AWARENESS ON CONSUMING IMMUNE RICH DIET TO OVERCOME COVID-19 INFECTION - AN ONLINE BASED SURVEY

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ABSTRACT

Objective: Coronavirus (COVID-19) being an infectious disease, emerged from Wuhan, China. The food we eat plays an important role in determining our health and immunity. In order to protect from infectious diseases, people in the society must be aware of consuming these immune rich foods. The aim of the present study is to create proper awareness on immune rich diet to overcome COVID-19 infection among the general public people.

Materials and methods: An online based survey questionnaire was prepared and circulated among 290 general public people comprising all age groups. The participants' demographics including name, age, gende ,occupation were asked. The questionnaire was enquired about the knowledge on immune rich foods, Vitamin C supplements, intermeal snacks taken during the lockdown, amount of fruits and

vegetables consumed, the effect of garlic, zinc-rich foods on immunity. Data was collected using Google forms and statistically analysed using the SPSS software.

Statistical analysis: In the present study, among n = 290 participants about, 67.2% of them were females and 32.8% of them were males.

Results: The results obtained from the survey showed that the majority of the participants were aware of recent COVID-19 infection and about 75 % of them have knowledge on consuming an immune rich diet.

Conclusion: Thus, the present study has concluded that the majority of the people have awareness on immune rich diet to overcome COVID-19 infection.

Keywords: COVID-19; infection; awareness; coronavirus; immune rich diet; Vitamin C supplements

INTRODUCTION

Coronavirus (COVID-19) being an infectious disease emerged from Wuhan, China. It has been declared as a pandemic by the World health organisation. The virus transmission is from human to human through respiratory droplets. This disease causes flu-like symptoms such as a cough, fever, and in more severe cases, difficulty in breathing. People in society should protect themselves by washing hands frequently, avoiding close contact with others, and personal health hygiene in order to protect against such infectious disease [1, 2]. The food we eat plays an important role in determining our health and immunity. Adaptive Immunity is the main immune response which helps to fight against bacteria, viruses which enter through our body [3, 4]. Many studies have been reported that young adults have a stronger immune system than older people who are more prone to get infectious disease [5, 6]. Balanced nutritional diet plays a vital role in maintaining our immunity and preventing viral infection. The immune rich diet mainly consists of micronutrients like Vitamin A, C, E, D, essential fatty acids, zinc, copper, iron-containing diet [7]. Vitamin C supplements including citrus fruits like oranges, gooseberry, kiwi, mango, guava maintain our immunity and act as an effective barrier against viral infections and common cold. The average recommended dose of vitamin C is about 40-60 mg per day [8, 9]. Vitamin D, being a fat-soluble vitamin, also plays a vital role in maintaining our immune response mechanisms in our body. Few epidemiological studies have been reported that vitamin D containing dietary sources prevents viral induced acute respiratory infection [10, 11]. Zinc is a main key component in our body which helps in normal function and development of immune

cells. The zinc-containing foods included are eggs, legumes, pulses, vegetables **[12]**. According to the World health organisation (WHO), each one should take at least five portions, equal to 100 grams of fruits and vegetables. Malnutrition is also a significant factor which increases mortality, morbidity and increases the rate of viral infection. In order to protect from infectious diseases, people in the society must be aware of consuming these immune rich foods **[13]**. The dietary supplementation of micronutrients, flavonoids, herbal medicines and other immune-boosting foods include garlic, broccoli, ginger, milk, probiotic products which act as a potential tool to support the immune system against the COVID-19 infection **[14, 15]**. The aim of the present study is to create proper awareness on immune rich diet to overcome COVID-19 infection among the general public people.

