

Changing consumption behaviour towards immune-boosting food amidst COVID- 19 outbreak: tracing the future trajectory

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Abstract

Businesses throughout the world have been affected by the coronavirus outbreak. Across countries and industries, small firms have suffered, and India is no different. While many enterprises were destroyed by the COVID-19 scenario, hundreds of others were able to cope. People are getting increasingly concerned about their physical and emotional health as the coronavirus pandemic spreads around the world. People's perspectives on life and what they value have altered. Consumers have been compelled to alter their routines as a result of the outbreak. People throughout the world are attempting to adapt to a new normal. Immune-Boosting foods have become the talk of the town amidst the pandemic. With this backdrop, the present study aimed to understand the demand for Immune-Boosting foods and the factors that have contributed to the market for immune-boosting foods. The sample data for this study was collected using the purposive sampling technique. Statistical interventions using multiple linear regression and correlation were conducted to understand the relationship between various factors related to immune-boosting foods. The study revealed that the pandemic had increased the respondents' inclination to purchase Immune-Boosting foods. Further, the inclination towards consumption of immune-boosting foods was influenced by independent variables like familiarity with immune-boosting foods, health consciousness, fear of contracting the disease, family testing COVID-19 positive, immune-boosting foods as a trending topic, Influence of social media, Frequent advertisements and offers, testimonials of others regarding Immune-Boosting foods. From the study, it can be inferred that the COVID-19 pandemic has laid a strong foundation for the future of immune-boosting foods.

1. Introduction

The entire world is badly hit by the pandemic (ILO, 2021). Studies have shown that COVID-19 has a lot of impact on individual well-being, which may lead to a mental health crisis, specifically in countries where a large number of cases were reported (Fiorillo and Gorwood, 2020). In the year 2020, one of the most googled health topics was "how to increase immunity" and there was an outpour in the number of questions about boosting immunity (Pandey, 2020). Every social media platform was flooded with content on immunity and more specifically immune-boosting foods. The word Immunity has a Latin origin, which roughly translates to 'protected from disease' and the immune system of the human body protects one from any infectious disease

(Rodgers, 2009). From the common cold to COVID-19, the human immune system, which is made up of diverse immune cells found throughout the body, keeps us healthy by fighting and preventing illnesses. Various developments in the last decade, such as the emergence of auto-immune disorders, widespread antibiotic resistance in microbes, and a better understanding of friendly bacteria and their functions, particularly in the human gut, have forced people to reconsider the immune system's unidirectional concept. Unfortunately, such an important existential mechanism of the human body did not find traction in the mainstream narrative till recently. It needed a pandemic of this magnitude to remind the world of the importance of immunity and now it is a buzzword and the word has gained a lot of cynosures.

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Immunity is aided by daily routine and dietary intake (Aman and Masood, 2020). Given the pandemic situation, individual attitudes towards health care have changed drastically. People are increasingly interested in investing in herbal/natural immunity-building treatments to combat various illnesses. Micronutrients, such as Vitamin C, vitamins B6 and B12, iron and zinc play a significant role at every stage of the immune response and have been discovered to have a significant impact on health by researchers (Gombart *et al.*, 2020). The demand for healthy food and beverages has increased, as COVID-19 has prioritized healthy eating as a means of minimizing the risk of chronic diseases. During the COVID-19 pandemic, resilience towards deterioration was based on individual nutritional status (Bogoch *et al.*, 2020). A lot of the health-related industries and secondary industries piggybacked into the limelight with COVID-19.

Healthier food options are well known among every individual but changing the food habits from unhealthy to healthy food choices face a high level of resistance and in most cases are episodic. With the advent of COVID-19, a dramatic shift was observed in terms of food consumption behaviour instantly. COVID-19 phenomenon acted as a catalyst to the disruption generating positive behavioural and dietary changes among individuals (Jaeger *et al.*, 2021).

