerings.

### **3.7.2 JIO INFRASTRUCTURE FACILITIES**

**Fiber Optic Network:** Jio has laid out a massive fiber optic network across India, which enables high-speed internet and voice calls for its customers.

**4G LTE Network:** Jio has built a 4G LTE network that covers almost all of India's geography. This network supports data transfer rates of up to 100Mbps, which enables users to stream high-quality video, make video calls, and access other digital services.

**Cloud Infrastructure:** Jio has built a cloud infrastructure that provides a range of services to businesses and consumers. The company's cloud services include storage, compute, and analytics, among others.

**Data centres:** Jio has built several data centres across India, which are used to store and process data for its digital services. These data centres are equipped with the latest hardware and software to ensure fast and secure data processing.

**Network Operations Centre's (NOCs):** Jio has established several NOCs across India to monitor and manage its network infrastructure. These NOCs are staffed 24/7 and use advanced tools and technologies to ensure that the network is operating smoothly.

**Jio Points:** Jio has established thousands of Jio Points across India, which are used to provide customer support and services. These Jio Points are staffed by trained personnel who can help customers with their queries and issues.

**Jio Apps:** Jio has developed several apps that provide digital services to its customers. These apps include JioTV, JioCinema, JioNews, JioSaavn, and more.

Overall, Jio has built a robust infrastructure that enables fast and reliable digital services for its customers.

### **3.7.3 JIO'S NEW PROJECT**

**The 44th AGM of Reliance Industries was conducted on 24 June 2021.** The company had mentioned certain key points that they undertook during the Coronavirus pandemic such as contributing to oxygen. Reliance boasts of producing 11% of the country's liquid oxygen that is the highest by any company, gave around 7.5 crore free meals, set up 116 vaccination centres in 109 cities across the country, and also conducted the largest corporate vaccination drive for its employees.

Other than these the Chairman of the company, Mukesh Ambani had also discussed various projects that the company will undertake in the coming future. Let's look at the projects and the details about them. [ One of the major key takeaways from the Annual General Meeting of Reliance is its clean energy business. The company has stated that it would invest around INR 75,000 crore in a new, clean and green energy business over the phase of the next 3 years.

Another takeaway is about the partnerships of Jio and the introduction of a new phone under the brand Jio with the collaboration with Google. The company also announced the launch of Jiomart, where it will collaborate with Facebook. Mathew: On the 44th

Annual General Meeting of Reliance the chairman of Reliance Industries, Mukesh Ambani has announced to begin the work on developing a clean energy project which is the Dhirubhai Ambani Green Energy Giga Complex in Jamnagar, which will be a 5,000 acres project

The company had announced that it has a target to reach a net-zero carbon company by 2035, where 60% of the revenue that is earned by the company is through hydrocarbon-fuelled energy operations, as per the reports of the recent financial year. While compared to other players in the industry 2035 is a relatively shorter time frame where the major players such as BPCL, Royal Dutch shell, and many others commit to reaching the target by 2050.

#### JioPhone Next Announcement at Reliance AGM

JioPhone Next will be developed through a partnership with Jio and Google and will be released as a Made in India phone. The smartphone will be powered through an optimized version of the Android platform, which will be especially developed for the Jio Phone Next. The smart phone will be a 4G enabled smartphone and will enable the users to use the phone in their preferred language. The phone is expected to deliver a great camera quality and even the latest updates on the Android features and the security updates.

JioPhone Next will contain all the major features such as Google Assistant, language translation, automatic read-aloud of screen text, smart camera with augmented reality, and much more. The smartphone is expected to be released in the market during the time of the Ganesh Chaturthi festival. The JioPhone Next is the most affordable 4G phone in the country and the entire world

#### Jio 5G plans announced at Reliance AGM

The company has plans to make India a 5G-must nation by the introduction of 5G into the country. The company has a 100% homegrown 5G solution where the company can roll out a 5G network in the country through a standalone position.

The Jio 5G solutions have successfully provided over 1GB per second during the trials that were conducted using the 5G network. Ambani has conveyed that the

company has received 5G approval from the regulators and trial spectrum for 5G field trials.

Ambani also stated that the company is confident to be the first one to launch full-fledged 5G services in the country. The company has also partnered with leading global partners in order to develop a full range of 5G capable devices.

: Google Cloud and Jio partnership announcement at Reliance AGM

Mukesh Ambani had announced the partnership of the company with the Google Cloud services in order to power the 5G services and network of Jio. Google will provide an end-to-end cloud offering that will power the automated lifecycle management of Jio's 5G network and services.

Jio and Microsoft partnership announcement at Reliance AGM

The company has also partnered with Microsoft in order to launch a 100 MW capacity of Jio-Azure cloud data centres in two cities of the country – Nagpur, and Jamnagar. The company is currently onboarding a group of customers for testing the product and service.

### **3.7.4 JIO BROADBAND NETWORK**

The company offers a range of services, including mobile and broadband internet services. Jio Broadband is the company's high-speed internet service that uses fiber optic cables to deliver internet to homes and businesses.

Jio Broadband offers speeds up to 1 Gbps, making it one of the fastest internet services available in India. The service is available in select cities and areas, and customers can check availability and register their interest on the Jio website.

Jio Broadband plans come with a range of benefits, including free voice calling, TV video calling, and access to Jio's suite of apps, which includes Jio TV, Jio Cinema, and JioMusic. Customers can also choose from a range of plans that offer different speeds and data limits, depending on their needs.

Overall, Jio Broadband is a reliable and high-speed internet service that offers a range of benefits to its customer's.

## **3.8 ADMINISTRATIVE UNTIS**

### **3.9 JIO SECURITY**

Jio Security application (“Application”) is owned by Reliance Industries Limited (“Reliance Jio”), having its registered office at 3rd Floor, Maker Chamber IV, 222 Nariman Point, Mumbai 400 021 Maharashtra, (India). Reliance Jio is committed to protecting the privacy of the users (“you” / “your” / “yourself”) of the Application and has provided this privacy policy (“Policy”) to familiarize you with the way Reliance Jio uses and discloses your information collected through the Application. To use this Application, you must have a subscriber identity module (SIM) of Reliance Jio Infocomm Limited or a Jio ID and password. This Policy form’s part and parcel of the Application’s End User License Agreement (“EULA”).

The terms of the Policy provided herein govern your use of the Application. The Policy also lays down how Reliance Jio may collect, use, share and transfer any information you provide.

Reliance Jio reserves the right, at its discretion, to change, modify, amend, add or remove portions of this Policy at any time. Reliance Jio recommends that you review this Policy periodically to ensure that you are aware of the current privacy practices of the Application.

The Application uses Symantec Corporation’s Norton Mobile Security Software (“Norton”) to provide the mobile security services to you. Therefore, on usage of this Application, you shall also be bound by the terms and conditions and the privacy policy of Norton available here (“Norton’s Privacy Policy”). Please read Norton’s Privacy Policy before using the services offered thereunder.

This Policy shall be construed to be provided in compliance with Information Technology Act 2000, as amended from time to time, and read with the Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules 2011.

### **3.10 PROFILE OF LANDLINE CONNECTIONS OF JIO**

You will get one voice (landline) connection with each JioFiber account.

Reliance Jio became the largest landline service provider in the country for the first time, in August. According to a data released by the Telecom Regulatory Authority of India (TRAI), it is stated that, with 7.35 million landline connections as on August 31, Reliance Jio pips state-owned telecom operator and hitherto market leader BSNL's 7.13 million connections.

The report also added that the overall telecom subscriber base in the country grew marginally to 117.5 crore in August, with Jio adding most of the new customers and rural areas growing at a higher rate than urban centres.

TRAI had earlier reported that the declining number of landline connections in the country as a cause for concern since the same network is also used to deliver fixed-line broadband services. Largely dominated by BSNL and MTNL, the number of landline connections declined from 36.76 million in 2010 to 20.58 million in 2020.

"The number of telephone subscribers increased from 11737.7 million at the end of July 2022 to 1175.1 million at the end of August, thereby showing a monthly growth rate of 0.1 per cent. Monthly growth rates of urban and rural telephone subscriptions were 0.1 and 0.14 per cent respectively," stated the report.

As per the report, Sunil Mittal-led Bharti Airtel added 0.3 million subscribers in August. It had added 0.5 million and 0.7 million subscribers in July and June, respectively. Third-placed Vodafone Idea continued to lose subscribers; 1.9 million in August against 1.5 million in July.

### **3.11 PROCEDURE FOR REGISTRATION OF JIO**

- To register for Jio services, you can follow these steps:
- Visit the Jio website or download the Jio app on your smartphone.
- Click on the 'Sign Up' or 'Register' button on the homepage.
- Enter your mobile number and click on the 'Generate OTP' button. You will receive an OTP (one-time password) on your mobile number.
- Enter the OTP on the next screen and click on the 'Verify' button.
- Enter your personal details such as name, email address, and date of birth.
- Choose a Jio plan that suits your needs and budget.
- Make the payment for your chosen plan.

- Once your payment is confirmed, you will receive a confirmation message on your registered mobile number.
- Your Jio SIM card will be delivered to your registered address within a few days.
- Insert the SIM card into your smartphone, activate it, and start using Jio services.
- Note that the registration process may vary slightly depending on the specific Jio service you are signing up for. It's also important to ensure that your mobile device is compatible with Jio's network before you sign up.

### 3.12 SPECIAL SCHEMES OF JIO

#### Some of the Popular Plans

Under the popular plans, Jio provides 2 GB/Day packs, 1.5 GB/Day packs, 1 GB/Day packs, 3 GB/Day packs and long-term packs. All of which are in popular demand among the Jio plans. These plans are simply the best when it comes to offering value for money!

#### Jio Freedom Plans (No Daily Limit)

Jio Prepaid Recharge Plans	Validity	Benefits
Rs. 296	30 days	Unlimited Voice Calls, 25 GB, 100 SMS/Day, Jio Subscription

Also Read: All Airtel Prepaid Data Plans

#### 2 GB/Day Packs

Here you will also find 2GB/day and 2.5GB/day plans for Jio Prepaid users.

Jio Prepaid Recharge Plans	Validity	Benefits
2999/-	365 days + 23 days	2.5 GB Data/Day (912.5 GB Total Data), Unlimited Voice Calls, 100 SMS/Day
2879/-	365 days	2 GB Data/Day (730 GB Total Data), Unlimited Voice Calls, 100 SMS/Day

2023/- 252 days	2.5 GB Data/Day (630 GB Total Data), Unlimited Voice Calls, 100 SMS/Day
899/- 90 days	2.5 GB Data/Day (225 GB Total Data), Unlimited Voice Calls, 100 SMS/Day
749/- 90 days	2 GB Data/Day (180 GB Total Data), Unlimited Voice Calls, 100 SMS/Day
719/- 84 days	2GB/day (168GB Total Data), Unlimited Voice Calls, 100 SMS/Day
533/- 56 days	2GB/day (168GB Total Data), Unlimited Voice Calls, 100 SMS/Day
299/- 28 days	2GB/day, 112 GB Total Data, Unlimited Voice Calls, 100 SMS/Day
249/- 23 days	2GB/day, 46GB Total Data, Unlimited Voice Calls, 100 SMS/Day
349/- 30 days	2.5 GB Data/Day (75 GB Total Data), Unlimited Voice Calls, 100 SMS/Day

### **1.5 GB/Day Packs**

Jio Prepaid Recharge Plans	Validity	Benefits
2545/-	336 days	504 GB data, Unlimited Voice Calls, 100 SMS/Day
666/-	84 days	126 GB Data, Unlimited Voice Calls, 100 SMS/Day
479/-	56 days	84 GB Data, Unlimited Voice Calls, 100 SMS/Day
259/-	30 days	1.5 GB/Day, Unlimited voice calls, 100 SMS/Day
239/-	28 days	42 GB Data, Unlimited Voice Calls, 100 SMS/Day
199/-	23 days	34.5 GB Total Data, Unlimited Voice Calls, 100 SMS/Day
119/-	14 days	21 GB Data, Unlimited Voice Calls, 300 SMS

### **1 GB/DAY PACKS**

Jio Prepaid Recharge Plans	Validity	Benefits
179/-	24 days	24 GB, UNLIMITED Voice calls, 100/ day SMS
149/-	20 days	20 GB Total Data, Unlimited Voice Calls, 100/ day SMS
209/-	28 days	28 GB Total Data, Unlimited Voice Calls, 100/ day SMS

### **3 GB/DAY PACKS**

Jio Prepaid Recharge Plans	Validity	Benefits
1199/-	84 days	Unlimited Voice Calls, 90GB, 100 SMS/Day
419/-	28 days	84 GB, 100 SMS/Day, Unlimited Voice Calls

### **3.12.1 IMPORTANT FEATURES OF JIO**

Jio Platforms Limited (Jio) is creating a massive digital ecosystem for a billion Indians with domain expertise across business verticals in the platform company. The platform company will not just provide world-class fixed-mobile converged connectivity, but also digital solutions across business verticals and the customer life cycle.

- All-4G NETWORK.
- India's only full-4G network offering a superior service experience.
- HD VOICE. Crystal clear voice calling with hardly any call-drops.
- FREE VOICE CALLS From Jio to all networks.
- UNLIMITED DATA. Never run out of data.
- WIDEST COVERAGE.
- FASTEST 4G SPEEDS.

### **3.13 SPECIAL PACKAGES OFFERED BY JIO**

Jio has been a pioneer telecom service provider in the country since 2014. These affordable Jio prepaid recharge plans and Jio data plans have made the telecom operator a market leader. The brand makes mobile recharges simple and straight for

your convenience. You can choose the plan as per your preference. How much you want to spend is an important factor when choosing.

For example, if you do fewer calls and more data usage, then choose the best plan that suits your requirement. For this, you can simply head over to Jio Recharge and choose the necessary service out of the three options provided – ‘Mobile & JioFi’, ‘JioFiber’ or ‘JioLink’. Enter your Jio number linked to the device, and you are all good to go.

There are two types of Jio Plans – Jio Prepaid recharge plans and Jio Post-paid recharge plans. Jio comes with plans and packs for talk time, data, SMS and other special recharge such as data, unlimited Jio to Jio call, IUC minutes, free SMSs and access to Jio online services like Jio TV and JioSaavn.

On the other hand, with its unlimited voice calls and SMS, the Jio Post-paid recharge plan also includes complimentary subscriptions to various OTT platforms and services. You can browse through the Jio Plans to avail the benefits of online recharge.

### **3.14 ROLE OF JIO IN FUTURE INDIAN TELECOM SCENARIO**

#### **TELECOM INDUSTRY IN INDIA, JIO IMPACT AND FUTURE**

India, the second-largest telecommunications market with a subscriber base of 1.20 billion has registered a revolutionary change in the entire telecommunication scene in the country. While it has registered strong growth in the past decade and a half, Indian mobile economy, a prominent part of the same, is growing rapidly and will contribute substantially to India's GDP.

In this widespread industry, there are various big, small and medium brands which are creating impact and some more than ever and this is eventually creating a lot of business opportunities that can be exploited from this famous industry.

Mukesh Ambani-led Reliance Jio continues to lead the telecom market in India. The telco reported an increase of 1.4 million gross subscribers in October 2022, up from 0.7 million in September 2022. The company's gross subscribers increased from 406 million in January 2022 to 421 million in October 2022.

Jio's active subscribers have reported a huge increase of 4.9 million subscribers in October 2022 as the telco continues to roll out 5G services in the country. In September, the company reported an increase of 0.9 million active subscribers. Jio's active subscribers increased from 369 million in January 2022 to 391 million in October 2022. The telco now commands 38.6% of active subscribers market share.

### **3.15 TELECOM SERVICES ACROSS THE COUNTRY**

The growth of services sector in our economy is a step forward in the development of Indian economy. In day-to-day life of an individual the use of mobile phones acts as necessity in getting connected with people for one or the other purpose. India has the largest variety of smartphones available for the users. Because of the fast technologies in smartphones & in market, the networks and services providers of telecom must be updated to meet the requirements of people. Indian telecommunication industry is one of the fastest growing telecom industries in the world. The mounting up of the subscribers reaches to an approximate 800 billion plus users in telecom sector.

The telecommunications industries within the sector of information and communication technology are made up of all telecommunications/telephone companies and internet service providers and plays a crucial role in the evolution of mobile communications and the information society.

Traditional telephone calls continue to be the industry's biggest revenue generator, but thanks to advances in network technology, telecom today is less about voice and increasingly about text (messaging, email) and images (e.g., video streaming). High-speed internet access for computer-based data applications such as broadband information services and interactive entertainment is pervasive. Digital subscriber line (DSL) is the main broadband telecom technology. The fastest growth comes from (value-added) services delivered over mobile networks.

### **3.16 FORMATION OF JIO AND JIO FIBER**

Reliance Jio Info comm Limited, doing business as Jio, is an Indian telecommunications company and a subsidiary of Jio Platforms, headquartered in Navi Mumbai, Maharashtra, India. It operates a national LTE network with coverage

across all 22 telecom circles. Jio offers 4G and 4G+ services all over India and 5G service in many cities. Its 6G service is in the works.

Jio soft launched on 27 December 2015 with a beta for partners and employees and became publicly available on 5 September 2016. It is the largest mobile network operator in India and the third largest mobile network operator in the world with over 42.62 crore (426.2 million) subscribers.

In September 2019, Jio launched a fiber to the home service, offering home broadband, television, and telephone services. As of September 2020, Reliance Industries has raised ₹ 1.65 lakh crore (US\$21 billion) by selling nearly 33% equity stake in Jio Platforms.

Jio Fiber is a fibre-to-the-home internet broadband service provided by telecom operator Reliance Jio Infocomm, part of the Mukesh Ambani-controlled Reliance group. The service was first announced as Jio GigaFiber in 2018 at the Reliance Industries 41st annual general meeting. Later renamed Jio Fiber, it is scheduled for a commercial launch on September 5, 2019.

The Jio Fiber service is currently under trials at select locations in several cities and states. The FTTH broadband service promises a speed of up to 1 Gigabit per second. Besides, it would be the core technology enabler behind the Giga TV platform and the company's products in the internet of thing ecosystem.

Currently, the Jio Fiber broadband service is offered at select locations across the country under the company's preview offer. In the preview offer, the broadband service is provided by the company without any cost. But, to obtain the connection, a user needs to deposit a refundable security deposit of Rs 4,500 for a 100Mbps and Rs 2,500 for 50Mbps connection. Though there is no deadline for the preview offer, it is expected to end soon after the commercial launch.

Though the company is yet to unveil Jio Fiber plans, Ambani announced at Reliance Industries' 42nd annual general meeting that the Jio Fiber base plan with a 100Mbps speed would start at Rs 700. The company also shared its plans to launch 'Jio forever' data plans, in which a free 4K LED television will be bundled with a Jio Fiber connection set-top box.

The bundled set-top box would be capable of streaming 4K resolution content. It will also support console-like gaming with support for external joysticks and controllers. It will have a provision to make video calls and also be capable of providing mixed reality experience for shopping, education, etc. Besides content from other platforms, the set-top box would come with a built-in suite for Jio apps, for entertainment, educations, cloud services, etc.

### **3.17 CHALLENGES FACED BY JIO**

#### **1. Addressable market**

Since China and India have nearly identical 4G networks, there has been a steady flux of 4G devices in India. The circulation of 4G devices has been gradually improving but the 4G enabled devices right now is still a meagre 1.6% according to a study conducted by Nokia. This means the core addressable market for Reliance Jio is still very small and telecom is a game of scale. It's mandatory for telecom operators to have good scale to operate profitably unless ARPUs are abnormally high. Airtel, Idea and Vodafone all have 60% + market share together, whereas in case of Reliance Jio, the core addressable market is just a mere 1.5% as of now. But it's important to know that LTE shipments are increasing at a very rapid rate with a jump of around 2400% according to Counterpoint.

#### **2. Ecosystem**

Leaving the core addressable market problem, there's also the problem of Ecosystem. Currently, Reliance Jio has spectrum in three bands namely 1800 MHz band, 2300 MHz band and 800 MHz band. The first two bands can't penetrate (in terms of coverage) as well as lower 800 MHz band. This 800 MHz band is crucial for Reliance Jio to have a robust coverage. Most recent 4G smartphones in India support 2300 MHz and 1800 MHz, but very few support the 800 MHz band. How Reliance Jio intends to make handsets support 800 MHz band is yet to be known.

#### **3. Vo-LTE and Vo-Wifi**

Since jio is a 4G only network, they are planning to carry voice over their LTE (VoLTE) but as usual very few smartphones currently support it. Also, the handoff between Vo-LTE and Vo-Wifi is very tricky which even lot of international operators

have failed to get right. I understand that calling is now just a feature in the grand scheme of things people do on a smartphone, but it's still a feature nonetheless and if a network can't reliably place calls, then that's an issue for a lot of people.

### **3.18 IMPROVEMENT EXPECTED TO BE APPLIED IN THE SYSTEM**

Analysts see an upgrade on the way to the estimated valuation of the digital business of Reliance Industries (RIL). So far, it has been valued only on the telecom arm, Jio. This is a sequel to Friday's announcement from RIL on a structure to make Jio debt-free. This is seen as a move towards a likely listing of the latter's shares.

"In most valuations used by the Street, including ours, Jio is valued mainly as a telecom service provider. No value is ascribed for Jio's suite of apps, digital investments and capabilities like AI, IoT, etc. This exercise aims to correct that positioning. Indeed, some of Jio's apps like TV, music and cinema are among the best in their respective categories," says Vikash Kumar Jain, research analyst at CLSA.

After this transfer, Jio's net debt will fall to Rs 46,300 crore (including deferred spectrum payment) and its ratio of net debt to FY21/FY22 operating earnings to only 1.5/1.2. This scheme is expected to get regulatory closure within three months. CLSA has a current sum-of-the-parts enterprise value (EV) of \$45 billion for the digital arm.

RIL says it intends to transfer the telecom business and other digital initiatives to a wholly owned subsidiary, while Jio's debt will move to RIL.

"The reorganisation will increase standalone liabilities, but Reliance hopes that will be able to monetise its stake in the platforms business at premium valuations. An EV of \$65-70 billion for the platform's entity will imply a hefty estimate of 1.75 times the net invested capital, in our estimate," note Somshankar Sinha and Piyush Nahar, analysts at Jefferies, in a note to investors.

Bank of America Merrill Lynch values RIL's digital businesses, including Jio, at an EV of \$64 bn.

In 2018-19, RIL made strategic investments in start-ups such as pharma software provider C-Square, citizen SaaS provider EasyGov, AI learning platform Embibe,

retail solution provider Fynd, logistics platform Grab, AI assistant platform Haptik, music streaming platform Saavn, deep tech start-up Tesseract, and vernacular language platform Reverie. These now get transferred to the wholly owned subsidiary.

RIL has also made significant investments in global tech start-ups such as DEN, Hathway, Eros International, Edcast, Karexpert Technologies, Vakt Holdings, Individual Learning, Radisys Corp, and Kai OS Technologies.

“There is a lot of talk on Jio transforming itself to a SuperApp around content, e-commerce, and online grocery — something on the lines of WeChat. Today, nothing much is visible on digital revenues but the fact that all digital properties are part of the Jio eco-system suggests Jio, with its captive subscribers of 350 million, stands a chance to monetise these digital services,” wrote Rajiv Sharma, head of research at SBICap Securities.

He also notes Jio has a payments bank licence and is likely to launch its enterprise offerings with a focus on the micro, small and medium enterprises space. This could pit it against Amazon in the cloud computing and alternate network segments.

**CHAPTER IV**  
**DATA ANALYSIS AND INTERPRETATION**

## **DATA ANALYSIS AND INTERPRETATION**

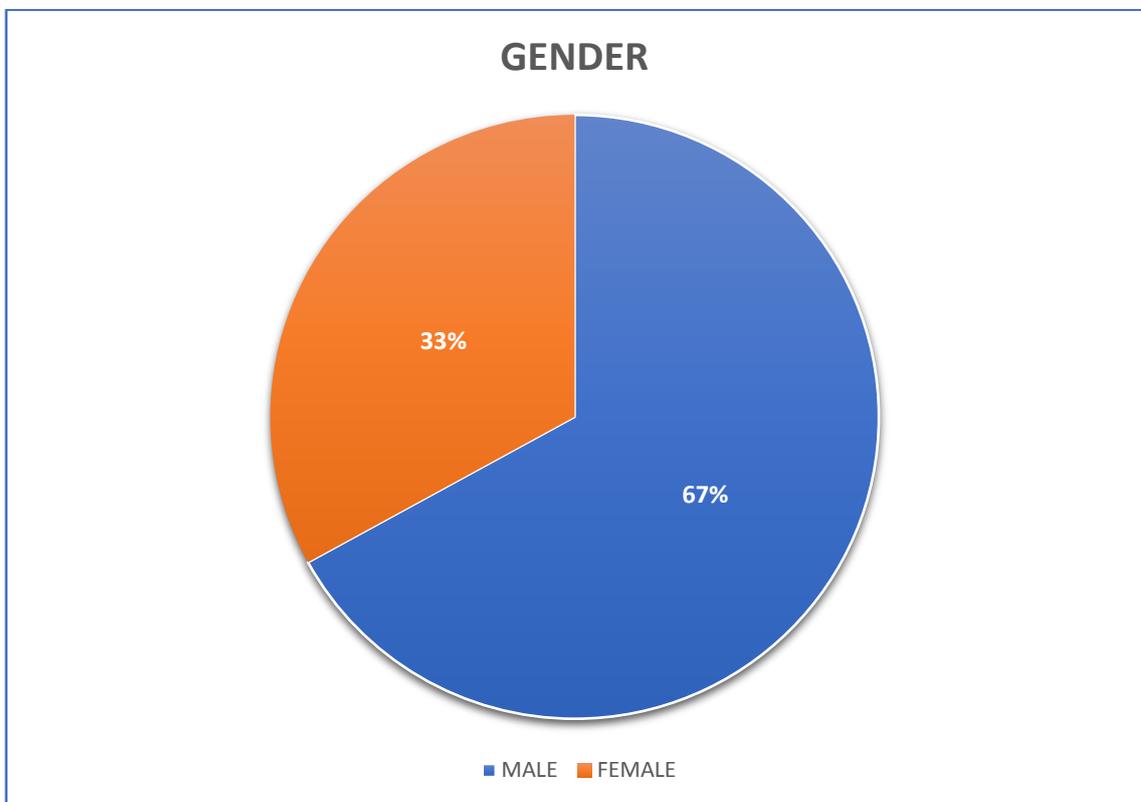
This chapter consists of two parts. The first part shows the demographic description about respondents. And the second part shows that the analysis and interpretation of the data connected with technical information. The chapter is to analyse the data collected from 30 respondents for identifying their level of job satisfaction. Primary data were collected from respondents of Irritty block, by using convenience sampling technique. A brief description of sample profile is given first, following by a detailed analysis and interpretation of the data collected and compiled.

**TABLE NO.4.1**

**DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR GENDER**

<b>GENDER</b>	<b>NO OF RESPONDENTS</b>	<b>PERCENTAGE</b>
MALE	67	67
FEMALE	33	33
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE: PRIMARY DATA



**CHART NO 4.1**

**INTERPRETATION:**

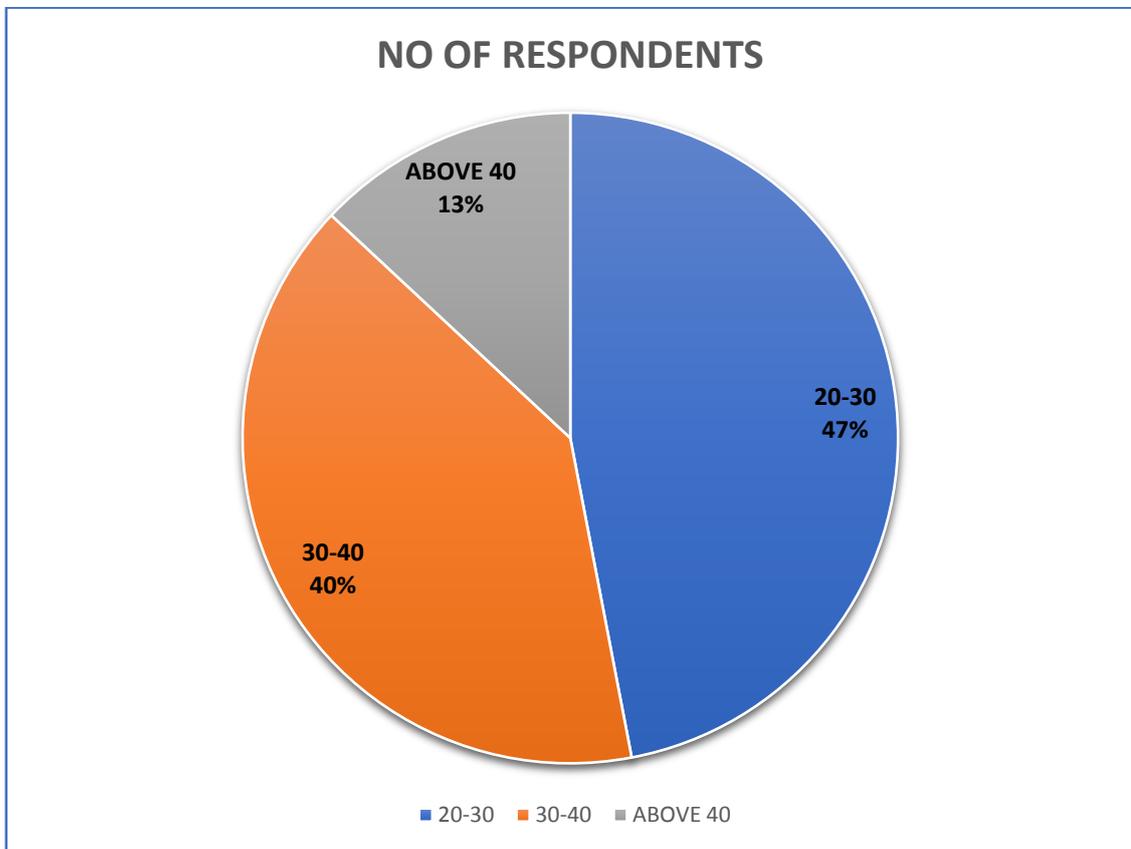
Table 4.1 shows that the gender wise classification of respondent. The analysis show that 33 percent of the respondents are female, and 67 percent belongs to male. The analysis reveals that majority of the respondents (67%) are male.

**TABLE NO.4.2**

**AGE WISE CLASSIFICATION OF RESPONDENTS**

<b>AGE</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
20-30	47	47
30-40	40	40
ABOVE 40	13	13
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE: PRIMARY DATA



**CHART NO 4.2**

**INTERPRETATION:**

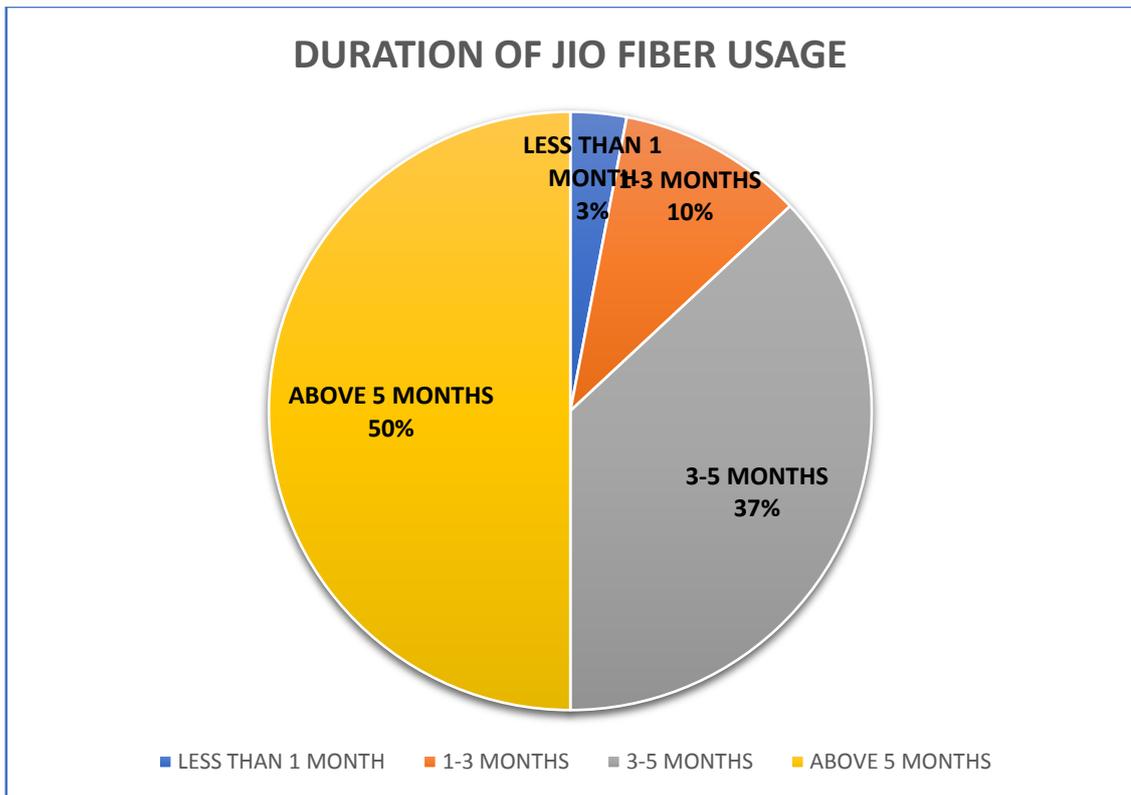
Table 4.2 shows that the respondents were classified into three groups 20-30, 30-40 and above 40 years. The analysis reveals that 47% belongs to 20-30 years category ,40% belongs to 30-40 years category and 13% are in the age group of above 40. The table shows that the majority of the respondents are in between the age group of 20-30 years.

**TABLE NO.4.3**

**DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR DURATION OF JIO FIBER USAGE**

<b>YEAR</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
LESS THAN 1 MONTH	3	3
1-3 MONTHS	10	10
3-5 MONTHS	37	37
ABOVE 5 MONTHS	50	50
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA



**CHART NO 4.3**

**INTERPRETATION:**

Table 4.3 shows that the respondents answered that the period of usage of jio fiber . whereas 10% is using jio fiber for 1-3 months. This table shows that 3 percent of the respondent using less than 1 month, 50% of the respondent using for more than 5 months.

**TABLE NO.4.**  
**CUSTOMERS PREFERENCE TO DISCONNECT JIO FIBER**

<b>RESPONSE</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
YES	77	77
NO	23	23
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA

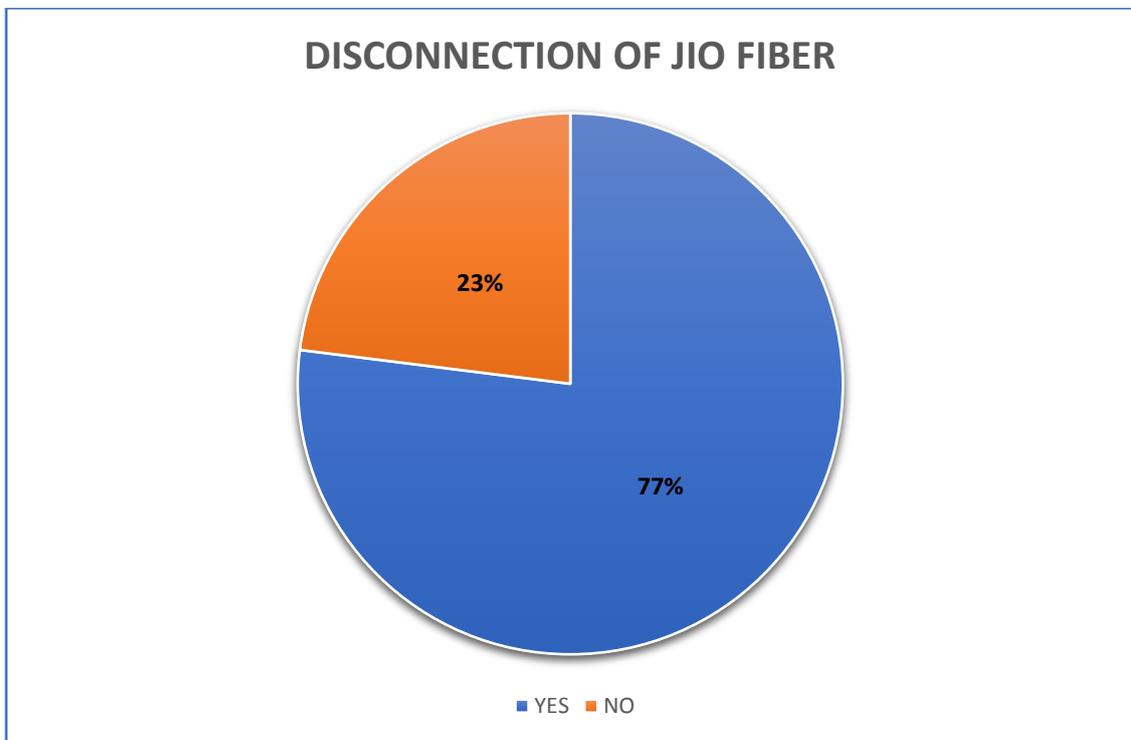


CHART NO 4.4

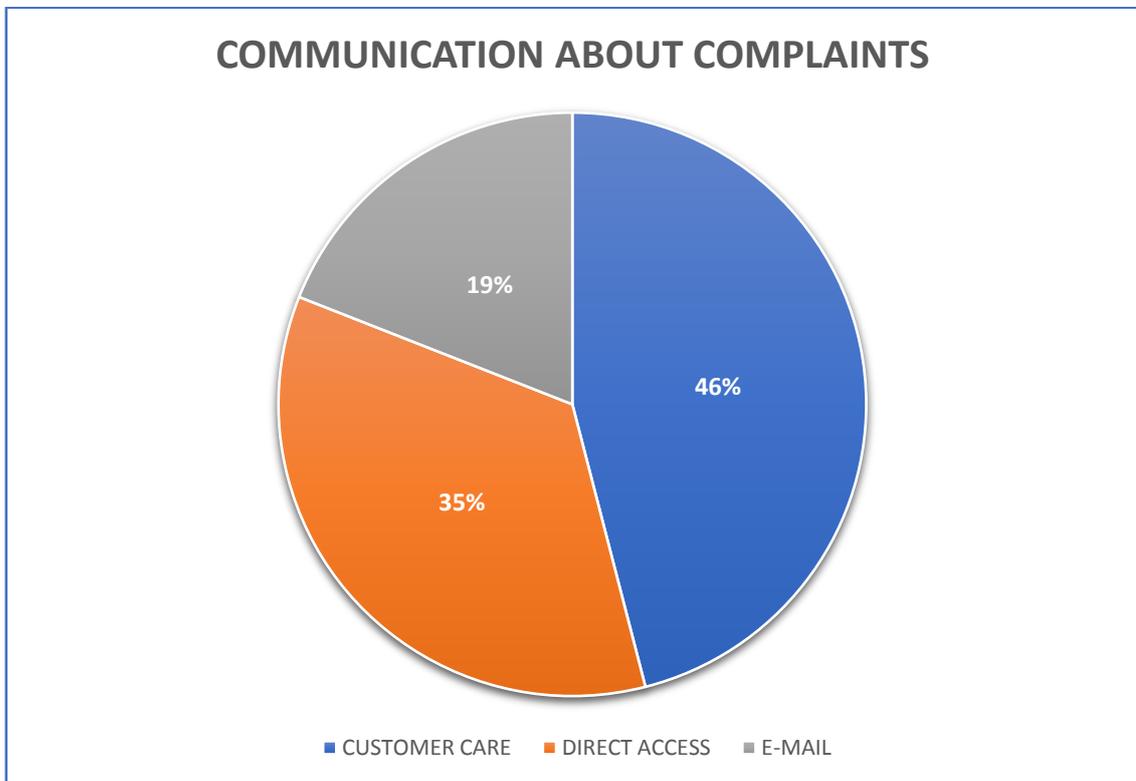
**INTERPRETATION:**

Table 4.4 shows that 23 percent of the respondent disagrees that they like to disconnect jio fiber. whereas the majority 77% agree with the statement.

**TABLE NO.4.4**  
**COMMUNICATION ABOUT THE COMPLAINTS**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
CUSTOMER CARE	46	46
DIRECT ACCESS	35	35
E-MAIL	19	19
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA



**CHART NO 4.4**

**INTERPRETATION:**

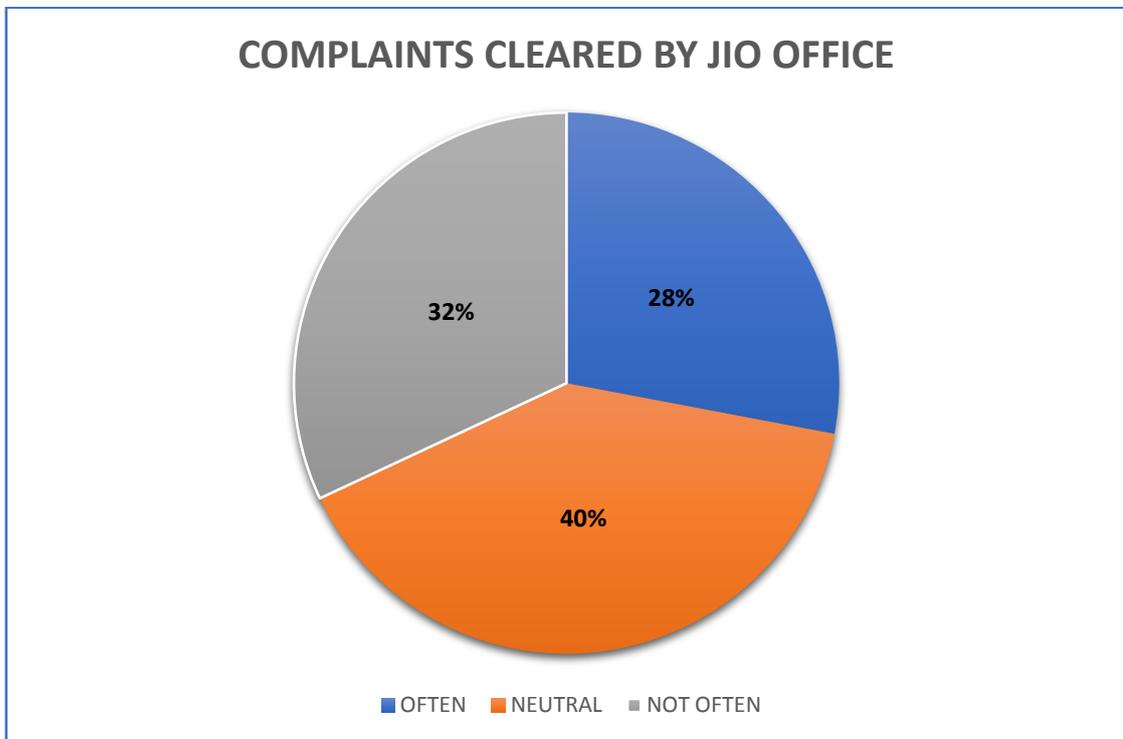
Table 4.4 shows that major respondents about 46% are communicated through complaints to the customer care. 35% responding through direct access. The rest of the respondents are communicated by e-mail.

**TABLE NO.4.5**

**HOW OFTEN COMPLAINTS ARE CLEARED BY JIO OFFICE**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
OFTEN	28	28
NEUTRAL	40	40
NOT OFTEN	32	32
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA



**CHART NO 4.5**

**INTERPRETATION:**

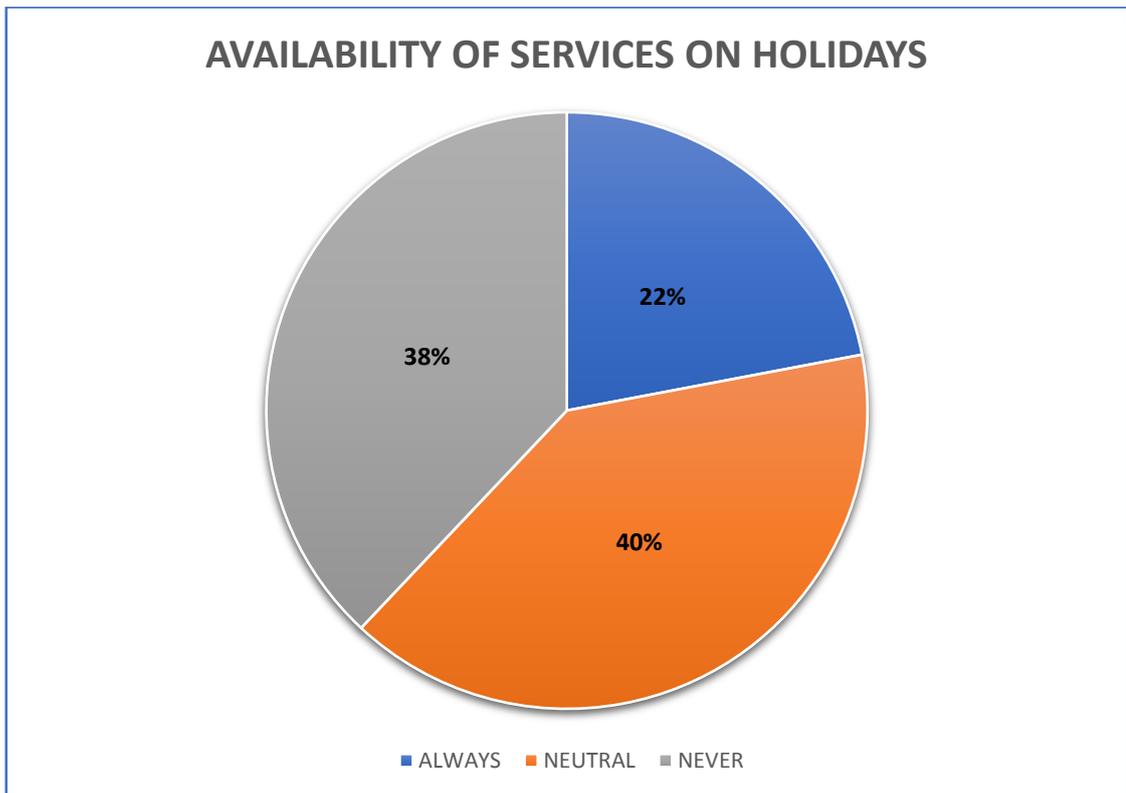
Table 4.5 explains that how often the complaints are cleared by JIO office. 32% of respondents says that they are not often cleared, 40% says neutral and the remaining 28% says the JIO office clear the complaints.

**TABLE NO.4.6**

**DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR  
AVAILABILITY OF SERVICES ON HOLIDAYS**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
ALWAYS	22	22
NEUTRAL	40	40
NEVER	38	38
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA



**CHART NO 4.6**

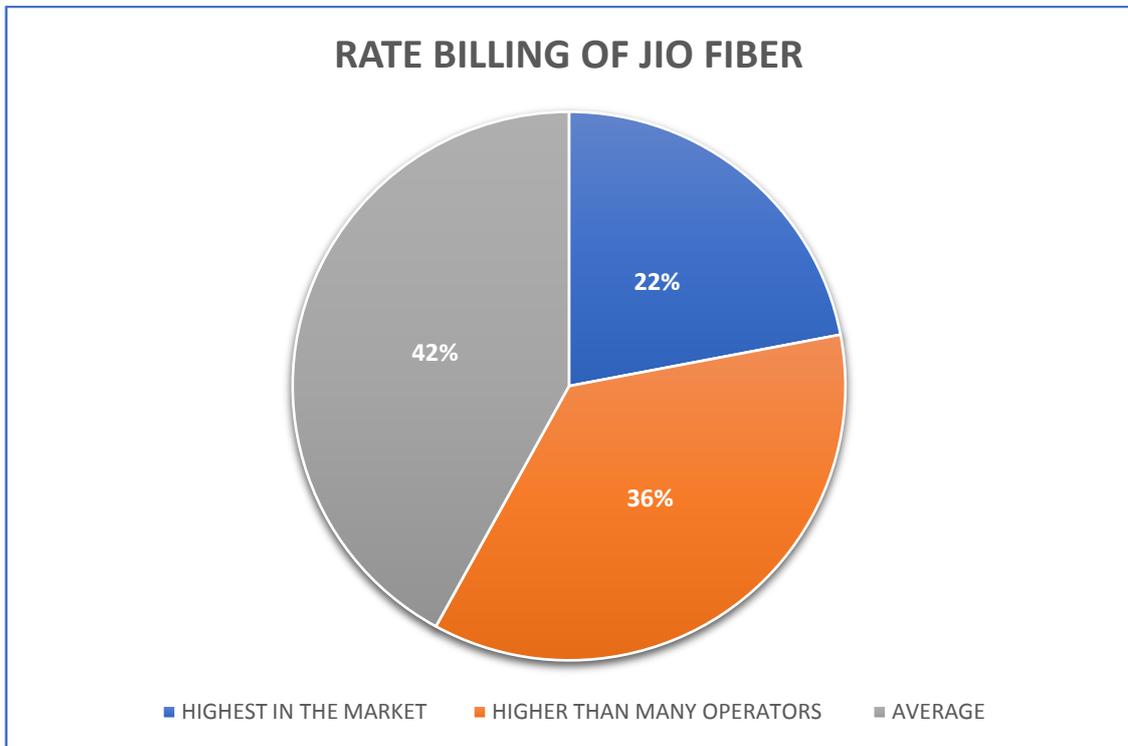
**INTERPRETATION:**

Table 4.6 shows that 22% of respondents have always get the services in holidays. 40% are says the services are neutral. The rest says it doesnot provide any services in holidays or after office hour.

**TABLE NO.4.7**  
**RATE BILLING OF JIO FIBER**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
HIGHEST IN THE MARKET	22	22
HIGHER THAN MANY OPERATORS	36	36
AVERAGE	42	42
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA



**CHART NO 4.7**

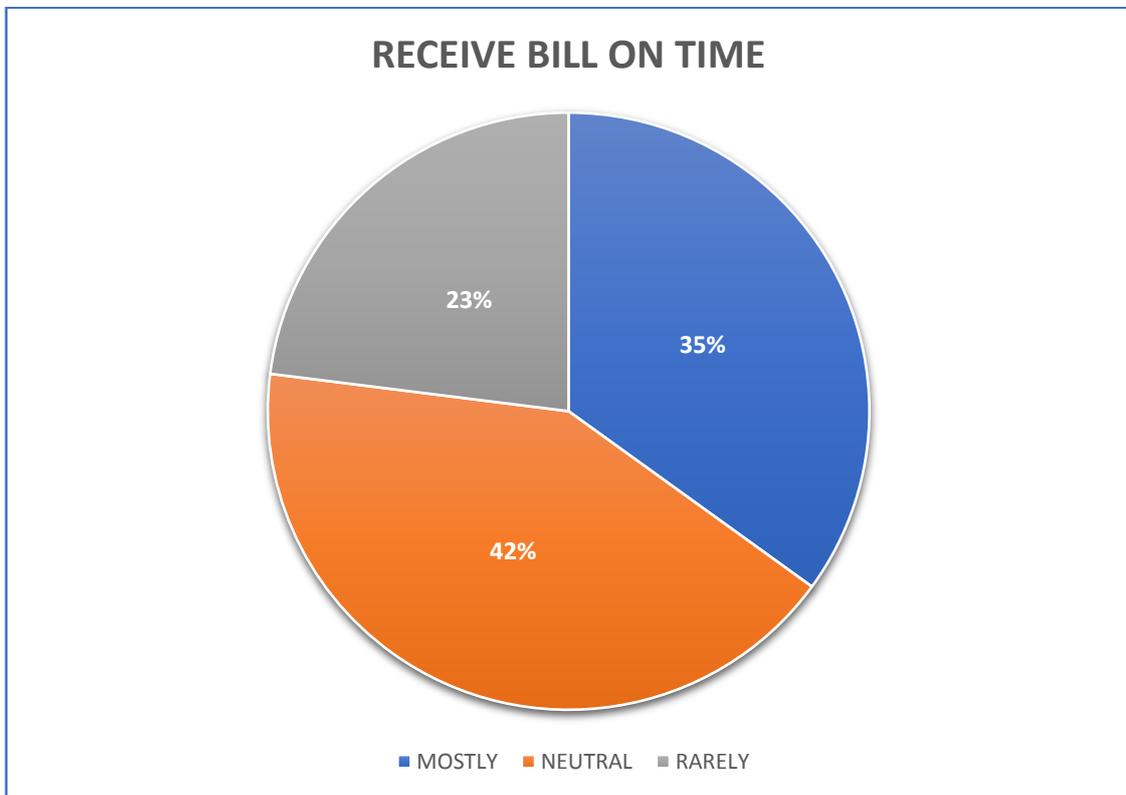
**INTERPRETATION:**

Table 4.7 show that Out of 100 respondents, they respondent to their rate billing as 22% highest in market and 36% in higher than many operations and the rest 42% in the average category.

**TABLE NO.4.8**  
**RECEIVE BILL ON TIME**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
<b>MOSTLY</b>	<b>35</b>	<b>35</b>
<b>NEUTRAL</b>	<b>42</b>	<b>42</b>
<b>RARELY</b>	<b>23</b>	<b>23</b>
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA



**CHART NO 4.8**

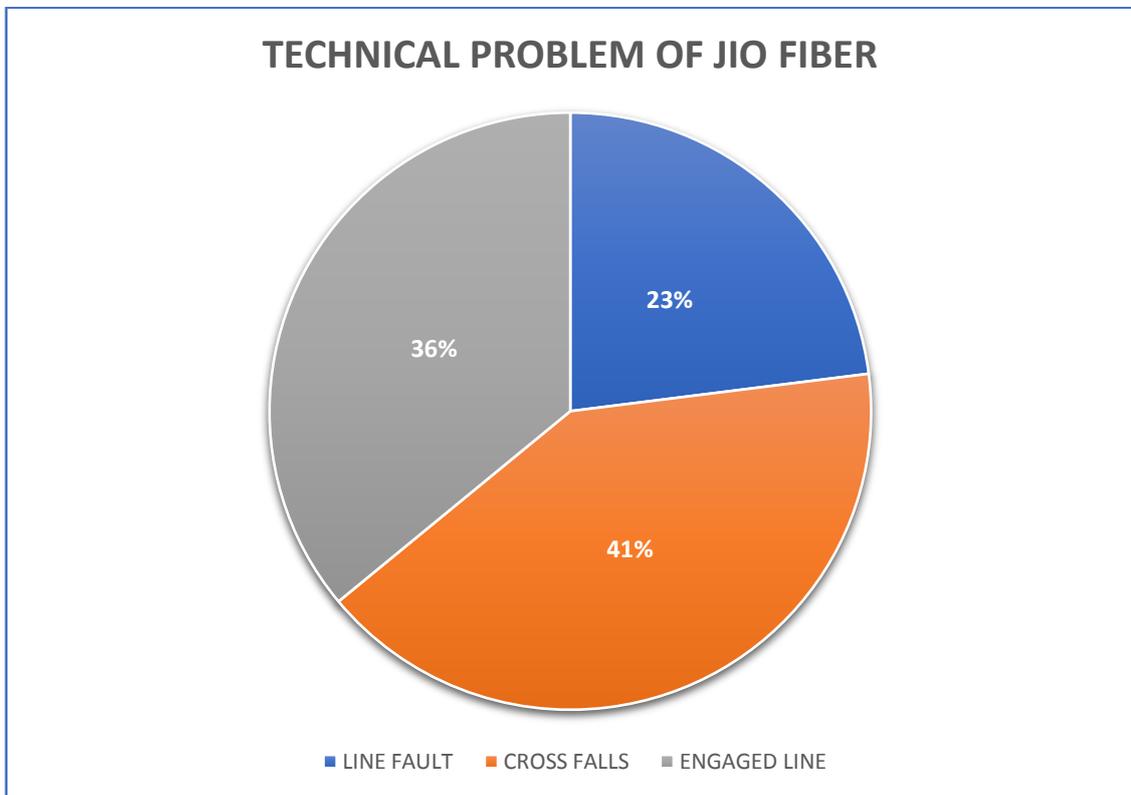
**INTERPRETATION:**

Table 4.8 shows that majority of the respondents about 42% are in the opinion of neutral.35% of the respondents are receive the bill on the time. The rest of the respondents are in the opinion of rare.

