




Original Article

Does COVID-19 Change the Food Habits of the Rural Elderly? A Cross-Sectional Study in Khulna District of Bangladesh

Abdul Jabbar¹, Ripul Kabir^{*1} 

¹. Discipline of Sociology, Social Sciences School, Khulna University, Khulna-9208, Bangladesh

^{*} **Corresponding Author:** Department of Sociology, social sciences school, Khulna University, Khulna-9208, Bangladesh. Tel: +01784489648, Email address: mrkabir@soc.ku.ac.bd

ABSTRACT

Article history

Received 26 Nov 2023
Accepted 5 Dec 2023

Citation: Jabbar A, Kabir R. Does COVID-19 change the food habits of the rural elderly? a cross-sectional study in Khulna district of Bangladesh. *Elderly Health Journal*. 2023; 9(2): 84-91.

Introduction: COVID-19 has changed all the routine works of human beings around the globe. The food habits of the elderly are changing due to various reasons. The purpose of this study was to find out the factors influencing food habit changes due to the pandemic.

Methods: A non-experimental research design, a survey, was executed at Sachibunia, Nijkhamr, Krishnonagar, and Raingamari villages under Batiaghata Upazila in the Khulna District of Bangladesh. Following a simple random sampling technique, data were collected through a field survey using an interview schedule. To show the relations between/among the variables, the chi-square/Fisher exact test was performed. For measuring the degree of relations of those variables, Binary Logistic Regression was used to find out the factors of food habit changes with a 95% confidence interval. For the model, $p < 0.05$ was considered statistically significant.

Results: The study reveals that 39% of the elderly changed their food habits during COVID-19. Except for the sex and employment status of the elderly, all the sociodemographic factors of this study were associated with food habit changes. Among these sociodemographic factors, age (OR = 2.51, 95% CI, 1.22-5.18), religion (OR = 2.07, 95% CI, 1.13-3.78), spouses' occupation (OR = 3.73, 95% CI, 1.90-7.32), and family head (OR = 3.74, 95% CI, 1.43-9.75) of the elderly influenced their food habits changes.

Conclusion: The socio-demographic and economic situations were responsible for the elderly's food habits changes.

Keywords: COVID-19, Food Habits, Aged, Food Menu, Sociodemographic, Pandemics

Introduction

Food habits play an important role in human health and it is shaped through one's sociocultural context. However, these habits change due to various reasons i.e., physical and socio-economic causes (1). The COVID-19 pandemic, which broke out in 2019 all over the world, has altered all routine work (2). In rural Bangladesh, the food habits of the elderly are not the same of urban ones. It is thought that urban elderly are much better cared for than those in rural areas because they are educated and even their family members are more concerned about elderly care. The issues of food

choices (3) and dietary habits were affected during the pandemic due to the lack of food availability and accessibility for fragile transportation and communication. In addition, the lockdown imposition and mobility limitations compel people to change their lifestyles which leads to muddled eating (4) like regular snacking and bouncing meals (5). In addition, negative psychological conditions and feelings like fear and sadness can enter into dietary habits. Hence, food habits may change in positive or negative directions depending on the individual's

sociodemographic and cultural background. Negative directions include worsening of diet variation (6-8).

The Family environment, through family interactions, may endorse healthy food habits (9). It is also revealed from different sources that food preferences are developed through consistent exposure to food; therefore, the availability and accessibility of certain food products are important (10). Studies indicate that food preferences influence different aspects of health indicators associated with individuals' health, such as weight status, nutritional status, age, gender, food preparation, and motives (11). Even though food preferences continue to change throughout the life course-biological, environmental, and social factors influence diet quality (12-14).

On the other hand, to increase the consumption of healthy food, an adequate food menu works as a pillar to boost the immune system of the body (15), and it may be pivotal for individuals (4). In addition, nutrition through the consumption of different types of protein and healthy fats pledges the normal function of the immune system, and it protects people from Coronavirus infection (15, 16) as well as other diseases. Healthy eating habits include many things, i.e., time available to organize eating activities, physicians' suggestions, etc. (17) covering low consumption of fruits and vegetables associated with increased consumption of sweets, and high consumption of snacks rich in energy, with low nutritional value (18, 19). The food patterns as positive outcomes in some populations emerge amid the pandemic due to the enhancement in family interaction and increased time at home (17, 20).