MATERIALS AND METHODS

A survey questionnaire was prepared and circulated among 290 general public people comprising all age groups. The participants' demographics including name, age, gender, occupation were asked. About 20 self-structured questions were prepared and checked for validity by three internal and external experts from Saveetha dental college. The present study involves the

random sampling method, to avoid sampling bias, the questions framed were very simple and easy to understand. The data were collected using the google forms software. Survey questionnaire enquired about the knowledge on immune rich foods, vitamin C supplements, intermeal snacks taken during the lockdown, amount of fruits and vegetables consumed, the effect of garlic, zinc-rich foods on immunity. The data collected was statistically analysed using the SPSS software and chi -square test was carried out to find whether the data is statistically significant or not. And pie charts the graphs were plotted using the descriptive statistics.

RESULTS

The survey was conducted among n = 290 participants in which about 67.2% of them were female and 32.7 % of them were male **(Figure 1)**. The questionnaire enquired about the knowledge on immune rich foods and recent COVID-19 infection. For the question about the awareness of recent COVID-19 infections, it was found that majority of the survey participants were aware of recent COVID-19 infections. The knowledge on COVID-19 symptoms was also asked for which, about 92.1% have answered as all of the above, 1% have answered it as cold, 4.5% have reported as shortness of breath, about

2.4 % as sore throat and cough as the symptoms **(Figure 2)**. For the question on knowledge on immune rich diet, about 75.1% were aware about the immune rich diet and answered as yes, 20 % have chosen as may be, and 4.8 % of them were not aware and chose no as an option **(Figure 3)**. For the awareness on consuming vitamin C supplements, about 85.5 % of them were aware and chose yes, whereas 14.5 % of them were unaware and chose no as an option **(Figure 4)**. The average amount of fruits and vegetables consumed in their diet was reported, about 47.9% of them have consumed 100gms per day, 35.9% of them consumed 200 gms per day and 16.2 % consumed less than 100 gms per day **(Figure 5)**. The intake of fruits and vegetables during the lockdown period were found to be increased about 56.9% , decreased to 27.9% and about 15.2 % were found to be the same as normal **(Figure 6)**. Intermeal snacks taken by the people during the lockdown period was reported to be about, 22.1% of them have the habit of taking biscuits and other refined carbohydrates, 47.9% of them were taking fruits, 18.6 % of them have pulses and 11.4% of them chose others as an option **(Figure 7)**. The question regarding the opinion of consuming garlic was asked, about 74.5% of them agreed that garlic as an immune booster and 10 % of them disagreed and 15.5 % of them were unsure **(Figure 8)**. For the question regarding the opinion of drinking milk to prevent respiratory infection, about 46.6% of them agreed and answered yes, 21% of them disagreed and 32% of them were unsure **(Figure 9)**. The question regarding knowledge on zinc-rich foods was asked, for which about 68.6% were aware and 23.4 % of them were unaware **(Figure 10)**. In addition to this, participants were also asked to mention the Vitamin C supplements and immune boosting foods which were known to them.