**TABLE NO.4.9**  
**TECHNICAL PROBLEM OF JIO FIBER**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
LINE FAULT	23	23
CROSS FALLS	41	41
ENGAGED LINE	36	36
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA



**CHART NO 4.9**

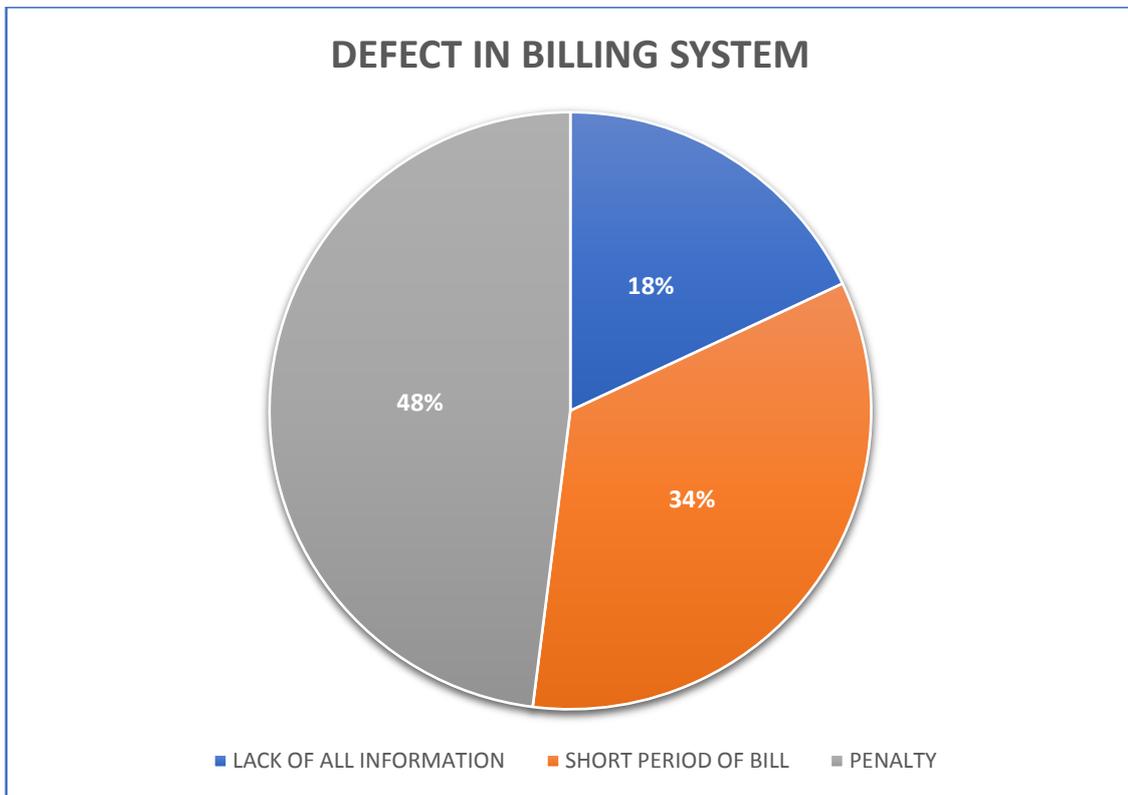
**INTERPRETATION:**

Table 4.9 shows that major technical problem of JIO was the cross falls, about 41% of respondents are in the problem of cross fall. 36% of respondents are says the problem of engaged line. And the remaining percent of respondents are affected by the problem of line fault.

**TABLE NO.4.10**  
**DEFECT IN BILLING SYSTEM**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
LACK OF ALL INFORMATION	18	18
SHORT PERIOD OF BILL	34	34
PENALTY	48	48
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA



**CHART NO 4.10**

**INTERPRETATION:**

Table no. 4.10 says about the defects in bill payment system. Majority of the respondents, about 48% says that the JIO provide a penalty system. 34% are in the opinion of short period of bill. And the rest of the respondents are in opinion of that the JIO provide lack of information to its customers.

**TABLE NO.4.11**  
**FREQUENT ENCOUNTER PROBLEM**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
BILLING	30	30
CONNECTIVITY	46	46
CUSTOMER CARE	24	24
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA

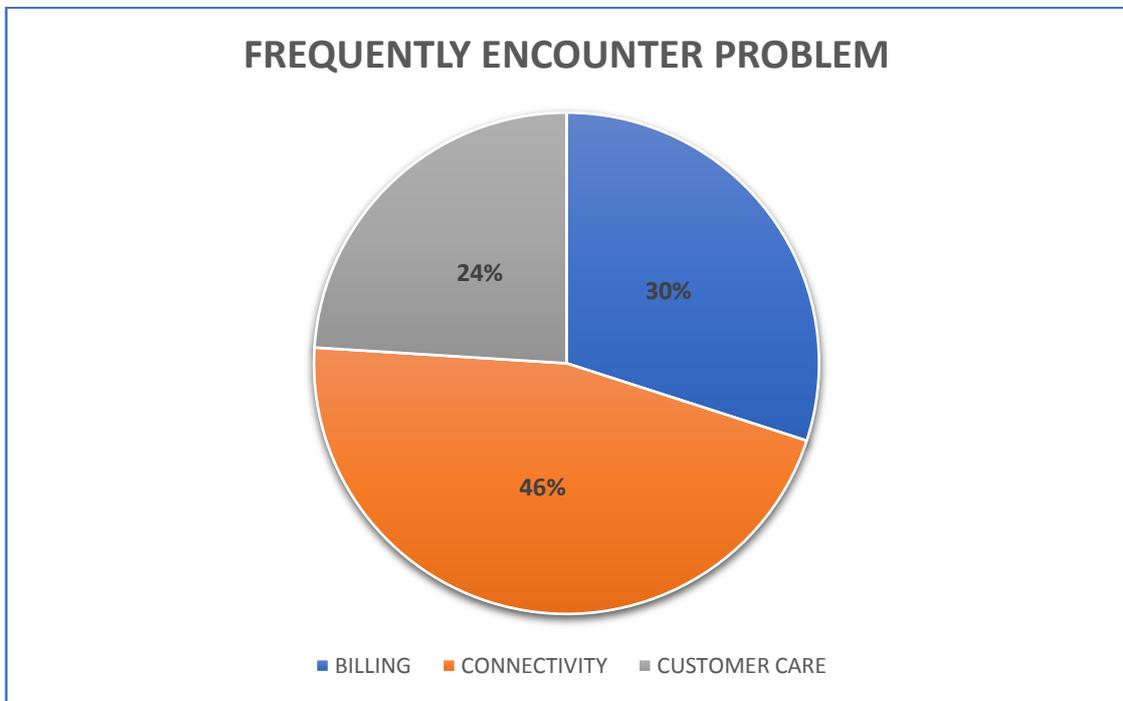


CHART NO 4.11

**INTERPRETATION:**

Table 4.11 shows that 46 percentage of respondents stated problems are due to connectivity, 30 percentage due to billing, 24 percentage due to customer care.

**TABLE NO.4.12**  
**INTERNET FACILITY AVAILABLE**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
YES	62	62
NO	38	38
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA

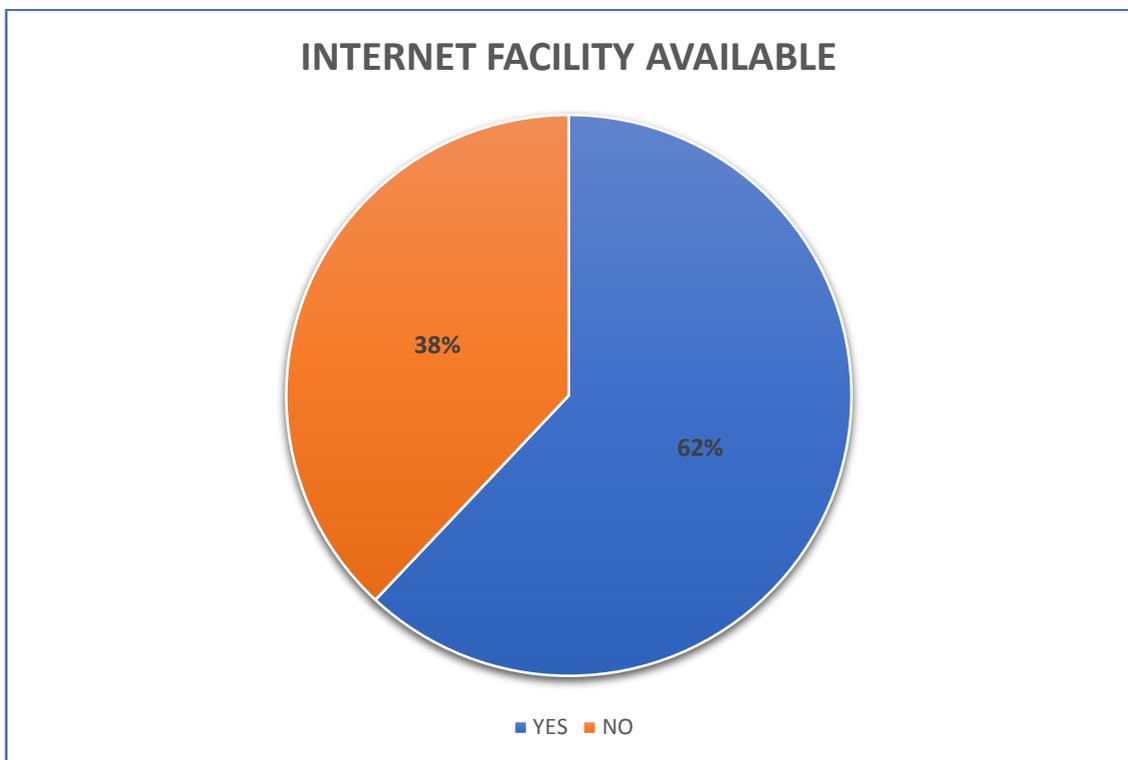


CHART NO 4.12

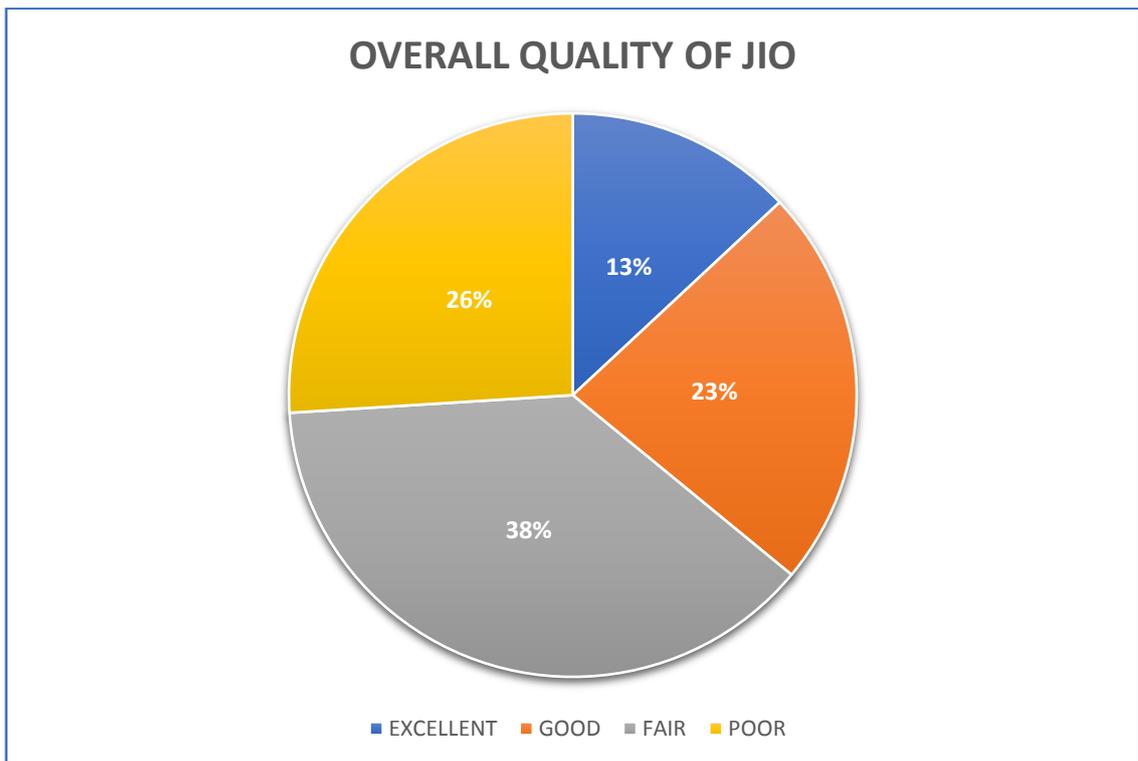
**INTERPRETATION:**

Table 4.12 shows that most of the respondents, about 62% says the JIO provide internet facilities. The 38% says they doesnot provide internet facility.

**TABLE NO.4.13**  
**OVERALL QUALITY OF JIO**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
EXCELLENT	13	13
GOOD	23	23
FAIR	38	38
POOR	26	26
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA



**CHART NO 4.13**

**INTERPRETATION:**

Table 4.13 shows that out of 100 respondents, they stated the quality of the JIO as (13%) Excellent, (23%) good, 38% fair, 26% poor in overall quality of JIO.

**TABLE NO.4.14**  
**SUGGESTIONS TO IMPROVE SATISFACTION LEVEL OF THE CUSTOMERS**

<b>PARTICULARS</b>	<b>NO. OF RESPONDENTS</b>	<b>PERCENTAGE</b>
<b>YES</b>	<b>71</b>	<b>71</b>
<b>NO</b>	<b>29</b>	<b>29</b>
<b>TOTAL</b>	<b>100</b>	<b>100</b>

SOURCE:PRIMARY DATA



CHART NO 4.14

**INTERPRETATION:**

Table 4.14 shows that 71% customers improved level of satisfaction and 29% customers have not had any improvement in their satisfaction level.

**TABLE NO.4.15****FACTORS INFLUENCED IN DISCONNECTING OF JIO FIBER**

VARIABLES	LEVEL OF ACCEPTANCE					TOTAL	MEAN SCORE
	HIGHLY SATISFIED	SATISFIED	NEUTRAL	DISSATISFIED	HIGHLY DISSATISFIED		
COVERAGE	20*5	62*4	14*3	4*2	0*1	398	3.98
CONNECTIVITY	28*5	30*4	5*3	27*2	10*1	339	3.39
BILLING	11*5	29*4	33*3	20*2	7*1	317	3.17
HANDSET	23*5	32*4	28*3	9*2	8*1	353	3.53
QUALITY OF SERVICES	19*5	13*4	20*3	36*2	12*1	291	2.91
INTERNET	21*5	18*4	41*3	7*2	13*1	327	3.27

SOURCE:PRIMARY DATA

**INTERPRETATION:**

The table no. 4.15 is a Likert scale which shows that, various satisfaction levels of JIO services. Most of the respondent's opinion that the JIO service coverage was high, i.e., 3.98 mean score. The second satisfactory services provided by JIO was its handset, which is about 3.53 mean score. Connectivity was in the third position 3.39. 3.27 mean score respondents are saying about the Internet facility provided by JIO. The 3.17 mean score of respondents are satisfied the billing system of JIO. The rest 2.91 mean score is saying about the quality of services provided by JIO.

**CHAPTER V**  
**FINDINGS, SUGGESTION AND CONCLUSION**

## 5.1 FINDINGS

Telecommunication has been recognized as an important tool for socio-economic development for nation. It is one of the support services needed for rapid growth and modernization of various section of economy. It has become essentially important in recent years because of enormous growth information technology and significant potential for the impact on the rest of the economy. The telecom section, which has the multiple effect on the economy has a vital role to play in economy by way of contributing to the increased efficiency. The available studies suggest that income of business entity and household increases using telecom services.

- Around 67 percentage of respondents are Male, and 33 percentage of respondents are Female.
- The study reveals that 50 percentage of respondents are using JIO above 5 years.
- Out of samples, majority of respondents want to disconnect JIO fiber. Most of the complaints are communicated through Customer Care (46 percentage), direct access (35 parentage) and e mail (19 percentage).
- About 40 percentage respondent's opinion that complaints are cleared by JIO office.
- Respondents are not aware about the promotional scheme of JIO.
- Most of the respondents receive bill on time neutrally.
- 41 percentage of respondents suggest that technical problem is due to cross fall.
- The analysis shows that 32 percentage of respondents are unaware about the internet facility.
- 71 percentage of respondents suggest improving the satisfaction level of customers.

## 5.2 SUGGESTIONS

Some of the comments can be valuable suggestion in jio. This enable the JIO to overcome its limitations and grow, some of them are given below

- ❖ From the research study, it has been found out that the customers are very particular about the quality of the telecom services and hence they want JIO to increase the quality of JIO services by providing the customers an attractive instrument with new writing connection.
- ❖ Customers are unaware about the new scheme provided by JIO, so effective media campaign is must to enhance the awareness level.
- ❖ Customer care of JIO should need improvement.
- ❖ It should set target points for a definite period and analysis it to get trends of market condition.
- ❖ If company is willing to provide quality serves to the customer, it will create changes in the approaches towards the company by customers.
- ❖ From this study we can understand that customers are interest to change their connection to other series it may because of service problems from the part of the company so if companies willing to solve such problems, there will not have such changes between the customers.
- ❖ JIO can provide special plans to different type of customers like student's plan, special offers etc. So, it will create to get more customers to the jio services.

### **5.3 CONCLUSION**

The customer satisfaction is the main goal of every business organization. In this competitive business scenario, each activity starts and end with the customer. In the present scenario. The telecommunication is the life dead for every business activity. Even in this industry there prevails a stiff competition between the service providers.

JIO being a private sector in order to thrive and excel how to understand about the customer's expectations. They also must understand about their competitors and their nuances in understanding their customers. Since communication industry is a competitive one it is high time for JIO to understand about their customers in Broadband as well as mobile services.

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## **APPENDIX**

**A STUDY ON CUSTOMER SATISFACTION OF JIO IN  
IRITTY AREA**

**QUESTIONNAIRE**

1.Name:

2.Age:

3.Gender:

Male  Female

4. For how long you do have been using the jio fiber?

Less than 1 month  1-3 months  3-5 months  above 5 months

5. Would you like to disconnect the jio fiber?

Yes  No

6. Which factor influenced most in disconnection of jio services. Rank it.

<b>Sl.NO</b>	<b>Factor</b>	<b>Rank</b>
1.	Frequent line failure	
2.	Poor voice clarity	
3.	Frequent wrong call	
4.	Discourteous behaviour of contact employee	
5.	Hidden charges	

7. To what extent do you agree or disagree with the statement with the connection jio landline services.

Sl. No	Particulars	Agree	Neutral	Disagree
1	Supplementary sounds are often disturbing			
2	Frequent instrument malfunctioning			
3	Make temporary adjustments on complaints			
4	Complex complaints registration process			
5	Poor customer care services			

8. In case of complaints how do you communicate it to the JIO office?

Customer care  Direct Access  E-Mail

9. Kindly rate the response time from JIO when you had filed a complaint.

Speedily  Neutral  Not speedily

10. How often the complaint is cleared by JIO office?

Often  Neutral  Not often

11. Kindly rate billing of JIO fiber services.

Highest in the market  Higher than many operations  Average

12. Do you avail service on holidays/ after office hour?

Always  Neutral  Never

13. Are you aware about the promotional scheme of JIO?

Yes  No

14. Do you receive your bill on time?

Mostly  Neutral  Rarely

15. What type of technical problem is in your JIO fiber connection?

Line fault  Cross Falls  Engaged Line

16. Do you receive voice from others and without clarity?

Often  Neutral  Never

17. What is the defect in billing system?

Lack of all information  Short period of bill  Penalty

18. In which of JIO services do you frequently encounter problem?

Billing  Connectivity Customer Care

19. Are you aware of the internet facility available in the jio?

Yes  No

20. Please rank your preference to pay your JIO bill.

SL.NO	Particulars	Rank
1.	Nearest Bank	
2.	Pickup Boy	
3.	Collection Center	
4.	Drop Boxes	
5.	Others	

21. How would you write the overall quality of your relationship on JIO, considering all your experience with them.

Excellent  Good  Fair  Poor

22. Rate the services offered by JIO according to your satisfaction level.

SL.NO	Particulars	Highly satisfied	Satisfied	Neutral	Dissatisfied	Highly Dissatisfied
1.	Coverage					
2.	Connectivity					
3.	Billing					
4.	Handset					
5.	Quality of services					
6.	Internet					

23. Would you like to give your suggestion to improve the satisfaction level of the customers.

Yes  No

If yes, please

specify.....  
 .....  
 .....

**“A STUDY ON PUBLIC AWARENESS ON COVID  
VACCINE”**

**A PROJECT REPORT**

**Submitted by**

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**In partial fulfillment for the award of the degree in  
BACHELOR OF BUSINESS ADMINISTRATION**

**OF KANNUR UNIVERSITY**

**DON BOSCO ARTS & SCIENCE COLLEGE, ANGADIKADAVU**

**March 2023**

# **KANNUR UNIVERSITY**



## **BONAFIDE CERTIFICATE**

Certified that this project report “**A STUDY ON PUBLIC AWARENESS ON COVID VACCINE**” is the Bonafide work of “**NIXON MICHAEL, THASMINA YASMIN. K, BENITTO BABU AND ABHISHEK DAMODAR**” who carried out the project under my supervision.

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## **DECLARATION**

We hereby we declare that the project work entitled “Nixon Michael, Thasmina Yasmin. K, Benitto Babu and Abhishek Damodar ” has been prepared by us and submitted to Kannur University in partial fulfillment of requirements for the award of award of Bachelor of Business Administration, is a record of original work **A STUDY ON PUBLIC AWARENESS ON COVID VACCINE**” done by us under the supervision of Mrs. Athira P, Assistant Professor, Department of Management Studies, Don Bosco Arts & Science College, Angadikadavu.

We also declare that this project report has not submitted by any one in full or partial for the award of any Degree, Diploma, Title or Recognition before.

Place: Angadikadavu

Date:

**NIXON MICHAEL**

**THASMINA YASMIN. K**

**BENITTO BABU**

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**NIXON MICHAEL**

**THASMINA YASMIN. K**

**BENITTO BABU**

**ABHISHEK DAMODAR**

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## **CHAPTER I**

### **INTRODUCTION AND DESIGN OF THE STUDY**

## 1.1 INTRODUCTION

The COVID-19 pandemic has disrupted the lives of people across the globe. The development of vaccines to combat the virus is one of the most significant scientific achievements of the century. However, the success of vaccination campaigns hinges on public trust and confidence in the vaccines. There are concerns about vaccine hesitancy and misinformation that could undermine efforts to achieve herd immunity. Therefore, this study aims to examine public awareness and attitudes towards COVID-19 vaccines. The research will investigate the factors that influence vaccine acceptance, knowledge about the vaccine, and the sources of information that people rely on. The findings of this study will be useful to policymakers, healthcare providers, and the public in understanding how to increase public confidence in COVID-19 vaccines.

The COVID-19 vaccine is a crucial tool in the fight against the COVID-19 pandemic. It works by triggering the immune system to recognize and defend against the SARS-CoV-2 virus that causes COVID-19. There are several types of COVID-19 vaccines, including mRNA vaccines, vector vaccines, and inactivated or protein-based vaccines. The vaccines have undergone rigorous clinical trials and have been shown to be safe and effective at preventing COVID-19 infections, severe illness, and death. Vaccination campaigns have been launched globally to vaccinate as many people as possible to achieve herd immunity and reduce the spread of the virus. The COVID-19 vaccine is recommended for everyone aged 12 years and above, except for those with specific medical conditions. Getting vaccinated is a crucial step in protecting oneself, loved ones, and communities from COVID-19.

There have been several studies conducted on public awareness regarding COVID-19 vaccines. These studies have shown that while there is a general understanding of the importance of vaccination, there is also a considerable amount of misinformation and hesitancy surrounding the COVID-19 vaccine.

One study conducted in the United States found that vaccine hesitancy was highest among certain demographic groups, including Black Americans, rural residents, and individuals with lower levels of education and income. Misinformation and conspiracy theories, such as the belief that the vaccine contains a microchip or that it can alter DNA, were also found to be major factors contributing to vaccine hesitancy.

Another study conducted in the United Kingdom found that while overall vaccine acceptance was high, there were concerns about vaccine safety and potential side effects. The study also found that individuals who were more likely to trust government institutions and healthcare professionals were more likely to get vaccinated.

To address these concerns and increase public awareness about the COVID-19 vaccine, many governments and healthcare organizations have launched public awareness campaigns. These campaigns have focused on providing accurate information about the vaccine, addressing common myths and misconceptions, and promoting the safety and efficacy of the vaccine.

In addition, healthcare professionals and community leaders have played an important role in increasing vaccine acceptance by answering questions and addressing concerns from their patients and communities. Overall, increasing public awareness and trust in the COVID-19 vaccine is crucial in achieving high levels of vaccination and controlling the spread of the virus.

## **1.1 STATEMENT OF THE PROBLEM**

The COVID-19 pandemic has resulted in a public health crisis of unprecedented proportions. While various preventive measures have been implemented worldwide, including social distancing, wearing of masks, and lockdowns, the development of a vaccine has been a crucial priority in the fight against the virus. Despite the global efforts to expedite the development and distribution of vaccines, there are still numerous challenges and concerns that need to be addressed. Some of the issues that need to be resolved include vaccine efficacy and safety, equitable distribution, vaccine hesitancy, and the emergence of new variants. These challenges underscore the need for comprehensive and coordinated global efforts to ensure that COVID-19 vaccines are widely available, accessible, and trusted by the public.

## **1.2 SIGNIFICANCE OF THE STUDY**

The study on COVID-19 vaccines is significant in the fight against the pandemic, addressing vaccine hesitancy, and achieving health equity.

## **1.3 SCOPE OF THE STUDY**

This study aims to make public awareness to covid vaccine. Hence the area of the study selected to iritty taluk.

#### **1.4 OBJECTIVE OF THE STUDY**

- To find out how many people taken covid vaccine in iritty region?
- How many people have been affected by covid in iritty region?
- How many people have taken a booster dose?
- How many people have taken 2 doses?
- Physical changes occurred before and after the vaccination?

#### **1.5 RESEARCH METHODOLOGY**

The process used to collect information and data for the purpose of so decisions. This provides the objective of the researcher and details, data collection methods, sampling filed work analysis and interpretation. Both primary data secondary data were used for the study. The collection of data is the most important step in statistical study of any investigation. Since all calculation and result depend upon the data collected. Thus, if there are any defects in the collection of data depend then it will affect whole investigation. The conclusion derived from the study is also affected.

##### **1.5.1 Sources of data**

Both primary and secondary data were collected for study.

Primary data: Questionnaire

Secondary data: Internet journals, Media reports Regulatory agency reports etc.

##### **1.5.2 Data collection**

The researcher selected the respondents from the youth of Iritty by using simple random sampling method. The actual data was collected in the month of February and March as per the schedule. The sample size is determined as 100 for analysis

##### **1.5.3 Tools for Collection of data**

In order to achieve the objective of the study the data is to be collected from each respondent. Researcher has decided to use questionnaire based on the objectives.

#### **1.5.4 Research Design**

Research design specifies the methods and procedures for conducting a particular study. It is a map of blue print to which the research is to be conducted. This is an explorative study. It aims to make public awareness to covid vaccine.

#### **1.5.5 Sample Data Design**

The research was made by the survey in accordance to the convenience of people. So, the sample type is convenient sampling

#### **1.5.6 Analysis of Data**

Primary data were processed and analysed manually for preparing report. In the study, tables were used for the presentation of data. For the analysis and interpretation of data, percentage method was used.

#### **1.6 Period of study**

The duration of study is from 2022 December 15<sup>th</sup> to 2023 March 31<sup>st</sup>

#### **1.7 Limitations of study**

- Limited long-term data
- Limited access and distribution
- Variants of the virus
- Vaccine hesitancy
- Political and social factors

**CHAPTER II**  
**REVIEW OF LITERATURE**

## 2.1 INTRODUCTION

Review of literature paves way for a clear understanding of the areas of research already undertaken and throws a light on the potential areas which are yet to be covered. Keeping this view in mind, an attempt has been made to make a brief survey of the work undertaken on the field of covid vaccine. This chapter deals with the review of literature concerned with the subject of this study. Many studies have been conducted. The review of some of the important studies is presented below..

Since the outbreak of the COVID-19 pandemic, there has been a rapid expansion in vaccine research focusing on exploiting the novel discoveries on the pathophysiology, genomics, and molecular biology of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. Although the current preventive measures are primarily socially distancing by maintaining a 1 m distance, it is supplemented using facial masks and other personal hygiene measures. However, the induction of vaccines as primary prevention is crucial to eradicating the disease to attempt restoration to normalcy. This literature review aims to describe the physiology of the vaccines and how the spike protein is used as a target to elicit an antibody-dependent immune response in humans. Furthermore, the overview, dosing strategies, efficacy, and side effects will be discussed for the notable vaccines: Bio NTech/Pfizer, Moderna, AstraZeneca, Janssen, Gamaleya, and SinoVac. In addition, the development of other prominent COVID-19 vaccines will be highlighted alongside the sustainability of the vaccine-mediated immune response and current contraindications. As the research is rapidly expanding, we have looked at the association between pregnancy and COVID-19 vaccinations, in addition to the current reviews on the mixing of vaccines. Finally, the prominent emerging variants of concern are described, and the efficacy of the notable vaccines toward these variants has been summarized.

The coronavirus disease 2019 (COVID-19) pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has resulted in over 192 million cases and 4.1 million deaths as of July 22, 2021. <sup>1</sup> This pandemic has brought along a massive burden in morbidity and mortality in the healthcare systems. Despite the implementation of stringent public health measures, there have been devastating effects in other sectors contributing to our economy. This has plunged the global economies toward deep recession and has racked up a debt of approximately 19.5 trillion USD. <sup>2</sup>

Immune protection in COVID-19 infection can be conceptualized as a spectrum wherein sterile immunity is at the end of positive spectrum. This is followed by transient infection (<3 days) and asymptomatic infection (~1 week). The negative spectrum of immune protection includes patients who are symptomatic, or hospitalized, or admitted to the intensive care unit for multiorgan support. The extreme end of the negative spectrum of immune protection is encompassed by case fatality. The vaccine will intervene prior to the viral insult and stabilize the population at the positive end of the spectrum of the immune protection. It will also prevent the perpetuating cycle of infection and reinfection via variants of SARS-CoV-2 virus in those who have achieved prior convalescence. One study by Dan et al. showed that in patients infected with COVID-19, immunological memory to SARS-CoV-2 remained intact for up to 6 months. <sup>3</sup> Unfortunately, there is no long-term data on the duration of protected immunity against SARS-CoV-2 in patients after convalescence. Therefore, these patients may also require vaccination but the current priority for vaccination can be stretched relative to the unaffected population.

While the ideal goal of the COVID-19 vaccine roll-out is to instill a global herd immunity; it is important to remember that this goal may never be reached. Furthermore, additional goals of vaccination may be to reduce mortality and stress on healthcare systems by reducing the cases of admitted patients. Various countries have already approved COVID-19 vaccines for human use, and more are expected to be licensed in the upcoming year. It is important that these vaccines are safe, efficacious, and can be deployed on a large scale. It is also prudent to eliminate the concerns of both the scientific and general community regarding its effectiveness, side-effects, and dosing strategies.

Historically, the process of vaccine manufacturing and clinical trials required approximately 10 years, but due to the burden of this disease, various observational studies were expedited so that all crucial information regarding the vaccine pharmacokinetics, pharmacodynamics, dosing, efficacy, and adverse events can be collected within a short period of time. Furthermore, there is a need to provide a compilation of accredited and appraised scientific literature on each of these approved vaccines with an aim to instill public health knowledge and vaccine literacy to members

of the scientific and general community. A section dedicated to COVID-19 vaccines and pregnancy is also included in the penultimate section of this review.

Finally, the emergence of the SARS-CoV-2 viral variants of concern (VOC) has attained increased replication, transmission, and infectivity warranting exploration of these genomic mutations as their phenotypes. Hence, the final section of this review will aim to clarify the jargon, highlight the vaccine efficacy (VE) against VOCs, and eliminate any misinformation regarding these variants.

Current prominent COVID-19 vaccines:-

#### **- BioNTech/Pfizer**

The BNT162b2 COVID-19 vaccine developed by BioNTech and Pfizer is a lipid nanoparticle-formulated, nucleoside-modified RNA vaccine that encodes a prefusion membrane-anchored SARS-CoV-2 full-length spike protein. 9 It was the first vaccine approved by the US Food and Drug Association (FDA) and now it has been approved in many other countries. 10 The BNT162b2 COVID-19 vaccine may be stored at standard refrigerator temperatures prior to use, but it requires very cold temperatures for long-term storage and shipping ( $-70^{\circ}\text{C}$ ) to maintain the stability of the lipid nanoparticle. In a phase-1 trial, it was compared to another vaccine candidate BNT162b1, and it was found to have a milder systemic side-effect profile with a similar antibody response. 11 Therefore, it was pushed forward to a blinded phase-2/3 clinical study. 9 In total, 43,548 participants were randomized to receive either two doses of the BNT162b2 vaccine ( $n=21,720$ ) or a placebo ( $n=21,728$ ) 21 days apart. The participant ages ranged from 16 to 91 years, 35.1% of participants were classified as having obesity and comorbidities within participants included HIV, malignancy, diabetes, and vascular diseases. 9 Based on the results of the study, 7 days after the second BNT162b2 dose, the VE was 95% (95% confidence interval (CI), 90.3–97.6) with only eight observed cases of COVID-19 in the vaccine recipients and 162 cases in the placebo recipients. 9 The efficacy remained consistent across subgroups characterized by age, sex, race, ethnicity, body mass index (BMI), and comorbidities (generally 90–100%). 9 Although there were 10 cases of severe COVID-19 with onset after the first dose, only one occurred in a vaccine recipient and nine in placebo recipients. Like the phase-1 trial results, the safety profile remained favorable with the most common local reaction being mild-to-moderate pain at the injection site while the

most common systemic symptoms were fatigue and headache (reported in 50%).<sup>9</sup> In both the vaccine and placebo group, the incidence of severe adverse events did not differ significantly (0.6% and 0.5%, respectively) and no deaths occurred related to the vaccine. As indicated by the manufacturer's information, contraindications for use include hypersensitivity to the active substance or any of the excipients.<sup>12</sup> These studies show that the mRNA-vaccine BNT162b2 is safe and effective in protecting against COVID-19. However, further investigations are needed to confirm long-term safety and to establish safety and efficacy for populations not included in this study.

### **- Moderna**

The mRNA-1273 vaccine, developed by Moderna, relies on mRNA technology to encode prefusion stabilized SARS-CoV-2 spike protein. It is the second COVID-19 vaccine to receive emergency use approval by the US FDA, and it is given as two 100- $\mu$ g doses intramuscularly into the deltoid muscle, 28 days apart.<sup>13</sup> Storage of the vaccine is done at temperatures between  $-25^{\circ}\text{C}$  to  $-15^{\circ}\text{C}$  for long-term storage,  $2^{\circ}\text{C}$  to  $8^{\circ}\text{C}$  for 30 days, or  $8^{\circ}\text{C}$  to  $25^{\circ}\text{C}$  for up to 12 hours. Results from the COVE phase-3 trial showed that the mRNA-1273 vaccine was effective at preventing COVID-19 illness in persons 18 years of age or older. A total of 30,420 participants aged 18 years or older were randomized 1:1 to receive either two doses of the vaccine or a placebo, 28 days apart.<sup>14</sup> The mean age of the participants was 51.4 years, and enrollment was adjusted for equal representation of racial and ethnic minorities. In the trial, symptomatic COVID-19 illness occurred in 11 participants within the vaccine group versus 185 participants within the placebo group, showing a 94.1% (95% CI, 89.3–96.8%) efficacy of the vaccine. Efficacy was similar across age, sex, race, and ethnicity as well as in patients with and without risk factors for severe disease (e.g. chronic lung disease, cardiac disease, and severe obesity). Importantly, a secondary endpoint for determining the efficacy of the vaccine in preventing severe COVID-19 was also used. All 30 participants with severe COVID-19 were in the placebo group, indicating a 100% efficacy of no hospital admissions.<sup>14</sup> Regarding the side effects of the vaccine, adverse events at the injection site and systemic adverse events occurred more commonly with the mRNA-1273 group compared to the placebo. The most common local reaction was mild to moderate pain at the injection site (75%). The most common systemic symptoms were fatigue, myalgia, arthralgia, and headache (50%).<sup>14</sup> The

overall incidence of serious adverse events did not differ significantly between groups and no deaths occurred in relation to the vaccine. While this vaccine is already being administered, further investigations are still necessary to establish safety and efficacy profiles for populations not included in this study as well as to assess its long-term effects. Current contraindications of the mRNA-1273 vaccine include any persons with known allergy to polyethylene glycol (PEG), another mRNA vaccine component or polysorbate. 15

#### **- AstraZeneca**

The Oxford and AstraZeneca ChAdOx1 COVID-19 vaccine uses a chimpanzee adenovirus vector to deliver the genetic sequence of a full-length spike protein of SARS-CoV-2 into host cells. 16 The storage for the ChAdOx1 vaccine is favorable, as it may be refrigerated at 2°C–8°C for 6 months. Pooled analysis of four ongoing clinical studies was used to assess efficacy, safety, and immunogenicity of the ChAdOx1 vaccine: COV001 (phase 1/2), COV002 (phase 2/3), COV003 (phase 3), and COV005 (phase 1/2). 17 Across the four studies participants over 18 were randomized to receive either the vaccine or a control (meningococcal group A, C, W, or saline). ChAdOx1 vaccine recipients received two standard doses (SDs) of the vaccine (SD/SD cohort) except for a subset in the COV002 trial who received a half lower dose (LD) followed by an SD (LD/SD cohort). 17 In the four studies, there was a total 23,848 participants, all of whom were used for gathering safety data; only 11,636 participants from the COV002 and COV003 trials were included in the primary efficacy analysis. 17 Of the 11,636 participants in the efficacy analysis, 2741 were in the LD/SD cohort, 88% were between 18 and 55 years old, and comorbidities present included cardiovascular disease, respiratory disease, and diabetes. 17 The results show that in the intended dosing regimen (SD/SD cohort), the VE was 62.1% (95% CI, 41.0–75.7) 14 days after the second injection for symptomatic COVID-19 (27 cases vs 71 cases respectively). 17 In the group that received an LD (LD/SD cohort), the VE was 90.0% (95% CI, 67.4–97.0; 3 cases vs 30 cases, respectively) while across the two dosing regimens the overall efficacy was 70.4% (95.8% CI, 54.8–80.6; 30 cases vs 101 cases, respectively). 17 The higher efficacy observed in the LD/SD cohort can be attributed to this group having a longer dosing interval between the two doses in comparison to the SD/SD cohort. Regarding safety, most of the adverse events were mild-moderate with

the most frequently reported being injection site pain/tenderness, fatigue, headache, malaise, and myalgia. 18 About 175 serious adverse events were noted, only three of which were possibly linked to intervention: transverse myelitis 14 days after second dose, haemolytic anemia in a control recipient and fever  $>40^{\circ}\text{C}$  in a participant still masked to group allocation. One contraindication for use of the vaccine is hypersensitivity to any of its components. In very rare cases, AstraZeneca has been associated internationally with venous thromboembolic events with thrombocytopenia with current estimates being 10–15 cases per million vaccinated patients. 19 This adverse event has been termed thrombosis with thrombocytopenia syndrome (TTS). In summary, these studies demonstrate that the AstraZeneca ChAdOx1 vaccine has a good efficacy and side-effect profile. Limitations include that less than 4% of participants were  $>70$ , no one over 55 got the mixed-dose regimen (LD/SD cohort), and those with comorbidities were a minority. Additional investigations are required to analyze long-term effects and assess efficacy and safety in populations not included or underrepresented.

#### **- Janssen COVID-19 vaccine**

The Janssen (Johnson & Johnson) COVID-19 vaccine, developed by Janssen Pharmaceutical in Netherlands. It is a single-dose intramuscular (IM) vaccine that contains a recombinant, replication incompetent human adenovirus (Ad26) vector encoding the spike protein of SARS-CoV-2 in the stabilized conformation. 20 It can be stored between  $2^{\circ}\text{C}$  and  $8^{\circ}\text{C}$  for up to 6 hours or at room temperature for a duration of 2 hours. The ENSEMBLE Phase-3 trial ( $n=43,783$ ) is a randomized, double-blind, placebo-controlled study which included participants  $\geq 18$  years. Efficacy assessment was performed at day 14 and 28. The primary outcome only included moderate and severe (hospitalization and death) infection. Overall, the VE in the moderate to severe cohort was 66.9% (95% CI: 59.0–73.4) at 14 days and 66.1% (95% CI: 55.0–74.8) at 28 days. 20 In the severe cohort, the VE was 76.7% (95% CI: 54.6–89.1) and 85.4% (95% CI: 54.2–96.9) at day 14 and 28 days, respectively. 20 At the time of the study, 96.4% of the strains in the United States, 96.4% were identified as the Wuhan-H1 variant D614G. The VE in the United States for the moderate to severe cohort was 74.4% (95% CI: 65.0–81.6) and 72.0% (95% CI: 58.2–81.7) at 14 days and 28 days, respectively. 20 In the US severe cohort, the VE was 78.0% (95% CI: 33.1–94.6) and

85.9% (95% CI: -9.4 to 99.7) at day 14 and 28 days, respectively. 20 Alternatively, 94.5% of the strains in South Africa were identified as beta variant. The VE in South Africa for the moderate to severe cohort was 52.0% (95% CI: 30.3–67.4) and 64.0% (95% CI: 41.2–78.7) at 14 days and 28 days, respectively. 20 In the South African severe cohort, the VE was 73.1% (95% CI: 40.0–89.4) and 81.7% (95% CI: 46.2–95.4) at day 14 and 28 days, respectively. 20 In Brazil, 69.4% of the strains were identified as P.2 lineage variant and 30.6% were identified as Wuhan-H1 variant D614G. The VE in Brazil for the moderate to severe cohort was 66.2% (95% CI: 51.0–77.1) and 68.1% (95% CI: 48.8–80.7) at 14 days and 28 days, respectively. 20 In the Brazilian severe cohort, the VE was 81.9% (95% CI: 17.0–98.1) and 87.6% (95% CI: 7.8–99.7) at day 14 and 28 days, respectively. 20 The most common localized solitary adverse reaction was the injection site pain (48.6%). Conversely, the most common systemic adverse reactions included headache, fatigue, myalgia, and nausea. 20 In the post authorization phase, adverse reaction included anaphylaxis, thrombosis with thrombocytopenia, Guillain Barré syndrome, and capillary leak syndrome. 20 Overall, the data demonstrate that the Janssen vaccine has a good efficacy and side-effect profile.

#### **- Gamaleya**

Sputnik V or Gam-COVID-Vac, developed by the Gamaleya Institute, is a recombinant human adenovirus-based vaccine that uses two different vectors (rAd26 and rAd5) to carry the gene encoding for the spike protein of SARS-CoV-2. Only one vector (rAd26) is given at dose 1 and the other (rAd5) at dose 2. This strategy prevents immunity against the vector. It can be stored as either a liquid at -18°C, or it can be freeze-dried and stored at 2°C to 8°C. 21 Regarding the safety and efficacy of the vaccine, both were evaluated in a randomized, double-blind phase-3 trial performed in Moscow, Russia. In the trial, a total of 21,977 participants aged 18 years or older were randomized in a 3:1 ratio to the vaccine or placebo groups. Two doses of the vaccine or placebo were given 21 days apart to the respective groups. 21 The mean age of the participants was 45.3 years, and the majority of participants were Caucasian (98.5%). 21 From 21 days after the first dose of the vaccine, efficacy against symptomatic COVID-19 illness was 91.6% (95% CI, 85.6–95.2%) with 16 confirmed cases of COVID-19 in the vaccine group and 62 confirmed in the placebo group. 21 There were also 20 cases of moderate to severe COVID-19 infection confirmed in the placebo

group at least 21 days after the first dose and 0 in the vaccine group, indicating a VE of 100% against moderate to severe infection. 21 The most common adverse effects in both groups were flu-like illness, injection site reactions, headaches, and asthenia, with the majority being grade 1 (94.0%). 21 Serious adverse events were also reported in both the vaccine group and placebo group, but they were deemed not to be associated with the vaccination. Further investigations are still needed to determine the duration of protection of the vaccine and to determine the safety and efficacy of the vaccine in populations not included in the study (e.g. children, adolescents, and pregnant and lactating women).

#### **- SinoVac**

CoronaVac is an inactivated vaccine developed by SinoVac Biotech containing inactivated SARS-CoV-2. 22 The vaccine can be stored at 2°C to 8°C for up to 3 years making it an attractive option for development. Two phase-1/2 clinical trials assessed the safety, tolerability, and immunogenicity of the CoronaVac vaccine. 22,23 The first study (18–59 years old included only) placed 744 participants in either a vaccine or placebo group where they were further divided based on vaccination schedule and dosage (3 and 6 µg). In the second study (≥60 years old included only), 422 participants were randomized to receive two doses of CoronaVac or placebo 28 days apart and then further divided based on dosage amount only (3 and 6 µg for phase 1; 1.5, 3, and 6 µg for phase 2). Safety results from both trials show a favorable side-effect profile with most symptoms being transient and of mild severity. The most common adverse effect was injection site pain; others included fatigue and fever. In the 18–59 years old study, one serious adverse event of acute hypersensitivity was possibly related to vaccination. 22 No serious adverse events were associated with the vaccine or placebo in the ≥60-year-old study. Between the dosage amounts in both studies, the tolerability was consistent and the immunogenicity was also similar for the 3 and 6 µg doses (less in 1.5 µg). 23 Multiple phase-3 trials have also taken place to determine the effectiveness of CoronaVac in countries, such as Brazil, Indonesia, and Turkey. In the Brazil trial, 252 cases of COVID-19 were recorded from roughly 9200 health care workers, with 167 in the placebo group and 85 in the vaccine group. 24 The reported efficacy of the vaccine in preventing mild and severe COVID-19 infection was 50.4%. In comparison, the Turkey trial reported that the vaccine was 83.5% effective at

preventing symptomatic infection based on 29 COVID-19 cases among 1,322 volunteers while results from the Indonesia trial found that the vaccine was 65.3% effective at preventing symptomatic infection based on 25 COVID-19 cases among 1,600 people. 24 Some reasons for the lower efficacy of CoronaVac in the Brazil trial may include increased likelihood of exposure to the virus since participants were healthcare workers, and insufficient time for participants to reach peak immunity since the doses were administered only 2 weeks apart. 24 The phase-3 SinoVac study in Chile showed the VE 14 days post second dose to prevent symptomatic COVID-19 (67%, 95% CI: 65–69%), hospital admission (85%, 95% CI: 83–87%), intensive care unit (ICU) admission (89%, 95%CI: 84–92%) and death (80%, 95%CI: 73–86%). 25 The Phase-3 SinoVac trial in Brazil showed an overall VE against symptomatic COVID-19 (50.7%, 95% CI: 35.9–62%), moderate cases requiring hospitalization (83.7%, 95% CI: 58–93.7%), and severe cases requiring hospitalization (100%, 95%CI: 56.4–100%). 26 As with any vaccine, a contraindication for CoronaVac is anaphylaxis to it or to one of its constituents.

#### **- Other prominent COVID-19 vaccines**

Due to the disease burden of SARS-CoV-2, the development and manufacturing of COVID-19 vaccines has been occurring at a remarkable pace which has not been seen before. There are many emerging vaccines with different mechanisms of actions that will be briefly explored. Bharat Biotech, an Indian company, has designed the inactivated COVID-19 vaccine Covaxin (BBV152). Once inside the body, the inactivated viruses can initiate an immune response through the interaction of surface proteins with APCs. Phase-1/2 trials showed no serious side effects and phase-3 trials are currently underway. 27 The state-owned Chinese company Sinopharm has also made an inactivated COVID-19 vaccine called BBIBP-CorV. The Sinopharm phase-3 trial showed that the VE in symptomatic cases for the WIV04 strain-based vaccine (72.8, 95% CI: 58.1–82.4%) and HB02 strain-based vaccine (78.1 95% CI: 64.8–86.3%).28,29 It is approved in Bahrain, U.A.E, and China. NVX-CoV2373 is another promising vaccine produced by Novavax. It is a protein subunit vaccine made by assembling SARS-CoV-2 spike proteins into nanoparticles. A phase-3 trial in the United Kingdom displayed an efficacy rate of 89.3%; however, a phase-2 trial in South Africa had an efficacy just under 50%. 28 This discrepancy is thought to arise because

of a new variant in South Africa. Other emerging vaccines include CoVLP produced by Medicago which uses the plant *N. benthamiana* to create virus-like particles that mimic SARS-CoV-2, CVnCoV produced by CureVac which is an mRNA vaccine, Convidecia produced by CanSino Biologics which is adenovirus based (Ad5), Ad26.COVS.2.S produced by Johnson & Johnson which is also adenovirus based (Ad26), and ZF2001 created by Anhui Zhifei Longcom which is a protein subunit vaccine. Even though highly effective, COVID-19 vaccines are already in use, it is still important to have a range of vaccines such as those listed above to bring the pandemic under control. Having a diverse profile ensures that vaccines will work for individuals from all ethnic backgrounds and with various underlying health conditions. 30 Getting the virus under control will also require doses for a large proportion of the world. To meet this requirement as soon as possible, having multiple vaccines will help in maximizing the volume of doses that can be produced. In addition, there are many technical issues such as cold storage and transportation, cost, and dosing of certain vaccines that arise when trying to vaccinate remote populations. For example, both the Pfizer-BioNTech and Moderna vaccines are expensive and transported at temperatures of  $-70^{\circ}\text{C}$  and  $-20^{\circ}\text{C}$  making it difficult to access many locations all at once. Since most vaccines require two doses spaced a few weeks apart, it can be challenging for individuals without regular access to healthcare as well. 30 Such considerations highlight the importance of having a range of single-dose vaccines and vaccines without the need for cold storage. A summary of efficacy, prominent side effects and storage recommendations for all the notable COVID-19 vaccines are shown in Table 1.

### **Post-vaccination contagion**

With the endurance of the COVID-19 vaccine still being heavily researched, a chief concern is the sustainability of the vaccine-mediated immune response. This is important in the consideration of whether vaccinated individuals could still contract, transmit, or be carriers of SARS-CoV-2 virus. Vaccinated individuals currently may not understand the rationale behind why social restriction rules still apply to them. Most COVID-19 mRNA vaccines require at least 3 weeks to mount an immunological response and create the required antibodies and proliferate accessory cells of the adaptive immune system of the appropriate recognition repertoire. 50 This may be particularly relevant in the context of travel, as the World Health Organization (WHO)

states that a proof of vaccination should not exempt international travelers from complying with social restrictions and risk-reduction measures.

### **Contraindications for COVID-19 vaccines**

All vaccines are contraindicated in cases of documented hypersensitivity to the active substance or any of the excipients. There are a set of general guidelines relative to patients which must be adhered to until further information is provided; predominantly regarding groups such as pregnant or lactating women and immunodeficient patients. The Centers for Disease Control and Prevention (CDC) considers absolute contraindications to patients who have had severe anaphylactic reactions to a previous dose of an mRNA COVID-19 vaccine or PEG, a component of the vaccine. Moreover, immediate allergic reactions of any severity to polysorbate are also a significant contraindication. Importantly, there are many precautions which are not classified as contraindications but must be considered, such as patients who have had allergic reactions to any vaccine or injectable therapy. In the cases of patients with a precaution to the vaccine, they should be counseled on the benefits and risks, but are not contraindicated from vaccination. 15 In the instance of patients with autoimmune diseases, there is currently insubstantial data regarding the efficacy of the vaccine; however, current guidelines suggest that individuals with autoimmune conditions may take the vaccine if they do not have any absolute contraindications. In the case of patients with HIV, limited data from COVID-19 mRNA vaccination trials suggest that they can receive the vaccine barring any contraindications.

### **COVID-19 vaccines and pregnancy**

Prior to discussing the relationship between the current vaccines for COVID-19 and pregnancy, it is crucial to gain an insight of the relationship between pregnancy and COVID-19 itself. Adhikari et al. showed that there was no difference in the frequency of Caesarean section, pre-eclampsia, preterm births, and abnormal fetal cardiotocography in pregnant women with and without SARS-CoV-2 infection. In addition, examination of the placenta revealed were no abnormalities, which were initially suspected due to the cross-matching between the SARS-CoV-2 spike protein and the placental syncytiin-1 protein. 52 Similarly, there was no association found between COVID-19 and first-trimester spontaneous abortions. 53 A systematic review

and meta-analysis revealed that COVID-19 leads to higher preterm deliveries (odds ratio (OR): 3.01, 95% CI: 1.16–7.85) and an increase in the ICU admission rates (OR: 71.63, 95% CI: 9.81–523.06) in pregnant women. 54

Pregnancy remained an exclusion criterion for all the COVID-19 vaccine trial; therefore, the efficacy of the COVID-19 vaccines in pregnant women is unavailable. However, given the effectiveness of the influenza vaccines elucidated in a meta-analysis conducted by Quach et al., it can be hypothesized that the effects of pregnancy on the vaccine would be minimal, but more data would be needed for confirmation. 55 Pfizer's animal studies revealed antibodies in the maternal rats, fetus, and offspring, in addition to no effects on fertility pregnancy or fetal development. 56 A similar study was conducted with the Moderna vaccine which led the US FDA to conclude that the vaccine did not have any adverse effects on female reproduction, fetal development, or postnatal development. 34 Furthermore, the Oxford-AstraZeneca vaccine animal studies are still pending. However, as a precaution, the National Immunization Advisory Committee (NIAC) has recommended for the two-dose schedule to not commence before 14 weeks of gestation and to be completed by week 33 of gestation. This precaution reduces any potential associations with miscarriage or pre-term birth.

Despite the exclusion of pregnancy in the preliminary stages of the trials, 23 Pfizer, 13 Moderna, and 21 AstraZeneca subjects became pregnant after enrolment into the trial. Among this cohort, there was one miscarriage part of the Pfizer control group, no miscarriages part of the Pfizer vaccine group, one miscarriage part of the Moderna control group, no miscarriages part of the Moderna vaccine group, three miscarriages part of the AstraZeneca control group, and two miscarriages part of the AstraZeneca vaccine group. While these preliminary numbers support the current guidelines regarding the vaccines being safe in pregnancy, it is crucial to be aware of the ongoing studies as new data emerges.

The CDC v-safe COVID-19 Pregnancy Study explored the effect of mRNA vaccine (Pfizer-BioNTech or Moderna) on the pregnancy. The pregnancy loss within those with a completed pregnancy included a spontaneous abortion (<20 weeks) rate of 12.6% (104 out of 827) and stillbirth (≥20 weeks) incidence of 0.1% (1 out of 725). 58 The

neonatal outcomes within the live birth infant cohort showed preterm birth (<37 weeks) incidence at 9.4% (60 out of 636), small for gestational age incidence of 3.2% (23 out of 724), and congenital anomalies were seen in 2.2% (16 out of 724). 58 No neonatal deaths were observed in this study.

### **Vaccine dosing strategies**

Limited vaccine resources have caused some governments to extend the date of the second dose beyond the recommended manufacturer date. On December 30, NHS England had made the decision to prioritize the administration of the first doses, and to extend the second doses of the vaccine to the end of 12 weeks, rather than the recommended 3–4 weeks as shown in the clinical phase-3 trial. Pfizer-BioN Tech at the time had no data to support this decision, and thus stated that the safety and efficacy of the vaccine had not been evaluated on different dosing schedules, and importantly, the second dose should not be administered later than 42 days.

Newly accrued evidence might warrant changes in the landscape of this vaccination program. Estimation of the effectiveness of the Pfizer-BioNTech after a single dose from the primary data from Israeli population (n = 500,000) showed that from day 0 to day 8 post-vaccination, the likelihood of contracting COVID-19 infection doubled. 60 This result may appear counterintuitive, but it takes 3 weeks for the vaccine to instill efficacy during which this real-world population could have not maintained the stringent public health measures which lead to the increased incidence in COVID-19 in this time-period. Then from day 8 to day 21 the incidence of COVID-19 declined and at day 21 the vaccine effectiveness was documented at 91%. 60 This efficacy was seen to stabilize at 90% for the duration of the study (9 weeks), and the authors of this study extrapolate this stability up to 6 months. 60 This concludes that the single dose of Pfizer-BioNTech is highly protective from day 21 onwards and supports the NHS England's vaccination policy for extending gaps between the doses. The data from the Early Pandemic Evaluation and Enhanced Surveillance of COVID-19 (EAVE II) trial in the Scottish population revealed that a single dose of Pfizer (n = 650,000) and Oxford-AstraZeneca (n = 490,000) vaccines resulted in a decline in hospitalization at 4 weeks by 84% and 94%, respectively.

However, the trials for the Oxford-AstraZeneca vaccine included varied spacing schedules between doses. The findings from these trials displayed that a greater space between the first and second dose provided a superior immune response. This is supported by a combined trial between a UK and Brazil study, which demonstrated a higher VE 14 days after a second dose in patients who had greater than 6 weeks between their first and second dose than patients who had less than 6 weeks by 53.4%.<sup>17,62</sup>

It was also proposed that to meet the supply shortage that vaccine dose can be halved. Half-dose of Moderna vaccine (50ug) was in a phase-IIa trial. Immune response in the half-dose group compared to those that received a full dose were the same. Therefore, this dosing strategy is supported from an immunogenicity perspective. It is reasonable to infer that the immunogenicity would translate to immune protection, but unfortunately no clinical trial has validated the immune protection for this dosing strategy.

**Go to:**

### **SARS-CoV-2 genome mutations**

Mutations are changes in the SARS-CoV-2 viral genome that occur naturally over time. These mutations from the parent SARS-CoV-2 virus create variants. A certain amount of genetic variation is expected as SARS-CoV-2 replicates as such it is important to monitor circulating viral variants to collate key mutations. Fortunately, coronaviruses have a slower rate of mutation of 1 to 2 nucleotides per month.<sup>63</sup> These definitions become complicated when environmental factors apply selective pressures on these variants that enable them to express distinct phenotypes that may facilitate viral fitness. This ability of a variant to express distinct phenotypes is termed as a strain. A compilation of beneficial lineage defining mutations can create a strain that has a higher transmission rate or induce severe disease. This raises the question: will the current vaccines or convalescent immunity from a non-variant SARS-CoV-2 infection provide adequate immunological protection against these new variants?

Coronaviruses mutate spontaneously via antigenic drift. This process typically utilizes the virus-specific transcription regulatory network (TRN) sequence to initiate the

change, resulting in a new mRNA sequence virus being formed. Homologous and genetic recombination allows for the virus to gain more ecological features and has been speculated to be the reason why SARS-CoV-2 was zoonotic in origin. 64 A variant of the original SARS-CoV-2 virus with a D614G substitution in the spike protein encoding gene emerged in early February 2020, and by June 2020, D614G became the dominant form of the virus circulating globally. 65 Studies have shown that the D614G mutation resulted in increased infectivity and transmissibility. 66 Since then, there have been many viral lineages to note, most notable VOC include the B.1.1.7/20I/501.Y.V1 variant that was first detected in the United Kingdom in October 2020, the B.1.351/20 H/501Y.V2 variant that was detected in South Africa in December 2020, and the Lineage P.1. (B.1.1.28.1) variant that was detected in Tokyo in January 2021 but is believed to have originated from Brazil.

