

Educational Program about Safe Food Handling Practices among Mothers Based on Health Belief Model in Selected Villages

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Abstract

The primary setting for outbreaks of foodborne illness is the household. It is crucial that customers are aware of correct food handling and safety measures in their home kitchens since pathogenic germs can migrate from human hands and food contact surfaces into foods and vice versa. **Aim:** To evaluate the effect of educational program about safe food handling practices among mothers based on health belief model in selected villages. **Methods:** A quasi-experimental research design (one group pre- and post-tests) was used in the current study. **Setting:** The research was conducted in four villages in Minia City. **Sampling:** A multistage cluster sample consisting of 120 mothers was calculated using the statistical software EPI-INFO V7.2.5. **Tools:** Two tools were utilized to collect data: 1st tool: part I, socio-demographic data, and part II, a self-reported practice questionnaire of mothers about safe food handling; 2nd tool: the health belief model (HBM) food safety scale. **Results:** The present research showed that 60% of the studied mothers had a poor level of practice before the educational program implementation, which increased to 85% having a good level of practice in the post-test, and there were highly statistically significant differences (p -value < 0.001) between pre- and post-implementation of the educational program concerning all items of the health belief model regarding safe food handling. **Conclusion:** There were highly statistically significant differences between pre- and post-implementation of the educational program concerning all items of practices regarding safe food handling, and there was a positive correlation between total scores of practices and the health belief model regarding safe food handling. **Recommendation:** Health care system should provide regular planned educational programs about safe food handling practices and include them in the component of MCH services and also conducting the same research again with a sizable sample in several community contexts

Keywords: Education program, Health belief model, Practice, Safe food handling.

Introduction

Food safety has become an important issue for public health in several nations. Food safety, as stated by the World Health Organization (WHO), is the set of circumstances and precautions that must be taken throughout the preparation, production, processing, preservation, and delivery of food to be able to make sure that it is wholesome, safe, and fit for people's consumption (Alemayehu et al., 2021).

The term "food-borne disease" refers to a group of illnesses brought on by consuming tainted food or water. These illnesses can be brought on by a number of factors, including infectious germs (bacteria and viruses), toxic substances, radioactive substances, as well as additional dangerous items. These factors can result in further than 250 various illnesses caused by food, from diarrhea to cancer (Todd, 2020).

Food-based illnesses and events have been named through the World Health Organization (WHO) as the biggest global health problem of the 21st decade (Ayaz et al., 2018). So, food safety is vital to avoiding foodborne illness and while strengthening humanity's health. Illnesses associated with food have become more prevalent internationally throughout the years, having a detrimental impact on both of them the health and economic well-being of both developing as well as developed states (Alemayehu et al., 2021).

Inappropriate preparation of food, either inside and external the house, can lead to foodborne infections (Saeed et al., 2021). Lacking food security legislation, lax regulatory structure, insecure home preparation of food, poor infrastructure, insufficient personal cleanliness, inappropriate handling of food, unsanitary water, insufficient circumstances in order to produce and store food, and poor knowledge of food safety are the primary factors responsible for food-

related illness outbreaks in developing countries (Sayuti et al., 2020). Mothers could transmit foodborne illnesses to their children, to prevent this risk providing health education program regarding food safety for them is very important (Osaili et al., 2022).

Pregnant women, the elderly, immunosuppressed individuals, and young kids younger than the age of five represent the populations most prone for contracting food-borne illnesses due to their low weight and immature immune system development (Ayad et al., 2022).

Food-related illnesses are more prevalent in developing and impoverished nations. However, they are frequently underestimated since those who suffer might not disclose their condition because of difficult reporting processes. Only individuals who visit clinics or hospitals for medical care are notified to the general health authority (Ali et al., 2023).

The Health Beliefs Model (HBM) was a different model used to analyze food handlers' practices. A group of experts in the American health service created this theory in the 1950s. Since then it has become widely recognized as a theoretical framework that describes and leads the adoption of all health-related practices. The model of significance and expectation, explains how people control health-related behaviors. These expectations include expectations about risk and how serious it will be, expectations about one's capacity to take the right actions, expectations about the advantages of doing so, and expectations about obstacles preventing one from taking the right actions (Ma'moun et al., 2020).

