

MISINFORMATION SPREAD ACROSS SOCIAL MEDIA- A CHALLENGE TO MEDICAL SCIENCES

A DISSERTATION
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CANDIDATE'S DECLARATION

I hereby certify that the work which is presented in the Project Work entitled **Misinformation spread across Social Media- a challenge to Medical Sciences** is in fulfillment of the requirement for the award of the degree of Master of Science in **Biotechnology** and submitted to the Department of **Biotechnology**, Delhi Technological University, Delhi is an authentic record of my own carried out during a period from **January 2021 -May 2021**, under the supervision of **Dr. Yasha Hasija**.

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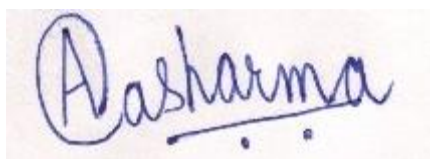
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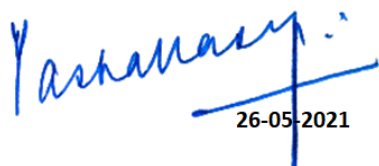
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ABSTRACT

In recent years, the internet has changed the scenario how we were before internet. It has changed our lives in the positive ways and has made our life easier. Before internet we had to go to libraries to get any information on any topic and had to go to markets for shopping but now, we can get anything from clothes to groceries on a click and can also get information about each and everything on internet on a single click but everything has two face despites of being a boon to the society internet has been a cause of distress to the medical sciences. Misinformation is proving to be a big problem for health care professionals and various research studies are going on finding the way to spread prevent of misinformation and how to correct the misinformation found on internet and social media.

Various research studies have been done till now which provides a way of correcting misinformation, how healthcare professionals, expert organizations can help in reducing spread of misinformation and correction of misinformation. But still there are limitations of the studies done till now as the research is done in a limited geographical area and on the limited social media platforms and only limited organizations and credible sources are available which can reduce spread of misinformation and only RNs and MDs were included in correcting misinformation and one of the major limitation is that even after correction of misinformation, false beliefs among people again starts spreading raising concern about the durability of correct information and also there is no full proof plan which can prevent the spread

of misinformation as studies have been done on correcting misinformation but there are no studies which focus on lasting durability of the correct information.

This study intends to take stock of how social media and medical sciences has evolved all together and how social media impact the people by spreading misinformation. The present study is statistical research, and it aims to understand and analyse the various dynamics involved in social media's role in spreading misinformation about medical sciences. Hence, taking into consideration the research objectives, random sampling was done. The sample of the present study comprises one hundred and twenty people randomly selected of different age group, educational background and gender. The tool used in the study is Survey method. The method used for data collection was through a Questionnaire. For the purpose of analysis all the responses were thoroughly studied to identify general trends and findings.

From the survey, the researcher can conclude that respondents are dependent on social media and internet for getting health related information and they use social media for getting and sharing facts about the medical conditions. People are also aware of misinformation being spread on various platforms but are not much aware about the consequences it causes, there is need to make them aware about it and also there is a need to validate each and every data present on the social media and internet before posting it through credible sources as people need credible sources to get information about any medical conditions.

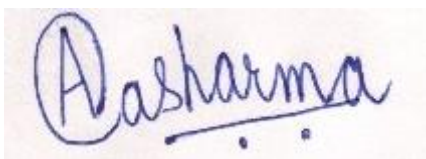
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(Arpita Sharma)

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CHAPTER 1

INTRODUCTION

1.1 EVOLUTION OF MEDICAL SCIENCES AND SOCIAL MEDIA

Internet and Social Media has evolved so much in a recent time. We have come so far from attaining a little knowledge from library to getting information about anything on a single click. Internet and social media are becoming an important tool for people to get any information related to health and medical sciences. The usage of social media and internet for getting information about various health related issues is growing day by day. Health related information is searched and shared through various modes of social media on a regular basis. Patients search online about their medical conditions be it for diagnosis reason or for treatment reason. Social media has helped people in getting information and there are so many applications by which one can get online consultation or various tests done at home itself otherwise earlier people have to go to hospitals for any disease and must wait in the long queues for their appointments. Social media have strengthened the medical sciences as medical experts from all over the globe can connect on a single medium and can exchange their ideas and treatments regarding each and everything. It has helped in faster research for discovering the correct treatment of any disease and proper and immediate consultation from experts across the globe can be done in real time for the betterment of patients. Social media and internet have also helped in creating awareness among people about the various diseases by spreading information about the symptoms, treatments, and precautions one should take to avoid getting infected.

The evolution of social media and medical sciences all together has strengthened the medical sciences, but everything has two face despites of being a boon to the society internet has been a cause of distress to the medical sciences. The variety of misinformation related to different diseases going viral on different search engines and social medias is proving to be very harmful to the society. The false myths about different type of medical conditions like eating this can cure that disease, doing this can cure this and many more, these types of myths we see daily on social media and internet which do not have any credible source leads to misperception among people and can cause health issues to them. Many studies have been done how one can correct the misinformation that is flowing on internet, but every study has one or the other limitations which is a major roadblock in improving internet in the field of medical sciences.

1.2 DEFINING MISINFORMATION

The main problem about social media is misinformation found on it. Misinformation can be defined as the information that deviates from the reality, the information which is factually incorrect and has no validation or verified source from where it has come which often leads to misperceptions. One can get misinformation from fake news links, fake messages being spread on WhatsApp, Facebook or any other social media platforms.

The information about medical sciences which spreads on the social media are of poor quality and has limited, unreferenced, informal or incomplete information. Due to spread of poor quality of information anxiety and panic situation arises among people, many people without checking the source spreads the false information which spreads to more people and situation gets worsened.

1.3 RISE OF SOCIAL MEDIA

Social media also known as Web 2.0 is generally defined as the internet-based tool where individuals or the different communities are allowed to interact and gather to receive or share information, ideas or any other content like related to different diseases. Social media sites may include different applications or websites depending upon the role they have as shown in Figure 1.1, it may include twitter, Facebook, Instagram, WhatsApp, Wikipedia, blogs or many more sites. According to their function social media can be categorized into different groups:

- Social Media for social interactions like Facebook, WhatsApp
- Social Media for professional interactions like LinkedIn
- Social Media for video sharing like YouTube
- Social Media for producing content like Twitter or Blogger
- Social Media for getting Information like Wikipedia
- Social Media for experiencing reality in the virtual world and for gaming experience like Second Life

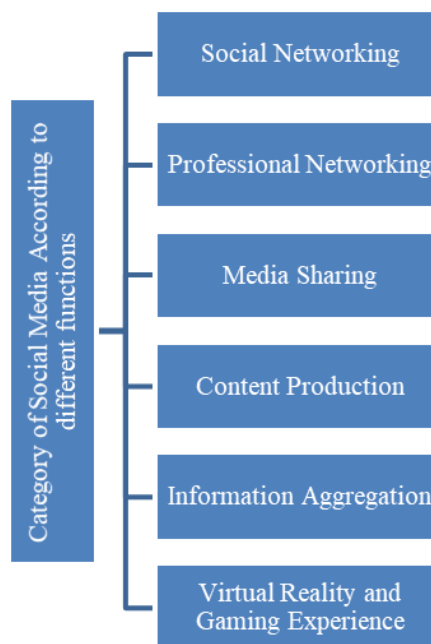


Figure 1.1 Different Type of Social Media according to their functions

1.4 ROLE OF SOCIAL MEDIA IN SPREADING MISINFORMATION

According to the different studies conducted as summarized in Figure 1.2, one of the studies talks about the spread of right and wrong news about 126,000 fallacious news were outspread by almost 3 million people on twitter between the year 2006-2017. Instead of truth, lies spread more quickly on twitter according to this study, lies spread to between 1000-10,000 people whereas truth only reaches hardly to more than 1000 people. This data shows how quickly the false information spread on social media and why it is a need to correct misinformation or prevent spread of misinformation. Social media while promoting many awareness campaigns has also at the same time have provided the platform for spreading of much misinformation regarding various diseases.