Currently, there exists two open-source real-time software tools to analyze and assign nomenclature of genetic variations in the SARS-CoV-2 virus: Nextstrain and PANGOLIN.<sup>64,67</sup> Both refer to the GISAID (Global Initiative on Sharing All Influenza Data) genomic database but have slight differences with regards to their nomenclature to describe various lineages of the virus. The COVID-19 Genomics UK Consortium has also developed CoV-GLUE, an open-source browser application that allows for easy referral of all sequenced SARS-CoV-2 genetic replacements, insertions, and deletions. 68 Therefore, sequencing every local infection will yield a repository to track the development of new mutations and variants.

#### Notable mutation drivers in the SARS-CoV-2 genome

Before diving deeper into these variants, it is important to understand the physical alteration in the S-protein at a molecular level and the perceived functional advantages that the SARS-CoV-2 gains. Table 2 highlights some of the notable S-protein mutations as they evolve amid the pandemic.

There are more variants emerging as the pandemic progresses, but it is important to note that there is still a myriad of available vaccines in our armamentarium that are adequately efficacious in the performed neutralization assays as well as the real-world data. Furthermore, while vaccines induce the antibody-dependent immunity, they can

also stimulate other components of the adaptative immune system such as the Memory B-cells, CD8<sup>+</sup> Tc cells, and CD4<sup>+</sup> Th cells to mount their own response against the viral variants. This can compensate for the reduction in neutralization rate by the vaccine induced antibodies. Interestingly, the adaptative immune system can proliferate libraries of memory B-cells with mutated antibody repertoires that can predict viral variants. Therefore, it is prudent to commence vaccinations in accordance with the local public health bodies. This combined with the continued implementation of public health measures until target level of herd immunity is acquired can lead toward mitigating the prevalence and incidence of COVID-19 variants.

### **- Conclusion**

This review highlighted the current available vaccines and candidates being rolled out amid the ongoing prevention measures and summarized the documented findings with regards to their efficacies, side-effects, and storage requirements. An overview of the physiology of immunogenic responses against the disease provided by the more prominent vaccines were discussed, alongside questions regarding the implementation of vaccines; heterologous prime-boosting, vaccine contraindications, dosing strategies, side effects, and the presence of SARS-CoV-2 mutations and variants.

There are still many unanswered questions that need to be addressed with regards to antibodies produced in individuals including their impact on the clinical course and severity of the disease, how long will they remain in the body to protect from the disease, and if what we have is enough to deal with newly emerging variants. Studies on these topics are rapidly being conducted and published on a global scale, and scientific communities are working on the clock to produce as much information to bring us a better understanding on how to deal with this disease.

For this global pandemic to end, it is imperative that people are vaccinated as quickly as possible until herd immunity can be achieved. One aspect of achieving this, in the face of vaccine hesitancy, is to address the lack of community understanding on how vaccines work, the risks, and the factors that keep this area of research volatile and distribution policies ever-changing. In addition, it is important to remain cautious about the information being released and to trust the accredited sources and experts, rather

than the aberrant rumors being spread through social media. Nonetheless, the COVID-19 vaccines have shown to be highly promising and we recommend for everyone that is eligible to take the vaccine at the correct dosing interval when they are given the chance as this would potentiate a positive trend toward pandemic resolution.

## **2.2 CONCLUSION**

Here in this chapter, the literature on COVID-19 vaccines has highlighted the significant strides made in developing and distributing vaccines to combat the pandemic. The vaccines have shown promising results in clinical trials, with high efficacy rates in preventing COVID-19 infection and reducing the severity of the disease.

However, the study of COVID-19 vaccines also underscores the need to address various challenges, including vaccine hesitancy, equitable distribution, emerging variants, and the long-term safety and efficacy of the vaccines. Addressing these challenges requires coordinated global efforts to ensure that COVID-19 vaccines are widely available, accessible, and trusted by the public.

The study of COVID-19 vaccines also highlights the need to address underlying issues such as health equity, political and social factors, and the impact of the pandemic on vulnerable populations. By addressing these issues, the development and distribution of COVID-19 vaccines can contribute to a comprehensive and coordinated global response to the pandemic.

**CHAPTER III**  
**THEORETICAL FRAMEWORK**

### **3.1 History of COVID-19 vaccine development:**

A **COVID-19 vaccine** is a vaccine intended to provide acquired immunity against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes coronavirus disease 2019 (COVID-19).

Prior to the COVID-19 pandemic, an established body of knowledge existed about the structure and function of coronaviruses causing diseases like severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). This knowledge accelerated the development of various vaccine platforms during early 2020. The initial focus of SARS-CoV-2 vaccines was on preventing symptomatic, often severe illness. In January 2020, the SARS-CoV-2 genetic sequence data was shared through GISAID, and by March 2020, the global pharmaceutical industry announced a major commitment to address COVID-19. In 2020, the first COVID-19 vaccines were developed and made available to the public through emergency authorizations and conditional approvals. Initially, most COVID-19 vaccines were two-dose vaccines, with the sole exception being the single-dose Janssen COVID-19 vaccine. However, immunity from the vaccines has been found to wane over time, requiring people to get booster doses of the vaccine to maintain protection against COVID-19.

The COVID-19 vaccines are widely credited for their role in reducing the spread of COVID-19 and reducing the severity and death caused by COVID-19. According to a June 2022 study, COVID-19 vaccines prevented an additional 14.4 to 19.8 million deaths in 185 countries and territories from 8 December 2020 to 8 December 2021. Many countries implemented phased distribution plans that prioritized those at highest risk of complications, such as the elderly, and those at high risk of exposure and transmission, such as healthcare workers.

Common side effects of COVID-19 vaccines include soreness, redness, rash, inflammation at the injection site, fatigue, headache, myalgia (muscle pain), and arthralgia (joint pain), which resolve without medical treatment within a few days.

COVID-19 vaccination is safe for people who are breastfeeding.

As of 1 March 2023, 13.32 billion doses of COVID-19 vaccines have been administered worldwide based on official reports from national public health agencies. By December 2020, more than 10 billion vaccine doses had been preordered by

countries, with about half of the doses purchased by high-income countries comprising 14% of the world's population. Despite the extremely rapid development of effective mRNA and viral vector vaccines, worldwide vaccine equity has not been achieved. The development and use of whole inactivated virus (WIV) and protein-based vaccines have also been recommended, especially for use in developing countries. The United States Food and Drug Administration (FDA) has now authorized bivalent vaccines to protect against the original COVID-19 strain and its Omicron variant.

Prior to COVID-19, a vaccine for an infectious disease had never been produced in less than several years – and no vaccine existed for preventing a coronavirus infection in humans.<sup>[21]</sup> However, vaccines have been produced against several animal diseases caused by coronaviruses, including (as of 2003) infectious bronchitis virus in birds, canine coronavirus, and feline coronavirus. Previous projects to develop vaccines for viruses in the family Coronaviridae that affect humans have been aimed at severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). Vaccines against SARS and MERS have been tested in non-human animals.

According to studies published in 2005 and 2006, the identification and development of novel vaccines and medicines to treat SARS was a priority for governments and public health agencies around the world at that time. There is no cure or protective vaccine proven to be safe and effective against SARS in humans. There is also no proven vaccine against MERS. When MERS became prevalent, it was believed that existing SARS research might provide a useful template for developing vaccines and therapeutics against a MERS-CoV infection. As of March 2020, there was one (DNA-based) MERS vaccine which completed Phase I clinical trials in humans, and three others in progress, all being viral-vectored vaccines: two adenoviral-vectored (ChAdOx1-MERS, BVRS-GamVac) and one MVA-vectored (MVA-MERS-S).

Vaccines that use an inactive or weakened virus that has been grown in eggs typically take more than a decade to develop. In contrast, mRNA is a molecule that can be made quickly, and research on mRNA to fight diseases was begun decades before the COVID-19 pandemic by scientists such as Drew Weissman and Katalin Karikó, who tested on mice. Moderna began human testing of an mRNA vaccine in 2015. Viral

vector vaccines were also developed for the COVID-19 pandemic after the technology was previously cleared for Ebola

As multiple COVID-19 vaccines have been authorized or licensed for use, real-world vaccine effectiveness (RWE) is being assessed using case control and observational studies. A study is investigating the long-lasting protection against SARS-CoV-2 provided by the mRNA vaccines.

SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), the virus that causes COVID-19, was isolated in late 2019. Its genetic sequence was published on 11 January 2020, triggering the urgent international response to prepare for an outbreak and hasten development of a preventive COVID-19 vaccine. Since 2020, vaccine development has been expedited via unprecedented collaboration in the multinational pharmaceutical industry and between governments. By June 2020, tens of billions of dollars were invested by corporations, governments, international health organizations, and university research groups to develop dozens of vaccine candidates and prepare for global vaccination programs to immunize against COVID-19 infection. According to the Coalition for Epidemic Preparedness Innovations (CEPI), the geographic distribution of COVID-19 vaccine development shows North American entities to have about 40% of the activity, compared to 30% in Asia and Australia, 26% in Europe, and a few projects in South America and Africa.

In February 2020, the World Health Organization (WHO) said it did not expect a vaccine against SARS-CoV-2 to become available in less than 18 months. Virologist Paul Offit commented that, in hindsight, the development of a safe and effective vaccine within 11 months was a remarkable feat. The rapidly growing infection rate of COVID-19 worldwide during 2020 stimulated international alliances and government efforts to urgently organize resources to make multiple vaccines on shortened timelines, with four vaccine candidates entering human evaluation in March (see COVID-19 vaccine § Trial and authorization status).

On 24 June 2020, China approved the CanSino vaccine for limited use in the military, and two inactivated virus vaccines for emergency use in high-risk occupations. On 11 August 2020, Russia announced the approval of its Sputnik V vaccine for emergency use, though one month later only small amounts of the vaccine had been distributed for use outside of the phase 3 trial.

The Pfizer–BioNTech partnership submitted an Emergency Use Authorization (EUA) request to the U.S. Food and Drug Administration (FDA) for the mRNA vaccine BNT162b2 (active ingredient tozinameran) on 20 November 2020. On 2 December 2020, the United Kingdom's Medicines and Healthcare products Regulatory Agency (MHRA) gave temporary regulatory approval for the Pfizer–BioNTech vaccine, becoming the first country to approve the vaccine and the first country in the Western world to approve the use of any COVID-19 vaccine. As of 21 December 2020, many countries and the European Union had authorized or approved the Pfizer–BioNTech COVID-19 vaccine. Bahrain and the United Arab Emirates granted emergency marketing authorization for the Sinopharm BIBP vaccine. On 11 December 2020, the FDA granted an EUA for the Pfizer–BioNTech COVID-19 vaccine. A week later, they granted an EUA for mRNA-1273 (active ingredient elasomeran), the Moderna vaccine.

On 31 March 2021, the Russian government announced that they had registered the first COVID-19 vaccine for animals. Named Carnivac-Cov, it is an inactivated vaccine for carnivorous animals, including pets, aimed at preventing mutations that occur during the interspecies transmission of SARS-CoV-2.

In October 2022 China began administering an oral vaccine developed by CanSino Biologics, using its adenovirus model.

Despite the availability of mRNA and viral vector vaccines, worldwide vaccine equity has not been achieved. The ongoing development and use of whole inactivated virus (WIV) and protein-based vaccines has been recommended, especially for use in developing countries, to dampen further waves of the pandemic.

### **Planning and investment**

Since 2020, vaccine development has been expedited via unprecedented collaboration in the multinational pharmaceutical industry and between governments. According to the Coalition for Epidemic Preparedness Innovations (CEPI), the geographic distribution of COVID-19 vaccine development puts North American entities having about 40% of the activity compared to 30% in Asia and Australia, 26% in Europe, and a few projects in South America and Africa.

Commitment to first-in-human testing of a vaccine candidate represents a substantial capital cost for vaccine developers, estimated to be from US\$14 million to US\$25 million for a typical Phase I trial program, but possibly as much as US\$70 million. For comparison, during the Ebola virus epidemic of 2013–16, there were 37 vaccine candidates in urgent development with only one becoming a licensed vaccine at a total cost to confirm efficacy in Phase II–III trials of about US\$1 billion.

### **International organizations**

Access to COVID-19 Tools (ACT) Accelerator

Main article: Access to COVID-19 Tools Accelerator

The Access to COVID-19 Tools Accelerator (ACT Accelerator or ACT-A), or the Global Collaboration to Accelerate the Development, Production and Equitable Access to New COVID-19 diagnostics, therapeutics and vaccines, is a G20 initiative announced by pro-tem Chair Mohammed al-Jadaan on 24 April 2020. A call to action was published simultaneously by the World Health Organization (WHO) on 24 April. As of January 2022, it was the largest international effort to achieve equitable access to COVID-19 health technologies.

### **National governments**

Canada announced CA\$275 million in funding for 96 vaccine research projects at Canadian companies and universities, with plans to establish a "vaccine bank" that could be used if another coronavirus outbreak occurs. A further investment of CA\$1.1 billion was added to support clinical trials and develop manufacturing and supply chains for vaccines. On 4 May, the Canadian government committed CA\$850 million to the WHO's live streaming effort to raise US\$8 billion for COVID-19 vaccines and preparedness.

China provided low-rate loans to a vaccine developer through its central bank and "quickly made land available for the company" to build production plants.<sup>1</sup> As of June 2020, six of the eleven COVID-19 vaccine candidates in early-stage human testing were developed by Chinese organizations. Three Chinese vaccine companies and research institutes are supported by the government for financing research, conducting clinical trials, and manufacturing the most promising vaccine candidates, prioritizing rapid evidence of efficacy over safety. On 18 May, China had pledged US\$2 billion to

support overall efforts by the WHO for programs against COVID-19. On 22 July, China announced plans to provide a US\$1 billion loan to make its vaccine accessible for Latin America and the Caribbean. On 24 August, Chinese Premier Li Keqiang announced it would provide Cambodia, Laos, Myanmar, Thailand, and Vietnam priority access to the vaccine once it was distributed.

Great Britain formed a COVID-19 vaccine task force in April 2020, to stimulate local efforts for accelerated development of a vaccine through collaborations of industry, universities, and government agencies. It encompassed every phase of development from research to manufacturing. The vaccine development initiatives at the University of Oxford and Imperial College of London were financed with £44 million.

In the United States, the Biomedical Advanced Research and Development Authority (BARDA), a federal agency funding disease-fighting technology, announced investments of nearly US\$1 billion to support American COVID-19 vaccine development and manufacture of the most promising candidates. On 16 April, BARDA made a US\$483 million investment in vaccine developer Moderna and its partner, Johnson & Johnson. BARDA has earmarked an additional US\$4 billion for development. It will have a role in other programs for development of six to eight vaccine candidates destined for clinical study into 2021 by companies such as Sanofi Pasteur and Regeneron. On 15 May, the government announced funding for a fast-track program called Operation Warp Speed to place multiple vaccine candidates into clinical trials by the fall of 2020 and manufacture 300 million doses of a licensed vaccine by January 2021. The project's chief advisor is Moncef Slaoui and its chief operating officer is General Gustavo Perna. In June, the Warp Speed team said it would work with seven companies developing vaccine candidates: Moderna, Johnson & Johnson, Merck, Pfizer, the University of Oxford in collaboration with AstraZeneca, and two others, although Pfizer later stated that "all the investment for R&D was made by Pfizer at risk.

### **Pharmaceutical companies**

Large pharmaceutical companies with experience in making vaccines at scale, including Johnson & Johnson, AstraZeneca, and GlaxoSmithKline (GSK), formed alliances with biotechnology companies, governments, and universities to accelerate progression to an effective vaccine. To combine financial and manufacturing

capabilities for a pandemic with adjuvanted vaccine technology, GSK joined with Sanofi in an uncommon partnership of multinational companies to support accelerated vaccine development.

By June 2020, tens of billions of dollars were invested by corporations, governments, international health organizations, and university research groups to develop dozens of vaccine candidates and prepare for global vaccination programs to immunize against COVID-19 infection. The corporate investment and need to generate value for public shareholders raised concerns about a "market-based approach" in vaccine development, costly pricing of eventual licensed vaccines, preferred access for distribution first to affluent countries, and sparse or no distribution to where the pandemic is most aggressive, as predicted for densely-populated, impoverished countries unable to afford vaccinations. The collaboration of the University of Oxford with AstraZeneca (a global pharmaceutical company based in the UK) raised concerns about price and sharing of eventual profits from international vaccine sales, arising from whether the British government and university as public partners had commercialization rights. AstraZeneca stated that initial pricing of its vaccine would not include a profit margin for the company while the pandemic was still expanding.

In June, AstraZeneca made a US\$750 million deal allowing CEPI and Gavi, the Vaccine Alliance to manufacture and distribute 300 million doses if its Oxford vaccine candidate proved to be safe and effective, reportedly increasing the company's total production capacity to over 2 billion doses per year. Commercialization of pandemic vaccines is a high-risk business venture, potentially losing billions of dollars in development and pre-market manufacturing costs if the candidate vaccines fail to be safe and effective. Pfizer indicated it was not interested in a government partnership, considering it to be a "third party" slowing progress. Further, there are concerns that rapid-development programs – like Operation Warp Speed – are choosing candidates mainly for their manufacturing advantages rather than optimal safety and efficacy

## **Development**

CEPI classifies development stages for vaccines as "exploratory" (planning and designing a candidate, having no evaluation in vivo), "preclinical" (in vivo evaluation with preparation for manufacturing a compound to test in humans), or initiation of Phase I safety studies in healthy people. Some 321 total vaccine candidates were in

development as either confirmed projects in clinical trials or in early-stage "exploratory" or "preclinical" development, as of September.

### **Early development**

After a coronavirus was isolated in December 2019, its genetic sequence was published on 11 January 2020, triggering an urgent international response to prepare for an outbreak and hasten development of a preventive vaccine.

In February 2020, the WHO said it did not expect a vaccine against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative virus, to become available in less than 18 months. The rapidly growing infection rate of COVID-19 worldwide during 2020 stimulated international alliances and government efforts to urgently organize resources to make multiple vaccines on shortened timelines, with four vaccine candidates entering human evaluation in March (see the table of clinical trials started in 2020, below).

By April 2020, "almost 80 companies and institutes in 19 countries" were working on this virtual gold rush. Also in April, CEPI estimated that as many as six of the vaccine candidates against COVID-19 should be chosen by international coalitions for development through Phase II–III trials, and three should be streamlined through regulatory and quality assurance for eventual licensing at a total cost of at least US\$2 billion. Another analysis estimates ten candidates will need simultaneous initial development, before a select few are chosen for the final path to licensing.

### **Cyber-espionage efforts**

In July 2020, the UK's National Cyber Security Centre, the Canadian Communications Security Establishment, and the U.S.'s Homeland Security Department Cybersecurity and Infrastructure Security Agency, and the National Security Agency (NSA) issued a joint statement saying that Russian state-backed hackers, specifically Cozy Bear (APT29) were attempting to steal COVID-19 treatment and vaccine research from academic and pharmaceutical institutions in other countries. Russia denied the claim, but has a history of cyber-espionage and cyberattacks on foreign targets. In November 2020, Microsoft reported that the Russian state-sponsored hacking group Fancy Bear (APT28) and North Korean state-sponsored hacking groups nicknamed "Zinc" and "Cerium" had been implicated in recent cyberattacks against researchers

developing a COVID-19 vaccine (including in Canada, France, India, South Korea, and the U.S.) as well as against the World Health Organization, and that the cyberattackers had used both brute force and phishing techniques to compromise computer systems. Microsoft reported that at least nine healthcare institutions were targeted, and that some attempts were successful. In February 2021, South Korean's National Intelligence Service gave a closed-door briefing to members of the South Korean parliament about North Korean efforts to steal COVID-19 vaccine technology from Pfizer.

### **Preclinical research**

In April 2020, the WHO issued a statement representing dozens of vaccine scientists around the world, pledging collaboration to speed development of a vaccine against COVID-19. The WHO coalition is encouraging international cooperation between organizations developing vaccine candidates, national regulatory and policy agencies, financial contributors, public health associations, and governments, for eventual manufacturing of a successful vaccine in quantities sufficient to supply all affected regions, particularly low-resource countries.

Industry analysis of past vaccine development shows failure rates of 84–90%. Because COVID-19 is a novel virus target with properties still being discovered and requiring innovative vaccine technologies and development strategies, the risks associated with developing a successful vaccine across all steps of preclinical and clinical research are high.

To assess the potential for vaccine efficacy, unprecedented computer simulations and new COVID-19-specific animal models are being developed multinationally. Of the confirmed active vaccine candidates, about 70% are being developed by private companies, with the remaining projects under development by academic, government coalitions, and health organizations. Historically, the probability of success for an infectious disease vaccine candidate to pass preclinical barriers and reach Phase I of human testing is 41–57%.

### **Challenges**

The rapid development and urgency of producing a vaccine for the COVID-19 pandemic may increase the risks and failure rate of delivering a safe, effective vaccine.

One study found that between 2006 and 2015, the success rate of obtaining approval from Phase I to successful Phase III trials was 16.2% for vaccines, and CEPI indicates a potential success rate of only 10% for vaccine candidates in 2020 development. Research at universities is obstructed by physical distancing and closing of laboratories.

### **Biosafety**

Early research to assess vaccine efficacy using COVID-19-specific animal models, such as ACE2-transgenic mice, other laboratory animals, and non-human primates, indicates a need for biosafety-level 3 containment measures for handling live viruses, and international coordination to ensure standardized safety procedures.

### **Antibody-dependent enhancement**

#### **Main article: Antibody-dependent enhancement**

Although the quality and quantity of antibody production by a potential vaccine is intended to neutralize the COVID-19 infection, a vaccine may have an unintended opposite effect by causing antibody-dependent disease enhancement (ADE), which increases the virus attachment to its target cells and might trigger a cytokine storm if a vaccinated person is later attacked by the virus. The vaccine technology platform (for example, viral vector vaccine, spike (S) protein vaccine or protein subunit vaccine), vaccine dose, timing of repeat vaccinations for the possible recurrence of COVID-19 infection, and elderly age are factors determining the risk and extent of ADE. The antibody response to a vaccine is a variable of vaccine technologies in development, including whether the vaccine has precision in its mechanism, and choice of the route for how it is given (intramuscular, intradermal, oral, or nasal).

Prior to the pandemic, ADE was observed in animal studies of laboratory rodents with vaccines for SARS-CoV, the virus that causes severe acute respiratory syndrome (SARS). Researchers therefore emphasized the need to carefully assess the potential for ADE to occur with COVID-19. However, as of 27 January 2022 there have been no observed incidences with vaccines for COVID-19 in trials with nonhuman primates, in clinical trials with humans, or following the widespread use of approved vaccines.

### **Trials**

In April 2020, the WHO published an "R&D Blueprint (for the) novel Coronavirus" (Blueprint). The Blueprint documented a "large, international, multi-site, individually

randomized controlled clinical trial" to allow "the concurrent evaluation of the benefits and risks of each promising candidate vaccine within 3–6 months of it being made available for the trial." The Blueprint listed a Global Target Product Profile (TPP) for COVID-19, identifying favorable attributes of safe and effective vaccines under two broad categories: "vaccines for the long-term protection of people at higher risk of COVID-19, such as healthcare workers", and other vaccines to provide rapid-response immunity for new outbreaks. The international TPP team was formed to 1) assess the development of the most promising candidate vaccines; 2) map candidate vaccines and their clinical trial worldwide, publishing a frequently-updated "landscape" of vaccines in development; 3) rapidly evaluate and screen for the most promising candidate vaccines simultaneously before they are tested in humans; and 4) design and coordinate a multiple-site, international randomized controlled trial – the "Solidarity trial" for vaccines – to enable simultaneous evaluation of the benefits and risks of different vaccine candidates under clinical trials in countries where there are high rates of COVID-19 disease, ensuring fast interpretation and sharing of results around the world. The WHO vaccine coalition will prioritize which vaccines should go into Phase II and III clinical trials, and determine harmonized Phase III protocols for all vaccines achieving the pivotal trial stage.

Phase I trials test primarily for safety and preliminary dosing in a few dozen healthy subjects, while Phase II trials – following success in Phase I – evaluate immunogenicity, dose levels (efficacy based on biomarkers) and adverse effects of the candidate vaccine, typically in hundreds of people. A Phase I–II trial consists of preliminary safety and immunogenicity testing, is typically randomized, placebo-controlled, while determining more precise, effective doses. Phase III trials typically involve more participants at multiple sites, include a control group, and test effectiveness of the vaccine to prevent the disease (an "interventional" or "pivotal" trial), while monitoring for adverse effects at the optimal dose. Definition of vaccine safety, efficacy, and clinical endpoints in a Phase III trial may vary between the trials of different companies, such as defining the degree of side effects, infection or amount of transmission, and whether the vaccine prevents moderate or severe COVID-19 infection. Phase III trials of AstraZeneca's intervention started 28 August 2020 and ended 5 March 2021.

In January 2022 'Moderna' and 'Pfizer' both started trials of vaccine tailored to immunize against the Omicron variant.<sup>1</sup> See Response by vaccine producers for vaccine development aimed at providing immunity to Omicron.

### **Enrollment of participants**

Vaccine developers have to invest resources internationally to find enough participants for Phase II–III clinical trials when the virus has proved to be a "moving target" of changing transmission rate across and within countries, forcing companies to compete for trial participants. As an example in June, the Chinese vaccine developer Sinovac formed alliances in Malaysia, Canada, the UK, and Brazil among its plans to recruit trial participants and manufacture enough vaccine doses for a possible Phase III study in Brazil where COVID-19 transmission was accelerating during June. As the COVID-19 pandemic within China became more isolated and controlled, Chinese vaccine developers sought international relationships to conduct advanced human studies in several countries, creating competition for trial participants with other manufacturers and the international Solidarity trial organized by the WHO.<sup>[82]</sup> In addition to competition over recruiting participants, clinical trial organizers may encounter people unwilling to be vaccinated due to vaccine hesitancy or disbelieving the science of the vaccine technology and its ability to prevent infection.

Having an insufficient number of skilled team members to administer vaccinations may hinder clinical trials that must overcome risks for trial failure, such as recruiting participants in rural or low-density geographic regions, and variations of age, race, ethnicity, or underlying medical conditions.

Eligibility criteria for AstraZeneca's Phase III trial included: Ages, 18 to 130 Years, All Sexes, and Healthy Volunteers. Inclusion Criteria specified, Increased risk of SARS-CoV-2 infection and medically stable. Exclusion criteria included; 1) confirmed or suspected immunosuppressive or immunodeficient state, 2) significant disease, disorder, or finding, and 3) Prior or concomitant vaccine therapy for COVID-19.

### **Adaptive design for the Solidarity trial**

A clinical trial design in progress may be modified as an "adaptive design" if accumulating data in the trial provide early insights about positive or negative efficacy of the treatment. The WHO Solidarity trial of multiple vaccines in clinical studies

during 2020, will apply adaptive design to rapidly alter trial parameters across all study sites as results emerge. Candidate vaccines may be added to the Solidarity trial as they become available if priority criteria are met, while vaccine candidates showing poor evidence of safety or efficacy compared to placebo or other vaccines will be dropped from the international trial.

Adaptive designs within ongoing Phase II–III clinical trials on candidate vaccines may shorten trial durations and use fewer subjects, possibly expediting decisions for early termination or success, avoiding duplication of research efforts, and enhancing coordination of design changes for the Solidarity trial across its international locations.

### **Proposed challenge studies**

#### **Main article: Human challenge study**

Challenge studies are a type of clinical trial involving the intentional exposure of the test subject to the condition tested, an approach that can significantly accelerate vaccine development. Human challenge studies may be ethically controversial because they involve exposing test subjects to dangers beyond those posed by potential side effects of the substance being tested. Challenge studies have been used for diseases less deadly than COVID-19 infection, such as common influenza, typhoid fever, cholera, and malaria. The World Health Organization developed a guidance document with criteria for conducting COVID-19 challenge studies in healthy people, including scientific and ethical evaluation, public consultation and coordination, selection and informed consent of the participants, and monitoring by independent experts. Beginning in January 2021, dozens of young adult volunteers will be deliberately infected with COVID-19 in a challenge trial conducted in a London hospital under management by the British government COVID-19 Vaccine Taskforce.<sup>[97]</sup> Once an infection dose of COVID-19 is identified, two or more of the candidate COVID-19 vaccines will be tested for effectiveness in preventing infection.

#### **Authorizations and licensure**

At the beginning of the COVID-19 pandemic in 2020, the WHO issued a guideline as an Emergency Use Listing of new vaccines, a process derived from the 2013–16 Ebola epidemic. It required that a vaccine candidate developed for a life-threatening

emergency be manufactured using GMP and that it complete development according to WHO prequalification procedures

Even as new vaccines are developed during the COVID-19 pandemic, licensure of COVID-19 vaccine candidates requires submission of a full dossier of information on development and manufacturing quality. In the UK and the EU, companies may use a "rolling review process", supplying data as they become available during Phase III trials, rather than developing the full documentation over months or years at the end of clinical research, as is typical. This rolling process allows the UK's regulator (MHRA) and the European Committee for Medicinal Products for Human Use to evaluate clinical data in real time, enabling a promising vaccine candidate to be approved on a rapid timeline by both the UK's MHRA and the European Medicines Agency (EMA). A rolling review process for the Moderna vaccine candidate was initiated in October by Health Canada and the EMA and in November in Canada for the Pfizer-BioNTech candidate.

### **Early authorizations in China and Russia**

On 24 June 2020, China approved the CanSino vaccine for limited use in the military and two inactivated virus vaccines for emergency use in high-risk occupations. On 11 August 2020, Russia announced the approval of its Sputnik V vaccine for emergency use, though one month later only small amounts of the vaccine had been distributed for use outside of the phase 3 trial. In September, the United Arab Emirates approved emergency use of the Sinopharm BIBP vaccine for healthcare workers, followed by similar emergency use approval from Bahrain in November.

### **First authorizations of RNA vaccines**

In the United States, an Emergency Use Authorization (EUA) is "a mechanism to facilitate the availability and use of medical countermeasures, including vaccines, during public health emergencies, such as the current COVID-19 pandemic." Once an EUA is issued by the FDA, the vaccine developer is expected to continue the Phase III clinical trial to finalize safety and efficacy data, leading to application for licensure (approval) in the United States. In mid-2020, concerns that the FDA might grant a vaccine EUA before full evidence from a Phase III clinical trial was available raised broad concerns about the potential for lowered standards in the face of political pressure. On 8 September 2020, nine leading pharmaceutical companies involved in

COVID-19 vaccine research signed a letter, pledging that they would submit their vaccines for emergency use authorization only after Phase III trials had demonstrated safety and efficacy.

The Pfizer-BioNTech partnership submitted an EUA request to the FDA for the mRNA vaccine BNT162b2 (active ingredient tozinameran) on 20 November 2020. On 2 December 2020, the United Kingdom's Medicines and Healthcare products Regulatory Agency (MHRA) gave temporary regulatory approval for the Pfizer–BioNTech vaccine, becoming the first country to approve this vaccine and the first country in the Western world to approve the use of any COVID-19 vaccine. On 8 December 2020, 90-year-old Margaret Keenan received the vaccine at University Hospital Coventry, becoming the first person known to be vaccinated outside of a trial,<sup>1</sup> as the UK's vaccination programme began. However, other vaccines had been given earlier in Russia. On 11 December 2020, the US Food and Drug Administration (FDA) granted an Emergency Use Authorization (EUA) for the Pfizer-BioNTech vaccine. On 19 December 2020, the Swiss Agency for Therapeutic Products (Swissmedic) approved the Pfizer-BioNTech vaccine for regular use, two months after receiving the application. This was the first authorization by a stringent regulatory authority under a standard procedure for any COVID-19 vaccine. On 23 December, a 90-year-old Lucerne resident became the first person to receive the vaccine in continental Europe.

As of December 2020, many countries and the European Union have authorized or approved the Pfizer-BioNTech COVID-19 vaccine. Bahrain and the United Arab Emirates granted emergency marketing authorization for the Sinopharm BIBP vaccine. In the United Kingdom, 138,000 people had received the Pfizer-BioNTech COVID-19 vaccine Comirnaty by 16 December, during the first week of the UK vaccination programme. On 18 December 2020, the US FDA granted an EUA for mRNA-1273, the Moderna vaccine. Vaccine manufacturers are awaiting full approvals to name their vaccines.

Moderna submitted a request for an EUA for mRNA-1273 to the FDA on 30 November 2020. On 18 December 2020, the FDA granted an EUA for the Moderna vaccine.

## **United Kingdom**

The UK Medicines and Healthcare products Regulatory Agency (MHRA) gave the first approval to the Oxford/AstraZeneca vaccine on 30 December 2020, as its second vaccine to enter the national rollout under a conditional and temporary authorization to supply.

## **Australia**

In October 2020, the Australian Therapeutic Goods Administration (TGA) granted provisional determinations to AstraZeneca Pty Ltd in relation to its COVID-19 vaccine, ChAdOx1-S [recombinant] and to Pfizer Australia Pty Ltd in relation to its COVID-19 vaccine, BNT162b2 [mRNA]. Janssen Cilag Pty Ltd was granted a provisional determination in relation to its COVID-19 vaccine, Ad26.COV2.S, in November 2020.

On 24 January 2021, the TGA granted provisional approval to Pfizer Australia Pty Ltd for Comirnaty

On 24 June 2021, the TGA granted provisional determination to Moderna Australia Pty Ltd for Elasomeran

## **European Union**

In October 2020, the Committee for Medicinal Products for Human Use (CHMP) of the European Medicines Agency (EMA) started 'rolling reviews' of the vaccines known as COVID-19 Vaccine AstraZeneca (ChAdOx1-SARS-CoV-2) and Pfizer-BioNTech COVID-19 Vaccine (BNT162b2). The EMA released an update on the status of its rolling review of the COVID-19 Vaccine AstraZeneca in December 2020, after the UK granted a temporary authorization of supply for the vaccine.

In November 2020, the EMA published a safety monitoring plan and guidance on risk management planning (RMP) for COVID-19 vaccines. The plan outlines how relevant new information emerging after the authorization and uptake of COVID-19 vaccines in the pandemic situation will be collected and promptly reviewed.<sup>[136]</sup> All RMPs for COVID-19 vaccines will be published on the EMA's website.<sup>[136]</sup> The EMA published guidance for developers of potential COVID-19 vaccines on the clinical evidence to include in marketing authorization applications.

In November 2020, the CHMP started a rolling review of the Moderna vaccine for COVID-19 known as mRNA-1273

In December 2020, the EMA received application for conditional marketing authorizations (CMA) for the mRNA vaccines BNT162b2 and mRNA1273 (Moderna Covid-19 vaccine). The assessments of the vaccines are scheduled to proceed under accelerated timelines with the possibility of opinions issued within weeks.

In December 2020, the CHMP started a rolling review of the Ad26.COV2.S COVID-19 vaccine from Janssen-Cilag International N.V

On 21 December 2020, the CHMP recommended granting a conditional marketing authorization for the Pfizer-BioNTech COVID-19 vaccine, Comirnaty (active ingredient tozinameran), developed by BioNTech and Pfizer. The recommendation was accepted by the European Commission the same day.

On 6 January 2021, the CHMP recommended granting a conditional marketing authorization for COVID-19 Vaccine Moderna and the recommendation was accepted by the European Commission the same day.

In January 2021, the EMA received an application for conditional marketing authorization (CMA) for the COVID-19 vaccine known as COVID-19 Vaccine AstraZeneca, developed by AstraZeneca and Oxford University. On 29 January 2021, the CHMP recommended granting the conditional marketing authorization and the recommendation was accepted by the European Commission the same day.

In February 2021, the CHMP started a rolling review of NVX-CoV2373, a COVID-19 vaccine being developed by Novavax CZ AS (a subsidiary of Novavax, Inc.) and a rolling review of CVnCoV, a COVID-19 vaccine being developed by CureVac AG.

In February 2021, the EMA announced that they are developing vaccine guidance to address the virus variants.<sup>1</sup>

In February 2021, the EMA received an application for conditional marketing authorization (CMA) for the COVID-19 Vaccine Janssen developed by Janssen-Cilag International N.V. The EMA recommended a conditional marketing authorization of the COVID-19 Vaccine Janssen on 11 March 2021 and it was accepted by the European Commission the same day.

In March 2021, the CHMP started a rolling review of Sputnik V (Gam-COVID-Vac). The EU applicant is R-Pharm Germany GmbH

In May 2021, the CMMP started evaluating the use of Comirnaty to include young people aged 12 to 15 and it started a rolling review of Sinovac COVID-19 Vaccine. The EU applicant for Sinovac is Life'OnS.r.l.

Conceptual diagram showing three vaccine types for forming SARS-CoV-2 proteins to prompt an immune response: (1) RNA vaccine, (2) subunit vaccine, (3) viral vector vaccine

Vaccine platforms being employed for SARS-CoV-2. Whole virus vaccines include both attenuated and inactivated forms of the virus. Protein and peptide subunit vaccines are usually combined with an adjuvant in order to enhance immunogenicity. The main emphasis in SARS-CoV-2 vaccine development has been on using the whole spike protein in its trimeric form, or components of it, such as the RBD region. Multiple non-replicating viral vector vaccines have been developed, particularly focused on adenovirus, while there has been less emphasis on the replicating viral vector constructs.

As of July 2021, at least nine different technology platforms are under research and development to create an effective vaccine against COVID-19. Most of the platforms of vaccine candidates in clinical trials are focused on the coronavirus spike protein (S protein) and its variants as the primary antigen of COVID-19 infection, since the S protein triggers strong B-cell and T-cell immune responses. However, other coronavirus proteins are also being investigated for vaccine development, like the nucleocapsid, because they also induce a robust T-cell response and their genes are more conserved and recombine less frequently (compared to Spike). Future generations of COVID-19 vaccines that may target more and conserved genomic regions will also act as an insurance against the manifestation of catastrophic scenarios concerning the future evolutionary path of SARS-CoV-2, or any similar Coronavirus epidemic/pandemic.

Platforms developed in 2020 involved nucleic acid technologies (nucleoside-modified messenger RNA and DNA), non-replicating viral vectors, peptides, recombinant proteins, live attenuated viruses, and inactivated viruses.

Many vaccine technologies being developed for COVID-19 are not like influenza vaccines, but rather are using "next-generation" strategies for precise

targeting of COVID-19 infection mechanisms. Several of the synthetic vaccines use a 2P mutation to lock the spike protein into its prefusion configuration, stimulating an adaptive immune response to the virus before it attaches to a human cell.[50] Vaccine platforms in development may improve flexibility for antigen manipulation, and effectiveness for targeting mechanisms of COVID-19 infection in susceptible population subgroups, such as healthcare workers, the elderly, children, pregnant women, and people with weakened immune systems.

### **Further information: mRNA vaccine**

Several COVID-19 vaccines, such as the Pfizer–BioN Tech and Moderna vaccines, use RNA to stimulate an immune response. When introduced into human tissue, the vaccine contains either self-replicating RNA or messenger RNA (mRNA), which both cause cells to express the SARS-CoV-2 spike protein. This teaches the body how to identify and destroy the corresponding pathogen. RNA vaccines often use nucleoside-modified messenger RNA. The delivery of mRNA is achieved by a coformulation of the molecule into lipid nanoparticles which protect the RNA strands and help their absorption into the cells.

RNA vaccines are the first COVID-19 vaccines to be authorized in the United Kingdom, the United States and the European Union. Authorized vaccines of this type are the Pfizer–BioNTech and Moderna vaccines. The CVnCoV RNA vaccine from CureVac failed in clinical trials.

Severe allergic reactions are rare. In December 2020, 1,893,360 first doses of Pfizer–BioNTech COVID-19 vaccine administration resulted in 175 cases of severe allergic reaction, of which 21 were anaphylaxis. For 4,041,396 Moderna COVID-19 vaccine dose administrations in December 2020 and January 2021, only ten cases of anaphylaxis were reported. Lipid nanoparticles (LNPs) were most likely responsible for the allergic reactions.

### **Adenovirus vector vaccines**

These vaccines are examples of non-replicating viral vector vaccines, using an adenovirus shell containing DNA that encodes a SARS-CoV-2 protein. The viral vector-based vaccines against COVID-19 are non-replicating, meaning that they do not

make new virus particles, but rather produce only the antigen which elicits a systemic immune response

Authorized vaccines of this type are the Oxford–AstraZeneca COVID-19 vaccine, the Sputnik V COVID-19 vaccine, Convidecia, and the Janssen COVID-19 vaccine.

Convidecia and Janssen are both one-shot vaccines which offer less complicated logistics and can be stored under ordinary refrigeration for several months.

Sputnik V uses Ad26 for its first dose, which is the same as Janssen's only dose, and Ad5 for the second dose, which is the same as Convidecia's only dose.

In August 2021, the developers of Sputnik V proposed, in view of the Delta case surge, that Pfizer test the Ad26 component (termed its 'Light' version) as a booster shot.

### **Inactivated virus vaccines**

Inactivated vaccines consist of virus particles that are grown in culture and then killed using a method such as heat or formaldehyde to lose disease-producing capacity, while still stimulating an immune response

Authorized vaccines of this type are the Chinese CoronaVac and the Sinopharm BIBP and WIBP vaccines; the Indian Covaxin; later this year the Russian CoviVac; the Kazakh vaccine QazVac and the Iranian COVIranBarekat Vaccines in clinical trials include the Valneva COVID-19 vaccine .

### **Subunit vaccines**

Subunit vaccines present one or more antigens without introducing whole pathogen particles. The antigens involved are often protein subunits, but can be any molecule fragment of the pathogen.

The authorized vaccines of this type are Novavax COVID-19 vaccine, the peptide vaccine EpiVacCorona, ZF2001, MVC-COV1901, Corbevax, the Sanofi–GSK vaccine, and Soberana 02 (a conjugate vaccine).<sup>1</sup>

### **Other types**

Additional types of vaccines that are in clinical trials include virus-like particle vaccines, multiple DNA plasmid vaccines,<sup>[98][99][100][101][102][103]</sup> at least two lentivirus vector vaccines, a conjugate vaccine, and a vesicular stomatitis virus displaying the SARS-CoV-2 spike protein.

Scientists investigated whether existing vaccines for unrelated conditions could prime the immune system and lessen the severity of COVID-19 infections. There is experimental evidence that the BCG vaccine for tuberculosis has non-specific effects on the immune system, but no evidence that this vaccine is effective against COVID-19.

### **Intranasal**

Intranasal vaccines target mucosal immunity in the nasal mucosa which is a portal for viral entrance to the body. These vaccines are designed to stimulate nasal immune factors, such as IgA. In addition to inhibiting the virus, nasal vaccines provide ease of administration because no needles (or needle phobia) are involved. Nasal vaccines have been approved for influenza, but not for COVID-19.

A variety of intranasal COVID-19 vaccines are undergoing clinical trials. One is in use in China. Examples include a vaccine candidate which uses a modified avian virus as a vector to target SARS-CoV-2 spike proteins and an mRNA vaccine delivered via a nasal nanoparticle spray. In September 2022, India and China approved the two first nasal COVID-19 vaccines (iNCOVACC and Convidecia) which may (as boosters)<sup>1</sup> also reduce transmission (potentially via sterilizing immunity).

### **Autologous**

Aivita Biomedical is developing an experimental autologous dendritic cell COVID-19 vaccine kit where the vaccine is prepared and incubated at the point-of-care using cells from the intended recipient. The vaccine is undergoing small phase I and phase II clinical studies.

## **Universal vaccine**

### **Main article: Universal coronavirus vaccine**

A universal coronavirus vaccine would be effective against all coronavirus (and possibly other) viruses. The concept was publicly endorsed by NIAID director Anthony Fauci, virologist Jeffery K. Taubenberger, and David M. Morens. In March 2022, the White House released the "National COVID-19 Preparedness Plan", which recommended accelerating development of a universal coronavirus vaccine.

One attempt at such a vaccine is being developed at Walter Reed Army Institute of Research. It uses a spike ferritin-based nanoparticle (SpFN). This vaccine began a Phase I clinical trial in April 2022

Another strategy is to attach vaccine fragments from multiple strains to a nanoparticle scaffold. Universality is enhanced by targeting the receptor-binding domain rather than the spike protein.

### **Formulation**

As of September 2020, eleven of the vaccine candidates in clinical development use adjuvants to enhance immunogenicity. An immunological adjuvant is a substance formulated with a vaccine to elevate the immune response to an antigen, such as the COVID-19 virus or influenza virus. Specifically, an adjuvant may be used in formulating a COVID-19 vaccine candidate to boost its immunogenicity and efficacy to reduce or prevent COVID-19 infection in vaccinated individuals. Adjuvants used in COVID-19 vaccine formulation may be particularly effective for technologies using the inactivated COVID-19 virus and recombinant protein-based or vector-based vaccines.<sup>[129]</sup> Aluminum salts, known as "alum", were the first adjuvant used for licensed vaccines, and are the adjuvant of choice in some 80% of adjuvanted vaccines. The alum adjuvant initiates diverse molecular and cellular mechanisms to enhance immunogenicity, including release of proinflammatory cytokines.

## **Clinical research**

### **Main article: COVID-19 vaccine clinical research**

COVID-19 vaccine clinical research uses clinical research to establish the characteristics of COVID-19 vaccines. These characteristics include efficacy, effectiveness and safety. As of November 2022, 40 vaccines are authorized by at least one national regulatory authority for public use:

As of June 2022, 353 vaccine candidates are in various stages of development, with 135 in clinical research, including 38 in phase I trials, 32 in phase I–II trials, 39 in phase III trials, and 9 in phase IV development.

Post-vaccination complications

Main article: Embolic and thrombotic events after COVID-19 vaccination

Post-vaccination embolic and thrombotic events, termed vaccine-induced immune thrombotic thrombocytopenia (VITT), vaccine-induced prothrombotic immune thrombocytopenia (VIPIT) thrombosis with thrombocytopenia syndrome (TTS), vaccine-induced immune thrombocytopenia and thrombosis (VITT), or vaccine-associated thrombotic thrombocytopenia (VATT), are rare types of blood clotting syndromes that were initially observed in a number of people who had previously received the Oxford–AstraZeneca COVID-19 vaccine (AZD1222) during the COVID-19 pandemic. It was subsequently also described in the Janssen COVID-19 vaccine (Johnson & Johnson) leading to suspension of its use until its safety had been reassessed. On 5 May 2022 the FDA posted a bulletin limiting the use of the Janssen Vaccine to very specific cases due to further reassessment of the risks of TTS, although the FDA also stated in the same bulletin that the benefits of the vaccine outweigh the risks.

In April 2021, AstraZeneca and the European Medicines Agency (EMA) updated their information for healthcare professionals about AZD1222, saying it is "considered plausible" that there is a causal relationship between the vaccination and the occurrence of thrombosis in combination with thrombocytopenia and that, "although such adverse reactions are very rare, they exceeded what would be expected in the general population".

## **History**

SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), the virus that causes COVID-19, was isolated in late 2019. Its genetic sequence was published on 11 January 2020, triggering the urgent international response to prepare for an outbreak and hasten development of a preventive COVID-19 vaccine. Since 2020, vaccine development has been expedited via unprecedented collaboration in the multinational pharmaceutical industry and between governments. By June 2020, tens of billions of dollars were invested by corporations, governments, international health organizations, and university research groups to develop dozens of vaccine candidates and prepare for global vaccination programs to immunize against COVID-19 infection. According to the Coalition for Epidemic Preparedness Innovations (CEPI), the geographic distribution of COVID-19 vaccine development shows North American entities to have

about 40% of the activity, compared to 30% in Asia and Australia, 26% in Europe, and a few projects in South America and Africa.

In February 2020, the World Health Organization (WHO) said it did not expect a vaccine against SARS-CoV-2 to become available in less than 18 months. Virologist Paul Offit commented that, in hindsight, the development of a safe and effective vaccine within 11 months was a remarkable feat. The rapidly growing infection rate of COVID-19 worldwide during 2020 stimulated international alliances and government efforts to urgently organize resources to make multiple vaccines on shortened timelines, with four vaccine candidates entering human evaluation in March (see COVID-19 vaccine § Trial and authorization status).

On 24 June 2020, China approved the CanSino vaccine for limited use in the military, and two inactivated virus vaccines for emergency use in high-risk occupations. On 11 August 2020, Russia announced the approval of its Sputnik V vaccine for emergency use, though one month later only small amounts of the vaccine had been distributed for use outside of the phase 3 trial.

The Pfizer–BioNTech partnership submitted an Emergency Use Authorization (EUA) request to the U.S. Food and Drug Administration (FDA) for the mRNA vaccine BNT162b2 (active ingredient tozinameran) on 20 November 2020. On 2 December 2020, the United Kingdom's Medicines and Healthcare products Regulatory Agency (MHRA) gave temporary regulatory approval for the Pfizer–BioNTech vaccine, becoming the first country to approve the vaccine and the first country in the Western world to approve the use of any COVID-19 vaccine. As of 21 December 2020, many countries and the European Union had authorized or approved the Pfizer–BioNTech COVID-19 vaccine. Bahrain and the United Arab Emirates granted emergency marketing authorization for the Sinopharm BIBP vaccine. On 11 December 2020, the FDA granted an EUA for the Pfizer–BioNTech COVID-19 vaccine. A week later, they granted an EUA for mRNA-1273 (active ingredient elasomeran), the Moderna vaccine.

On 31 March 2021, the Russian government announced that they had registered the first COVID-19 vaccine for animals. Named Carnivac-Cov, it is an inactivated vaccine for carnivorous animals, including pets, aimed at preventing mutations that occur during the interspecies transmission of SARS-CoV-2.

In October 2022 China began administering an oral vaccine developed by CanSino Biologics, using its adenovirus model.

Despite the availability of mRNA and viral vector vaccines, worldwide vaccine equity has not been achieved. The ongoing development and use of whole inactivated virus (WIV) and protein-based vaccines has been recommended, especially for use in developing countries, to dampen further waves of the pandemic.

In November 2021, the full nucleotide sequences of the AstraZeneca and Pfizer/BioNTech vaccines were released by the UK Medicines and Healthcare products Regulatory Agency, in response to a freedom of information request.

### **Effectiveness**

This section is an excerpt from COVID-19 vaccine clinical research § Effectiveness

Evidence from vaccine use during the pandemic shows vaccination can reduce infection and is most effective at preventing severe COVID-19 symptoms and death, but is less good at preventing mild COVID-19. Efficacy wanes over time but can be maintained with boosters. In 2021 the CDC reported that unvaccinated people were 10 times more likely to be hospitalized and 11 times more likely to die than fully vaccinated people.

CDC reported that vaccine effectiveness fell from 91% against Alpha to 66% against Delta. One expert stated that "those who are infected following vaccination are still not getting sick and not dying like was happening before vaccination." By late August 2021 the Delta variant accounted for 99 percent of U.S. cases and was found to double the risk of severe illness and hospitalization for those not yet vaccinated.

In November 2021, a study by the ECDC estimated that 470,000 lives over the age of 60 had been saved since the start of vaccination roll-out in the European region.

On 10 December 2021, the UK Health Security Agency reported that early data indicated a 20- to 40-fold reduction in neutralizing activity for Omicron by sera from Pfizer 2-dose vaccinees relative to earlier strains. After a booster dose (usually with an mRNA vaccine), vaccine effectiveness against symptomatic disease was at 70%–75%, and the effectiveness against severe disease was expected to be higher

According to early December 2021 CDC data, "unvaccinated adults were about 97 times more likely to die from COVID-19 than fully vaccinated people who had received boosters".

A meta analysis looking into COVID-19 vaccine differences in immunosuppressed individuals found that people with a weakened immune system, are less able to produce neutralizing antibodies. For example, organ transplant recipients needing three vaccines to achieve seroconversion.<sup>12</sup> A study on the serologic response to mRNA vaccines among patients with lymphoma, leukemia and myeloma found that one-quarter of patients did not produce measurable antibodies, varying by cancer type.

In February 2023, a systematic review in *The Lancet* said that the protection afforded by infection was comparable to that from vaccination, albeit with an increased risk of severe illness and death from the disease of an initial infection.

### **Duration of immunity**

As of 2021, available evidence shows that fully vaccinated individuals and those previously infected with SARS-CoV-2 have a low risk of subsequent infection for at least six months. There is insufficient data to determine an antibody titer threshold that indicates when an individual is protected from infection. Multiple studies show that antibody titers are associated with protection at the population level, but individual protection titers remain unknown. For some populations, such as the elderly and the immunocompromised, protection levels may be reduced after both vaccination and infection. Available evidence indicates that the level of protection may not be the same for all variants of the virus.

As of December 2021, there are no FDA-authorized or approved tests that providers or the public can use to determine if a person is protected from infection reliably.

As of March 2022, elderly residents' protection against severe illness, hospitalization and death in English care homes was high immediately after vaccination, but protection declined significantly in the months following vaccination. Protection among care home staff, who were younger, declined much more slowly. Regular boosters are recommended for older people, and boosters for care home residents every six months appear reasonable.

The US Centers for Disease Control and Prevention (CDC) recommends a fourth dose of the Pfizer mRNA vaccine as of March 2022, for "certain immunocompromised individuals and people over the age of 50"

### **Immune evasion by variants**

In contrast to other investigated prior variants, the SARS-CoV-2 Omicron variant and its BA.4/5 subvariants are evading immunity induced by vaccines, which may lead to breakthrough infections despite recent vaccination. Nevertheless, current vaccines are thought to provide protection against severe illness, hospitalizations, and deaths due to Omicron

### **Vaccine adjustments**

This section is an excerpt from SARS-CoV-2 Omicron variant § Vaccine adjustments  
In June 2022, researchers, health organizations and regulators were discussing, investigating (including with preliminary laboratory studies and trials) and partly recommending COVID-19 vaccine boosters that mix the original vaccine formulation with Omicron-adjusted parts – such as spike proteins of a specific Omicron subvariant – to better prepare the immune system to recognize a wide variety of variants amid substantial and ongoing immune evasion by Omicron (and other SARS-CoV-2 variants).

In June 2022 Pfizer and Moderna developed bivalent vaccines to protect against the SARS-COV-2 wild-type and the Omicron variant. The bivalent vaccines are well-tolerated and offer immunity to omicron superior to previous mRNA vaccines. The United States Food and Drug Administration (FDA) has authorized the bivalent vaccines for use in the USA

### **Effectiveness against transmission**

As of 2022, fully vaccinated individuals with breakthrough infections with SARS-CoV-2 delta (B.1.617.2) variant have peak viral load similar to unvaccinated cases and can transmit infection in household settings.

### **Mix and match**

According to studies, the combination of two different COVID-19 vaccines, also called cross vaccination or mix-and-match method, provides protection equivalent to that of mRNA vaccines – including protection against the Delta variant. Individuals who

receive the combination of two different vaccines produce strong immune responses, with side effects no worse than those caused by standard regimens.

### **Adverse events**

For most people, the side effects, also called adverse effects, from COVID-19 vaccines are mild and can be managed at home.

All vaccines that are administered via intramuscular injection, including COVID-19 vaccines, have side effects related to the mild trauma associated with the procedure and introduction of a foreign substance into the body. These include soreness, redness, rash, and inflammation at the injection site. Other common side effects include fatigue, headache, myalgia (muscle pain), and arthralgia (joint pain), all of which generally resolve without medical treatment within a few days. Also like any other vaccine, some people are allergic to one or more ingredients in COVID-19 vaccines. Typical side effects are stronger and more common in younger people and in subsequent doses, and up to 20% of people report a disruptive level of side effects after the second dose of an mRNA vaccine. These side effects are less common or weaker in inactivated vaccines. Covid-19 vaccination related enlargement of lymph node happens in 11.6% of those who received one dose of vaccine and in 16% of those received two doses.

COVID-19 vaccination is safe for breastfeeding people. Temporary changes to the menstrual cycle in young women have been reported. However, these changes are "small compared with natural variation and quickly reverse". In one study, women who received both doses of a two-dose vaccine during the same menstrual cycle (an atypical situation) may see their next period begin a couple of days late. They have about twice the usual risk of a clinically significant delay (about 10% of these women, compared to about 4% of unvaccinated women). Cycle lengths return to normal after two menstrual cycles post-vaccination. Women who received doses in separate cycles had approximately the same natural variation in cycle lengths as unvaccinated women. Other temporary menstrual effects have been reported, such as heavier than normal menstrual bleeding after vaccination.

Serious adverse events associated COVID-19 vaccines are generally rare but of high interest to the public. The official databases of reported adverse events include the World Health Organization's VigiBase, the United States Vaccine Adverse Events

Reporting System (VAERS) and the United Kingdom's Yellow Card Scheme. Increased public awareness of these reporting systems and the extra reporting requirements under US FDA Emergency Use Authorization rules have increased reported adverse events.