Following the guidelines for food safety at every stage, from manufacturing to consumption, can help prevent public health issues and the majority of incidents of foodborne diseases (Saeed et al., 2021). According to WHO (2020), the

best ways to stop foodborne outbreaks are through food safety education and training.

The community health nurse plays a fundamental part in preventing food-related illnesses and raising consumer knowledge of food safety through the administration of active educational and training courses for food handlers (Hassan et al., 2022). In order to protect their health and welfare, mothers are typically the ones who handle food at home (Ayaz et al., 2018).

Significance of the study

The World Health Organization (WHO) stated that hazardous food containing dangerous microbes, viruses, parasites, or chemicals is the root cause of over two hundred sicknesses, extending from gastrointestinal tract infections to malignancies. Each year, almost sixty million people will be infected from consuming tainted food, as well as 420,000 people dying. This outcomes in the loss of 33 million years of optimal life (Ali et al., 2023).

The third-highest anticipated strain of infections caused by food in a human population is found in the Middle East as well as North Africa, which includes Egypt. Additionally, non-typhoidal Salmonella, Escherichia coli, norovirus, and Campylobacter represent seventy percent of the overall incidence of foodborne infections in these states, infecting an estimated 100 million residents each year (Faour et al., 2020).

Studies show a growing connection between hazardous domestic food safety practices and foodborne diseases (Hassan et al., 2018). Additionally, because household kitchens are frequently used for several purposes, there is a higher danger of food poisoning and the dissemination of food-related diseases (Mkhungo et al., 2018). If household food handlers don't follow hygienic food handling practices, they frequently cause contamination (Ayaz et al., 2018).

Ineffective efforts have been made to lower the hazards through the creation of successful health education programs. The majority of food handling at home is done by mother's so in order to protect health and wellbeing, it is crucial to analyze mothers' attitudes and behaviors as well as learn how to prevent unsafe food from being prepared at home (Ayaz et al., 2018).

There is a shortage of studies available in Egypt that determine practices for mothers regarding safe food handling, but most studies (Latif et al., 2013; Elsherbiny et al., 2019; Wahdan et al., 2019; Ahmed & Amin, 2021; and Hassan et al., 2022) have focused on improving food handlers' knowledge and practices at restaurants, and based on the recommendations mentioned in the previous research, there is a need for an educational program to improve mothers' practices regarding safe food handling at home. As a consequence, it is evident that there is a gap when the HBM is applied to professional food handling methods.

Aim of the study: -

The aim of this research is to evaluate the effect of an educational program about safe food handling practices among mothers based on a health belief model in selected villages.

Research hypothesis:

- Implementation of the educational program will increase mothers' practices concerning safe food handling.
- The use of the educational program will raise the mean score of mothers' beliefs about safe food handling as measured by HBM.
- There is a significant relation between practice & health belief model and sociodemographic characteristics.

Subjects & Methods

Research design: A quasi-experimental research design (one group pre- and post-tests) was used in the current study.

Setting: The study was carried out in four villages in Minia City.

Sample type: a multistage cluster sampling technique was used.

Inclusion Criteria:

Mothers who participate in all stages of purchasing, preparing, cooking, and storing food for their families.

Sample size and technique:

This research was carried out in Minia City, which consists of forty-two (42) villages. First, a cluster of the four sectors (North, South, East, and West) was chosen. Then, one village was chosen at random from each sector, the following four (4) villages: Tahnasha, Damaris, Maqousa, and Zohra. Finally, we took every fourth household from each village using systematic random sampling, and all women were chosen in accordance with the predetermined inclusion criteria. According to the National Registry, the total number of adult females in the four randomly selected villages, as stated by the statistics center of Minia governorate, was assessed to fulfill the study's aim with a 95% degree of confidence and an 80% study power, the appropriate sample size of 120 moms was chosen using the computer application EPI-INFO V7.2.5: The distribution of the entire sample was as follows.

villages	Zohra	Maqousa	Tahnasha	Damaris	Total
Total Number of village's mothers	5231	4635	3842	7192	20900
Ratio (%)	25%	22%	18%	35%	100%
Number of the sample	30	26	22	42	120

Tools for Data Collection: Two separate tools were used to collect data.