The rise of COVID-19 cases has developed a need and requirement for items that support the body's immune framework. Based on expanding focus and awareness among Indian shoppers towards preventive health and wellbeing, the Indian packed Immune-Boosting products sector is projected to reach \$ 347 million by FY 2026 (Business Wire, 2021). Food consumption behaviour pre, during and post-pandemic suggests that well-being, health, social, and mental components affected the food usage and food perspective among individuals with an increased inclination towards natural/organic food and self-cooking (Wachyuni and Wiweka, 2020). Along with the packaged immune-boosting products, traditional spices that help boost immunity have also gained popularity. Anti-inflammatory and anti-viral properties of various spices are being used by those focused on preventing the infection. The sale of dry ginger, clove, black pepper, cinnamon and turmeric among others has seen an increase since the outbreak of the virus. Consuming 'Kashayam' is also gaining importance as it is a concoction of various spices and herbs that have been around in Indian culture known to cure certain ailments and boost the body's resistance towards infections (Gopal, 2021).

The probable relationship between COVID-19 and

spice consumption has been investigated by analysing reports gathered from 163 nations including total cases, total deaths, and total recovered cases that showed a clear interrelation between the total number of COVID-19 cases per million people and the spice supply per capita per day. Countries with lower utilization of spices per capita showed a more prominent number of COVID-19 cases for each million population due to the herbs and spices being not able to help build immunity and body resistance (Elsayed and Khan, 2020). Plenty of clinical and preclinical investigations validate the effectiveness of various spices to treat different illnesses during COVID-19. The potential immune-boosting properties of the spices along with their safety profiles make spices a focus for phyto research and home cures during these distrustful occasions. Though the insusceptible effect of different Indian spices and their capability to handle the novel COVID-19, with remarks on the safety and toxicity aspects of flavours is underway (Devan *et al.*, 2021); Indians are gobbling immunity boosters to fight COVID-19 in the form of DIY blends or readymade products, in turn boosting FMCG immunity portfolio unit gross sales deals by 13.5% in 2020 from basically 3.9% in 2019. Information from economic analyst Kantar affirmed utilization of turmeric powder increased more prominently than 5 occasions to 14.4%, development of drinks improved to 6%, honey, and chyavanprash. Ayurveda-based preventive medical services have acquired unmistakable importance with people presently with an inclination towards immune-boosting merchandise (Mukherjee and Malviya, 2021). Indian spice and honey are at the centre stage for preventing and treating viral disease, including COVID-19 as honey and its main components hinder the entry and passage of the infection into the host cell and its replication and regulate the inflammatory course by managing cellular signalling pathways including oxidative stress, irritation, inflammation, and apoptosis (Abedi *et al.*, 2021). The pandemic has made 75% of purchasers search out better immune-boosting food and drink varieties, and as indicated by Google Trends information, surfing for the joined terms, 'food' and 'immune system' soared by 670% in February and March (Ewing-Chow, 2021). Companies making immune boosting products are also using the opportunity by using the term 'immune-boosting' with vested interest to promote it through social media.

The present research paper aimed to study the storyline of immune-boosting foods after the COVID-19 pandemic outbreak. The study was aimed at understanding the popularity of immune-boosting foods amidst the global pandemic and the extent of change in the food consumption pattern of consumers amidst COVID-19.

2. Materials and methods

2.1 Selection of respondents

The study was carried out during the period when Immune-Boosting foods were in demand, i.e., April 2021 to June 2021 amidst the COVID-19 outbreak. By adopting descriptive research design, 408 sample respondents were selected based on Purposive Sampling Technique. In order to bring out robust view about the study objectives, the Purposive sampling technique has been adopted .

2.2 Sources of data collection

The study was mainly based on primary data and the required primary data for the study were collected using the survey method. The survey was conducted using structured questionnaire method. In addition to hard copy of the questionnaire an online questionnaire using Google forms was developed and floated due pandemic restrictions.

2.3 Justification of the sample size

As per the Krejcie and Morgan (1970) table, for a population range of 1 million with a confidence level of 95% with a 5% margin of error, the required sample size should be 384. Accordingly, the questionnaire was sent to 420 respondents to enhance the response rate and the researchers found that 408 responses were complete in all aspects. Hence, the sample size for the study was finalized as 408.