**Rare serious effects include:**

- anaphylaxis, a severe type of allergic reaction Anaphylaxis affects one person per 250,000 to 400,000 doses administered.
- blood clots (thrombosis). These vaccine-induced immune thrombocytopenia and thrombosis are associated with vaccines using an adenovirus system (Janssen and Oxford-AstraZeneca). These affect about one person per 100,000.
- myocarditis and pericarditis, or inflammation of the heart. There is a rare risk of myocarditis (inflammation of the heart muscle) or pericarditis (inflammation of the membrane covering the heart) after the mRNA COVID-19 vaccines (Moderna or Pfizer-BioNTech). The risk of myocarditis after COVID-19 vaccination is estimated to be 0.3 to 5 cases per 100,000 persons with the highest risk in young males. In an Israeli nation-wide population based study (in which the Pfizer-BioNTech vaccine was exclusively given), the incidence rate of myocarditis was 54 cases per 2.5 million vaccine recipients, with an overall incidence rate of 2 cases per 100,000 persons, with the highest incidence seen in young males (aged 16 to 29) at 10 cases per 100,000 vaccine recipients. Of the cases of myocarditis seen, 76% were mild in severity, with one case of cardiogenic shock (heart failure) and no deaths reported.<sup>[255]</sup> COVID-19 vaccines may protect against myocarditis due to subsequent COVID-19 infection.<sup>[256]</sup> The risk of myocarditis and pericarditis is significantly higher (up to 11 times higher with respect to myocarditis) after COVID-19 infection as compared to COVID-19 vaccination, with the possible exception of younger men (less than 40 years old) who may have a higher risk of myocarditis after the second Moderna mRNA vaccine (an additional 97 cases of myocarditis per 1 million persons vaccinated).
- thrombotic thrombocytopenia and other autoimmune diseases, which have been reported as adverse events after COVID-19 vaccine.

There are rare reports of subjective hearing changes, including tinnitus, after vaccination.

The rate and type of side effects is also compared to the alternatives. For example, although vaccination may trigger some side effects, the effects experienced from an infection could be worse. Neurological side effects from getting COVID-19 are hundreds of times more likely than from vaccination.

## **Society and culture**

### Distribution

Main article: Deployment of COVID-19 vaccines

**Note** about table in this section: Number and percentage of people who have received at least one dose of a COVID-19 vaccine (unless noted otherwise). May include vaccination of non-citizens, which can push totals beyond 100% of the local population. Table is updated daily by a bot.

As of 11 January 2023, 12.7 billion COVID-19 vaccine doses have been administered worldwide, with 67.9 percent of the global population having received at least one dose. While 4.19 million vaccines were then being administered daily, only 22.3 percent of people in low-income countries had received at least a first vaccine by September 2022, according to official reports from national health agencies, which are collated by Our World in Data.

During a pandemic on the rapid timeline and scale of COVID-19 cases in 2020, international organizations like the World Health Organization (WHO) and Coalition for Epidemic Preparedness Innovations (CEPI), vaccine developers, governments, and industry evaluated the distribution of the eventual vaccine(s). Individual countries producing a vaccine may be persuaded to favor the highest bidder for manufacturing or provide first-service to their own country. Experts emphasize that licensed vaccines should be available and affordable for people at the frontline of healthcare and having the most need.

In April 2020, it was reported that the UK agreed to work with 20 other countries and global organizations including France, Germany, and Italy to find a vaccine and to share the results and that UK citizens would not get preferential access to any new COVID-19 vaccines developed by taxpayer-funded UK universities. Several companies planned to initially manufacture a vaccine at artificially low pricing, then

increase prices for profitability later if annual vaccinations are needed and as countries build stock for future needs.

An April 2020 CEPI report stated: "Strong international coordination and cooperation between vaccine developers, regulators, policymakers, funders, public health bodies, and governments will be needed to ensure that promising late-stage vaccine candidates can be manufactured in sufficient quantities and equitably supplied to all affected areas, particularly low-resource regions." The WHO and CEPI are developing financial resources and guidelines for the global deployment of several safe, effective COVID-19 vaccines, recognizing the need are different across countries and population segments. For example, successful COVID-19 vaccines would be allocated early to healthcare personnel and populations at greatest risk of severe illness and death from COVID-19 infection, such as the elderly or densely-populated impoverished people.

The WHO had set out the target to vaccinate 40% of the population of all countries by the end of 2021 and 70% by mid-2022, but many countries missed the 40% target at the end of 2021.

### **Access**

Further information: Deployment of COVID-19 vaccines § Equitable access

Countries have extremely unequal access to the COVID-19 vaccine. Vaccine equity has not been achieved or even approximated. The inequity has harmed both countries with poor access and countries with good access.

Nations pledged to buy doses of the COVID-19 vaccines before the doses were available. Though high-income nations represent only 14% of the global population, as of 15 November 2020, they had contracted to buy 51% of all pre-sold doses. Some high-income nations bought more doses than would be necessary to vaccinate their entire populations

In January 2021, WHO Director-General Tedros Adhanom Ghebreyesus warned of problems with equitable distribution: "More than 39 million doses of vaccine have now been administered in at least 49 higher-income countries. Just 25 doses have been given in one lowest-income countries. Not 25 million; not 25 thousand; just 25."

In March 2021, it was revealed the US attempted to convince Brazil not to purchase the Sputnik V COVID-19 vaccine, fearing "Russian influence" in Latin America. Some

nations involved in long-standing territorial disputes have reportedly had their access to vaccines blocked by competing nations; Palestine has accused Israel of blocking vaccine delivery to Gaza, while Taiwan has suggested that China has hampered its efforts to procure vaccine doses.

A single dose of the COVID-19 vaccines by AstraZeneca would cost 47 Egyptian pounds (EGP), and the authorities are selling it between 100 and 200 EGP. A report by Carnegie Endowment for International Peace cited the poverty rate in Egypt as around 29.7 percent, which constitutes approximately 30.5 million people, and claimed that about 15 million of Egyptians would be unable to gain access to the luxury of vaccination. A human rights lawyer, Khaled Ali, launched a lawsuit against the government, forcing them to provide vaccination free of cost to all members of the public.

According to immunologist Dr. Anthony Fauci, mutant strains of the virus and limited vaccine distribution pose continuing risks and he said: "we have to get the entire world vaccinated, not just our own country." Edward Bergmark and ArickWierson are calling for a global vaccination effort and wrote that the wealthier nations' "me-first" mentality could ultimately backfire because the spread of the virus in poorer countries would lead to more variants, against which the vaccines could be less effective.

In March 2021, the United States, Britain, European Union member states and some other members of the World Trade Organization (WTO) blocked a push by more than eighty developing countries to waive COVID-19 vaccine patent rights in an effort to boost production of vaccines for poor nations. On 5 May 2021, the US government under President Joe Biden announced that it supports waiving intellectual property protections for COVID-19 vaccines. The Members of the European Parliament have backed a motion demanding the temporary lifting of intellectual properties rights for COVID-19 vaccines.

In a meeting in April 2021, the World Health Organization's emergency committee addressed concerns of persistent inequity in the global vaccine distribution. Although 9 percent of the world's population lives in the 29 poorest countries, these countries had received only 0.3% of all vaccines administered as of May 2021. In March 2021, Brazilian journalism agency AgênciaPública reported that the country vaccinated about

twice as many people who declare themselves white than black and noted that mortality from COVID-19 is higher in the black population.

In May 2021, UNICEF made an urgent appeal to industrialized nations to pool their excess COVID-19 vaccine capacity to make up for a 125-million-dose gap in the COVAX program. The program mostly relied on the Oxford–AstraZeneca COVID-19 vaccine produced by Serum Institute of India, which faced serious supply problems due to increased domestic vaccine needs in India from March to June 2021. Only a limited amount of vaccines can be distributed efficiently, and the shortfall of vaccines in South America and parts of Asia are due to a lack of expedient donations by richer nations. International aid organizations have pointed at Nepal, Sri Lanka, and Maldives as well as Argentina and Brazil, and some parts of the Caribbean as problem areas, where vaccines are in short supply. In mid-May 2021, UNICEF was also critical of the fact that most proposed donations of Moderna and Pfizer vaccines were not slated for delivery until the second half of 2021, or early in 2022.

In July 2021, the heads of the World Bank Group, the International Monetary Fund, the World Health Organization, and the World Trade Organization said in a joint statement: "As many countries are struggling with new variants, and a third wave of COVID-19 infections, accelerating access to vaccines becomes even more critical to ending the pandemic everywhere and achieving broad-based growth. We are deeply concerned about the limited vaccines, therapeutics, diagnostics, and support for deliveries available to developing countries." In July 2021, The BMJ reported that countries have thrown out over 250,000 vaccine doses as supply exceeded demand and strict laws prevented the sharing of vaccines.<sup>1</sup> A survey by The New York Times found that over a million doses of vaccine had been thrown away in ten U.S. states because federal regulations prohibit recalling them, preventing their redistribution abroad.<sup>[298]</sup> Furthermore, doses donated close to expiration often cannot be administered quickly enough by recipient countries and end up having to be discarded. To help overcome this problem, the Prime Minister of India, Narendra Modi announced that they would make their digital vaccination management platform CoWIN open to the global community. He also announced that India would also release the source code for the contact tracing app AarogyaSetu for developers around the world. Around 142 countries including Afghanistan, Bangladesh, Bhutan,

Maldives, Guyana, Antigua & Barbuda, St. Kitts & Nevis and Zambia expressed their interest in the application for COVID management.

Amnesty International and Oxfam International have criticized the support of vaccine monopolies by the governments of producing countries, noting that this is dramatically increasing the dose price by five times and often much more, creating an economic barrier to access for poor countries. Médecins Sans Frontières (Doctors without Borders) has also criticized vaccine monopolies and repeatedly called for their suspension, supporting the TRIPS Waiver. The waiver was first proposed in October 2020 and has support from most countries, but delayed by opposition from EU (especially Germany – major EU countries such as France, Italy, and Spain support the exemption), UK, Norway, and Switzerland, among others. MSF called for a Day of Action in September 2021 to put pressure on the WTO Minister's meeting in November, which was expected to discuss the TRIPS IP waiver.

In August 2021, to reduce unequal distribution between rich and poor countries, the WHO called for a moratorium on a booster dose at least until the end of September. However, in August, the United States government announced plans to offer booster doses eight months after the initial course to the general population, starting with priority groups. Before the announcement, the WHO harshly criticized this type of a decision, citing the lack of evidence for the need for boosters, except for patients with specific conditions. At this time, vaccine coverage of at least one dose was 58% in high-income countries and only 1.3% in low-income countries, and 1.14 million Americans already received an unauthorized booster dose. US officials argued that waning efficacy against mild and moderate disease might indicate reduced protection against severe disease in the coming months. Israel, France, Germany, and the United Kingdom have also started planning boosters for specific groups. In September 2021, more than 140 former world leaders, and Nobel laureates, including former President of France François Hollande, former Prime Minister of the United Kingdom Gordon Brown, former Prime Minister of New Zealand Helen Clark, and Professor Joseph Stiglitz, called on the candidates to be the next German chancellor to declare themselves in favour of waiving intellectual property rules for COVID-19 vaccines and transferring vaccine technologies. In November 2021, nursing unions in 28 countries have filed a formal appeal with the United Nations over the refusal of the UK, EU, Norway, Switzerland, and Singapore to temporarily waive patents for Covid vaccines.

During his first international trip, President of Peru Pedro Castillo spoke at the seventy-sixth session of the United Nations General Assembly on 21 September 2021, proposing the creation of an international treaty signed by world leaders and pharmaceutical companies to guarantee universal vaccine access, arguing "The battle against the pandemic has shown us the failure of the international community to cooperate under the principle of solidarity".

Optimizing the societal benefit of vaccination may benefit from a strategy that is tailored to the state of the pandemic, the demographics of a country, the age of the recipients, the availability of vaccines, and the individual risk for severe disease. In the UK, the interval between prime and boost dose was extended to vaccinate as many persons as early as possible, many countries are starting to give an additional booster shot to the immunosuppressed and the elderly, and research predicts an additional benefit of personalizing vaccine dose in the setting of limited vaccine availability when a wave of virus Variants of Concern hits a country.

Despite the extremely rapid development of effective mRNA and viral vector vaccines, vaccine equity has not been achieved. The World Health Organization called for 70 percent of the global population to be vaccinated by mid-2022, but as of March 2022, it was estimated that only one percent of the 10 billion doses given worldwide had been administered in low-income countries. An additional 6 billion vaccinations may be needed to fill vaccine access gaps, particularly in developing countries. Given the projected availability of newer vaccines, the development and use of whole inactivated virus (WIV) and protein-based vaccines are also recommended. Organizations such as the Developing Countries Vaccine Manufacturers Network could help to support the production of such vaccines in developing countries, with lower production costs and greater ease of deployment.

While vaccines substantially reduce the probability and severity of infection, it is still possible for fully vaccinated people to contract and spread COVID-19. Public health agencies have recommended that vaccinated people continue using preventive measures (wear face masks, social distance, wash hands) to avoid infecting others, especially vulnerable people, particularly in areas with high community spread. Governments have indicated that such recommendations will be reduced as vaccination rates increase and community spread declines.

## **Economics**

Vaccine inequity damages the global economy, disrupting the global supply chain. Most vaccines were being reserved for wealthy countries, as of September 2021, some of which have more vaccine than is needed to vaccinate their populations fully. When people, under-vaccinated, needlessly die, experience disability, and live under lockdown restrictions, they cannot supply the same goods and services. This harms the economies of under-vaccinated and over-vaccinated countries alike. Since rich countries have larger economies, rich countries may lose more money to vaccine inequity than poor ones, though the poor ones will lose a higher percentage of GDP and experience longer-term effects. High-income countries would profit an estimated US\$4.80 for every \$1 spent on giving vaccines to lower-income countries.

The International Monetary Fund sees the vaccine divide between rich and poor nations as a serious obstacle to a global economic recovery. Vaccine inequity disproportionately affects refuge-providing states, as they tend to be poorer, and refugees and displaced people are economically more vulnerable even within those low-income states, so they have suffered more economically from vaccine inequity.

## **Liability**

In the US, these liability shields took effect on 4 February 2020, when the US Secretary of Health and Human Services Alex Azar published a notice of declaration under the Public Readiness and Emergency Preparedness Act (PREP Act) for medical countermeasures against COVID-19, covering "any vaccine, used to treat, diagnose, cure, prevent, or mitigate COVID-19, or the transmission of SARS-CoV-2 or a virus mutating there from". The declaration precludes "liability claims alleging negligence by a manufacturer in creating a vaccine, or negligence by a health care provider in prescribing the wrong dose, absent willful misconduct." In other words, absent "willful misconduct", these companies can not be sued for money damages for any injuries that occur between 2020 and 2024 from the administration of vaccines and treatments related to COVID-19. The declaration is effective in the United States through 1 October 2024.

In December 2020, the UK government granted Pfizer legal indemnity for its COVID-19 vaccine.

In the European Union, the COVID-19 vaccines were granted a conditional marketing authorization which does not exempt manufacturers from civil and administrative liability claims. The EU conditional marketing authorizations were changed to standard authorizations in September 2022. While the purchasing contracts with vaccine manufacturers remain secret, they do not contain liability exemptions even for side-effects not known at the time of licensure.

The Bureau of Investigative Journalism, a nonprofit news organization, reported in an investigation that unnamed officials in some countries, such as Argentina and Brazil, said that Pfizer demanded guarantees against costs of legal cases due to adverse effects in the form of liability waivers and sovereign assets such as federal bank reserves, embassy buildings or military bases, going beyond the expected from other countries such as the US. During the pandemic parliamentary inquiry in Brazil, Pfizer's representative said that its terms for Brazil are the same as for all other countries with which it has signed deals.

### **Controversy**

In June 2021, a report revealed that the UB-612 vaccine, developed by the US-based COVAXX, was a for-profit venture initiated by the Blackwater founder Erik Prince. In a series of text messages to Paul Behrends, the close associate recruited for the COVAXX project, Prince described the profit-making possibilities in selling the COVID-19 vaccines. COVAXX provided no data from the clinical trials on safety or efficacy it conducted in Taiwan. The responsibility of creating distribution networks was assigned to an Abu Dhabi-based entity, which was mentioned as "Windward Capital" on the COVAXX letterhead but was actually Windward Holdings. The firm's sole shareholder, which handled "professional, scientific and technical activities", was Erik Prince. In March 2021, COVAXX raised \$1.35 billion in a private placement.

### **Misinformation and hesitancy**

This section is an excerpt from COVID-19 vaccine misinformation and hesitancy

Anti-vaccination activists and other people in many countries have spread a variety of unfounded conspiracy theories and other misinformation about COVID-19 vaccines based on misunderstood or misrepresented science, religion, exaggerated claims about side effects, a story about COVID-19 being spread by 5G, misrepresentations about how the immune system works and when and how COVID-19 vaccines are made, and

other false or distorted information. This misinformation has proliferated and may have made many people averse to vaccination. This has led to governments and private organizations around the world introducing measures to incentivize/coerce vaccination, such as lotteries, mandates and free entry to events, which has in turn led to further misinformation about the legality and effect of these measures themselves.

## **CONCLUSION**

The theoretical framework for COVID-19 vaccines involves rigorous efficacy and safety testing, equitable distribution, addressing vaccine hesitancy, and continued innovation in vaccine development and manufacturing. These principles are essential to combat the COVID-19 pandemic and protect global public health.

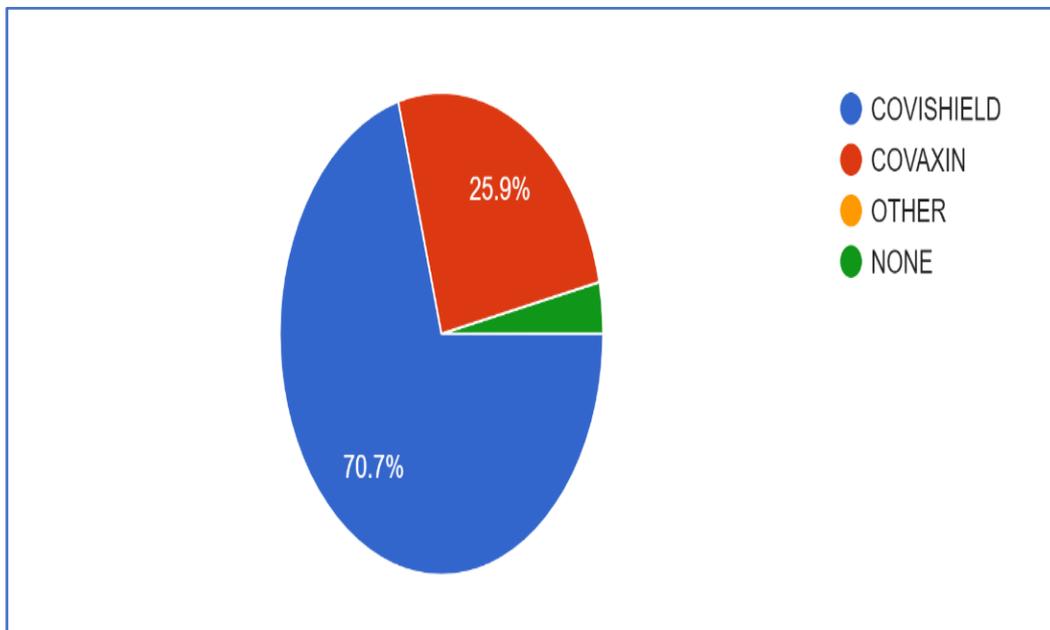
**CHAPTER IV**  
**DATA ANALYSIS AND INTERPRETATION**

**Table4.1**  
**Which vaccine was taken**

<b>Response</b>	<b>No. of respondents</b>	<b>Percentage</b>
COVISHIELD	71	71%
COVAXIN	26	26%
Other	3	3%
None	0	0%

**Source of data: Primary data**

**Figure4.1**  
**Which vaccine was taken**



The table 4.1 shows that 71 respondents has taken covishield, 26 has taken covaxin, 3 has taken other vaccines and none is 0.

This survey result is also shown in figure 4.1

**Table4.2**

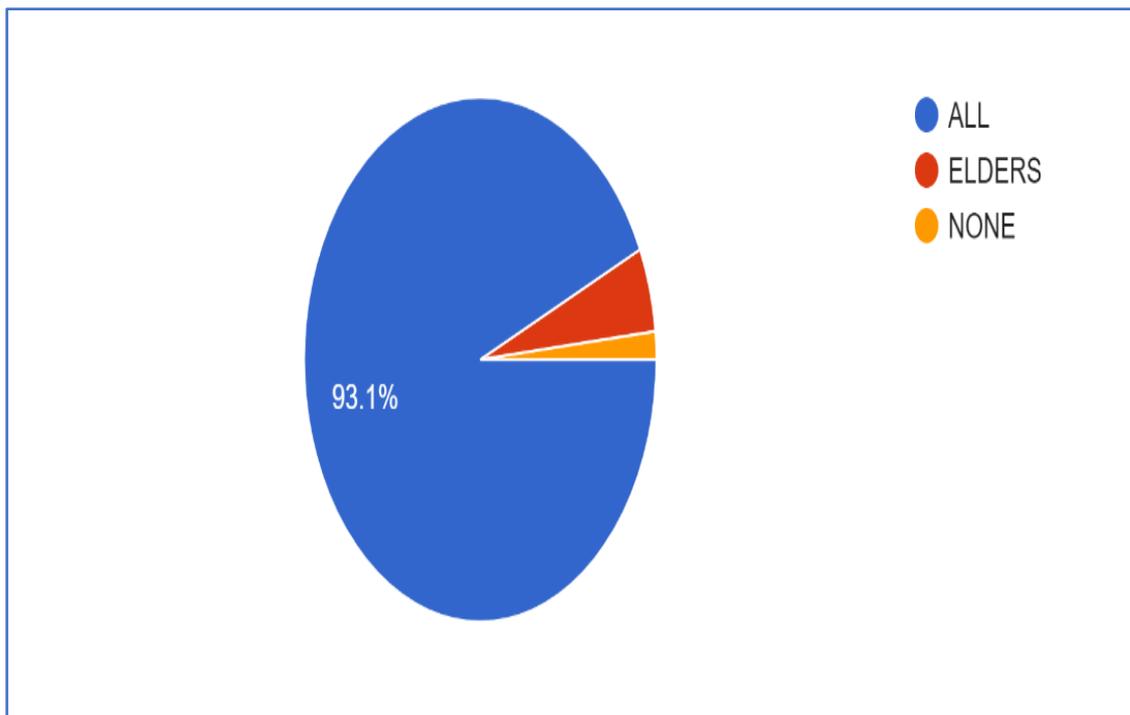
**How many people were vaccinated from a house hold**

<b>Response</b>	<b>No. of respondents</b>	<b>Percentage</b>
All	93	93%
Elders	5	5%
None	2	2%

Source of data: Primary data

**How many people were vaccinated from a house hold**

**Figure4.2**



The table 4.2 shows that 93 respondents vaccinated from a household is All , 5 respondents vaccinated from a household is Elders and none is 2.

This survey result is also shown in figure 4.2

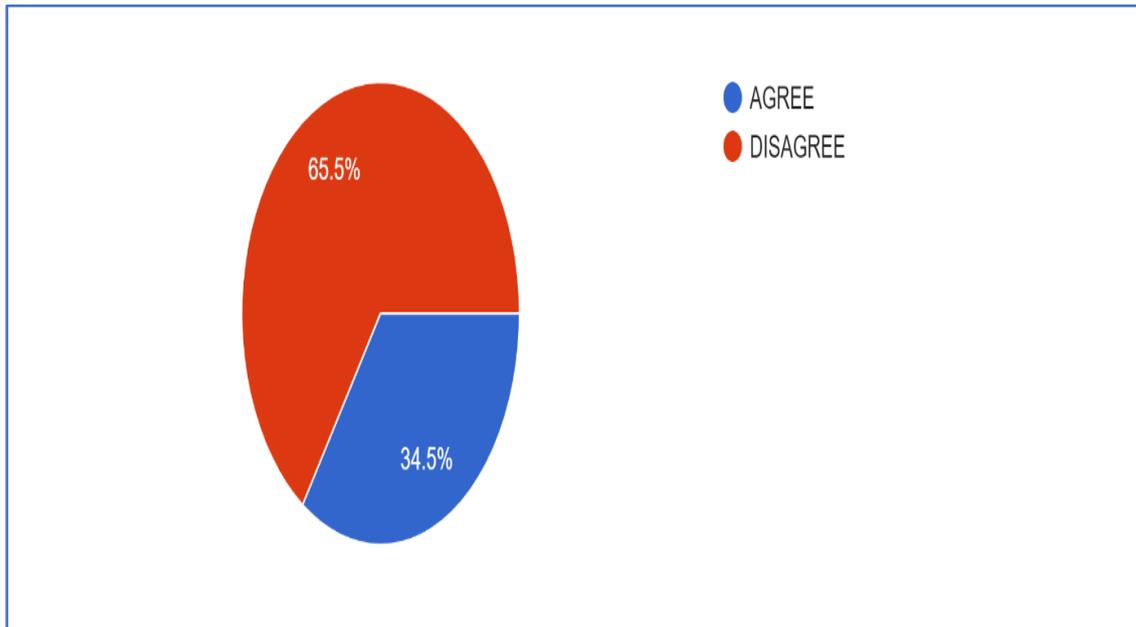
**Table4.3**

**Is there any side effect due to covid vaccine**

<b>Response</b>	<b>No of response</b>	<b>percentage</b>
Agree	65	65%
Disagree	35	35%

**Source of data: Primary data**

**Is there any side effect due to covid vaccine**



The table 4.3 shows that 65 respondents disagree that there is side effect due to covid vaccine and 35 respondents agree that there are side effects due to covid vaccine.

This survey result is also shown in figure 4.3

**Table4.4**

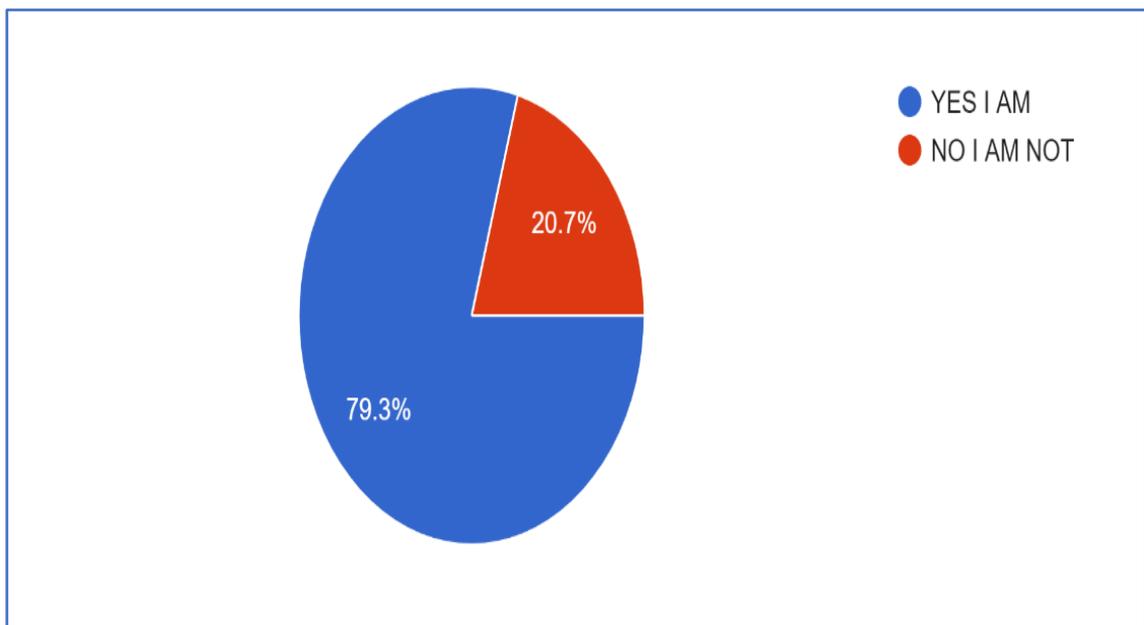
**Are you satisfied with your vaccine**

<b>Response</b>	<b>No of response</b>	<b>percentage</b>
YES I AM	79	79%
NO I AM NOT	21	21%

Source of data: Primary data

**Figure4.4**

**Are you satisfied with your vaccine**



The table 4.3 shows that 79respondents were satisfied with covid vaccine and 21 respondents were not satisfied with covid vaccine.

This survey result is also shown in figure 4.4

**Table 4.5**

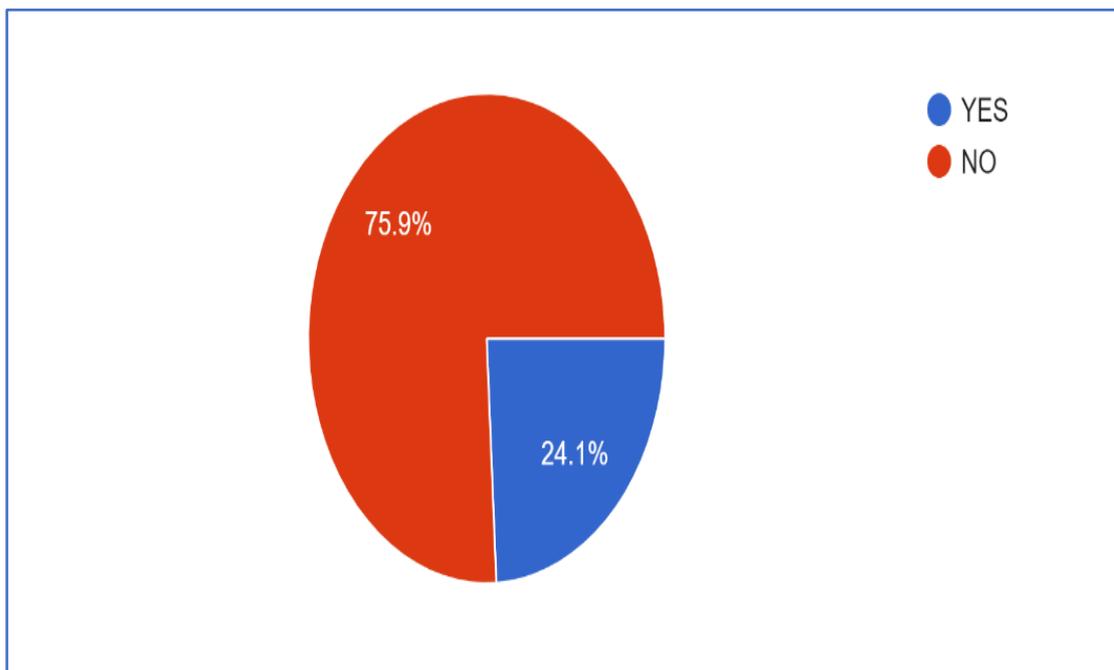
**Have you had your booster vaccine**

<b>Response</b>	<b>No of response</b>	<b>percentage</b>
Yes	24	24
No	76	76

Source of data: Primary data

**Figure 4.5**

**Have you had your booster vaccine**



The table 4.4 shows that 76 respondents has taken booster vaccine and 24 responds has not taken booster vaccine.

This survey result is also shown in figure 4.4

**Table 4.6**

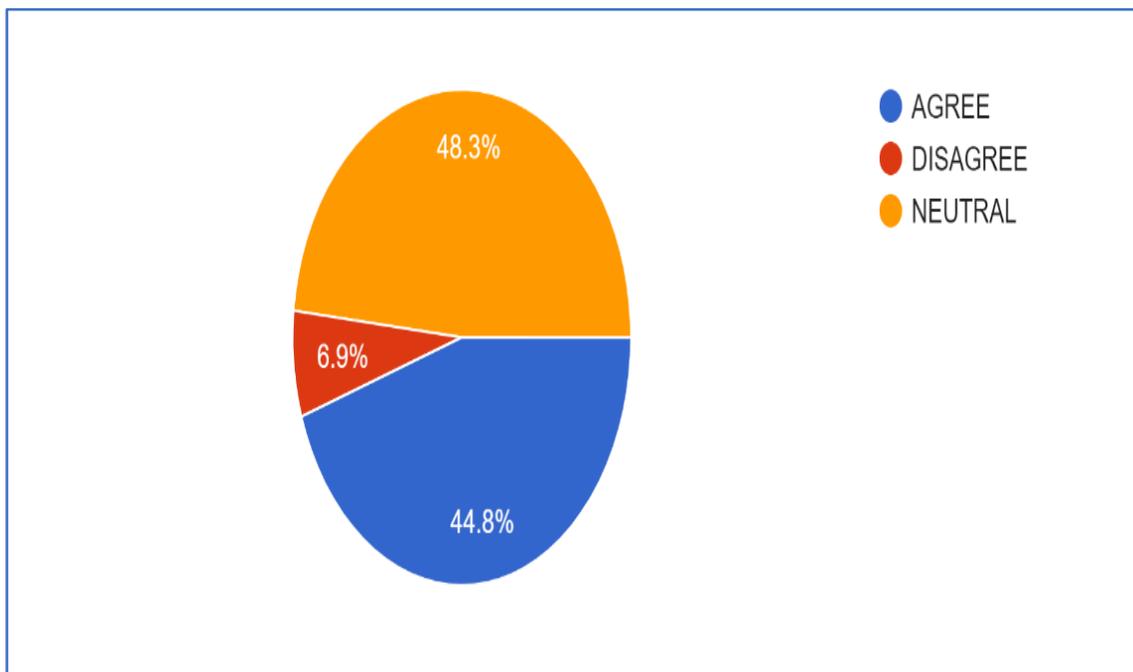
**Was the vaccine good enough to prevent covid**

<b>Response</b>	<b>No of response</b>	<b>percentage</b>
AGREE	45	45%
DISAGREE	7	7%
NEUTRAL	48	48%

Source of data: Primary data

**Figure 4.6**

**Was the vaccine good enough to prevent covid**



The table 4.6 shows that 49 respondents agree that vaccine was good enough to prevent covid, 7 responds disagree that vaccine was good enough to prevent covid and 48 respondants thinks it is neutral.

This survey result is also shown in figure 4.6

**Table 4.7**

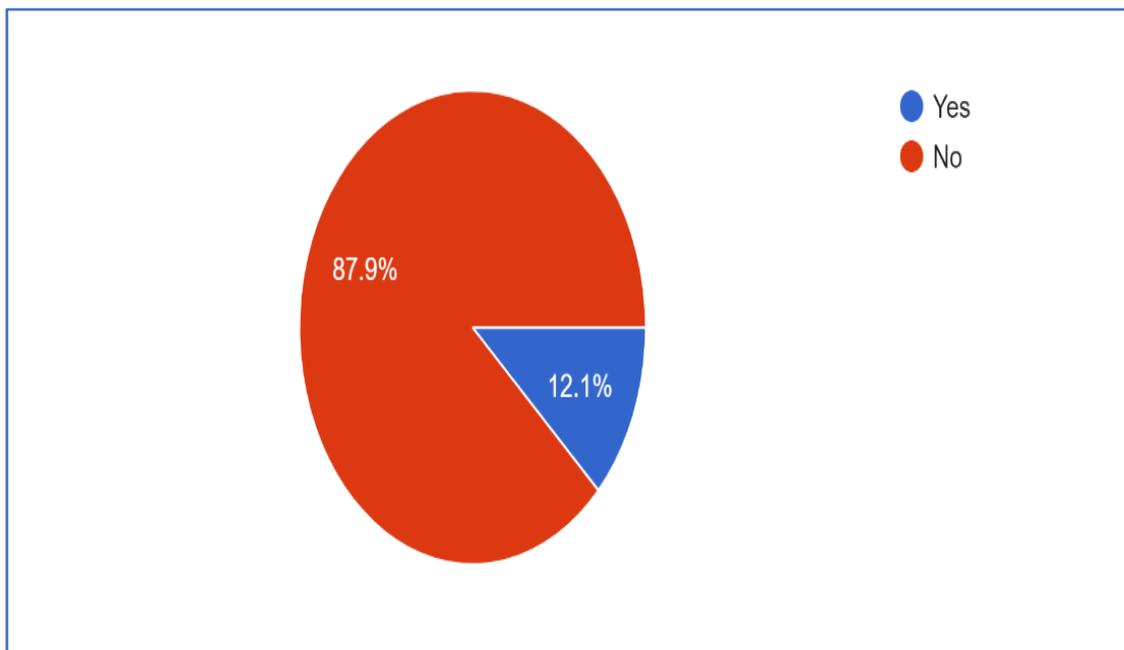
**Are you still struggling with the side effects of your vaccination**

<b>Responds</b>	<b>No of responds</b>	<b>Percentage</b>
YES	12	12%
NO	88	88%

Source of data: Primary data

**Figure 4.7**

**Are you still struggling with the side effects of your vaccination**



The table 4.7 shows that 88respondents is not struggling with the side effects of your vaccination and 12 respondants are struggling with the side effects of vaccination

This survey result is also shown in figure 4.7

**Table 4.8**

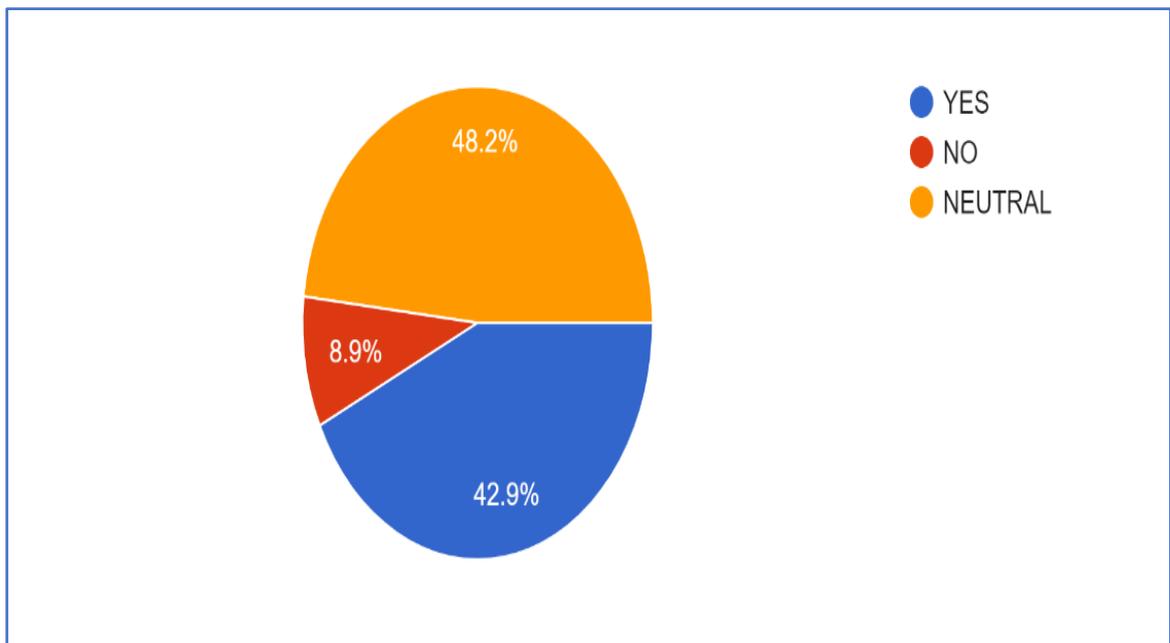
**Was the vaccine good enough to prevent covid**

<b>Responds</b>	<b>No of responds</b>	<b>percentage</b>
YES	48	48%
NO	9	9%
NEUTRAL	43	43%

Source of data: Primary data

**Figure 4.8**

**Was the vaccine good enough to prevent covid**



The table 4.8 shows that 48 respondents believe that vaccine good enough to prevent covid, 9 responds think that vaccine is not good enough to prevent covid and 43 respondents think it is neutral.

This survey result is also shown in figure 4.8

**Table 4.9**

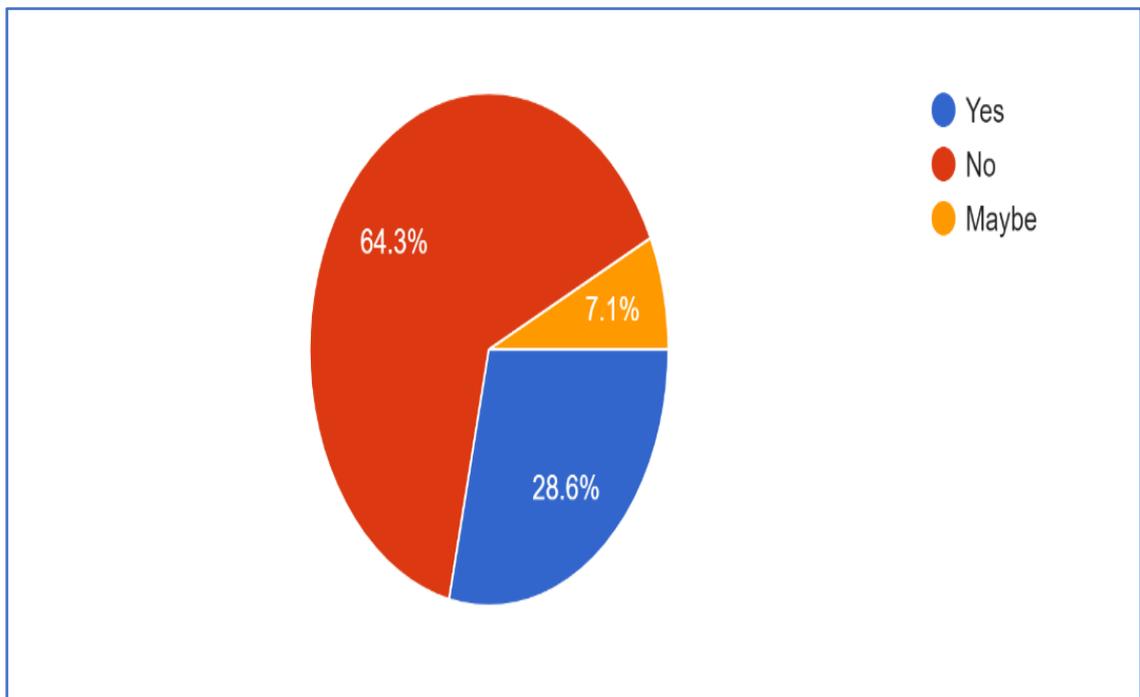
**Do you have any relative who died of covid**

<b>Response</b>	<b>No of response</b>	<b>percentage</b>
YES	29	29%
NO	64	64%
MAYBE	7	7%

Source of data: Primary data

**Figure 4.9**

**Do you have any relative who died of covid**



The table 4.9 shows that 29 respondents that their relatives died of covid, 64 respondents that their relatives didn't die of covid and 7 respondents think maybe their relatives died of covid..

This survey result is also shown in figure 4.9

**Table 4.10**

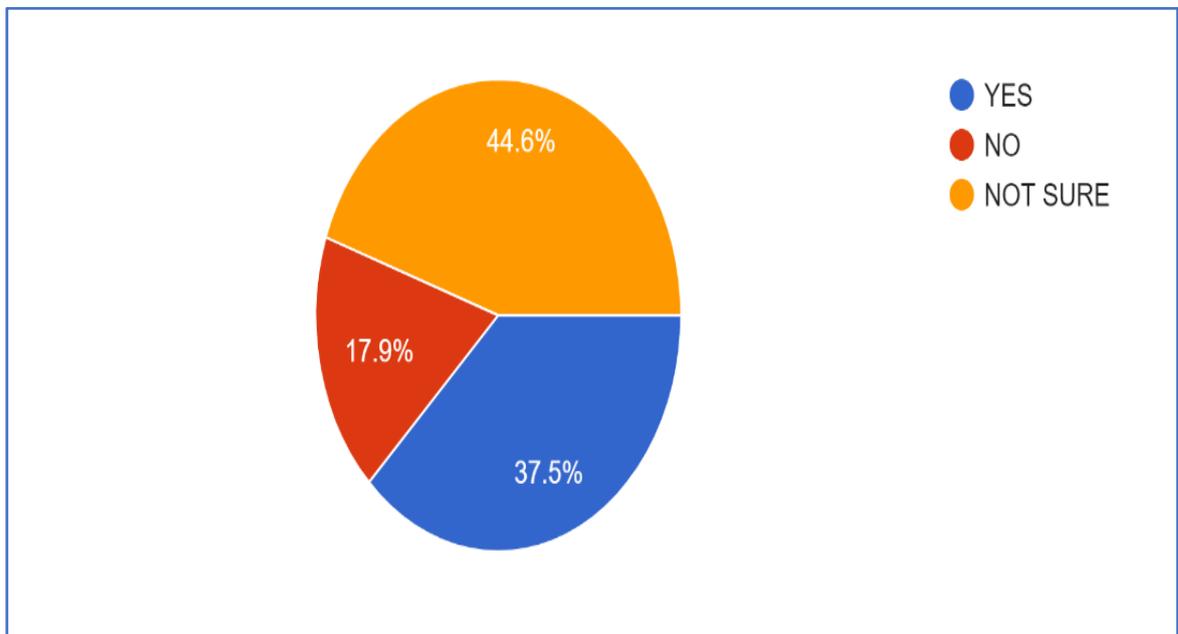
**Can someone you know with covid 19, get covid 19 vaccine / booster dose**

<b>Respondents</b>	<b>No of respondents</b>	<b>percentage</b>
YES	37	37%
NO	18	18%
NOT SURE	45	45%

Source of data: Primary data

**Figure 4.10**

**Can someone you know with covid 19, get covid 19 vaccine / booster dose**



The table 4.10 shows that 37respondents know someone with covid 19 gets covid 19 vaccine , 18 respondents don't know any one who is with covid 19 gets covid 19 and 45 respondents not sure about covid person who has taken covid vaccine.

This survey result is also shown in figure 4.10

**CHAPTER V**  
**SUMMARY OF FINDINGS, SUGGESTIONS AND**  
**CONCLUSION**

## 5.1 FINDINGS

- 71 respondents has taken covishield vaccine
- 93 respondents were vaccinated from house hold
- 65 respondents disagree that there is side effects due to covid vaccine
- 76 respondents has taken their booster vaccine.
- 48 respondents are not sure about vaccine could prevent covid
- 88 respondents are not struggling with the side effects of vaccination
- 64 respondents relatives are not died of covid
- 45 respondents are not sure about covid 19 person get covid 19 vaccine
- 47 respondents responded that young children are susceptible to covid 19 especially to test positive
- 73 respondents believe that covid 19 vaccine made in fetal cells
- 48 respondents will take vaccine maybe sometime after getting covid 19
- 89 respondents don't has anykind of allergic reaction
- 77 respondents were vaccinated for other
- 65 respondents agree that vaccine is very important to improve public acceptance and decrease vaccine hesitancy in confronting the diseases
- 71 respondents were asked to shown proof of vaccination when traveling
- 65 respondents has visited vaccination centre
- 63 respondents were received communication from healthcare about covid 19 vaccine
- 76 respontents believe that a vaccine is a great hope to find a solution to control the virus infection
- 75 respondents agree that vaccine must be acceptable and usable among the majority of the population
- 73 respondents has not experienced mental health issue due to the side effects of covid 19 vaccine

## 5.2 SUGGESTIONS

- Conduct health camps and community meetings to educate the people about the importance of covid 19 vaccine
- Partner with local health organisations to create trust and credibility among the rural populations
- Use technology to disseminate information about covid 19 vaccine through mobile apps, text messages and social media
- Conduct health awareness campaigns
- Use local media such as radio, newspapers and posters to promote covid 19 vaccine and its benefits
- Conduct door-to-door campaigns to educate and enrol people about the importance of covid 19 vaccination
- Get vaccinated: The COVID-19 vaccine is a safe and effective way to protect yourself and others from the virus. It is highly recommended that you get vaccinated as soon as possible, unless you have a medical reason not to.  
Follow public health guidelines: Even after getting vaccinated, it is important to continue following public health guidelines such as wearing masks, social distancing, and practicing good hygiene.
- Be aware of side effects: Like with any vaccine, you may experience side effects after getting the COVID-19 vaccine. These are typically mild and go away on their own, but if you have concerns, you can talk to your healthcare provider.
- Stay informed: As the situation around COVID-19 evolves, it is important to stay informed about the latest developments, including new strains of the virus, vaccination requirements, and public health guidelines.
- Encourage others to get vaccinated: Encourage your friends and family to get vaccinated as well. The more people who get vaccinated, the faster we can put an end to the pandemic.

### **5.3 CONCLUSION**

The COVID-19 vaccines have been shown to be highly effective at preventing severe illness, hospitalization, and death from the virus. Vaccines have played a crucial role in reducing the spread of COVID-19 and helping to bring an end to the pandemic.

While there have been some concerns and misinformation about the safety and efficacy of the vaccines, numerous clinical trials and real-world data have shown that the benefits of vaccination far outweigh any potential risks. It is important to follow the guidance of public health authorities and medical professionals to make informed decisions about vaccination. based on the scientific evidence and expert recommendations, getting vaccinated against COVID-19 is highly recommended for everyone who is eligible.

## **BIBLIOGRAPHY**

## **BIBLIOGRAPHY**

### **Books:**

- "The Plague Cycle: The Unending War Between Humanity and Infectious Disease" by Charles Kenny
- "A Shot in the Arm: How the Covid-19 Vaccine is Changing the World" by Donald G. McNeil Jr.

### **Journal:**

- The Lancet - This medical journal has published many articles on COVID-19 vaccines, including clinical trial results, vaccine efficacy, and vaccine distribution.
- The New England Journal of Medicine (NEJM) - NEJM has published several articles on the COVID-19 vaccine, including results of clinical trials, vaccine efficacy, and vaccine distribution.
- Journal of the American Medical Association (JAMA) - JAMA has published articles on the COVID-19 vaccine, including clinical trial results, vaccine efficacy, and vaccine distribution.
- Vaccine - This journal focuses on research and development in the field of vaccines. It has published several articles on COVID-19 vaccines, including vaccine development, vaccine efficacy, and vaccine distribution.
- Nature - This scientific journal has published articles on the COVID-19 vaccine, including vaccine development, vaccine efficacy, and vaccine distribution.
- Science - This scientific journal has published articles on the COVID-19 vaccine, including vaccine development, vaccine efficacy, and vaccine distribution.

## **WEBSITES**

<https://www.google.com/>

<https://www.wikipedia.org/>

[https://en.wikipedia.org/wiki/History\\_of\\_COVID-19\\_vaccine\\_development](https://en.wikipedia.org/wiki/History_of_COVID-19_vaccine_development)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8637774/>

[https://www.mohfw.gov.in/covid\\_vaccination/vaccination/index.html](https://www.mohfw.gov.in/covid_vaccination/vaccination/index.html)

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines>

<https://www.cdc.gov/coronavirus/2019-ncov/vaccines/index.html>

## **APPENDIX**

## QUESTIONNAIRE

NAME:

PLACE:

AGE:

GENDER:

1. Which vaccine was taken ?

COVISHIELD

COVAXIN

OTHER

NONE

2. How many people were vaccinated from a house hold?

ALL

ELDERS

NONE

3. Is there any side effect due to covid vaccine ?

AGREE

DISAGREE

4. Are you satisfied with your vaccine ?

YES I AM

NO I AM NOT

5. Have you had your booster vaccine?

YES

NO

6. Was the vaccine good enough to prevent covid ?

AGREE

DISAGREE

NEUTRAL

7. Are you still struggling with the side effects of your vaccination?

Yes

No

8. Was the vaccine good enough to prevent covid ?

YES

NO

NEUTRAL

9. Do you have any relative who died of covid?

Yes

No

Maybe

10. Can someone you know with covid 19, get covid 19 vaccine / booster dose ?

YES

NO

NOT SURE

11. Are young children susceptible to covid 19 especially of tests positive ?

YES

NO

12. Are covid 19 vaccine made in fetal cells?

YES

NO

13.If you had the virus , do you still need the vaccine?

INTERESTED

NOT INTERESETED

MAYBE SOMETIMES

14.Do you have any kind of allergies ( especially drug allergy) ?

YES

NO

15. Are you vaccinated for other diseases?

RABIES

NIPAH

FLU

OTHER

16.Do you have any disabilities?

BLIND

DEAF

STROKE

PARALYZED

17.Measurement of the populations general knowledge of the corona virus vaccine is very important to improve public acceptance and decrease vaccine hesitancy in confronting the diseases ?

AGREE

DISAGREE

STRONGLY AGREE

STRONGLY DISAGREE

18. have you or anyone you know being diagnosed with covid-19 does it feels as normal fever ?

Same as normal fever

IT IS MORE SEVERE THAN A NORMAL FEVER

19. Have you been asked to shown proof of vaccination when traveling or attending public event?

YES

NO

20. Have you visited any vaccination center or clinics and observed the number of people receiving covid-19 vaccine?

YES

NO

21. Have you received any communication from your healthcare, provides or local government about the covid-19 vaccine?

YES

NO

MAYBE SOMETIMES

22. The covid -19 pandemic is still threatening the world vaccine. A vaccine is a great hope to find a solution to control the virus infection?

AGREE

DISAGREE

STRONGLY AGREE

STRONGLY DISAGREE

23. Many corona virus vaccines are now available however, to be effective, a vaccine must be acceptable

And usable among the majority of the population?

AGREE

DISAGREE

STRONGLY AGREE

STRONGLY DISAGREE

24. have you or anyone you know experienced mental health issue due to the side effects of covid-19 vaccine?

Yes, lots of people

No, no one

My relatives

Other...

**“A STUDY ON SAVINGS AND INVESTMENT HABIT OF  
WORKING WOMEN WITH SPECIAL  
REFERENCE TO IRITTY TALUK”**

**A PROJECT REPORT**

**Submitted by**

**ANUSREE.P**

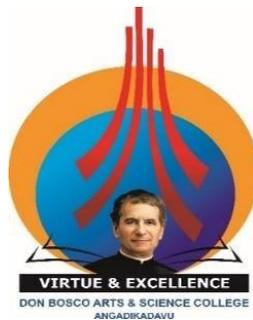
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**DERIN THOMAS**

**DB20BBAR009**



Under the supervision of

**Mrs. ATHIRA P**

(Asst. Professor. Department of Management Studies, DBASC)

**In partial fulfillment for the award of the degree In**

**BACHELOR OF BUSINESS ADMINISTRATION**

**OF KANNUR UNIVERSITY**

**DON BOSCO ARTS & SCIENCE COLLEGE**

**MARCH 2023**

# **KANNUR UNIVERSITY**



## **BONAFIDE CERTIFICATE**

Certified that this project report “**A STUDY ON SAVINGS AND INVESTMENT HABIT OF WORKING WOMEN WITH SPECIAL REFERENCE TO IRITTY TALUK**” is the bonafide work of “Anusree P, Jith Anthony and Derin Thomas” who carried out the project under my supervision.

**Mrs. SUNITHA K S**

**HEAD OF THE DEPARTMENT**

**Mrs. ATHIRA P**

**SUPERVISOR**

**BACHELOR OF BUSINESS ADMINISTRATION**

**DON BOSCO ARTS AND SCIENCE COLLEGE**

**ANGADIKADAVU 670706**

## **DECLARATION**

We, Anusree P, Jith Antony and Derin Thomas hereby we declare that the project work entitled “ **A STUDY ON SAVING AND INVESTMENT HABITS AMONG WORKING WOMEN WITH SPECIAL REFERENCE TO IRITTY TALUK** “ has been prepared by us and submitted to Kannur University in partial fulfilment of requirements for the award of Bachelor of Business Administration, is a record of original work done by us under the supervision of Mrs. Athira P, Department of Management Studies , Don Bosco Arts and Science College, Angadikadavu.

We also declare that this project report has not submitted by any one in full or partial for the award of any Degree, Diploma, Title or Recognition before.

Place: Angadikadavu

Date:

**ANUSREE P**  
**JITH ANTHONY**  
**DERIN THOMAS**

## **ACKNOWLEDGMENT**

We sincerely wish to express our deep sense of gratitude to all who helped us to complete project work. First and foremost, we thank the God Almighty, for his blessings and grace for the successful completion of the project work.

We acknowledge our gratitude to the principal, Fr. Dr. Francis Karackat, Don Bosco Arts and Science College, Angadikadavu for giving us an opportunity to undertake this venture.

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We also wish to express our sincere thanks to our guide Mrs. Athira P for her valuable advices and timely assistance during the period of study.

We owe our sincere sentiments of gratitude to all the classmates and to those who in one way or the other spared their valuable time and efforts to bring this project work to its finishing point.

**ANUSREE P**  
**JITH ANTONY**  
**DERIN THOMAS**

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**CHAPTER I**  
**INTRODUCTION**

## **1.1 GENERAL INTRODUCTION**

This chapter studies the importance of savings and investment habits of working women, factors influencing them in taking decisions on investment, the challenges they face, the qualities they possess for becoming a good investor and to find various portfolios opted by working women. Economic growth of a nation is driven by savings and its transformation into investment. Savings made by one section of the society can be lent to another section where there might be a need for money for production purposes. This type of saving-investing cycle creates economic growth across many sections of the society and results in job creation. By increasing savings within the country, the dependence on foreign direct investment reduces. Generally, when savings rate of a country is high, the investments increase and the economy grows. But if investment opportunities are not identified within the country, the savings flow out of the country. If savings are hidden in homes or used to buy Gold or Real Estate, they don't get channeled into investments by businesses. One thing which becomes very clear is the fact that there is a pressing need to study savings and investment side by side for all strata of the society in order to turn valuable savings into productive investment. The following chapter discusses the importance of savings and investment with special reference to Iritty taluk, factors influencing them in taking decisions on investment, the challenges they face, the qualities they possess for becoming a good investor and to find various portfolios opted by working women.

Investment refers to putting money to start or expand a project or to purchase an asset or interest, where these funds are put to work, with goal to income or increase in value over a period of time. It occurs in various areas of the economy such as business management and finance. It may be referred to as any mechanism used for generating future income. It can also be referred to as an asset that is created with the intention of allowing money to grow. An investment may involve choice of an individual or an organization after some analysis or thought to place or lend money in an asset such as property, commodity, stock, bond or any financial derivatives that has certain level of risk and provides possibilities of generating returns over a period of time.

