



## **Awareness on Importance of Immune Boosting Diet among Dental Students- A Survey**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

**Introduction:** An immune system is essential for survival. The immune system must be looking for any signs of invasion mostly caused by microorganisms. It plays a vital role in protecting the body against diseases, fighting against foreign bodies and does a remarkable job in defending against microorganisms. A Natural immune booster is an additional immunising agent which helps to increase and sustain the immune response of the body. The aim of this study is to show the awareness level on importance of immune boosting diet among dental students

**Materials and methods:** A questionnaire was prepared consisting of a total 14 questions and was uploaded through an online survey link. The responses were collected and analysed which were later interpreted as pie charts. A total of 100 undergraduate dental students have taken the survey with consent. The data was analysed by IBM SPSS software where descriptive statistics and chi square test was done, where the results are plotted as graphs.

**Results:** A total of 100 participants have taken the survey in which 50% were males and 50% were females. A question was asked whether food directly affects our health in which 96% have answered yes. In another question pertaining to how many meals you eat per day. 48% have answered three times and 48% have answered two times. 98% believe that skipping meals affects

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our immunity/health. 94% believe that Indian spices can boost our immunity. 92% believe green tea is a great antioxidant. 57% have answered that taking natural food along with supplements can boost immunity instead of just taking either one. 48% answered that fat has more calories followed by carbohydrates. 88% believe that Consumption of carbohydrates can lead to increase in triglycerides. 97% believe that consumption of citrus fruits can increase immunity

**Conclusion:** According to the study, students are aware about the nutrition which is required for maintaining and improving their immunity. As a budding doctor, the students should be aware about the nutrition which is required for maintaining immunity especially during this COVID 19 pandemic.

*Keywords: Immunity; diet; diseases; natural immune booster; Indian spices; innovative technology; novel method.*

## 1. INTRODUCTION

The immune system protects the body against diseases caused due to microorganisms, to clear and heal the injured tissues, and also provides constant watch of malignant cells within the body. The immune system also developed tolerance to avoid any bad response to healthy tissues.

There are two types of immunity defenses in the immune system. Innate immunity is the body's first line of defence in the event of an infection. It is based on an antigen-independent defensive mechanism that the host employs instantly or within hours of encountering an antigen. Because the innate immune system has no immunologic memory, it may be unable to recognise antigen if it attacks the host again in the future. Antigen-dependent adaptive immunity entails a lag period between antigen exposure and peak response. Adaptive immunity, unlike innate immunity, may memorise the antigen invading the host, allowing the host to mount a more quick and effective immune response when exposed to the antigen again [1-4].

Innate immunity's main role is to attract immune cells to infection and inflammatory sites by producing cytokines, which are tiny proteins involved in cell-to-cell communication. Phagocytes (macrophages and neutrophils), dendritic cells, mast cells, basophils, eosinophils, and natural killer (NK) cells are among the cells involved in the innate immune response. Neutrophils and macrophages are the two main cell types found in phagocytes. Both of these cells have the same purpose in that they engulf (phagocytose) microorganisms. Neutrophils contain granules that, when released, aid in the removal of harmful bacteria, in addition to their phagocytic properties. Unlike neutrophils (short-lived cells), macrophages are long-lived cells that

are engaged in antigen presentation to T cells as well as phagocytosis. Adaptive immunity develops when innate immunity fails to eliminate infectious pathogens and the infection becomes established. T cells, which are activated by antigen presentation cells (APCs), and B cells are among the cells of the adaptive immune system. T cells are divided into three types: cytotoxic T cells with the CD8 receptor, which are involved in direct killing of infected damaged cells and tumour cells; T helper cells with the CD4 receptor, which are important in coordinating the responses of other immune cells; and T regulatory cells (Treg), which are CD4-bearing T cells that are important in maintaining immune tolerance [5,6].