3. Results and discussion

3.1 Demographic information of the respondents

From Table 1, Table 2 and Table 3, it can be inferred

that, out of the 408 respondents, 52.9% were male and 47.1% were female. The majority (52.7%) of the respondents belonged age group 25 to 34 followed by 37.3% from the 18 to 24 age group, 8.1% of the respondents belong to the 35 to 44 age group, and 1.9% from the 45 and above age group. In terms of income of the respondents, 33.2% are from the < 0.5 million income group, 31.4% are from the 0.5 million to 1 million income group, 19.1% are from the 1 million to 1.5 million income group, and 16.2% are > 1.5 million income group.

Table 1. Gender of the respondents

Gender	Frequency	Percentage
Male	216	52.94
Female	192	47.06

Table 2. Age group of the respondents

Age Group	Frequency	Percentage
18-24	152	37.25
25 to 34	215	52.70
35-44	33	8.09
45 and above	8	1.96

Table 3. Income of the respondents

Income	Frequency	Percentage
Less than 5 Lakh	127	31.13
Lakh - 10 Lakh	146	35.78
Lakh - 15 Lakh	73	17.89
More than 15 Lakh	62	15.20

It is evident from Table 4 that 48.53% agreed and 43.14% strongly agreed about gaining familiarity with Immune-Boosting foods in post-pandemic. While 51.72% of the respondents strongly agreed about becoming more aware of immune-boosting foods post-pandemic. From the responses, it can also be observed that 39.46% of the respondents were also in agreement with increased awareness levels concerning immune-

Table 4. Demand for immune-boosting foods

Particulars	Strongly Agree	Agree	Disagree	Strongly Disagree
I have become more familiar with immune-boosting foods post-COVID-19 pandemic	198(48.53%)	176(43.1 %)	23(5.64%)	11(2.70%)
I am more health-conscious post-COVID-19	211(51.72%)	61(39.46%)	30(7.35%)	6(1.47%)
I feel that immune-boosting foods have become a trending topic of discussion	221(54.17%)	150(36.7%)	33(8.09%)	4(0.98%)
I browse online for popular brands and product reviews of immune-boosting foods before making a purchase	167(40.93%)	128(31.3%)	89(21.8%)	24(5.88%)
I feel that consuming immune-boosting foods is important to fight COVID-19 and any other future diseases	216(52.9%)	176(43.1%)	12(2.94%)	4(0.98%)
I am more inclined to purchase Immune-Boosting foods post the pandemic	175(42.8%)	167(40.9%)	52(12.7%)	14(3.43%)
I prefer to make an online purchase compared to an offline purchase	183(44.8%)	105(25.7%)	100(24.5%)	20(4.90%)
I am willing to pay a premium price for immune-boosting foods	110(26.9%)	130(31.8%)	108(26.4%)	60(14.7%)
I will continue to consume immune-boosting foods after the pandemic ends	196(48.04%)	181(44.3%)	20(4.90%)	11(2.70%)
I am willing to recommend immune-boosting foods to others	206(50.4%)	171(41.9%)	21(5.15%)	10(2.45%)

boosting foods. Around 54.17% of the respondents strongly agreed that immune-boosting is a trend that picked up during the pandemic. Whereas 42.89% of the respondents felt a strong inclination to purchase immune-boosting foods post the pandemic. More than 80% of respondents felt the pandemic increased their inclination to purchase immune-boosting foods whereas more than 15% disagreed with the statement. A total of above 55% were seen to be less phased by having to spend extra for the purchase of immune-boosting foods. Whereas, a little above 40% of the respondents were not keen to pay a premium price. Approximately 48.04% strongly agreed to continue consuming immune-boosting foods even after the end of the pandemic followed by a larger set of respondents of 44.36% agreeing to consume immune-boosting foods after the pandemic ends while around 8% either disagreed or strongly disagreed with the statement. The respondents were more than willing to recommend immune-boosting foods to others. Approximately 50.49% of the respondents were highly willing in recommending immune-boosting foods, followed by 41.91% who were also in agreement with the statement.