From the above findings, it has been clear that consuming an immune rich diet found to be effective against COVID 19 infection, about 74.8 % of the survey participants accepted and answered as yes, 20.3% of them answered as may be and 4.8% chosen as no as the option. Finally, the question was asked about the way of awareness spread on the immune rich diet against COVID -19, it was found that , about 43.4 % have chosen family, 37.2% were chosen social media, 12.1% of were chosen as doctors and 7.2 % of them chose friends as the option. Thus the present study shows that the majority of the participants are aware of consuming an immune rich food to prevent COVID-19 infection, only few of the participants were not aware due to some misconceptions or lack of knowledge.
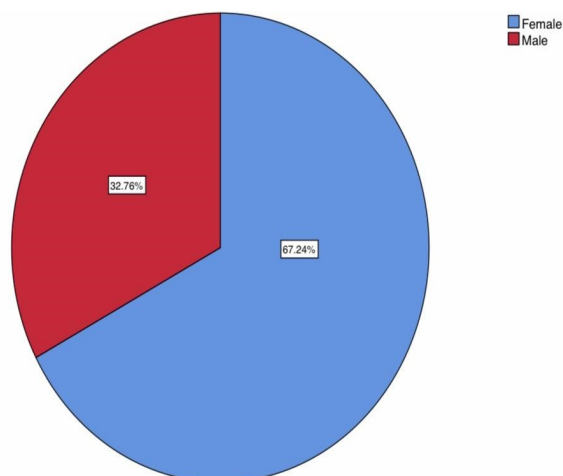
Figure 1: The pie chart represents the distribution of the gender of the study participants. 67.2% of them were females and 32.7 % of them were males.
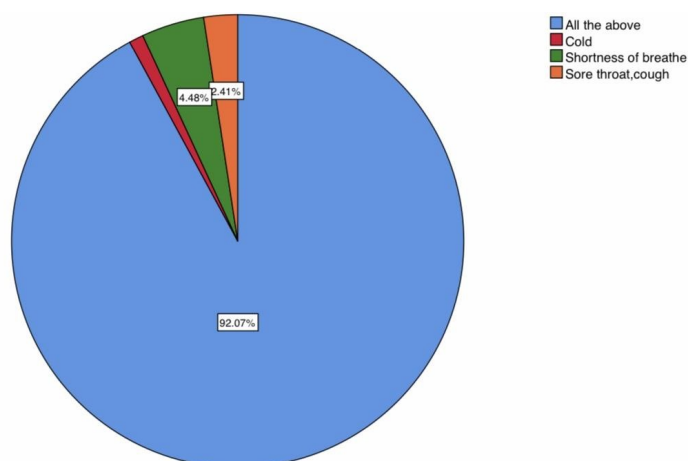

Figure 2: The pie chart depicts the percentage distribution of knowledge of study participants about COVID-19 symptoms. 1% have answered it as cold, 4.5% have reported as shortness of breath, about 2.4 % as sore throat and cough as the symptoms and 92.1% have answered all of the above.
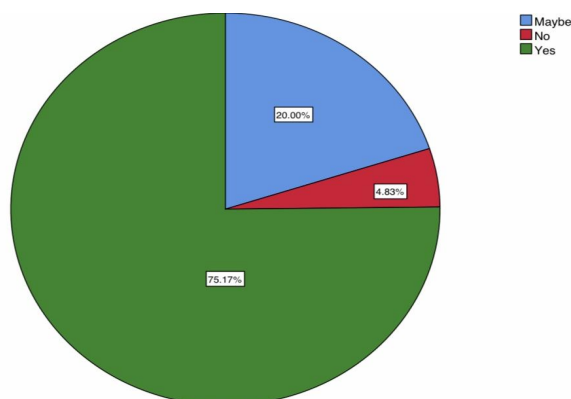

