Knowledge and awareness on natural dietary immunoboosters to combat Covid 19-A survey

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ABSTRACT

A natural immune booster is an additional immunizing agent which helps to increase and sustain the immune response of the body. Circumin is an active compound in turmeric which is a natural antioxidant which is used as an immune booster, antimicrobial, antipathogen and as a detoxifying agent. Pepper contains piperine that has antioxidant potential which will decrease the level of lipid peroxidase and has immunomodulatory activity, it increases macrophage migration index and phagocytic index. The vitamin C is a powerful antioxidant that reduces the duration and severity of upper respiratory tract infections. Along with natural immune boosters, healthy practices like yoga and meditation will regulate and maintain organ functions, thereby improving our immunity. The main aim of the study is to create an awareness on natural dietary immunoboosters to combat COVID 19. A self structured questionnaire comprising of about 15 questions was prepared and circulated through online based i.e. Google forms. The results were obtained and statistically analyzed through SPSS software. The survey was done on a small scale population comprising 110 participants in which 62 male (56.4%) and 48 female (43.6%) participated. About 95.5% of the population are aware that taking citrus fruits that have vitamin C will boost their immunity but only 4.5% of them are not aware. 80% of the population are aware that green tea is a powerful antioxidant which will help in building immunity but 9.1% were not aware and 10.9% was not sure of the fact. 82.7% of the population are well aware that spinach and other green vegetables have to be cooked as little as possible to retain nutrients present in them but only 10.9% of them were not sure and 6.4% of them were not aware.

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INTRODUCTION

A Natural immune booster is an additional immunizing agent which helps to increase and sustain the immune response of the body. The immune response is evoked by our body (Ngcobo, 2016). Curcumin is an active compound in turmeric which is a natural antioxidant which is used as an immune booster, antimicrobial, antipathogen and as a detoxifying agent (Prasad *et al.*, 2014). Pepper contains piperine that has antioxidant potential which will decrease the level of lipid per-

oxidase and has immuno modulatory activity, it increases macrophage migration index and phago-cytic index. These indices confirm piperine is an immunobooster (Kumar, 2011).
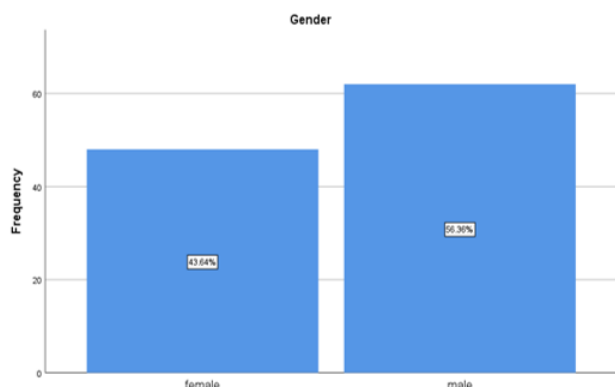

Figure 1: Graph showing the number of male and the number of females participating in the survey
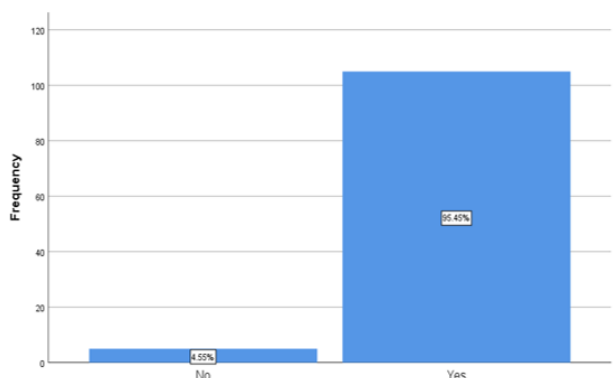