From Table 5, it is clear that the majority of the respondents accepted being fearful of contracting COVID-19 and thus, considered the consumption of immune-boosting foods. Approximately 15.69% agreed to some extent with the statement as well, followed by 4.17% of respondents who felt that fear of contracting the disease did not influence them to try Immune-Boosting foods. 26.47% of the respondents agreed to a large extent that family members' health influenced their decision towards incorporating immune-boosting foods. This was followed by a large number of respondents about 43.14% who agreed with the statement to a moderate extent. 40.93% of the respondents agreed with the statement that social media influenced them to a large extent towards their consumption of immune-boosting foods. Approximately 40.93% were in agreement with the statement to a moderate extent

followed by 17.16% who agreed with the statement to some extent, and finally, 9.31% who were not in agreement with the statement. 38.73% of the respondents agreed with the statement that mass media like television, newspapers, and magazines influenced them to a large extent towards their consumption of immune-boosting foods. 36.76% were in agreement with the statement to a moderate extent followed by 11.27% who agreed with the statement to some extent, and finally, 13.24% who were not in agreement with the statement. 45.10% of the respondents agreed that frequent advertisements and offers persuaded them regarding immune-boosting foods. 40.20% agreed to the statement to a moderate extent followed by 11.52% of the respondents who accepted the statement to some extent. 3.19% stated advertisements and offers did not influence them in any way. 32.84% of the respondents agreed that recommendations of doctors or recommendations by someone from the medical fraternity influenced them regarding immune-boosting foods. 49.26% agreed to the statement to a moderate extent followed by 12.25% of the respondents who accepted the statement to some extent. 5.64% responded that they do not agree with the statement. 22.55% of the respondents agreed that testimonials of others who have used immune-boosting foods and their experiences after incorporating immune-boosting foods into their diet and lifestyle were more influential towards their perception of immune-boosting foods. 50.98% agreed to the statement to a moderate extent followed by 19.61% of the respondents who accepted the statement to some extent. 6.86% of the respondents stated disagreement with the statement.

3.2 Hypothesis 1

Null Hypothesis (H_0): There is an equal influence of various factors affecting demand for Immune-Boosting foods on the inclination to purchase Immune-Boosting foods.

In order to test the Null Hypothesis (H_0) the

Table 5. Factors that influenced the trend for immune-boosting foods

Particulars	Large Extent	Moderate Extent	Some Extent	No Extent
Fear of contracting the disease and the surge in COVID-19 cases across the nation	173(42.40 %)	154(37.75%)	64(15.69%)	17(4.17%)
A family member or self-infected with COVID-19	108(26.47%)	176(43.14%)	68(16.67%)	56(13.73%)
Influence of social media	167(40.93%)	167(40.93%)	52(12.75%)	22(5.39%)
Influence of mass media	158(38.73)	150(36.76)	46(11.27)	54(13.24)
Frequent advertisements and offers on various immune-boosting foods	184(45.10%)	164(40.20%)	47(11.52%)	13(3.19%)
Recommendations by Doctors/medical personnel	134(32.84%)	201(49.26%)	50(12.25%)	23(5.64%)
I have seen improvement in my health after consuming Immune-boosting foods	92(22.55%)	208(50.98%)	80(19.61%)	28(6.86%)
Testimonials or recommendations of others who consume immune-boosting foods	106(25.98%)	216(52.94%)	69(16.91%)	17(4.17%)

variable viz., inclination to purchase immune-boosting foods has been considered as a dependent variable and familiarity with immune-boosting foods, health consciousness, fear of contracting the disease, family testing COVID-19 positive, immune-boosting foods as a trending topic, influence of social media, frequent advertisements and offers, Testimonials regarding immune-boosting foods were considered as independent variables.

From Table 6 and Table 7, it can be inferred that all the independent variables have a significance value of less than 0.05 and thus, can be said that all the independent variables considered for the regression have a significant impact on the respondent's inclination towards purchasing immune-boosting foods.