In one study it showed that the twitter bots and unidentified accounts were the ones which post most about the vaccines and mostly those were the misinformation that they were spreading which can result in increase of vaccine preventable diseases. Due to these unidentified accounts misinformation about vaccines and diseases spread among people and they start various campaigns about vaccine which is mostly anti vaccine campaign and they refuse to take vaccines and these myths spread to other people also who without checking the credible source starts believing the false myths about vaccines and start refusing to take vaccines which leads to the serious concern among healthcare professionals and government on how to combat this problem and eradicate the vaccine preventable diseases.

According to Pew Research Centre survey around 72% adults in past 12 months had searched online about the medical condition from which they are suffering, or others are suffering. This survey indicates how people depends on internet to know about

their health condition and if they counter any misinformation, that may lead to misperceptions which can be harmful for their health.

A study was conducted between 2019-2020 and from the study it was intimated that the people who relied on social media for getting news about Covid-19 pandemic has the minimal knowledge about the real facts and truth during the outbreak of Covid-19. In another study it was revealed about 74% of public posts regarding Covid-19 outbreak had a source from news organization and only 1% were associated with health and science sites.

In February 2020 also, WHO had warned everyone regarding the infodemic that is happening with covid-19 outbreak where lot of information is available making difficult for everyone to distinguish between the information and the misinformation. These studies are important in understanding why social media is detrimental to medical sciences and why there is requirement to combat the issue regarding misinformation

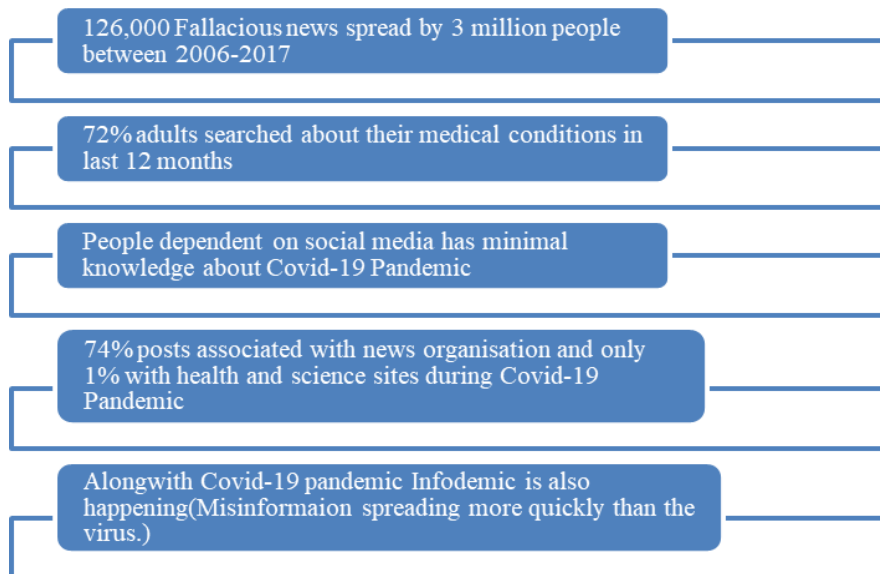


Figure 1.2 Data extracted from Various Surveys showing Social media is causing distress to medical sciences

1.5 OBJECTIVES OF THE RESEARCH

1.5.1 Research Questions of the study

This study intends to take stock of how social media and medical sciences has evolved all together and how social media impact the people by spreading misinformation through the following research questions:

- What is social media and misinformation?
- How do people use social media to get information about various medical conditions?
- What is the impact of using social media for getting health related information on people?
- Is there a need of credible resources to provide relevant information to the people?

1.5.2 Aim of the study

To analyse the role of social media in spreading misinformation through survey method.

1.5.3 Objectives of the study

- To understand misinformation spread on social media.
- To identify the role of social media in spreading misinformation.
- To analyse the data received from the survey method given by the stakeholders.
- To provide recommendations through the critical analysis of the data.

CHAPTER 2

LITERATURE REVIEW

2.1 REVIEW OF RELATED LITERATURE

Various studies with their different objectives have been explained one by one in the next sub-sections and has been summarized in the figure 2.1.

2.1.1 Correction of misinformation using computer science and checking the backfire effects

John Cook et al. conducted a study and laid the platform how misinformation can be corrected. They conducted a study how to effectively correct the information found on internet without having any “backfire effects”. They concluded that how misinformation with the help of combination of information and computer science can helps in removing the misinformation from the internet. Two important findings were concluded from the study that various backfire effects can arise when correcting misinformation can ironically reinforce misinformation and how the view of world can play a part in the persistence of misinformation.

2.1.2 Testing of familiarity backfire effects

Ullrich K.H. Ecker et al. conducted a research that can corrections made on social media spread misinformation to newer audiences and they also tested the familiarity backfire effect. The findings from the studies concluded that after corrections were not able to create misconceptions strongly as compared to the person who were not exposed to the false claims or corrections and it was safe to repeat corrected misinformation.

2.1.3 Correction of misinformation using new feature of social media

Leticia Bode et al. performed the experiment of correcting misinformation by using Facebook new function which provides a link within Facebook which provides related link when people click on the former link. By using social media function misinformation and misperception were significantly reduced. The inference can be drawn from this study that if social media platforms come together and work on building new features which can help in preventing spread of misinformation will be beneficial to the society as people mostly come across false information on different social media.

2.1.4 Correction of misinformation using expert organization

In another study by Leticia Bode et al. it was found that expert organization Centers for Disease Control and Prevention (CDC) can stop the spread of misinformation and misperception when they themselves correct the information on Twitter in comparison to the misinformation corrected by another user. This study provides a way how an expert organization if actively involved can significantly help in reducing spread of misinformation. Many organizations along with CDC like WHO and many more organizations can be formed which can work together actively by

forming committees especially for the correction and preventing spread of misinformation.

2.1.5 Correction of misinformation in any tone by people on social media

In their another study Leticia Bode et al. also concluded that social media can be a great help in reducing the spread of misinformation and people using it should be encouraged to correct any misinformation they found in any tone they feel comfortable as their study provided the evidence that misperceptions were reduced when people correct the misinformation in any tone be it uncivil, affirmational or neutral. From the study it can be inferred that people should be motivated through various campaigns be it online campaigns on social media or offline campaigns through print media, electronics media to correct any misinformation they came across on any social media platform and should also be motivated to first know the source about the information before forwarding any information to other people.