Figure 2: Graph showing the awareness of citrus fruits boosting the immunity

Figure 3: Graph showing the awareness of betacarotene to improve immune function

Figure 4: Bar graph showing the supplements which ward off flu
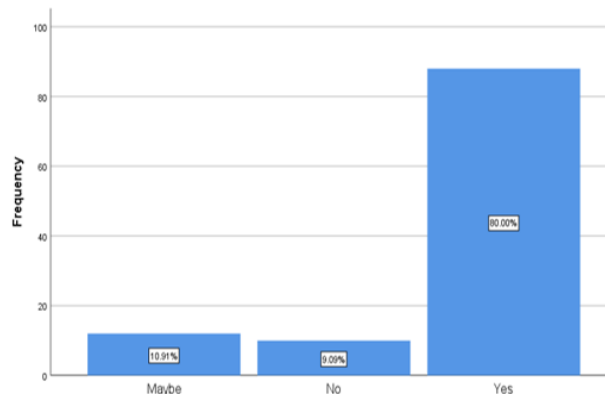
Figure 5: X axis shows the response; Y axis shows the frequency Graph showing that most of them are aware (80%) of green tea is a powerful antioxidant that helps to build immunity

The vitamin C is a powerful antioxidant that reduces the duration and severity of upper respiratory tract infections (Carr and Maggini, 2017). Along with natural immune boosters, healthy practices like yoga and meditation will regulate and maintain organ functions, thereby improving our immunity (David, 2019), will make the individual to have high muscular endurance (Abigail, 2019), improve thyroid gland functioning in people affected with goitre (Samuel and Devi, 2015). It also helps in weight reduction in obese individuals (Fathima, 2016; Baheerati and Devi, 2018) and lowers the risk of myocardial infarction (Renuka and Sethu, 2015) by lowering the fat deposition. Individuals should have good sleep quality (duration) and sleep pattern to maintain proper immune function (Ilankizhai and Devi, 2016).

Respiratory diseased patients like asthma and wheezing patients will generally have low immunity, so they are easily prone to immunity, so they are eas-
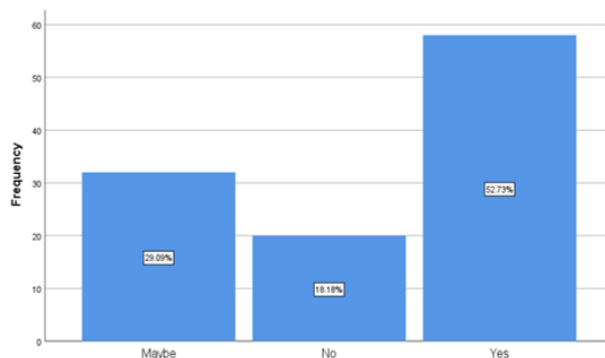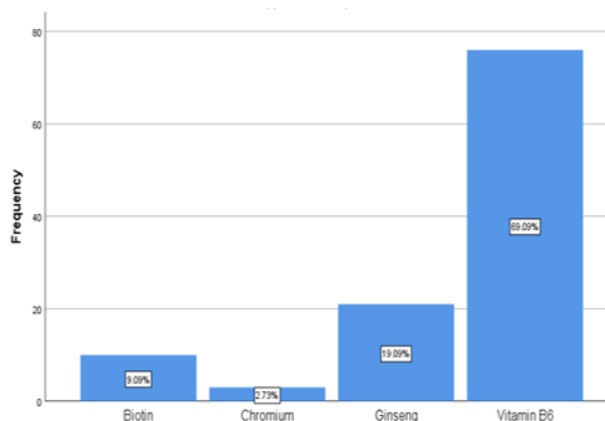
ily prone to communicable and pandemic diseases. So these patients should be precautious and should have a proper diet and lifestyle (Dave and Preetha, 2016) and even due to having pets at home, may cause respiratory disease (Timothy *et al.*, 2019). If proper diet is taken, the risks of getting fatty liver disease (Choudhari and Jothipriya, 2016), neonatal jaundice and kernicterus (Harsha, 2015) is lowered. Snoring is a life threatening condition where the individual fails to have proper sleep quality which makes them fall sick often (Shruthi and Preetha, 2018) and will mostly have lower back pain (Swathy and Sethu, 2015). Onychocryptosis is a condition in which the corner of the toenail grows into flesh and this condition is not caused due to fall in immunity, it is of genetic origin or poor nail hygiene and maintenance (Iyer *et al.*, 2019). Removal of adenoids due to various pathological reasons results in increased risk of developing respiratory infections and allergic conditions, thereby it is important that such individuals should take more dietary immune supplements (Devi and Sethu, 2018).
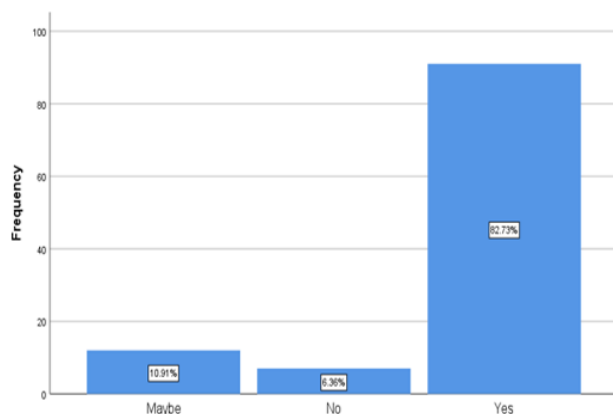