R square value is 0.910 implying that 91% of the proportion of variance of the dependent variable is influenced by the independent variables. This shows that 91% of the respondents' inclination towards purchasing immune-boosting foods is influenced by the independent variables - familiarity with immune-boosting foods, health consciousness, fear of contracting the disease, family testing COVID-19 positive, immune-boosting foods as a trending topic, influence of social media, frequent advertisements and offers, testimonials of others regarding immune-boosting foods.

3.3 Hypothesis 2

Null Hypothesis (H₀₂): There is no significant relationship between online browsing about immune-

boosting foods and inclination towards purchasing immune-boosting foods

In order to Test Null Hypothesis (H₀₂), correlation analysis has been carried out. Inclination to purchase immune-boosting foods has been assumed as the dependent variable and Browsing online for information regarding immune-boosting foods has been considered as independent variable.

From Table 8, it can be inferred that the significance of the independent variable (online browsing) on the Dependent Variable (Inclination to purchase immune-boosting foods) is <0.001 with a correlation coefficient of 0.669. A correlation coefficient of 0.669 implies that there is quite a high degree of positive correlation between the dependent and independent variables. Thus, an increase in online browsing (independent variable) will also result in an increase in the inclination towards purchasing Immune-Boosting foods. As the significance is 0.000, which is less than 0.05, the null hypothesis (H₀₂) is rejected and it can be concluded that there is a significant relationship between online browsing about immune-boosting foods and inclination towards purchasing immune-boosting foods.

3.4 Hypothesis 3

Null Hypothesis (H₀₃): There is no significant relationship between belief in Immune-Boosting foods for COVID-19 protection and continuity in consumption of Immune-Boosting foods after the pandemic.

Table 6. Regression coefficients

Model	Coefficients ^a			t	Sig.
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
(Constant)	-0.333	0.045		-7.361	0.000
Familiarity	0.080	0.025	0.071	3.209	0.001
health-conscious	0.078	0.025	0.068	3.187	0.002
Fear of contracting the disease	0.151	0.024	0.159	6.381	0.000
Family member testing COVID-19 Positive	0.028	0.014	0.034	2.040	0.042
trending topic	0.173	0.023	0.148	7.566	0.000
Influence of social media	0.313	0.026	0.333	12.215	0.000
Frequent ads and offers	0.299	0.027	0.294	10.894	0.000
Testimonials	0.073	0.016	0.075	4.424	0.000

^acoefficients of all independent variables mentioned in the model.

Table 7. Regression model summary

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.954 ^a	0.910	0.908	0.243

^aPredictors: (Constant), testimonials, trending topic, family member +, health conscious, familiarity, fear of contracting the disease, frequent advertisements and offers, influence of social media

^bDependent Variable: inclined to purchase

Table 8. Correlation for hypothesis 2

		Correlations	
		Browse online	Inclined to purchase
Browse online	Pearson Correlation	1	0.669**
	Sig. (2-tailed)		0.000
	N	408	408
Inclination to purchase immune-boosting foods	Pearson Correlation	0.669**	1
	Sig. (2-tailed)	0.000	
	N	408	408

**Correlation is significant at the 0.01 level (2-tailed).

Table 9. Correlation for hypothesis 3

		Correlations	
		Belief in immune-boosting foods for COVID-19 protection	Continue to consume
Belief in immune-boosting foods for COVID-19 protection	Pearson Correlation	1	0.617**
	Sig. (2-tailed)		00.000
	N	408	408
Continue to consume	Pearson Correlation	0.617**	1
	Sig. (2-tailed)	00.000	
	N	408	408

**Correlation is significant at the 0.01 level (2-tailed).

In order to trace the future trajectory for Immune-Boosting foods, the Null hypothesis (H_0) has been framed and tested using correlation. To conduct correlation, continuity in consuming immune-boosting foods has been assumed as a dependent variable and Familiarity with immune-boosting foods has been considered as the independent variable.