Nutrition can support the functioning of immune cells, helping them to not only launch effective responses against infections, but also to end such reactions quickly when necessary, avoiding any underlying persistent inflammation. A natural immune booster is an additional immunising substance that aids in increasing and maintaining the body's immunological response. Curcumin, an active component in turmeric, is a natural antioxidant that has been utilised as an immune booster, antibacterial, anti-pathogen, and detoxifying agent [7]. Our team has a wealth of knowledge and research experience, which has resulted in high-quality papers [8-27].

The purpose of this study is to assess dentistry students' understanding of the importance of an immune-boosting diet.

## 2. MATERIALS AND METHODS

A survey of dental undergraduate students at Saveetha Dental College was undertaken using an online questionnaire to assess their knowledge of the importance of an immune-boosting diet. The survey was completed

voluntarily by the participants. After a thorough examination of the existing literature, the survey instrument, which was a validated questionnaire, was created. There were 14 questions in the questionnaire. To acquire the most responses, the questionnaire was distributed to participants via an online survey platform. Only completed surveys were used for analysis, and those that were incomplete were discarded. Descriptive statistics were utilised as the statistical test. All of the responses were recorded and tabulated. SPSS software was used to compile the data. A statistically significant Chi Square test with a p value of 0.05 was used.

### 3. RESULTS AND DISCUSSION

A total of 100 people took part in the survey, 50% of whom were men and 50% of whom were women (Fig.1). 96% of those surveyed agreed that diet has a direct impact on our health (Fig. 2). Another question concerned the number of meals you consume each day. 48% have responded three times, and 48% have responded twice (Fig. 3). 98% of people believe that missing meals has a negative impact on our health and immunity (Fig. 4). 94% of people think Indian spices can help us stay healthy (Fig. 5).

Green tea is thought to be a good antioxidant by 92% of those surveyed (Fig. 6). Instead of only taking one or the other, 57% believe that combining natural foods and supplements can help increase immunity (Fig. 7). Fat has more calories than carbohydrates, according to 48% of respondents (Fig. 8). 88% of people believe that eating carbohydrates raises triglyceride levels (Fig. 9). Citrus fruit eating is thought to boost immunity by 97% of people (Fig. 10). The Chi square test between gender and immunity boosters revealed a statistically significant  $p < 0.05$  (Fig. 11).

The modern diet consists of junk food. An empty calorie food is one that is high in calories but low in micronutrients like carbs, proteins, vitamins, minerals, or amino acids, as well as fiber. These foods lack the nutrients that your body requires to remain healthy. As a result, this meal is seen as unhealthy and referred to as junk food [28–30].

People tend to skip meals due to so many reasons such as stress, weight loss etc. skipping a meal can affect the diet quality of a person which leads to greater intake of energy at subsequent meals [31,32].