Figure 8: Graph showing the knowledge of minerals for maintaining optimal immune function
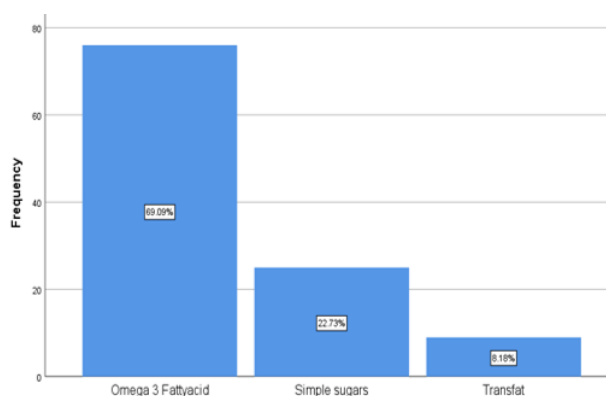
Figure 9: Graph showing the nutrients that help in improving the immune system

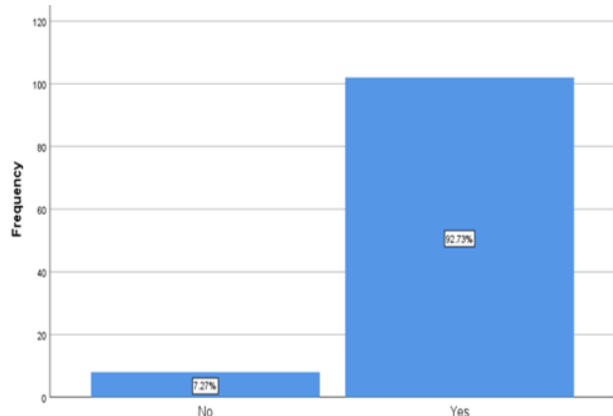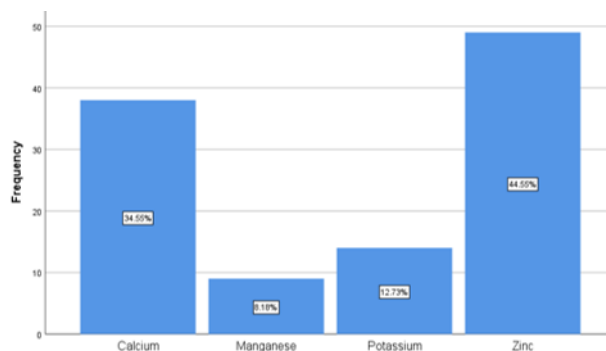**Figure 6: X axis gives the responses and Y axis shows the count**

Figure 7: Graph showing the awareness of spices and condiments regulate the immune system