Figure 3: The pie chart represents the distribution of the knowledge of consuming an immune rich diet among the participants, about 75.1% were aware about the immune rich diet and 4.8 % of them were not aware about the immune rich diet.
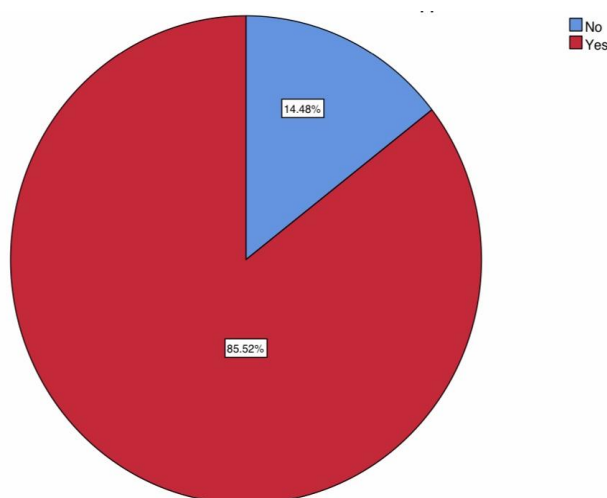
Figure 4: The pie chart represents the distribution of awareness of study participants on consuming vitamin C supplements, about 85.5 % of them were aware whereas 14.5 % of them were unaware.
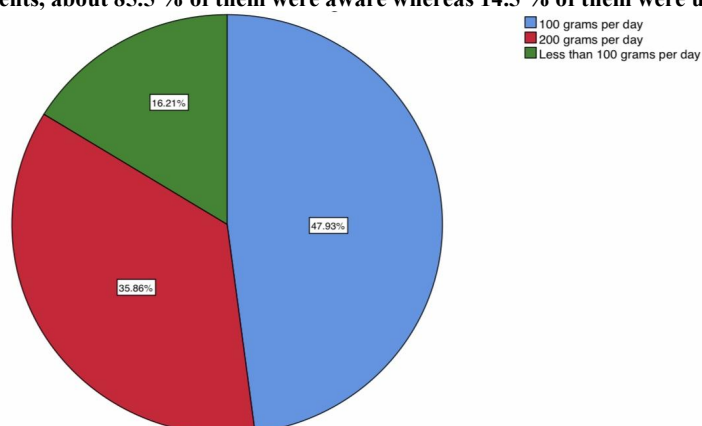

Figure 5 : The pie chart represents distribution of average amount of fruits and vegetables taken by the participants, about 47.9% of them have consumed 100 gms per day, 35.9% of them consumed 200 grams per day and 16.2 % consumed less than 100 grams per day.
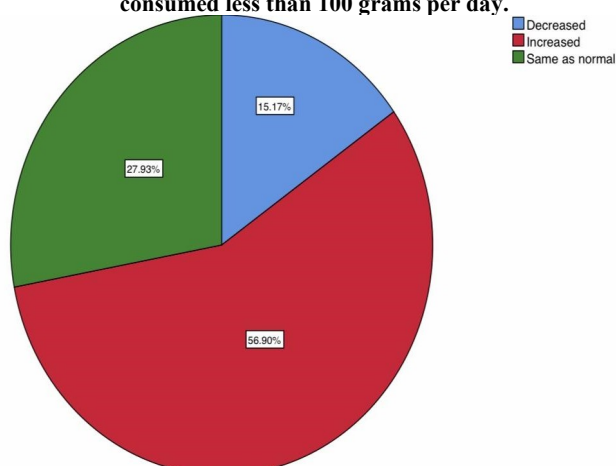

Figure 6: The pie chart represents the distribution of the intake of fruits and vegetables during the lockdown period by the participants, 56.9% of the participants stated that their consumption increased, 27.9% of them responded that the intake is decreased and about 15.2 % reported to be the same as normal.
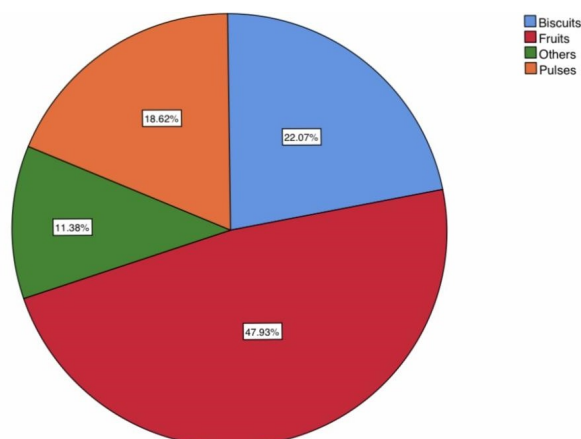
Figure 7: The pie chart represents the percentage distribution of intermeal snacks taken by the participants during the lockdown period. 22.1% of them have biscuits and other refined carbohydrates, 47.9% of them are taking fruits, 18.6 % of them have pulses.
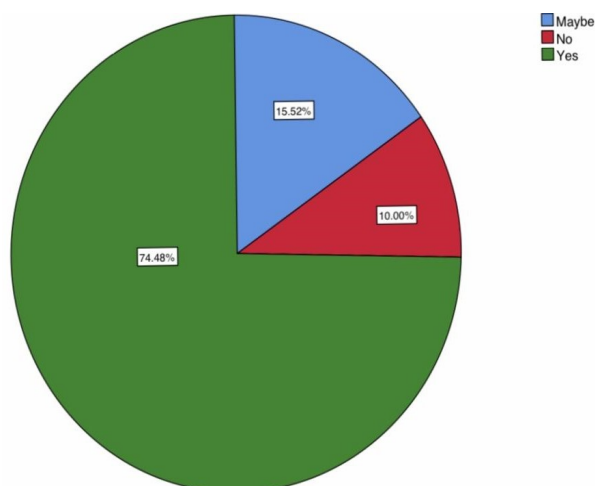