Tool: The researcher will create a structured interview questionnaire after reviewing pertinent literature as (Salem et al., 2017), (Pourtaheri et al., 2018), (Ma'moun et al., 2020), (Boulos & Abouelezz, 2020), (Ali et al., 2021), (Rabeya et al., 2022), (Ayad et al., 2022), (Ali et al., 2023). It consisted of two sections:

Part I: socio-demographic characteristics: these included the following: age, social status, level of educational, income, employment, family member numbers, and if the mother had previously attended any training or lectures on food safety

Part II: self-reported practice questionnaire of mothers about safe food handling (pre-posttest), adopted from WHO 2020 and modified by the researchers, involves twenty-seven (27) questions to assess the reported food practice of mothers concerning four main parameters: food purchasing and storage, six (6); preparation, ten (10) cooking, four (4); and personal hygiene, seven (7).

Scoring system: The final grade was 27, a score of one was assigned for a correct response and a score of zero for either an unknowing response or a wrong response, and it was divided into the following categories: Good practices were classified if they scored more than or equal to 50% of the overall score. Poor practices were classified if the score was below 50% of the overall score (Rabeya et al., 2022).

Tool II: Health Belief Model Food Safety Scale:

The HBM food safety scale that was developed by Botle B.J. (2013) and modified by the investigator to assess participants' beliefs and perceptions about food safety involved of 29 questions covering the HBM's elements. Six (6) items assessed perceived susceptibility, six (6) items perceived severity, ten (10) items perceived barriers, four (4) items perceived benefits, and three (3) items related to self-efficacy. Scale responses are rated using a five-point Likert scale by each participant, with 1 being strongly disagree, 2 being disagree, 3 being neutral, 4 being agree, and 5 being strongly agree.

Scoring System: -

The total health belief score ranged from 29 to 145. Higher scores on such scales mean higher perceived severity, perceived susceptibility, perceived barriers, perceived benefits, and high self-efficacy. Low (if rating \leq 60%) (29–87) and High (if rating $>$ 60%) (88–145) (Ma'moun et al., 2020).

Validity and Reliability of the Tools:

Five professors with experience in the study's topic evaluated the study tools for face validity. The face validity of the tools was created to understand the range of measurements that were expected of them. Experts' opinions and directions served as the basis for the item's sequencing, simplicity, importance, applicability, language, term, form, and general appearance, which were then modified as needed.

The study tools' Cronbach's alpha coefficient was used to evaluate the reliability test. Each tool's internal consistency was evaluated using the Cronbach's alpha coefficient. (0.789 & 0.893) for **self-reported practice questionnaire of mothers about safe food handling and health belief model food safety scale respectively**

Pilot of the study:

10% of the whole sample of 12 mothers who were investigated underwent it. It was conducted to evaluate the tools' applicability and clarity, the viability of fieldwork, and any potential challenges the researcher would face that might obstruct data collection. The trial sample was used; the basic sample did not undergo any alterations.

Procedure:

The mayor of each village was legally requested to sign an approval letter outlining the intended outcome of the present study in writing. The collection of data lasted for 8 months, starting from the beginning of August 2022 to the end

of March 2023, through 2 days weekly (10.00 am–3.00 pm) through the three following phases: assessment phase (pre-test), implementation phase, as well as evaluation phase (post-test).

1. Assessment phase (pre-test)

- Mothers who were at home were first interviewed, and they were briefly briefed on the purpose and goals of the study. The moms have been informed that their participation is optional, as is their freedom to stop at any moment. All mothers gave their verbal approval.
- After getting each mother's consent to take part in the study, the researchers gave each one of them an overview and demonstration of the problems with the assessment tool. Accordingly, the researchers collected data on socio-demographic status, self-reported practice questionnaires of mothers about safe food handling, and a health-belief model food safety scale. It required each mother between thirty and forty-five minutes to fill out the questionnaire; in cases where the mother was illiterate, the researchers filled out the form. Every day, the researchers assembled about 2:5 mothers.
- Following the pretest, an agreement was concluded for every mother on an appropriate date for the carrying out of educational sessions, as well as ten mothers were grouped next to each other in the dorm and matched at the same time (12 groups every group consisting of 10 mothers were set up).

