

Original Research Article

A cross-sectional study for determining the perception and preferences of immunity boosters for protection against COVID-19

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ABSTRACT

Background: The World Health Organisation declared the novel coronavirus (COVID-19) outbreak as a global pandemic on March 11, 2020. The consumption of vitamins, especially C, D, and zinc, hydroxychloroquine, and Arsenicum album 30 (homeopathy), has increased tremendously. However, the clinical trial showing the benefits of these agents is still underway though there have been a lot of discussion about these in print, electronic, and social media.

Method: A questionnaire-based observational study was conducted. The participants were inquired about the use of any type of immunity booster by them and the source of information regarding the same. The data was analysed using Excel and Python.

Results: Our study included 1147 participants. A dramatic increase of 21.97% in the consumption of immunity-boosting agents after the COVID-19 outbreak was observed, maximally in Ayurveda. The major source of information for immunity-boosters was provided by friends/family/relatives (50.4%). 52.7% of the respondents selected Ayurveda as their preferred choice of immunity booster (prophylaxis). If the respondents were to develop any of the COVID-19 symptoms, the majority (45.1%) decided to contact their family doctor, and 53.7% chose Allopathy as their preferred system for treatment. 91.5% of the respondents agreed to take a vaccine if it develops.

Conclusion: There has been a boom in the immunity booster drug market because people are selecting immunity boosters despite no scientific background. It is imperative to educate people regarding the same and also conduct research studies to find benefits, if any.

Keywords: Immunity, Boosters, Ayurvedic medicine, Homeopathy, COVID-19 vaccine

INTRODUCTION

The World Health Organization (WHO), on March 11, 2020, had declared the novel COVID-19 outbreak a global pandemic.¹ Due to its high speed of transmission and the presence of asymptomatic carriers, it is becoming challenging to keep incidence in check. The total number of cases in the world have reached over 25 million, with India having over 3.6 million cases till date.²

India's response to tackling this pandemic relies on a combination of its three systems of medicine i.e. allopathy, ayurveda, and homeopathy. The first line of defence our body has against viruses is the innate immune system. Thus, the Indian government has put a strong emphasis on improving immunity. Ministry of AYUSH has recommended self-care guidelines with special importance on respiratory health. They have stressed upon the use of Samshamani Vati (ayurveda),

Nilavembu Kudineer decoction (Siddha), Arsenicum album 30 (Homeopathy). Alongside these medicines, they have emphasized the consumption of Chavanprash, golden milk, and practice of steam inhalation and oil pulling.³ The national task force for COVID-19 under the Indian Council Of Medical Research also recommended the use of hydroxychloroquine for high-risk population (asymptomatic healthcare workers involved in the care of suspected or confirmed cases of COVID-19 and asymptomatic household contacts of laboratory confirmed cases of COVID-19).⁴ Clinical trials for the use of Emtricitabine/tenofovir disoproxil as prophylaxis are also ongoing.⁵

Anti-viral properties of Zn such as inhibition of virus attachment, uncoating, and infection, and of ascorbic acid by strengthening both innate and adaptive immune system has led to their increased use as popularized by social media platforms.^{6,7} Vit d induces cathelicidins and defensins, lowers viral replication rates, and reduces concentrations of pro-inflammatory cytokines. It also improves immunity. A number of research studies have recommended that people at risk of COVID-19 consider taking it to reduce the risk of infection.⁸

Globally, alternate forms of medicine for prophylaxis are also being considered. For example, the use of Traditional Chinese medicine. Since the beginning of the COVID-19 pandemic, formulations of A. annua have been used in Africa and China for COVID-19 prevention and treatment following claims by government officials.⁹

Amidst this long list of prophylactic and immunity-boosting agents, the National Institute of Health recommends against using any kind of pre/post-exposure prophylaxis, as the clinical trials for all the agents mentioned above are still in development.¹⁰

A vaccine to prevent COVID-19 is probably the best hope, and researchers worldwide are rushing to create one. The acceptance by the general population due to safety concerns will seem to be another problem healthcare official will have to deal. With such diverse, contradicting, and research deficit information available, confusion in the mind of people has increased. With this research, seek to find the perception of people towards the use of immunity boosters to prevent COVID-19 infection.