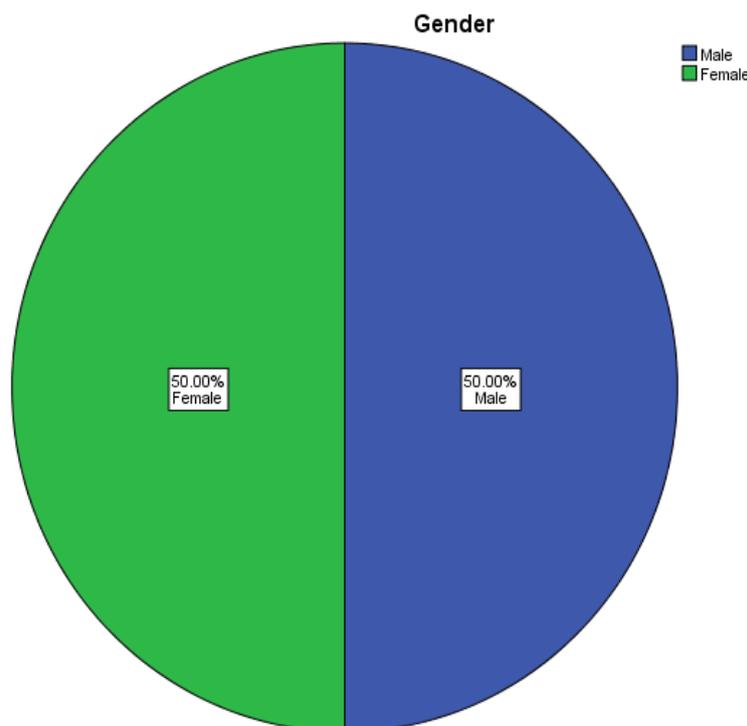


Fig. 1. A pie chart depicting the gender distribution based on the responses. Males (blue) make up 50% of the population, while females make up 50% of the population (green)

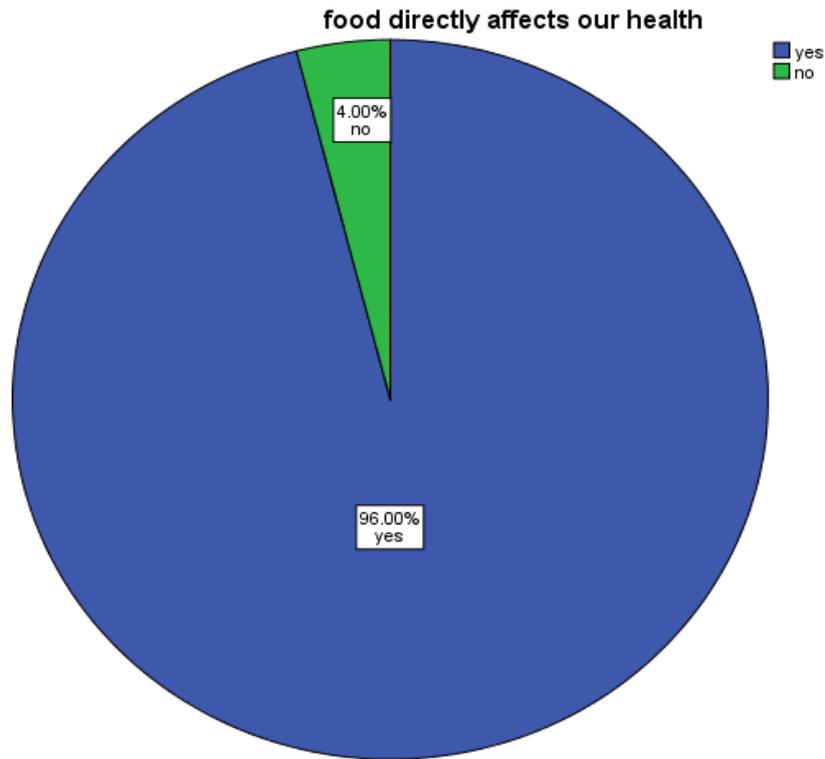


Fig. 2. A pie chart depicting the distribution of responses to the question "does food directly affect our health," with yes (96%) being the most popular option, followed by no (4%). (green)