2- Implementation phase (accomplishing the education program)

- Health education sessions was conducted in one of participant's homes by grouping them according to the distance between homes,
- Diverse instructional approaches were utilized involving demonstrations along with group discussions. The contents of the program covering food safety practices in food preparation as well as handling and comprehensive information on these practices.
 - The researchers created the educational guidance, and it was composed of two sections:
The first section (theoretical part) is comprised of one session (it lasted for approximately 15 to 20 minutes) that covers the definition, types, causes, modes of transmission, symptoms, significance of using safe food handling, preparation, and serving practices, and the prevalence of food poisoning globally.
The second section includes of four practice sessions, which each lasted for about 15-20 minutes and included the following: -
- First session (food shopping and storage): how to distinguish between food that should be consumed raw and cooked, the ideal temperature range for any kind of food, as well the time period for storing.
- Second session (food preparation): designating and cleaning specialized utensils for preparing foods that have no exposure to heat while cooking, and different tools for food that is exposed to heat.

- Third session (Food cooking): Choose cookware made of healthy materials and use the recommended cooking temperature.
- Fourth session: How to properly wash your hands before, during, and after food preparation and cooking.
- In order to meet the session's goals, a brochure with information on the same issue was handed to the moms at the end of the session. This was done to get feedback from the mothers regarding this subject and make sure the benefits for women were realized.

3. Evaluation phase (post-test):

- Three weeks following the program's conclusion, the self-reported practices of mothers regarding safe food handling and the HBM safe food scale were checked utilizing the comparable data gathering tool.

Ethical considerations:

A formal request was provided to the Ethics Committee for Scientific Research at the Faculty of Nursing at

Minia University prior to the pilot study carrying out and the real research.

Study participants' confidentiality was taken into account when data were being collected. Respondents were assured that all their data would be kept in strict confidence, and privacy would also be assured by giving each participant a number rather than their name to preserve their privacy.

Statistical design:

Descriptive statistics were used to summarize, tabulate, and show the gathered data. The data were statistically analyzed using the Statistical Package for the Social Sciences (SPSS), version 20. The frequency distribution was utilized to display the qualitative data, and the mean and standard deviation were used to convey the quantitative data's degree of dispersion. Regression was utilized to show how the variables related to one another. The correlations within the quantitative variables were found using Pearson correlation. At a p-value ≤ 0.05 , statistical significance was taken into account.

Results:

Table 1: Percentage distribution of studied mothers according to their demographic data (N = 120)

Socio-demographic data	Study sample N= 120	
	No	%
Mother age / years		
18-<30	30	25.0
30-<40	60	50.0
40-<50	20	16.7
50 +	10	8.3
	Mean \pm SD	35.05 \pm 9.90
Marital status		
Married	97	80.8
Widow	9	7.5
Divorced	14	11.7
Education Level		
Illiterate	75	62.5
Read and write	16	13.3
secondary education	13	10.9
University education	16	13.3
Working state		
Employee	25	20.8
House wife	95	79.2
Income		
enough	32	26.7
Not enough	88	73.3
Number of family members		
2	12	10.0
3-5	28	23.3
5+	80	66.7

Table (1): This table shows that (50%) of the studied mothers with ages ranged from 30 :< 40 with a mean age of (mean \pm SD 35.05 \pm 9.90), (80.8%) of the participants were married, and (62.5%) of them were illiterate. (79.2%) of the studied women were housewives; (73.3%) did not have enough income; and (66.7%) had more than five family members.