METHODS

This is a questionnaire based cross-sectional observational study conducted in the general population residing in Gujarat under the guidance of Department of Pharmacology, A.M.C MET Medical College (affiliated with L.G. Hospital, Ahmedabad). A self-developed questionnaire regarding the use of immunity boosters for prevention of COVID-19 infection was used. It was validated by the senior faculty of Department of Community Medicine and Department of Pharmacology

at A.M.C MET Medical College. The questionnaire was prepared using Google Forms and was circulated electronically through social media. The data collection was done for a period of two weeks from July 20, 2020 to July 30, 2020.

The questionnaire contained questions regarding the socio-demographic profile of the participant, choice of immunity booster if using any, source of information regarding the immunity booster, attitude towards vaccination for prevention of COVID-19 infection, etc, in the form of yes or no answers or multiple-choice questions. The percentages of the various options selected by the subjects were calculated and analysed.

The inclusion criterion was the ability to understand and answer google form-based questionnaires and those willing to give written informed consent.

It was mandatory to answer all the questions before form submission. A Google sign-in was kept compulsory to ensure that respondents could fill the questionnaire only once and the confidentiality of the data was assured. The language was kept very simple to present no problem in understanding the meaning of the question. The objectives were duly explained to every respondent and doubts, if any, were clarified. The responses gathered were analysed with the use of Excel and Python software, and appropriate statistical tests were used.

RESULTS

Total 1500 questionnaires were distributed, out of which 1147 responses were obtained and included in the study.

Socio-demographic profile of the study population

The maximum number of respondents were in the age group of 20-40 years. Of the total respondents, 66.1% were males, and 33.9% were females, and the majority, 46.2% of them were graduates (Table 1).

Table 1: Socio-demographic profile of the study population.

Variables	Total (n)	Percentage (%)
Age (years)		
<20	101	8.8
20-40	702	61.2
40-60	283	24.7
>60	61	5.3
Gender		
Male	758	66.1
Female	389	33.9
Education		
Till high school	114	9.9
Graduate	530	46.2
Postgraduate	503	43.9

Immunity booster consumption before and after COVID-19

The study population was inquired about the use of immunity boosters by them before and after the outbreak of the COVID-19 pandemic. They were allowed to choose from multiple branches of medicines as per their consumption. Before COVID-19 pandemic began, 663 people (57.8%) did not prefer to take immunity boosters while 482 (42.19%) were already taking them. After the pandemic, 736 (64.16%) people were taking immunity boosters while only 411 (35.83%) did not prefer taking them. So, an overall increase of 21.97% in the consumption of immunity boosters was seen in the study population after the pandemic (Figure 1).

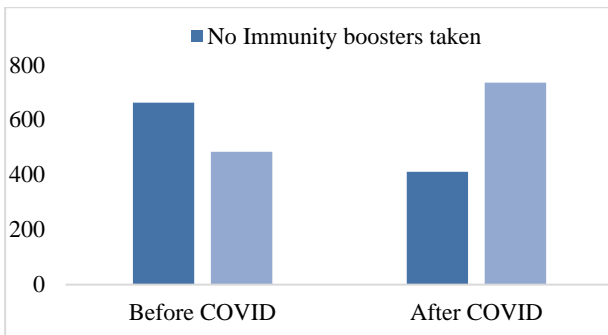


Figure 1: Change in immunity booster consumption before and after COVID-19.

Preference of immunity boosters taken before and after COVID-19

In this study, it was seen that many people took multiple immunity boosters before and after COVID-19 and most of them preferred ayurvedic medicines for the same.

Of all the responses obtained about the preference before COVID-19, 223 (46.07%) were allopathic immunity boosters, 329 (67.97%) were ayurvedic and 54 (11.15%) were Homeopathic.

Of all responses obtained after COVID-19, 326 (44.29%) were allopathic, 556 (75.54%) were ayurvedic and 117 (15.89%) were homeopathic.

So, this study concluded that there was an absolute increase seen in immunity boosters consumed by people from all three systems, but the percentage increase was seen maximum with ayurvedic immunity boosters (7.57%).

Source of information about protective/immunity boosting agents

When asked about the source of information about the protective agents/ immunity boosting agents that the people used, a few used only a single source while most obtained information from multiple sources.