2.1.6 Testing the efficacy of time of correction and the durability of correction

In the study by Patrick R. Rich et al. it was investigated that whether correcting information immediately or the correction is delayed does it have an effect on efficacy of correction and also if the correction is made for how many days it stops the spread of misinformation. In their investigation they found that there was not any evidence which can conclude that time matters in the efficacy of the correction. In another experiment also even if the people know or remember the correct knowledge and their misperceptions are reduced initially but after some time when misinformation spreads again people start believing in that despite having knowledge

about the correct information. This study raises concerns even after correction of misinformation by experts like journalists, healthcare experts and others does not show the lasting durability in the beliefs in spite of people have lasting durability in the knowledge.

2.1.7 Need of correction to avoid anxiety especially during pandemic

In a study by Heena Sahni et al. it was found that how at the time of Covid-19 pandemic social media had created so much anxiety and panic due to spread of misinformation and how misinformation has spread more quickly than the virus. The study had opened the research because correcting misinformation is the need of time so that in future if any pandemic come there is no issue of misinformation as misinformation do more harm than the disease itself.

2.1.8 Correction of misinformation by healthcare experts

In the study by John Robert Bautista et al. study was conducted how healthcare experts can rectify the misinformation present on social media like Facebook and Twitter. The study can lay the platform for health professionals how experts can rectify the misinformation on social media.

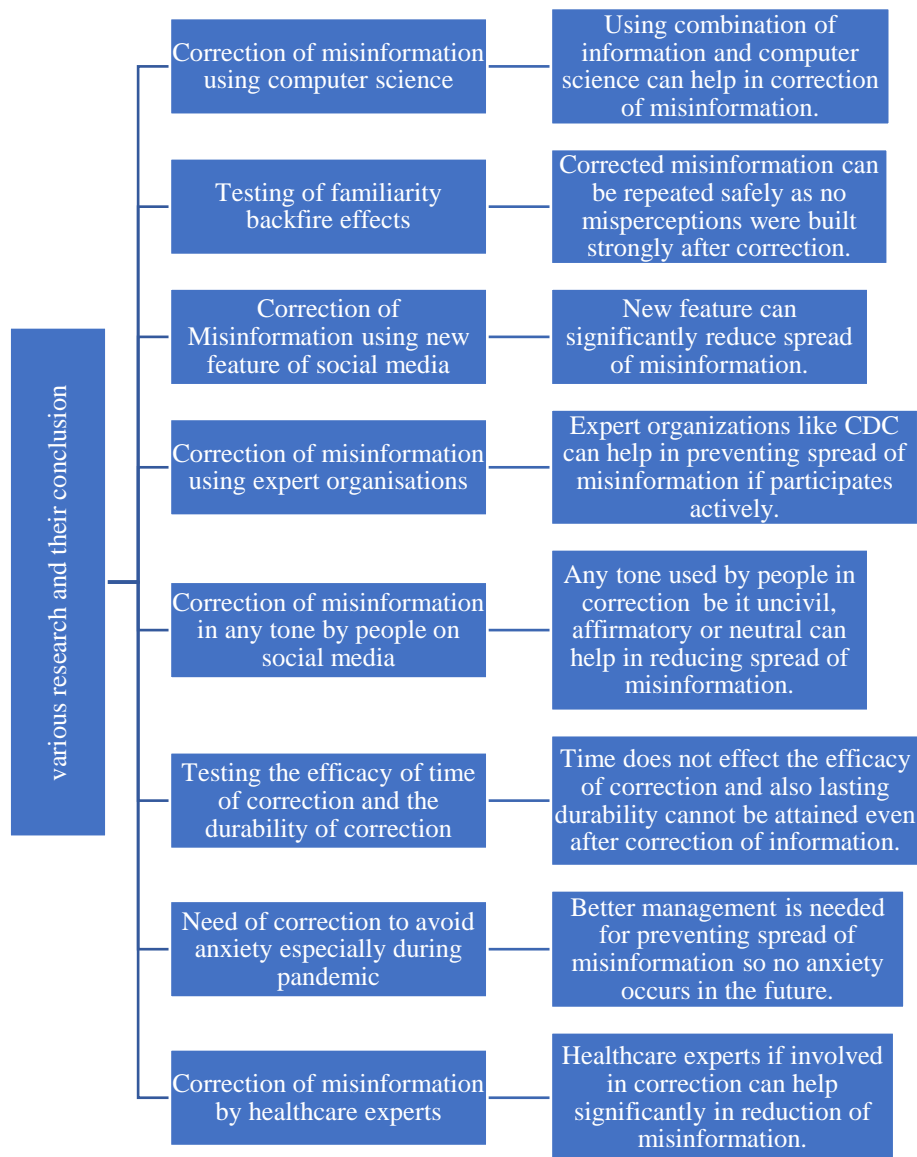


Figure 2.1 Various Studies conducted on correction of misinformation and their conclusions

2.2 GAPS FOUND IN THE LITERATURE

Despite various studies being conducted on correction of misinformation there is still a need of more research as pointed in Figure 2.2 and opting other ways including present ones to combat the spread of misinformation as misinformation still spreads on internet at a rapid speed.

2.2.1 Studies conducted in a limited area and on a limited social media platform

The studies done till now has been done in a limited area and on limited social media platforms. The studies conducted till now are mostly on correcting misinformation on social media platforms like Twitter and Facebook and also the research is not done globally it has been done in the limited space which is also a major drawback of the research. There are many other social media and websites other than Facebook and Twitter for instance, Instagram, Tik Tok and others video uploading platforms where people engagement is increasing at a rapid rate and chances of spreading of misinformation is also increasing and there is scope of research on these platforms too to prevent the spread of misinformation.

2.2.2 Less active and limited expert organizations

In the studies it has been concluded how expert organizations like CDC can help in correcting misinformation on social media but there is a limitation that CDC is not as active as it is a need for them to be active in correcting misinformation. It is a need of time for having organizations which are active in correcting misinformation as their activeness can prevent spread of misinformation to the extent. Another limitation is that there are only few credible sources for correcting so much misinformation available on social media platform. More organizations should be form so that there is no burden on single organization for correcting misinformation and the work can be divided between different organizations.

2.2.3 Only RNs and MDs included

In other study where health professionals were included to correct the misinformation only registered nurses and medical doctors were employed to correct misinformation, other healthcare professionals like physiotherapists, nutritionists and others should also be included in the study. Inclusion of other healthcare professionals will benefit more in correcting misinformation as the topics of misinformation are varying and inclusion of other experts can help in correcting misinformation according to different topics and their experts.

2.2.4 Checking of durability of corrected information

There is also need of checking the durability of the corrected information along with creating different measures to correct the misinformation. The study conducted shows how even after correcting the information, people start believing misinformation even after remembering the corrected information. There is need to focus on a research which can enhance durability of corrected information.