From Table 9, it can be inferred that the significance of the independent variable (belief in immune-boosting foods for COVID-19 protection) on the dependent variable (Continue to consume Immune-boosting foods) is <0.001 with a correlation coefficient of 0.617, which implies that there is quite a high degree of positive correlation between the two variables. Thus, an increased belief in immune-boosting foods for COVID-19 protection will increase the respondent's decision to continue consuming Immune-Boosting foods even after the pandemic and it can be concluded that there will be continuity in consumption of Immune-Boosting foods after the pandemic.

4. Conclusion

With the onset of the pandemic, immunity and immune-boosting foods have become a buzzing topic. Every household became more cautious with what they were consuming once there was a surge in COVID-19 cases across the country. The respondents became more aware and familiar with Immune-Boosting foods post the pandemic. The infection's severity and spread brought about seriousness in the population regarding physical and mental health. The pandemic has shifted focus towards what is consumed and people are more cautious

about what they eat. Building immunity has become an utmost priority in every household. The finding is similar to Kantar's report on the public's inclination towards Ayurvedic based preventive medical services and immune-boosting services and also with the (Mukherjee and Malviya, 2021) reports that FMCG immunity portfolio unit gross sales increased to 13.5% in 2020 from 3.9% in 2019.

A majority of the population believes in immune-boosting foods to fight any illness including COVID-19. The pandemic has changed the needs of the population with the focus being shifted more towards healthier food choices and especially foods that can help protect them against infections like COVID-19 and other diseases. The findings of this study are similar to other studies (Abedi *et al.*, 2021), that reported the increased consumption of Indian spice and honey to boost immunity.

The majority of the respondents felt they were more inclined to purchase immune-boosting foods. Premium-priced products did not completely dissuade the respondents from making a purchase. It can be seen that there is some extent of reduced priced sensitivity towards immune-boosting products. Respondents are willing to spend more on immune-boosting foods, which they believe will make them and their families stronger against infections. The respondents are willing to consume Immune-Boosting foods even after the pandemic to ensure they are healthy enough to fight any diseases in the future as well. Thus, a positive trajectory can be mapped for the future of Immune-Boosting foods. The result is validated by the (Business Wire, 2021)

report, which spotlights the expanding focus and awareness among Indian shoppers towards preventive health and well-being, projected Indian packed Immune-Boosting products sector to reach \$ 347 million by FY 2026.

Fear of contracting the disease and the rapid increase in COVID-19 positive cases has accelerated the trend and increased the demand for Immune-Boosting foods. Particularly during COVID-19, mass media information did sway respondent opinions in favour of building immunity and towards the incorporation of a healthier diet. Media-induced awareness regarding immune-boosting products has also influenced the public. It has also been investigated through a focussed study on social media influence by Ewing-Chow, 2021, on the search term 'immune boosting' by the public and was found that the 'immune boosting' term was also used by the companies intentionally to promote the purchase of their products (Wagner *et al.*, 2020).

Recommendations about immune-boosting foods by doctors and others from the medical fraternity have a great influence on moulding consumer opinion towards such food. Commonly known and used ingredients like raw honey, spices, and herb powders gained high acceptance showing familiarity and experience of using these products has influenced them to accept the efficacy of the consumables towards improving health and well-being. A strong cultural influence can be seen with the respondents in using homemade remedies that have been prevalent in the Indian culture such as Kashaya and Turmeric Milk. The results are in sync with the report published by Gopal (2020) who explained the gained popularity of traditional spices among the public.

It can be concluded that the COVID-19 infection severity and spread brought about seriousness in the population regarding physical and mental health. Demand for immune-boosting foods can be realized with the increased levels of health consciousness in society. A surge in COVID-19 cases instilled strong fear in the population about contracting the disease. People were ready to do everything it takes to keep themselves safe from falling prey to the infection. The fear of contracting the disease has had a huge impact on the demand for immune-boosting foods. The COVID-19 pandemic has laid a strong foundation for the future of immune-boosting foods.

Conflict of interest

The authors declare no conflict of interest.

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