A total of 376 respondents chose a single source of information. Of those resorting to a single source of information, their choices were friends/family/ relatives: 170 (45.21%), family doctor: 74 (19.68%), social media (WhatsApp, Facebook etc): 48 (12.76%), research articles/ WHO guidelines: 39 (10.37%), government sources: 32 (8.51%) and television: 13 (3.45%) respectively.

Out of 1147 respondents, 771 chose multiple sources and amongst them also friends and family were the primary source of information followed by social media (WhatsApp, Facebook, etc.) (Figure 2).

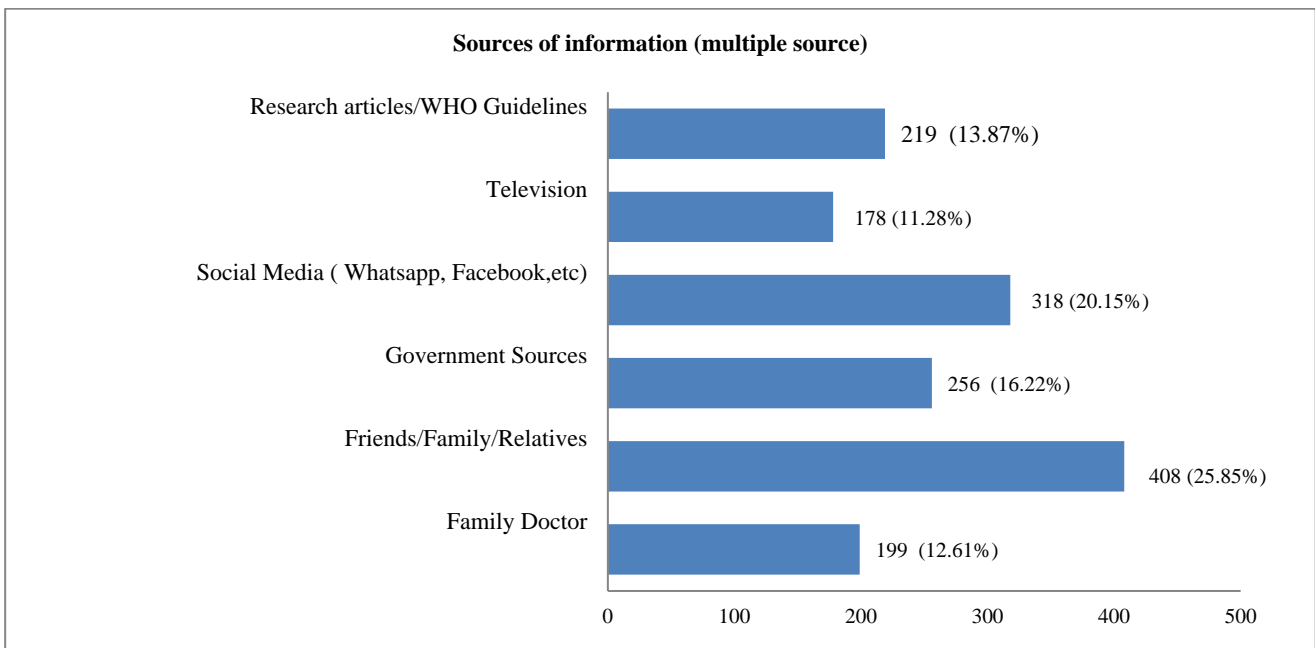


Figure 2: Sources of information about immunity boosters (multiple sources).