The overall dietary intake of rural people in Bangladesh is very poor, they also never thought about this since they think that what they are taking is normal and sufficient for their health (21). The food consumption pattern also changed over time, particularly after the COVID-19 pandemic. In rural Bangladesh, elderly people are treated as the most negligible person in the family as they cannot contribute economically. Old age, a period of vulnerability, indeed influences food habits (22). The situation becomes worse when any one of the live partners loses particularly for the woman when she loses her husband (23). With age, their voice becomes fainter in terms of food preferences (24). In most cases, the family head makes the decisions about what their food menu will be for the day (25). It is also a matter for the family head how this food menu will be managed, even in abnormal situations. So, the food menu preferences of the rural elderly in Bangladesh are thought to rarely happen. In addition, when a lockdown is imposed on free movement, little scope is left for the villagers to choose the foods and vegetables from the market. The choice of food may not snigger the family members due to hastiness with the limited time and safety bindings.

Moreover, the majority of the rural family passed their days with hardship due to lack of unemployment and it was difficult for them to buy whatever they chose from balanced diets. In rural areas, the elderly yield the food the whole family takes all the year. Few

instances will tell you that separate food menus are managed based on their preferences. Another important thing regarding food habits changes may adhere to their taste related to the physical fitness, psychological aspects, and sociodemographic conditions of the elderly. Little research has been conducted regarding the rural elderly's food habits changes during the pandemic in Bangladesh. In this study, we try to find out the factors related to food habits changes.

Methods

Study design and sampling

A non-experimental research design, a survey, was executed at Sachibunia, Nijkhamr, Krishnonagar, and Raingamari villages under Batiaghata Upazila in the Khulna District of Bangladesh. This cross-sectional study was carried out to explore the factors influencing the food habits changes of the elderly during the COVID-19 pandemic. The elderly who were 60 and above years old, able to listen and talk with and out of mental disorders were taken as a participant in the study. Four research assistants conducted a household survey from March 9 to 17, 2021 to determine the size of the population. Finally, 3,294 elderly people were identified with the criteria above. With the help of Cochran's formula, 344 elderly people were selected as the sample for the study.

Data collection

To collect data from the field, an interview schedule was developed containing both open and close-ended questions. There were two sections of the schedule i.e., sociodemographic information (age, religion, sex, marital status, education, spouse occupation and education, family type, family member, income earner, head of the family, employment status, monthly expenditure, length of living with spouses) and food habits of the elderly. In the food habits section, the elderly were asked about food habits changes and their types during COVID-19. Before the finalization of the schedule, a pretest was conducted on 10 (2.90% of the sample) elderly people randomly to develop the quality of validity and reliability of the questions of the interview schedule. After a modification based on the pretest, the interview schedule was finalized. Five data collectors collected data from fields from March to May 2021. In some of the cases, family members of the respective respondents helped the elderly to respond regarding some issues. On average, every respondent took 45 minutes to complete the interview.

Ethical consideration

The study was approved by the Khulna University Ethical Clearance Committee (KUECC-2021/02/12). All methods were carried out by relevant guidelines and regulations of the Ethical Committee of the University.

An informed consent was taken from the respondent during data collection and they were assured that data collected for the study would be kept confidential and used only for this study.

Statistical analysis

After collecting data from the field, it was processed with repeated coding and decoding as per the necessity of the study. The processed data were analyzed and interpreted using descriptive as well as inferential statistics. The data were analyzed by SPSS 25.0 (IBM Corp.). Percentages and frequency were used to describe the sociodemographic characteristics of the elderly. To show the relations between/among the variables, the chi-square/Fisher exact test was performed. For measuring the degree of relations of those variables, Binary Logistic Regression was used to find out the factors of food habit changes. Sociodemographic factors (first as reference category) were entered into the logistic regression model to calculate the odds ratios and determine the statistical significance with a 95% confidence interval. For the model, $p < 0.05$ was considered statistically significant.