Previous research by Sarfraz (2020) gave 6 smart steps to build immunity against COVID 19, the study explained how vitamins improve the immunity through dietary nutrients which are immunity stimulatory agents. The study also gave nutritional diets for immunity. Another study by Martineau (2019) concluded that supplementation of vitamin D_3 or D_2 will lower the risk of acute respiratory infections. So the supplementation of vitamin D will be useful for patients of respiratory infections. The study by Janahi *et al.* (2011) was studied to know the general public knowledge on the preventive behaviours against H_1N_1 pandemic, so, the public knowledge was known among people of kingdom of Bahrain, this study was supported by Gupta (2015) was studied to know the knowledge, attitude and practices during swine flu pandemic. The cure for COVID 19 is still unknown, so people should know how to be aware of preventing themselves from the infection by taking natural food supplements. The main aim of the study is to create an awareness on natural dietary immunoboosters to combat COVID 19 and to study their knowledge on natural dietary immunoboosters.
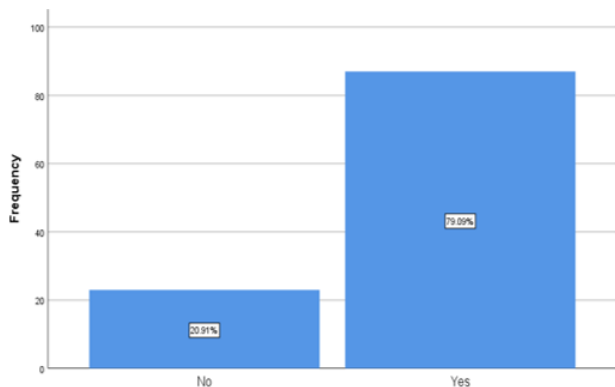
Figure 10: Graph showing the awareness of chicken soup improves immune system during cold
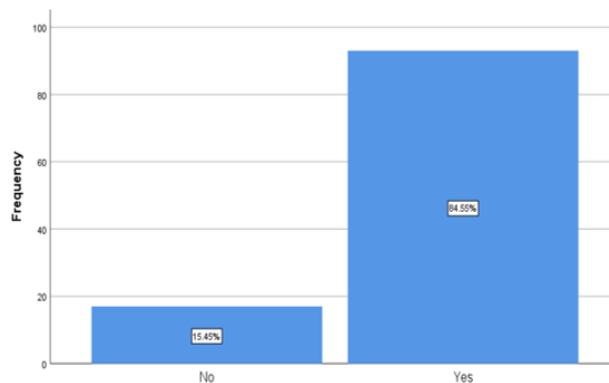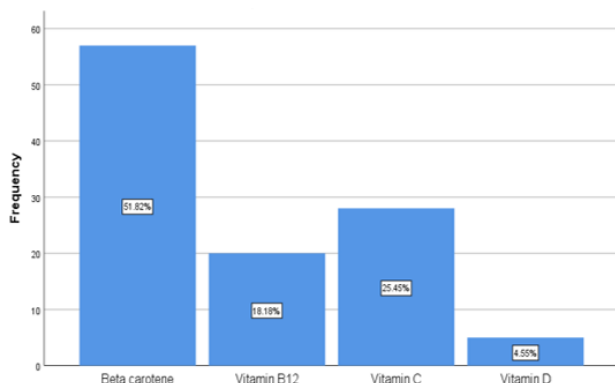

Figure 11: Graph showing the orange colored vegetables are antioxidants containing beta carotene

Figure 12: X axis shows the category and Y axis gives the frequency

Figure 13: Graph showing that eating fresh fruits and vegetables will boost your immunity

Figure 14: Graph showing that staying hydrated regulates immunity to fight COVID 19

ing about 15 questions was prepared and circulated through google forms. The statistics test that was
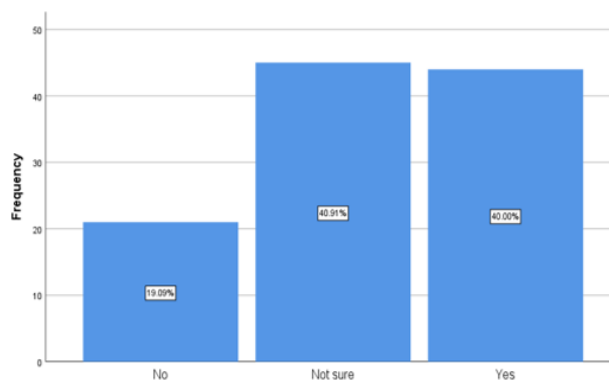
Figure 15: X axis gives the category and Y axis gives frequency

