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DIETARY MEASURES TO IMPROVE IMMUNITY OF OUR BODY

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ABSTRACT

Immunity refers to a balanced state in multicellular organisms conferring on it adequate capabilities to fight against any infection or any allergies. Diet plays a vital role in the process of enhancing the immunity level and in maintaining a good level of immune response against pathogens. This study was carried out to analyse the awareness level about the connection between diet and immunity. An online survey was conducted with a self structured questionnaire comprising of 16 questions related to diet, immunity and the need for immune response against infections, the results were studied and analysed using statistical software "SPSS version 20" and the outcomes are represented in the form of Pie charts. In this present study, awareness of general population related to connection between diet and immunity, 86.81% are aware about the connection though 12.5% answered that they are unaware, among them 76.39% of the survey participants believed that immunity is the key factor necessary or important to be followed to prevent themselves from diseases such as Covid 19.The present survey conducted concludes that the majority of the population believe there is a strong connection between diet and immunity and are aware of the connection. So it is evident that the general population possesses adequate

awareness on the connection between diet and immunity and could provide a baseline for resistance against disease.

Keywords: Awareness; Knowledge; Diet; Immunity; Disease

INTRODUCTION

Immunity is a balanced diet in multicellular organisms possessing adequate amount of capabilities to fight against any infection, disease or any other allergies. Immunity poses a complex system in multicellular organisms called immune system.Immune system consist of physiological barriers such as skin, low stomach pH, innate immunity and adaptive immunity. Immune system requires all nutrients in proper level for proper functioning **[1]**. Traditionally immunity is categorised into innate immunity and adaptive components each with different function and role **[2]**.

Innate immunity is the inborn capacity of the body to offer resistance to pathogens and toxin products. Innate immunity was first described in 1906 by nobel prize winner ILYA MECHNIKOV **[3]**. Innate immunity is produced by cells of hematopoietic and non-hematopoietic origin. Hematopoietic cells include natural killer cells, macrophage, neutrophils. Innate immunity is further subdivided into 2 components such as humoral immunity and cell mediated immunity **[4]**. Humoral immunity is mediated by antibodies where the antibody provides the first line of defence against infections, long-term humoural immunity is mediated by continuous differentiation of B cells **[5]**.

Immunity is an essential factor to protect ourselves from the infections such as covid19,influenza etc. so in the recent times various studies regarding covid19 origin, prevention methods, correlation of associated topics with coronavirus were conducted and one among them is the research carried out to understand the connect between cancer and the global alarming covid19 condition and the recent studies carried out discovered that people suffering with cancer are more vulnerable to covid19 infection **[6, 7]**. However the recent studies also discovered that the aerosol generated in dental procedures reveals that dental profession are at a high risk of developing the viral infection due to enhanced transmission through these large droplets **[8–12]**, but potentially oral biopsy procedure done in dentistry is effective in detecting covid19 among smokers by the procedure GS17913 and ACE which are found to be receptor for the viral outbreak **[13]**, also the teledentistry mainly the dental photographs have proved to be a trusted source to improve the oral health of people to fight against the infection covid19 **[14, 15]**. It is

also found that the presence of the covid19 infection can be identified from the gingival crevicular fluid **[16-20]**.

Nutrition refers to the sum of foods consumed by individual. The level of nutritional requirement varies with respect the type of diet of each and every person. Recent studies shows that the nutritional level intake by individual has reduced in the past decade and the prevalence of various inflammatory and autoimmune disease as enhanced is in attack due to low immunity level of our body **[21]**.

Foods such as oranges, pineapple, carrot, cabbage, walnuts, almonds, peppers, green tea, lemon, ginger, turmeric are considered as potential nutritional rich foods through diet. Nutritional deficiency is one of the commonly associated problems with impaired immune response accompanied by impairment in the cell mediated immunity, phagocyte function, secretory antibody response, antibody affinity and the complete system **[22]**. The present study aims at assessing the knowledge and awareness about the connection between diet and immunity level.

MATERIALS AND METHOD

An online survey was conducted with a self structured questionnaire with the sample size of hundred participants comprising two parts, the first part consist of questions related to socioeconomic details and the second part consist of questions related to facts, questions that instill awareness among the participants. The participants were given a short introduction on the importance of immunity level against pathogens, the need for nutrients and its role in boosting immunity against pathogens. The questionnaire was validated in the standard manner. Preventive measures such as selection of survey participants randomly, avoiding participants from answering irrelevant questions, placing a restriction over the participant population and age group were followed to minimise the sampling bias. The self structured questionnaire was prepared using the online survey platform “Google forms”. The responses were recorded by circulating the questionnaire link through social media, with the collected responses descriptive analysis was carried out using the statistical software “SPSS software version 20”. The results of the descriptive analysis was represented in the form of Pie charts.