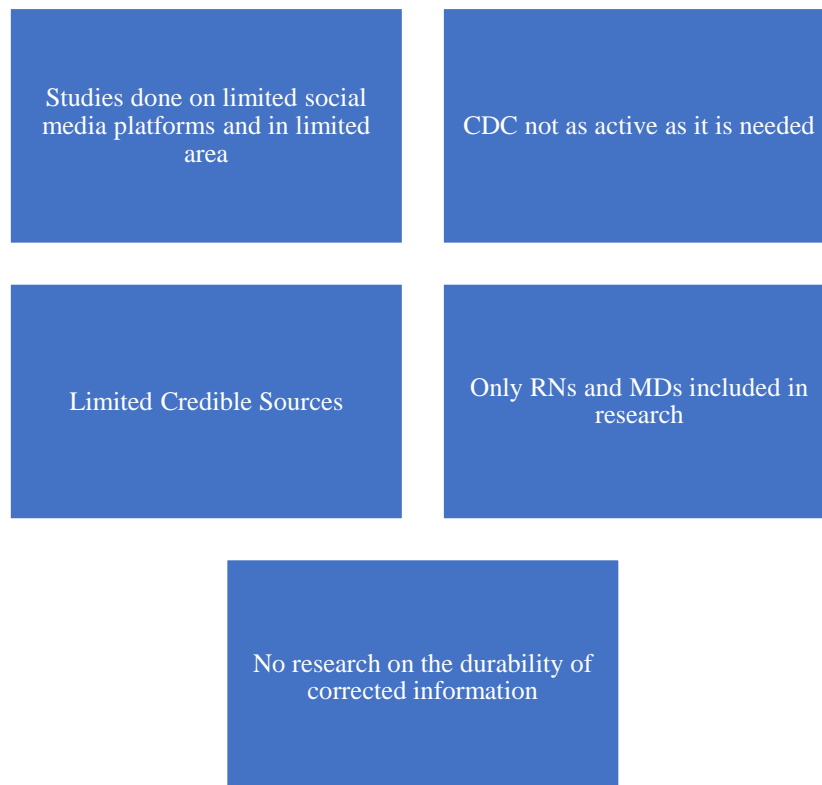


Figure 2.2 Limitations of the study

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

Research design can be defined as “a constitution of procedures and techniques that is chosen by a researcher to integrate various elements of research in a reasonably rational manner so that the research problem is effectively handled”. It presents perceptions about how to conduct research using any type of methodology. Every researcher has a number of research questions which need to be inspected and this can only be done by a research design. The design of a research is helpful in explaining the type of research being conducted by the researcher which might be survey, correlational, ex-post facto, grounded theory, etc.

The primary function of a research design is to make sure that the evidences obtained enables the researcher to answer the questions as unknowable as possible. It also tells the researcher about the next logical step of the data collection and analysis.

3.2 RESEARCH DESIGN OF THE STUDY

The present study was aimed at analysing the role of social media in spreading misinformation through survey method. The present study is statistical research, and it aims to understand and analyse the various dynamics involved in social media’s role in spreading misinformation about medical sciences. Hence, taking into consideration the research objectives, random sampling was done. According to

W.M. Harper 'A random sample is a sample selected in such a way that every item in the population has equal chance of being included.'

Statistical Data are the sets of facts about an attribute or character expressed in quantitative, qualitative or numerical form that is, it is a set of values on one or more observational units. The main sources for the collection of statistical data are:

1) Experiments: Experiments are performed in the fields, botanical gardens, laboratories or clinical pathology, and in hospitals. Data is collected with a specific objective by one or more workers and is compiled for analysis and conclusion. The data is made available to various scientific workers through thesis and scientific papers published in scientific journals.

2) Surveys: A survey is a method of collecting the data in which participants answer certain questions about their behaviour, attitudes or beliefs. Surveys are composed of multiple questions assessing the constructs of interests. Closed-ended questions in a survey has several response options from which the respondent needs to choose. These types of surveys are much easier to summarize and analyse (Encyclopedia of Research Design).

3) Records: Data collected through experiments or surveys are maintained in registers or books and journals over a long period of time to be consulted or referred for future use for various purposes. For example, vital statistics like birth, marriages and deaths and for illness in hospitals are made use in demography and public health practice.

The data according to their source can be of 2 types:

1) Primary Data- The data that is collected by the researcher from his own experimental studies or measurements are called primary data. They are original and raw. For the purpose of statistical analysis and interpretation, they are processed by statistical methods. For example, data that is collected from different departments of

any institution like hospital for two weeks to know the frequency of patients that are suffering from different diseases visiting the hospital is the primary data.

2) Secondary Data- The data obtained from some secondary source such as journals, magazines, newspapers or research papers etc are known as secondary data. These data have already been collected by some other person and organised by statistical procedures. These are in finished form and ready to analyse and interpret. For example, data obtained from meteorological department are used by department of environment, agriculture, forests and oceanography. Similarly, data collected by National sample survey are used by various economists, sociologists and population scientists.

The statistical data obtained either through experiments, surveys or from old records can be of following two types:

1) Qualitative Data: Qualitative data include observations that are not numerical but descriptive. They represent the number of individuals with the same characteristic or attribute and not the measurement of the attribute. It means qualitative data have only one variable that is the number of individuals. There is no magnitude or size of the characteristics as the same cannot be measured. Persons with same attribute are counted. They form a group or class such as young, old, infants, healthy, patients, treated, non-treated, or placebo, etc. These characteristics or variables cannot be measured but the frequency of person of each type is determined and represented.

2) Quantitative Data: Quantitative data are represented in numbers. They have both frequency as well as magnitude. Each attribute studied, has two variables the characteristic and frequency. Characteristic is a feature like height, number of RBCs, or amount of haemoglobin per mL blood. Frequency is the number of persons with same characteristic and in the same range. The quantification of data leads to numerical measurements which are interpreted in a meaningful way.

The tool employed for the study was an Online Survey and the method of Data Collection was Questionnaire (Google Form). The analysis of the data was performed statistically along with the graphical representation.

3.3 SAMPLE DESCRIPTION

The sample of the present study comprises one hundred and twenty people randomly selected of different age group, educational background and gender.

3.4 TOOLS

The tool used in the study is Survey method. Data collection was done through a Questionnaire.

The Questionnaire was used as the primary tool for data collection in the research. Questionnaires are a set of systemised questions, which follow a set scheme in order to collect data about any topic. The questionnaire often is given in the same way to all the participants of the survey.

Questionnaires provide answers that are often easy to tabulate or evaluate, and the resulting data is easy to analyze, especially if the questionnaires mainly contain items with options that need to be reviewed. This produces fruitful result to the researcher who is able to understand the data and offer insight into the matter.

Questionnaires can be managed anonymously. Knowing your answers will be anonymous will encourage respondents to be honest. In contrast, responses to telephone interviews and face-to-face interviews are not inherently anonymous which serves the researcher well.

3.5 DATA COLLECTION

When collecting data, information about variables of interest is systematically recorded and measured so that research questions can be answered, hypotheses tested and results evaluated.

To collect the data the participants were randomly chosen who anonymously answered the ten questions given in the Questionnaire. There were 120 respondents who participated in the present study and expressed their opinion about the various questions presented to them in the Questionnaire. The questions which were asked to them were as following: -

1. Have you/your family members suffered from any medical conditions in the past 18 months?
2. Did you ever search those medical conditions on the internet?
3. Did the information received from the internet caused any panic or anxiety?
4. If yes, did you ever tried the various suggestions given on the internet?
5. Have you seen any medical advice being circulated on the internet related to any diseases?
6. Have you ever forwarded the chain messages about the diagnosis, treatment, etc. of various medical condition?
7. Have you ever cross-checked the treatments, suggestions, diagnosis received from these messages with a credible source?

8. If yes, which sources did you use?

9. If the diagnosis, suggestions, treatments are found to be misleading, have you ever tried to correct it?

(E.g., by leaving comments on the website, by advising people not to rely on the media channels, by spreading awareness about it, etc.)