Investment always comes with a certain amount of risk. If not analyzed properly, investment may be subject to loss of money which cannot be controlled by the investor. The returns on investment in form of income or price appreciation with statistical significance is the aim of investing. Risk and return go hand in hand in investing. Lower risk means lower returns while higher returns are accompanied by higher risk. The spectrum of investment is vast consisting of financial and non-financial products. Under financial we have bank deposits, share market, commodity market, insurance post properly, investment may be subject to loss of money which cannot be controlled by the investor. The returns on investment in form of income or price appreciation with statistical significance is the aim of investing. Risk and return go hand in hand in investing. Lower risk means lower returns while higher returns are accompanied by higher risk.

The spectrum of investment is vast consisting of financial and non-financial products. Under financial we have bank deposits, share market, commodity market, insurance post office schemes and other bonds. Non-financial product comprises of real estate, gold etc. The type of investment we choose depends on specific need, rate of return and risk preference of the investors. Degrees of risk and returns vary for each investment type. The main aim is to multiply invested money depending on the investment term. A thorough understanding of concepts and available options will help the investor to plan for maximum return without any risk. The study helps in analyzing the saving pattern and investment preference of working women towards various products based on demographic factors.

The economic cycles of boom, recession, depression and recovery not only effect the level of GDP but also the income of the people, and hence saving ratio and investment behavior. So, it is important the savings and investment both of which contributes to be economic development. Savings is the backbone of investment, which means higher the savings, higher will be the investment.

## **1.2 STATEMENT OF STUDY**

The study aims at understanding the current savings and investment habit of working woman ,the problems they face while investing ,opted portfolios and factors

influencing them in making investment decisions. There are a lot of investment opportunities available in the market because there is high and continuous flow of money. This study here analyses the savings and investment habits of working women.

### **1.3. SCOPE OF STUDY**

The study is focusing on preference of savings and investment by working women in Irrity taluk and it will be helpful to identify the different and better investment options available in the market.

### **1.4 SIGNIFICANCE OF STUDY**

The aim of investment is to multiply the money at various rates depending upon the term of investment. Investment usually follows savings. Higher savings usually help finance higher levels of investment. Most part of the study is concentrated on investment behavior. As we know, most working women earn considerable amount of money and with more savings, they will be able to invest funds in both long term and short term investments. Nowadays, so many modern financial products are available for investment which provides high growth. Saving money helps to become financially secure and acts as a safety net in times of emergency. This empirical study on savings and investment habit of working women in Irrity taluk is to know the benefits of savings and investment according to individual priority. The study also aims at unraveling the influence of demographic factors such as gender, age, income and the educational background of the respondents.

### **1.5. OBJECTIVES OF STUDY**

- 1) To analyze saving habit and investment pattern of working women.
- 2) To know the factors influencing the investment decision of working women.
- 3) To study the problem faced by working women in making investment decisions.
- 4) To find various investment portfolio opted by working women.

## **1.6. RESEARCH METHODOLOGY**

### **1.6.1. RESEARCH DESIGN**

The study is an descriptive research based on the survey method. The method adopted for data collection and sample design are described in the following paragraphs.

### **1.6.2 SOURCES OF DATA COLLECTION**

#### **1.6.2.1: PRIMARY DATA**

Using the survey method primary data was obtained from the respondents by administering the questionnaire and evaluating the feedback. Personal interviews were also conducted with few respondents who provided valuable information inputs.

#### **1.6.2.2: SECONDARY DATA**

Secondary data included information collected from various internet download, books, publication and various journals.

#### **1.6.2. SAMPLE SIZE**

We have taken 100samples for this survey.

### **1.6.3. TOOLS FOR DATA ANALYSIS**

The primary data were processed and analyzed annually. Questionnaires and interviews were used to collect primary data. Percentage analysis is used for the analysis and interpretation of data. Tables and chart were used to analyze data.

## **1.7. PERIOD OF STUDY**

The period of study is from 15/12/2023 to 31/03/2023

## **1.8. AREA COVERED**

The area covered to conduct this study is the premises of iritty taluk with the concern of studying the savings and investment habit of working women .

## **1.9. LIMITATIONS**

1. The study is based on perception of working women.
2. The study area is Iritty taluk.
3. This is an academic effort and it is limited to cost, time and geographical area.
4. As the data is collected from 100 respondents only, generalization to other women investors is Inevitable.
5. An interpretation of this study is based on the assumption that the response is right.

## **1.10. PRESENTATION OF THE STUDY**

The project consist of five chapters:

Chapter 1 : Introduction

Chapter 2 : Review of Literature

Chapter 3 : Theoretical Framework

Chapter 4 : Data Analysis

Chapter 5 : Findings and Recommendations and Implications

**CHAPTER II**  
**REVIEW OF LITERATURE**

Review of literature paves way for a clear understanding of the areas of research already undertaken and throws a light on the potential areas which are yet to be covered. Keeping this in mind, an attempt has been made to make a brief survey on savings and investment habits among working women with special reference to Irittytaluk. This chapter deals with the review of literature concerned with the subject of this study. The review of some of the important studies is presented below.

**1.Bajtelmit and Van Derhei (1996)** find that the different gender has different opinion regarding investment decisions. Women are not interested in risky investment and are more conservative than men. Women don't prefer risky investment unless it has high return rate. Women always take cautious and less risky decisions.

**2.Santhiyavalli G and Usharani M (March, 2001).** <sup>1</sup>They took sample of 75 respondents. They studied that women investors are taking less risk and prefer safe investment. Role of women is very important in the economy of world. They concluded that women have less interest in shares and debentures market. So steps should be taken to encourage it.

**3.Sheng-Hung Chen and Chun-Hung Tsai (2010)** wanted to identify key factors influencing individual investors decision to make portfolio choices is of importance to understand their heterogeneous investment behavior . Study stated female investors tend to be more detail oriented; elder is more likely to have low level of risk tolerance; the level of education is thought to impact on a person s ability to accept risk; increasing income level of individual investor is associated with increased levels of risk tolerance. At last, they argued single investors are more risk tolerance than married investors are.

---

<sup>1</sup> Bajtelmit, V. L. and Van derhei (1996) Why do women invest differently than Men?, Financial Counselling and Planning . Volume5 Issue 4(III) – international journal.

Santhiyavalli G and Usharani M (March, 2001), International Journal of Innovative Research and Practices Volume 2 ,Issue 3

Sheng-Hung Chen and Chun-Hung Tsai (2010), Investment preference risk perception and portfolio choices under different socio-economic status ,SSRN Electronic journal

**4. Gaur Arti (2011)** Female investors tend to display less confidence in their Investment decisions and hence have lower satisfaction levels and female investors are more cautious vis-à-vis males with regards to prospective investment in equity shares especially if availability of fund is low.

**5.Chandrakumar (2013)** highlighted that some factors of salaried employees like education level, awareness about the current financial system, age of investors etc. have significant impact while deciding the investment options.

**6.Vasagadekar's (2014)** research on working women concluded that due to high level of education, today's women are getting the best job offers with high pay packages. It has become the today's need for working women in India to increase their wealth. As mostly women are low in financial literacy, it becomes more possible for them to manage their portfolios on their own. Also, the risk taking capacity of working women in India is low. This is due to lack of financial knowledge.

**7.Uma &Sasikala, (2014)** published their findings in International Journal of Management and Social Science Research Review. They conducted a study on awareness about the investment pattern among the working women in Virudhunagar district. They studied the demographic factors like income, gender, age, occupation, education and the risk covering nature of working women. They found that the percentage of the women investors investing in the Indian equity market is very less as compared to the bank deposits. They revealed the following problems faced by women investors in Virudhunagar district: the difficult commission and brokerage, cumbersome procedures; Lack of awareness, High risk, low liquidity, price fluctuation, cheating by chit fund Company. It indicated that the payment of commission and brokerage while making investment is the major problem faced by the working women.<sup>2</sup>

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Gaur Arti, Julee, Sukijha Sunita, Difference in Gender Attitude in Investment Decision Making in India, Research Journal of Finance and Accounting, Vol 2, No 12, 2011.

<sup>2</sup>Chandrakumar (2013),A study on preferred investment avenue among salaried people , IBEA ,International Conference On Business, Economics and Accounting.

**8.Pestonjee D. M. and Balsara Anita H (2015)** studied the topic “Investment Pattern and Decision Making: The Role of working Women.” They tried to find out how far working women enjoy freedom to take investment related decisions on their own and the pattern of investments in the male dominated investment world in India. They collected required .Data with the help of a questionnaire, which included questions relating to saving, type of investment, influencing factors, expenditure and decision makers. The questions relating to investment pattern and its decision maker with respect to working women were studied .By taking a sample of 227 respondents from three cities: 108 in Ahmadabad, 60 in Sholapur and 59 in Gulbarga. After analyzing and interpreting the data they concluded. That there was no significant difference among the respondents across the cities with Respect to age, family size and type of family, marital status, level of education, Occupation and annual income. No cultural and demographical patterns were associated with decision making of working women

**9.Bansal, (2017)** conducted a survey on Inclination of Working Women Towards Investment- Study of Preference Over Various Investment Avenues in Ludhiana in 2017. This study revealed that majority of working women who make financial investments lie in the age group of 20-40, they are conservative investors, they prefer to spend their 10%-25% income ,working women of banking sector invest more as compared to women of education or insurance sector. Age and income were found to be directly correlated with their Investment pattern. Most preferred Reasons for investment were found to be Capital Appreciation, Future needs, Tax saving and hedging were found as the least preferred reasons for investment. Women of

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Vasagadekar,P.(2014). A research paper on investment awareness among Indian working women with reference to Pune region. International journal of scientific and engineering research,5(6).

Uma, K., & Sasikala, P. (2014). Study on consumer perception and buying behaviour towards selected home appliances products in Madurai District. Indian Journal of Applied Research, 4(4), 87-88

Ludhiana relied mostly on either their husbands or fathers for <sup>3</sup>investment decisions. Working women of Ludhiana preferred to invest their income in bank deposits, followed by mutual funds and insurance and Gold.

**10.Venkatesh G C & Surya Prakash Rao B K, (2018)**, studied to identify the investor's perception towards investment portfolio in Vijayawada city with an objective to analyze the investors decision towards investment portfolio among <sup>4</sup>120 investors. Analysis using various statistical tools revealed that the investor's choices on investment decisions are same among both men and women.<sup>5</sup>

**11.S.PackiaRaj (2018)** presented "A study on investment pattern of working women in Arrupukottai". From this study it is found that working women become aware of various investment avenues from their family members and friends. Further it is also observed that almost all the respondents are aware of investment avenues like bank fixed deposit ,post. the study it is noticed safety of principal and regular return on

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Pestonjee D M & Balsara Anita H, 2000. "Investment Pattern And Decision Making: The Role of Working Women," IIMA Working Papers WP2000-1,P.2-04, Indian Institute of Management Ahmedabad, Research and Publication Department.

Bansal.(2017). Study on Inclination Of Working Women Towards Investment- Study Of Preference Over Various Investment Avenues In Ludhiana. IJIRAS- volume 4 Issue 6 .

Venkatesh G C & Surya PrakashRao B K, (2018), Investor's Perception Towards Various investment Avenues – A Study In Vijayawada City Of Andhra Pradesh, International Journal of Research In Finance And Marketing, Volume 8, Issue 8.

S.PackiaRaj, (2018),A study On investment pattern of working women in Arrupukottai , International Journal Of Research And Analytical Review Volume 6 Issue 11

<sup>5</sup> Rekha G &Vishnupriya R, (2019), A Study On Investment Pattern Among Working Women, International Journal Of Research And Analytical Reviews, Volume 6, Issue1.

investment are the main motive behind investment of funds by working women. The major problems faced by working women while investing are long term maturity, lack of awareness, misguidance, minimum transparency, Improper portfolio management, lack of product innovation and cheating by chit fund companies.

**12.Rekha G & Vishnupriya R, (2019)**<sup>1</sup>, studied the awareness about investment avenues, the investment pattern of working women and factors influencing their investment decision using both primary and secondary data among 148 respondents at Coimbatore city found that investment for ‘Children Education’ was the most influential factor. It was also found that there was significant difference in the factors influencing investment among employees belonging to various occupation.

**CHAPTER III**  
**THEORETICAL FRAMEWORK**

### **3.1 What is the meaning of investment?**

Investment refers to putting your money in an asset with the aim of generating income. Financial investments come in different forms, such as mutual funds, unit linked investment plans, endowment plans, stocks, bonds and more. However, the primary goal behind all investments remains the same, i.e., to increase the value of your invested money.

### **3.2 History of investments in India**

Savings and financial inclusion:

Savings and investments are important not only for families but also for the development of the country. Savings and investments have been an important priority for India as a nation, ever since we got our independence from colonial era on the 15<sup>th</sup> August 1947.

The Government of India constituted the National Savings Organization (now the National Savings Institute) in 1948. This started the history of investment in India. The Post Office Savings Bank is listed in the Constitution of India. The Government Savings Certificate Act passed in the Parliament in 1959 and the Public Provident Fund Act of 1968 setup the framework of the Government Small Savings Schemes. The very idea of small savings is that, savings and investments should be inclusive, right down to the village level. Successive Governments continued to build upon the idea of financial inclusion leading up to the Prime Minister Jan Dhan Yojana announced on our Independence Day in 2014, which has been a huge success. The success of Jan Dhan Yojana will go a long way in history of investment in India.

Financial Markets and mutual funds in history of investments in India:

Along with savings, building a strong financial market with broad participation is essential for a developed economy. Pre-independence, equity markets in India did not have wide public participation. With the objective of encouraging public participation in the industrial growth of India, the Government passed the Unit Trust of India (UTI) Act in 1963. This led to the formation of the first mutual fund in India, a major milestone in the history of mutual funds in India.

Mutual fund is a financial instrument which pools the money of different people and invests them in different financial securities like stocks, bonds etc. The Government's stated objective in setting up UTI was "encouraging saving and investment and participation in the income, profits and gains accruing to the Corporation from the acquisition, holding, management and disposal of securities".

Financial Markets and mutual funds in history of investments in India:

As per Unit Trust of India Act of 1963, Unit Trust of India functioned under the regulatory and administrative control of the Reserve Bank of India (RBI). In 1964, UTI launched Unit Scheme 1964 (US '64) – this was the first mutual fund scheme to be launched in India. This scheme became very popular and subsequently, Unit Trust of India launched several other mutual fundschemes. In 1978, the Government de-linked RBI from the regulatory and administrative control of UTI and the Industrial Government Bank of India (IDBI), a Public Sector Undertaking (PSU) took over the regulatory and administrative control of UTI.

In 1987, the Government allowed public sector banks and public financial institutions (e.g. Life Insurance Corporation of India) to launch their mutual funds. State Bank of India (SBI) mutual fund was the first non UTI mutual fund to be established in India. Subsequently, other PSU banks like Canara Bank, Punjab National Bank, Indian Bank, Bank of Baroda etc also entered the mutual fund industry. LIC entered the mutual fund industry in 1989.

Economic reforms instituted in 1991 provided further impetus to the financial market in India. Securities and Exchange Board of India (SEBI) was setup in 1992 to act as the regulator of capital markets in India. SEBI also became the regulator of mutual funds in India. As part of economic liberalization, the Government also allowed the participation of private sector asset management companies (AMCs) in mutual funds. This was the pivotal change in the mutual fund industry. The first private sector mutual fund was launched in 1993 and subsequently many other AMCs entered the mutual fund industry; there are currently 43 AMCs in the mutual fund industry.

Subsequent reforms enacted by the Government and SEBI, including setting up of National Stock Exchange (NSE), introduction of derivative trading, the repealing UTI Act of 1963, abolition of entry load, introduction of direct mutual fund plans,

allowing Employee Provident Fund (EPF) to invest in stocks and numerous other regulations led to further growth of financial markets and mutual funds in India.

### **3.3 How does investment work?**

Investing helps you grow your money which can then be used to meet your future financial goals. When you invest your money, it is likely to provide you with returns. These returns can either be guaranteed or market-linked depending on where you invest your money. With guaranteed returns, the amount you receive is fixed at the beginning of the investment. With market-linked returns, you get the option to invest in equity and debt markets. Equity markets have the potential to provide high returns but carry high risks as well. Debt markets carry low risk and provide stable returns. The longer you stay invested, the higher the returns you are likely to receive. These returns can serve as a source of income and help you fulfill your financial aspiration.

### **3.4. Characteristics of Investment**

#### **1. Risk Factor**

Every investment contains certain portion of risk. It is a key feature of investment which refers to loss of principal, delay in payment of interest and capital etc. Most investors prefer to invest in less riskier securities.

#### **2. Expectation of Return**

Return expectation is the main objective of investment. Investors expect regularity of high and consistent income for their capital.

#### **3. Safety**

Investors expect safety for their capital. They desire certainty of return and protection of their investment or principal amount.

#### **4. Liquidity**

Liquidity means easily sale or convert the capital or investment into cash without any loss. So, most investors prefer liquid investments.

#### **5. Marketability**

It is another feature of investment that they are marketable. It means buying and selling or transferability of securities in the market.

## **6. Stability of Income**

Investors invest their capital with high expectation of income. So, return on their investment should be adequate and stable.

### **3.5 Objectives of Investment**

1. **Safety of Capital:** While there is no such thing as an absolutely safe and secure investment or one that is completely risk free. If your primary objective is safety, you will look for investments that have a minimal risk level. But then, the safest investments tend to have the lowest rates of return and may not even keep up with inflation. Safe investments include government issued securities, money market instruments and securities guaranteed by banks.
2. **Income:** If your primary objective is income, you will have to sacrifice a degree of safety in order to increase your returns. Even the most conservative investors like to have some level of income in their portfolios just to keep up with the rate of inflation. E.g.: investing in stock markets earns a higher return but with higher risk.
3. **Growth:** If you are growth oriented, you would normally be less concerned with safety, and do not totally depend on income from investment funds. These types of investments in growth instruments are more likely to fluctuate in value and might have a greater risk of loss.
4. **Tax Savings:** Income generated by common shareholders is considered capital gains and is taxed differently. Taxes on capital gains are significantly lower than taxes on interest income or ordinary income like salary. If your primary objective is tax-saving, registered plans such as national pension schemes and tax free savings accounts are the best bet. However, there are also effective ways to earn good returns along with saving taxes like investing in tax saving mutual funds or life insurance policy.
5. **Liquidity:** Investments such as bonds or bond funds are relatively liquid, meaning they can in many cases be converted into cash quickly and with little risk of loss. Stocks are less liquid since they can be sold easily but selling at the wrong time can cause a serious loss.

## **6.Safeguard your Money**

Investing keeps your money safe from immediate and unnecessary expenditures. It also helps you keep your money safe from inflation effects. Inflation erodes the value of your money unless it is invested in an interest-earning asset. Thus, investing will help you automatically keep up with inflation.

## **7. Grow your Savings:**

Investment is the only way to start growing your invested money. It allows your money to earn interest and if you keep the interest invested it will also start to earn interest.

## **8. Build Funds for Emergencies:**

Life is usually a series of ups and downs. Few times you are earning decent and saving money while other times you need a large sum for an emergency. Building investment pools help you on such rainy days.

## **9. Secures your Retired Life:**

Retired life is where you don't have a source of income to sustain your life. Once you have built a retirement corpus, you can experience the freedom that comes with it.

## **3.6 Types of investment**

### **Mutual funds**

Mutual fund is a company that pools money from many investors and invests the money in securities such as stocks, bonds, and short-term debt. The combined holdings of the mutual fund are known as its portfolio. Investors buy shares in mutual funds. Each share represents an investor's part ownership in the fund and the income it generates.

### **Stocks**

Companies sell shares of stock to raise money for start-up or growth. When you invest in stocks, you're buying a share of ownership in a corporation. You're a shareholder. There are two types of stock, common stock and preferred stock. Investment returns and risks for both types of stocks vary, depending on factors such as the economy, political scene, the company's performance and other stock market factors.

## **Bonds**

When you buy a bond, you're lending money to a company or governmental entity, such as a city, state or nation. Bonds are issued for a set period of time during which interest payments are made to the bondholder. The amount of these payments depends on the interest rate established by the issuer of the bond when the bond is issued. This is called a coupon rate, which can be fixed or variable. At the end of the set period of time (maturity date), the bond issuer is required to repay the par, or face value, of the bond (the original loan amount). Bonds are considered a more stable investment compared to stocks because they usually provide a steady flow of income. But because they're more stable, their long-term return probably will be less when compared to stocks. Bonds, however, can sometimes outperform a particular stock's rate of return. Keep in mind that bonds are subject to a number of investment risks including credit risk, repayment risk and interest rate risk.

## **Exchange trade fund**

An exchange-traded fund (ETF) is a type of pooled investment security that operates much like a mutual fund. Typically, ETFs will track a particular index, sector, commodity, or other assets, but unlike mutual funds, ETFs can be purchased or sold on a stock exchange the same way that a regular stock can. An ETF can be structured to track anything from the price of an individual commodity to a large and diverse collection of securities. ETFs can even be structured to track specific investment strategies.

## **Cash equivalent**

Cash equivalent investments protect your original investment and let you have access to your money. Examples include savings account, certificate of deposit etc. These different types of investments generally deliver a more stable rate of return. But cash equivalent investments aren't designed for long-term investment goals such as retirement. After taxes are paid, the rate of return is often so low that it doesn't keep pace with inflation.

## **Equity**

Equity is the amount of money that a company's owner has put into it or owns. On a company's balance sheet, the difference between its liabilities and assets shows how

much equity the company has. The share price or a value set by valuation experts or investors is used to figure out the equity value. This account is also called owners' equity, stockholders' equity, or shareholders' equity.

### **Trade**

In simple terms, trade is basically an exchange, voluntary in nature between two parties in requirement of each other's resources i.e. goods and services.

This system is based purely on the concept of need, having a sort of symbiotic relationship in which both benefit each other. In financial terms, trade basically refers to the sale and purchase of assets and securities between two consensual sides.

### **Annuity**

An annuity is a contract between you and an insurance company in which you make a lump-sum payment or series of payments and, in return, receive regular disbursements, beginning either immediately or at some point in the future.

### **Alternative Investment**

An alternative investment is a financial asset that does not fall into one of the conventional investment categories. Conventional categories include stocks, bonds, and cash. Alternative investments can include private equity or venture capital, hedge funds, managed futures, art and antiques, commodities, and derivatives contracts. Real estate is also often classified as an alternative investment.

### **Corporate Bond**

A corporate bond is a type of debt security that is issued by a firm and sold to investors. The company gets the capital it needs and in return the investor is paid a pre-established number of interest payments at either a fixed or variable interest rate. When the bond expires, or "reaches maturity," the payments cease and the original investment is returned.

### 3.7. Benefits of investment

- Potential for long-term returns:

While cash is undoubtedly safer than shares, it's unlikely to grow much, or find opportunities to grow, in the long run.

In the past, investors have found rewards over longer terms with investments that come with a level of capital risk. That means the risk that you might lose some or all of the amount you initially invested. Of course, these rewards are not guaranteed.

Volatility in the stock market, when stock prices change rapidly over a short period of time, isn't necessarily a bad thing. In fact, volatility can sometimes offer investment managers the opportunity to buy attractive shares at a cheaper price and get better returns in the long term.

- Outperform inflation:

In order for your savings to grow in real terms over time, they need to earn a rate of return after tax that's greater than the rate of inflation.

With today's low interest rates, it can be difficult to find a savings account that can give you a return above the current inflation rate. So it's worth considering investments which have the potential to outperform inflation.

- Provide a regular income:

If you're retired or approaching retirement, you'll probably be looking for something can give you a regular income to cover day-to-day living expenses.

There's a range of investments, including equities, bonds and property, that can provide you with regular income that's often higher than the rate of inflation.

- Tailor to your changing needs:

You or an Investment Manager can design your investment portfolio to achieve different goals as you go through life, e.g. you may prefer less risky options as you get older. With careful planning you can tailor your portfolio to reflect your changing goals and priorities.

If you plan on investing over a long time period, you may want to invest in funds that have growth potential, risky sectors such as emerging markets, or private equity where your savings can ride out short term market changes. If you're approaching retirement, you may want to invest in more income-focused options.

CT has a wide range of investment trusts, so you can create the right portfolio for your financial goals.

- Invest to fit your financial circumstances:

As your financial circumstances change over time, you can change how you invest to suit your needs. You can invest lump sums as and when you can, or smaller regular amounts in a monthly investment plan.

If you have the money available, you can start investing straight away. The sooner you invest, the longer your investment has to grow. Alternatively, investing a regular amount each month can help iron out fluctuations in the stockmarket, particularly in a volatile market.

Our investment options let you top-up your investments whenever you like. You can stop, start or change your monthly investments at any time. Also, you can switch between any of our trusts whenever you want. Just write to us and we'll do the rest.

This section of the website is directed at persons who are located in the UK. Please read our full terms and conditions and the relevant Key Information Documents ("KID") before proceeding with any investment product referred to on this website. Nothing on this website is, or is intended to be, advice to buy or sell any investments. If you are at all unsure whether an investment product will meet your individual needs, please seek advice.

### **3.8. Advantages of investing**

- Investing is the least "active" approach to participating in the markets. It can be good for those who have an interest in the markets but don't have enough interest in it to make it a part of their daily or weekly schedule.
- Some people have extreme difficulty doing short-term trading. Some, in fact, believe it's impossible to determine short-term moves with consistent accuracy. For such people, investing may be a good choice.
- Holding a position for more than a year potentially allows you to tap into the long-term capital gains tax, which is generally a lower tax rate than short-term capital gains tax.

- This is not meant to be tax advice. Please consult a competent and qualified tax professional for details about taxes as they apply to the time you're reading this and to your individual situation.

### **3.9 Disadvantages of investing**

- Of the three time horizons, investing can be the slowest way to make money, assuming that you could be an excellent swing trader or day trader.
- Because investing reuses the same capital very infrequently, the annual returns are generally not as good as a successful professional trader. Earning an average 10 per cent return annually may be considered acceptable for an investor. However, some day traders have made 10 per cent returns in a week! That's certainly not meant to be an income claim, nor is that normal, but, yes, it does happen.
- Investors notoriously have a very difficult time outperforming the market — making investing decisions that result in a better return than if you simply invested that same money into an equity index fund, such as the S&P 500, and didn't touch it. Even many professional fund managers aren't able to do that for their clients after costs

### **3.10. The difference between savings and investment**

Savings and investment are two different aspects of financial planning. Below are some key differences between the two:

#### **A) Savings**

This is the money you set aside from your income for a particular goal, such as buying a car, travelling, staying financially prepared for an emergency, and more. The risk associated with savings is minimal. However, savings do not offer any considerable growth of money. Your "savings" are usually put into the safest places, or products, that allow you access to your money at any time. Savings products include savings accounts, checking accounts, and certificates of deposit. Some deposits in these products may be insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration. But there's a tradeoff for security and ready availability. Your money is paid a low wage as it works for you.

After paying off credit cards or other high interest debt, most smart investors put enough money in a savings product to cover an emergency, like sudden unemployment. Some make sure they have up to six months of their income in savings so that they know it will absolutely be there for them when they need it

### **b) Investment**

When you invest your money in the right way, it grows in value and provides you returns. Your investments can be used to fulfil your financial goals such as buying a house, your child's higher education, and more. Investments also carry a risk that may vary for different investment products. When you "invest," you have a greater chance of losing your money than when you "save." The money you invest in securities, mutual funds, and other similar investments typically is not federally insured. You could lose your "principal"—the amount you've invested. But you also have the opportunity to earn more money.

### **3.11. How do investment plans in India work?**

In India, investments are categorised as short term and long term, which has an implication on their taxability. Short term investments require an asset to be held for 1 to 3 years, for example, a recurring deposit, mutual funds, and more. Anything beyond this is a long term investment, such as insurance plans, Public Provident Fund, fixed deposits, National Pension Scheme, and more.

### **3.12. Why should you invest in investment plans?**

The need for investments cannot be stressed enough. While systematic savings can ensure that you have enough funds for a financial emergency, investments make sure that you do not lose out on the value of your money.

Inflation can reduce the worth of your money with time. A commodity that costs ₹ 10/- today can cost ₹ 50/- five years from now. Therefore, simply saving your money is not enough. You need to invest it so that your funds grow with time.

Investment plans can offer you high returns over time to build wealth and cater for your long-term objectives.

### **3.13. Types of investments based on the risk profile**

- Low-risk investments

The risk is negligible, but the return on investment may also be less than medium and high-risk options. These include instruments like government bonds, corporate bonds, treasury notes, and more

- Medium-risk investments

The rate of return is moderately high here

- High-risk investments

These investments offer the maximum potential for growth. These include instruments like mutual funds, ULIPs, equity, and more

### **3.14. Investments as per life stages**

- First job: Since you are just beginning your investment journey, ELSS, Equity, and Term Insurance can be good options. These are all affordable instruments that do not require a lump sum investment. Moreover, the risk and reward are ideal for someone starting their career.
- Marriage: Health insurance for self and family becomes crucial at this stage. This ensures that you and your family stay protected against the costs of healthcare. So, you can focus on important goals, such as family planning and career planning.
- Birth of a child, buying a house, child education :ULIPs and savings plans make for a good choice here. These plans offer life protection and investment growth. Your loved ones stay financially secured and you can invest for long term goals .
- Retirement: Money back plans, unit-linked retirement plans, immediate annuity plans, and more such plans are ideal for retirement. The maturity benefits can help you maintain a similar standard of living in retirement as before, and the life protection component acts as a financial cushion for your family

### **3.15. Investment Risk**

Investment risk is defined as the probability or uncertainty of losses rather than expected profit from investment due to a fall in the fair price of securities such as bonds, stocks, real estate, etc. Each type of investment is exposed to some degree of

investment risk like the market risk i.e., the loss on the invested amount or the default risk i.e., the money invested is never returned back to the investor.

### **3.15.1. Types of investment risk:**

- **Market risk:** The risk of investments declining in value because of economic developments or other events that affect the entire market. The main types of market risk are equity risk, interest rate risk and currency risk.
- **Liquidity risk:**  
The risk of being unable to sell your investment at a fair price and get your money out when you want to. To sell the investment, you may need to accept a lower price. In some cases, such as exempt market investments, it may not be possible to sell the investment at all.
- **Concentration risk:**  
The risk of loss because your money is concentrated in 1 investment or type of investment. When you diversify your investments, you spread the risk over different types of investments, industries and geographic locations
- **Credit risk:**  
The risk that the government entity or company that issued the bond will run into financial difficulties and won't be able to pay the interest or repay the principal at maturity. Credit risk applies to debt investments such as bonds. You can evaluate credit risk by looking at the credit rating of the bond. For example, long-term Canadian government bonds have a credit rating of AAA, which indicates the lowest possible credit risk.
- **Reinvestment risk:**  
The risk of loss from reinvesting principal or income at a lower interest rate. Suppose you buy a bond paying 5%. Reinvestment risk will affect you if interest rates drop and you have to reinvest the regular interest payments at 4%. Reinvestment risk will also apply if the bond matures and you have to reinvest the principal at less than 5%. Reinvestment risk will not apply if you intend to spend the regular interest payments or the principal at maturity.
- **Inflation risk:**  
The risk of a loss in your purchasing power because the value of your investments does not keep up with inflation. Inflation erodes the purchasing power of money

over time – the same amount of money will buy fewer goods and services. Inflation risk is particularly relevant if you own cash or debt investments like bonds. Shares offer some protection against inflation because most companies can increase the prices they charge to their customers. Share prices should therefore rise in line with inflation. Real estate also offers some protection because landlords can increase rents over time.

- **Horizon risk:**

The risk that your investment horizon may be shortened because of an unforeseen event, for example, the loss of your job. This may force you to sell investments that you were expecting to hold for the long term. If you must sell at a time when the markets are down, you may lose money.

- **Longevity risk:**

The risk of outliving your savings. This risk is particularly relevant for people who are retired, or are nearing retirement.

- **Foreign investment risk:**

The risk of loss when investing in foreign countries. When you buy foreign investments, for example, the shares of companies in emerging markets, you face risks that do not exist in Canada, for example, the risk of nationalization.

### **3.15.2 Investment Risk Management:**

Although there are risks in investment, these risks can be managed and controlled.

Various ways of managing the risks include:

- **Diversification:** Diversification includes spreading investment into various assets like stocks, bonds, and real estate, etc. This helps the investor as he will gain from other investments if one of them does not perform. Diversification can be achieved across different assets and also within the assets (e.g., investing across various sectors when investing in stocks).
- **Investing Consistently (Averaging):** By investing consistently i.e., investing small amounts at regular intervals of time, the investor can average his investment. He will sometime buy high and sometimes buy low and maintain the initial cost price of the investment. However, if the investment rises in the market price, he will gain on the whole investment.

- **Investing for the Long Term:** Long-term investments provide higher returns than short-term investments. Although there is short-term volatility in the prices of securities, however, they generally gain when invested over a longer horizon.

### **3.16. What Is Saving?**

People save money for both purchases and in case of emergencies. Saving is an essential part of personal finance that involves setting aside money for future use. Think of it as putting your money in a piggy bank, but instead of an actual piggy bank, you can use a savings account or a certificate of deposit (CD) that earns interest over time. You can save for different reasons, such as buying a new gadget, going on a vacation, or having an emergency fund for unexpected expenses.

### **3.17. A Brief Historical Account:**

The wise saying “A penny saved is a penny earned” may be loosely credited with originating the concept of a savings account. Bank accounts have a long evolutionary history. Many people argue that since the Romans are credited with inventing coins, bank accounts preexisted Mesopotamia, where they were used to store grain, gold, silver, weapons, and other valuables. They also argue that in those days, deposit receipts were cashed or used as payment in transactions. However, the historical account of the evolution of the savings account in particular may be dated back to the 1500s. Importantly, the first-known savings bank came up in 1765 in France. Types of Savings Accounts Savings accounts are basically of two types: (1) with checkbook facility and without checkbook facility. Savings account holders are allowed to deposit checks, drafts, dividend warrants, and so on, which stand in their name only. The savings accounts can be opened individually or jointly. There are restrictions on the maximum amount that can be deposited in or withdrawn from a savings account.

### **3.18. Historical Timeline of Evolution of Savings Accounts/Savings Banks :**

1500s- Cashiers were developed in Amsterdam (Holland), providing a means of security to store money for a small fee.

1697-The first idea of a savings institution was developed in England.

1765-Brumuth (France) was established. This is the first-known savings bank in the world.

1778-The first savings bank of Germany (Hamburg) was established.

1787-The first savings bank of Switzerland (Berne) was established.

1799-The first savings bank of England (Wend-over) was established.

1810-The first savings bank of Denmark (Holsteinborg) was established.

1816-The first chartered savings bank was established in the United States.

1861- A postal savings bank was established in England.

1911-The U.S. Postal Savings system was established. It was discontinued later

### **3.19 . Socioeconomic Significance of Savings Accounts :**

From the point of view of theoretical economics, savings are equal to investment less current expenditure. Savings here is nothing but the aggregates of savings accumulated in personal, corporate, and government savings accounts in the economy. The relationship between economic growth and savings is an important consideration. With economic growth, the per capita income of the individual increases, and consequently, per capita consumption expenditure also increases. Thus, higher economic growth leads to higher savings. On the other hand, savings play a proactive role in capital formation in an economy. This is the reason why governments often offer a number of savings and investment schemes that are tax exempt to promote the practice of saving among individuals. While individuals can save a considerable amount of tax through such schemes, governments, in turn, can invest the accumulated funds in various development projects. A study conducted by the World Bank in 2012 suggests that roughly half of all adults in the world have an individual or joint bank account. However, wider disparity was found between the West (where 89 percent of adults had accounts) and the developing world (where only 41 percent of adults had accounts). The study found that educational level also plays an important role in people having a bank account. For example, in Africa, 55 percent of people with tertiary education had bank accounts, while only 10-percent people with primary or no education had bank accounts. The gender gap is also quite a visible factor in people having bank accounts, especially in the developing

countries. The study found that all over the world, 46 percent of adult men had bank accounts while only 37 percent of adult women had bank accounts. The disparity was most noticeable in South Asia, the Middle East, and North America. An earlier United Nations study, undertaken by Marc J. Scher in 2001, suggests that the postal services in Asia have played a pivotal role in promoting domestic savings as well as in offering other domestic financial services to the most excluded sections of the society. Empirical research in developing countries like Bangladesh underlines the role of small savings (e.g., the microcredit and microfinance scheme pioneered by Muhammad Yunus, the founder of Grameen Bank) in reducing poverty and thereby upgrading the standard of living of the people. Savings accounts may also be made a tool for direct benefit transfer. The recent scheme of opening savings bank accounts launched by the Government of India, named Pradhan Mantri Jan-Dhan Yojana, has become a tool of direct benefit transfer and at the same time has promoted financial inclusion, especially among the lower-income groups of the country. Reiterating the old saying, “A penny saved is a penny earned,” the First International Thrift Congress, held in 1924 in Milan, marked October 31 as World Thrift Day, or World Savings Day, to raise public awareness on savings.

### **3.20. Recent Trends in Services Offered in a Savings Account:**

Keeping pace with the changing times and riding on the advancements in the field of information technology, savings bank account holders are today offered considerable flexibility in terms of transaction rights and other add-on services. Banks today offer a variety of savings accounts. These include basic savings bank accounts, savings bank accounts, savings plus bank accounts, premium savings bank accounts, savings accounts for youth, savings bank accounts for minors, and so on, with a host of varied services under each category. The add-on services offered by a bank to a savings account holder include the following: free account statement through ATM (automated teller machine), online banking, mobile banking, withdrawal of money through ATM-cum-debit card, money transfer to other account holder's savings account, and so on. The facilities offered on savings accounts vary from bank to bank, however. With the advancements in the field of information and technology, many more changes are sure to come.

### **3.21. Reasons why saving money is important**

Savings is crucial for everyone, regardless of their earnings, spending and life stage. Here are some reasons why you need to start saving.

- It offers peace of mind: Knowing that you have a certain amount accumulated for times of your need, gives you peace of mind. You can lead a stress-free life with the knowledge that you will not have to struggle if things take an unexpected route.
- It gives you a better future: Your savings can be the answer to a number of your goals. You can buy a house, accumulate funds for your retirement, or purchase a vehicle. You can secure your future, indulge in the best of things that life has to offer and live a very fulfilling life.
- It provides for your children's education: With a considerable amount of savings, you can fuel your children's dreams and pay for the best schools and colleges across the world.
- You can plan your short-term goals: Savings are not just aimed at the long term. You can also benefit from savings in the short term. A lot of people save for a few months and then travel.
- It gives your family security in case of an unfortunate event: By saving in a disciplined manner, you can make sure that your family is well-provided for. In unfortunate times, your savings can act as a cushion for your loved ones and help them overcome any financial difficulty.

### **3.22. Advantages of Saving Money**

- Become financially independent:  
It will help you stand on your own two feet and make your way in the world. With even a small nest egg of savings, you could afford the deposit for renting a flat, get on the property ladder or pay off student debts.
- Less worries about surprise expenses:  
One of the biggest benefits about saving money is reducing stress and ability to cover unforeseen expenses. Simply living paycheck to paycheck without any savings leaves you exposed to emergency costs that can't be planned for.

- Prepare for future life changes:

One point that keeps recurring in this article is the uncertainty of life .These are not always necessarily bad things and saving can help you prepare for a number of changes in circumstances.

- Financial security to pursue your dreams:

One awesome benefit to saving money is the freedom to chase you dreams .With money in the bank you might just be able to reduce your hours at work and start your own business. That's exactly what I used my savings for.

### **3.23. Disadvantages of Saving Money**

- It's better to pay off debt than save money:

If you're trying to put yourself in a better financial situation it's very tempting to ignore your debts and save money, that way at least your bank account is growing.

It is in fact better to pay off your credit card debts and loans before saving money. The reason for this is simple. Borrowing money is expensive.

- You'll have less nice stuff :

The hardest part about saving money is the temptation.

To save money you'll have to sacrifice buying new things and live with what you've got, in the short term at least.

- Saving money makes you less wealthy:

This point is a little more complex but still important to understand.

Saving money is great for a number of reasons mentioned above and you should always have a fund for emergency expenses.

### **3.24. Types of savings**

- Online savings account:

A brick-and-mortar financial institution isn't the only place to shop for a savings account. Online banks provide an easy, accessible way to manage your money from anywhere in the world on your smart phone or computer.

- High-yield savings account:

High-yield savings accounts are similar to traditional savings accounts with one big difference: The interest rates are higher, allowing you to grow your savings faster without compromising safety and liquidity.

- Student savings account:

Another savings account option is one specifically for students. Student savings accounts tend to have features that make banking easier for young people with modest financial means. You can find accounts with no minimum opening deposits and no monthly service fees.

- CDs:

A certificate of deposit, or CD, is another type of savings account. CDs typically pay a higher yield than traditional savings accounts because you agree to let the bank keep your money locked up for a specific term that could range from three months to five years or longer. The downside is reduced liquidity, or the ability to withdraw funds when you want them without a penalty.

- Money market accounts:

Money market accounts offer a safe place to store your savings and take advantage of decent yields. Many of the top money market accounts are offering APYs of 2 percent or higher.

- Savings accounts with automatic savings features:

Savers who want extra help reaching their goals might consider opting into automatic savings features. Some work by rounding up debit card transactions to the nearest dollar, then transferring the difference into your savings account.

- Cash management account:

Cash management accounts (CMA) are a little different from other savings vehicles. They are not available at banks and credit unions. These accounts are offered by non-bank financial institutions such as brokerages and robo-advisor platforms.

- Health Savings Account:

A health savings account (HAS) is similar to a standard savings account, except it is designed for a singular purpose: to pay medical expenses. You must be enrolled in a high-deductible health plan (HDHP) to open an HAS, and you and/or your employer can contribute to the account.

- **Savings Accounts for women:**  
Many leading banks offer Savings Accounts for women customers. These Savings Accounts often come with beneficial offers on skill-building programmes and courses that enable women to be self-sufficient. Like Privilege Bank Accounts, Savings Accounts for women also give account holders exclusive value-added benefits like discounts on lockers, dedicated banking assistance, and preferential rates on loans, among other things.
- **Family Savings Accounts:**  
Family Savings Accounts are types of accounts that enable all the members in your family to address their diverse banking needs through one common platform. It offers account holders a range of benefits over the regular, Individual Savings Account, such as lower minimum balance requirements, added banking privileges and superior benefits like Wealth Management and Private Banking. ICICI Bank's Family Banking division offers account holders all this and more.
- **Basic Savings Account:**  
A Basic Savings Account is a simple type of account that you can open with a financial institution. It simply serves the purpose of holding your money in a secure space. In exchange for this, you get to earn interest on the amount deposited. The rate of interest varies from one bank to another. Basic Savings Accounts often have a minimum balance requirement and you need to take care that the balance in your account doesn't fall below that limit.

### **3.25. Benefits of saving money:**

One of the best ways to take charge of your finances in today's uncertain economy is to accumulate a healthy savings account. Nobody wants to feel the stress of knowing that they are only a paycheck or two away from financial disaster because they lack money to fall back on when "stuff happens." Specific examples include job loss, disability, a car breakdown, a sick child or pet, and other types of financial emergencies. Saving provides a financial "backstop" for life's uncertainties and increases feelings of security and peace of mind. Once an adequate emergency fund is established, savings can also provide the "seed money" for higher-yielding investments such as stocks, bonds, and mutual funds.

There is also evidence from a recent study by the Northwestern Mutual insurance company that savings is linked to increased happiness. Actually, what the study found was that people who are “planners” and do future-oriented things such as setting goals and taking steps (e.g., saving money) to achieve those goals feel happier, and better about their lives, than those who don’t make plans. On a related note, the Consumer Federation of America found a strong relationship between having spending and saving plans and maintaining emergency funds. Particularly for low-income individuals, those with a spending plan with goals were far more likely to have saved money for emergencies than were those without a plan.

Economists and psychologists attribute findings like these to the sense of control that people have when they plan ahead and know what they need to do to get from where they are now to where they want to be. It is well established by research that people who feel a sense of control over life events are often happier, cope better, and are more resilient in times of stress than others. Conversely, people are especially unhappy in situations where they perceive themselves to have a lack of control. It is, therefore, no surprise that commuting ranks high on the list of things that make people most unhappy. Commuters never know from day to day what traffic gridlock, accidents, and weather-related hassles they’ll encounter.

Encouraging people to develop and implement a personal saving plan is the central focus of the America Saves program. The motto of America Saves is “Build Wealth, Not Debt.” 2009 also marks the third year of America Saves Week, an annual event that focuses attention on the benefits of saving. Throughout the country, there will be information and events designed to promote saving and to help individual savers develop a personal action plan. The dates for America Saves Week 2009 are February 22 to March 1.

America Saves is an example of a “social marketing campaign.” This means that the messages associated with this program are designed to change people’s behavior rather than to sell them a product or service, as is typical with most marketing messages. Just like the “Buckle Up for Safety” campaign several decades ago that got many people in the habit of wearing seat belts, America Saves seeks to get more

Americans into the savings habit to improve their future financial security and that of the country.

### **3.26. Risk of savings**

- **Overview:**

When you begin to build up your savings, it's important to consider your options for where to store your money. Many people squirrel away their reserves into savings accounts; you know, those safe, comfortable accounts you can open up at your local bank. However, depending on your financial objectives, a savings account may not be right for you. Before you sign on any dotted lines, evaluate the risks involved so you can make a well-informed financial decision.

- **Low Interest, Poor Return:**

If your goals are to make money on the cash you store away, then a savings account may disappoint you. Savings accounts are not intended for accumulating high returns on the money you put into them. In fact, one great disadvantage to savings accounts is that they offer low interest rates, which means a poor return for you. In fact, the returns may be so low that you risk inflation eating away at the value of your deposit. If you are interested in seeing growth on your reserves, stocks or bonds are another option, as you will rarely see any significant movement with savings accounts. Of course, the stock market is riskier than a savings account in a federally insured bank, and you have to weigh the risks.

- **Bank Charges:**

Some banks charge annual fees for having a savings account with them. It's possible that the fees for your savings account will be higher than the amount of interest you earn on your savings account. According to MSN Money, various activities within your savings account may cause hidden fees to activate. For instance, going below the required minimum balance may activate penalty fees. Therefore, know the terms of your savings accounts — and all the little fees that go along with it — so that you don't wind up with a surprise bill at the end of the year.

### **3.27. Which is riskier, saving or investing?**

By definition, saving entails very little risk. Investing, on the other hand, comes with the risk of losing money. Therefore, investing, in general, is riskier than saving.

### **3.28. Why do some people prefer to save rather than invest?**

Some people may choose to save rather than invest for a variety of reasons. Some people prefer the sense of security of having more money set aside in a savings account for unexpected expenses or emergencies. Others may have a larger number of short-term financial goals, such as saving for a vacation or the down payment on a house, and prefer to keep the money in a low-risk savings account. Additionally, some people may not have the knowledge or expertise to invest, or they may not feel comfortable with the level of risk associated with investing due to having a low risk tolerance. Finally, some people may simply not have enough money to invest after covering their essential expenses.

### **3.29. The Bottom Line**

Saving and investing are both important components of a healthy financial plan. Saving provides a safety net and a way to achieve short-term goals, while investing has the potential for higher long-term returns and can help achieve long-term financial goals. However, investing also comes with the risk of losing money. Each approach has its own pros and cons, and it's important to Find the right balance that works for your financial situation and goals. Ultimately, a well-rounded approach that includes both saving and investing can help build wealth, protect against financial shocks, and provide a solid foundation for a more secure financial future.

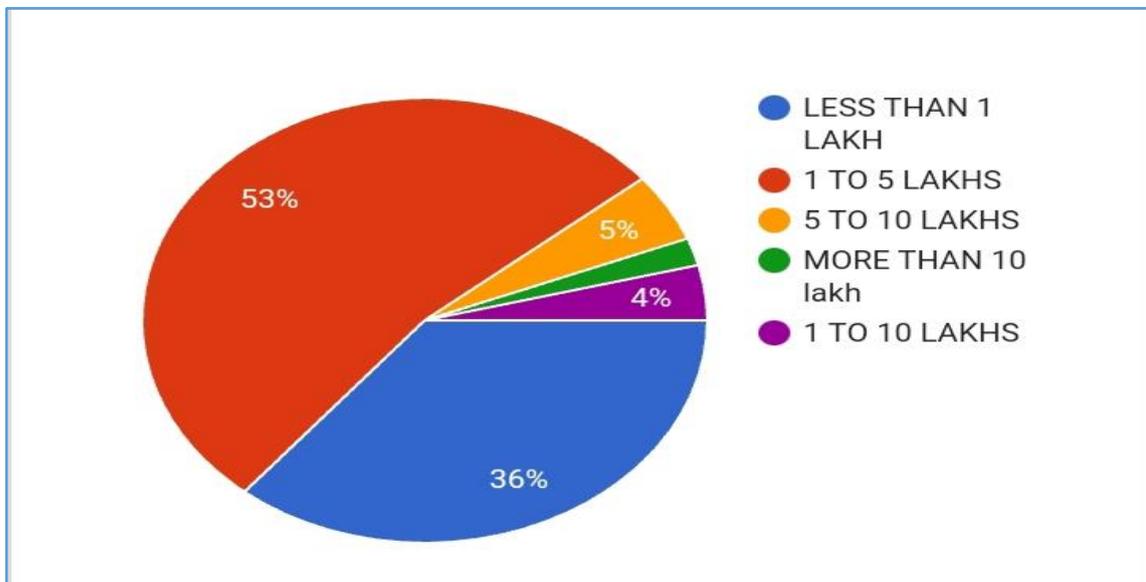
**CHAPTER IV**  
**DATA ANALYSIS AND INTERPRETATION**

**Table4.1**  
**Annual Income**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Less than 1 lakhs	36	36%
1 to 5 lakhs	53	53%
5 to 10 lakhs	5	5%
More than 10 lakhs	6	6%

**Source of data: Primary Data**

**Figure No: 4.1**  
**Annual Income**



The table 4.1 shows that 53respondents have annual Income between1 to 5 lakhs ,36 respondents have annual Income less than 1 lakhs ,5 have annual income between 5 to 10 lakhs and the rest have annual income above 10 lakhs. Majority of the respondents are having an annual income of 1 to 5 akhs.

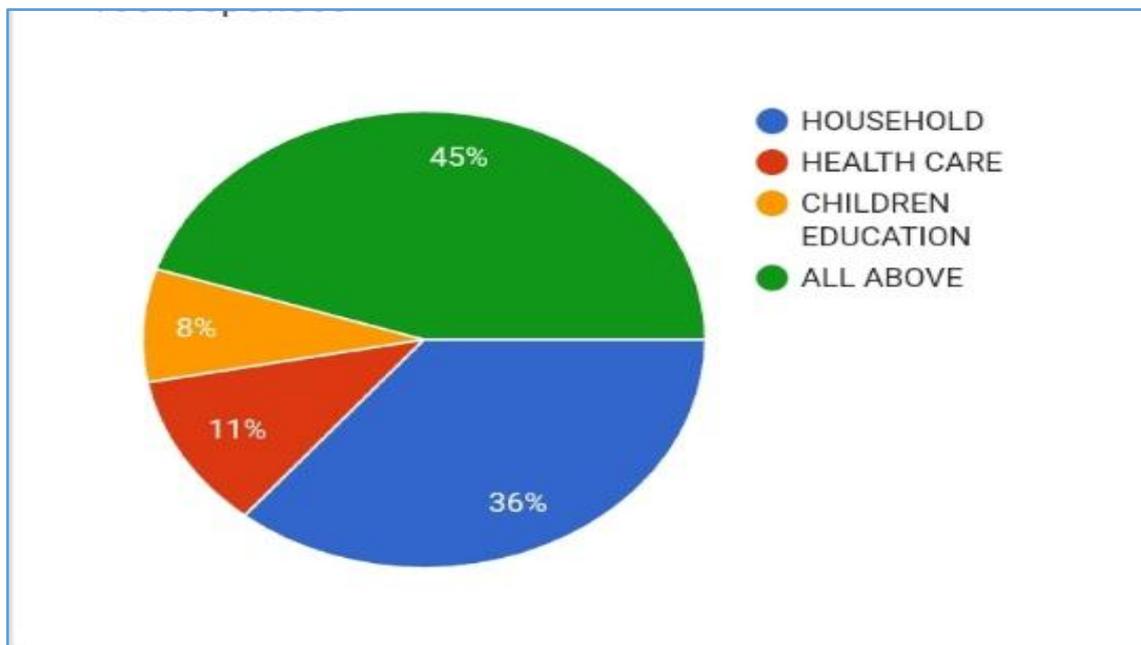
This survey result is also shown in figure 4.1

**Table 4.2**  
**Spending of monthly income**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Health care	11	11%
Household	36	36%
Children education	8	8%
All above	45	45%

**Source of data: Primary Data**

**Figure no 4.2**  
**Spending of monthly income**



The table 4.2 shows that 45 respondents spend monthly income on all the above areas while 36 spend it on household ,11 spends on health care and 8spends it on children education. Majority of the respondents spend their monthly income on all the three categories i.e. household , health care, children education.

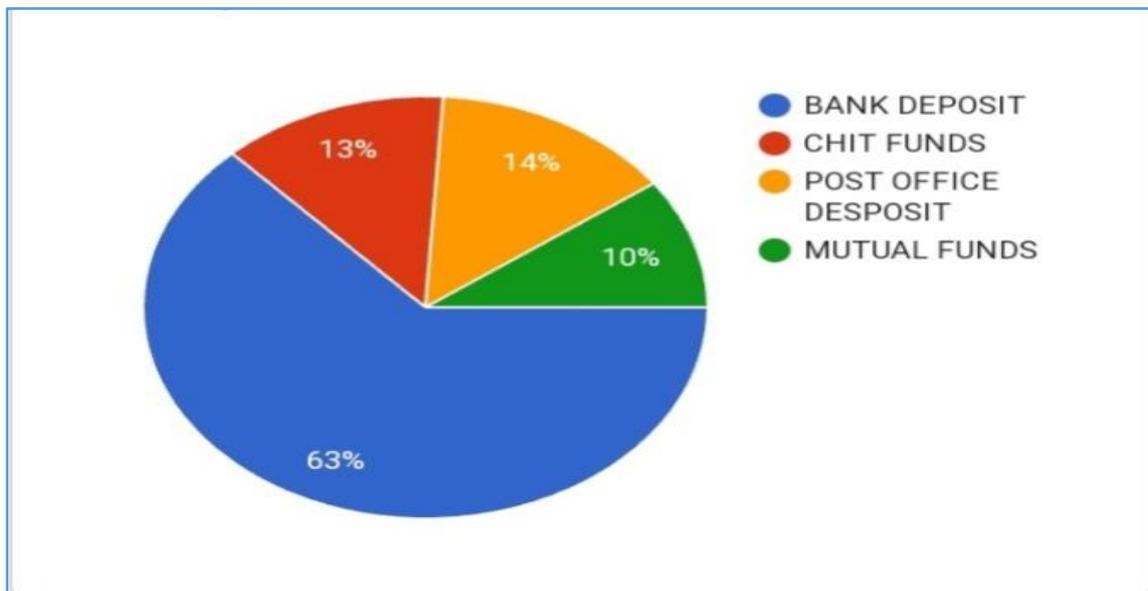
This survey result is also shown in figure 4.2

**Table no 4.3**  
**Most preferred saving avenue**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Chit funds	13	13%
Bank deposits	63	63%
Post office deposit	14	14%
Mutual funds	10	10%

**Source of data: primary data**

**Figure no 4.3**  
**Most preferred saving avenue**



The table 4.3 shows that about 63 respondents prefer bank deposits, while 14 of them prefer post office deposit ,13 prefer chit funds and 10 prefer mutual funds. Majority of the respondents preferred saving avenue is bank deposit.

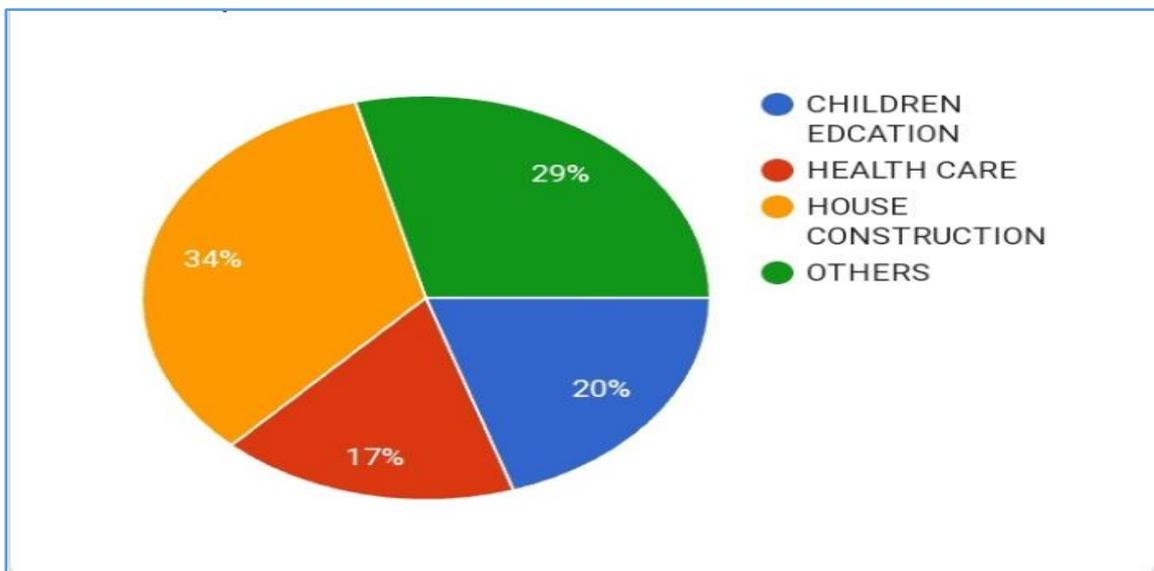
This survey result is also shown in figure 4.3

**Table no4.4**  
**Saving objectives**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Children education	20	20%
Health care	17	17%
House construction	34	34%
<b>Other</b>	<b>29</b>	<b>29%</b>

**Source of Data :Primary Data**

**Figure no 4.4**  
**Saving objectives**



The table no 4.4 shows that 34 respondents savings objective is house construction ,29 respondents objective for Saving is other things while 20 respondents objective is children education and rest of the respondents prefer objectives is health care. Majority of the respondents saving objective is construction of house.