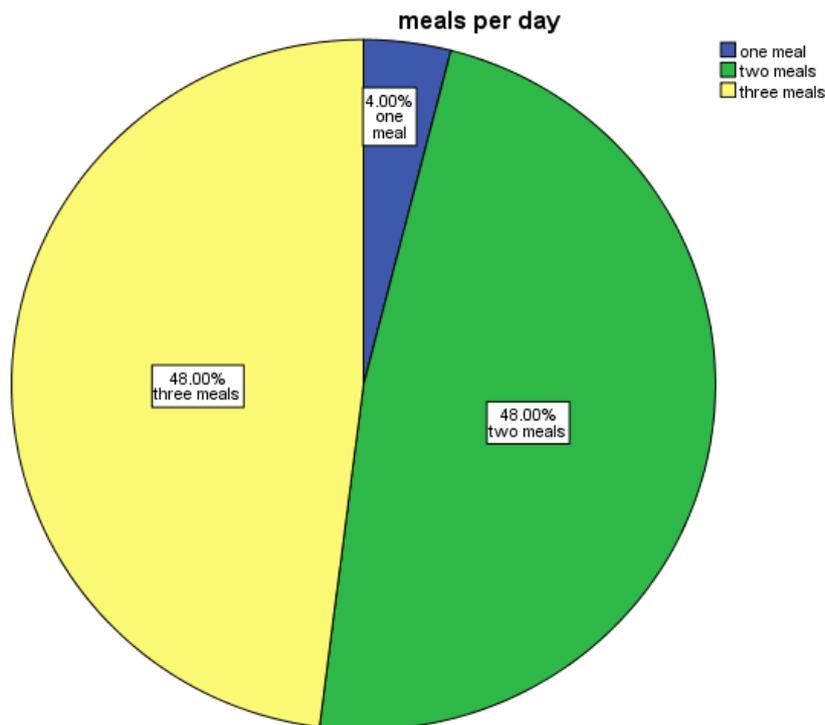
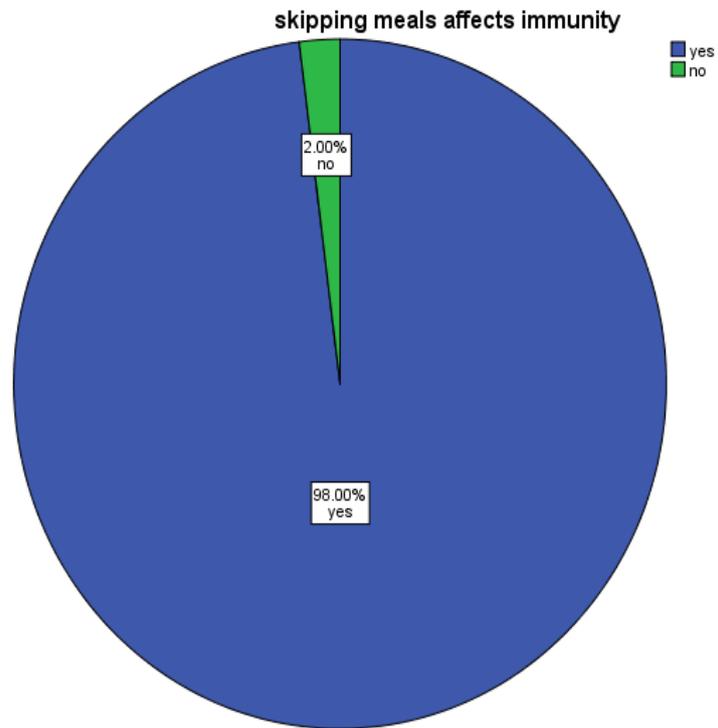
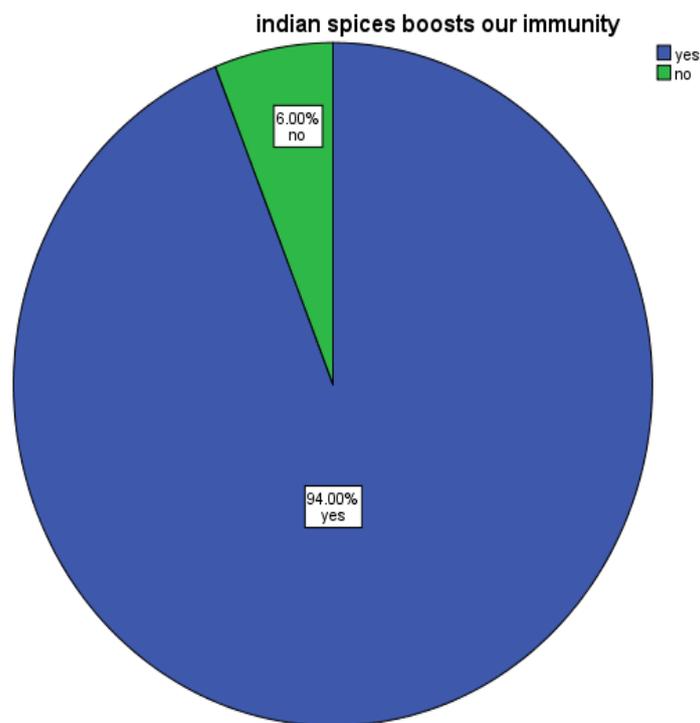