10. Would you like to have verified, credible sources to provide basic information related to the diseases on various platforms?

3.6 METHOD OF DATA ANALYSIS

For the analysis all the responses were thoroughly studied to identify general trends and findings.

CHAPTER 4

DATA ANALYSIS

4.1 INTRODUCTION

Data analysis is the process of reviewing, cleansing, transforming, and modelling data to uncover useful information, draw conclusions, and support decisions. The form that qualitative data takes while analysing is generally inductive because the researcher goes from particular data to general certain trends and themes. The analysis of the data is an important part of the research and in qualitative research collecting and analysing the data should go hand-in-hand (Tesch, 1990).

Providing analysis to the collected data is an integral part of the research because it helps the researcher to build a portrait of the opinions expressed by the respondents (Creswell, 2007). The researcher has built upon this idea and has went on to analyse it to draw some general trends and findings. Keeping in mind the objectives of the research the following data has been analysed.

4.2 ANALYSIS OF THE DATA

4.2.1 Question 1

In the first question asked to the participants they were asked whether they or their family members had suffered from any medical condition. Out of the 120 responses received, 98 responded Yes and 24 responded No.

1. Have you/your family members suffered from any medical conditions in the past 18 months?
120 responses

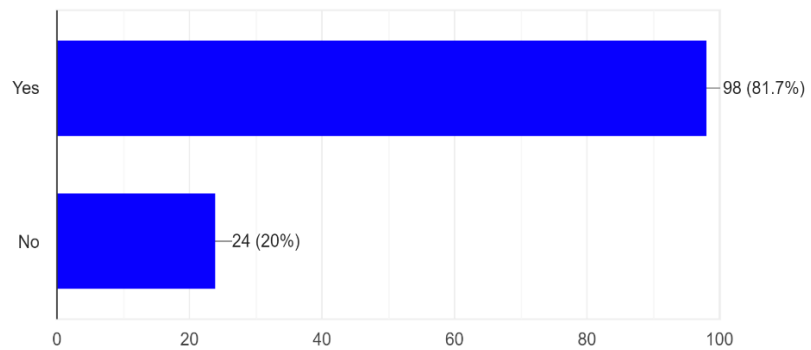


Figure 4.1 Chart showing percentage of people suffered from medical condition

From the chart we can interpret that majority of the people or their family members have suffered from various medical conditions in the past 18 months. This data helped the researcher in probing for further questions related to social media consumption of the respondents and its usage vis-à-vis medical conditions.

4.2.2 Question 2

In the second question, participants were asked whether they have ever searched about those medical conditions on the internet. Out of the 120 responses received, 97 responded Yes and 25 responded No.

2. Did you ever search those medical conditions on the internet?

120 responses

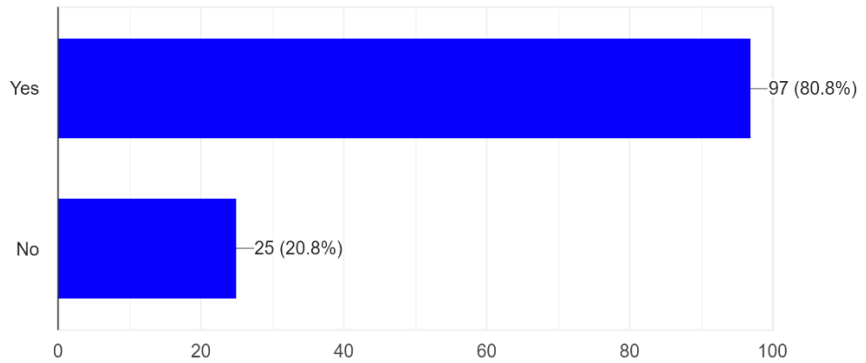


Figure 4.2 Chart showing searches done for medical condition online

From the chart we can observe that majority of the people (80.8%) people search on the internet about the medical conditions they are suffering from. This gives an idea of how the internet has become an integral part of our lives and now it is not only limited to socialize, access information about general topics, provide entertainment but also widely used to gain knowledge about the medical conditions, symptoms, etc.

4.2.3 Question 3

In question 3 participants were asked whether the information received from the internet caused any anxiety or panic among them. Out of the 120 responses received, 42 responded Yes, 34 responded No while 48 responded Maybe.

3. Did the information received from the internet caused any panic or anxiety?

120 responses

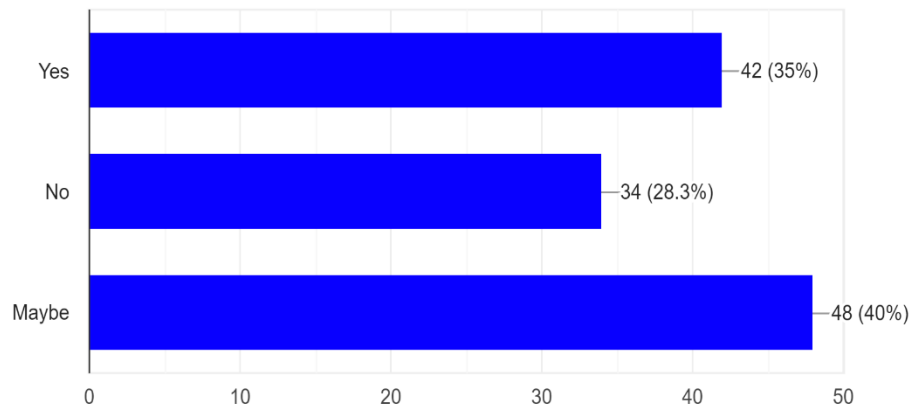


Figure 4.3 Chart showing panic or anxiety caused among respondents

From this chart we can interpret that the results given by the internet about various medical conditions was received with a mix response. It has been observed that 35% of the people were anxious after seeing the result online while 40% were less anxious. Here, the result received also plays a crucial role in causing panic among the people.

4.2.4 Question 4

In question 4 participants were asked whether they have tried any suggestion given on the internet. Out of 120 responses received, 33 responded Yes, 40 responded No and 50 responded Sometimes.

4. If yes, did you ever tried the various suggestions given on the internet?

120 responses

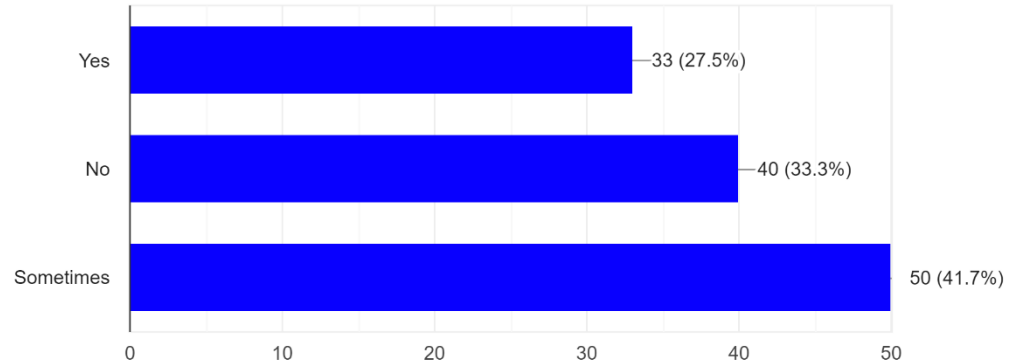


Figure 4.4 Chart showing the percentage of people that tried various suggestions given on the internet

From the chart we can construe that people often try the suggestions given on the internet. There is also some percentage of people who do not try these suggestions at home but they remain to be few. The number of people who sometimes try the suggestions are high as compared to the ones who always try it.