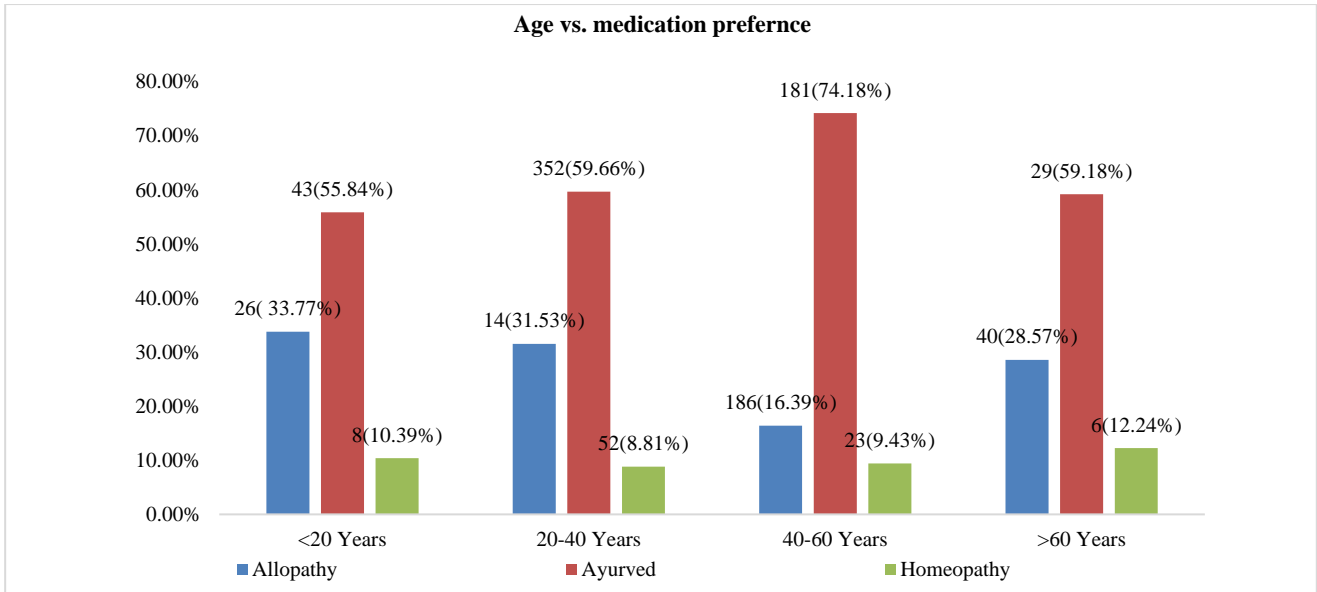


Figure 3: Age-wise preference of branch of medicine for protection against COVID-19/boosting immunity.

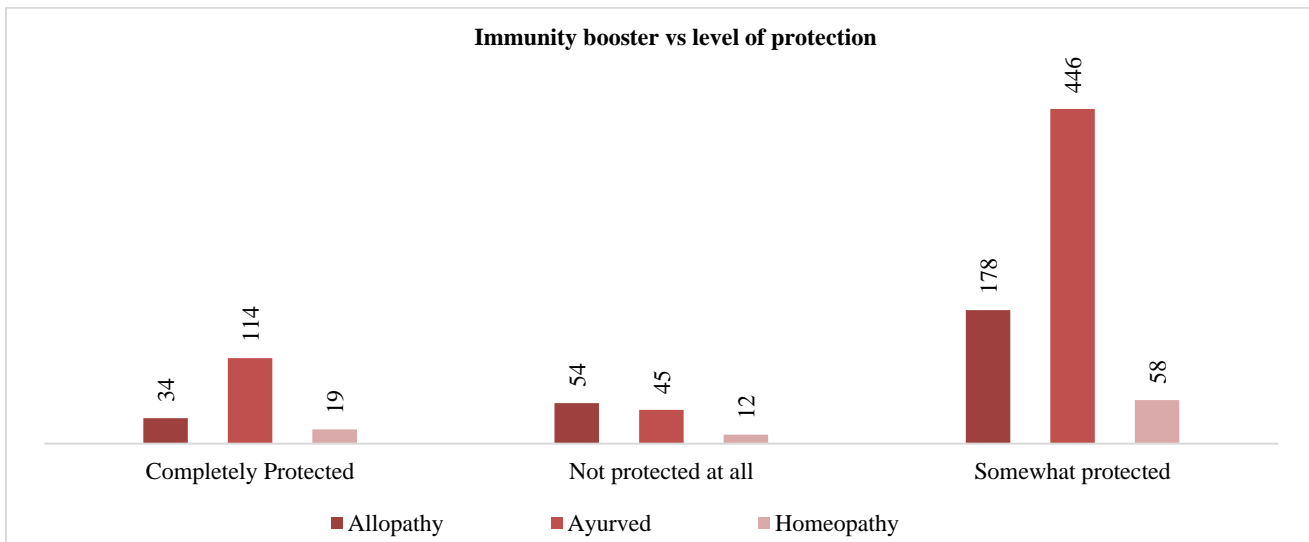


Figure 4: Level of protection felt depending on the immunity booster/protective agents taken.

