Journal of Commerce and Accounting Research
13 (4) 2024, 38-45
http://publishingindia.com/jcar/
doi: https://doi.org/10.21863/jcar/2024.13.4.004

Submitted: 10 March, 2023
Accepted: 29 November, 2023

STUDY ON FACTORS AFFECTING FOOD CONSUMPTION BEHAVIOUR AMID COVID-19

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Abstract *The outbreak of novel coronavirus (COVID-19) has impacted in all facet of human being. The lifestyle of people has affected in the world to large extend. Due to severity, speedy spread and uncertainty forced countries to impose lockdown, the lockdown created concern on basic needs. Considering food is one of the basic needs, the present study was conducted to understand food consumption in COVID-19. The descriptive cross sectional research design was employed in present study. The data from 150 respondents were collected using online data collection tool. The data were analysed using descriptive statistics, factor analysis and binary logistic regression. The study found that 88 percent respondents were agreed on their food consumption practices were changed and 12 percent respondents were disagreed. The three factors which determine food consumption were product attributes, peer influence and lifestyle changes in COVID-19 and price. The binary logistic regression found that for changes in the COVID-19 impact on food consumption the peer influence and lifestyle changes in COVID-19 and price plays a significant role whereas the product attributed does not play significant role. The outcome of the study will be helpful to marketers in designing strategies to market food products.*

Keywords: *Food Consumption, Impact of COVID-19, Lifestyle in COVID-19, Binary Logistic Regression, Factor Analysis*

INTRODUCTION

The coronavirus (COVID-19) identified in the China in December 2019, and in short time, it spread to numbers of countries. The COVID-19 became global crises and World Health Organization (WHO) has declared it as global pandemic on March 11, 2020. In India, the first case of COVID-19 reported on January 30, 2020 and on the March 24, 2020 government announced 21 days (March 25, 2020–April 14, 2020) nationwide lockdown, which was further extended for 19 days (April 15, 2020–May 3, 2020), 14 days (May 4, 2020–May 17, 2020) and 14 days (May 18, 2020–May 31, 2020). After that country was opened in phases. The health crisis leads to economic and financial crisis (Kumar and Gupta, 2023). The COVID-19 has impacted all aspects of human life (Karim & Shetu, 2023). The consumer's shopping behavior suddenly changed in that situation (Jain, Shivanani & Babu, 2023).

During the lockdown the strict restriction was imposed on movement, which affect to the supply chain of the produces. The food item is one of the major categories which affected by restriction. The effect of COVID-19 will differ from one country to another country depending upon epidemiological situation and socio-economic development (Ben Hassen et al., 2020).

Food is basic need of life. The selection of food is influenced by varieties of factors such as economical, biological, physical, social, psychological, attitude, knowledge, belief and life stage (Eufic, 2006). COVID-19 has changed consumers' relationship with food and consumption habits. Due to restrictions of transit during lockdown, the food supply chain was disturbed, which lead to limited access of food and grocery items to people. The restriction on outdoor movements changes the lifestyle of every individual (Bhumika, 2020). The psychological changes due to COVID-19 might have affected food-related behaviour such as stress-related eating (Janssen et al., 2021). The present study focuses on factors affecting Food Consumption Behaviour amid COVID-19.

THEORETICAL BACKGROUND

Food Consumption

Being one of the important part and basic need of human; food consumption is important area of research among

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the researchers. The study related to determinants of food choices seem to be easy but, food consumption affected by varieties of factors ranging from personal, environmental, situational and economical. Food choice is influenced by many interrelated factors (Shepherd, 1999). As Wadolowska et al. (2008) suggested the factors affecting food choice identified by researchers in large numbers but they may be classified in to 3–10 major groups. Shephard (1989) divided food choice factors in three identical groups namely product related factors, consumer related factors and environment related factors. The researchers classified the product related factors into internal product attributes (taste, visual appearance, aroma, texture and nutrient contents) and external product attributes (packaging, information and advertisements) (Shepherd, 1999; Chen & Antonelli, 2020). The consumer related factors include demographic factors (e.g. age, education, occupation), psychological factors (personality, moods) and physiological factors (hunger, appetite, satiety) (Shepherd, 1999). Divine and Lepisto (2005) examined the consumer's demographics, personal value and psychographic antecedents as important determinant of food consumption. (Parmar & Rathod, 2020) found the freshness is most important factor for food choice followed by price, taste, season and availability. Cleanliness/freshness of food products followed by price, quality, variety, packaging and non-seasonal availability impact food choice (Ali & Kapoor, 2010). Environmental factors include economic, cultural and social factors (Shepherd, 1999). Consumption of different food items varies among socio-economic groups and regions (Gupta, 2014). Horská (2011) stated that the price is an important parameter in the consumer choice and the consumer faces tradeoff between price and quality. Food choices model comprises of three major components life course, influences and personal systems (Sobal et al., 2006). The biggest determinant of food selection is availability, one choose to eat what is available (Rozin 2006).