Figure 8: The pie chart represents the percentage distribution of the opinion of study participants on consuming garlic as an immune booster to prevent COVID-19. 74.4% of them agreed and 10 % disagreed and 15.5% of them were unsure.
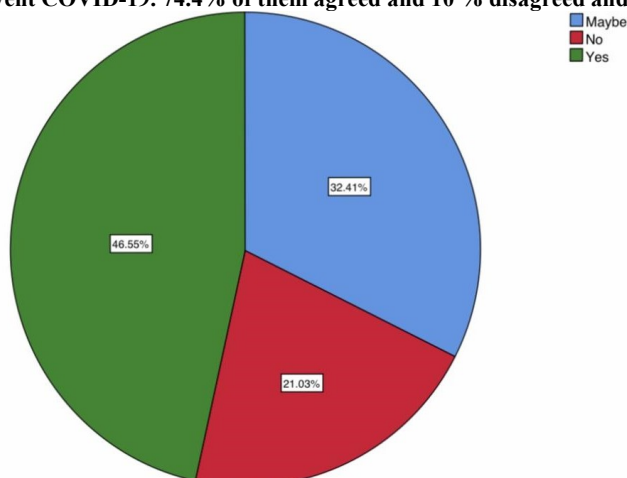

Figure 9: The pie chart represents the percentage distribution of opinion of study participants on drinking milk to prevent respiratory infection. 46.5% agreed and about 21% of them disagreed and 32.41% of them were unsure.
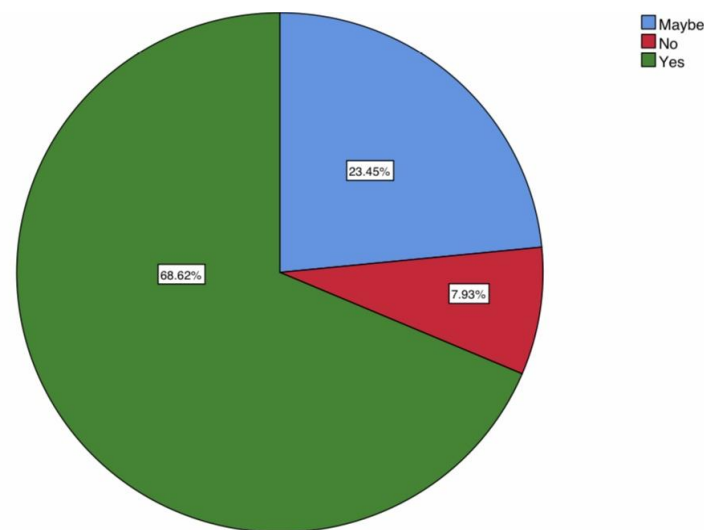
Figure 10: The pie chart represents the percentage distribution of knowledge of study participants on consuming zinc-rich foods to prevent viral infection. 68.6% were aware and 7.9 % of them were not aware of it and 23.45 % of them were unsure.
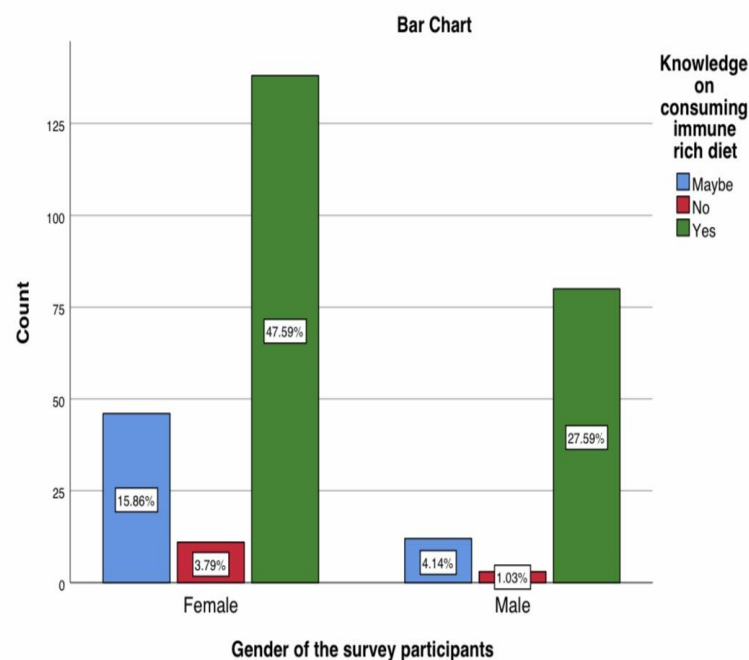
Figure 11: Bar graph represents the association between gender and knowledge on consuming the immune rich diet . X axis represents the gender of the participants, Y axis represents the percentage of participants having awareness on consuming immune rich