RESULTS AND DISCUSSION

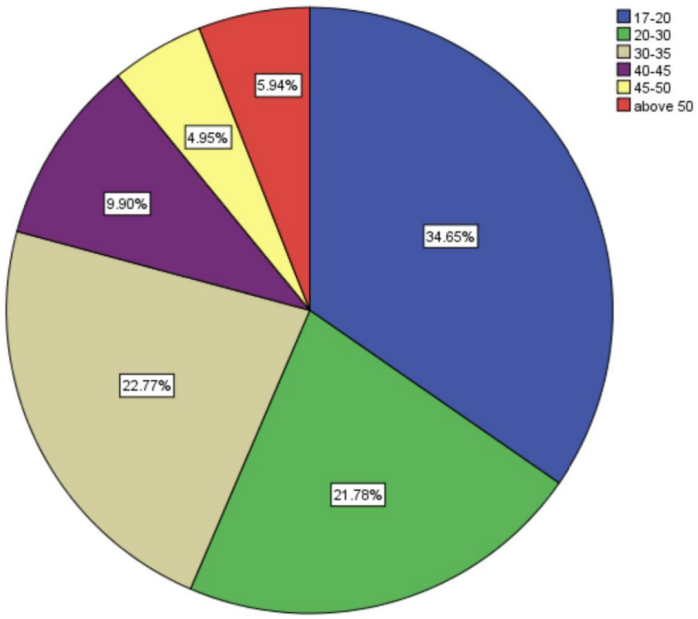

Figure 1: Pie chart depicts the age group of participants where34.65% of the population consist of participants belonging to the age group of 17-20(blue),21.78% of the participants belong to the age group 20-30(green),22.77% belong to the age group 30-35 years(dark yellow),9.90% belong to the age group 40-45 years,4.95% belong to the age group 45 -50 years,and around 5.94% belong to the age group above 50 years(red).

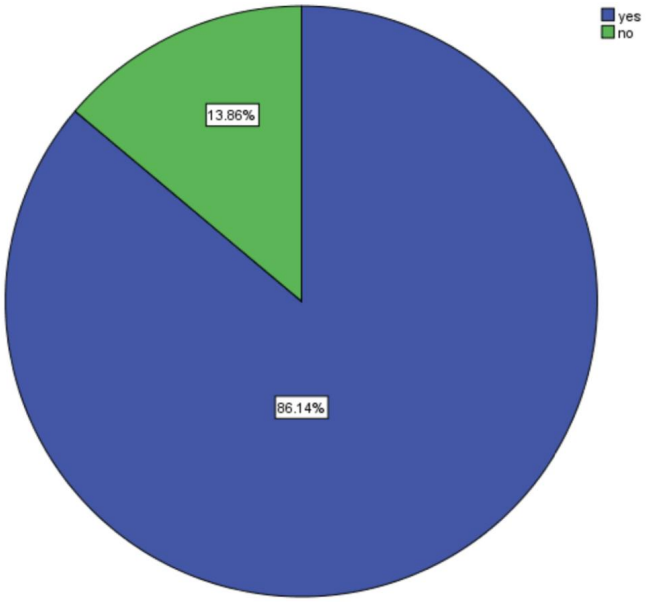

Figure 2: Pie chart showing responses to the question on the importance of diet pattern in preventing covid19. 86.81% believe that diet plays a strong role in prevention of covid19 (green). 12.5% unaware (yellow)

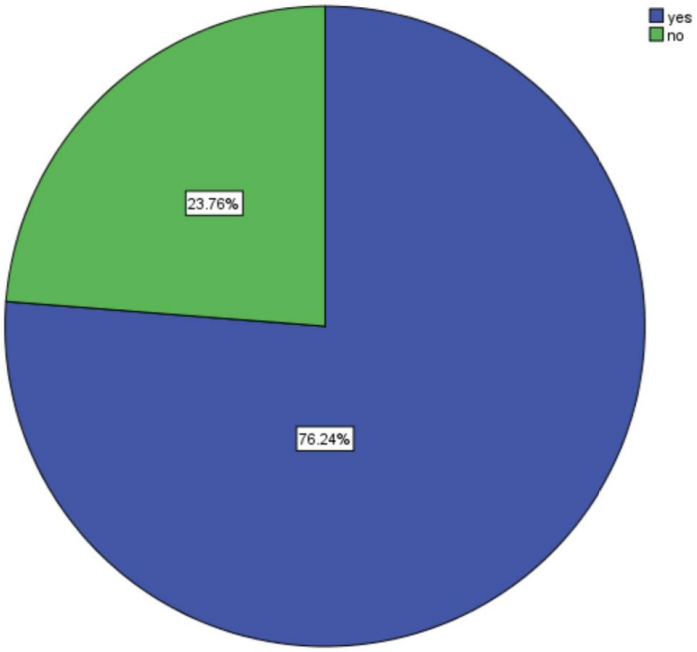

Figure 3: Pie chart depicts the importance of immunity against covid19. 76.3% agree it is essential (blue), 23.61% unaware (green)

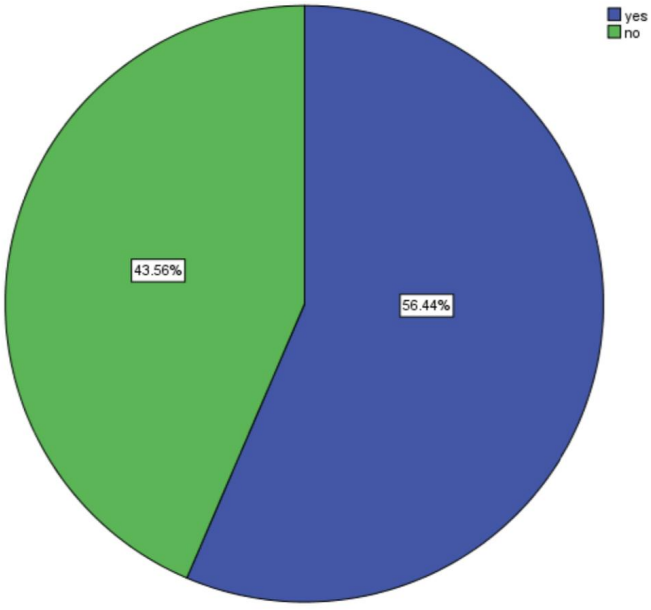

Figure 4: Pie chart depicts few important sources that improve immunity. 63.1% agreed that cauliflower and Palak proved to be good sources to boost the immunity of our body (blue). 36.81% unaware (green)