Preferred branch of medicine for immunity booster/protective agent for COVID-19

The majority of respondents 605 (52.7%) selected ayurveda as their preferred branch of medicine as a choice for immunity boosters/preventive agent for COVID-19. 266 (23.2%) preferred Allopathy, 89 (7.8%) preferred homeopathy. Out of the total 1147 respondents, 187 felt no branch of medicine is protective against COVID-19.

The data was further analyzed to see whether the choice of branch of medicine was affected by the age, gender and education level of the respondents Amongst all age-groups, it was found that the majority preferred ayurveda for protection against COVID-19 (Figure 3).

A significant association between the age of the candidate and their choice of most effective Immunity booster was found ($X^2=22.74$, p value=0.00088).

Perceived level of protection depending on the immunity booster/protective agents taken

While analysing results regarding the perceived level of protection, those respondents not taking any medication were excluded from the data.

Out of the total candidates taking medication (n=960), 167 (17.3%) felt completely protected, 111 (11.56%) felt not protected at all, and 682 (71.04%) felt somewhat protected from COVID-19.

Amongst those who took ayurvedic preparations (n=605), 18.84% felt completely protected, 73.71% felt somewhat protected and 7.43% felt not protected at all.

Amongst those who took allopathic preparations (n=266), 12.78% felt completely protected, 66.91% felt somewhat protected and 20.30 % felt not protected at all.

Amongst those who took homeopathic preparations (n=89), 21.3% felt completely protected, 65.16% felt somewhat protected and 13.48 % felt not protected at all.

The majority of the respondents felt that the immunity boosters they were taking were "somewhat effective" in protecting them against acquiring the infection (Figure 4).

A significant association was found between the category of Immunity booster/Protective agent and the level of protection felt by the candidate, ($X^2 = 33.213$, P-value<0.01).

Line of action if COVID-19 symptoms develop

When asked about their line of action if the respondents were to develop any symptoms associated with COVID-19 like cough, sore throat, fever, cold, the majority of

candidates 517 (45.1%) chose to contact their family Doctor.

But, 266 (23.2%) candidates opted for home remedies and wait for the symptoms to subside (Figure 5).

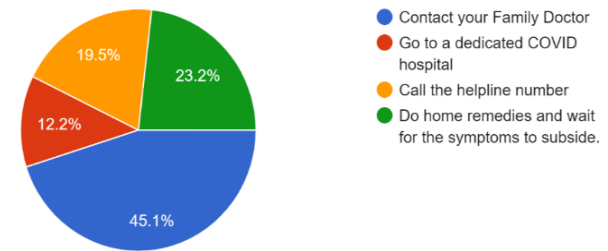


Figure 5: First line of action if COVID-19 symptoms develop.

The data was further analysed to see if the choice of line action on development of COVID-19 infection was affected by the age, gender and education level of the respondent. The majority of the respondents in all the age-groups chose to contact their family doctor first. A significant association was found between the line of action selected and the age of the candidate. ($X^2=33.39$, p value=0.0001) (Figure 6). No association was found with gender or education.