4.2.5 Question 5

In the question 5 participants were asked whether they have seen any medical advice being circulated on the internet related to any diseases. Out of 120 responses received, 101 responded Yes, 15 responded No and 5 responded Maybe.

5. Have you seen any medical advise being circulated on the internet related to any diseases?
120 responses

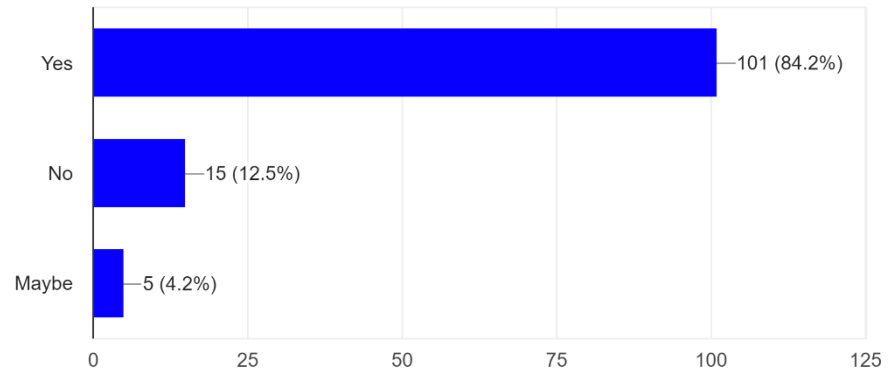


Figure 4.5 Chart showing percentage of people seen medical advices on the internet

From the chart we can conclude that larger part of the people has seen messages/information about the medical diseases being circulated on the internet. This response gives an idea to the researcher about the abundance of messages found on the internet and social media advising people about various diseases and their symptoms.

4.2.6 Question 6

In the question 6, participants were asked whether they have forwarded any message chains about the diagnosis, treatment, etc. Of various medical conditions. Out of 120 responses received, 25 responded Yes, 77 responded No and 20 responded Maybe.

6. Have you ever forwarded the chain messages about the diagnosis, treatment, etc. of various medical condition?

120 responses

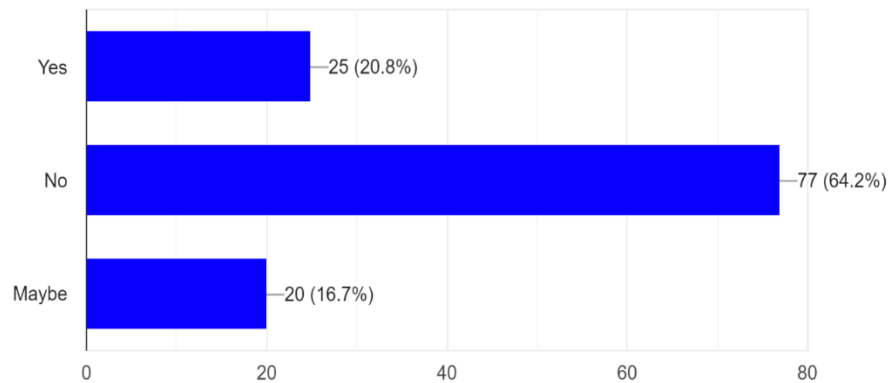


Figure 4.6 Chart showing percentage of people forwarded the chain messages

From the chart we can concur that majority of the people do not forward the chain messages they receive on the internet. This gives a hope in preventing the spread of misinformation on various medical websites and social media platforms. This concludes that there is a need to curb information posted on various websites as it may result in following ill-advised symptoms.

4.2.7 Question 7

In the question 7, participants were asked whether they have cross-checked the treatments, suggestions, diagnosis received from the messages received. Out of 120 responses received, 93 responded Yes, 27 responded No.

7. Have you ever cross-checked the treatments, suggestions, diagnosis received from these messages with a credible source?

120 responses

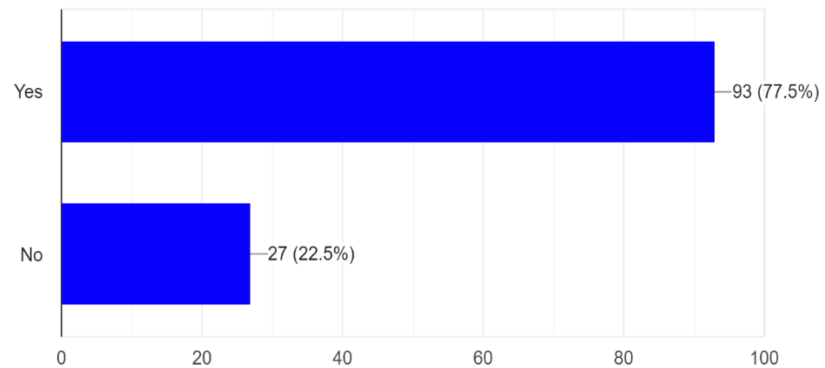


Figure 4.7 Chart showing percentage of people crosschecked the medical advice with a credible source

From the chart one can conclude that majority of the people cross-check the medical information received by them through the internet which helps in creating awareness among the people about various conditions and its diagnosis. The people who do not verify the messages pose a threat towards the spread of misinformation among people.

4.2.8 Question 8

In the question 8, participants were asked about the various sources they use to get the information verified/credited to which 64 participants answered Various Medical sites, 23 people answered Social Media, 66 answered Doctor/Medical Practitioners and 35 answered Friends/Family Members.

8. If yes, which sources did you use?

120 responses

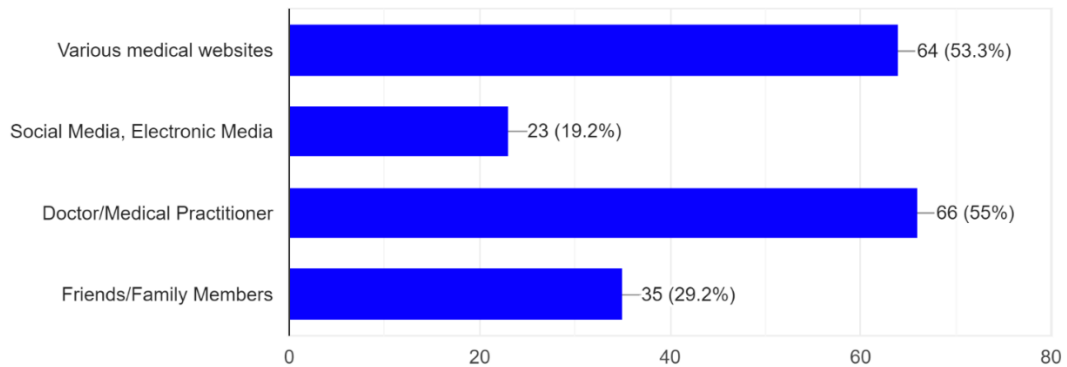


Figure 4.8 Chart showing the percentage of various sources used by the people

From the chart one can concur that people use various sources to verify the information that they receive on the internet and on social media. Majority of the people uses various medical websites as their primary source for substantiating the information which can be helpful as well as harmful depending upon the severity of the disease and the truthfulness of the information shared. If more and more people take advice from medical practitioners and the websites provide credible and verified information, social media can be an asset for the community.