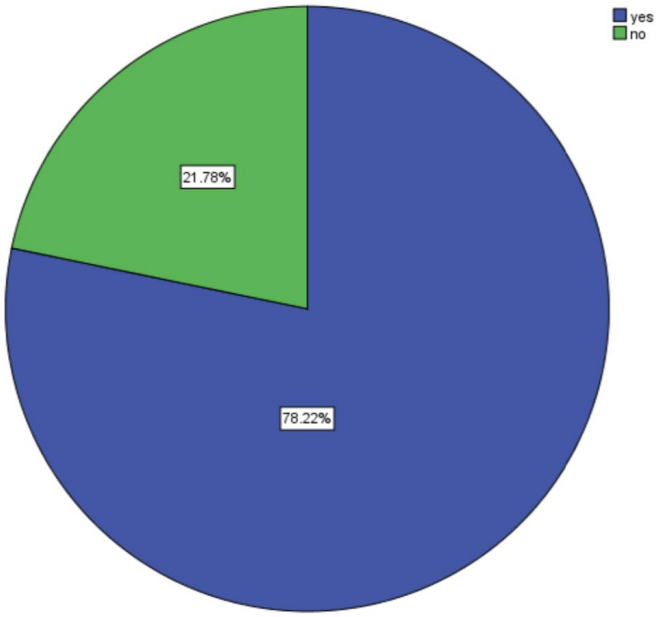

Figure 5: Pie chart depicts a fact regarding the correlation between action of natural killer cells and the level of immunity .76.4% agreed that good immunity level increases the activity of natural killer cells of our body (blue), 20.8% unaware (green)

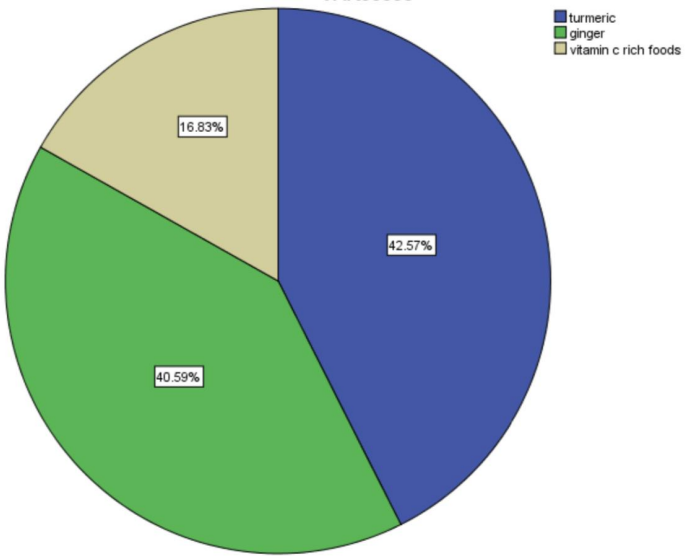

Figure 6: Pie chart shows few important sources that help in boosting immunity. 44.44% believe that turmeric is the best source for boosting immunity(blue) followed by 31.94%who touted ginger as the best source for boosting Immunity (green) and around 23.61% think vitamin C rich foods as the possible source for boosting immunity (yellow)

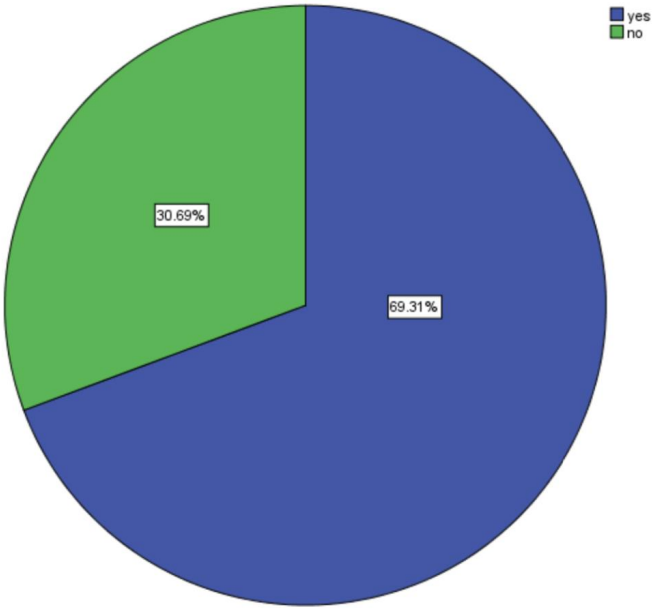

Figure 7: Pie chart depicts the role of Ayurvedic herbs in boosting immunity.72.92% believe Ayurvedic herons plays a major role in boosting immunity (blue) .27.08% unaware (green)