Results*Sociodemographic character*

More than 76 percent of the elderly belonged to the age ≤ 70 years. Almost 53 percent of them were male, more than 71 percent of them were literate, and 50.6 percent of them were Muslim. In addition, most of the elderly (78.2%) lived in a nuclear family and more than half of the elderly families (55.52 %) had ≤ 7 members. However, more than 72 percent of them were unemployed. More than 56 percent of the elderly's length of living with a spouse was 20 to 39 years. (Table 1)

Changes to the food habits

It is seen from Figure 1 that 39 percent of the elderly changed their food habits due to the COVID-19 pandemic whereas 61 percent of them did not change it.

Food habits changes and sociodemographic character

All the sociodemographic characteristics but sex ($p = 0.492$) and employment status ($p = 0.806$) of the elderly were significantly associated with their food habits changes. (Table 2)

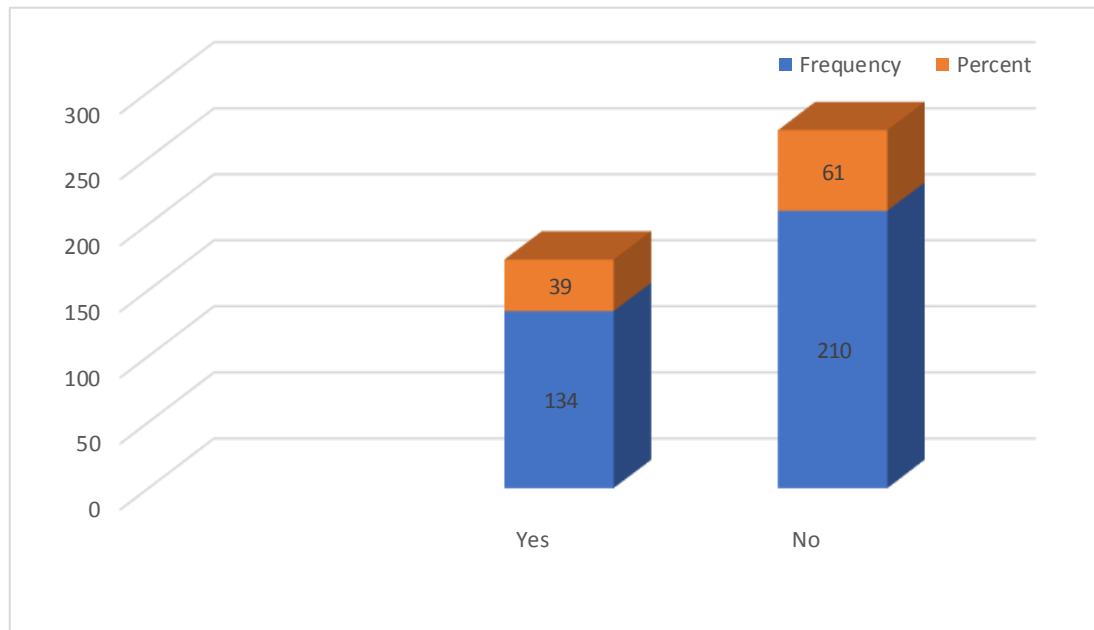
Factors influencing food habits changes

There are so many factors that can affect the food habits change of the people. Eating habits depend on many things i.e., culture, region, and religion. Age, religion, spouse occupation, and family head of the elderly had a positive and significant influence on food habits changes amid the pandemic (Table 3). Father (OR = 3.74, 95% CI, 1.43-9.75) as a family and housewife as spouse (OR=3.73, 95% CI, 1.90-7.32) occupation influenced 3.7 times higher to change the food habits among the elderly. In addition, > 70 years of age (OR = 2.51, 95% CI, 1.22-5.18) and religion as Sanatan (OR = 2.07, 95% CI, 1.13-3.78) had 2 times higher influence on their food habits change issues. Though the number of family income earners (3) was not statistically significant, on food habit changes, it exerted a 3.56 times higher effect in the model (OR = 3.56, 95% CI, 6.50-19.54) than any other member.