4.2.9 Question 9

In the question 9, participants were asked whether they have tried to correct the misinformation or make the people aware of the erroneous nature of the information to which 54 participants answered Ignored, 46 people answered Sometimes and 24 answered Always.

9. If the diagnosis, suggestions, treatments are found to be misleading, have you ever tried to correct it?

120 responses

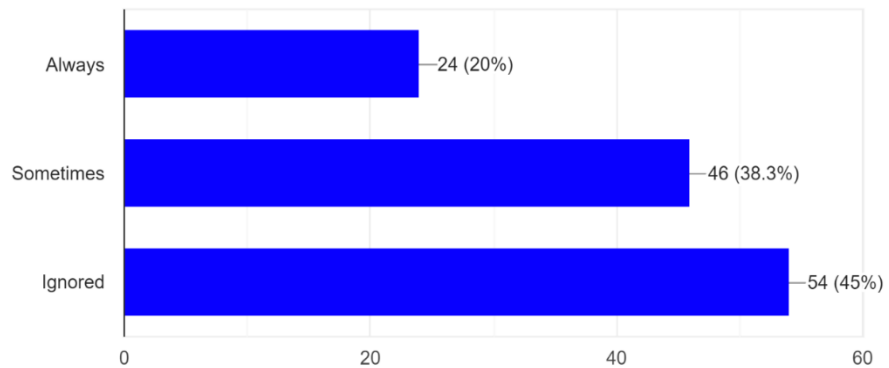


Figure 4.9 Chart showing how much people corrected the information if the information found misleading

From the chart one can understand that people seldom correct the misinformation that they come across on the internet. This adds to the problem of the information being easily accessible to the public use. The ignorance of the people towards the false information spread on the internet poses as a grave danger to the people who rely on these sources as their primary way of seeking information about the medical conditions.

4.2.10 Question 10

In the question 10, participants were asked whether they would like to have verified credible sources to provide information related to various diseases to which 106 people replied Yes, 6 replied No and 8 replied Maybe.

10. Would you like to have verified, credible sources to provide basic information related to the diseases on various platforms?

120 responses

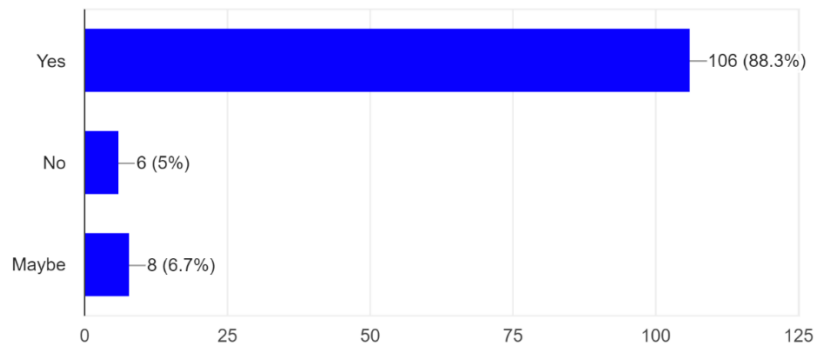


Figure 4.10 Chart showing the percentage of people who want credible sources

From the chart one can understand the urgency and necessity of providing credible and verified sources of information about various medical conditions and diseases. In the present times, one cannot overlook the dependency of the people on the internet and hence it becomes crucial to provide legitimate information about various medical conditions so that the internet can become a safe place to seek information.

CHAPTER 5

CONCLUSION

5.1 Conclusion

Internet and social media are a boon when used in a right manner but when it is used improperly, it leads to havoc by spreading misinformation which can be harmful to the society. Misinformation leads to unnecessary panic and anxiety among people by spreading false news about the diseases, medications and precautions one should take. Misinformation spread also leads to misperceptions about the vaccines and various anti vaccine campaign starts rolling out on social media leading to unwanted panic and difficulties for healthcare professionals and government on how to combat this situation and make people aware about the safety and side effects of vaccines. Various research studies have been done till now which provides a way of correcting misinformation, of how healthcare professionals, expert organizations can help in reducing spread of misinformation and correction of misinformation. Various studies have been done for testing the familiarity backfire effect and checking the efficacy of time on correction of misinformation and the durability correct information possess. But still there are limitations of the studies done till now as the research is done in a limited geographical area and on the limited social media platforms. Another problem that persists is that only limited organizations and credible sources are available which can reduce spread of misinformation and only RNs and MDs were included in correcting misinformation and one of the major limitations is that even after the correction of misinformation, false beliefs among people starts spreading again, raising concerns about the durability of correct information. To battle this situation, there is no full proof plan which can prevent the spread of misinformation as studies have been done on correcting misinformation but there are no studies which focus on lasting durability of the correct information.

From the survey conducted by the researcher it was found that 80.8% of people had searched about their medical conditions on the internet. The trend shows how people depend on internet for getting information about their medical conditions. Due to the results received from the respective searches it creates some sort of panic and anxiety among the people. Some suffer from more anxiety and some suffer from less anxiety depending on the information received through the online websites. It can be interpreted that use of internet for getting health related information proves to be harmful rather than being useful as it creates unnecessary panic and anxiety among the people.

Upon asking whether the respondents have tried various suggestions given on the internet the response collected suggests that majority of the people had tried the suggestions always or sometimes. From this data one can conclude that people use internet and social media to cure their medical conditions and it is a point of concern because if any person comes across any misinformation related to the medical issues they are suffering from and tried the given suggestions, it can cause irreplicable damage to their health.

When participants were asked whether they have seen any medical advice being circulated on internet related to any diseases, majority of people responded Yes. From the data, we can conclude that how social media and internet is playing a critical role in spreading messages about medical conditions. A single misinformation in the circulated medical advice can spread to thousands of people via messages, posts or links and can lead to misperceptions and ill-advised practices which is very harmful for the health of the people. After this, participants were asked whether they have forwarded any medical advice about various medical conditions 64.2% responded No but 20.8% and 16.7% responded Yes and Maybe. From this data one can conclude that even though majority of people responded No, there still are people who forwards the messages and a single person can spread the information to many people which is a matter of distress as it will lead to spread of information to more and more people and a presence of misinformation in the forwarded messages can lead to unnecessary dismay and angst among others as well.

In the next questions, participants were asked whether they have cross checked the medical advice from any credible sources and if yes, what sources they have used to cross check. Surprisingly, 77.5% responded Yes that they have cross checked the information. It is a positive sign as people are aware of misinformation being circulated on social media and they cross check the information they received on social media. Answering about the sources, 53.3% responded various medical sites, 19.2% responded social and electronic media, 55% Doctor/Medical Practitioner and 29.2% Family members/Friends as their source for cross checking the information. Many people have selected more than one source for cross checking the information. Analysing the data one can conclude people also depends on various medical sites, social media, electronic media, family members and friends apart from Doctors/Medical Practitioner for getting information and cross checking the information about medical conditions. This raises an alarmingly need to provide as many valid and reliable sources to the people as possible since relying on the advice on social/electronic media, friends/family members may prove to be fatal in some conditions. Therefore, there is need to validate information available on these sources as any misinformation available on internet and social media can spread to thousands of people.