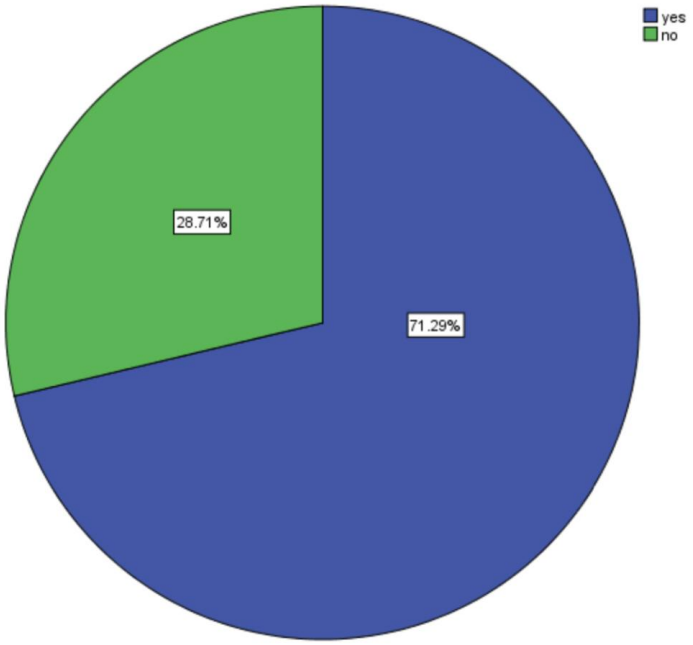

Figure 8: Pie chart shows the the response to the question on the importance of nuts in improving immunity.74.315 believe consumption of nuts improve immunity (blue), 25.69% were unaware (green)

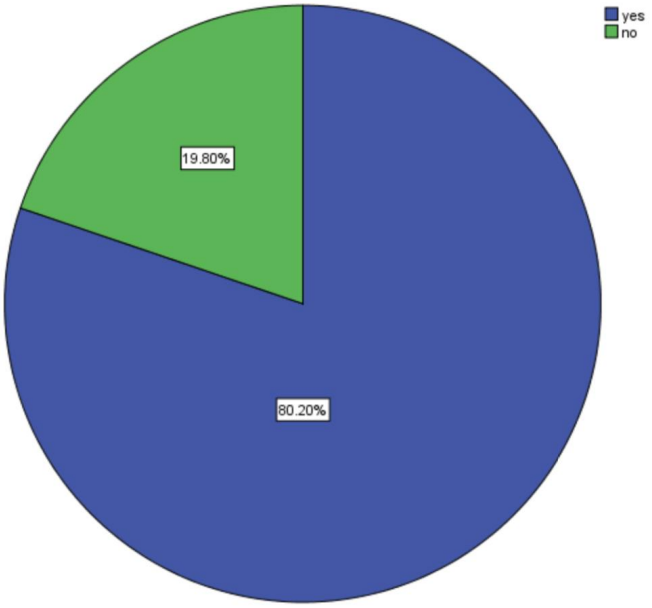

Figure 9: Pie chart shows the response to the question on role of water content in maintaining a proper immunity level, 81% agreed that water content plays an important role in maintaining a balanced immunity level (blue), 18% disagree (green)

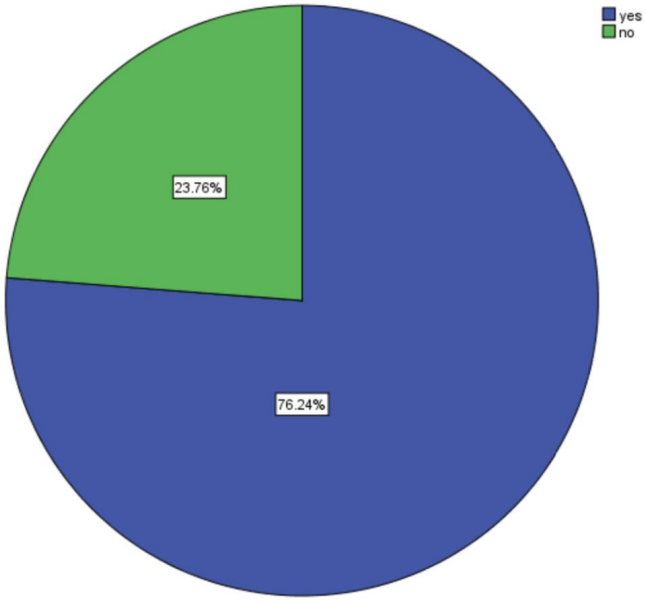

Figure 10: Pie chart shows the response to the question on the role of the traditional diet pattern of the country in boosting immunity, 76.39% believes traditional diet pattern helps in boosting Immunity (blue). 23.61% disagree (green)

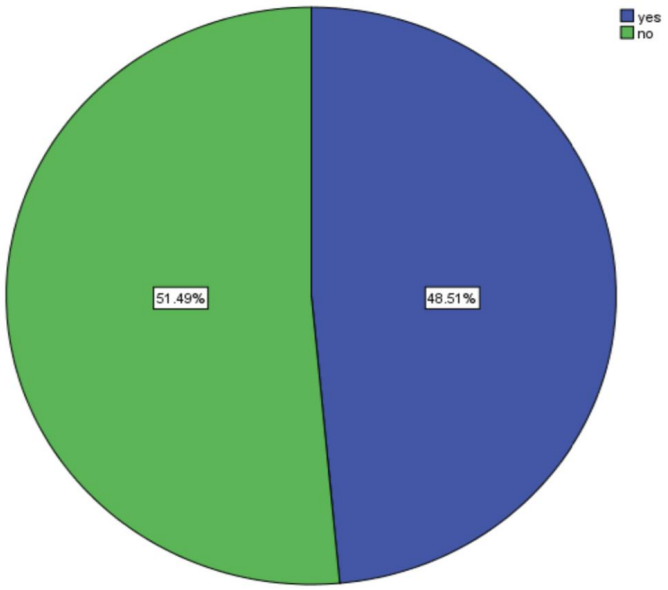

Figure 11: Pie chart shows the perception level of people towards eating food with added chemical preservatives and its effect on maintaining immunity level.55.56% answered it does not help in maintaining immunity level(blue).44.44% answered it plays a role in maintaining the immunity level(green)