diet. Green denotes that the participants have knowledge, red denotes less knowledge and blue denotes the lack of knowledge on immune rich diet. Chi-square test was done and association was found to be statistically significant. Pearson's Chi square value- 6.187; p value- 0.045 (<0.05), providing females had more knowledge on consuming an immune rich diet.
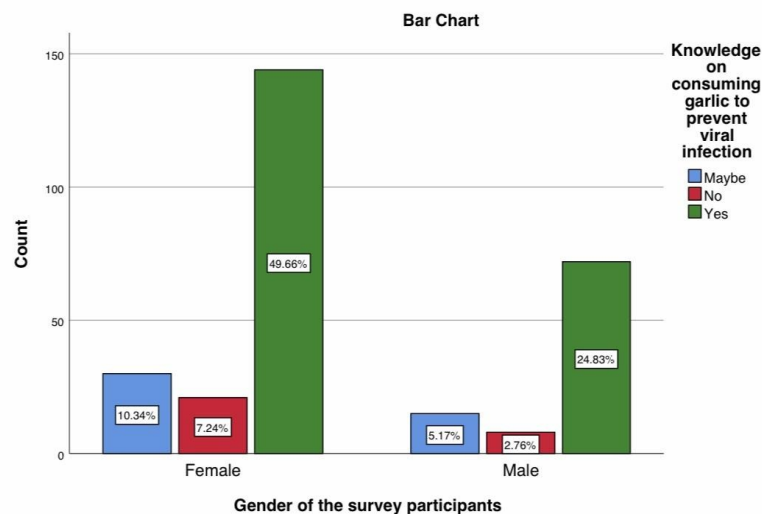
Bar Chart

Figure 12 : Bar graph represents the association between gender and opinion on consuming garlic to prevent viral infection. X axis represents the gender of the participants, Y axis represents the percentage of participants having knowledge about the opinion of consuming garlic. Green denotes that the participants agreed, red denotes they disagreed and blue denotes that they are not sure about prevention of viral infection by consuming garlic. Chi-square test was done and association was found to be not statistically significant. Pearson's Chi-square value- 0.391; p value- 0.822 (>0.05), females have better awareness than males, however not statistically significant.