This survey result is also shown in figure 4.4

**Table no.4.5**

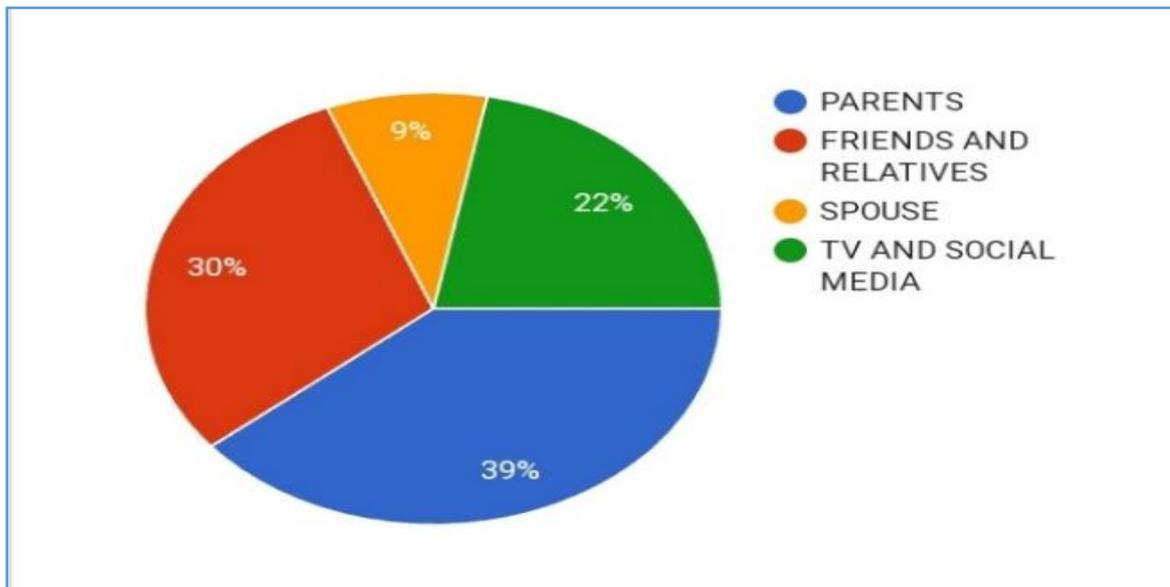
**Information gathering source about investment avenue**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Parents	39	39%
Friends and relatives	30	30%
Spouse	9	9%
TV and social media	22	22%

**Source of data: Primary Data**

**Figure 4.5**

**Information gathering source about Investment Avenue**



The table shows that 39 respondents gather information about investment avenue from parents, 30 from friends and relatives, 22 from TV and social media and 9 from spouse. Majority of the respondents gathered their information about investment avenue is from their parents.

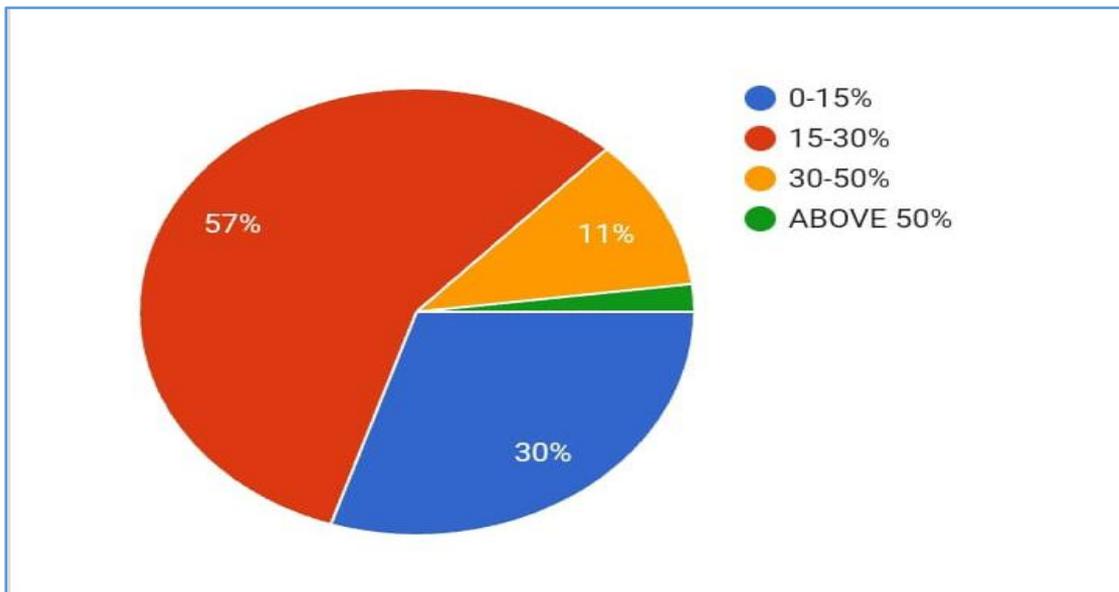
This survey result is also shown in figure 4.5

**Table no 4.6**  
**Percentage of income investing**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
0-15%	30	30%
15-30%	57	57%
30-50%	11	11%
Above 50%	2	2%

**Source of Data : Primary Data**

**Figure 4.6**  
**Percentage of income investing**



The table 4.6 shows that 57 respondents invest 15-30% of their income while 30 invest 0-15% of their income, 11 invests 30-50% of their income and 2 respondents invest more than 50% of their income. Majority of the respondents invest a percentage of 15-30%.

This survey result is also shown in figure 4.6

**Table no 4.7**

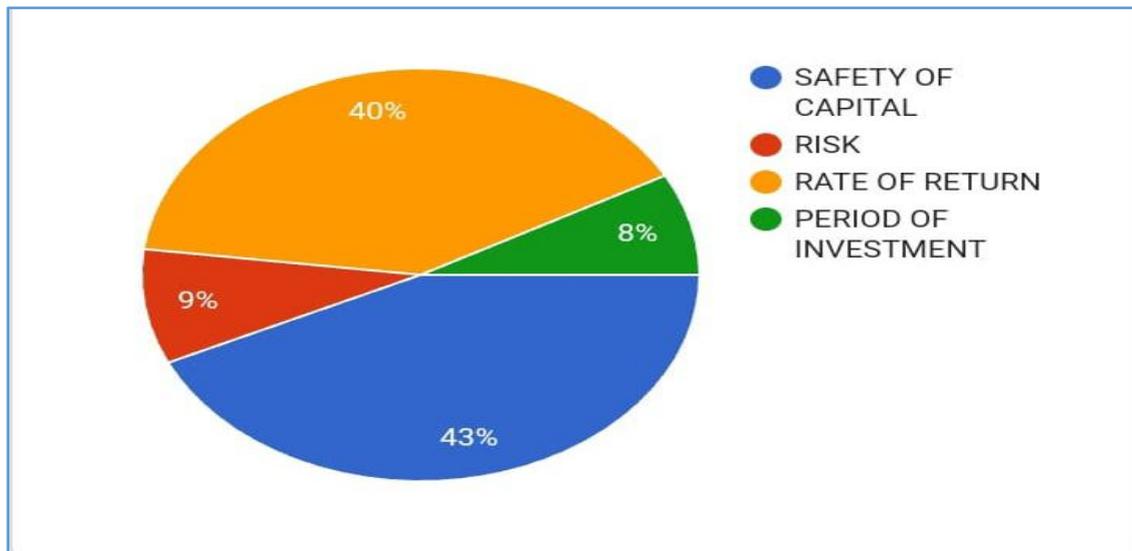
**Factors considered before investing money**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Safety of capital	43	43%
Risk	9	9%
Rate of return	40	40%
Period of investment	8	8%

**Source of data: Primary Data**

**Figure 4.7**

**Factors considered before investing money**



The table 4.7 shows that 43 respondents consider the factor - safety of capital while investing money, 40 respondents consider the factor- rate of returns ,9 consider risk and the rest of the respondents consider the factor-period of investment. Majority of the respondents considered factor before investing money is safety of capital.

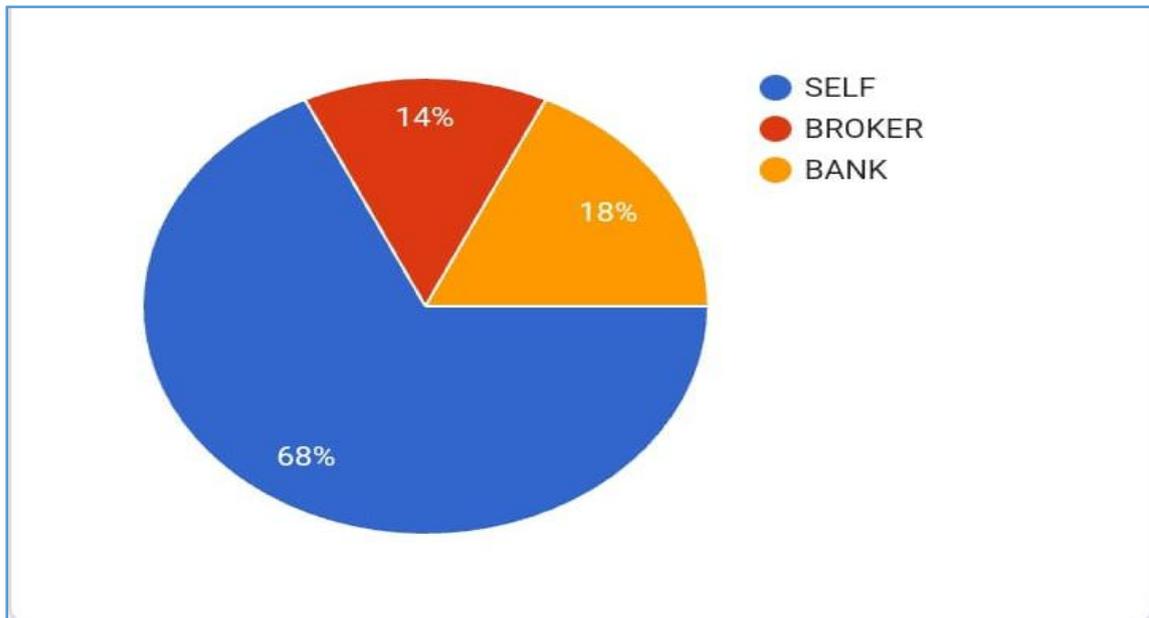
This survey result is also shown in figure 4.7

**Table no 4.8**  
**Management of investment**

Response	No of respondents	Percentage
Self	68	68%
Broker	14	14%
Bank	18	18%

**Source of data: Primary Data**

**Figure no 4.8**  
**Management of investment**



The table 4.8 shows that 68 respondents manage their investment by themselves, 18 manages by bank and 14 by brokers. Majority of the respondents manages their investment by themselves.

This survey result is also shown in figure 4.8

**Table no:4.9**

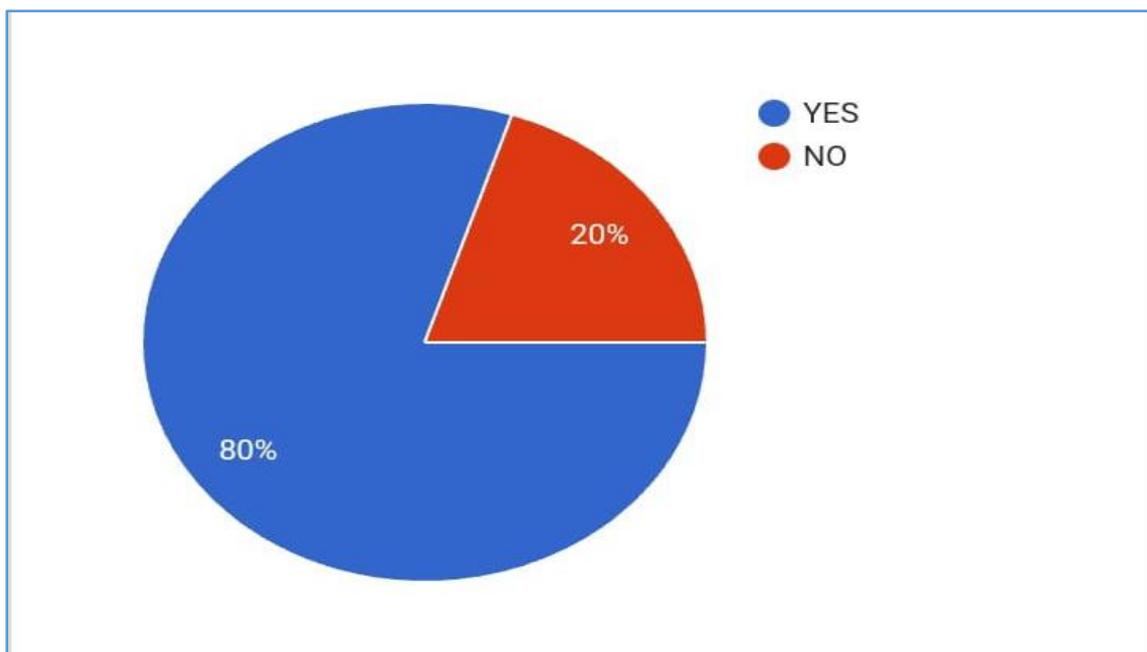
**Investment till date**

Response	No of respondents	Percentage
Yes	80	80%
No	20	20%

**Source of data: Primary Data**

**Figure no 4.9**

**Investment till now**



The table 4.9 shows that 80 respondents are currently having investment and 20 doesn't have any investments till now. Majority of the respondents are having investment now.

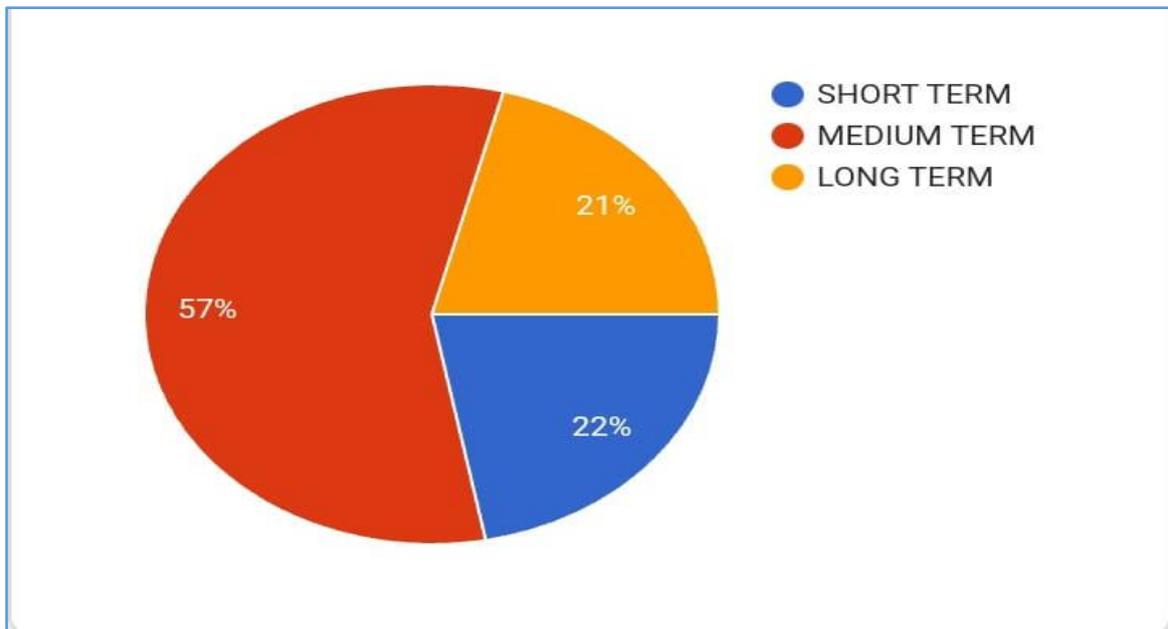
This survey result is also shown in figure 4.9

**Table 4.10**  
**Preferred period of investment**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Short term	22	22%
Medium term	57	57%
Long term	21	21%

**Source of Data: Primary Data**

**Figure 4.10**  
**Preferred period of investment**



The table 4.10 shows that 57 respondents prefer medium term investment while 22 respondents prefer short term and 21 prefer long term. Majority of the respondents prefers medium term investment period.

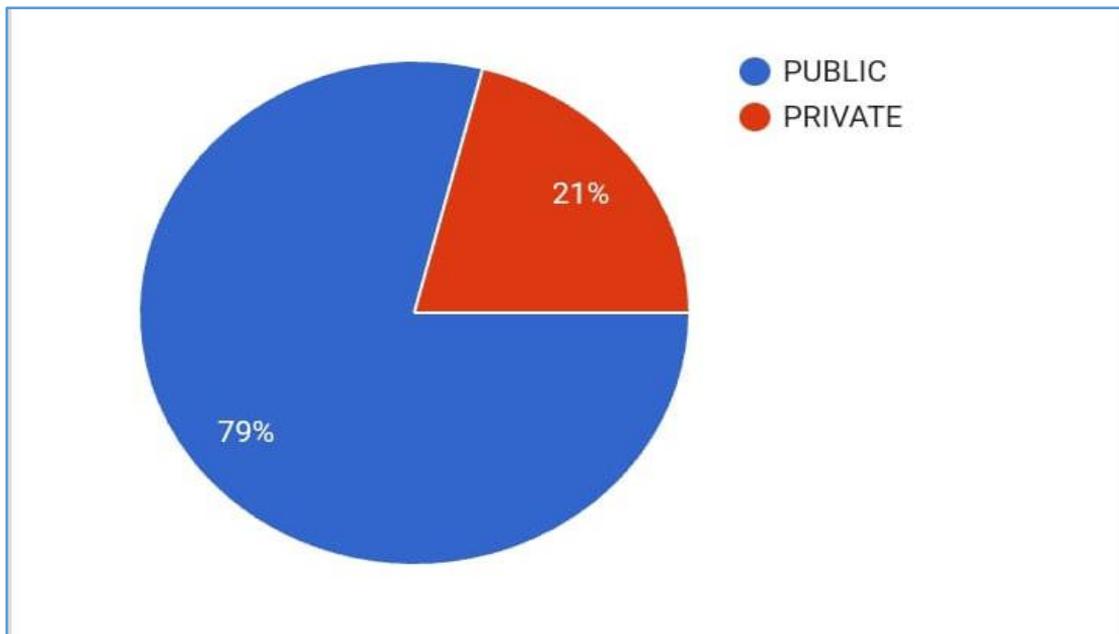
This survey result is also shown in figure 4.10

**Table no 4.11**  
**Preferred sector**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Public	79	79%
Private	21	21%

**Source of data: Primary Data**

**Figure no 4.11**  
**Preferred sector**



The table no 4.11 shows that 79 respondents prefer public sector to invest while 21 like to invest in private sector. Majority of the respondents like to invest in public sectors.

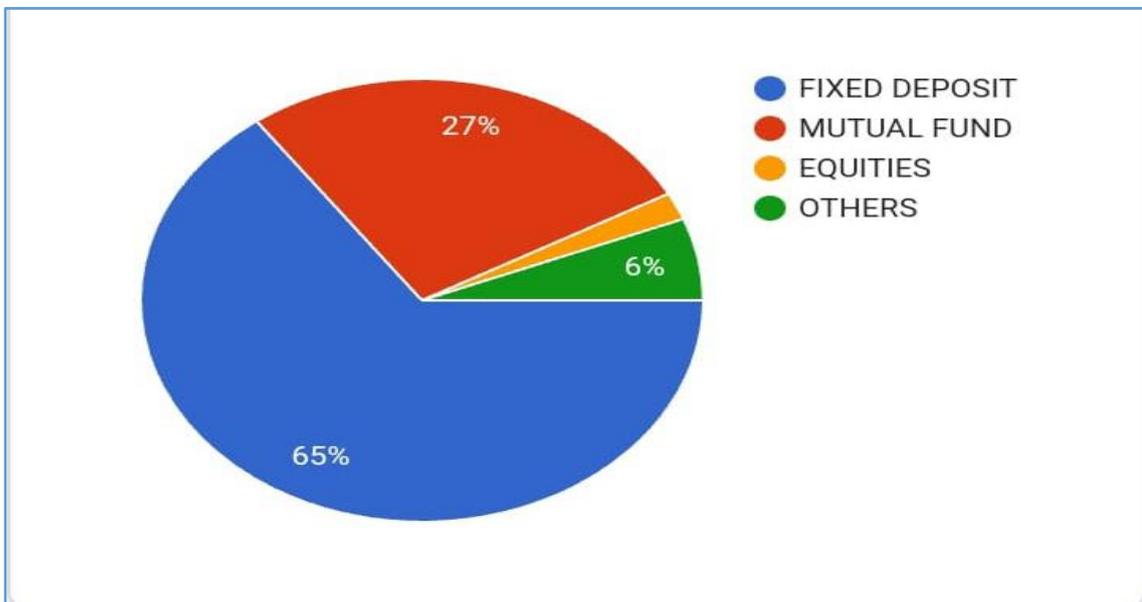
This survey result is also shown in figure 4.11

**Table no 4.12**  
**More profitable investment**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Fixed deposit	65	65%
Mutual fund	27	27%
Equities	2	2%
Others	6	6%

**Source of data Primary Data**

**Figure no 4.12**  
**More profitable investment**



The table no 4.12 shows that 65 respondents are of the opinion that Fixed deposit are more profitable, while 27 opinions that Mutual funds are profitable, 6 opinion other avenues and 2 says equities. Majority of the respondents feels fixed deposit more profitable

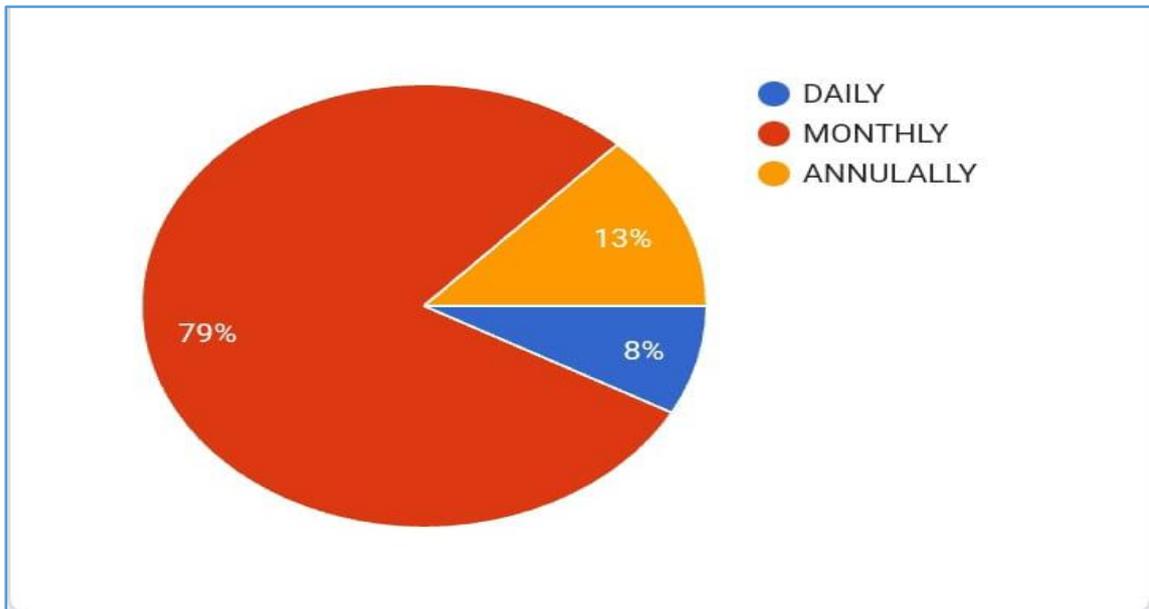
This survey result is also shown in figure 4.12

**Table no 4.13**  
**Monitoring of Investment**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Daily	8	8%
Monthly	79	79%
Annually	13	13%

**Source of Data : Primary Data**

**Figure no 4.13**  
**Monitoring of Investment**



The table 4.13 shows that 79 respondents monitor their investment monthly, 13 monitor annually and the rest monitor daily. Majority of the respondents monitor their investment monthly.

This survey result is also shown in figure 4.13

**Table no 4.14**

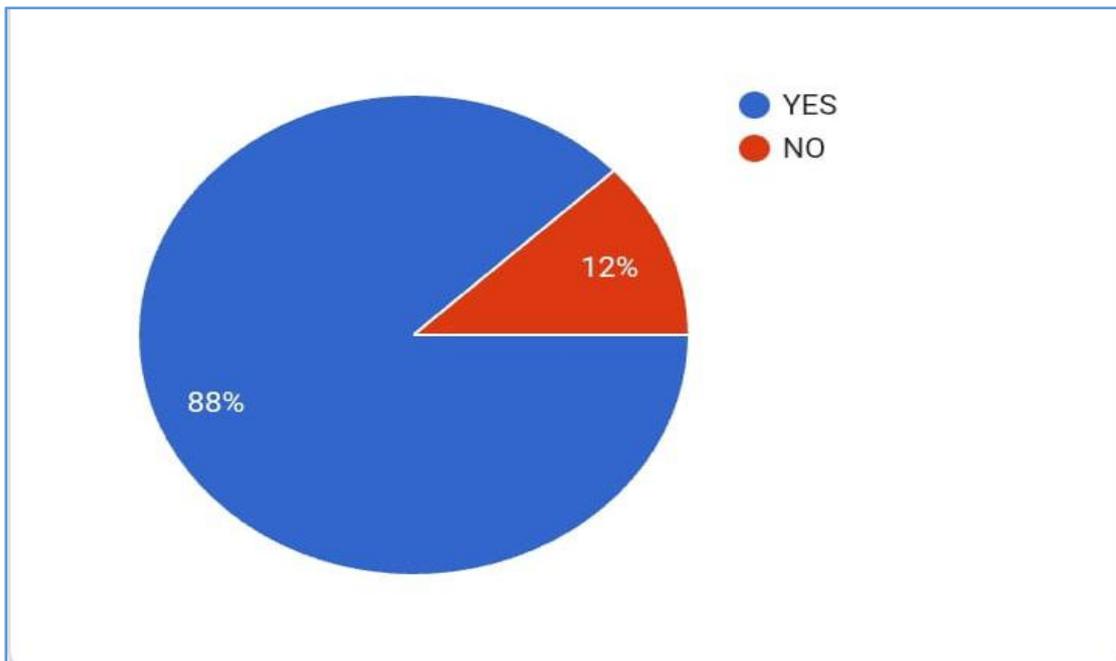
**Any Current savings for future purpose**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Yes	88	88%
No	12	12%

**Source of Data: Primary Data**

**Figure:4.14**

**Any current savings for future purpose**



The table 4.14 shows that 88 respondents are saving money for future use while 12 doesn't have any savings for future. Majority of the respondents are saving their current income for future purpose.

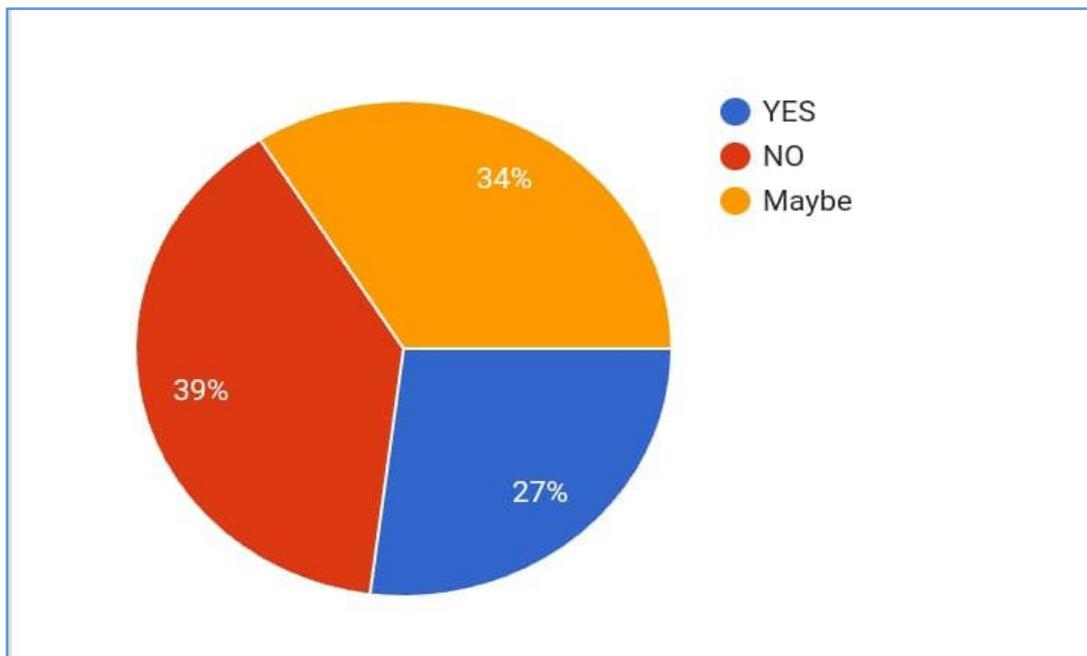
This survey result is also shown in figure 4.14

**Table no 4.15**  
**Any retirement plans**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Ye s	27	27%
No	39	39%
Maybe	34	34%

**Source of data: Primary Data**

**Figure 4.15**  
**Any retirement plans**



The table 4.15 shows that 39 respondents doesn't have any retirement plans while 34 respondents are not sure about it and 27 are having Retirement plans. Majority of the respondents doesn't have any retirement plans.

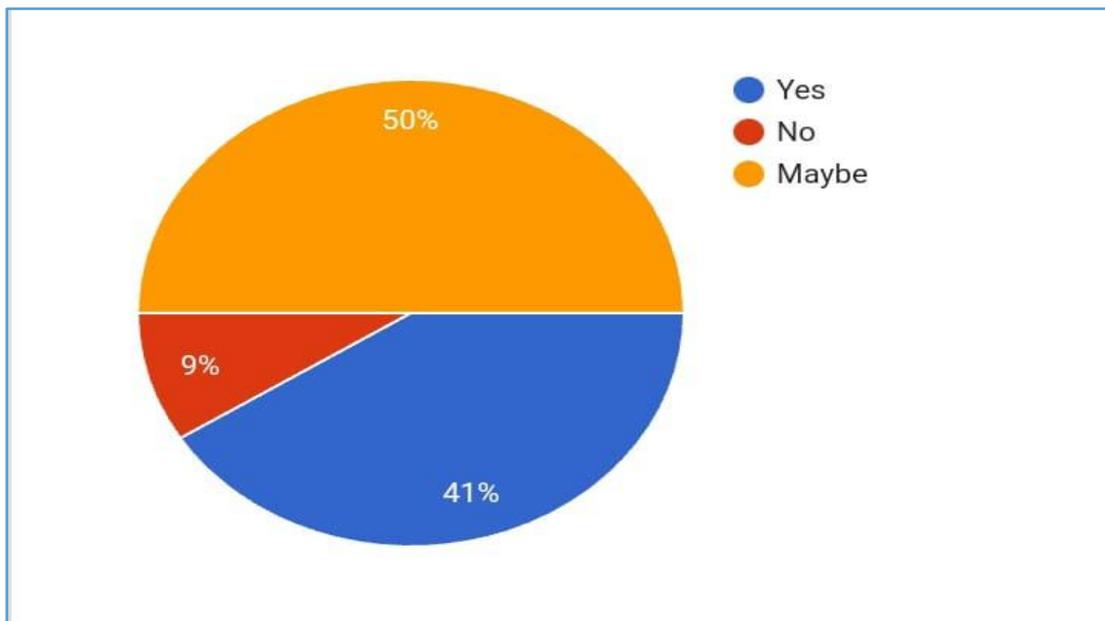
This survey result is also shown in figure 4.15

**Table no 4.16**  
**Understandings about investment options and potential risk**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Ye s	41	41%
No	9	9%
Maybe	50	50%

**Source of data: Primary Data**

**Figure 4.16**  
**Understanding of investment options and potential risk**



The table shows that 50 respondents are not sure about the investment options and potential risk , 41 knows about it but 9 respondents are not aware about the general investment options and potential risk. Majority of the respondents are not sure about the investment options and potential risks.

This survey result is also shown in fig 4.16

**Table no 4.17**

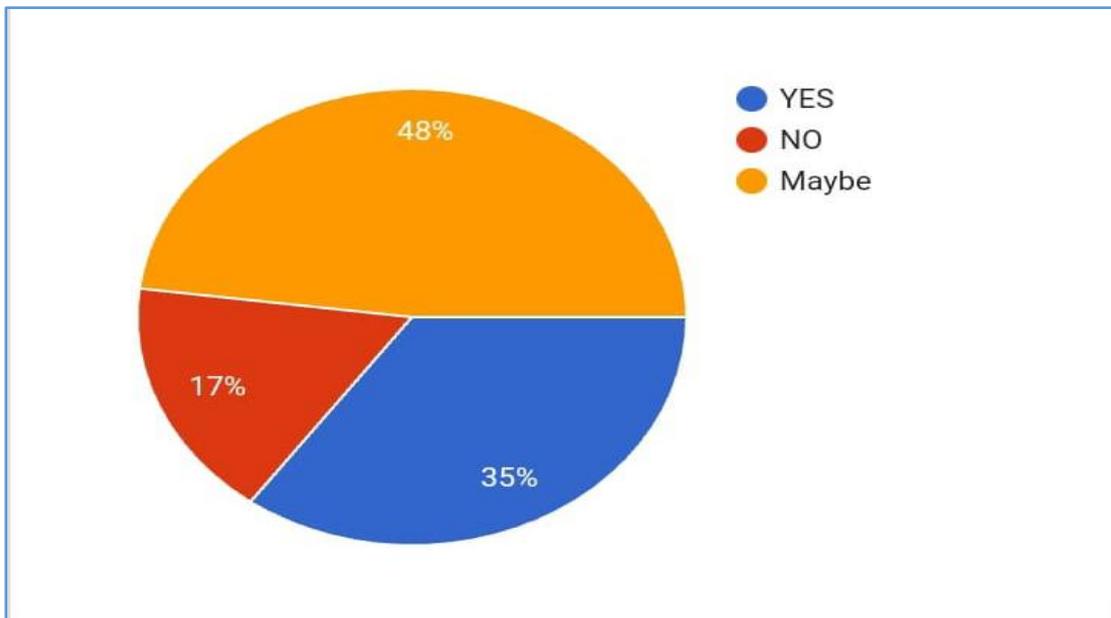
**Is women facing problems while Investing**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Yes	35	35%
No	17	17%
Maybe	48	48%

**Source of data: Primary Data**

**Figure 4.17**

**Is women facing problems while Investing**



The table shows the 48 respondents are not that sure whether there is any problems women face while investing ,35 are sure that women face problems while investing and 17 doesn't think that there is any problems women face while investing. Majority of the respondents are not sure whether they are facing problems or not.

This survey result is also shown in figure 4.17

**Table no 4.18**

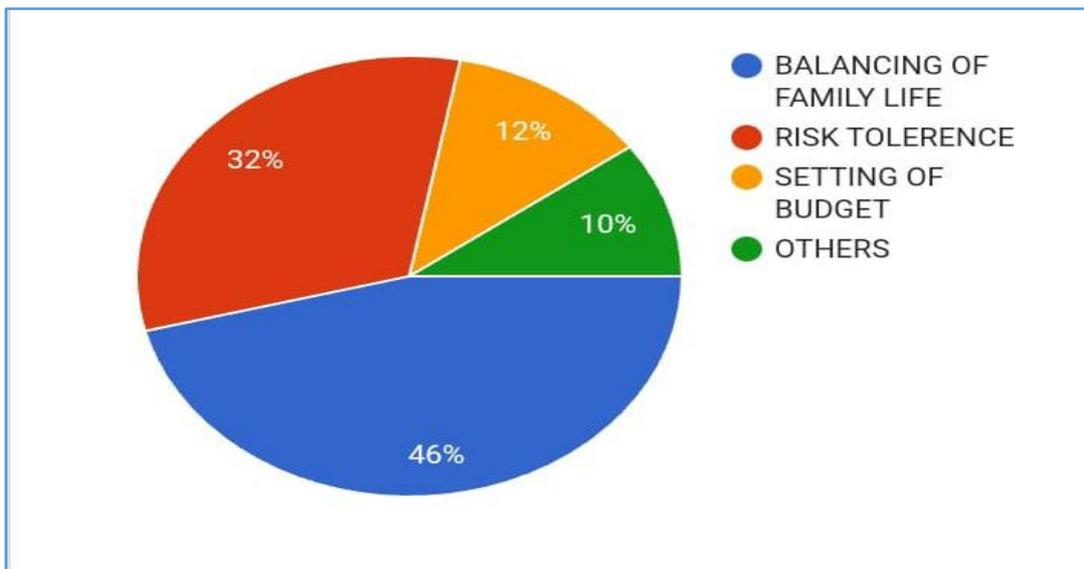
**Challenges faced by women in terms of savings and investment**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Balancing of family life	46	46%
Risk tolerance	32	32%
Setting of budget	12	12%
Others	10	10%

**Source of Data : Primary Data**

**Figure 4.18**

**Challenges faced by women in terms of savings and investment**



The table 4.18 shows that 46 respondents are of opinion that main challenge faced by women in terms of savings and investment is balancing of family life ,32 opinions that it's risk tolerance, while 12says it's difficulty in setting by budgets and 10 says it some other challenges. Majority of the respondents face the challenge of balancing their family.

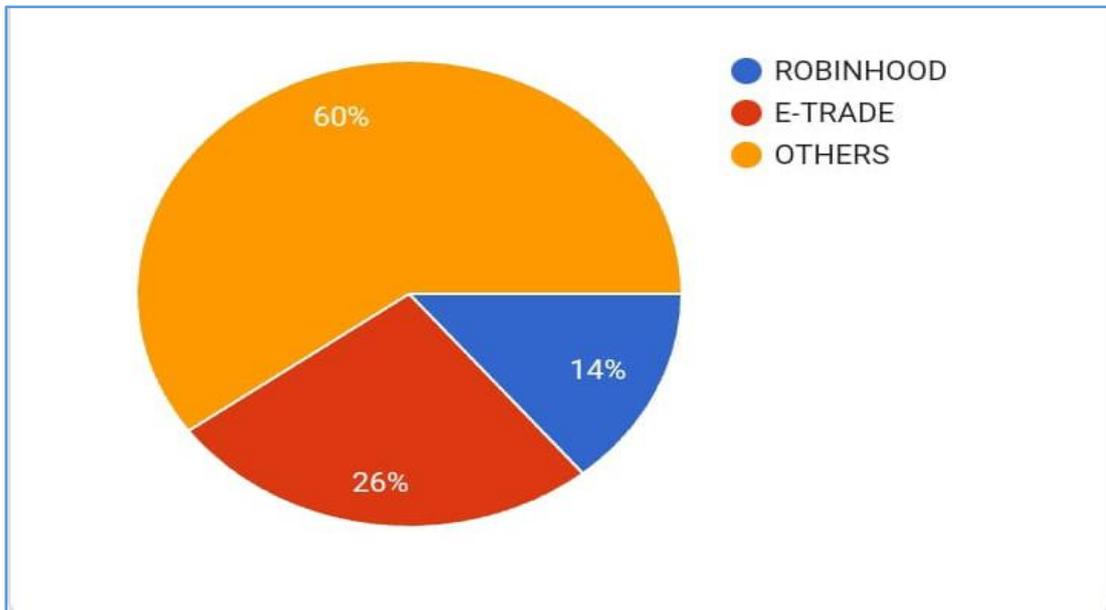
This survey result is also shown in figure 4.18

**Table no 4.19**  
**Using of online platform**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
Robin hood	14	14%
E trade	26	26%
Others	60	60%

**Source of Data : Primary Data**

**Figure 4.19**  
**Using of online platform**



The table 4.19 shows that 60 respondents prefer using online platforms other than Robin hood and e-trade, 26 prefer e trade and 14 prefer Robin hood. Majority of the respondents use online platforms other than Robin hood and e-trade.

This survey result is also shown in figure 4.19

**Table no 4.20**

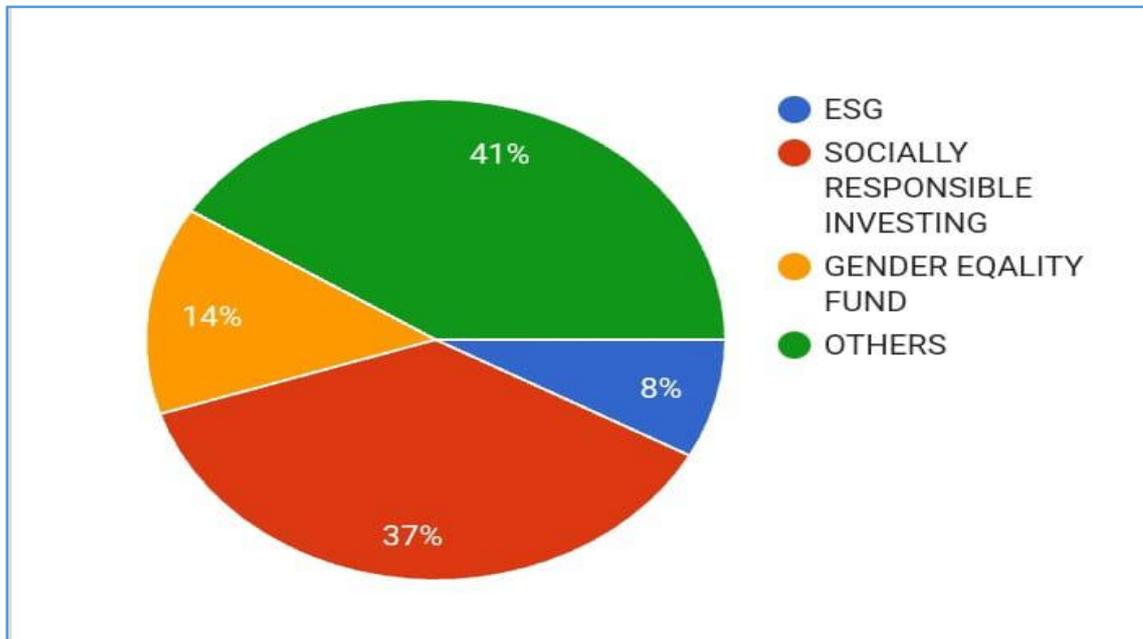
**Investment in sustainable assets**

<b>Response</b>	<b>No of respondents</b>	<b>Percentage</b>
ESG	8	8%
Socially responsible investing	37	37%
Gender equity fund	14	14%
Others	41	41%

**Source of Data: Primary Data**

**Figure 4.20**

**Investment in sustainable assets**



The table shows that 41 respondents invest in sustainable assets others than ESG , socially responsible investing , gender equity fund .37 respondents prefer socially responsible investing ,14 prefer gender equity fund and the rest 8respondents prefer ESG. Majority of the respondents invest in sustainable assets other than ESG, socially responsible investment and gender equality fund.

This survey result is also shown in figure 4.20

**CHAPTER: V**  
**FINDINGS, SUGGESTIONS & CONCLUSION**

## 5.1 FINDINGS

- 1..Majority of the respondents considered factor before investing money is safety of capital.
2. Majority of the respondents are not sure whether they are facing problems or not.
- 3.. Majority of the respondents face the challenge of balancing their family.
4. Majority of the respondents preferred saving avenue is bank deposit.
5. Majority of the respondents gathered their information about investment avenue is from their parents
6. Majority of the respondents invest a percentage of 15-30%.
7. Majority of the respondents are having an annual income of 1 to 5 lakhs.
8. Majority of the investors like to manage their investment by themselves.
9. Majority of the respondents are having investment now.
10. Majority of the investors prefer medium term investment.
11. Majority of the respondents prefer public sector to invest.
12. Majority of the investment feels fixed deposits is more profitable.
13. Majority of the investors monitor their investment monthly.
14. Majority of the investors save their money for future use.
15. Majority of the respondents doesn't have any retirement plans.
- 16Majority of the respondents are not sure about the investment options and potentialrisks.
- 17.Majority of the respondents spend their monthly income on all the three categories i.e. household , health care, children education.
- 18.Majority of the respondents saving objective is construction of house.
- 19.Majority of the respondents use online platforms other than Robin hood and e-trade.
- 20 Majority of the respondents invest in sustainable assets other than ESG, socially responsible investment and gender equality fund.

## 5.2 SUGGESTIONS

- Most preferred saving avenues were found to be saving bank deposits, fixed deposits, chit funds etc. There are plenty other avenues, women are unaware of. They must be taught about the potential and benefits of other avenues.
- A majority of women prefer self-managed investments. It would be a better choice to manage investments through institutions like banks, stock markets etc. who provide a wide range of services and also gives us advice on where and how to invest.
- It was observed that there was preference towards low risk investments keeping in mind, the safety of capital. They must be encouraged to invest in high risk avenues where there is potential for higher returns.
- Proper steps should be undertaken to educate women about various Government schemes which are extremely secure and yields high return.
- Most of the respondents want to invest only for medium term. This has to be changed, where they should develop the habit of investing for long term in order to enjoy good return in future, to get tax advantages etc.,
- It becomes necessary for women to learn to use the technology in order deal with their investment through online. The investment company, banks or the financial institution where the women have invested should guide their clients / customers accordingly.

### **5.3 CONCLUSION**

This study was conducted in order to understand the Savings and investment behavior of working women with special reference to Iritty taluk, and also how aware they are of the different savings and investment avenues that are available, factors and problems that affect them. Income, Investment and savings are all related and connected terms. Savings are being done for future needs especially for buying/constructing houses and children's education. It was observed that investments with higher returns were being preferred, but, along with it, the risk factor severely affected their decisions. This research provides valuable information to companies about the preferences of women and what they are looking for while making investments, and also advises them on which individuals to target and plan their policies and strategies accordingly. Women equip themselves to be financially literate when they do so, they become aware of how to invest in various investment options like share, bonds, debentures and money market instrument. When they are well aware they will invest in these options which will in turn pool more money in the economy thus increasing the productivity, demand and supply which in turn will pave way for economic growth.

In short, through this study we conclude that women prefer to invest in risk free or low risk avenues. Lack of awareness is the major reason for women not investing in avenues with risk factor. Various measures should be taken to create awareness about the various investment avenues for working women.

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## **APPENDIX**

## QUESTIONNAIRE:

Topic: “A study on savings and investment habit of working women with special reference to Irritty taluk”

1. Name: \_\_\_\_\_
  
2. Age: \_\_\_\_\_
  
3. Educational qualification
  - Bachelors
  - Masters
  - High School
  - Others
  
4. Marital status
  - Single
  - Married
  - Divorced
  - Widowed
  
5. What is your annual income?
  - Less than 1 lakh
  - 1 to 5 lakhs
  - 5 to 10 lakhs
  - More than 10 lakhs
  
6. How is your monthly income being spent?
  - Household
  - Health care
  - Children education
  - All above

7. Which is your most preferred saving avenue/portfolio?
- Bank deposit
  - Chit funds
  - Post office deposit
  - mutual funds
8. What is your saving objective?
- Children education
  - Health care
  - House construction
  - Others
9. From which source do you gather information about investment average ?
- Parents
  - Friends and relatives
  - Spouse
  - Tv and social media
10. What % of your income do you invest?
- 0-15%
  - 15-30%
  - 30-50%
  - Above 50%
11. What factors do you consider before investininvestments
- Safety of capital
  - Risk
  - Rate of return
  - Period of investment
12. How would you manage your investment?
- Self
  - Broker
  - Bank

13. Any investment till now?

- Yes
- No

14. Preferred period of investment?

- Short term
- Medium term
- Long term

15. What sector would you like to invest

- Public
- Private

16. Which investment do you feel more profitable?

- Fixed deposit
- Mutual fund
- Equities
- Others

17. How often would you monitor your investment?

- Daily
- Monthly
- Annually

18. Are you currently saving money for future use?

- Yes
- No

19. Do you have a retirement plan in place?

- Yes
- No
- Maybe

20. Do you have a general understanding of investment options and their potential risk and return?

- Yes
- No
- Maybe

21. Do womens face any problem while investin .

- Yes
- No
- Maybe

22. In your option what are the challenges faced by working women in terms of saving and investment in iritty taluk?

- Balancing of family life
- Risk tolerance
- Setting of budget
- Other

23. Do you invest using an online platform such as

- Robinhood
- E-trade
- Others

24. Do you invest in sustainable or diverse assets?

- ESG
- Socially responsible investing
- Gender equality fund
- Others

**“A COMPARATIVE STUDY ON SANITARY NAPKINS  
AND MENSTRUAL CUP”**

**A  
PROJECT REPORT**

**Submitted by**

**GOKUL BINOY**

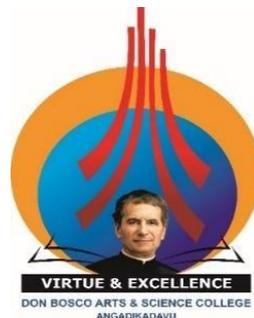
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**ANJALI JOSEPH**

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**ANITTA JOHNSON**

**DB20BBAR008**



Under the supervision of

**Ms. Preena K V**

(Asst. Professor. Department of Management Studies, DBASC)

**In partial fulfillment for the award of the degree in**

**BACHELOR OF BUSINESS ADMINISTRATION**

**KANNUR UNIVERSITY**

**DON BOSCO ARTS & SCIENCE COLLEGE**

**MARCH 2023**

# **KANNUR UNIVERSITY**



## **BONAFIDE CERTIFICATE**

Certified that this project report **“THE COMPARATIVE STUDY ABOUT SANITARY NAPKINS AND MENSTRUAL CUP”** is the bonafide work of “Anjali Joseph, Gokul Binoy and Anitta Johnson” who carried out the project under my supervision.

**Mrs. SUNITHA K.S**

**HEAD OF THE DEPARTMENT**

**Ms. Preena K V**

**SUPERVISOR**

**BACHELOR OF BUSINESS ADMINISTRATION**

**DON BOSCO ARTS AND SCIENCE COLLEGE**

**ANGADIKADAVU 670706**

## **DECLARATION**

We, Gokul Binoy, Anjali Joseph and Anitta Johnson hereby declare that the project work entitled report “**COMPARATIVE STUDY ABOUT SANITARY NAPKINS AND MENSTRUAL CUP**” has been prepared by as and submitted to Kannur University in partial fulfilment of requirements for the award or Bachelor of Business Administration, is a record of original work done by as under the supervision of Mrs.Preena K V, Assistant Professor, Department of BBA, Don Bosco Arts and College Angadikadavu.

We also declare that this project report has not been submitted by anyone of full or partial for the award of any Degree, Diploma, Title or recognition before.

Place: Angadikadavu1.

Date:

GOKUL BINOY

ANJALI JOSEPH

ANITTA JOHNSON

## **ACKNOWLEDGEMENTS**

We dedicate this page to different person who had been involved with in the strenuous task of the accomplishment of this project. First and foremost, we thank God Almighty, for His blessings and grace for the successful completion of the project work.

We express our special thanks to Fr. Dr.Francis Karackat, principal of our college who strengthening us with valuable advice.

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We owe our sincere sentiments of gratitude to all the classmates and to those who in one way or the other spared their valuable time and efforts to bring this project work to its finishing point.

GOKUL BINOY

ANJALI JOSEPH

ANITTA JOHNSON

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**CHAPTER I**  
**INTRODUCTION**

## 1.1 INTRODUCTION

Sanitary napkins and menstrual cups are two commonly used menstrual products by women worldwide. While sanitary napkins have been in use for many years, menstrual cups have gained popularity in recent years as an eco-friendlier and more cost-effective alternative. In this comparative study, we will explore the similarities and differences between these two products in terms of their usage, benefits, drawbacks, and impact on the environment and women's health. This study aims to provide women with comprehensive information that can help them make informed decisions when choosing between these two menstrual products.

Apart from personal hygiene, menstrual hygiene management practices are important for prevention of urinary and reproductive problems. Menstrual cup, a revolutionary eco-friendly and sustainable menstrual hygiene product is changing the dynamics of use of sanitary products around the globe. The inception of menstruum is undoubtedly the most vibrant transformations transpiring in each woman during puberty. Menarche is a psychosocial and behavioural switch apart from a physiological change. Menstrual hygiene includes essentialities and requirements inclusive of but not limited to the utilization of absorbents like sanitary pads, tampons and menstrual cups, satisfactory cleansing of the genitals, suitable dumping of utilized absorbents, and other healthcare needs of females during the menstrual cycle. For the Period Of menstruum, practicing good hygiene is very critical which precludes from undesirable health consequences. Though menstruation is a natural bodily activity, it is nevertheless enveloped with societal prohibitions, fallacies, and mismanagements, which is incredibly difficult for menstruating girls in emerging nations. Owing to these societal anastigmatic, ethnic, and holy restraints, catamenial procedures are deemed as a massive constraint for managing catamenial hygiene.

Menstrual cups, commercially available reusable pads (RMP: layers of fabric sewn together as a period pad in an enterprise for production of menstrual products), and period pants are less-known alternatives. However, use of single-use pads is common as is the use of non-commercial cloths that can be reused or disposed, and a whole range of other non-hygienic makeshift materials in times of dire need. Adequate options to deal with menstruation allow girls and women to continue their activities, work, or education without fear of leakage. Ideally, menstrual products should be

comfortable and not result in a reduction of mobility, injuries to the perineum, vulva and vagina, or genitourinary tract and skin infections. Considerations for choice of product include cost, access, ease of use, method of disposal, and sanitation facilities for changing and washing, and resulting environmental impacts caused by the selected product. Ignorance, prejudice, cultural norms, lack of means, setting, safety fears, and lack of availability can impede girls and women from testing the full range of products available to assess what works best for them to manage their menstruation.

The reusable menstrual cup has substantially lower environmental impacts than single use menstrual products. This was shown to be the case across all impact categories and regardless of the material from which the menstrual cup was produced. The menstrual cup has a better environmental performance than single use option, even when use for just one year.

The study found that reusable cups have much lower environmental impact than single use pads. Although shown to be environmentally preferred by a considerable margin, the menstrual cup cannot be considered a viable alternative unless the wider social and economic system is able to accommodate.

## **1.2 STATEMENT OF THE PROBLEM**

The research aims to compare the effectiveness, convenience, cost, and other relevant factors of sanitary napkins and menstrual cups as menstrual hygiene products. The study may also investigate the differences in their environmental impact, safety, and potential health risks. The research involves surveys to collect data and draw conclusions about which menstrual hygiene product is more suitable for different users. The findings of this study can help individuals, organizations, and policymakers make informed decisions about menstrual hygiene management.

## **1.3 NEED AND SIGNIFICANTS OF THE STUDY**

Menstrual cups and sanitary napkins are both products used by menstruating individuals to manage their menstrual flow. A comparative study of these two products is significant for several reasons:

**Health and hygiene:** Menstrual cups are made of medical-grade silicone, latex, or rubber and are reusable, whereas sanitary napkins are made of absorbent materials such

as cotton, and are disposable. A comparative study can help understand which product is more hygienic and can reduce the risk of infections.

**Cost-effectiveness:** Menstrual cups are generally more expensive upfront but can last for several years, while sanitary napkins are disposable and need to be replaced frequently. A comparative study can help understand which product is more cost-effective in the long run.

**Environmental impact:** Sanitary napkins generate a significant amount of waste, while menstrual cups are reusable and generate less waste. A comparative study can help understand the environmental impact of both products.

**Comfort and convenience:** Menstrual cups are inserted into the vagina, while sanitary napkins are attached to the underwear. A comparative study can help understand which product is more comfortable and convenient for users.

**Education and awareness:** A comparative study can help raise awareness about menstrual hygiene products and educate individuals about the different options available to them.

In conclusion, a comparative study of menstrual cups and sanitary napkins is essential to help individuals make informed decisions about menstrual hygiene products. It can help promote health, hygiene, cost-effectiveness, environmental sustainability, and education and awareness.

## **1.4 SCOPE OF THE STUDY**

The scope is to explore and compare the effectiveness, comfort, and environmental impact of using sanitary napkins and menstrual cups during menstruation. The study will examine the advantages and disadvantages of using both products, including cost, convenience, and ease of use. The study will also investigate the potential health risks associated with the use of sanitary napkins and menstrual cups, such as toxic shock syndrome and vaginal infections. The study will provide insights into the preferences of women towards the use of menstrual cups and sanitary napkins and will help in promoting menstrual health and hygiene. Ultimately, the study aims to provide information that will enable women to make informed choices about their menstrual hygiene products.

## **1.5 OBJECTIVE OF THE STUDY**

- To study public awareness of the environmental impact of menstrual products ad product choice.
- To know about the menstrual product brands mostly preferred.
- To identify the most sustainable and affordable menstrual product.
- To study a descriptive cross-sectional study on menstrual hygiene.
- To know about the use of menstrual sanitary products in women on reproductive age.
- To Study on customer buying behaviour towards menstrual products.

## **1.6 LIMITATIONS OF THE STUDY**

- The major limitation of our study was, we collect data of 35 age below women.
- Lack of time to finish the project.
- Some of the respondents did not respond actively so the personal bias has occurred.
- Descriptive method was the research design so we had faced all the difficulties of descriptive method.