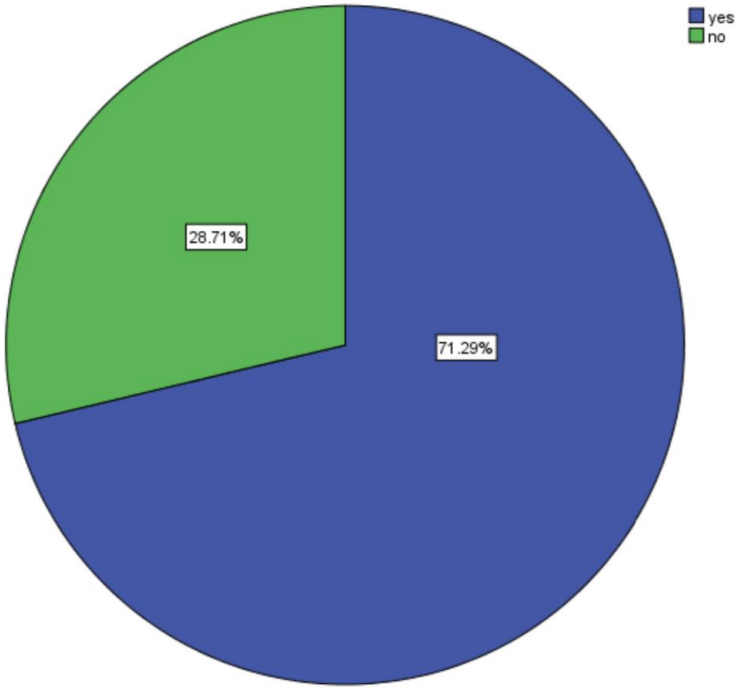

Figure 12: Pie chart depicts the responses to the question on possibility of vitamin tablets in improving immunity.75% agree vitamin tablets increase immunity (blue). 25% disagree (green)

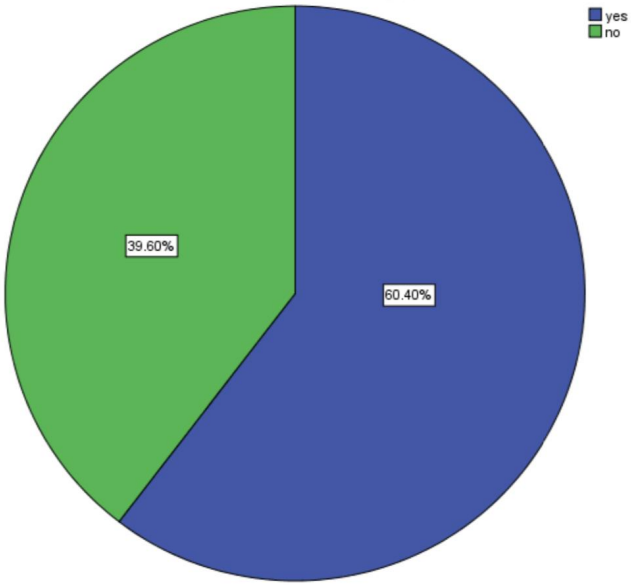

Figure 13: Pie chart shows responses to the question on other set of sources that help in boosting immunity, 67.36% agreed that it acts as potential sources to improve immunity(blue), 32% disagree (green)

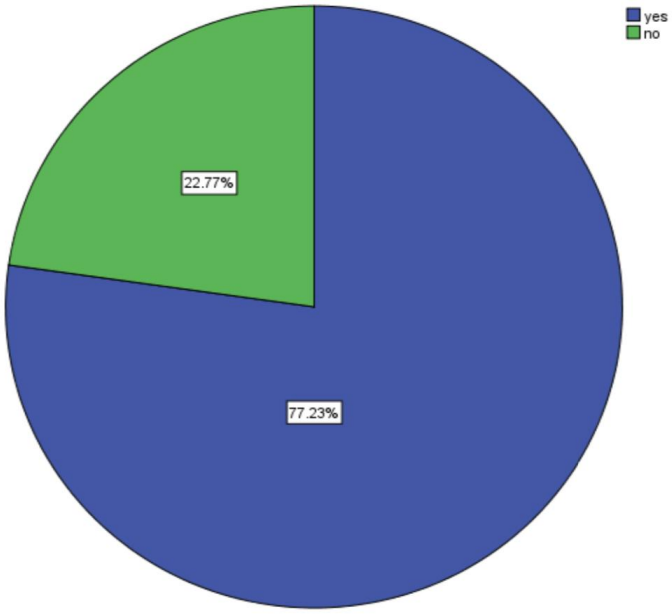

Figure 14: Pie chart depicts the role of iron in boosting immune response, 83.33% believe that iron helps in boosting immunity of our body (blue), 15.97% disagree (green)