MATERIALS AND METHODS

The study was done as an online setting which is a prospective observational study. The pros of the study were large numbers of data that can be stored and was cost effective and easy to handle and cons where the options may not be available to the participant and the participants truthfulness cannot be tested. A self structured questionnaire compris-

used is descriptive statistics from SPSS software. The method of representation of output variables was a bar graph. The questionnaire was validated internally through three staff in college and checked and externally through three random persons and also checked. The independent variables of the study were height, weight, age, skin tone and dependent variables are natural dietary immunoboosters, food habits, COVID 19. The results were obtained from SPSS software.
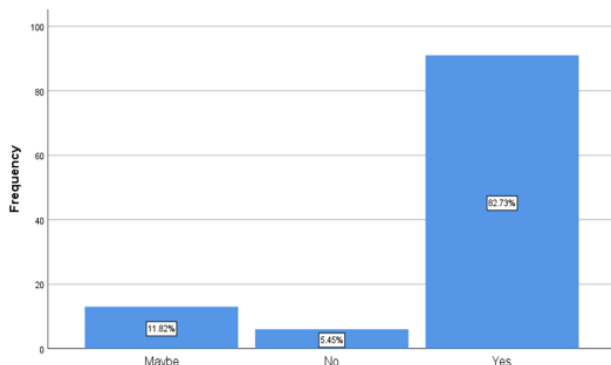
Figure 16: Graph showing ginger, amla and turmeric help against COVID 19 infection

RESULTS AND DISCUSSION
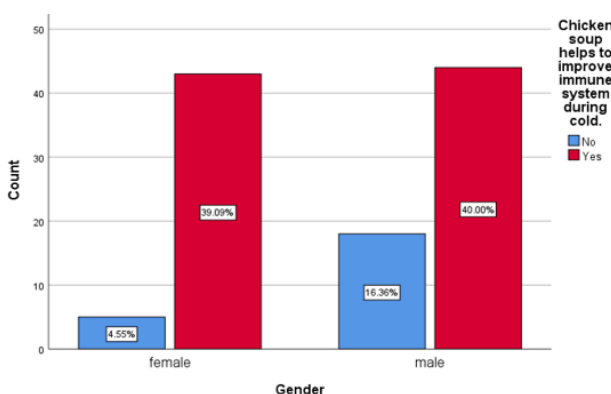
Figure 17: Bar graph association Chi square analysis between gender and awareness of chicken soup that improves immunity during cold. axis gives gender and Y axis gives frequency

Figure 18: Bar graph representing association between gender and awareness of chicken containing vitamin B_6

Figure 18 shows the graph shows participants who are aware in green color, who are not aware in red color and who are not sure in blue color. Out of 35.45% participants who are aware, about 18.18% are males and 17.27% are females, so males are

more aware than females that chicken contains vitamin B_6. Chi square test was done and the association was found not to be statistically significant. Pearson Chi square value is 3.756, p-value is 0.153 and it is not statistically significant.
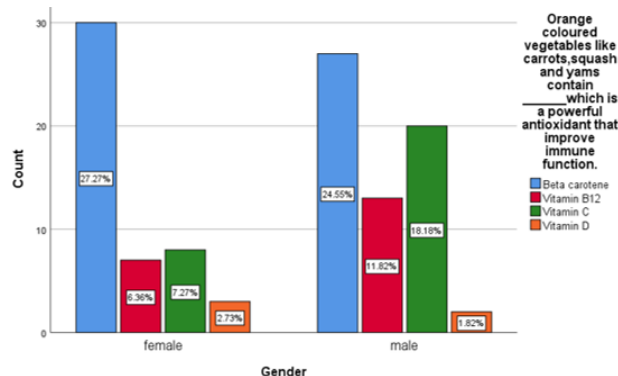
Figure 19: Bar graph association Chi square analysis between gender and awareness of orange colored vegetables that are antioxidants containing beta carotene
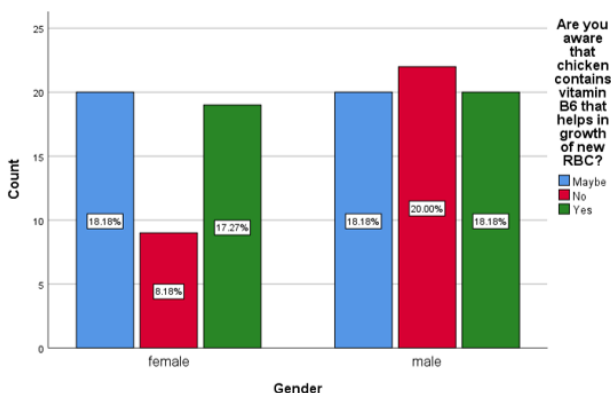
Figure 19 shows the graph shows the participants who answered beta carotene in blue color, vitamin B_{12} in red color, vitamin C in green color and vitamin D in orange color. Out of 51.82% participants who answered beta carotene, about 24.55% are males and 27.27% are females, so females are more aware than males about the fact that orange colored vegetables contain beta carotene. Chi square test was done and the association was found not to be statistically significant. Pearson Chi square value is 5.610, p-value is 0.132 and it is not statistically significant.