## **1.7 RESEARCH METHODOLOGY**

Research methodology is a way to systematically solve the research problem. The researcher indicates to adopt descriptive design for the research. Descriptive design will help to gather detailed and accurate information about the study. This design helps to analyse of the variable in descriptive manner.

### **1.7.1 RESEARCH DESIGN**

Research design is the frame or blueprint for conducting the research. Research design is the arrangement of condition for collection and analysis of data in a manner that to combine relevance to the research purpose. The study designed as an empirical one based on the survey method. The collected data were presented in tables and these table were analysed systematically.

### **1.7.2 SAMPLING TECHNIQUE**

Convenient sampling method is adopted for selecting customers.

### **1.7.3 DATA COLLECTION METHOD**

#### **1.7.3.1 PRIMARY DATA:**

In order to gather secondary data and also to provide profound insight in to the topic ‘The comparative study about sanitary napkins and menstrual cup’, the researcher considered the use of questionnaire for consumer in most suitable way.

#### **1.7.3.2 SECONDARY DATA:**

Secondary data was collected from the existing data sources, catalogues, internet, magazines, case studies, newspapers, journals, articles etc. The information so called has been consolidated in a meaningful manner for the purpose.

#### **1.7.4 SAMPLE SIZE:**

We have taken 100 respondents for the purpose of this survey.

### **1.7.5 TOOLS FOR DATA ANALYSIS**

✓ The tool which is used for the data collection in this study is questionnaire.

✓ **Percentage method.**

The present study is used percentage analysis method. Percentage analysis is the method of present raw streams of data as a percentage for better understanding.

Percentage = amount/total\*100

✓ **Ranking method**

Ranking method is a non-quantitative method of comparing different alternatives. In statistics “ranking” refers to the data transformation in which numerical or ordinal value are replaced to their rank when the data are stored. Ranks are related to the indexed list of order statistics. which consist of the original data set rearranged into assenting order. A ranking is a return ship between a set of items such that, for any two items the first is ranked first is either “ranked higher than”, or “ranked equal to the second.

✓ **Likert Scale Analysis**

The Likert scale one of the most widely used attitude scaling techniques. In this approach, the respondent this asked to his agree arrangement or disagree with each of the series of agreement that are related to the objects in questions.

Normally the Likert scale is expressed in terms of five categories, all those three and seven are some used. The usual description for the five categories is,

- ❖ Strongly agree
- ❖ Agree
- ❖ Neutral
- ❖ Strongly disagree
- ❖ Disagree

## **1.8 PRESENTATION OF THE REPORT**

The project is divided into five chapters.

1. **Chapter 1- Introduction and design of the study:**The chapter deals with introduction, statement of the study, objectives of the study, scope of the study, scope of the study, research methodology, research design, data collection method, tools used for data collection, period of the study, limitation of the study.
2. **Chapter 2- Review of literature:** Following the introductory chapter, the second chapter deals with review of literature on this area.
3. **Chapter 3- Theoretical framework:**this chapter involves theoretical background and other relevant information to study.
4. **Chapter 4- Data analysis and interpretation:**In connection of the objectives the presentation of the data for analysis and interpretation were done in a systematic manner with necessary tables.
5. **Chapter 5 – Findings, suggestions and conclusion:** this chapter provides a brief summary of findings, suggestions which drawn on the basis of the result of the study and conclusion.

## **1.9 PERIOD OF THE STUDY**

The duration of study is from 15 December 2022 to 31 March 2023.

**CHAPTER II**  
**REVIEW OF LITERATURE**

## INTRODUCTION

The literature review on the comparative study of sanitary napkins and menstrual cups suggests that menstrual cups are a more sustainable and cost-effective option for menstrual management. The review covers various aspects of menstrual management, including affordability, hygiene, comfort, and environmental impact.

Regarding comfort, menstrual cups are known to offer greater comfort during physical activities, such as swimming or exercising, and have a lower risk of leakage than sanitary napkins. However, some women may experience discomfort during insertion or removal of menstrual cups.

The review concludes that menstrual cups are a more sustainable and cost-effective option for menstrual management. However, the decision to switch from sanitary napkins to menstrual cups depends on individual preferences and comfort levels. The review recommends educating women about menstrual cup usage and providing affordable menstrual cup options to promote sustainable menstrual practices.

**1. Lakshmi R** stated in their study, “Hygiene Products- Awareness, Usage and Disposal of Hygiene Products by Girls/ Women”

March 2022

St. Joseph's College of Engineering, Chennai

Menstruation is still regarded filthy and disgusting in many regions of India. Cultural norms, parental guidance, personal choices, financial status, and external pressures all influence menstrual hygiene behaviours. Sanitary pads are not biodegradable; posing health and environmental risks, and a lack of disposal options may lead to girls and women using hygienic products for an extended period of time in an unsanitary manner. The objective of this study is to find the demographic profile of the respondents, awareness about sanitary products, and affordability of sanitary products, sanitary product usage habit, and the disposal of sanitary napkin. This study reveals the sanitary product usage habit, and the problems of disposal of sanitary napkin.

**2. Anmiya Peter Cochin University of Science and Technology & K. Abiath** stated in their study, “Menstrual Cup: A replacement to sanitary pads for a plastic free period”

June 2021

In today's society both men and women have spoken out about menstrual health. Through videos, films and talks many people - including male, have become more informed and aware of the subject. A menstrual pad or sanitary napkin is a type of feminine hygiene product that is easily available nowadays. Unfortunately, a topic in this subject that is not talked or address as often is how much sanitary napkins are harmful to both the environment and health. Although they are useful and hygienic it creates a lot of plastic waste. The best solution to the issues related to sanitary pads is the use of menstrual cups. These materials are made up of natural rubber or silicone rubber which can be easily inserted into the vagina.

This can reduce the problems faced by using sanitary napkins and can be reused for five years or more. Thus, menstrual cup would be an eco-friendly and better alternative to the highly polluting sanitary napkins.

**3. Jamie Hand, Christina Hwang, Wren Vogel, Christina Wright Lopez** in their study, "An exploration of market organic sanitary products for improving menstrual health and environmental impact"

February 2023 Journal of Water, Sanitation and Hygiene for Development

Many menstruators around the world have limited access to education about menstruation and to sanitary methods for managing menstruation. The use of sanitary products is influenced by economic status, proximity to resources, education, and cultural beliefs. Improper use of sanitary products or lack thereof can lead to major health issues. Plastic-based, commercial pads take decades to degrade and cause harm to the environment and pose health risks to menstruators. To combat the lack of education and accessibility to menstrual products, there is a need to develop inexpensive, environmentally friendly, and culturally acceptable menstrual hygiene pads. Organic sanitary pads have been developed with locally available materials, such as water hyacinth, banana stems, bamboo, papyrus, hemp, and cotton. These sanitary pads have the potential to create better health and economic outcomes for menstruators across the globe and reduce the environmental footprint.

**4. Anju Dwivedi** in her study, "Menstrual Products: Sustainability and Futurity – An Imperative Study on The Cognizance Towards Eco-Friendly Sanitary Products and Practices."

July 2021

Narayana Business School, Ahmedabad

Menstruation, besides being considered a nationwide taboo, has also been a huge source of pollution. Every year, the manufacturing of Sanitary products and their riddance generates tonnes and tonnes of desecration. A methodized and definitive way to dispose of the menstrual waste without sabotaging the environment is a dire necessity at the moment. The research paper has taken gumption intending to understand how much Women are aware of the apogee of pollution caused by the usage of Sanitary products. Also, their cognizance towards Environment-friendly Sanitary products and their praxis has been determined. A meticulously made hypothesis helps in the understanding of the interrelationships of different variables in the study. Consequently, this study shall help in arbitrating the Sustainable ways of dealing with menstruation. Menstruation, Pollution, Environment-Friendly, Sanitary products, Sustainable.

**5.AdvsunilNavanitlal Shahin** their article, “A Study on Environment Friendly Menstrual Hygiene”

December 2021

Menstruation and menstrual practices still face many social, cultural, and religious limitations which are a big barrier in the path of menstrual hygiene management. While reviewing the literature, we found that little, inaccurate, or incomplete knowledge about menstruation is a great hindrance to a path of women's hygiene. Girls and women have very less or no knowledge about reproductive tract infections caused due to ignorance of personal hygiene during menstruation time. In urban areas, women do not have access to sanitary products or they know very little about the types and methods of using them or are unable to afford such products due to high cost. So, they mostly depend on reusable cloth pads which they wash and use again. The needs and requirements of adolescent girls and women are ignored even though there are major developments in the area of water and sanitation. Women manage menstruation differently when they are at home or in school or college or Railway Station or at Hostel or Relative home, they dispose of menstrual products in domestic wastes and public toilets and they flush them in the Public toilets without knowing that the pads do not disintegrate them in water and they won't help absorb fluid or blood and it can be

stuck in the drain and because of not knowing all these the consequences of difficulty of drainage pipe and leading to no water supply. Hence there is a need to educate and make them aware of the environmental water pollution and health distress associated with the skin. Carrying through modern techniques like incineration can help to reduce waste. Also, awareness should be created to emphasize the use of reusable sanitary products or natural sanitary products made from materials like banana fibre, bamboo fibre, sea sponges, water hyacinth, and more.

**6. Linda Mason, Liverpool School of Tropical Medicine, Elizabeth Nyothach,** in their study, “Menstrual cups, maturation of the adolescent vaginal microbiome, and STI/HIV risk Menstrual cups and cash transfer to reduce reproductive harm and school dropout.

July 2019

use and views of the cup compared to girls provided with disposable sanitary pads for a feasibility study. All were trained by nurses on puberty, hand washing, and product use. They self-completed a net book survey at baseline and twice a term during a year follow-up. We examined their reported ease of insertion and removal, also comfort, soreness, and pain with product use. An aggregate ‘acceptability’ score was compiled for each product and girls’ socio-demographic and menstrual characteristics were compared. Measures of cup acceptability demonstrated girls had initial problems using the cup but reported difficulties with insertion, removal and comfort reduced over time. Girls using pads reported fewer acceptability issues. At baseline, approximately a quarter of girls in the pad arm reported inserting pads intravaginally although this was significantly lower among girls with prior experience of pad use.

**7. Maria Cohut, Ph.D.h,** in her study, “Menstrual cups vs. pads and tampons: How do they compare?”

**July 18, 2019**

For their review, the researchers looked at 43 studies with 3,319 participants between them. The cohorts came from different income countries; more specifically, 15 studies included cohorts from low- and middle-income countries, and 28 studies worked with participants from high income countries. Four of these studies, totalling 293 participants, directly compared menstrual cups with tampons and disposable pads to see

which ones were most likely to leak. Three of these studies found that leakage rates were similar between menstrual cups and other products, while one study suggested that menstrual cups leaked significantly less.

**8. Weerawatsopon S, Luangdansakul W Mail, Prommas S, Smanchat B, Bhamarapratana K, Suwannarurk K,** in their study, “Comparative Study of Satisfaction and Acceptability between Using Menstrual Cup versus Sanitary Pads in Health Care Personnel Comparative Study of Satisfaction and Acceptability between Using Menstrual Cup versus Sanitary Pads in Health Care Personnel”

To evaluate and compare the satisfaction and acceptability of using MC and sanitary pads (SP) in health care personnel (HCP).

Participants were HCP in Bhumibol Adulyadej Hospital who were willing to participate in the study between October 2019 and March 2020.

Acceptability for MC was lower than SP. MC’s acceptability was preferred among HCPs with regular sexual intercourse. MC had higher satisfaction and less side effects than SP.

Received 26 May 2020 | Revised 24 August 2020 | Accepted 25 August 2020

**9. Mags Beksinska et al.,** in their article, “Acceptability of the menstrual cup among students in further education institutions in KwaZulu-Natal, South Africa”

**2021 Feb.**

The primary objective of this research was to evaluate long-term user acceptability of menstrual cups in a student population in South Africa.

The menstrual cup was well accepted among this student population and should be considered as a cost-effective and environmentally sustainable option in menstrual health management initiatives in South Africa.

Higher education; South Africa; menstrual cup; menstrual health management; students.

**10. Anna Maria van Eijket et al.,** “Menstrual cup use, leakage, acceptability, safety, and availability: a systematic review and meta-analysis”

**Lancet Public Health. 2019 Aug.**

Girls and women need effective, safe, and affordable menstrual products. Single-use products are regularly selected by agencies for resource-poor settings; the menstrual cup is a less known alternative. We reviewed international studies on menstrual cup leakage, acceptability, and safety and explored menstrual cup availability to inform programmes.

Our review indicates that menstrual cups are a safe option for menstruation management and are being used internationally. Good quality studies in this field are needed. Further studies are needed on cost-effectiveness and environmental effect comparing different menstrual products.

**11. Anna Maria van Eijket al.,** “A systematic review and meta-analysis of reusable menstrual pads for public health internationally”

**2021.** November 1, 2020

Girls and women need effective, safe, and affordable menstrual products. Single-use menstrual pads and tampons are regularly provided by agencies among resource-poor populations.

Reusable menstrual pads (RMPs: fabric layers sewn together by an enterprise for manufacture of menstrual products) may be an effective alternative.

RMPs are used internationally and are an effective, safe, cheaper, and environmentally friendly option for menstrual product provision by programmes. Good quality studies in this field are needed.

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**CHAPTER: III**  
**THEORETICAL FRAMEWORK**

## **INTRODUCTION**

Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge, within the limits of the critical bounding assumptions. The theoretical framework is the structure that can hold or support a theory of a research study. The theoretical framework introduces and describes the theory which explains why the research problem under study exists.

It is a set of concepts, theories, and models that guide the research process and help to understand the research topic. In this comparative study about sanitary napkins and menstrual cups, the theoretical framework will provide a foundation for examining the topic of menstrual hygiene management and the effectiveness of different menstrual products.

By utilizing this theoretical framework, the study aims to provide a comprehensive and nuanced understanding of the factors that influence menstrual product use and effectiveness, as well as the potential implications for menstrual health and hygiene.

## **MENSTRUAL HEALTH**

The term “menstrual health” has seen increased use across advocacy, programming, policy, and research, but has lacked a consistent, self-contained definition. As a rapidly growing field of research and practice a comprehensive definition is needed to (1) ensure menstrual health is prioritised as a unified objective in global health, development, national policy, and funding frameworks, (2) elucidate the breadth of menstrual health, even where different needs may be prioritised in different sectors, and (3) facilitate a shared vocabulary through which stakeholders can communicate across silos to share learning. To achieve these aims, we present a definition of menstrual health developed by the Terminology Action Group of the Global Menstrual Collective. We describe the definition development process, drawing on existing research and terminology, related definitions of health, and consultation with a broad set of stakeholders. Further, we provide elaboration, based on current evidence, to support interpretation of the definition.

Menstrual health is integral to improving global population health, achieving the Sustainable Development Goals, and realising gender equality and human

rights. Although the past decade has seen growing awareness of menstrual-related challenges, increased multi-sectoral investment is needed to comprehensively address the needs of all people who menstruate.

Research and practice have developed a nuanced understanding of menstrual experiences, and their intersections with physical, mental, and social health. Varied terminologies have evolved, but increasingly actors are using menstrual health to evoke a holistic framework relevant to the varied objectives of policy and programming. Despite broad usage, *menstrual health* lacks a formal, self-contained definition. This has complicated advocacy efforts and has led to fragmented action and funding for menstrual health as organisations struggle to conceptualise the topic and situate it within their mandates. A unified definition of menstrual health is thus needed to advance advocacy, policy, practice, and research, highlight the relevance of menstrual health across sectors, and facilitate communication across stakeholder groups.

Referring to “women, girls, and all other people who experience a menstrual cycle” draws attention to the fact that people experience menstruation differently, shaped by their lived experiences, needs and circumstances. Disability, age, gender identity, place of residence, homelessness, housing instability, conditions of detention, migration, disaster, insecurity and displacement, religion, ethnicity, caste, culture and many other factors influence menstrual experiences and must be considered to adequately meet menstrual health needs. This does not mean that those who do not experience a menstrual cycle are not affected by social, cultural and economic aspects of menstruation or that they should not play an essential role in achieving this state for others. On the contrary, achieving a complete state of menstrual health requires education about the menstrual cycle for everyone, including men and boys, health care providers, and the dismantling of harmful stigma and norms amongst society at large.

## **INFORMATION**

To ensure menstrual health, women, girls, and others who experience a menstrual cycle must have access to accurate biological and practical information. Biological information about the menstrual cycle and its relationship to reproduction and fertility enables understanding of the body for menstrual health and SRHR. Practical knowledge, such as information about hygiene, nutrition, and self-care, equips those

who menstruate to make informed decisions, supports alleviating discomforts, and bodily autonomy. Further, accurate information can dismantle misconceptions and taboos which compromise menstrual health. The provision of this information must be timely to support mental well-being and equip people who experience a menstrual cycle to determine which changes are normal and which might require medical attention. For example, information about menstruation must be provided prior to menarche. Similarly, knowledge about changes to the menstrual cycle due to contraceptive methods, pregnancy and the post-partum period, perimenopause, menopause, and in response to disease or other health stressors such as substantial weight loss is required before the onset of these changes. Finally, for information to be accessible and understood it needs to be age-appropriate and in formats for people with different impairments.

## **MATERIAL, FACILITIES AND SERVICES**

To support menstrual health, individuals must be able to select care practices that are preferable and comfortable for them, and be able to afford the resources required for self-care. These practices should support hygiene and minimise the risk of infection and harm. Women, girls, and others who menstruate must be able to care for their body with the level of privacy they desire such that they feel free from unwanted observation or disturbance, and in safety such that they are protected from risk of physical, emotional or social harm. Safety must be considered in the location of infrastructure and services, the quality of menstrual materials, infrastructure, and disposal practices. The menstrual health of the individual requires that disposal practices protect from emotional and social harm, while disposal practices are also contributors to environmental health. Research has identified a broad range of practices undertaken by individuals to care for their body during menses, and the infrastructure and services required to support these. Self-care needs are not limited to accessing materials to collect menses, but include transporting and storing materials, and require facilities and services for changing materials, washing hands and the body, disposing of used materials and cleaning reusable materials which may include washing, drying and other sterilising practices such as ironing or boiling. These care needs are relevant throughout the day and night, both at and away from the home. Materials, facilities, and services

need to be accessible to people with disabilities. Difficulties managing menstruation are a source of distress, irritation and discomfort, have been identified as barriers to education and employment, have been linked to potential reproductive tract infections, and can compromise social well-being.

## **DIAGNOSIS, CARE AND TREATMENT FOR DISCOMFORTS AND DISORDER**

A range of disorders of the menstrual cycle have significant implications for physical, mental, and social well-being. In addition, other difficulties associated with the menstrual cycle impact quality of life including pain, physical discomfort, impacts on mental health, and abnormal uterine bleeding. These may occur in the absence of disorders of the menstrual cycle. Timely diagnosis and support for disorders and discomforts requires those experiencing a menstrual cycle to be able to identify menstrual symptoms that are abnormal for their body, to feel comfortable seeking advice and support, and to have access to health services provided by competent health workers who operate in a system that is responsive to menstrual health needs. In grounding menstrual health within the menstrual cycle, we recognise that the treatment of health conditions that may cause abnormal uterine bleeding, such as uterine fibroids or cancer, falls beyond the remit of menstrual health. However, by addressing menstrual health needs there is significant opportunity to improve the health of those experiencing these conditions. Treatment and care for discomforts and disorders may range from clinical care to advice for self-care or access to resources such as medication, counselling, exercise, or heat therapy.

## **A POSITIVE AND RESPECTFUL ENVIRONMENT**

Harmful norms and stigma surrounding the menstrual cycle undermine physical, mental, and social well-being. A positive and respectful environment is needed across all levels, including the interpersonal, community and societal, for individuals to attain and maintain menstrual health. This means menstrual health must be considered in decision-making to ensure policies and programmes support a safe and positive environment. Resources and support may be required from a variety of sources, such as

family members, care-givers, the community, educational institutions and the government, to equip individuals to care for their body with confidence throughout their menstrual cycle. Making informed decisions about menstrual care requires that people experiencing a menstrual cycle have access to sufficient information about the available options (addressed in item 1) and are empowered to make their own decisions based on their values. Such decisions range from the selection of safe, acceptable menstrual materials, to accessing health care for discomforts and disorders.

## **FREEDOM TO PARTICIPATE IN ALL SPHERES OF LIFE**

Social well-being, as part of menstrual health, requires that individuals are free to choose to participate in civil, cultural, economic, social, and political life without restrictions or exclusions related to their menstrual cycle. We emphasise decision-making and choice by menstruators who may decide whether to engage in activities depending on their preferences, values, and beliefs. Individuals may choose to abstain from participation, and we recognise that menstrual-related restrictions may be preferred. In other cases, social expectations and coercion linked to menstruation exclude preferred participation, with negative repercussions for physical, mental, and social well-being. Persistent lack of power in decision-making combined with harassment, violence or exclusion may have further negative impacts on health and safety. Freedom to participate in all spheres of life across the menstrual cycle has implications for many other human rights beyond the right to health, including education, work, and culture.

## **DISCUSSION**

The definition of menstrual health presented here reflects current evidence and practice. The past decade has seen exponential growth in attention to menstrual health, and as the field continues to expand, we expect that new iterations of the definition may be needed. Given the multifaceted nature of menstrual health, expanded components of the definition and other terms may be useful for dialogue and advocacy within each sector and for informing action and research.

This definition of menstrual health builds on the foundation laid by advocates for menstrual health and hygiene. In 2012, “menstrual hygiene management” was defined by the Joint

Monitoring Program (JMP) for Water Supply, Sanitation and Hygiene as

“Women and adolescent girls using a clean menstrual management material to absorb or collect blood that can be changed in privacy as often as necessary for the duration of the menstruation period, using soap and water for washing the body as required, and having access to facilities to dispose of used menstrual management materials. They understand the basic facts linked to the menstrual cycle and how to manage it with dignity and without discomfort or fear.”

This definition was developed to advocate for the inclusion of menstrual needs in the Sustainable Development Goals. Menstrual hygiene was also included in the recent Lancet-Guttmacher definition of reproductive health. As the field has grown, however, there is a recognised need for new terminology that (1) avoids unintentionally reinforcing menstruation as dirty or impure, which has been voiced as a critique of “hygiene” terminology, (2) goes beyond the care of menstrual bleeding to include the many social and psychological components of menstrual experience, as well as needs related to health and social inclusion, and (3) is inclusive of gender-diverse populations. The term “menstrual health” has been used by a range of stakeholders in the absence of a self-contained or established definition. The most frequently used explanation of the meaning of “menstrual health” has been as an extension of menstrual hygiene to “other systematic factors linking menstruation with health and wellbeing”.

The definition we provide here builds on and incorporates the essential contributions made by past work and seeks to evolve terminology in research and practice. It offers a concise statement aligned with the WHO’s definition of health, in addition to the requirements needed to attain menstrual health. We have chosen this approach to position the field for greater recognition and engagement with other actors in the health and gender communities.

## **HISTORY OF SANITARY NAPKINS:**

Sanitary napkins, also known as menstrual pads, have a long and interesting history. The use of menstrual pads dates back to ancient times, when women would use various materials such as wool, animal skins, and moss to absorb menstrual blood.

The first commercially available menstrual pad was introduced in the late 1800s by Johnson & Johnson, a company known for producing medical supplies. These pads were made of cotton wool and held in place with a belt. However, menstrual pads were not widely accepted until the early 20th century, when disposable pads were introduced.

Disposable menstrual pads were first patented in 1896 by Susan B. Anthony, a prominent women's rights activist. However, it wasn't until the 1920s that disposable pads became more widely used, as advertising campaigns began to target women directly.

During World War II, the availability of cotton was limited, leading to the development of new materials for menstrual pads, such as cellulose wadding and synthetic fibres. This paved the way for the modern-day menstrual pad, which is typically made of a combination of absorbent materials and a waterproof backing.

Over the years, menstrual pads have continued to evolve, with new designs and materials being introduced to improve comfort, absorbency, and convenience. Today, there are a variety of menstrual pad options available on the market, including reusable cloth pads and organic pads made from natural materials.

You are first introduced to the concept of “periods” during puberty. This is the age when you (like almost every other girl) are likely to start menstruating, and a basic understanding about the what’s and how’s of periods can certainly come in handy at this juncture. Perhaps this is also the first time you’ll hear the words “sanitary pads” or “sanitary napkins” that you will need on a monthly basis to manage periods. During this time, an obvious question is - what are sanitary pads?

## **WHAT ARE SANITARY NAPKINS?**

It's a strange term, but a "sanitary napkin" or "sanitary pad" just means an absorbent pad that you wear on your panties during your period in order to absorb menstrual blood. Sanitary napkins (or pads) come in a number of varieties and sizes. Depending on your menstrual flow and preference, you need to choose a sanitary napkin of appropriate thickness, length and absorbency. Don't worry, after the first few times of trying to understand your body's response to periods, you will eventually settle on the right 'type of sanitary pad' However, another question that pops up at this point is - how to use sanitary napkins?

## **HOW TO USE SANITARY NAPKIN?**

Using a sanitary napkin is pretty easy. Here are a few basic steps on how to wear a sanitary napkin:

Remove the paper on the back side of the pad and place it on your panty

Remove the paper from wings. Wrap the wings around both sides of the panty and press firmly

Remember, it's equally important to know how to dispose after use.

## **HOW TO DISPOSE SANITARY NAPKIN?**

Remove the paper on the back side of the pad and place it on your panty

Remove the paper from wings. Wrap the wings around both sides of the panty and press firmly

By following the right steps for disposal, you can help waste collectors easily identify and segregate sanitary waste. This waste can now be handled in a hygienic manner and be recycled to ensure minimal impact on the environment.

## **WHEN TO CHANGE A SANITARY NAPKIN?**

A sanitary pad is meant to absorb blood, vaginal mucus and other materials that your body discards during periods. This may give you an idea of how hygienic or unhygienic it could be if you aren't able to change your pad for long! Yes, you are on the right track if you think a sanitary pad needs to be changed frequently. However, how often to change pads during your periods cannot have a standard answer that is applicable to every woman. Like most things, it actually depends on a number of factors. Just so you know, it may seem like you bleed a lot during your period, but most girls normally lose between 4 and 12 teaspoons of blood during a typical menstrual cycle, which really isn't a lot. However, if you normally have medium to low flow or are not bleeding much during a particular menstrual cycle, it does not mean that you can skip changing your pad for the entire day! You need to know how often you should change a sanitary pad and stick to a fairly stable routine.

If you are using a pad with higher absorption capacity that is made for long usage, then such a pad can be used slightly longer. As mentioned before, however, there is no fixed answer that will be true for every woman. Keep track of your flow for the initial few months and that could help you understand when to change a pad and what works best for you. One tip from Stayfree® that will always come in handy is to carry an extra pad in your bag at all times so that there are no surprises!

Changing your pad on a regular basis is extremely important to ensure good hygiene and avoid vaginal odour which can be uncomfortable. It will also leave you feeling clean and fresh throughout the day! However, in spite of your research on how often to change period pads there may be times when it is not possible to do so during the entire day. Don't worry though; Stayfree® has taken care to find a solution for such a situation too. Stayfree® offers pads with up to 12 hours of protection, which absorb wetness and leave you feeling clean and fresh for longer!

With a wide range of Stayfree® sanitary pads that are meant to keep you dry and comfortable, you will never have to worry about periods ever again!

The sanitary pad is far and away the most widely used method of menstrual management. It is easy to use, easily accessible, and pretty straightforward. The pads we use today are made up of mostly synthetic, bleached material, but what were they like fifty years ago? And when were they invented?

Menstrual pads have been mentioned in history as early as the 10th century in Ancient Greece, where a woman is said to have thrown one of her used menstrual rags at an admirer in an attempt to get rid of him.

Before the disposable pad was invented, most women used rags, cotton, or sheep's wool in their underwear to stem the flow of menstrual blood. Knitted pads, rabbit fur, even grass was all used by women to handle their periods.

The very first disposable pads were thought up by nurses, looking for new methods to stop excessive bleeding, particularly on the battlefield. The first pads were made from wood pulp bandages by nurses in France. It was very absorbent, and cheap enough to throw away afterwards. Commercial manufacturers borrowed this idea and the first disposable pads were available for purchase came as early as 1888 – called the Southall pad. In America, Johnson & Johnson developed their own version in 1896 called Lister's Towel: Sanitary Towel's for Ladies.

The problem was, women did not feel comfortable asking for this product, so in the early 1920s, the name was changed to Unpack, a name that did not describe the product.

Even though sanitary pads were available during this time, they were much too expensive for most women, and they continued using more traditional methods. When they could be afforded, women were allowed to place money in a box so that they would not have to speak to the clerk and take a box of Kotex pads from the counter themselves. It took several years for disposable menstrual pads to become commonplace.

The earliest disposable pads were generally in the form of a cotton wool or similar fibrous rectangle covered with an absorbent liner. The liner ends were extended front and back so as to fit through loops in a special girdle or belt worn beneath undergarments. This design was notorious for slipping either forward or back of the intended position. Later, an adhesive strip was placed on the bottom of the pad for

attachment to the saddle of the panties, and this became a favoured method with women. The belted sanitary napkin quickly disappeared during the early 1980s, thank goodness. Over the last twenty years, the sanitary pad industry has advanced by leaps and bounds. Gone are the days of bulky belts and diaper-like thickness. With the invention of more absorbent materials and better designs, pads are more comfortable and practical than ever. The invention of ‘wings’ keeps pads in place in the underwear, and the invention of ‘scented pads’ reduces odour.

Sanitary pads are the most widely used form of menstrual management, but they are still overpriced, particularly in developing countries.

The functions of sanitary napkins are **to absorb and retain menstrual fluid, and isolate menstrual fluids from the body**. Important and desired properties are: no leakage, no unesthetic appearance or colour, no odour, no noise, stay in place, comfortable to wear (thin body shape), and a high level of hygiene.

Sanitary napkins, also known as pads or menstrual pads, are used by many women during their menstrual cycles to absorb menstrual blood. Some advantages of using sanitary napkins include:

## **ADAVNTAGES**

**Comfort:** Sanitary napkins come in various sizes and shapes, which can provide comfortable coverage and absorbency during different phases of menstruation.

**Safety:** Sanitary napkins are made from safe and non-toxic materials, which are designed to keep the menstrual blood away from the body and prevent any infections.

**Convenience:** Sanitary napkins are easily available at drugstores and supermarkets, and can be disposed of easily.

**Durability:** Sanitary napkins are designed to be strong and durable, which means they can provide long-lasting protection.

**Choice:** Sanitary napkins come in different types and designs, which allow women to choose a product that best suits their needs.

**Environmentally friendly options:** Many brands offer sanitary napkins made from eco-friendly materials, which can help reduce environmental impact.

Overall, sanitary napkins provide a safe and convenient way for women to manage their menstrual cycles.

## **DISADVANTAGES**

While sanitary napkins have several advantages, there are also some disadvantages that users may experience:

**Discomfort:** Some women may find sanitary napkins uncomfortable to wear, especially if they are too bulky or do not fit well.

**Leakage:** Sanitary napkins may leak if they are not changed frequently enough or if they are not the right size or shape for the user.

**Odour:** Sanitary napkins can develop an unpleasant odour if not changed frequently, especially during heavy flow days.

**Irritation:** Some women may experience skin irritation or rashes from prolonged use of sanitary napkins.

**Environmental impact:** Sanitary napkins are disposable products and can contribute to landfill waste. They also require a significant amount of energy and resources to produce.

**Cost:** Using sanitary napkins can be expensive over time, especially for women who have heavy periods and need to change pads frequently.

Overall, while sanitary napkins provide a safe and convenient way to manage menstruation, some women may find them uncomfortable, leaky, or irritating. In addition, the environmental impact and cost of using disposable sanitary napkins are also concerns for some users.

Sanitary napkins, also known as menstrual pads, are absorbent pads worn by women during menstruation to manage menstrual bleeding. They are available in different sizes, shapes, and absorbencies, and are designed to fit comfortably and securely in the underwear. Sanitary napkins are made from a combination of materials, including absorbent materials such as cotton, wood pulp, and superabsorbent polymers. The materials used vary by brand, and some may also include fragrances, adhesives, and other additives.

## **THERE ARE DIFFERENT TYPES OF SANITARY NAPKINS AVAILABLE, INCLUDING:**

Regular pads: Designed for light to medium flow.

Overnight pads: Designed for heavy flow and provide more coverage and absorbency.

Pantyliners: Designed for light flow or for use as backup protection with tampons or menstrual cups.

Sanitary napkins should be changed every 4-8 hours, depending on flow and absorbency. They are disposable and should be wrapped and disposed of properly to avoid environmental contamination.

While sanitary napkins are a common and widely used menstrual product, some women may prefer alternative options such as tampons, menstrual cups, or period underwear. It is important for each woman to find a menstrual product that fits her needs and preferences for comfort, convenience, and sustainability.

## **HISTORY OF MENSTRUAL CUP:**

The menstrual cup has a long and interesting history. The first menstrual cup was patented in the United States in 1937 by Leona Chalmers, but it was made of rubber and did not gain widespread popularity. The first silicone menstrual cup was invented

in the 1980s by a woman named Susan Frank, who founded the company The Keeper, Inc. to produce and market the product.

In the years since, menstrual cups have become increasingly popular, especially among those who are looking for eco-friendly and cost-effective alternatives to disposable menstrual products. Today, there are many different brands and styles of menstrual cups available, made from a variety of materials and designed to fit different body types and flow levels.

While the menstrual cup has a relatively short history compared to other menstrual products like pads and tampons, it has a rich and evolving legacy. As attitudes towards menstruation and menstrual products continue to shift, the menstrual cup is likely to remain an important part of the conversation.

A **menstrual cup** is a menstrual hygiene device which is inserted into the vagina during menstruation. Its purpose is to collect menstrual fluid (blood from the uterine lining mixed with other fluids). Menstrual cups are usually made of flexible medical grade silicone, latex, or a thermoplastic isomer. They are shaped like a bell with a stem or a ring. The stem is used for insertion and removal, and the bell-shaped cup seals against the vaginal wall just below the cervix and collects menstrual fluid. This is unlike tampons and menstrual pads, which absorb the fluid instead.

Every 4–12 hours (depending on the amount of flow), the cup is removed, emptied, rinsed, and reinserted. After each period, the cup requires cleaning. One cup may be reusable for up to 10 years, making their long-term cost lower than that of disposable tampons or pads, though the initial cost is higher. As menstrual cups are reusable, they generate less solid waste than tampons and pads, both from the products themselves and from their packaging. Most menstrual cup brands sell a smaller and a larger size. Some menstrual cups are sold colourless and translucent, but several brands also offer coloured cups.

Menstrual cups typically do not leak if used properly, though incorrect placement or inadequate cup size can cause some women to experience leakage. Menstrual cups are a

safe alternative to other menstrual products; risk of toxic shock syndrome infection is similar or less with menstrual cups compared to pads or tampons.

## **WHO INVENTED THE FIRST MENSTRUAL CUP?**

While commonly mistaken as a modern product, the menstrual cup was patented in 1867 by S.L. Hockert. This version of the menstrual cup involves a rubber sack with a ring that can be inserted into the vagina and removed with a cord.

Even though inventions for menstrual products were evolving, the taboos of menstruation prevented many of them from launching into or being successful in the mainstream market. Many women didn't want to be seen purchasing or having these products on them. In order to remain discrete, women would often purchase menstrual products through mail-in orders. Unfortunately, stigma wasn't the only barrier that arose – disposable napkins were often not affordable or accessible. It wasn't until the end of the century – when cloths became more mainstream – that these disposable 'luxuries' were accessible to the common class.

## **HOW LONG HAVE MENSTRUAL CUPS BEEN AROUND?**

Apart from traditional disposable menstrual products, the first commercial menstrual cup hit the market. In 1937, American actress Leona Chalmers invented Cassette (also known as Dinette or Florene). These cups were made of vulcanized rubber and were designed for comfort while allowing users to wear tight clothing without belts or pins. Despite the many ads made to popularize Cassette, many women still preferred to use tampons and pads, and it wasn't until the 21st century that menstrual cups would have their uprising!

## **USE**

The menstrual cup is first folded or pinched and then inserted into the vagina. It will normally unfold automatically and create a light seal against the cervix. In some cases, the user may need to twist the cup or flex the vaginal muscles to ensure the cup is fully open. If correctly inserted, the cup should not leak or cause any discomfort. The stem should be completely inside the vagina. If it is not, the stem can be trimmed. There are

various folding techniques for insertion; common folds include the c-fold, as well as the punch-down fold.

If lubrication is necessary for insertion, it should be water based, as silicone lubricant can be damaging to the silicone.

After 4–12 hours of use (depending on the amount of flow), the cup is removed by reaching up to its stem to find the base. Simply pulling on the stem is not recommended to remove the cup, as this can create suction. The base of the cup is pinched to release the seal, and the cup is removed. After emptying, a menstrual cup should be rinsed or wiped and reinserted. It can be washed with a mild soap, and sterilized in boiling water for a few minutes at the end of the cycle. Alternatively, sterilizing solutions (usually developed for baby bottles and breast pump equipment) may be used to soak the cup. Specific cleaning instructions vary by brand.

## **HOW TO USE A MENSTRUAL CUP?**

A consultation with your gynaecologist can be helpful before you decide to switch to a menstrual cup. As many feminine hygiene brands sell menstrual cups in different sizes, you will have to find your size first. To do that, you and your gynaecologist must consider:

Your age

The length of your cervix

Whether your menstrual flow is heavy or low

The capacity of the cup

The flexibility and firmness of the menstrual cup

Your pelvic floor muscles strength

Menstrual cups are usually available in two sizes, small and large. If you are below 30-years of age, you should use the smaller-sized cups. However, if your age is more than 30-years, or your periods are heavy, or you have had a vaginal birth, the larger-sized cups are ideal for you.

Unless you have used a tampon before, you may find using the device uncomfortable initially. However, with the right technique and a little bit of practice, you can learn how to use a menstrual cup the right way.

## **INSERTING A MENSTRUAL CUP:**

**The following are the steps to use a menstrual cup:**

- ✓ Wash hands thoroughly with soap and water.
- ✓ Apply a water-based lubricant at the rim of the menstrual cup; this can make the process of inserting the menstrual cup inside your vagina easier.
- ✓ Fold the menstrual cup in half. Make sure the rim of the menstrual cup faces upward.
- ✓ Insert the menstrual cup (with the rim facing upward) inside your vagina. The cup should fit a few inches below your cervix.
- ✓ Rotate the menstrual cup after inserting it inside your vagina. When you rotate the cup, it will spring open; this will create an airtight seal inside the vagina and stop any leakage.
- ✓ If you insert the menstrual cup correctly in your vagina, you will not feel its presence. It will also allow you to perform your routine activities without the menstrual cup falling out.
- ✓ Normally, you can wear the menstrual cup for 6 to 12 hours without worrying about leakage. If you experience normal blood flow, you can even wear the menstrual cup overnight. However, you must remove the cup without exceeding the 12-hour mark.

## **REMOVING A MENSTRUAL CUP:**

**The following are the steps to remove a menstrual cup:**

- ✓ Wash hands thoroughly with soap and water.
- ✓ Gently insert your thumb and index finger into your vagina. Slowly, pull the stem of the menstrual cup until you reach its base.
- ✓ Gently pinch the base to release the airtight seal. Then, pull down to remove the menstrual cup.

- ✓ Once you take it out, empty the blood into the toilet or sink. Wash and clean it thoroughly with water and insert again.
- ✓ If you switch to reusable menstrual cups, you must wash and clean them thoroughly before reinserting them into your vagina. The menstrual cup should be emptied twice a day to reduce the risk of irritation.
- ✓ With proper care, your reusable menstrual cups can last about six months to a year. Disposable menstrual cups need to be thrown away after each use.

### ✓ **ADVANTAGES**

- When using a menstrual cup, the menstrual fluid is collected after it flows from the cervix and is held in liquid form. With tampons, liquid is absorbed and held in semi-coagulated form against the cervix.
- If a user needs to track the number of menses produced (e.g., for medical reasons), a menstrual cup allows one to do so accurately.
- Users employ about 1-2 liters of water to clear menstrual cups.

### **ACCEPTABILITY STUDIES**

A large Fleur cup menstrual cup (centre) can hold about three times as much liquid as a large tampon.

A 2011 randomized controlled trial in Canada investigated whether silicone menstrual cups are a viable alternative to tampons and found that approximately 91% of women in the menstrual cup group said they would continue to use the cup and recommend it to others. In a 1991 clinical study involving 51 women, 23 of the participants (45%) found rubber menstrual cups to be an acceptable way of managing menstrual flow.

In a pilot project among refugees in Uganda, 87% used the menstrual cup consistently over 3 months.

In a randomized controlled feasibility study in rural western Kenya, adolescent primary school girls were provided with menstrual cups or menstrual pads instead of traditional menstrual care items of cloth or tissue. Girls provided with menstrual cups had a lower prevalence of sexually transmitted infections than control groups. Also, the prevalence of bacterial vaginosis was lower among cup users compared with menstrual pad users or those continuing other usual practice. After six months, menstrual cup users were free

from embarrassing leakage or odour, and could engage in class activities and sport without humiliation or being teased.

## **ACCESS TO WATER AND HYGIENE**

- Cleaning a menstrual cup in a public toilet can pose problems as the hand washing sinks are often in a public space rather than in the toilet cubicle. Some manufacturers suggest wiping out the cup with a clean tissue and cleaning the cup at the next private opportunity. The user could also carry a small bottle of water to rinse the cup privately over the toilet. Another option is to use wet wipes. Since menstrual cups only need to be emptied after half a day or less often (unless the flow is very heavy) many users do not have to empty them in public toilets, but rather wait until they return home.
- A lack of clean water and soap for handwashing, needed before inserting the cup, presents a problem to women in developing countries. Insertion requires thorough washing of the cup and hands to avoid introducing new bacteria into the vagina, which may heighten the risk of UTIs and other infections. Disposable and reusable pads do not demand the same hand hygiene, though reusable pads also require access to water for washing out pads.
- Because menstrual cups require boiling once a month, this can be a problem in developing countries if there is a lack of water, firewood, and good hygiene practices. Other options currently in use, such as rags that are washed, may be less hygienic.
- Removing a menstrual cup can be messy. Sometimes menstrual blood can spill during removal, although many women remove the device while hovering over a toilet to catch such spillage.

When using a urine diverting dry toilet, menstrual blood can be emptied into the part that receives the faeces. If any menstrual blood falls into the funnel for urine, it can be rinsed away with water.

## **LEAKAGE**

Menstrual cups collect menstrual fluid inside the vagina and generally do not leak (if emptied often enough and inserted properly). Some women experience leakage due to improper use or cup size. For example, a menstrual cup may leak if it is not inserted correctly and does not pop open completely and seal against the walls of the vagina. Some factors mentioned in association with leakage included menorrhagia, unusual anatomy of the uterus, need for a larger size of menstrual cup, and incorrect placement of the menstrual cup, or that it had filled to capacity. However, a proper seal may continue to contain fluid in the upper vagina even if the cup is full.

The frequency of reported leakage for menstrual cups is similar or lower than for tampons and pads.

### **Safety**

Menstrual cups are safe when used as directed and no health risks related to their use have been found.

No medical research was conducted to ensure that menstrual cups were safe prior to introduction on the market. Early research in 1962 evaluated 50 women using a bell-shaped cup. The researchers obtained vaginal smears, gram stains, and basic aerobic cultures of vaginal secretions. Vaginal speculum examination was performed, and pH was measured. No significant changes were noted. This report was the first containing extensive information on the safety and acceptability of a widely used menstrual cup that included both preclinical and clinical testing and over 10 years of post-marketing surveillance.

One case report noted the development of endometriosis and adenomyosis in one menstrual cup user. Additionally, one survey with a small sample size indicated a possible link. Therefore, two organizations have issued a combined statement that urged further research. However, the U.S Food and Drugs Administration declined to remove menstrual cups from the market, saying that there was insufficient evidence of risk.

A 2011 randomized controlled trial measured an ovaginal infection in a comparison of menstrual cup and tampon use, and found no difference.

No differences in the growth of *Staphylococcus aureus* or health harms were identified among school girls provided with menstrual cups compared to those using menstrual pads, or continuing their usual practice in rural western Kenya.

Menstrual cups can be used with an IUD; however, there is an unclear association with respect to IUD expulsion.

## **TOXIC SHOCK SYNDROME**

Toxic shock syndrome (TSS) is a potentially fatal bacterial illness. Scientists have recognized an association between TSS and tampon use, although the exact connection remains unclear.

TSS caused by menstrual cup use appears to be very rare. The probable reason for this is that menstrual cups are not absorbent, do not irritate the vaginal mucosal tissue, and so do not change the vaginal flora in any measurable amount. Conversely, vaginal dryness and abrasions may occur if the tampon used is more absorbent than needed for the menstrual flow, and normal liquid that should line the vaginal wall is also absorbed. Research has shown that the cup has no impact on the vaginal flora, which means there is no effect on the presence of *S. aureus*, the bacterium that can cause TSS. The risk of TSS associated with cervical caps used for contraception in the female barrier method is also very low. Cervical caps and menstrual cups both use mostly medical grade silicone or latex.

A widely reported study showed that in vitro, bacteria associated with toxic shock syndrome (TSS) are capable of growing on menstrual cups.

A 2019 review found the risk of toxic shock syndrome with menstrual cup use to be low, with five cases identified via their literature search. Data from the United States showed rates of TSS to be lower in women using menstrual cups versus high-absorbency tampons. Infection risk is similar or less with menstrual cups compared to pads or tampons.

## **TYPES**

Menstrual cups are generally bell-shaped, with a few exceptions. Most brands use medical grade silicone as the material for the menstrual cup, although latex and thermoplastic elastomer are also options. Menstrual cups made from silicone are generally designed to last for 1–5 years.

The majority of menstrual cups on the market are reusable, rather than disposable.

## **SIZE, SHAPE, AND FLEXIBILITY**

Most menstrual cup brands sell a smaller and a larger size. The smaller size is typically recommended for women under 30 or women who have not given birth vaginally. The larger size is typically recommended for women over 30 or have given birth vaginally, or have a heavy flow. However, there have been no studies that show any need for a different sized cup based on age or parity. Cups with even smaller sizes are recommended for teenagers, as well as women and girls who are more physically fit, as those with stronger pelvic floor muscles may find a larger cup uncomfortable. If the cervix sits particularly low or is tilted, a shorter cup may be more suitable. Capacity is important for women who have a heavier flow. The average menstrual cup holds around 20 ml. Some cups are designed to be larger and hold 37–51 ml. Most sizes have a larger capacity than a regular tampon, which is 10–12 ml.

Menstrual cups also vary by firmness or flexibility. Some companies offer a range of firmness levels in their cups. A firmer cup pops open more easily after insertion and may hold a more consistent seal against the vaginal wall (preventing leaks), but some women find softer cups more comfortable to insert.

## **COLOUR**

The silicone of which most brands of cups are produced is naturally colourless and translucent. Several brands offer coloured cups as well as, or instead of the colourless ones. Translucent cups lose their initial appearance faster than coloured – they tend to get yellowish stains with use. The shade of a coloured cup may change over time, though stains are often not as obvious on coloured cups. Stains on any colour of the cup can often be removed or at least lightened by soaking the cup in diluted hydrogen peroxide and/or leaving it out in the sun for a few hours.

Most cups produced do not have any other additives to them, except for the coloured cups. The colouring used is reported to be safe and approved by the FDA for medical use and food colouring.

## **SIMILAR DEVICES**

**Menstrual discs** (also called cervical cups) are disc-shaped, like a diaphragm, with a flexible outer ring and a soft, collapsible centre. They collect menstrual fluid like menstrual cups, but stay in place by hooking behind the pubic bone instead of relying on suction. Menstrual discs come in both disposable and reusable varieties.

## **COST**

The costs for menstrual cups vary widely, from US\$0.7 to \$47 per cup (based on a 2019 review of 199 brands of menstrual cups available in 99 countries).

Reusable menstrual products (including menstrual cups, but not disposable menstrual cups) are more economical than disposable products. Money will be saved using a menstrual cup, compared with other options such as tampons. A woman in a developed country spends an average of US\$60 per year on pads and tampons. If a woman menstruates for 40 years, the lifetime expense for pads and tampons is US\$2,400. If the average silicone menstrual cup lasts between one and five years, then between eight and 40 would be needed in 40 years. If a menstrual cup costs US\$30 (costs vary by manufacturer), the lifetime cost for a menstrual cup would be between US\$240 and US\$1,200.

The up-front cost of a menstrual cup may be expensive for women from low-income households, especially in developing countries. Buying pads or using rags monthly may seem more affordable than purchasing a menstrual cup, though the lifetime cost is higher.

## **ENVIRONMENTAL IMPACT**

Since they are reusable, menstrual cups help to reduce solid waste. Some disposable menstrual pads and plastic tampon applicators can take 25 years to break down in the ocean and can cause a significant environmental impact. Biodegradable sanitary options are also available, and these decompose in a short period of time, but they must be composted, and not disposed of in a landfill.

When considering a 10-year time period, waste from consistent use of a menstrual cup is only a small fraction of the waste of pads or tampons. For example, if compared with using 12 pads per period, use of a menstrual cup would comprise only 0.4% of the plastic waste.

Each year, an estimated 20 billion pads and tampons are discarded in North America. They typically end up in landfills or are incinerated, which can have a great impact on the environment. Most of the pads and tampons are made of cotton and plastic. Plastic takes about 50 or more years and cotton starts degrading after 90 days if it is composted.

Given that the menstrual cup is reusable, its use greatly decreases the amount of waste generated from menstrual cycles, as there is no daily waste and the amount of discarded packaging decreases as well. After their life span is over, the silicone cups are put in landfills or incinerated.

Menstrual cups may be emptied into a small hole in the soil or in compost piles, since menstrual fluid is a valuable fertilizer for plants and any pathogens of sexually transmitted diseases will quickly be destroyed by soil microbes. The water used to rinse the cups can be disposed of in the same way. This reduces the amount of wastewater that needs to be treated.

In developing countries, solid waste management is often lacking. Here, menstrual cups have an advantage over disposable pads or tampons as they do not contribute to the solid waste issues in the communities or generate embarrassing refuse that others may see.

Menstrual cups may have been inspired by other types of vaginal inserts used throughout history. Vaginal inserts had various purposes from birth control, enabling abortions, to supporting a prolapsed uterus. The first version of what we would now call a menstrual cup was a rubber sack attached to a rubber ring created by S.L. Hockert in 1867, which was patented in the United States. An early version of a bullet-shaped menstrual cup was patented in 1932, by the midwifery group of McGlasson and Perkins. Leona Chalmers patented the first usable commercial cup in 1937. Other menstrual cups were patented in 1935, 1937, and 1950. The Gassaway brand of menstrual cups was introduced in the 1960s, but it was not a commercial success. Early menstrual cups were made of rubber.

In 1987, another latex rubber menstrual cup, The Keeper, was manufactured in the United States. This proved to be the first commercially viable menstrual cup and it is still available today. The first silicone menstrual cup was the UK-manufactured Moon cup in 2001. Most menstrual cups are now manufactured from medical grade silicone

because of its durability and hypoallergenic properties, though there are also brands made of TPE (thermoplastic elastomer). Menstrual cups are becoming more popular worldwide, with many different brands, shapes, and sizes on the market. Most are reusable, though there is at least one brand of disposable menstrual cups currently manufactured.

Some non-governmental organizations (NGOs) and companies have begun to propose menstrual cups to females in developing countries since about 2010, for example in Kenya and South Africa. Menstrual cups are regarded as a low-cost and environmentally friendly alternative to sanitary cloth, expensive disposable pads, or "nothing" – the reality for many females in developing countries.

While numerous companies all over the world offer this product it was still not well known in around 2010. It may be difficult for companies to make profit from this product as one single menstrual cup can last a girl or woman five years or longer. Most women hear of menstrual cups through the internet or word of mouth, rather than through conventional advertising on TV for example.

## **SOCIETY AND CULTURE**

### **DEVELOPING COUNTRIES**

Menstrual cups can be useful as a means of menstrual hygiene management for women in developing countries where access to affordable sanitary products may be limited. A lack of affordable hygiene products means inadequate, unhygienic alternatives are often used, which can present a serious health risk. Menstrual cups offer a long-term solution compared to some other feminine hygiene products because they do not need to be replaced monthly.

The municipality of Alappuzha in Kerala, India has launched a project in 2019 and gave away 5,000 menstrual cups for free to female residents. This is to encourage the use of these cups instead of non-biodegradable menstrual pads to reduce waste production. In 2022, a village in Kerala named, Cymbaling had said to become India's first sanitary napkin free panchayat under a project called 'Valakati', which give 5,700 menstrual cups for free.

## **CULTURE AND MENSTRUATION**

Feminine hygiene products that need to be inserted into the vagina can be unacceptable for cultural reasons. There are myths that they interfere with female reproductive organs and that they cause females to lose their virginity. Use of a menstrual cup could stretch or break the hymen. Since some cultures value the preservation of the hymen as evidence of virginity (see also virginity test); this can discourage young women from using cups.

## **MENSTRUAL CUP**

A menstrual cup is a reusable menstrual product that is designed to collect menstrual blood. It is made of medical-grade silicone, latex or rubber and is shaped like a small cup with a stem. To use a menstrual cup, it is folded and inserted into the vagina, where it opens up and creates a seal to prevent leaks.

Menstrual cups come in various sizes and shapes, and can be worn for up to 12 hours at a time before being emptied, washed and reused. They are an eco-friendly and cost-effective alternative to disposable pads and tampons, as they can last for several years with proper care.

Some benefits of using a menstrual cup include reduced environmental waste, cost savings, reduced risk of toxic shock syndrome (TSS), and the ability to have sex during menstruation. However, they may require a bit of a learning curve for first-time users, and some people may find them uncomfortable or difficult to use.

It is important to follow proper cleaning and sanitization guidelines when using a menstrual cup to avoid infection or other complications. Additionally, people with certain medical conditions or anatomical differences may not be able to use menstrual cups safely, so it is always best to consult with a healthcare provider before trying one.

Advantages and disadvantages of menstrual cup

## **ADVANTAGES OF MENSTRUAL CUPS:**

- **Cost-effective:** Menstrual cups can last for several years with proper care, which can be more cost-effective than buying disposable pads or tampons every month.
- **Eco-friendly:** Since menstrual cups are reusable, they can help reduce the amount of waste produced by disposable menstrual products.
- **Longer wear time:** Menstrual cups can be worn for up to 12 hours, which is longer than most disposable menstrual products. This means fewer trips to the bathroom and less hassle.
- **Lower risk of toxic shock syndrome (TSS):** Menstrual cups do not increase the risk of TSS, which is a potentially life-threatening condition associated with tampon use.
- **Comfortable:** Many people find menstrual cups to be more comfortable than tampons or pads, since they do not create the same level of dryness or irritation.

## **DISADVANTAGES OF MENSTRUAL CUPS:**

- **Learning curve:** It can take some time to learn how to properly insert and remove a menstrual cup, which can be a challenge for some people.
- **Messy:** Removing and cleaning a menstrual cup can be messy, especially if you are not used to it.
- **Not suitable for all body types:** Some people may find menstrual cups uncomfortable or difficult to use due to anatomical differences.
- **Need for proper cleaning:** Menstrual cups need to be cleaned properly in between uses, which can be a hassle if you do not have access to clean water or a private bathroom.
- **Public stigma:** Some people may feel uncomfortable or embarrassed about using a menstrual cup, especially if it is not widely accepted in their culture or community.

## **OVERVIEW**

A menstrual cup is a reusable menstrual product designed to collect menstrual blood. It is made of medical-grade silicone, latex, or rubber and is shaped like a small cup with a

stem. Menstrual cups come in various sizes and shapes to fit different body types and flow levels. They can be inserted into the vagina and create a seal to prevent leaks.

Menstrual cups have several advantages over disposable menstrual products such as pads and tampons. They are cost-effective, eco-friendly, and can be worn for up to 12 hours before being emptied and washed. Additionally, they do not increase the risk of toxic shock syndrome (TSS), which is a potentially life-threatening condition associated with tampon use. Many people also find menstrual cups to be more comfortable than other menstrual products, as they do not create the same level of dryness or irritation.

However, there are some disadvantages to using a menstrual cup. It can take some time to learn how to properly insert and remove the cup, which can be a challenge for some people. Removing and cleaning the cup can also be messy, especially if you are not used to it. Additionally, some people may find menstrual cups uncomfortable or difficult to use due to anatomical differences.

Overall, menstrual cups can be a convenient and eco-friendly alternative to disposable menstrual products. However, it is important to follow proper cleaning and sanitization guidelines when using a menstrual cup to avoid infection or other complications. Additionally, people with certain medical conditions or anatomical differences may not be able to use menstrual cups safely, so it is always best to consult with a healthcare provider before trying one.

## **SANITARY NAPKINS AND MENSTRUAL CUP**

Sanitary napkins and menstrual cups are two common menstrual hygiene products used by women during their menstrual cycle. In this comparative study, we will explore the key differences between sanitary napkins and menstrual cups, including their composition, usage, convenience, cost, and environmental impact.

### **COMPOSITION:**

Sanitary napkins are made of absorbent materials, such as cotton or synthetic fibres, which are held in place by an adhesive strip. They are available in various sizes and thicknesses to accommodate different flow levels.

On the other hand, menstrual cups are made of medical-grade silicone or latex, and they are designed to be inserted into the vagina to collect menstrual blood. They are reusable and can last for several years with proper care.

### **USAGE:**

Sanitary napkins are easy to use, as they simply need to be attached to the underwear. However, they need to be changed every few hours to prevent leaks and odor.