Table 2: Distribution of the mean score of mothers' practice regarding safe food handling pre- and post-educational program (n = 120)

items	practice		Paired samples t-test	p- value
	Pre- intervention Mean \pm SD	Post- intervention Mean \pm SD		
Food purchasing and storage	13.4 \pm 3.4	23.2 \pm 2.2	-12.063	0.001*
Food preparation	20.2 \pm 2.1	33.1 \pm 3.4	-13.969	0.001*
Food cooking	21.5 \pm 4.3	40.3 \pm 4.2	-8.445	0.001*
personal hygiene	30.5 \pm 7.1	53.3 \pm 6.3	-14.468	0.001*
Total score	85.6\pm16.9	149.9\pm16.1	-18.948	0.001*

**** High Significance P \leq 0.001**

Table 2 indicates that there were highly statistically significant differences (p-value <0.001) between pre- and post-implementation of the educational program concerning all items of practices regarding safe food handling (food purchasing and storage, preparation, cooking, and personal hygiene).

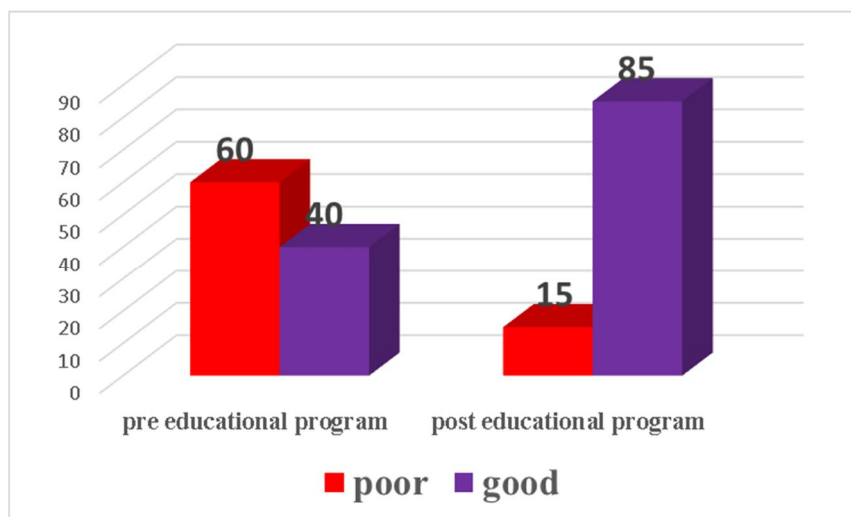


Fig. 1: Distribution of studied mothers' total practices score about safe food handling at pre- and post-intervention (n = 120).

Figure 1 illustrates that concerning practice related to safe food handling, 60% of studied mothers had a poor level of practice pre-implementation of the educational program; this improved post-implementation of the educational program to 85% of them having a good level of practice.

Table 3: Multiple linear regression analysis of predictors/ factors associated with mothers' practice regarding safe food handling after educational program application (N = 120):

variables	OR	95% CI	χ^2	P-value
Mother age	0.827	0.135, 2.374	6.191	0.011
Marital status	0.961	0.425, 2.412	0.236	0.940
Education Level	4.371	2.416, 7.521	13.017	0.002
Working state	2.014	0.631, 5.291	12.128	0.002
Income	3.551	1.524, 2.363	15.241	0.001
Number of family members	3.427	2.153, 1.847	15.076	0.001

cOR, crude odds ratio; CI, confidence interval

Table 3 elucidates that mothers in a young age category (18–40 years), those with a university education, employed mothers, and those who had enough income had higher significant odds of their practice score than relevant categories.

Table (4): Distribution of health belief model domains' mean scores and standard deviation regarding safe food handling among studied mothers pre- and post-educational program (n = 120):

Domains	Pre- educational program	Post- educational program	t	P- value
	Mean± SD	Mean± SD		
Perceived susceptibility Not susceptible	9.12±0.3	16.11±0.9	6.55	0.010*
perceived severity Low perceived severity	11.31±1.5	30.43±3.3	5.17	0.001**
perceived benefits Un useful	10.16±1.9	29.12±1.6	10.57	0.001**
perceived barriers Have barriers	12.21±1.6	28.17±2.3	13.13	0.001**
Self-Efficacy Low self-efficacy	10.24±1.4	16.39±1.8	14.27	0.002**
Total score	53.04±6.7	120.22±9.9	16.51	0.001**

** High Significance $P \leq 0.001$

Table 4 indicates that there were highly statistically significant differences (p -value < 0.001) between pre- and post-implementation of the educational program concerning all items of the health belief model (perceived sensitivity, severity, benefits, barriers, and Self-Efficacy) regarding safe food handling.