Figure 20: Bar graph representing association between gender and belief of eating fresh fruits and vegetables would boost immunity against COVID19

Figure 20 shows the graph shows participants who are aware in red color and who are not aware in blue color. Out of 84.55% participants who are aware, about 45.45% are males and 39.09% are females, so males are having more belief than females that eat-

ing fresh fruits and vegetables boosts immunity to combat COVID 19. Chi square test was done and the association was found not to be statistically significant. Pearson Chi square value is 1.654, p-value is 0.198 and it is not statistically significant.

Figure 21 shows the graph shows participants who are aware in green color, who are not aware in red color and who are not sure in blue color. Out of 82.73% participants who are aware, about 44.55% are males and 38.18% are females, so males are more aware than females that ginger, amla and turmeric are natural immunity supplements against COVID 19. Chi square test was done and the association was found not to be statistically significant. Pearson Chi square value is 1.369, p-value is 0.504 and it is not statistically significant.
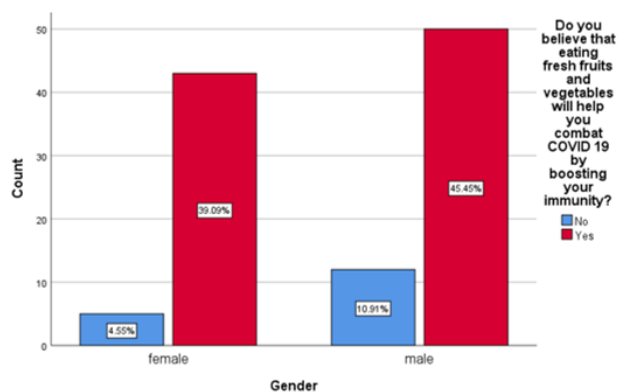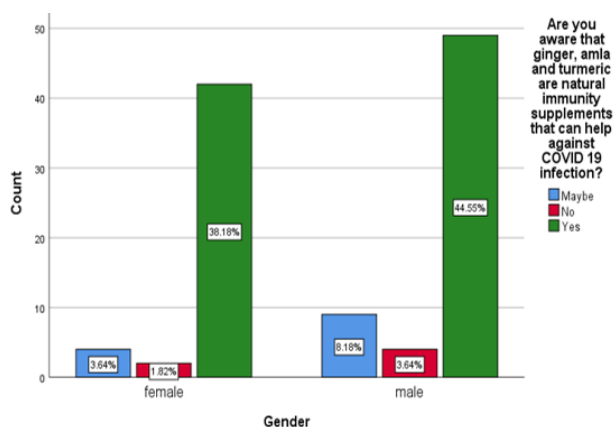

Figure 21: Bar graph representing association between gender and awareness of ginger, amla and turmeric that are immunity supplements which help against COVID 19

Figure 1, represents X axis shows the gender and Y axis shows Frequency.

Figure 2, represents X axis showing the response; Y axis gives the frequency. Graph showing that most of them are aware (95.45%) that taking citrus fruits will boost immunity.

Figure 3, represents X axis shows the categorical response andY axis the count. Results show that most of them are aware (52.73%) that betacarotene improves immune function, few are not aware and not sure.

Figure 4, represents X axis shows the response; Y axis shows the frequency Most of them are not aware that ginseng only helps us to ward off flu. Only few are aware of the fact (19.09%).