Menstrual cups require some practice to insert and remove properly, but they can be worn for up to 12 hours without the need for replacement. They also do not cause any odor or discomfort.

### **CONVENIENCE:**

Sanitary napkins are easily available at drugstores and supermarkets, and they can be disposed of after use. However, they can cause discomfort and a feeling of wetness during hot and humid weather. Menstrual cups may not be readily available in all stores, but they can be purchased online. They are also convenient for outdoor activities, such as swimming or hiking, as they do not need to be changed frequently.

### **COST:**

Sanitary napkins are generally less expensive than menstrual cups, but the cost can add up over time. On average, a woman may spend several hundred dollars on pads over the course of her menstrual years. Menstrual cups, on the other hand, have a higher initial cost but can last for years with proper care. This makes them a more cost-effective option in the long run.

### **ENVIRONMENTAL IMPACT:**

Sanitary napkins generate a significant amount of waste, as they are disposed of after each use. They also contain plastic and other non-biodegradable materials, which contribute to environmental pollution.

Menstrual cups are reusable and produce much less waste compared to sanitary napkins. They also do not contain any harmful chemicals, making them a more environmentally friendly option.

## **CONCLUSION:**

In conclusion, both sanitary napkins and menstrual cups have their own advantages and disadvantages. While sanitary napkins are easy to use and readily available, they generate a significant amount of waste and can be uncomfortable during hot weather. Menstrual cups require some practice to use properly but are more convenient, cost-effective, and environmentally friendly. Ultimately, the choice between these two menstrual hygiene products depends on personal preferences, lifestyle, and budget.

## **CHAPTER IV**

# **DATA ANALYSIS AND INTERPRETATION**

#### **4.1 ANALYSIS AND INTERPRETATION**

This chapter is deals with analysis and interpretation of data collected from the general public. This analysis and interpretation are based on the responds given by the women who use menstrual products like sanitary napkins and menstrual cups. The processed data is presented on the analysis part with the help of table and figures for the easy understanding and interpretation.

#### **4.2 ANALYSIS**

Analysis of data is considered to be highly skilled and technical job which should be carried out only by the researcher himself or under his close supervision. It is through systematic analysis that the underlining features of the data are revealed and valid generalisation is arrived at. Analysis of data there for means critical examination of the object under study and for determining the patterns of relationship among the variables to it using both qualitative and quantitative method.

#### **4.3 INTERPRETATION**

Interpretation refers to the techniques of drawing inference from the collected facts and explaining the significance of those inferences after an analytical and experimental study. It is a search for broader and abstract means of the research and findings. Interpretation analysis the abstract relations in more concrete teams and tries to unfold the reasons for existing type of relations or findings it relates the empirical findings with theoretical principles and helps to draw a number of useful inferences from the study.

The data obtained from women of different ages are analysed and interpret with the help of various tables and charts as on next page:

**TABLE NO 4.1**

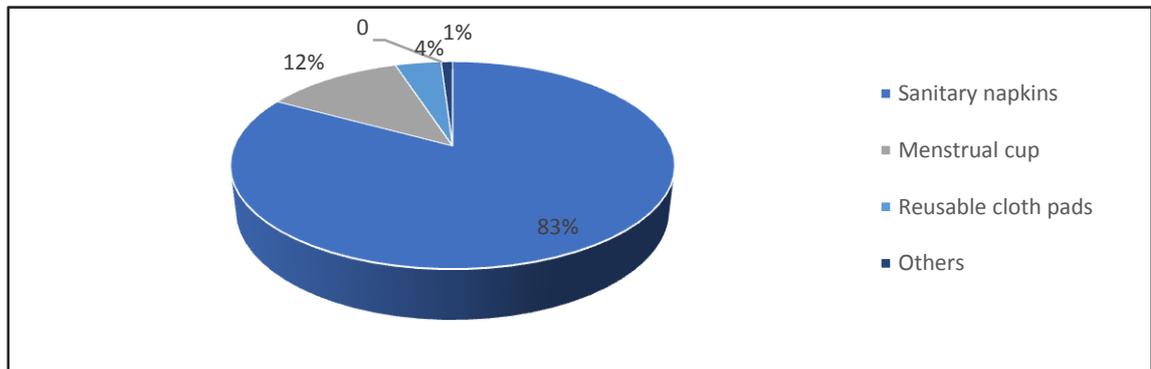
**PRODUCT WHICH WAS PREFERRED TO USE DURING  
MENSTRUSATION**

Response	No. of response	Percentage
Sanitary napkins	83	83%
Menstrual cup	12	12%
Reusable cloth pads	04	04%
Others	01	01%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.1**

**PRODUCT WHICH WAS PREFERRED TO USE DURING  
MENSTRUSATION**



**INTERPRETATION**

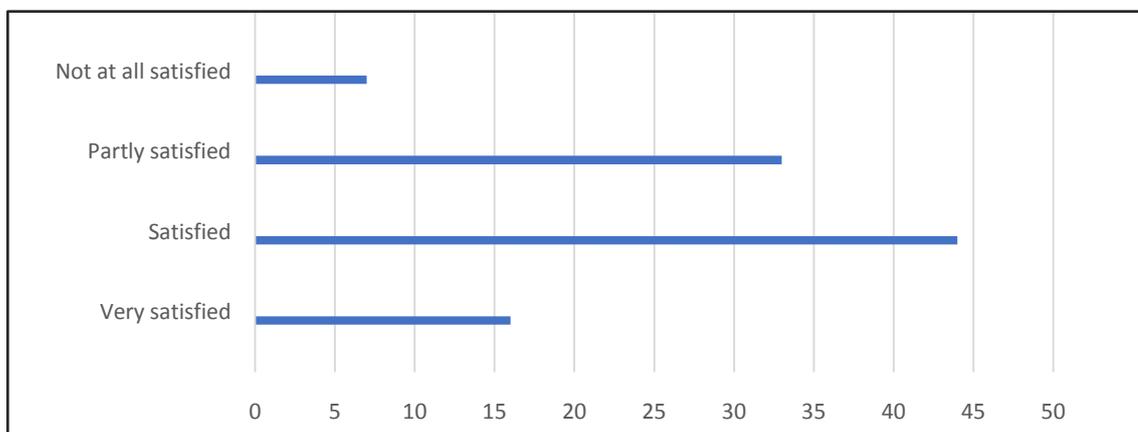
The figure no. 4.1 shows that the mostly used menstrual products by women in the society during their period. Here 83% of the respondents choose sanitary napkins, 12% choose menstrual cups, 4% were choose reusable cloth pads and 1% of the respondents choose other methods. There for most of the respondents were prefer to by sanitary napkins.

**TABLE NO. 4.2**  
**LEVEL OF SATISFACTION TOWARDS THE CHOICE OF**  
**MENSTRUAL PRODUCTS**

Response	No. of response	Percentage
Not at all satisfied	07	07%
Partly satisfied	33	33%
Satisfied	44	44%
Very satisfied	16	16%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.2**  
**LEVEL OF SATISFACTION TOWARDS THE CHOICE OF**  
**MENSTRUAL PRODUCT**



### **INTERPRETATION**

The figure no. 4.2 shows that the level of satisfaction of the respondents towards the choice of their products. Here 7% of the respondents were not at all satisfied with the choice of their menstrual product, 33% were partly satisfied, 44% satisfied and 16% of the respondents are very satisfied with the choice of their product. Therefore, most of the respondents were satisfied with their choice of menstrual products.

**TABLE NO. 4.3**

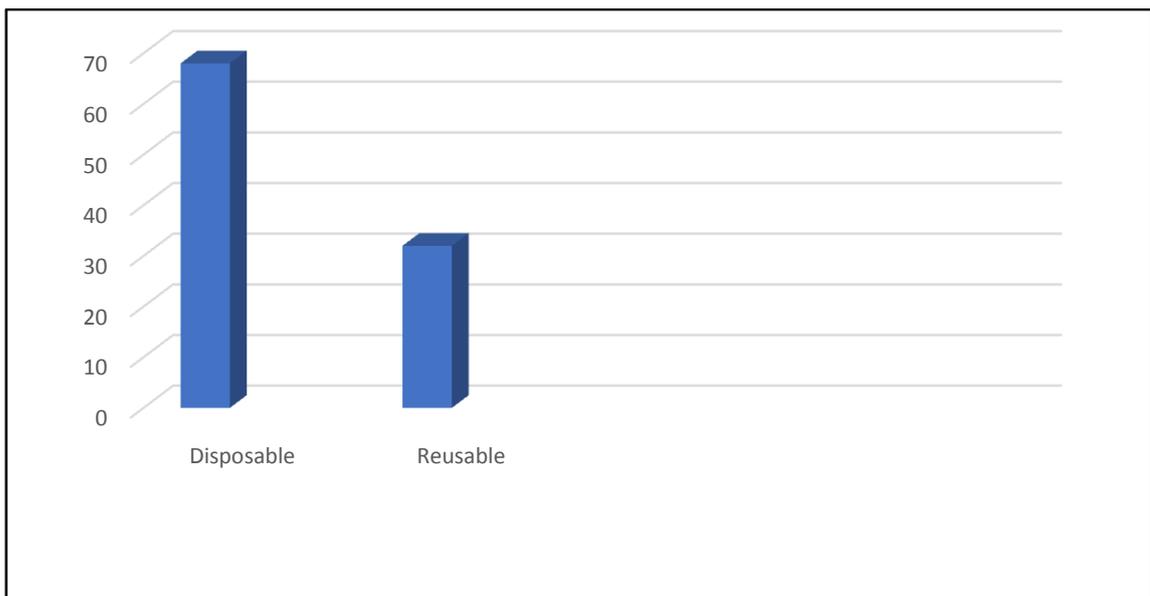
**TYPES OF PRODUCTS**

Types	No. of response	Percentage
Disposable	68	68%
Reusable	32	32%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.3**

**TYPES OF PRODUCTS**



**INTERPRETATION**

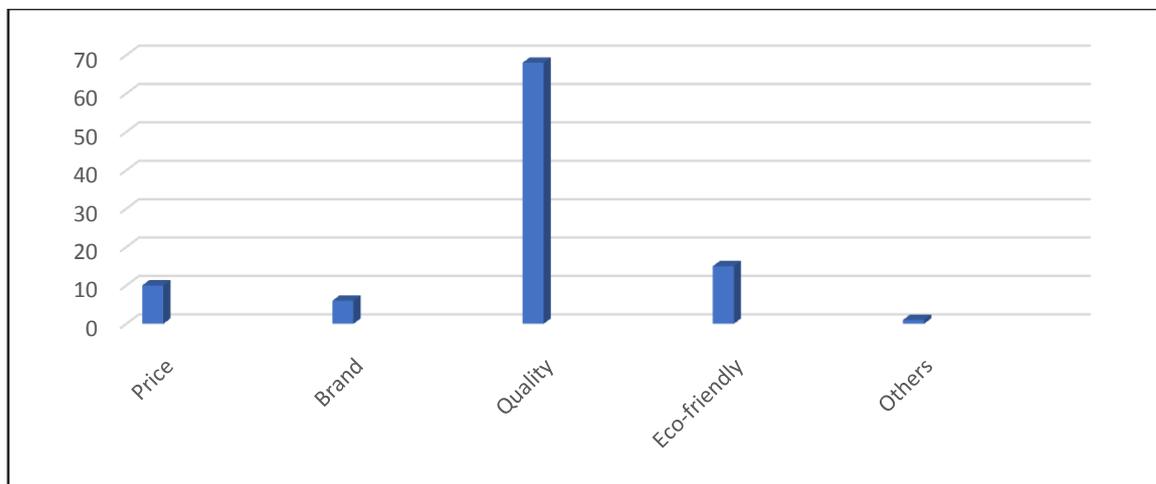
The figure no. 4.3 shows the types of menstrual products chosen by the general public. Here 68% of the respondents were choose disposable menstrual products and 32% were choose reusable products available in the market. Therefore, most of the respondents choose disposable menstrual products during their period.

**TABLE NO. 4.4**  
**FACTORS CONSIDER WHEN BUYING MENSTRUAL**  
**PRODUCTS**

Responses	No. of response	Percentage
Price	10	10%
Brand	06	06%
Quality	68	68%
Eco-friendly	15	15%
Others	01	01%
Total	100	100%

Source of data: Primary Data.

**FIGURE 4.4**  
**FACTORS CONSIDER WHEN BUYING MENSTRUAL**  
**PRODUCTS**



### **INTERPRETATION**

The figure no. 4.4 shows the factors consider when buying menstrual products. Here 68% of the respondents consider the quality for purchasing menstrual products, 15% consider eco-friendly products and 01% of them consider some other factors. Therefore, most of the respondents were consider the quality when buying a menstrual product.

**TABLE NO. 4.5**

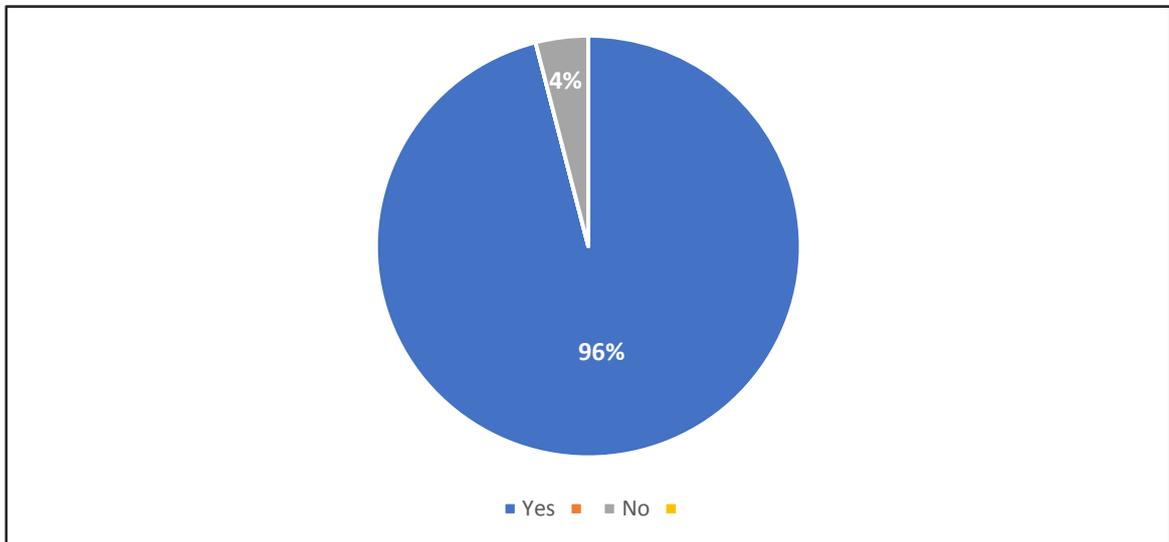
**AWARENESS OF THE ENVIRONMENTAL AND HEALTH ISSUES THAT COME WITH DISPOSABLE PERIOD PRODUCTS**

Response	No. of Response	Percentage
Yes	96	96%
No	04	04%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.5**

**AWARENESS OF THE ENVIRONMENTAL AND HEALTH ISSUES THAT COME WITH DISPOSABLE PERIOD PRODUCTS**



**INTERPRETATION**

The figure no. 4.5 shows the awareness of general public over the environmental and health issues come with disposable period products. Here 96% of the respondents were aware of those issues and 04% were unaware of the issues. Therefor most of them were aware of issues come with the use of disposable period products.

**TABLE NO. 4.6**

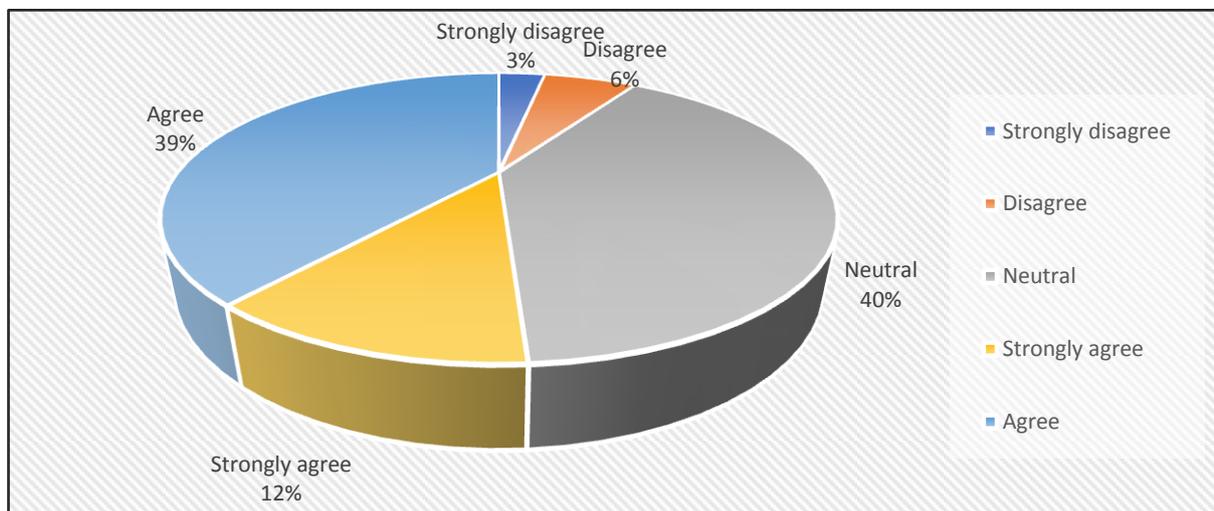
**SANITARY NAPKINS ARE SERIOUSLY HARMFUL TO HEALTH**

Response	No. of response	Percentage
Strongly disagree	03	03%
Disagree	06	06%
Neutral	40	40%
Strongly agree	12	12%
Agree	39	39%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.6**

**SANITARY NAPKINS ARE SERIOUSLY HARMFUL TO HEALTH**



**INTERPRETATION**

The figure no. 4,6 shows that sanitary napkins are seriously harmful to health. Here 40% of response were neutral, 39% were agree with the statement. Therefore, most of the respondents were neutral with the statement “**sanitary napkins are seriously harmful to health**”

**TABLE NO. 4.7**

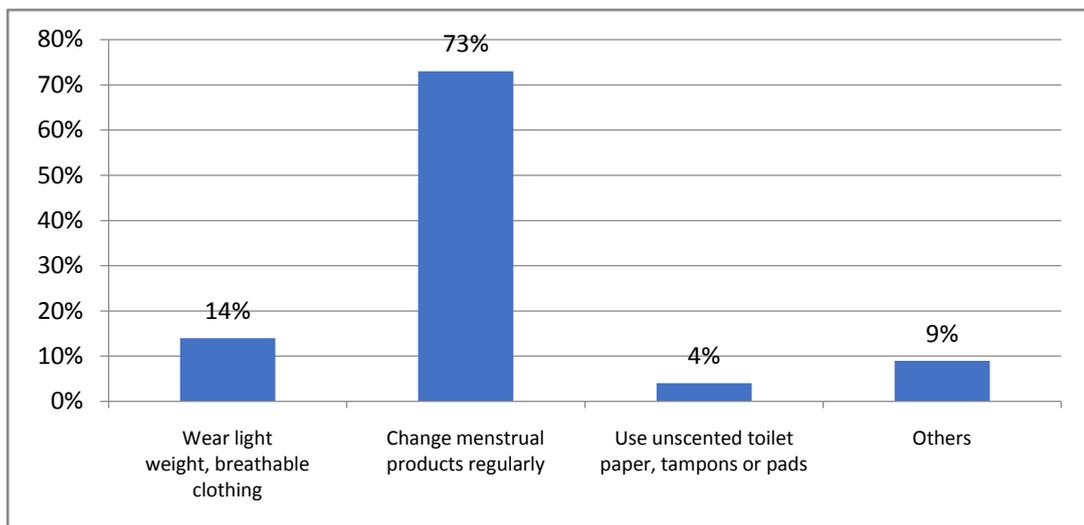
**THINGS THAT ARE CONSIDER TO MAINTAIN HEALTH AND HYGIENE WHILE USING MENSTRUAL PRODUCTS**

Things	No. of response	Percentage
Wear light weight, breathable clothing	14	14%
Change menstrual products regularly	73	73%
Use unscented toilet paper, tampons or pads	04	04%
Others	09	09%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.7**

**THINGS THAT ARE CONSIDER TO MAINTAIN HEALTH AND HYGIENE WHILE USING MENSTRUAL PRODUCTS**



**INTERPRETATION**

Figure no. 4.7 shows the things that are consider to maintain health and hygiene while using menstrual products. Here 73% of respondents choose the option “change menstrual products regularly” 14% “wear light weight breathable clothing”. Therefore, most of the people prefer to change menstrual products regularly to maintain hygiene.

**TABLE NO. 4.8**

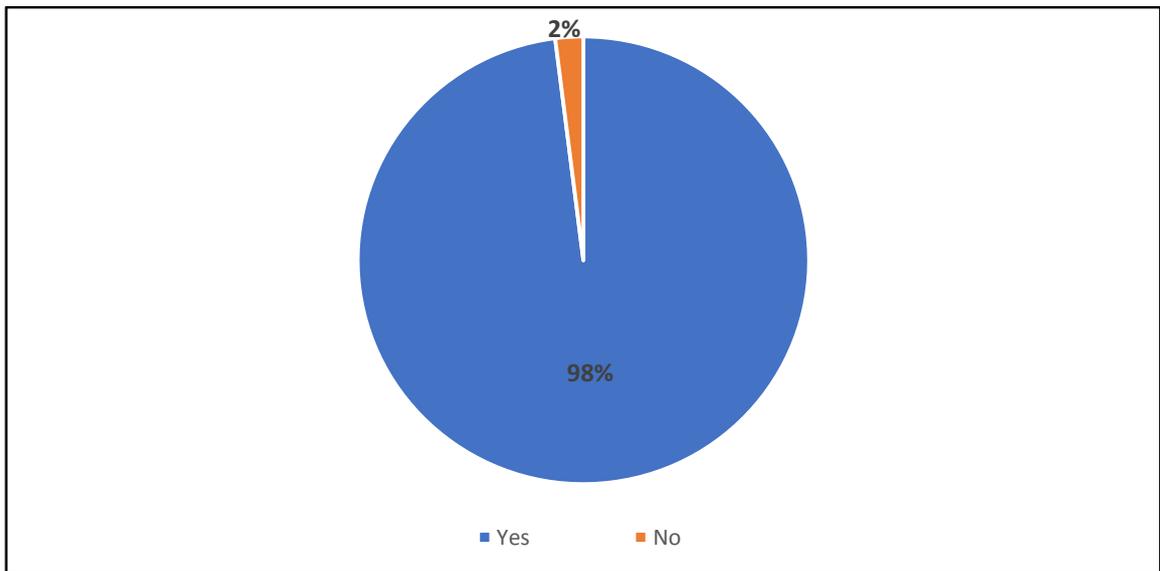
**PEOPLE WHO KNOW ABOUT MENSTRUAL CUP**

Response	No. of response	Percentage
Yes	98	98%
No	2	02%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.8**

**PEOPLE WHO KNOW ABOUT MENSTRUAL CUP**



**INTERPRETATION**

The figure no. 4.8 shows the percentage of general public who heard of menstrual cup. Here 98% of the respondents were heard of menstrual cups and 2% of them were not heard of menstrual cups. Therefore, most of the people have the knowledge about menstrual cups.

**TABLE NO. 4.9**

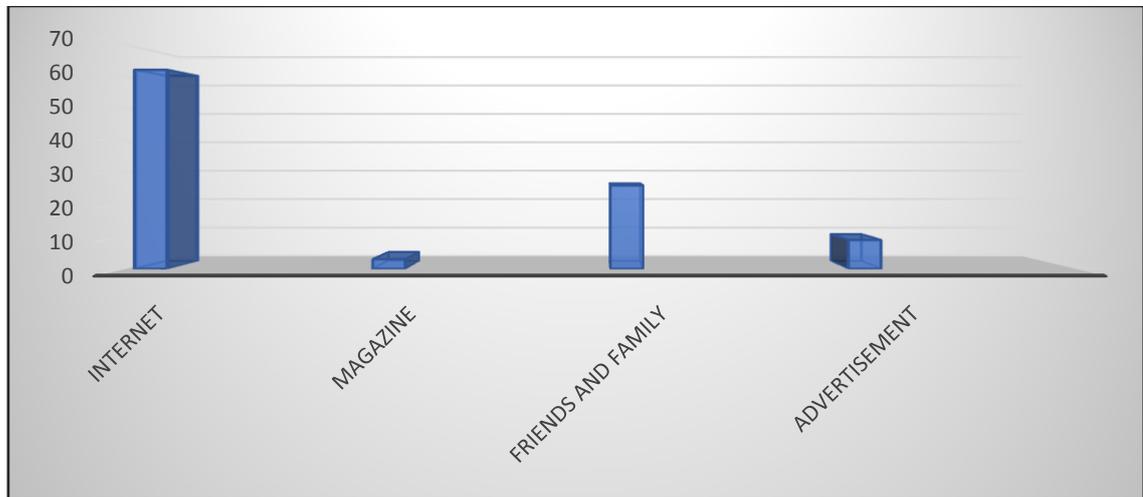
**SOURCES OF INFORMATION ABOUT MENSTRUAL CUPS**

Sources	No. of response	Percentage
Internet	62	62%
Magazine	03	03%
Friends and family	26	26%
Advertisement	09	09%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.9**

**SOURCES OF INFORMATION ABOUT MENSTRUAL CUPS**



**INTERPRETATION**

The figure no. 4.9 shows the sources by which people come to know about menstrual cups. Here 62% of respondents were come to know about menstrual cup through internet, 3% from magazine, 26% from friends and family and 9% of them were come to know about menstrual cup through advertisements. Therefore, most of the people get knowledge about menstrual cup through internet.

**TABLE NO. 4.10**

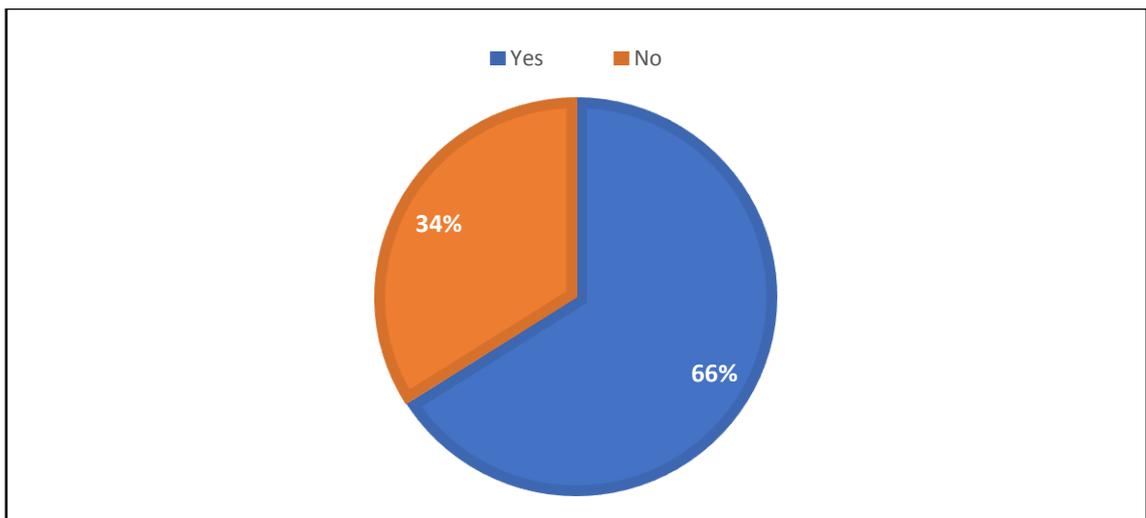
**ADVERTISEMENTS FOR MENSTRUAL CUPS**

Response	No. of response	Percentage
Yes	66	66%
No	34	34%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.10**

**ADVERTISEMENTS FOR MENSTRUAL CUPS**



**INTERPRETATION**

The figure no. 4.10 shows the percentage of advertisements about menstrual cups. Here 66% of people know about menstrual cups through advertisements and about 34% of people didn't see advertisements of menstrual cups. Therefore, most of the respondents saw advertisements of menstrual cups.

**TABLE NO. 4.11**

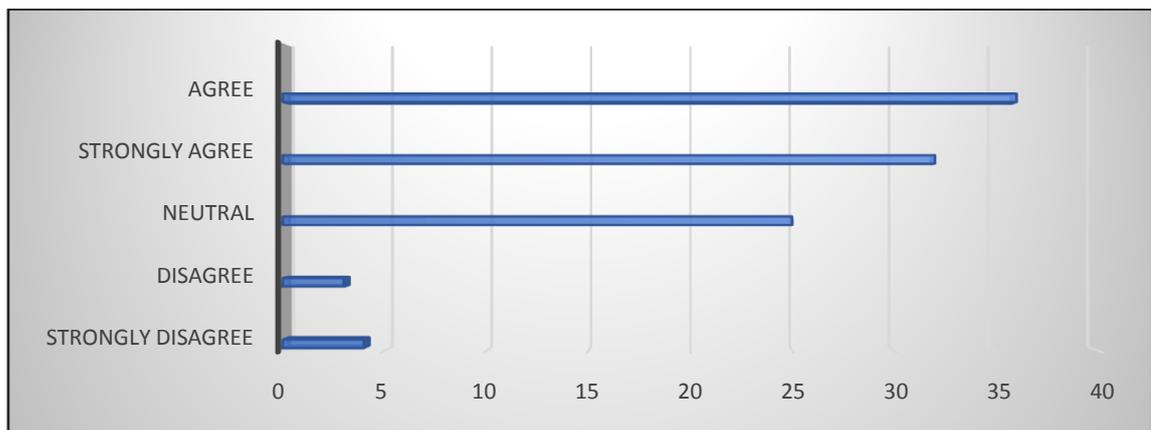
**MENSTRUAL CUP BEING MORE ENVIRONMENT FRIENDLY  
AND COST EFFECTIVE THAN PADS**

Response	No. of response	Percentage
Strongly disagree	04	04%
Disagree	03	03%
Neutral	25	25%
Strongly agree	32	32%
Agree	36	36%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.11**

**MENSTRUAL CUP BEING MORE ENVIRONMENT FRIENDLY  
AND COST EFFECTIVE THAN PADS**



**INTERPRETATION**

Figure no. 4.11 shows response of the general public towards the statement “ **enstrual cup being more environment friendly and cost effective than pads**”. Here 32% of the respondents were strongly agree and 36% were agree with the statement. Therefore most of the respondents were strongly agree with the given statement of this study.

**TABLE NO.4.12**

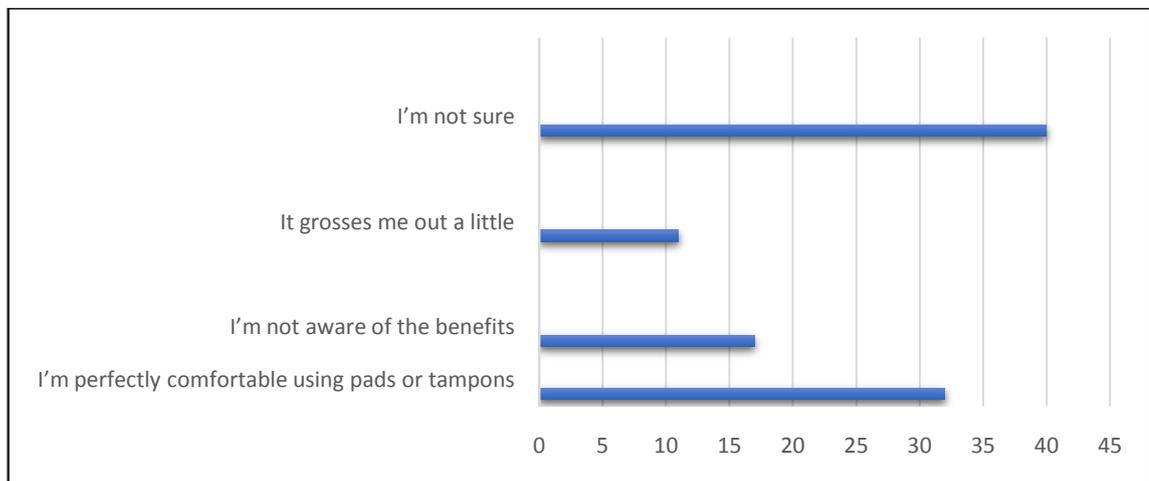
**POSSIBLE REASONS FOR NOT ADOPTING MENSTRUAL CUPS**

Reasons	No. of response	Percentage
I'm perfectly comfortable using pads or tampons	32	32%
I'm not aware of the benefits	17	17%
It grosses me out a little	11	11%
I'm not sure	40	40%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO.4.12**

**POSSIBLE REASONS FOR NOT ADOPTING MENSTRUAL CUPS**



**INTERPRETATION**

Figure 4. 12 shows the possible reason for not adopting menstrual cups. Here 32% of respondents were perfectly comfortable using pads or tampons, 17% were not aware of the benefits of menstrual cups, 11% were choose the option “it grosses me out a little” and 40% of respondents were not sure of reason for not adopting menstrual cups. Therefore, most of the respondents choose the option “I’m not sure”.

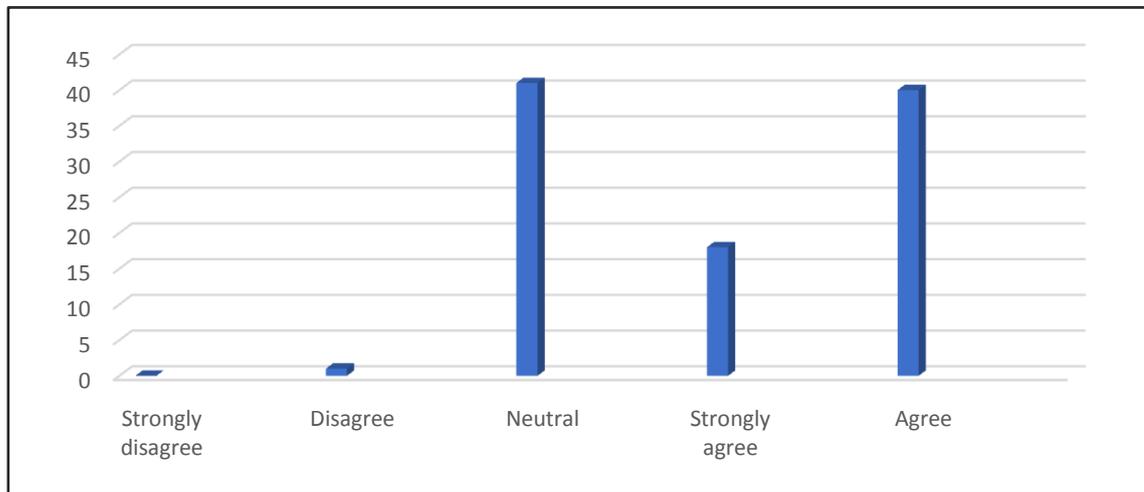
**TABLE NO. 4.13**

**MENSTRUAL CUPS ARE SAFE TO USE**

Response	No. of response	Percentage
Strongly disagree	0	0%
Disagree	1	1%
Neutral	41	41%
Strongly agree	18	18%
Agree	40	40%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.13**



**MENSTRUAL CUPS ARE SAFE TO USE**

**INTERPRETATION**

Figure no. 4.13 shows the response of general public towards the statement “**menstrual cups are safe to use**”. Here 18% of the respondents were strongly agree and 40% of the respondents were agree with the statement. Therefore, most of the respondents were neutral with the statement “**menstrual cups are safe to use**”

**TABLE NO. 4.14**

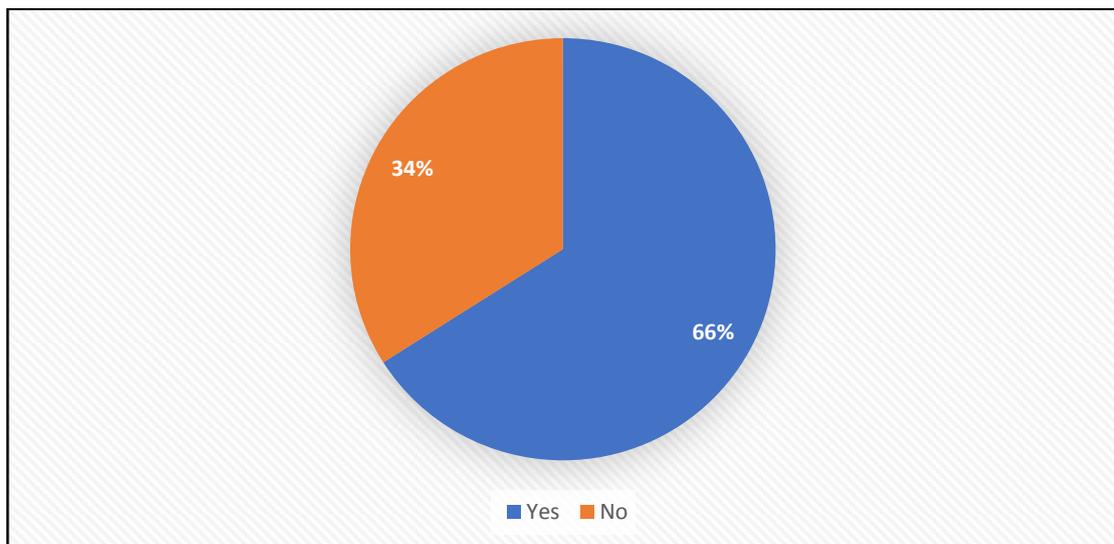
**CONSIDERED USING ALTERNATIVE REUSABLE PERIOD PRODUCTS LIKE MENSTRUAL CUPS OR CLOTH PADS**

Response	No. of response	Percentage
Yes	66	66%
No	34	34%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.14**

**CONSIDERED USING ALTERNATIVE REUSABLE PERIOD PRODUCTS LIKE MENSTRUAL CUPS OR CLOTH PADS**



**INTERPRETATION**

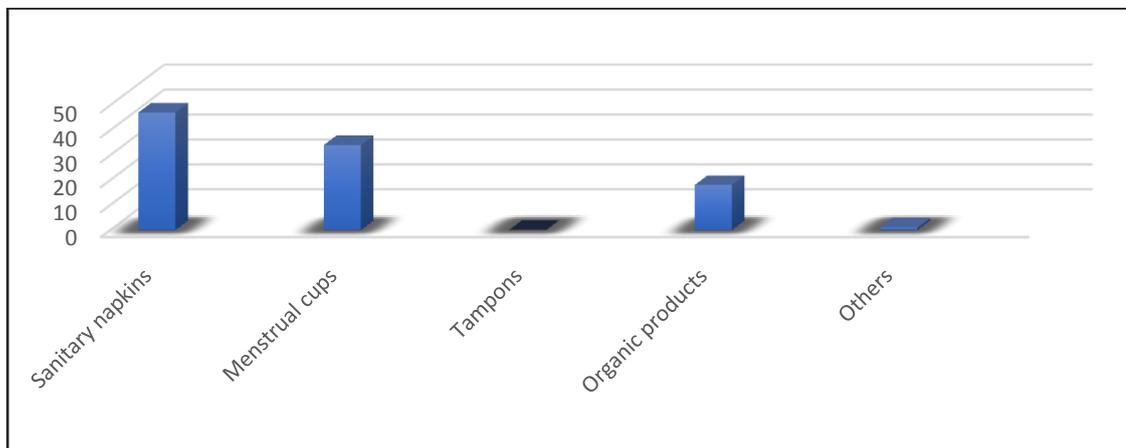
Figure no. 4.14 the percentage of general public who considered using alternative reusable period products like menstrual cups or cloth pads. Here 66% were considered using reusable period products and 34% of the respondents were not considered those reusable products. Therefore, most of the respondents were considered reusable menstrual products.

**TABLE NO. 4.15**  
**CHOICE OF MENSTRUAL PRODUCTS THAT ARE SOLD AT**  
**THE SAME PRICE**

Products	No. of response	Percentage
Sanitary napkins	47	47%
Menstrual cups	34	34%
Tampons	0	0%
Organic products	18	18%
Others	1	1%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.15**  
**CHOICE OF MENSTRUAL PRODUCTS THAT ARE SOLD AT**  
**THE SAME PRICE**



### INTERPRETATION

Figure no. 4.15 shows the choice of general public towards menstrual products, where those products are sold at the same price. 47% of the respondents were choose sanitary napkins, 34% were choose menstrual cups,18% were choose organic period products. Therefore, most of the respondents choose sanitary napkins, where the menstrual products are sold at the same price.

**TABLE NO. 4.16**

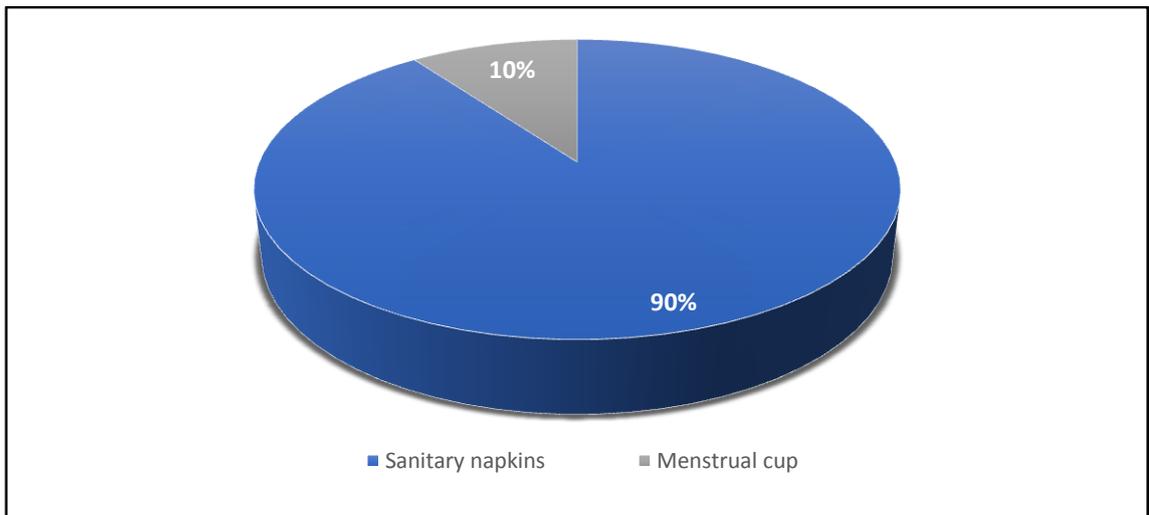
**PRODUCT THAT ARE MORE AVAILABLE IN MARKET**

Products	No. of response	Percentage
Sanitary napkins	90	90
Menstrual cup	10	10
Total	100	100

Source of data: Primary Data.

**FIGURE NO. 4.16**

**PRODUCT THAT ARE MORE AVAILABLE IN MARKET**



**INTERPRETATION**

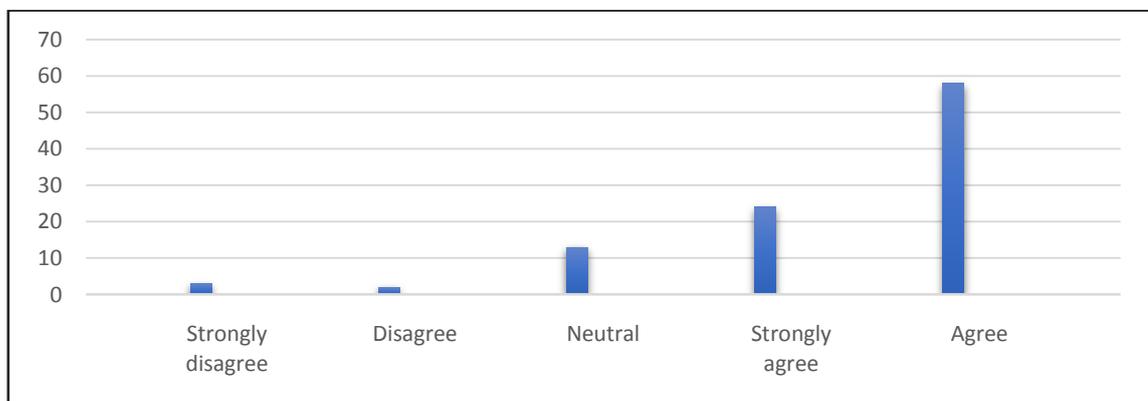
Figure no. 4.16 shows the menstrual products that are more available in market. Here 90% of the respondents choose sanitary napkins and 10% were choose menstrual cups. Therefore, most of the respondents were choose sanitary napkins as more available menstrual product in the market.

**TABLE NO. 4.17**  
**SANITARY NAPKINS ARE CLEARLY THE MOST USED**  
**PRODUCT**

Response	No. of response	Percentage
Strongly disagree	3	3%
Disagree	2	2%
Neutral	13	13%
Strongly agree	24	24%
Agree	58	58%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.17**  
**SANITARY NAPKINS ARE CLEARLY THE MOST USED**  
**PRODUCT**



### **INTERPRETATION**

Figure no. 4.17 shows the response of general public towards the statement “sanitary napkins were the most used product”. Here 3% of the respondents were strongly disagree with the statement, 2% were disagree, 13% were neutral with the statement, 24% were strongly agree with statement and 58% of the respondents were agree with the statement. Therefore, most of the respondents were agree with the statement “sanitary napkins are the most used period product.

**TABLE NO. 4.18**

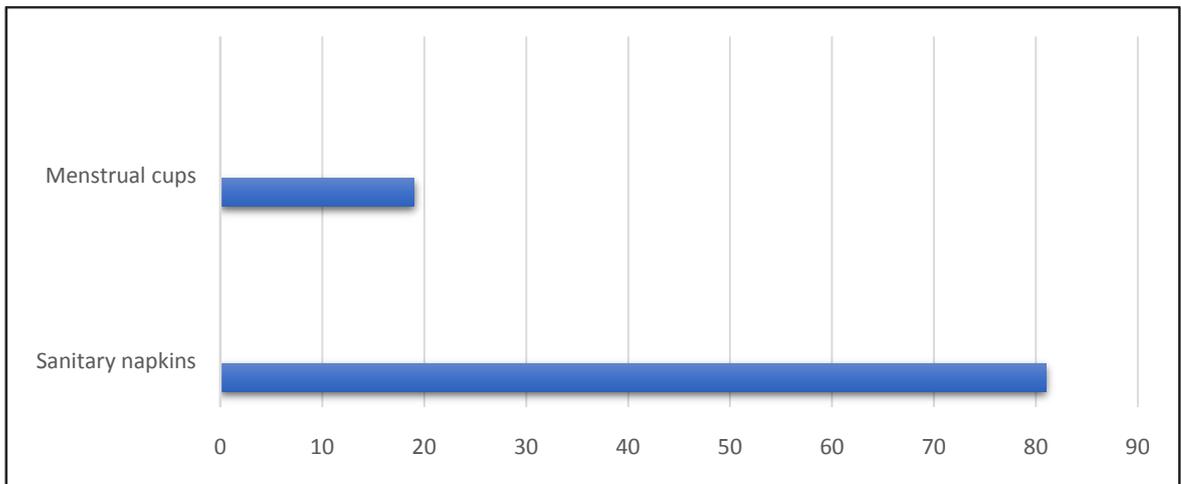
**PRODUCT WHICH IS COMFORTABLE**

Products	No. of response	Percentage
Sanitary napkins	81	81%
Menstrual cups	19	19%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.18**

**PRODUCT WHICH IS MORE COMFORTABLE**



**INTERPRETATION**

Figure no. 4.18 shows the most comfortable period product chosen by the respondents. Here 91% of the respondents were choose sanitary napkins and 19% were choose menstrual cups. Therefore, most of the respondents were likely to choose sanitary napkins during their menstruation period.

**TABLE NO. 4.19**

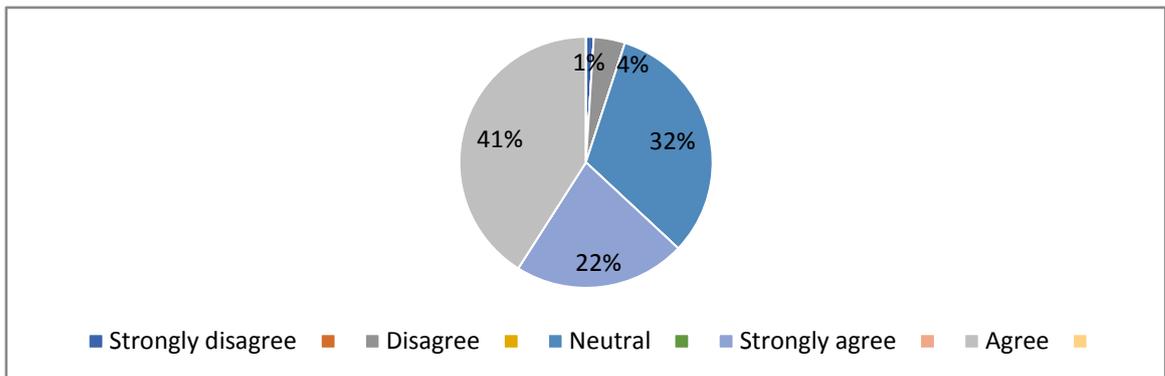
**REUSABLE MENSTRUAL PRODUCTS ARE SUBSTANTIVELY BETTER**

Response	No. of response	Percentage
Strongly disagree	01	01%
Disagree	04	04%
Neutral	32	32%
Strongly agree	22	22%
Agree	41	41%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO. 4.19**

**REUSABLE MENSTRUAL PRODUCTS ARE SUBSTANTIVELY BETTER**



**INTERPRETATION**

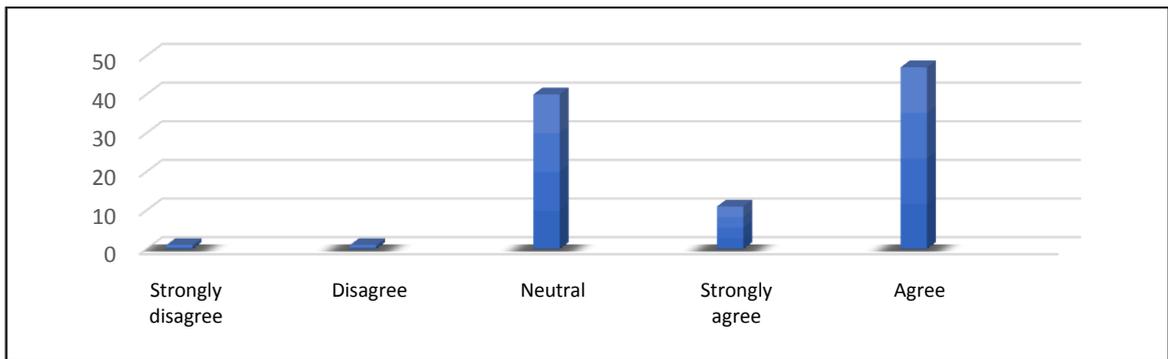
Figure no. 4.19 shows the response of the general public towards the statement “reusable menstrual products are substantively better”. Here 32% of the respondents were neutral with the statement and 41% of them were strongly agree with the statement. Therefore, most of the respondents were strongly agree with the statement “reusable menstrual products are substantively better”.

**TABLE NO.4.20**  
**FOR SINGLE USE MENSTRUAL PRODUCTS, THE ENVIRONMENTAL IMPACT LIE MAINLY IN THE PRODUCTION OF MATERIALS**

Response	No. of responses	Percentage
Strongly disagree	01	01%
Disagree	01	01%
Neutral	40	40%
Strongly agree	11	11%
Agree	47	47%
Total	100	100%

Source of data: Primary Data.

**FIGURE NO.4.20**  
**FOR SINGLE USE MENSTRUAL PRODUCTS, THE ENVIRONMENTAL IMPACT LIE MAINLY IN THE PRODUCTION OF MATERIALS**



**INTERPRETATION**

Figure no. 4.20 shows the response of general public towards the statement “for single use menstrual products the environmental impact lies mainly in the production of materials”. Here 47% of the respondents were agree with the given statement and 40% of them were neutral with the statement. Therefore, most of the respondents were agree with the statement.

## **CHAPTER: V**

### **FINDINGS, SUGGESTIONS & CONCLUSION**

## 5.1 FINDINGS AND SUGGESTIONS

This chapter includes major suggestions and findings about the research. The findings and suggestions are very important in every research. The findings mean the innovation of the newly things. Before the study, the researcher had some preconceived ideas regarding the topic of study. This study helped researcher to realize the actual facts regarding the study.

## 5.2 FINDINGS

Major findings of the study are given below:

- It is found that most of the responds were prefer to buy sanitary napkins.
- Majority of the respondents were satisfied with the choice of their product.
- Majority use disposable periods products.
- Majority of the respondent prefer quality over brand and price of the product.
- Even if respondents are aware of the environmental and health issues that come with disposable periods products too, no one give concern on using eco-friendly products.
- Respondents prefer using sanitary napkins over other sanitary products even if they are aware that sanitary napkins are harmful to health.
- It is found that most of the respondents prefer changing menstrual products regularly as their conscious of maintaining their health and hygiene.
- Most of the respondents are heard of menstrual cup.
- It is found that most of the respondents come to know about menstrual cup through internet.
- Majority of the respondents have seen advertisements for menstrual cup.
- It is found that most of the respondents agree that menstrual cups are more environmental and cost effective than sanitary napkins.
- Majority of the respondents were not sure about or not comfortable using menstrual products and also found that most of the respondents were not aware of the benefits of menstrual cup, some of them are afraid too.
- Most of the respondents were neutral to the opinion that menstrual cups are safe to use.
- It is found that, if sanitary napkins are sold at same price, majority of the respondents choose sanitary napkins other than menstrual cups.

- Most of the respondents are of the opinion that sanitary napkins are products which is more available in the market.
- Most of the respondents agree that sanitary napkins are clearly the most used sanitary product.
- Most of the respondents were more comfortable to use sanitary napkins other than menstrual cup.
- Majority of the respondents agree that reusable period products are substantively better.
- Most of the respondents agree that for single use menstrual products the environmental impact lie mainly in the production of materials.

### **5.3 SUGGESTIONS**

- In order to improve the demand pattern of menstrual products other than sanitary napkins, the channel of distribution of all other menstrual products should be effective.
- As more prefer disposable products, manufactures should try to produce more eco-friendly period products.
- Manufactures should ensure that their products are having the required quality.
- People should be given more awareness about the harmfulness that sanitary napkin cause to health and they should be manufactured to use other eco-friendly sanitary products.
- Most of the people know about menstrual cup through internet. So, develop innovative ideas with the view to increase market demand of the product.
- Increase the availability of menstrual cups in the market.
- Manufactures should ensure that their products will never be a cause of health issues.
- Ensure the products are safe and comfortable to use.

## **5.4 CONCLUSION**

In conclusion, the comparative study between sanitary napkins and menstrual cups revealed several interesting findings. Menstrual cups were found to be more cost-effective, environmentally friendly, and comfortable compared to sanitary napkins. Additionally, menstrual cups were also found to have a lower risk of leakage and infection compared to sanitary napkins. However, the use of menstrual cups requires proper education and familiarity with the product, which may take time and effort. On the other hand, sanitary napkins are more accessible and familiar to many women, but they generate more waste and may cause discomfort and irritation. Ultimately, the choice between sanitary napkins and menstrual cups depends on individual preferences and needs. Nevertheless, the findings of this comparative study may help women make an informed decision about the menstrual products they use.

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# **APPENDIX**

**QUESTIONNAIRE**  
**COMPARATIVE STUDY ABOUT SANITARY NAPKINS AND**  
**MENSTRUAL CUP**

Name:

Age:

Occupation:

1. What product do you use during your period?

Sanitary napkins  Menstrual cup

Reusable cloth pads  Others

2. Are you satisfied with the choice of your product?

Not at all  satisfied Partly satisfied

Satisfied  Very satisfied

3. Which kind of product you choose the most?

Disposable  Reusable

4. What feature you look for when buying menstrual product?

Price  Brand

Quality  Eco-friendly

Others

5. Are you aware of the environmental and health issues that come with disposable period products like pads and tampons?

Yes  No

6. sanitary napkins are seriously harmful to health. Do you agree?

Strongly disagree  Disagree  Neutral

Strongly agree  Agree

6. While using menstrual product, what all things are conscious to maintain your health and hygiene?

Wear lightweight and breathable clothing

Change menstrual products regularly

Use unscented toilet paper or pads

Others

8. Have you heard of menstrual cup?

Yes  No

9. Where did you come to know about menstrual cup?

Internet  Magazine

Friends and family  Advertisements

10. Have you ever seen any advertisement for menstrual cup?

Yes  No

11. Menstrual cup being more environmentally friendly and cost effective than sanitary napkins.

Strongly disagree  Disagree  Neutral

Strongly agree  Agree

12. What are the possible reason for not adopting menstrual cup?

I'm perfectly comfortable using pads

I'm not aware of the benefits

It grosses me out a little

I'm not sure

13. Menstrual cups are safe to use

Strongly disagree  Disagree  Neutral

Strongly agree  Agree

14. Have you considered using alternative reusable sanitary products like menstrual cups and cloth pads?

Yes  No

15. If menstrual products are sold at the same price, which would you choose?

Sanitary napkins  Menstrual cup  Tampons

Organic cloth pads  Others

16. Which product is more available in market?

Sanitary napkins  Menstrual cup

17. Sanitary napkins are clearly the most used product. Do you agree?

Strongly disagree  Disagree  Neutral

Strongly agree  Agree

18. Which product is more comfortable for you?

Sanitary napkins  Menstrual cup

19. Reusable menstrual products are substantively better.

Strongly disagree  Disagree  Neutral

Strongly agree  Agree

20. For single use menstrual products the environmental impact lies mainly in the production of materials.

Strongly disagree  Disagree  Neutral

Strongly agree  Agree