Food Choice and Lifestyle

"Lifestyle is assumed to be the backcloth that frames a consumer's perceptions of products and services and guides her choices and behaviours" Thogersen (2017). The COVID-19 induced lockdown forced people to stay home. The lockdown changed people routine. Sudden changes have occurred in the habits and lifestyle of the population, with drastic reduction of socialisation, self-isolation affecting eating habits and everyday behaviours (Di Renzo et.al, 2020). It also influenced food purchasing behavior, eating behaviour and food consumption (AlTarrah et al., 2021; Caroppo et al., 2021). Rawat et al. (2021) found that the change in the lifestyle behaviour was observed due to COVID-19 and further weight gain and decline in physical activities also observed. The lockdown had effect on lifestyle and increased psychological stress. There is no significant difference among age and gender groups (demographic factors) for food consumption (Nair et al., 2020; Parmar & Rathod, 2020). Pandemics have a profound impact on the pattern of consumption including food items in rural and urban India. Majority of consumers shifted their focus towards essential products only and prefer healthy food products during pandemic (Kumar & Abdin, 2020). The Spanish consumers shopping habit changed during lockdown, further also observed food-related changes due to mandatory changes in the lifestyle and moods (Laguna et.al, 2020). Like, before COVID-19 the first and second food preference was meat and bakery foods but after COVID-19 first and second preference were fruits and vegetables and in case of causes for preference cost and health replaced with quality and health (Celik & Dane, 2020). People have different behaviour regarding their food choices in pandemic, consumers prefer to cook at home and not eat in restaurants, engaging in comfort eating, paying more attention to their health, looking for the foodstuffs to boost immune system, eating foodstuff with less salt, sugar and calorie and limiting food waste (Borsellino et al., 2020). Bennett et al. (2021) observed that COVID-19 lockdown resulted into favourable and unfavourable both type of changes in the eating practices.

RESEARCH METHODOLOGY

The present study was conducted with the aim to study factors affecting food consumption behaviour amid COVID-19. The present study follow descriptive cross sectional research design. The primary data were collected using structured questionnaire. The structured questionnaire was contained research questions and questions related to demographic profile. To study the impact of COVID-19 on food consumption the nine variables were chosen based on related literature. The variables were rated on 5-point rating scale (5- Most influencing, 4- Somewhat Influencing, 3- Neutral, 2- Less influencing and 1- Least Influencing). For, overall food consumption changes during COVID-19 question was asked on four-point rating scale (4- Strongly Agree, 3- Agree, 2- Disagree, 1- Strongly Disagree). The COVID-19 restricted the movements so to collect the data from respondents the online platform was used. The prepared questionnaire was transferred to online data collection tool; Google forms. The link of form was circulated to known people using social media. The respondents were further requested to send it among their known thus, in this study snowball sampling was used. The sampling size was 150. For factor analysis, MacCallum and Widaman (1999) suggest sample size over 100 is appropriate for small number of factors and three to four

indicator to a factor. Gorsuch (1983) suggested sampling size at least 100 subjects. The survey was conducted in April and May, 2020. The collected data were analysed with descriptive statistics, exploratory factor analysis and binary logistic regression.

DISCUSSION ON ANALYSIS AND RESULTS

Demographic Profile of Respondents

The present study collected information on demographic profile of respondents (gender, education, marital status and place of stay (rural or urban). Out of the surveyed respondents 62.7 percent respondents were male and 37.3 percent were female. About 80 percent respondents belong to urban areas whereas 20 percent belong to rural area. In case of marital status 78 percent respondents were unmarried and 22 were married. In case of education the 2 percent respondents were educated up to HSC level, 43.3 percent respondents educated up to graduation level and 54.7 percent respondents educated up to Post Graduate and above level.

Factors Affecting Food Consumption

To study the determinants factors affecting food consumption behaviour amid COVID-19, the respondents were exposed to nine items using 5-point rating scale (5- Most influencing, 4- Somewhat Influencing, 3- Neutral, 2- Less Influencing, 1- Least Influencing). The respondents were asked to rate them according to their choice. For, the analysis 8 variables were used. The exploratory factor analysis was applied to analyse the collected responses. The Bartlett's test of Sphericity and Kaiser Meyer-Olkin (KMO statistics) measures of sample adequacy were used to assess the appropriateness to perform exploratory factor analysis. The value of Kaiser-Meyer-Olkin measures of sampling adequacy test is accepted greater than 0.5 (Malhotra, 2010). In the present study the KMO value is found 0.633 and for Bartlett's test of Sphericity the chi-square value was found 213.449 (degree of freedom-26) and the test found significant at 5 percent significance level (Table-1). So, the exploratory factor analysis can be performed for the present data.