Table (5): Correlation between studied mothers' total practices and health belief model' scores pre- and post-educational program regarding safe food handling (n = 120)

Items	Pre-educational program health belief model' total Scores		Post-educational program health belief model' total Scores	
	r	p-value	r	p-value
Pre-educational program Total Practices	0.116	0.412	0.889	0.001**
Post-educational program Total Practices	0.324	0.001**	0.214	0.135

** High Significance $P \leq 0.001$

Table 5 shows that there was a positive correlation between total scores of practices and the health belief model regarding safe food handling of the studied mothers at pre- and post-educational programs ($P \leq 0.001$).

Discussion

Safe food handling practices are a worldwide health attention, specifically in developing nations, as a consequence of raising food-related diseases. Greater efforts are required to improve those practices, and awareness program should be provided (Tamiru et al., 2022). Additionally, Obande, D., (2023) & Mohammed et al., (2019) recommended the necessity for implementing educational program regarding food safety to target awareness of mothers. Therefore, the current research aimed to evaluate the effect of an educational program about safe food handling practices among mothers based on health belief model in selected villages.

The existing paper found that the average age of the mothers who were studied was (Mean \pm SD 35.05 \pm 9.90), the majority of them were married as well as housewives and about two-thirds of them were illiterate. Also, three-quarters of them did not have enough income, and about two-thirds of them had more than 5 family members. It was agreed with a study by Ali et al., 2021 in Minia Governorate, Egypt, which noticed that the mean age of participating mothers was 35.05 \pm (9.9 SD), most of them were married, half of them were illiterate, the majority were housewives, more than half of them were have not enough income and more than one-third of them were had more than 5 family members. Also, Mohammed et al., 2019 in Assiut Governorate, Egypt, concluded that the mean age of participating mothers was 30.37 \pm 6.58, more significant than two-fifths of moms had completed secondary schooling. This consistency in findings may be attributed to the similarities in study population and study setting which was conducted in a rural community in Upper Egypt which has the same rural culture that does not let females complete their education and employment. Also, it was consistent with Dagne et al., 2021 in Addis Ababa, Ethiopia, who reported that the mean age of participants was 39.844 \pm 11.02 (SD), and most women had been wedded and were illiterate.

It didn't match with the findings of Hassan et al., 2022 in Cairo, Egypt who stated that the mean age of participants was 41.60 \pm 11.3 SD, and about two-thirds of them didn't attain a secondary level of education. Also, it disagreed with the findings of Elobeid et al., 2019 in Doha, Qatar, which revealed that the majority of participants were aged between 21-30 yrs. and the vast minority of them had primary school education, and Mohammed et al., 2019 who revealed that greater than half of participants were employed, more than half of them had a middle social class level. This discrepancy in outcomes might be owing to the difference in study participants and settings.

Regarding participants' total mean score of safe food handling practices, the existing paper highlighted that there was a highly statistically significant rise in the total mean grades of these practices prior to as well as after implementing the educational package. Additionally, there were extremely statistically significant discrepancies in all elements of safe food handling practices prior to as well as after fulfillment of the instructional package. From the researchers' points of view, it may be attributed to a positive effect of the educational intervention and the clarity of instructions in increasing mothers' awareness regarding hazards of unsafe food handling practices and inspiring and persuading them to modify those unsafe practices to promote their family health.

It corresponded with the findings of Hassan et al., 2022 who discovered that there were statistically significant differences in participants' food safety practice scores prior to

and after the program's completion, and with the findings of Ghaffari et al., 2020 in Iran who revealed that there was a significant improvement in participants' practices following the program's completion. It also, agreed with Gaber et al., 2017 in Tanta City, Egypt who revealed that there was a significant improvement in scores of all parameters of food safety practices after conducting the instructive program and Wahdan et al., 2019 in Egypt which revealed that all participants practice regarding food safety were improved after implementing the program.