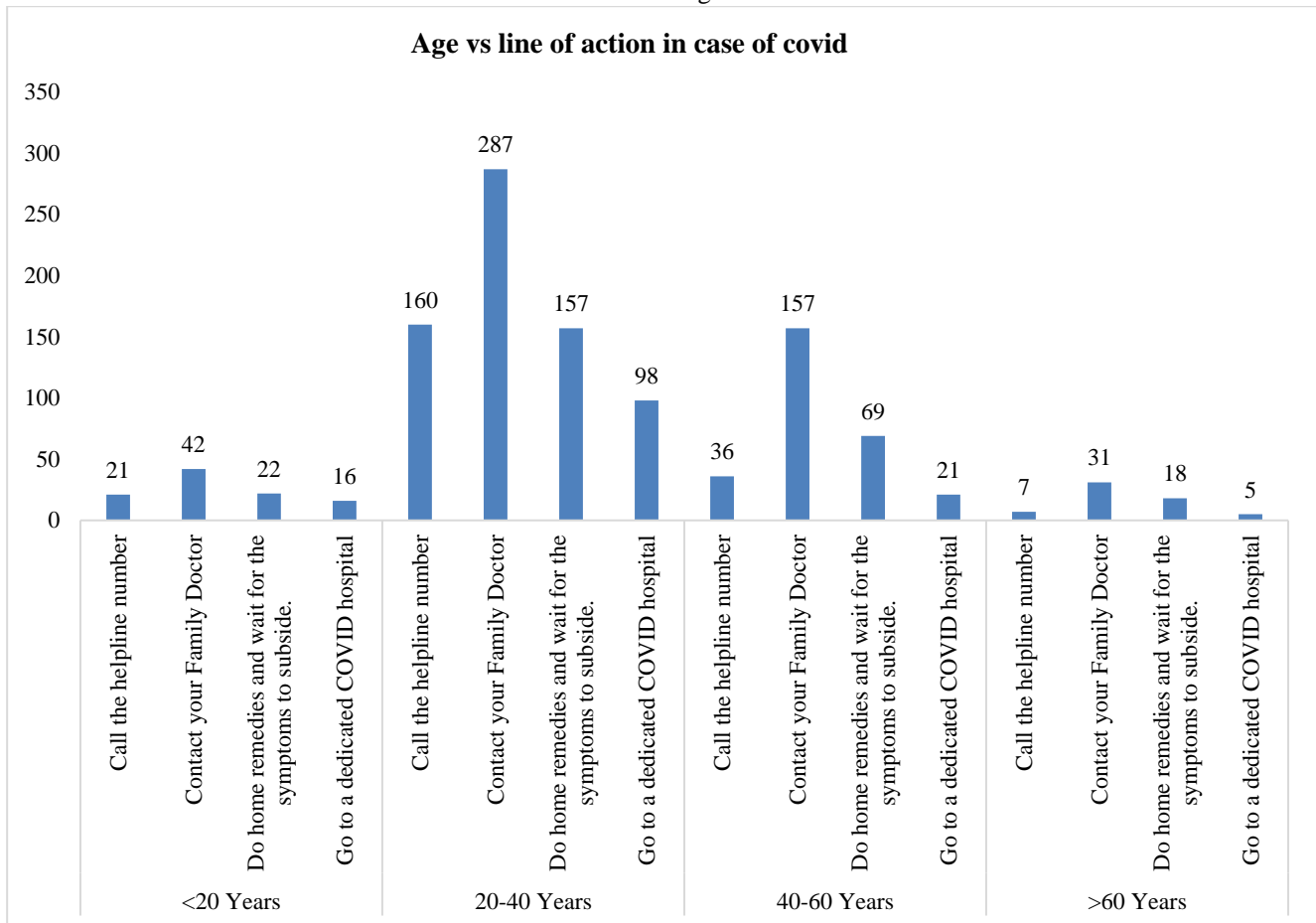


Figure 6: Age-wise line of action if COVID-19 symptoms develop.

Branch of medicine preferred in case of development of COVID-19 symptoms

A majority of candidates, 53.7% (616), selected Allopathy as their preferred system of medicine if they were to develop COVID symptoms while 22.3% (256) selected ayurveda, and 4.3% (49) chose Homeopathy (Figure 7).

No significant association was found between the age of the candidate and the preferred branch of medicine. ($X^2=7.53$, p value=0.589).

Opinion about ayurvedic/homeopathic agents being used to tackle this pandemic

A majority 481 (41.9%) of total candidates were of the opinion that ayurvedic /homeopathic agents are relatively safer than their allopathic counterparts, and hence there is no harm in trying them. 374 (32.6%) felt that these agents were somewhat effective while 88 (7.7%) found them to be not effective at all. 204 (17.8%) believed that ayurvedic/ homeopathic agents were highly effective in tackling the pandemic.

Willingness to take COVID-19 vaccine if developed

Even though a majority of candidates, 1049 (91.5%) agreed to take the COVID-19 vaccine as and when it develops, 98 candidates (8.5%) declined. A significant association was found between the age of the candidate and their preference for taking the COVID-19 vaccine. ($X^2= 24.46$, p value<0.01) (Table 2). No significant association was found between the education of the candidate and their preference for taking the COVID-19 vaccine ($X^2=5.03$; p value=0.08).