Table 1: Kaiser-Meyer-Olkin Measures of sampling Adequacy and Bartlett's Test of Sphericity

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.633
Bartlett's Test of Sphericity	Approx. Chi-Square	213.449
	Df	26
	Sig.	.000

The factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables. To perform exploratory factor analysis out of 6–7 methods available, the principal component analysis was adopted in present study. The eigen value greater than 1 was considered for the analysis and Varimax with Kaiser Normalization was applied as rotation method. The rotated component matrix was presented sorted by size and the coefficients were suppressed having value below 0.4. The factor analysis yielded three factors which explained 63.190 percent of total variance (Table 2).

Table 2: Total Variance Explained

Total Variance Explained			
	Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	2.072	25.904	25.904
2	1.865	23.311	49.214
3	1.118	13.976	63.190
Extraction Method: Principal Component Analysis.			

Table 3: Rotated Component Matrix

Rotated Component Matrix[a]				
	Component			
	1	2	3	Factor Name
News & News Channel	.865			Peer Influence
Social Media	.808			
Swadeshi Product	.650			
Availability		.771		Product Attributes
Freshness		.761		
Taste		.611		
Change in lifestyle due to COVIID			.702	COVID 19 Impact and Price
Price			.536	
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 6 iterations.				

The exploratory factor analysis yielded three factors and the first factor is termed as peer influence due to high loading to News and News channels (0.865), Social media (0.808) and Swadeshi product (0.650). This factor explained 25.904 percent of total variance. During the COVID-19 outbreak people movement were restricted and the primary source of information were news channels and social media. Information has major impact on consumer behaviour

during COVID-19 (Jain, Shivnani & Babu, 2023). The role of media and other people's behaviour observed for panic buying during COVID-19 (Ntontis et al., 2022). The misleading rumours were spreading on social media during COVID-19 (Depoux et al., 2020). Media has identified as a powerful resources to spread awareness of disease (Anwar, 2020). Many people learn new dishes, skills during lockdown. Palmer et al. (2021) observed German respondents trying new recipes or foods and cooking with fresh ingredients. Consumption of local food rises (Hassen et al., 2022) Laguna et al. (2020) observed that Spanish people searched COVID-19 and food highest on Google search and also watched YouTube videos for COVID-19 news and food recipes.

The second factor can be termed as product attributes due to high loading to availability (0.771), freshness (0.761) and taste (0.611). This factor explained 23.311 percent of total variance. The present outcome of the study is concurrent with various previous literature (Shepherd, 1999: Parmar & Rathod, 2020). Freshness (Ali & Kapoor, 2010; Parmar & Rathod, 2020) and availability (Rozin, 2006). The COVID-19 induced lockdown restrictions hit heavily on supply chain of food products. It has changed food trade policies for some governments by export restrictions and import facilitation (Aday & Aday, 2020). Even panic buying of essential items were also observed including food items. The fear of unavailability of food in future increased the stockpiling and panic buying (Lehberger, Kleih & Spark, 2021). Bandyopadhyaya and Bandyopadhyaya (2021) observed grocery stocking behaviour in India and also found significant impact of socio economic factors on grocery stocking behaviour. When any pandemic situation occurs in any country, the behaviour of the consumer changes (Karin & Shetu, 2023) "Avoiding shortage" and "Pursuing ease" are two main motivations for food stockpiling behaviour (Wang & Gao, 2021).

The third factor termed as COVID-19 impact and price due to high loading to lifestyle changes during COVID-19 (0.702) and price (0.536). This factor explained 13.976 percent of total variance. The lockdown and restricted movements forced people to stay home, the work from home and education from home (e-education) started, which changed the lifestyle of people. The changes in lifestyle were observed due to COVID-19 (Rawat et al., 2021). Xiao et al. (2021) noted lifestyle changes due to decrease overall physical activity and exercise, combined with overall increased food intake. COVID-19 lockdown made lifestyle worse and made eating habits negatively (Galali, 2021). Cavello et al. (2020) observed due to lockdown the behavioural changes and consumption paradigm was observed in Italian population. Pandemic had difference impacts on people's lifestyle and food consumption patterns (Janssen et al., 2021).

Binary Logistic Regression

The respondents were asked whether the COVID-19 have changes their food consumption practice? The 88 percent respondents were agreed that their food consumption practices were changed and 12 percent respondents were disagreeing. The binary logistic regression was applied to the data. The logistic regression is a kind of regression model which is used when the dependent variable is categorical. It determines the impact of multiple independent variables presented simultaneously to predict membership of one or other of the two dependent variable categories (Burns & Burns, 2008). To build the model the dependent variable is taken as "COVID-19 has changes their consumption pattern on binary scale 0 is not agreed (No) and 1 for agreed (Yes). The factors yielded by factor analysis were considered as independent variables.