Table 1. Percentage distribution of the elderly by sociodemographic information

Variables	n	%	Variables	n	%
Age (years)			Family member		
≤ 70	262	76.2	≤ 7	301	87.5
> 70	82	23.8	> 7	43	12.5
Sex			Head of the family		
Male	182	52.9	Myself	159	46.2
Female	162	47.1	Spouse	54	15.7
Religion			Son	131	38.1
Islam	174	50.6	Employment status		
Sanatan	170	49.4	Employed	95	27.6
Education			Unemployed	249	72.4
Illiterate	99	28.8	Number of family income earners		
Literate	245	71.2	1	219	71.3
Spouse's occupation			2	68	19.8
Others	172	64.4	3	20	5.8
Housewife	95	35.6	Monthly expenditures (BDT)		
Spouse's education			≤ 10000	236	68.6
Illiterate	45	16.9	> 10000	108	31.4
Literate	222	83.1	Length of living with a spouse (in years)		
Family type			20-39	193	56.1
Nuclear	269	78.2	40-59	151	43.9
Joint	75	21.8			

(Source: Field survey-2021)



(Source: Field survey-2021)

Figure 1. Food habits changes**Table 2. Relations between sociodemographic variables and changes to food habits**

Variables		n	%	Changes to food habits		p
				Yes (%)	No (%)	
Age (years)	≤ 70	262	76.2	114 (43.5)	148(56.5)	0.002*
	> 70	82	23.8	20 (24.4)	62(75.6)	
Sex	Male	182	52.9	74 (40.7)	108(59.3)	0.492
	Female	162	47.1	60 (37.0)	102(63.0)	
Religion	Islam	174	50.6	80 (46.0)	94(54.0)	0.007*
	Sanatan	170	49.4	54 (31.8)	116(68.2)	
Education	Illiterate	99	28.8	29 (29.3)	70(70.7)	0.020*
	Literate	245	71.2	105 (42.9)	140(57.1)	
Spouse's occupation	Others	172	64.4	98 (57)	74(43)	0.000*
	Housewife	95	35.6	27 (28.4)	68(71.6)	
Spouse's education	Illiterate	45	16.9	12 (26.7)	33(73.3)	0.003*
	Literate	222	83.1	113 (50.9)	109(49.1)	
Family type	Nuclear	269	78.2	117 (43.5)	152(56.5)	0.001*
	Joint	75	21.8	17 (22.7)	58(77.3)	
Family member	≤ 7	301	87.5	125 (41.5)	176(58.5)	0.012*
	> 7	43	12.5	9 (20.9)	34(79.1)	
Head of the family	Myself	159	46.2	70 (44)	89(56)	0.017*
	Spouse	54	15.7	12 (22.2)	42(77.8)	
	Son	131	38.1	52 (39.7)	79(60.3)	
Employment status	Employed	95	27.6	38 (40.0)	57(60.0)	0.806
	Unemployed	249	72.4	96 (38.6)	153(61.4)	
Number of family income earners	1	219	71.3	101 (45.7)	120(54.3)	0.017*
	2	68	19.8	24 (36.4)	42(63.6)	
	3	20	5.8	3 (15)	17(85)	
Monthly expenditures (BDT)	≤ 10000	236	68.6	106 (44.9)	130(55.1)	0.001*
	> 10000	108	31.4	28 (25.9)	80(74.1)	
Length of living with a spouse (in years)	20-39	193	56.1	66 (34.2)	127(65.8)	0.041*
	40-59	151	43.9	68 (45.0)	83(55.0)	