Fig. 3. A pie chart depicts the distribution of responses to the question "How many meals do you eat per day," with two meals (green) and three meals (yellow) receiving the most votes (blue), followed by one meal (4%). (blue)



**Fig. 4. A pie chart depicting the distribution of responses to the question “ does skipping meals affect our immunity/health” with yes being the most answered option-98%(blue ) followed by no-2%(green)**



**Fig. 5. A pie chart depicting the distribution of responses to the question“ does indian spices boost our immunity” with yes being the most answered option-94%(blue ) followed by no-6%(green)**

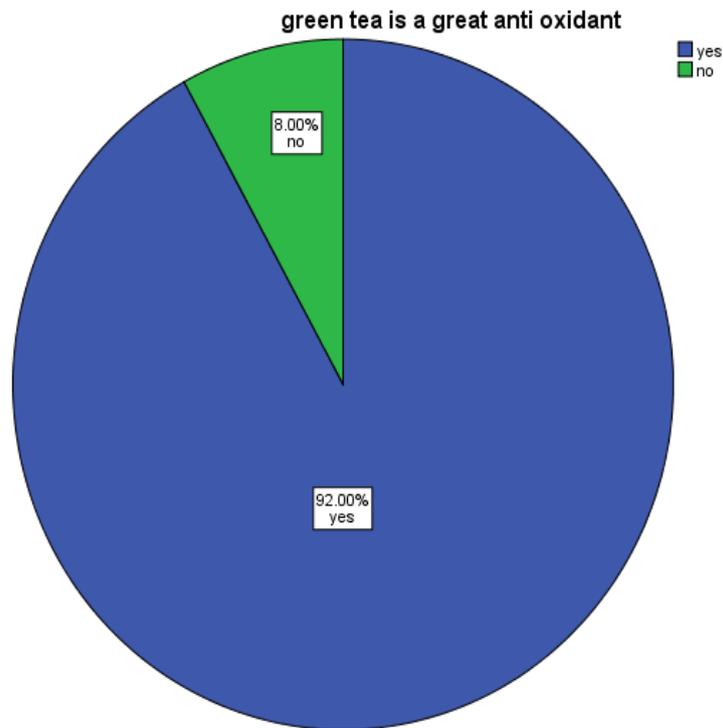


Fig. 6. A pie chart depicting the distribution of responses to the question “ is green tea a great antioxidant” with yes being the most answered option-92%(blue ) followed by no-8%(green)