The Omnibus test may be interpreted as a test of the capability of all predictors in the model jointly to predict the dependent variable (Talpova, 2014). For the omnibus test result, the chi-square value was found to be 11.691, and overall significance value of the model was below 0.05 (Table 4). The result confirms that the independent variables influence the dependent variable's variation.

Table 4: Omnibus Tests Result

Omnibus Tests of Model Coefficients				
		Chi-Square	**df**	**Sig.**
Step 1	Step	11.691	3	.009
	Block	11.691	3	.009
	Model	11.691	3	.009

The pseudo r square can be used to evaluate model fit in the logistic regression. The most commonly used pseudo r-square are Cox & Snell R Square and Nagelkerke R Square (Fernandes et al., 2020). The value of Cox & Snell R Square and Nagelkerke R Square are ranging 0–1. In the present study, the values of Cox & Snell R Square and Nagelkerke R Square found 0.075 and 0.144 respectively (Table 5). As the value of Nagelkerke R Square suggest the independent variables explain 14.4 percent of variance in dependent variable for present model.

Table 5: Binary Logistic Model Summary

Model Summary			
Step	-2 Log Likelihood	Cox & Snell R Square	Nagelkerke R Square
1	98.386[a]	.075	.144
a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.			

Goodness of fit statistics assess the fit of a logistics model against actual outcomes (Peng et al., 2002; Stephanie, 2016), to check goodness of fit of present model the Hosmer and Lemeshow test was applied. The p value close to 1 supports the feasibility of the model and for the present study it is found as 0.506 which shows goodness to fit (Table 6).

Table 6: Hosmer and Lemeshow Test of Goodness to Fit

Hosmer and Lemeshow Test			
Step	Chi-Square	df	Sig.
1	7.286	8	0.506

The Table 7 depicts the classification 88 percent of the responses for COVID-19 impact on food consumption pattern were correctly classified based on the above suggested model. The cut of value for classification table is 0.5. The value 88 percent suggest goodness of the model chosen for the model.

Table 7: Classification

Classification Table[a]					
			Predicted		
			COVID 19 Impact on Food Consumption		Percentage Correct
Observed			No	Yes	
Step 1	COVID 19 Impact on food consumption	No	1	17	5.6
		Yes	1	131	99.2
	Overall Percentage				88.0
a. The cut value is .500					

Table 8: Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Product Attributes	.165	.258	.410	1	.522	1.180
	Peer Influence	.552	.244	5.097	1	.024	1.736
	Changes in Lifestyle and Price	.555	.250	4.910	1	.027	1.741
	Constant	2.233	.297	56.366	1	.000	9.331

Table 8 depicts variables in the equation which shows the contribution of each independent variable for dependent variable. In the logistic regression, the wald test is used to determine independent variables statistical significance, as shown in table the peer influence (p=0.024) and changes lifestyle and price (p=0.027) found significant at 5 percent significance level where as the product attribute is not found significant (p=522). The odds of a respondents who feels that food consumption in COVID-19 has changes by a factor of 1.736 for raw score increase in peer influence and 1.741 with raw score increment in changes in lifestyle in COVID-19 and price. The food consumption in COVID-19 changes with increasing in changes in COVID-19 lifestyle and price (74.1 percent) and peer influence (73.6 percent). The present study findings are in line with the findings (Kumar & Abdin, 2020; Singh et al., 2021).

CONCLUSIONS AND IMPLICATIONS OF THE FINDINGS

Food is considered as one of the basic need of life, the present study was planned to study determinants of food consumption in COVID-19 pandemic. The e-survey was conducted using online data collection platform. The study found that there are three major factors which determine food consumption in COVID-19 are peer influence, product attributes and lifestyle changes in COVID-19 and price. Further, the outcome of binary logistic regression suggest that for food consumption changes in the COVID-19 the peer influence and lifestyle changes in COVID-19 and price plays a significant role. The outcome of the study will helpful to the marketers in designing strategies in COVID-19 for food items. COVID-19 brought work from home and

restrictions on movements which brought forceful changes in lifestyle. The changes in lifestyle create opportunities for the market players to design the food items which are healthy and promote them as healthy food as USP (Unique selling preposition). Further the social media is one of the major influencer for food consumption during COVID-19, the marketer can grab the opportunity to market healthy food products through social media and digital marketing. The restriction on the movement will increase home delivery and eating at home, the marketer can also grab this opportunity by ensuring safety in food preparation and delivery.

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