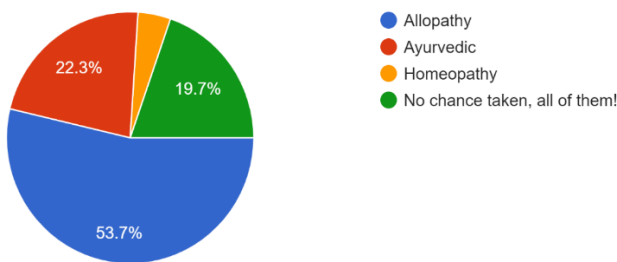


Figure 7: Branch of medicine preferred in case of development of COVID-19 symptoms.

Table 2: Age-wise willingness to take COVID-19 vaccine if developed.

Age (years)	No	Yes	Total
<20	2	99	101
20-40	52	650	702
40-60	30	253	283
>60	14	47	61
Total	98	1049	1147

DISCUSSION

An online survey to know the perception and preferences of immunity boosters for protection against COVID-19 was conducted, and data was collected from 1147 respondents. A majority of the respondents belonged to the age group of 20-40. From our study, it was found that there was a substantial increase in the people taking immunity boosters before and after the COVID-19 pandemic (42.19% to 64.16%). The increase was seen most evident in the consumption of the Ayurvedic medication (67.97% to 75.54%). Homeopathy and Allopathy immunity boosters also showed a significant increase in terms of the number of people consuming them.

To ascertain the sources of information regarding protective agents/ immunity boosters that the respondents took, they were allowed to choose single/ multiple sources of information. Friends/family and relatives were the top choice for both single and multiple (45.21% and 25.85% respectively). Amongst multiple sources that the population used others were social media (20.15%), government sources (16.22%), research articles/ WHO guidelines (13.8%), family doctor (12.61%), and television (11.28%). In similar research conducted by Wang et al on COVID-19 related information sources, the sources used by people were as follows: internet (80.6%), friends (21.2%), colleagues (24.3%) and family members (24.9%), media (53.5%), academic lessons (20.5%) and medical staff(19.3%).¹¹ From both studies, it is seen that people relied on multiple sources of information and that peer group and the internet (which includes many other sources including social media) seem to be the main source of information for general public. It is also important to point out here that a layman should be encouraged to believe and apply information only from trustworthy sources like their family doctor, researches, guidelines, etc.

In the data we collected, it was seen that 52.7% of people felt ayurvedic medicines to be the most effective immune boosters, 23.2% felt it was allopathic, and 7.8% preferred homeopathy. A good 16.3% of respondents had the view that none of them were effective immune boosters. This belief of the most effective immune booster also had a statistically significant relationship with the age of the people. Though there is insufficient research for the increased effectiveness of one system over the other, the use of ayurveda for immune boosters might be linked to the role of the Indian government in promoting the AYUSH system. Ministry of AYUSH under Government of India had published guidelines on boosting immunity under which they had laid extensive emphasis on the use of Ayurvedic products like turmeric, decoction, etc.³

According to a general survey not pertaining to COVID, but regarding the relative popularity of the three branches by Jawla et al with 500 survey takers, 50% preferred Allopathy, 28% preferred ayurvedic, and 20% preferred

homeopathic system of medicines. In the case of common ailments, 35 % of people preferred allopathic, 48% preferred ayurvedic, and 17% preferred homeopathic medicines.¹² Though this study was performed on a relatively few numbers of patients, it gives a hint on the relative popularity.

On asking about the level of protection that the survey takers felt after taking the immune boosters/protective agents for protection against COVID, it was found out that 73.71% of all felt somewhat protected, 18.84% felt completely protected, and 7.43% did not feel protected at all. Also, the choice of immunity booster/protective agents was statistically associated with the level of protection they felt. The prevailing guidelines given by the National Institute of Health and Centers for Disease Control and Prevention for COVID-19 do not comment on any dietary supplements and currently do not recommend any pharmacological interventions until efficacy is proven through proper clinical trials.^{10,13} So the false sense of complete protection by the use of various medications may lead to avoidance of the use of basic necessary preventive measures like hand-washing, wearing a mask, etc., and it is essential to educate people regarding the same.