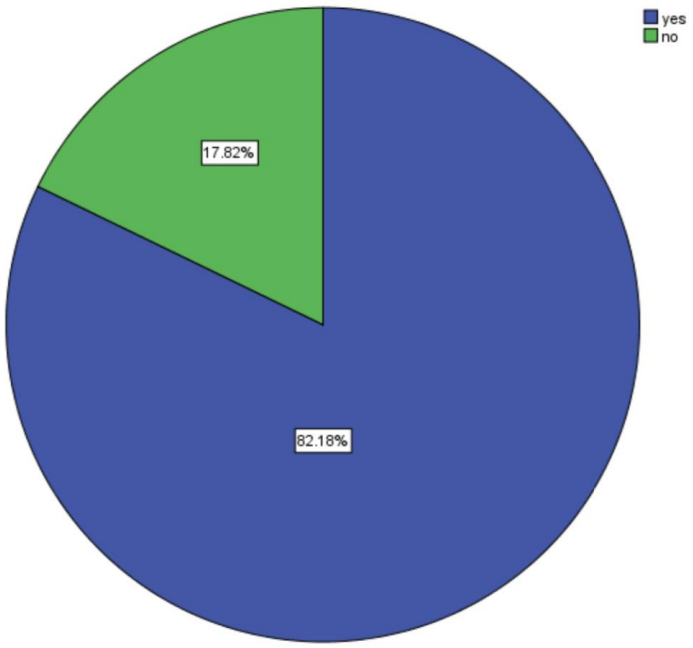

Figure 15: Pie chart depicts the importance of hydration level in preventing disease,81.25% agreed that hydration level plays a Major role in preventing disease(blue),18% disagree(green)

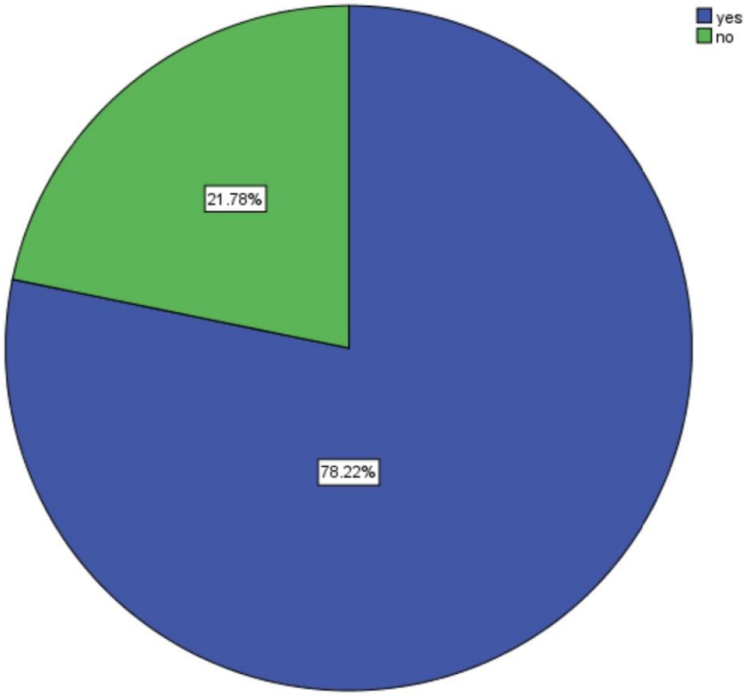

Figure 16: Pie chart reveals the importance of tulsi in boosting Immunity,79.72% think tulsi plays a major role in boosting immunity(blue),20.28% unaware(green)

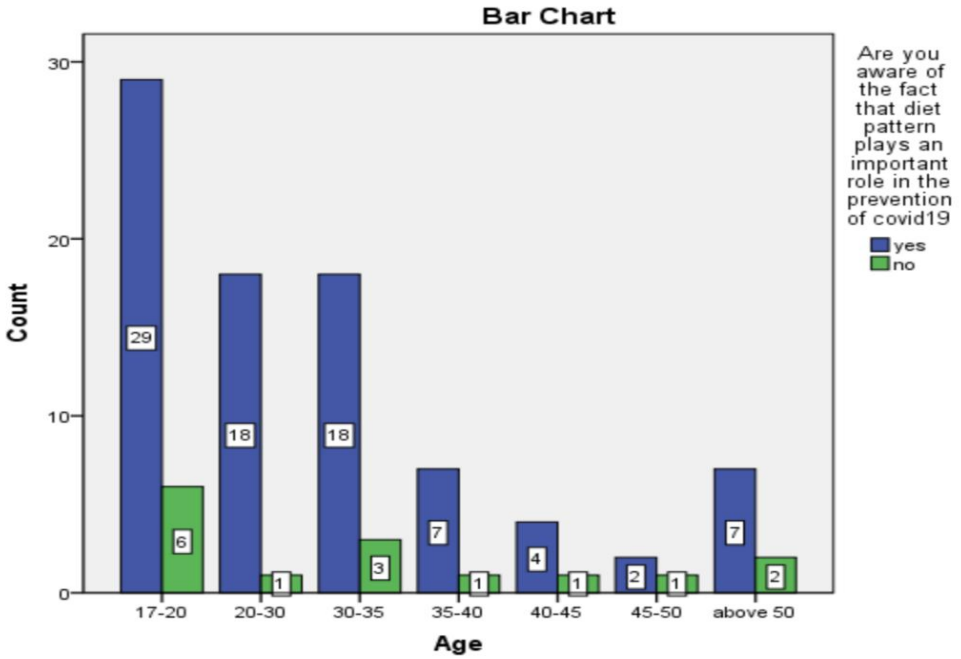

Figure 17: Bar graph representing the association between age groups of respondents and awareness of the role of diet pattern in fighting against COVID19.X axis represents the age groups and Y axis represents individuals who are aware (blue) and unaware (green) regarding the role of diet pattern in fighting against Covid 19. Chi square test p value=0.828;(p value> 0.05), though 17-20 age group had more awareness than the other age groups, the association was statistically not significant