Bar Chart
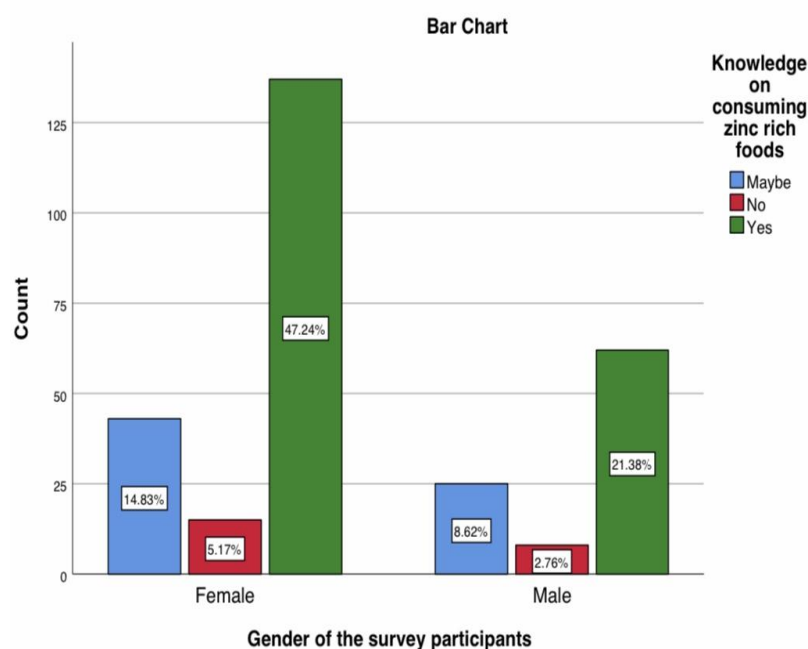
Figure 13: Bar graph represents the association between gender and knowledge on consuming zinc rich supplements which can prevent viral infection. X axis represents the gender of the participants, Y axis represents the percentage of participants having knowledge about the zinc rich supplements. Green denotes that the participants have knowledge about it, red denotes less knowledge and blue denotes that they were unsure about consuming zinc rich foods. Chi-square test was done and association was found to be not statistically significant. Pearson's Chi square value- 0.770; p value - 0.680 (>0.05), females have more knowledge than males, however not statistically significant.
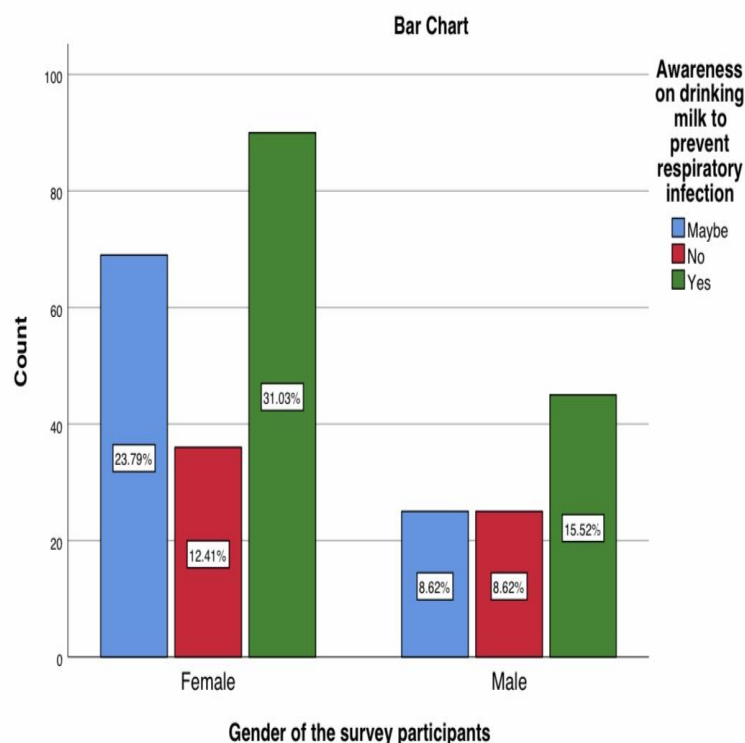
Figure 14: Bar graph represents the association between gender and opinion on drinking milk which can prevent respiratory infection. X axis represents the gender of the participants, Y axis represents the percentage of participants having awareness on drinking milk to prevent respiratory infection. Green denotes that the participants are aware, red denotes they are unaware and blue denotes they are not sure. Chi-square test was done and association was found to be not statistically significant. Pearson's Chi square value- 3.514; p value- 0.173 (>0.05), females have better awareness than males, however not statistically significant.