Figure 5, represents X axis: Response; Y axis: Frequency.

Figure 6, represents Graph shows that most of them are aware (82.73%) that spinach and other green

vegetables should be cooked as little as possible to retain nutrients.

Figure 7, represents X axis gives the responses and Y axis gives the count. Graph shows that most are aware (92.73%) that spices and condiments regulate the immune system.

Figure 8, represents X axis shows the minerals and Y axis shows the frequency. Graph showing that most are aware (44.55%) that zinc is the mineral that maintains optimal immune function.

Figure 9, represents X axis gives the category and Y axis gives the frequency. Graph showing that most are aware (69.09%) that omega 3 fatty acid is the nutrient that improves immune function.

Figure 10, represents X axis shows the category and Y axis shows the frequency. Graph showing that most are aware (79.09%) that chicken soup improves immune system during cold.

Figure 11, represents X axis gives the category and Y axis gives the frequency. Graph showing that most are aware (51.82%) that orange colored vegetables contain beta carotene.

Figure 12, represents Graph showing that most are not sure (36.36%) that chicken contains vitamin B6 that helps in growth of new RBC while 35.45% are aware.

Figure 13, represents X axis gives the category and Y axis gives the frequency. Graph showing that most are aware (84.55%) that eating fresh fruits and vegetables boosts immunity to combat COVID 19.

Figure 14, represents X axis shows the category and Y axis gives the frequency. Graph showing that most are aware (75.45%) that staying hydrated regulates immunity to fight COVID 19.

Figure 15, represents Graph showing that most are not sure (40.91%) that a low carb diet reduces risk of COVID 19 but to the same level, they are aware of it (40%).

Figure 16, represents X axis gives the category and Y axis gives frequency. Graph showing that most are aware (82.73%) that ginger, amla, turmeric are natural supplements which will help against COVID 19.

Figure 17, represents X axis gives gender and Y axis gives frequency.

Figure 18, represents X axis gives gender and Y axis gives frequency.

Figure 19, represents X axis gives gender and Y axis gives frequency.

Figure 20, represents X axis gives gender and Y axis gives frequency.

Figure 21, represents X axis gives gender and Y axis gives frequency.