Concerning demographic predictors of participants' safe food handling practices, the present findings clarified that mothers of younger age, those with a university education, employed mothers, and those who had enough income had greater significant odds of their practice scoring than others. From the researcher's points of view, mothers of younger age were supposed to acquire the required knowledge about safe food handling more easily than mothers of older age, and mothers with high educational levels were supposed to more easily understand and gain the required knowledge of safe food handling than mothers with a lower level which might be positively reflected on their attitudinal and behavioral changes and translated into sufficient practices. Also, mothers who had enough income and employed mothers were supposed to have enough money that help them to follow and apply all safe food handling measures including food purchasing and storage, preparation, cooking, and personal hygiene.

It was consistent with the findings of Rabeya et al., 2022 and Al Banna et al., 2022 in Bangladesh which revealed that participants' educational level, monthly income, and employment status significantly affect the average score of their practices and Osaili et al., 2022 in Dubai, United Arab Emirates which highlighted that there was a relation between food safety practices of participants and their employment status, age, and educational levels which was statistically significant. Also, Dagne et al., 2021 in Debarq, revealed that mothers' level of education and income, were significantly connected with their food security attitude. In contrast, Madilo, et al., 2023 in Ghana indicated that age has no influence on participants' food safety practices, and Ayaz, et al., 2018 in Saudi Arabia, showed that mothers' age, employment status, and income had no significant relation with their practices.

Based on the findings of the present paper, there were greater statistically significant variations in the whole elements of the health belief model regarding safe food handling practices of participants. Correspondingly, there was a positive correlation between overall scores of the health belief model and participants' practices prior to as well as post-implementation of the educational package. From the researchers' points of view, it might be attributed to the helpful effectiveness of the educational program in changing mothers' beliefs regarding safe food handling which was reflected in desirable changes in their behaviors and significant improvement in their practices regarding safe food handling.

It was consistent with the findings of Wang et al., 2021, in China, which concluded that there was a difference in the factor that determines the desire for various food-handling practices, and with Habiballah et al., 2020, in Jordan, which illustrated the significant effect of HBM paradigms on participants' practices and the significant association among food handling knowledge as an adjusting issue in the HBM theories. Also, it corresponded with the findings of Salem &

Said, 2018 in Egypt, which revealed that the mean score of Health Belief Model items was significantly increased after the intervention.

In contrast, Pourtaheri et al., 2018 in Iran presented that there were no significant relationships between food handling practices and health belief model items. These contrasts in results may be attributed to the differences in the study population, setting, and cultural dissimilarities.

Finally, the current research highlighted that the educational program that relied on HBM was effective in changing mothers' health beliefs regarding food safety which was reflected in desirable changes in their behaviors and significant improvement in their practices. From the researchers' points of view, the findings of this study could be taken as a baseline for desirably changing the public's beliefs concerning safe food handling and persuading them to adopt desirable practices.

Conclusion

Considering the data from this study, we might draw the conclusion that age, level of education, employment status, and family income were significant demographic predictors of mothers' safe food handling practices. There was an extremely statistically significant increase in the total mean score of these practices before and following the implementation of the educational package. Also, there were greater statistically significant variances in all items of HBM concerning safe food handling practices. Correspondingly, there was a positive correlation among total scores of HBM items as well as mothers' practices prior to and after implementing the educational package.

Recommendation

- Guiding booklets/ brochures about safe food handling practices should be printed and handed out to mothers attending maternal and child health (MCH) centers.
- Activating the role of the community health nurse regarding safe food handling practices among mothers to decrease its hazards to family health.
- Healthcare system should provide regular planned educational program about safe food handling practices and include it in components of MCH services.
- Mass media campaigns should be provided to the public to increase their awareness regarding safe food handling practices.
- Conducting similar research again with a sizable sample in several community contexts.

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