On inquiring about the line of action that the respondents might take if they developed COVID-19 symptoms, 45.1% preferred to contact their family doctor as the initial step. 12.2% stated that they might visit a COVID-19 hospital, 19.5% were willing to call the helpline number, and 23.2% were of the view that they will want to try home remedies and wait for the symptoms to subside. In our study, it was found out that there was a statistically significant association between the age of the respondents and their initial response in case they developed COVID-19 symptoms, and no such association was found with gender or education. The guideline given by the Ministry of Health and family welfare under the government of India states that if you experience fever, cough, and difficulty breathing, seek medical care by calling the COVID-19 helpline early to reduce the risk of developing a more severe infection.¹⁴ So it becomes quite necessary to impart this knowledge to people who have a taboo associated with the virus or are just wanting to postpone seeking early medical care, which may be due to a variety of other reasons.

A very important and interesting result from our study showed that there was a maximum rise in Ayurvedic medications after the COVID-19 pandemic began. Also, most of them (52.7%) felt that Ayurveda was most effective as an immunity booster or when used for protective purposes, but 53.7% of all respondents were likely to adopt Allopathy in case they did develop COVID-19 symptoms. Though COVID-19 symptoms may/may not be a medical emergency, as of now, it is one of the most mysterious and dreadful pandemics that humankind has seen in recent history. One of the reasons for choosing Allopathy in such situations could be

because of the vigorous clinical trials that the allopathic medications undergo and also the worldwide presence and acceptance of this system of medicine. In a study done by Jawla et al, it was observed that in case of medical emergencies, 79% of people prefer Allopathy, 20% prefer ayurvedic, and only 1% people prefer homeopathy.¹²

Since most of the respondents were willing to adopt Allopathy in case, they developed COVID-19 symptoms, they were further asked to give their view on the current Ayurvedic/Homeopathic agents being used to tackle the pandemic. 17.8% opined that these agents were highly effective, 32.6% felt that these were somewhat effective, and 41.9% were of the opinion that they are harmless than their allopathic counterparts, and hence there was no harm in trying them. In a survey conducted in Nepal by Kafle et al, the patients chose to consume Ayurvedic medicines since they have fewer or no side effects.¹⁵ Though the survey in Nepal was carried out with 511 respondents only, it indicates how Ayurvedic medicines may be perceived as free of side effects by the general population.

When the entire world seems to be waiting for the COVID-19 vaccine to come out, a significant 8.5% of respondents in our study were not willing to take the vaccine at all. This was statistically related to the age of the respondents but not with their education. In other studies, also there have been quite a staggering number of people who seem to be refusing vaccine altogether. For example, a study from Indonesia by Harapan et al showed that from among 1,359 respondents, 93.3% were willing to be vaccinated for a 95% effective vaccine. In contrast, only 67.0% (911/1,359) agreed to take vaccine with 50% effectiveness.¹⁶ Another research from Israel concluded that healthcare staff directly involved in the care of COVID-19 positive patients were more willing to take vaccination. As against this, parents, nurses, and medical workers not taking direct care of COVID-19 positive patients were more hesitant to take the vaccine.¹⁷ These studies throw light on how different factors might be governing people's mindset on whether to take or not to take a vaccine.

In a nutshell, this research gives us an idea about what choices people are making for the prevention of COVID-19 infection and throws light on certain factors that are influencing them to make their choice. To date, there is no proof regarding the benefit of any prophylactic medication to prevent COVID-19 infection. Though this study gives an idea of people's preferences and choices, commenting on the benefit of each of these immunity boosters requires thorough clinical trials.

CONCLUSION

A substantial increase in people taking immunity boosters was found after the COVID-19 pandemic hit. Consumption of ayurvedic medicines has seen a more

significant rise as compared to its counterpart- Allopathy and homeopathy. Formal sources like official guidelines or the advice of a doctor are followed only by a few. It is essential that people be made aware of the correct source of information to rely upon. Most people are willing to consult a family doctor if they develop symptoms, but some are also ready to continue with home remedies until symptoms subside.

Thus, this study gives us an overall idea of the prevalent views of the population regarding the immunity boosters being used to protect against COVID-19 infection.

Limitations

Considering the magnitude of the pandemic, sample size is small. More researches need to be conducted to establish the benefits of the immunity boosters, which have been widely publicized by the media. Also, the government should take more steps to impart scientific knowledge to the population to prevent misuse and overuse of these agents.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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