The survey was done on a small scale population comprising 110 participants in which 62 male (56.4%) and 48 female (43.6%) participated (Figure 1). From the survey, it was found that 95.5% of the population were aware of the fact that taking citrus fruits having vitamin C will boost their immunity but only 4.5% of them were not aware of the same (Figure 2). 52.7% of the population were aware that Beta carotene improves immune function, but 18.2% were not aware and 29.1% were not sure of the fact (Figure 3). Among biotin, chromium, ginseng, vitamin B_6; the supplements that help us to ward off flu were answered as 9.1% biotin, 2.1% chromium, 19.1% ginseng (correct answer) and 69.1% vitamin B_6 (Figure 4). 80% are aware that green tea is a powerful antioxidant which will help in building immunity but 9.1% were not aware and 10.9% were not sure of the fact (Figure 5). 82.7% of the population were well aware that spinach and other green vegetables had to be cooked as little as possible to retain nutrients present in them but only 10.9% of them were not sure and 6.4% of them were not aware (Figure 6). Mostly about 92.7% of them were well aware that spices and condiments of the Indian kitchen would definitely help in regulating the immune system, but 7.3% were not aware of the fact (Figure 7). Then, among calcium, manganese, potassium, zinc; the mineral for maintaining optimal immune function were answered as 34.5% calcium, 8.2% manganese, 12.7% potassium, 44.5% zinc as zinc is the mineral that maintains optimal immune function as zinc regulates immune function as its deficiency suppresses immune function (Figure 8). Among omega 3 fatty acid, simple sugars, trans fat, the nutrient that improves immune function was answered as 69.1% omega 3 fatty acid, 22.7% simple sugars, 8.2% trans fat, so most of the population were aware that omega 3 fatty acid is the nutrient that improves immune function (Figure 9). 79.1% of the population were aware that chicken soup improves the immune system during cold but 20.9% were not aware of the fact (Figure 10). Among beta carotene, vitamin B_{12}, vitamin C, vitamin D, the orange colored vegetables that contains powerful antioxidants was answered as 51.8% beta carotene, 18.2% vitamin B_{12}, 25.5% vitamin C, 4.5% vitamin D, most of them were not aware that beta carotene is present in orange colored vegetables which is a powerful antioxidant (Figure 11). 35.5% of them were aware that chicken containing vitamin B_6 helps in growth of new RBC but 36.4% of them were not sure and 28.2% were not aware of the fact (Figure 12). About 84.5% believe that eating fresh fruits and vegetables will help us to combat COVID 19 by boosting immunity but only 15.5% was not aware of the fact (Figure 13). Nearly 75.5% agreed that staying hydrated would help to regulate immunity to fight COVID 19 only 17.3% were not sure and 7.3% of them were not aware of the fact (Figure 14). 40% of the population were aware that low carb diet would reduce the risk of COVID 19 but nearly 40.9% were not sure of the fact and 19.1% of them were not aware (Figure 15). 82.7% of them were aware that ginger, amla, turmeric are natural immunity supplements that help against COVID 19 infection, only 5.5% were not aware and 11.8% were not sure of the health benefit behind it (Figure 16). The Chi square analysis was done using gender as a fixed parameter and the p value with their significance was obtained ($p \leq 0.05$ means statistically significant; $p > 0.05$ means not statistically significant). The Chi square analysis was performed between gender and awareness of chicken soup that improves immunity during cold and the p-value was found as 0.017 and it was observed as statistically significant (Figure 17). The Chi square analysis was performed between gender and awareness of chicken containing vitamin B_6 that helps in growth of new RBC and the p-value was found as 0.153 and it was not statistically significant (Figure 18). The Chi square analysis was performed between gender and awareness of orange colored vegetables that are antioxidants containing beta carotene and the p-value was found as 0.132 and it was not statistically significant (Figure 19). The Chi square analysis was performed between gender and belief of eating fresh fruits and vegetables would boost immunity against COVID 19 and the p-value was obtained as 0.198 and it was not statistically significant (Figure 20). The Chi square analysis was performed between gender and awareness of ginger, amla and turmeric that are immunity supplements which help against COVID 19 and the p-value was obtained as 0.504 and it was not statistically significant (Figure 21).

Previous study by Sekhri *et al.* (2013) concluded that 71.1% of the population are aware that turmeric has medicinal properties that fight against any pathogens, in the present study it is observed that about 82.7% of the population are aware that ginger, turmeric, amla help us to fight against present pandemic issue which is also supported by another study by Dominic *et al.* (2018) concluded that 92.6% of the population was aware that ginger has role in infection control. A study by Patterson (1990) was studied in American population, 56% of population was aware that eating fresh fruits and vegetables will boost immunity, in present study, 84.5% believed it and in another

study by Gupta (2015) concluded that 72.6% of population will drink water and stay hydrated during H_1N_1 pandemic, in the present study 75.5% agreed to the statement. The study by Almufarej (2019) concluded that 49.7% aware, 50.3% not aware of food sources of vitamin B_{12} in Saudi population, in present study, the orange colored vegetables contain beta carotene not vitamin B_{12} where 51.8% are aware of the vitamin B_{12} food sources in Indian population, which is contradictory to the study. Most of the results of previous studies strongly agreed with the results of the present study.

The limitations of the present study is that the study was done in a small scale population of 110 participants and in a homogeneous population. The participant truthfulness is not tested, so the results may be biased. The options may not be available for the participants to answer the question, so minimal error may be present.

Knowledge of natural dietary immunoboosters is a big boon in present day pandemic chaos as there is no cure to COVID 19 and also no vaccines. So, it is always better to stay safe and these natural dietary immunoboosters are very important which maintains and regulates our immunity.

CONCLUSIONS

From the survey results, it is clear that the majority of the sample population were aware of the fact that food supplements can regulate and boost natural immunity. Quite sarcastically it was to be scrutinised as to how far this knowledge is put to actual practice by the same population. It is also to be noted that in this present situation of 'stay at home' due to the pandemic, how far practising these healthy dietary practices would be feasible to the people.

ACKNOWLEDGEMENT

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