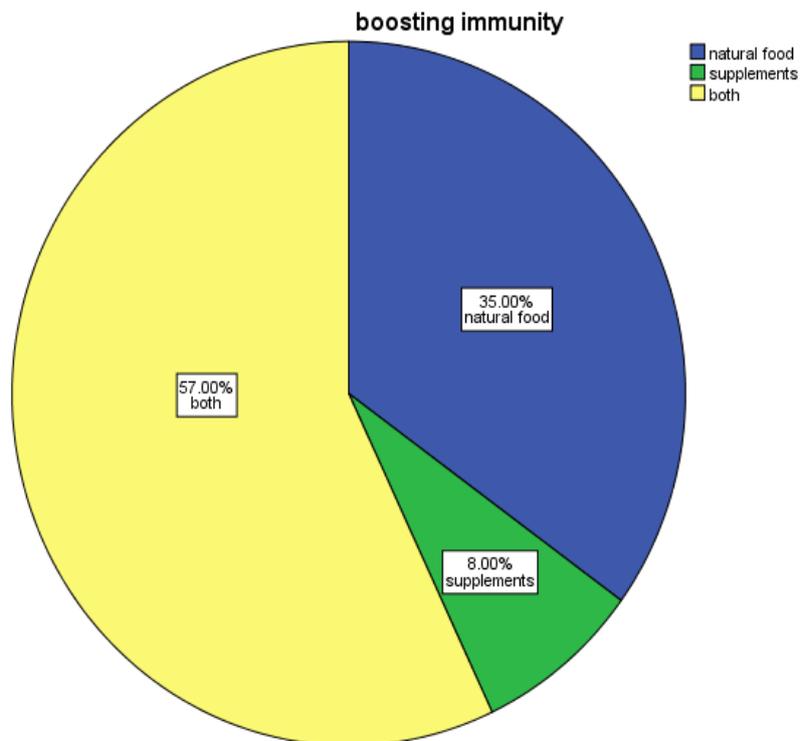
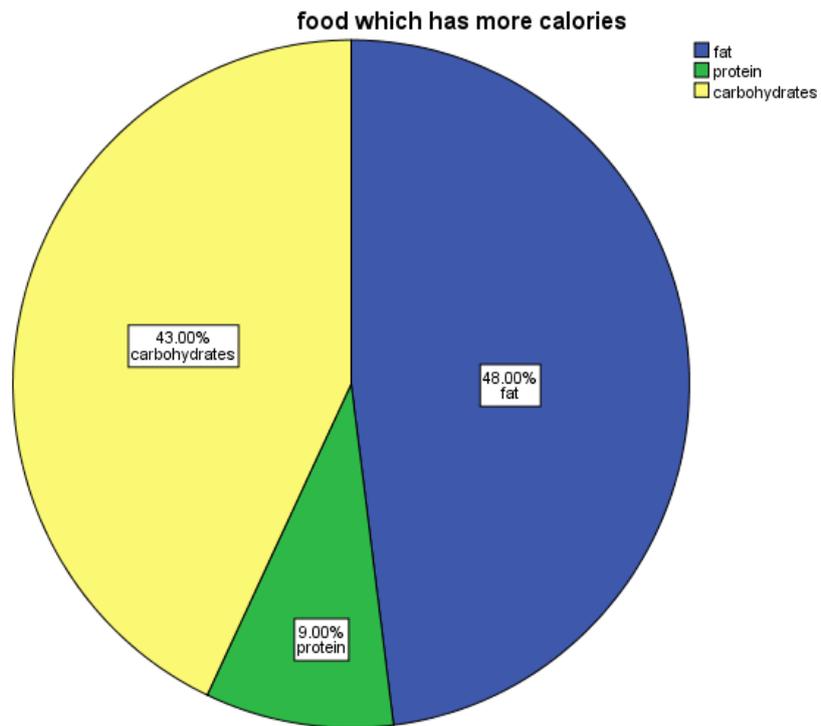
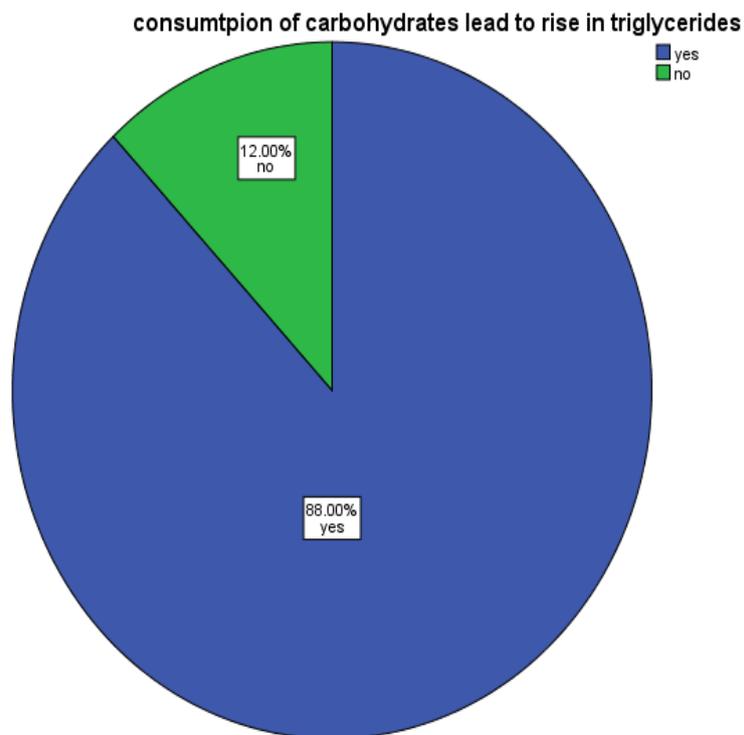