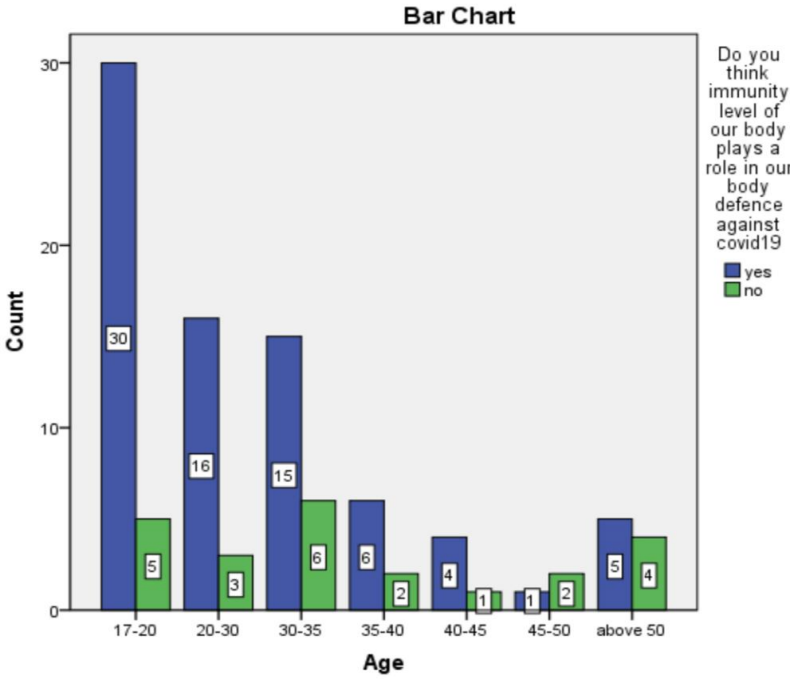

Figure 18: Bar graph representing the association between age groups of respondents and awareness of the role of immunity level of our body in fighting against COVID19 X axis represents the age groups and Y axis represents individuals who are aware (blue) and unaware (green) regarding the role of diet pattern. Chi square test p value=0.235; (p value> 0.05) hence statistically not significant. Though 17-20 yr age group was found to have increased awareness, it was statistically not significant

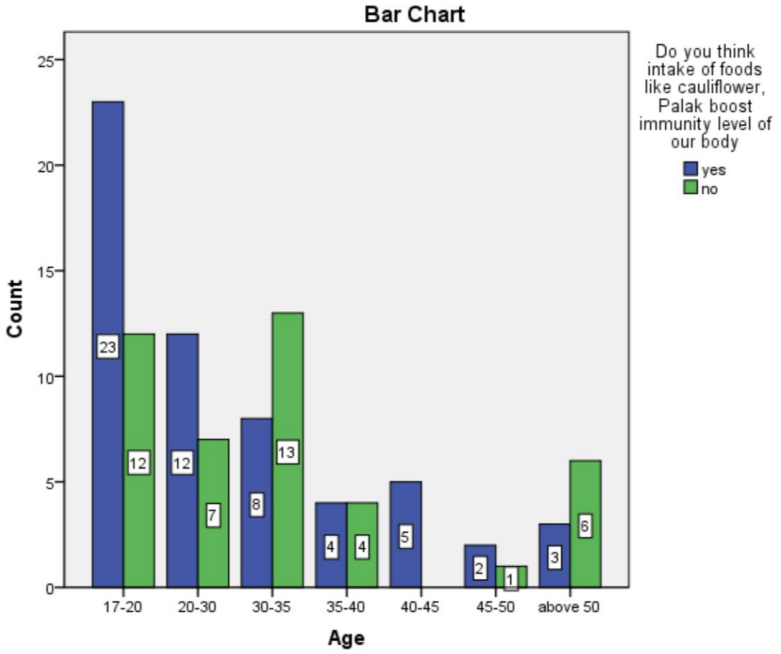

Figure 19: Bar graph representing the association between age groups of respondents and awareness of the role of foods like cauliflower, Palak in fighting against COVID19. X axis represents the age groups and Y axis represents individuals who are aware (blue) and unaware (green) regarding the role of diet pattern. Chi square test p value=0.104;(p value> 0.05) hence statistically not significant.Though 17-20 yr age group was found to have increased awareness, it was statistically not significant.

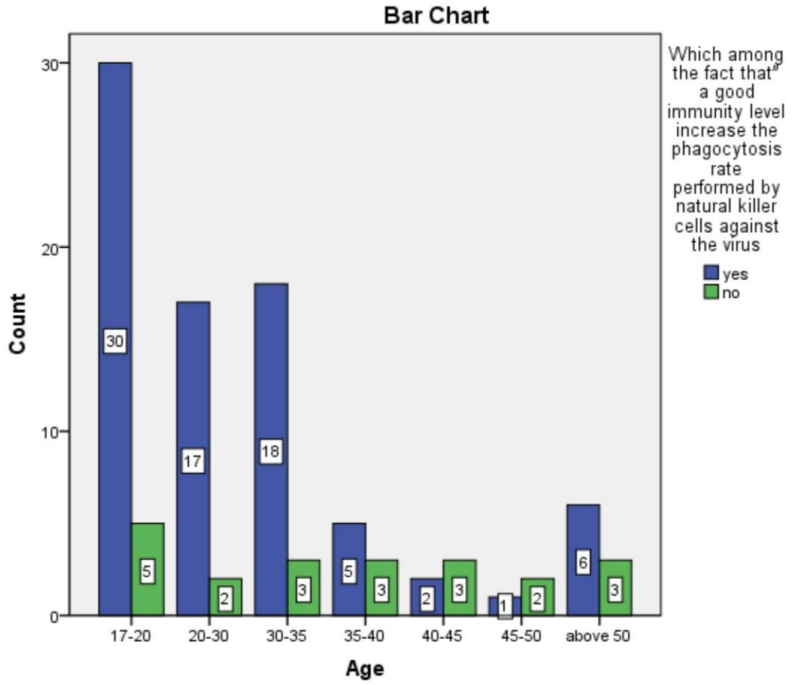

Figure20: Bar graph representing the association between age groups of respondents and awareness of the role of natural killer cells in fighting against COVID19.X axis represents the age groups and Y axis represents individuals who are aware (blue) and unaware (green) regarding the role of diet pattern. Chi square test p value=0.039; (p value<0.05) hence statistically significant. 17-20 age group showed significant awareness on the role of natural killer cells in fighting against COVID 19