(Source: Field survey-2021) *p < 0.05** p < 0.001

Table 3. Predictors of food habits changes of the elderly during COVID-19

Sociodemographic variables	B	p	OR	95% CI for OR	
				Lower	Upper
Age (year)					
≤ 70 ^{RC}					
> 70	0.923	0.012	2.51	1.22	5.18
Religion					
Islam ^{RC}					
Sanatan	0.727	0.018	2.07	1.13	3.78
Schooling					
No ^{RC}					
Yes	-0.085	0.815	.919	0.451	1.87
Spouse occupation					
Others ^{RC}					
Housewife	1.31	0.000	3.73	1.90	7.32
Spouse's schooling					
No ^{RC}					
Yes	-0.665	0.132	.514	0.216	1.22
Family type					
Nuclear ^{RC}					
Joint	0.356	0.479	1.42	0.532	3.83
Family head					
Self ^{RC}					
Father	1.32	0.007	3.74	1.43	9.75
Son	0.376	0.265	1.45	0.752	2.81
Family member					
≤ 7 ^{RC}					
> 7	0.008	0.989	1.00	0.337	3.01
Number of family income earners					
1 ^{RC}					
2	-0.033	0.921	.967	0.501	1.86
3	1.27	0.143	3.56	0.650	19.54
Monthly expenditure (BDT)					
≤ 10000 ^{RC}					
> 10000	0.674	0.051	1.96	0.998	3.86
Length of living with a spouse					
20-39 ^{RC}					
40-59	-0.410	0.176	0.664	0.366	1.20

Note -Reference category OR-Odd Ratio; *p < 0.05** p < 0.001

Discussion

In rural areas of Bangladesh, it was difficult for the elderly to change their food habits. There may be some causes i.e., lack of awareness, availability of a proper food menu, and direct involvement with food collection and management. In addition, most of the elderly's families cannot afford to buy vitamins and protein-rich food. They buy those common items for all the family members, not targeting the elderly. Food preferences greatly vary due to health factors, changes in the environment, and education (26). It also gets changed through some catalysts i.e., diseases (due to doctor's prescription), lack of availability of food, disaster, or the pandemic situations. The current study revealed that most of the rural elderly did not change their food habits during COVID-19 in Bangladesh. It seems to be a burden for the family. Even the rural elderly due to unconsciousness do not change their food menu. In some cases, the elderly cannot manage the family to change their food habits as they do not contribute to the family economically. Other studies

(27, 28) mentioned the reverse results. To them, more than half of the respondents changed their eating habits stating a positive change, i.e., an increase in ingesting of fresh fruits and vegetables. In addition, smell/taste symptoms can change food habits (29).

This study revealed that food habits changes were associated with elderly age, education, religion, spouse occupation, spouse education, family types, family head, family members, income earners, monthly expenditures, and length of living with a spouse. Educated persons are always self-concerned. They can manage the family to be obedient to their necessities. The level of education was considered for food habit changes (27, 30, 31). Personal savings, household income, employment status of the head of household, and nutrition knowledge of the head of household were found to be linked with dietary change (32). Our study found that aged elderly compared to less aged ones frequently changed their food habits during the COVID-19 situation and this finding resembles (20,

27, 33). To them, the elderly subjects were less likely to negatively change food habits in comparison with young adults, while adults were more likely to vary their habits positively than the younger. Members of nuclear families have the great possibility to look after their elderly properly. So, it is easier to respond to the elderly's preferences accordingly even in pandemic situations.

Though in our study, sex was not found to be a significant contributor to food habit changes, in many studies, sex of the participants played a vital role in changing habits during the pandemic (33, 34). This study showed that the elderly who were Muslims were more likely to alter their food habits amid the pandemic situation. In the Muslim community, the elderly are better cared for due to religious canon. Muslim respondents in a study skipped meals more often than Christians even though they received less sodium compared to other faiths (35). This study further mentioned that housewives as a spouse's occupation predisposed the food habits among the elderly. It is the easiest way for them to prefer a food menu for their husbands. Reciprocal understanding between spouses becomes vital to choosing the food menu, especially for the elderly, and negative changes in the food consumption profile were found to be carried out with Brazilians (36) and other populations during the quarantine period (20, 37, 38).

Father as a family head was found to be a significant contributor to food habit changes during the pandemic. They can easily manage their food choices and purchase them accordingly. This study also found that the increased family income earners had a positive effect on food habit changes. During the COVID-19 outbreak, the head of household's occupation was significantly associated with dietary diversity (32). Female-headed families were found to have less food intake than male-headed families (33).