DISCUSSION

A similar cross-sectional study done on knowledge, attitude towards COVID-19 infection, stated that the majority of the people have knowledge on COVID-19 infection and its symptoms. Only few of the people reported to be unaware [16, 17]. In the present study, the majority of them have knowledge about vitamin C supplements. Similar to this findings, a population-based study done in UAE, reported that people have more knowledge on vitamin D rich diet which prevents bone-related diseases [18,

19]. As a contrast, to these findings, a study reported by Ojedokun *et al* reported, about 48% of the survey participants are unsure about consuming healthy dietary supplements [19, 20]. The fruits and vegetables taken in our diet keeps us healthy and disease-free. It should be taken at the recommended level of about 100 grams per day. Our study shows that the majority of them have knowledge of consuming adequate amounts of fruits and vegetables to be included in their diet. A similar study reported that almost 92% of the participants

had good knowledge on recommended daily intake of fruits and vegetables [21]. As a contrast to these findings, a previous study has concluded that the majority of adolescents consume only half a cup of fruits daily with an improper diet [22, 23].

Our present study has revealed that intake level of fruits in people has increased during the lockdown period, but a previous study done among the school children reported that, children take only less intake of fruits when they are at home [24, 25]. The present study has reported that the majority of the people take fruits as their intermeal snacks during the lockdown. A similar study conducted among college students, reported that the majority of females take fruits and vegetables daily in their diet [26, 27]. As a contrast to our study findings, a previous study by Begum et al., on the assessment of nutritional behaviour was reported, that only few people have poor dietary habits and imbalanced diet plan [28, 29]. A recent cross-sectional study on knowledge and beliefs of the General Public of India on COVID-19 have reported that the majority of the participants have less knowledge of garlic and its effective role in preventing the viral infection [30, 31]. In our present study, the majority of the people are aware of drinking milk, as it prevents respiratory infection. A

study similar to our findings reported that the majority of people are aware of drinking milk as a preventive measure to overcome Middle East Respiratory Syndrome infection MERS [32, 33]. Zinc is an important micronutrient which builds up a high immune response against the viral infection in our body. The main zinc-containing foods are legumes, eggs, green leafy vegetables, almonds etc. In the present study only few participants were known about the zinc supplements. A recent nutritional study also reported that the majority of the people have less knowledge on micronutrients, zinc-rich foods and its beneficial effects on the body [34, 35].

CONCLUSION

Balanced nutritional diet with immune rich food plays a vital role in maintaining immunity and prevents us from viral infectious disease. A recent COVID-19, being a life threatening disease affects the people worldwide. So, people with proper knowledge and awareness on an immune rich diet are able to protect against such viral infectious diseases. From the results obtained from the survey, present study has concluded that majority of the survey participants have awareness of consuming an immune rich diet, to overcome the recent COVID-19 infection. Thus the findings of our study provide valuable information on consuming

an immune rich diet among the general public during pandemic conditions.

ACKNOWLEDGEMENTS

The authors are thankful to Saveetha Dental College for providing a platform to express our knowledge.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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