Fig. 7. A pie chart depicting the distribution of responses to the question “what helps in boosting immunity ” with both, natural food and supplements being the most answered option-57%(yellow) followed by natural food-35%(blue) and 8% supplements(green)



**Fig. 8. A pie chart depicting the distribution of responses to the question “which food has more calories” with fat being the most answered option-48%(blue) followed by carbohydrates-43%(yellow) and 9%-protein(green)**



**Fig. 9. A pie chart depicting the distribution of responses to the question “does consumption of carbohydrates lead to rise in triglycerides” with yes being the most answered option-88% (blue ) followed by no-12% (green)**

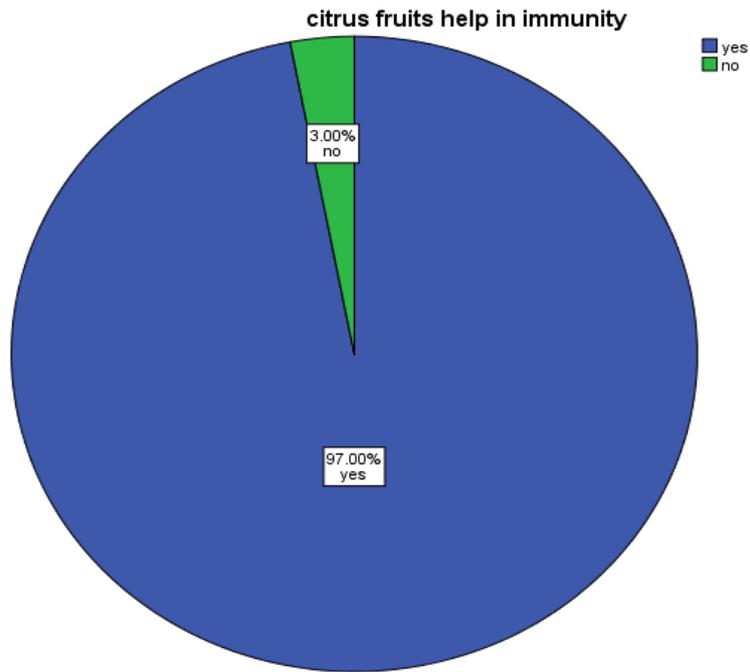


Fig. 10. A pie chart depicting the distribution of responses to the question “does citrus food help in immunity” with yes being the most answered option-97% (blue ) followed by no-3% (green)