Conclusion

This study explored the factors of food habits changes of the elderly during COVID-19. To unveil the factors of food habit changes, the sociodemographic contexts of the elderly were considered for this study. The Elderly's age was marked as an important aspect of it. Virus exposure together with taste symptoms may have influenced it. Muslim elderly compared to the Sanatan religion had more scope to alter their food habits. In addition, housewives as spouses' occupations of the elderly were found to be an influencing factor for food habit changes. Because they could look after their husbands' food choices. However, the father as the family head played a positive role in changing their food habits during the pandemic. Family bonding and family care for the elderly during the pandemic situation can help them change the food menu easily. If the understanding between the elderly and family members goes well, the elderly can share their ideas regarding the food menu with the family members without any hesitation. Special management regarding

the availability of foods i.e., green vegetables, vitamin-rich foods, and local fresh fruits in the market can be solicited.

Study limitations

The most important thing about this study was that it was conducted during COVID-19 with face-to-face interviews. It was an opportunity to follow the expression of the elderly while asking for information regarding food menu preferences. The study has some limitations. Previous food items the elderly preferred should also be studied. During the confinement, there were many more things to be considered for food menu preferences among the elderly i.e., lack of availability of fresh fruits and vegetables. Data were collected from a single Upazila of Khulna district in Bangladesh and the sample size was quite small. A larger sample would produce a better result on this issue. Finally, it was a quantitative study. Mixed method approaches would help to understand more in-depth about food habits of the elderly if their background stories were connected to this study.

Implication of the study

The rural elderly especially those who are more aged should be treated properly about food preferences due to their fragile health conditions and psychological nervousness. Female elderly should be cared for more seriously as in the male-dominated society, they are often ignored in the family sphere regarding healthy and nutritional foods. The elderly from the Hindu community had less scope to be involved in food preferences during the pandemic due to the sociocultural context. So, they should come out of the culture. In a Joint family, due to sociodemographic causes, the elderly are not heard and cared for appropriately. In the COVID situation, they become nervous due to virus infection. So, top priority should be given to the elderly issues in the family. The more the family members, the more chaotic situations emerge in the family. The family with more members should be taken into the affairs of the state intervention amid the pandemic.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could appear to influence the work reported in this paper.

Acknowledgments

We are indebted to the KU Research Cell as they had funded to conduct the study. We also acknowledge the contribution of the head of the elderly family because without their help it was quite impossible to complete this study.

Funding

This study received funds from Khulna University and the receipt no. was KURC-61/2020.

Authors' contribution

Dr. Md. Abdul Jabbar (Principal Investigator)-Conceptualization, methodology, review of the draft, and overall supervision.

Md. Ripul Kabir – Data curation, writing the original draft, and referencing.

References

1. Robinson E, Boyland E, Chisholm A, Harrold J, Maloney NG, Marty L, et al. Obesity, eating behavior and physical activity during COVID-19 lockdown: A study of UK adults. *Appetite*. 2021; 156: 1-8.
2. Souza TC, Oliveira LA, Daniel MM, Ferreira LG, Della Lucia CM, Liboredo JC, et al. Lifestyle and eating habits before and during COVID-19 quarantine in Brazil. *Public Health Nutrition*. 2022; 25(1): 65–75.
3. Béné C. Resilience of local food systems and links to food security – A review of some important concepts in the context of COVID-19 and other shocks. *Food Security*. 2020; 12(4): 805–22.
4. Naja F, Hamadeh R. Nutrition amid the COVID-19 pandemic: a multi-level framework for action. *European Journal of Clinical Nutrition*. 2020; 74(8): 1117–21.
5. Anderson E, Durstine JL. Physical activity, exercise, and chronic diseases: A brief review. *Sports Medicine and Health Science*. 2019; 1(1): 3–10.
6. Tribst AAL, Tramontt CR, Baraldi LG. Factors associated with diet changes during the COVID-19 pandemic period in Brazilian adults: Time, skills, habits, feelings and beliefs. *Appetite*. 2021; 163: 1-10.
7. Hall KD, Ayuketah A, Brychta R, Cai H, Cassimatis T, Chen KY, et al. Ultra-processed diets cause excess calorie intake and weight gain: an inpatient randomized controlled trial of ad libitum food intake. *Cell Metabolism*. 2019; 30(1):67-77.
8. Shan Z, Rehm CD, Rogers G, Ruan M, Wang DD, Hu FB, et al. Trends in dietary carbohydrate, protein, and fat intake and diet quality among US adults, 1999-2016. *The Journal of the American Medical Association*. 2019; 322(12): 1178–87.
9. Vandeweghe L, Moens E, Braet C, Van Lippevelde W, Vervoort L, Verbeken S. Perceived effective and feasible strategies to promote healthy eating in young children: focus groups with parents, family child care providers and daycare assistants. *BMC Public Health*. 2016; 16(1): 1-12.
10. Yee AZH, Lwin MO, Ho SS. The influence of parental practices on child promotive and preventive food consumption behaviors: a systematic review and meta-analysis. *International Journal of*