In the next question, when asked whether people tried to correct the information after finding the information to be misleading, 20% responded Always, 38.3% responded sometimes and 45% responded Ignored. From this data, one can concur that people are not much aware about the consequences misinformation can cause. Therefore, there is an urgent need to make people aware about the misinformation spread and they should be motivated to correct the information in any tone they want to. While exploring the topic of the research, the researcher studied that correcting information by people in any tone has helped in reducing the spread of misinformation.

In the last question, when asked whether participants wanted credible sources to get basic information about any disease on various platforms 88.3% responded Yes, 5% responded No and 6.7% responded Maybe. This indicates how much people depend

on these platforms to get information about medical advice and like every customer who wants perfect and accurate item, people also wants that every information they receive on various platforms should be validated by proper and accurate credible sources.

From the survey, the researcher can conclude that people are dependent on social media and internet for getting health related information and they use social media for getting and sharing information about the medical conditions. People are also aware of misinformation being spread on various platforms but are not much aware about the consequences it causes, there is need to make them aware about it and also there is a need to validate each and every data present on the social media and internet before posting it through credible sources as people need credible sources to get information about any medical conditions.

5.2 RECOMMENDATIONS FOR THE PREVENTION OF SPREADING MISINFORMATION

There are many ways by which there can be significantly reduction in the spread of misinformation:

- Expert organizations can come together and help in preventing the spread of false information available on the social media and should be given the responsibility of correcting the misinformation. Many committees should be formed which should include various healthcare professionals, research scholars, journalists and others and should be given the sole responsibility of correcting misinformation. These committees should be active in correcting misinformation as their activeness is the key for preventing and correcting misinformation successfully.
- The study had shown that how using Facebook new feature helped in reducing the misperceptions, other social media platforms can also develop a feature which before letting user share the information should authenticate and validate the information the user is posting on social

media which can help in preventing the misinformation to be posted on social media.

- We have seen on Twitter and other platforms how one can differentiate a public figure or a celebrity from other fake accounts of the celebrity by checking the blue tick after the name of the celebrity. Just like how blue tick validates the real accounts of the public figure this feature should also be a part of the different websites that provide health related information. It can help people in finding correct website and information among various websites which can misled them.
- Disclaimers should be given in the form of videos that the information is general and can vary situation-wise as people often ignore the disclaimer which is in the written form and starts panicking by reading health related stuffs present on the websites. The information available related to health conditions can also be in form of video and the presenter should aware the public that the information can vary from people to people and before taking any precautions or medications one should definitely seek an expert.
- Various health campaigns can be organised for people to spread awareness about the misinformation. We have seen till date many campaigns like campaigns for spreading awareness about breast cancer, HIV-AIDS and others has proven successful in spreading awareness about the different diseases among lot of people. Print media, electronic media can play a big role in spreading awareness about misinformation as well.
- Different search engines can make sure only websites which are authenticate and provide correct information should come when searches are done related to health stuff. Search algorithm should be set in such a way that only authenticate information should come on searching and websites having no credible source about the information they are putting on their sites should be blocked from putting any information online.

- Algorithms can be developed in such a way that it does not let the user with no credible sources put any information on social media platforms. No forwarding of fake messages should be done and people using social media should be aware time to time by broadcasting videos, messages spreading awareness about the misinformation and the harmful effects misinformation can cause.
- Lastly, the government should formulate stringent laws and should take stringent actions against people or channels spreading misinformation about any medical issues as some of it might turn into life-threatening advices.

5.3 SUGGESTIONS FOR FUTURE RESEARCH

There is a scope of research on finding ways to prevent misinformation and future studies should be done on how the spreading of misinformation can be prevented and also focus on the durability of the correct information. Many recommendations can be looked upon for preventing spread and correction of misinformation by forming committees having experts for correcting misinformation, by developing new features on social media which can help in reducing spread of misinformation, by organizing various awareness campaigns for spreading awareness about misinformation, by broadcasting disclaimers in the form of video on websites and by allowing only authenticated data to be posted on websites and social media. Keeping all this as the base, future research should be done in a way that finds a suitable way of not only correcting misinformation but also on increasing the durability of corrected information. These recommendations can also open a way for future studies and methodologies should focus on these recommendations and research should also be expanded to more geographical areas and more social media platforms.

APPENDICES

Appendix 1 Questionnaire prepared for the survey (Google Form)

SURVEY ON MEDICAL INFORMATION

* Required

1. Email Address

2. 1. Have you/your family members suffered from any medical conditions in the past 18 months? *

Check all that apply.

Yes

No

3. 2. Did you ever search those medical conditions on the internet? *

Check all that apply.

Yes

No

4. 3. Did the information received from the internet caused any panic or anxiety? *

Check all that apply.

Yes

No

Maybe

5. 4. If yes, did you ever tried the various suggestions given on the internet? *

Check all that apply.

Yes

No

Sometimes

-
6. 5. Have you seen any medical advise being circulated on the internet related to any diseases? *

Check all that apply.

- Yes
 No
 Maybe

7. 6. Have you ever forwarded the chain messages about the diagnosis, treatment, etc. of various medical condition? *

Check all that apply.

- Yes
 No
 Maybe

8. 7. Have you ever cross-checked the treatments, suggestions, diagnosis received from these messages with a credible source? *

Check all that apply.

- Yes
 No

9. 8. If yes, which sources did you use? *

Check all that apply.

- Various medical websites
 Social Media, Electronic Media
 Doctor/Medical Practitioner
 Friends/Family Members

10. 9. If the diagnosis, suggestions, treatments are found to be misleading, have you ever tried to correct it? *

Eg. by leaving comments on the website, by advising people not to rely on the media channels, by spreading awareness about it, etc.

Check all that apply.

- Always
 Sometimes
 Ignored

11. 10. Would you like to have verified, credible sources to provide basic information related to the diseases on various platforms? *

Check all that apply.

- Yes
 No
 Maybe

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Google Forms

Appendix 2 Screenshot of Conference Website

International Conference on Machine Learning and Big Data Analytics (ICMLBDA) 2021

29-30 March 2021

Indian Institute of Technology, Patna

In Collaboration with

Indian Institute of Technology (BHU)-Varanasi-India, California State University, San Bernardino-USA

Emlyon Business School-France, Research Institute of Big Data Analytics-Xi'an Jiaotong-Liverpool University-China



Conference Proceedings

ALL ACCEPTED & PRESENTED papers will be reviewed for possible publication in SPRINGER AISC.



🚩 **Early Bird Registration is now open: Till Mar 08, 2021.**

REGISTER NOW

Amid prevailing conditions due to COVID19, a virtual meeting platform is to be made available for all registered authors who intend to

Appendix 3

Certificate of Paper Presentation

**International Conference on Machine Learning and
Big Data Analytics (ICMLBDA) 2021**
29 – 30 March 2021

- CERTIFICATE -

THIS CERTIFICATE IS HEREBY GRANTED TO

ARPITA SHARMA

From **Delhi Technological University**

For presenting his/her paper entitled “**Misinformation- A challenge to medical sciences: A systematic review**” authored by “**Arpita Sharma, Yasha Hasija**”, in session “**Machine Learning Application on Big Data Analytics**” through ONLINE mode in ICMLBDA, 2021 organized by **Indian Institute of Technology, Patna** in collaboration with **Indian Institute of Technology (BHU), Varanasi**.

March 30, 2021



Dr. Amrita Chaturvedi
Session chair



Dr. Rajiv Misra
Technical Programme Chair



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