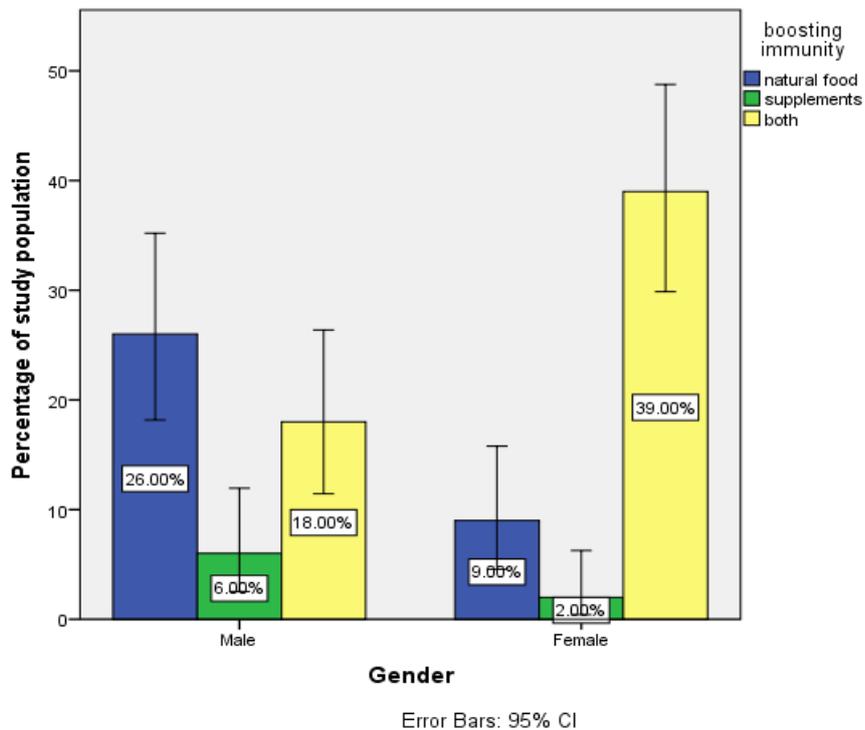


Fig. 11. This error bar graph depicts the relationship between Gender and Immune Boosting. Gender is represented on the X-axis, while the proportion of the study population is represented on the Y-axis. Natural foods are shown by blue, supplements are indicated by green, and both are indicated by yellow. The Chi square test yielded a statistically significant result of  $p=0.000(p<0.05)$

Turmeric provides instant relief from cough and cold, respiratory problems such as sinus and upper respiratory problems such as bronchial asthma and is proven to be an excellent immunity booster. Black pepper is also an excellent immunity booster as it has antioxidants, antimicrobial, and gastro-protective properties. Cinnamon is an aromatic spice that has antibacterial, antiviral, and antifungal properties that helps in dealing with infections and respiratory problems. Clove is an anti-inflammatory and antibacterial with high amounts of eugenol which can help in dealing with infections, helps in giving relief from coughing and reduces the throat pain, It is also an excellent remedy to treat oral hygiene. Fenugreek is a herb that acts as a natural antioxidant and strengthens the immune system. Cumin seeds work as antioxidants and help in fighting with the free radicals keeping the body healthy and glowing from inside. It helps in maintaining blood sugar, fights bacteria and has an anti-inflammatory, antiseptic effect which helps in reducing the pain. Cardamom decreases the cold and cough and helps in relieving from certain respiratory problems [33–35]. Previous studies have shown that people were aware about the use of spices and how it can increase our immunity [36,37].

Increased carbohydrate consumption has been linked to an increase in triglyceride levels in studies. Triglycerides are fats that provide energy to your body. Because your body produces triglycerides and also obtains them from the foods you eat, greater calorie consumption can result in an increase in triglycerides, which can increase the risk of heart disease [38,39].

Limitations of the study include short sample size and a unicentred study.

#### 4. CONCLUSION

From the results based on the survey we can say that the students were aware about the importance of an immune boosting diet and how it can affect our immunity. But it has to be seen how many of them actually follow this diet. People have to especially now due to the ongoing pandemic and the only thing which can protect us from this pandemic is having a good diet which can improve our immune system.

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- Saveetha Dental College
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#### CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the author(s).

#### ETHICAL APPROVAL

It is not applicable.

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#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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