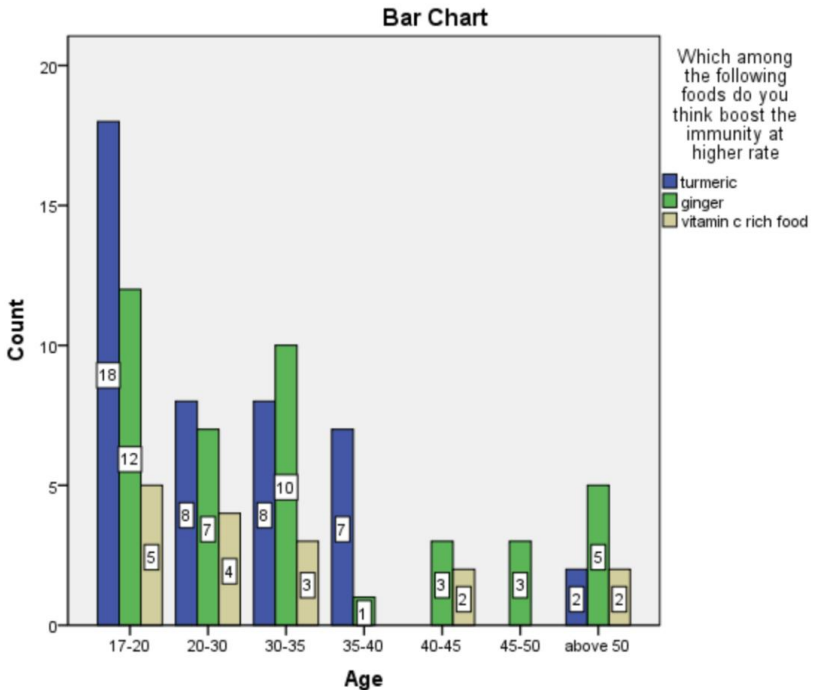

Figure 21: Bar graph representing the association between age groups of respondents and awareness of the role of type of food in fighting against COVID19. X axis represents the age groups and Y axis represents individuals who are aware (blue) and unaware (green) regarding the type of food. Chi square test p value=0.098; (p value>0.05) hence statistically not significant. Though 17-20 yr age group was found to have increased awareness, it was statistically not significant.

Diet pattern plays a important role in the process of boosting immunity of our body. Severe protein malnutrition is found to provoke thymus atrophy, which reduces the thymus cell number leading to decreased or increased number of immature T cells **[23]**. Conditions such as primary immunodeficiency results due to the nutrient deficiency **[24]**.

The present study was compared to the study performed by (Michael A 2015) to find the awareness level among people about the connection between diet and immunity in preventing conditions such as covid19 pandemic prove that diet is closely related to immunity through his descriptive analysis study **[25]**. In the current study about 87.5% of the population believe there is a connection between diet, immunity and in the process of preventing covid19.

Most people are aware of the modern lifestyle of eating foods rich in chemicals leads to immune dysfunction **[26]**. This statement is proved in the study conducted by (Rook G.A.W 2010). In the current study around 76% of the participants are aware that traditional diet patterns improve immunity of our body which is relating that people are

aware of the consequences caused due to modern lifestyle diet, which ultimately leads to fall in the immunity levels.

The leaves of Tulsi are consumable and is being used to normalise kapha and vata **[27]**.The leaves of Tulsi were described as the best to medicine for pneumonia due to presence of strong evidence for the antiviral effect of the Tulsi **[28]**. In the present study 79.9% agreed to Tulsi plays a major role in the process of boosting immunity of our body which concludes that the findings correlate to the properties of tulsi found in the study done by (Sai Sailesh kumar goothy 2020) **[29]**.

Study done by (Bobby J Cherayil 2010) proves that Iron content influence the activation of NF-KB,a transcription factor that is required for a number of genes involved in innate immunity and inflammation[30].So the study states that iron deficiency affects the functioning of innate and adaptive immune system. In the present study 83.33% believe that Iron plays a major role in immune response.

Study conducted by Kin Onkwok showed that partial immunity from previous infection shows the same with the common seasonal Coronavirus noted for COVID-19 **[31]**. In the present study 76.6% think immunity is the key to overcome pandemic outbreak Covid19.

Therefore, this study shows that diet and immunity are linked intricately with each other and are interdependent. The Interaction between nutrition and immunity was found to be of clinical, practical and public health importance in recent years **[32]**.

CONCLUSION

Awareness and knowledge among the participants about the connection between the type of diet, diet plan, diet pattern and immunity was analysed and the study concludes that the majority of the population believe there is a strong connection between diet and immunity and are aware of it. Therefore it should translate to consumption of a planned, nutritious diet to improve the immunity and help all individuals in the fight against Covid 19.

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