Behavioral and Nutrition and Physical Activity. 2017; 14(47): 1-14.

11. Sánchez-García R, Reyes-Morales H, González-Unzaga MA. Preferencias alimentarias y estado de nutrición en niños escolares de la Ciudad de México. *Boletín médico del Hospital Infantil de México*. 2014; 71(6): 358–66.
12. Rathi N, Riddell L, Worsley A. Food consumption patterns of adolescents aged 14–16 years in Kolkata, India. *Nutrition Journal*. 2017; 16(1): 1-12.
13. Marty L, De Lauzon-Guillain B, Labesse M, Nicklaus S. Food choice motives and the nutritional quality of diet during the COVID-19 lockdown in France. *Appetite*. 2021; 157:1-8.
14. Beckerman JP, Alike Q, Lovin E, Tamez M, Mattei J. The Development and public health implications of food preferences in children. *Front Nutrition*. 2017; 4: 1-8.
15. Abbas AM, Kamel MM. Dietary habits in adults during quarantine in the context of COVID-19 pandemic. *Obesity Medicine*. 2020; 19: 1-3.
16. de Faria Coelho-Ravagnani C, Corgosinho FC, Sanches FLFZ, Prado CMM, Laviano A, Mota JF. Dietary recommendations during the COVID-19 pandemic. *Nutrition Reviews*. 2021; 79(4): 382–93.
17. Scarmozzino F, Visioli F. Covid-19 and the subsequent lockdown modified dietary habits of almost half the population in an Italian sample. *Foods*. 2020; 9(5): 1-8.
18. Sidor A, Rzymiski P. Dietary choices and habits during COVID-19 lockdown: experience from Poland. *Nutrients*. 2020; 12(6): 1-13.
19. Pellegrini M, Ponzo V, Rosato R, Scumaci E, Goitre I, Benso A, et al. Changes in weight and nutritional habits in adults with obesity during the “lockdown” period caused by the COVID-19 virus emergency. *Nutrients*. 2020; 12(7): 1-11.
20. Rodríguez-Pérez C, Molina-Montes E, Verardo V, Artacho R, García-Villanova B, Guerra-Hernández EJ, et al. Changes in dietary behaviors during the covid-19 outbreak confinement in the Spanish COVID-19 study. *Nutrients*. 2020; 12(6): 1-11.
21. Ramos-Padilla P, Villavicencio-Barriga VD, Cárdenas-Quintana H, Abril-Merizalde L, Solís-Manzano A, Carpio-Arias TV. Eating habits and sleep quality during the COVID-19 pandemic in adult population of Ecuador. *International Journal of Environmental Research and Public Health*. 2021; 18(7): 1-11.
22. Banna JC, Buchthal OV, Delormier T, Creed-Kanashiro HM, Penny ME. Influences on eating: a qualitative study of adolescents in a periurban area in Lima, Peru. *BMC Public Health*. 2015; 16(1): 1-11.
23. Johnson CS. Nutritional considerations for bereavement and coping with grief. *The Journal of Nutrition, Health and Aging*. 2002; 6(3): 171–6.
24. Host A, McMahon AT, Walton K, Charlton K. Factors influencing food choice for independently living older people-a systematic literature review.

Journal of Nutrition in Gerontology and Geriatrics. 2016; 35(2): 67–94.

25. Blake CE, Monterrosa EC, Rampalli KK, Khan ANS, Reyes LI, Drew SD, et al. Basic human values drive food choice decision-making in different food environments of Kenya and Tanzania. *Appetite*. 2023; 188: 1-12.

26. Offei-Ansah C. Food habits and preferences as a factor in the choice of meals by students in the University of Cape Coast. *Nutrition and Health*. 2012; 21(3): 151–72.

27. Turki S, Bouzekri K, Trabelsi T, Ati JE. Impact of COVID-19 lockdown on food habits, appetite and body weight in Tunisian adults. *Journal of Nutritional Science*. 2022; 11: 1-12.

28. Skotnicka M, Karwowska K, Kłobukowski F, Wasilewska E, Małgorzewicz S. Dietary habits before and during the COVID-19 epidemic in selected European countries. *Nutrients*. 2021; 13(5): 1-18.

29. Lopez-Leon S, Wegman-Ostrosky T, Perelman Cc, Sepulveda R, Rebolledo Pa, Cuapio A, et al. More than 50 long-term effects of covid-19: a systematic review and meta-analysis. *Medrxiv: The Preprint Server for Health Sciences*. 2021; 2021: 1-22.

30. Samanta S, Banerjee J, Rahaman SN, Ali KM, Ahmed R, Giri B, et al. Alteration of dietary habits and lifestyle pattern during COVID-19 pandemic associated lockdown: An online survey study. *Clinical Nutrition ESPEN*. 2022; 48: 234–46.

31. Jara MF, Leyton B, Cuevas C, Espinoza PG. Women's perceptions about changes in food-related behaviors at home during the COVID-19 pandemic in Chile. *Public Health Nutrition*. 2021; 24(14): 4377–86.

32. Pakravan-Charvadeh MR, Mohammadi-Nasrabadi F, Gholamrezai S, Vatanparast H, Flora

C, Nabavi-Pelesaraei A. The short-term effects of COVID-19 outbreak on dietary diversity and food security status of Iranian households (A case study in Tehran province). *Journal of Cleaner Production*. 2021; 281:1-12.

33. Shahzad MA, Qing P, Rizwan M, Razzaq A, Faisal M. COVID-19 pandemic, determinants of food insecurity, and household mitigation measures: a case study of Punjab, Pakistan. *Healthcare*. 2021; 9(6): 1-17.

34. Canello R, Soranna D, Zambra G, Zambon A, Invitti C. Determinants of the lifestyle changes during COVID-19 pandemic in the residents of Northern Italy. *International Journal of Environmental Research and Public Health*. 2020; 17(17): 1-13.

35. Navarro-Prado S, González-Jiménez E, Perona JS, Montero-Alonso MA, López-Bueno M, Schmidt-RioValle J. Need of improvement of diet and life habits among university student regardless of religion professed. *Appetite*. 2017; 114: 6–14.

36. Malta DC, Gomes CS, Szwarcwald CL, Barros MBDA, Silva AGD, Prates EJS, et al. Distanciamento social, sentimento de tristeza e estilos de vida da população brasileira durante a pandemia de Covid-19. *Saúde Em Debate*. 2020; 44(4): 177–90.

37. Barrea L, Pugliese G, Framondi L, Di Matteo R, Laudisio D, Savastano S, et al. Does Sars-Cov-2 threaten our dreams? Effect of quarantine on sleep quality and body mass index. *Journal of Translational Medicine*. 2020; 18(1): 1-11.

38. Eftimov T, Popovski G, Petković M, Seljak BK, Kocev D. COVID-19 pandemic changes the food consumption patterns. *Trends in Food Science and Technology*. 2020; 104: 268–72.