

PALATE PROTECTORS: APPLYING THE HEALTH BELIEF MODEL TO UNDERSTAND FOOD HANDLING PRACTICES IN FIVE-STAR HOTELS, PETRA CITY

¹ Dr. Abdullah Faisal Al-Fawzan and ² Prof. Rania Ahmed Al-Mansour

Department of Hotel Management, Petra College for Tourism and Archaeology, Al-Hussein Bin Talal University, Jordan,

Department of Management Management, College of Business, King Faisal University, Kingdom of Saudi Arabia

Abstract

The global food paradox presents a pressing challenge, with a need for efficient food production and consumption on one hand, and growing concerns about food safety and public health on the other. This paradox has often resulted in suboptimal management, leading to foodborne outbreaks, particularly in low to medium-income countries. The Middle East, including Jordan, has witnessed several cases of foodborne diseases, with Salmonella infections being a significant contributor to foodborne outbreaks. One critical obstacle in addressing food safety is the ever-present risk of food hazards at various stages of the food supply chain. Food handlers, due to their direct and continuous contact with food, are identified as a primary source of these hazards. As a result, controlling foodborne illnesses necessitates a focus on food handlers.

This study shines a spotlight on food handlers by examining the behavioral aspects of their practices. It delves into the practices of food handlers employed in five-star hotels in Petra, Jordan. These hotels, despite their role in catering services and their potential for contributing to foodborne illnesses, are a vital part of the tourism industry, which significantly contributes to a country's economic development.

Keywords: Food safety, foodborne illnesses, food handlers, behavioral practices, Jordan.

1. Introduction

The world nowadays lives one of its great paradoxes relating to food, the most precious resource for mankind. On one side people need to be efficient by reducing the waste in food and water through mass production and consumption; while on the other side, they concern in a growing trend for food safety to control public health (Uyttendaele et al., 2016). In many cases, the aforementioned paradox was not managed optimally leading to foodborne outbreaks in many countries especially in those considered as low-medium income ones (Grace, 2015). In the Middle East region, many cases of foodborne diseases were reported (Wakid, 2006; AbuMadi et al., 2008; Simsek et al., 2009 & Imam et al., 2016). Similar to other countries, in Jordan many foodborne outbreaks had been recorded, a large part of these outbreaks caused by Salmonella infection (Kiswani & Nsour, 2007 & Abdel-Dayem et al., 2014).

One of the key issues that make it difficult to face the food safety challenge in any food production process is the risk of food hazards that are probable in any of the food supply chain's steps (McIntyre et al., 2013). However, it was established that food handlers are the most probable source of food hazards within different stages of the food supply chain; this is because of their continuous direct contact with the food (Harakeh et al., 2005). Accordingly, it was established that the stepping stone to control foodborne illnesses is food handlers (Sagoo et al, 2003).

Hence, the current research spot more light on food handlers by investigating the behavioral aspects of their practices. The study was undertaken on food handlers working at five stars hotels in Petra city, Jordan. Hotels are part of the catering services responsible for a large portion of foodborne illnesses (Griffith, 2002). Nevertheless, the hotels are a key sector within the tourism industry, which in its turn plays a significant role in developing the economy of any country (Aziri & Nedelea, 2013).

Accordingly, any research effort for improving the quality of tourism industry products (such as food safety researches) is expected to enhance tourism destinations' competitiveness and increase tourism sustainability; this in turn expected to improve its contribution to the economy. This is truly important for a developing country such as Jordan, where the tourism industry is the biggest employing sector and participates for 14% of the Jordanian GDP (U.S. Agency for International Development (USAID), 2017).

2. Background

Food handlers contribute largely to the occurrence of foodborne diseases either by their malpractices (Clayton & Griffith, 2008), or by being a source for food infection (Medus et al, 2006). Accordingly, it becomes a necessity to understand food handlers' practices in order to control them, which is ultimately expected to reduce foodborne outbreaks; this can be achieved by identifying factors affecting food handlers' practices, which if manipulated successfully can facilitate the control of these practices (Clayton et al., 2002; Green & Selman, 2005). According to Griffith (2002), factors influencing food handlers' practices can be categorized into three groups: personal factors (such as motivation, learning, attitude, personality & perception), cultural/social factors (such as organizational culture, social class, ethnicity, family, lifestyles, leadership & work status) and external factors (such as legislations, foodborne outbreaks & media). However, a significant aspect of food handlers' practices that needs an explanation is the phenomena of contradiction between their knowledge (of proper practices and/or of food safety legislations) and their actual practices; such explanation can be achieved by investigating the behavioral aspects of food handlers' practices (Coleman et al., 2000).

It was argued by Paulson (2000), that any improvement of food handlers' practices needs environmental and psychological support; to do so, it was recognized that there is a necessity to employ the models of social sciences in studying food handlers' practices (Griffith et al., 1995). Significant models that were applied to understand food handlers' practices were the social cognition models. According to Griffith (2002), these models assume that the best way to explain the behavior of individuals is by interpreting their developed meanings for their social environment.

Among different social cognition theories, that were applied in food safety researches are the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) by Ajzen (1991). The TRA assumes

that individuals' intention toward a certain behavior is based on their attitudes about that behavior and their perception of others' attitudes about the same behavior. However, the TRA was developed into the TPB by adding an extra construct which is individuals' perception of the difficulty to perform the intended behavior; this development aimed to increase the TRA explanation by covering behaviors beyond individuals' control (Armitage & Conner, 2001).

One more model was employed to study food handlers' practices is the Health Beliefs Model (HBM). This model was developed in the 1950s by a team at the U.S health public service; since then, it was embraced as a theoretical framework that explains and guides the adoption of any health-related practices. The HBM explains individuals' behavior in controlling health-related practices according to the theory of value & expectancy, which assumes that individuals control these practices depending on many expectations & their valuation of these expectations; these expectations include the expectation of risk and its severity, the expectation of ability in taking the proper actions, the expectation of benefits from following proper actions and the expectation of barriers against these actions (Janz et al, 2002).

The previously mentioned expectations were the base of the HBM constructs; these are as follow:

- Perceived susceptibility: the awareness of risk in terms of probability and the scope of effect;
- Perceived severity: the beliefs about risks consequences and their seriousness;
- Perceived benefits: the beliefs about the recommended action's capability in reducing risks and yielding positive outcomes;
- Perceived barriers: the beliefs about psychological and tangible costs for the recommended action;
- Cues to action: these are the strategies that can be applied to increase individuals' readiness to take the recommended actions;
- Self-efficacy: the confidence in having the ability to take the recommended action (Janz et al, 2002).

In other words, according to the HBM, to increase individual's tendency in applying any health-related practices (such as food handling), s/he needs to have a high perception of susceptibility, severity and benefits and low perception of barriers against these practices; at the same time s/he needs to have enough awareness about the cues to action and self-efficacy of performing these practices.

For more than 50 years, the HBM was applied to explain people's behavior toward different health concerns; examples include the explanation of self-examination of breast cancer (Friedman et al, 1998), medication adherence for cases with affective disorders (Scott, 2000), dental cleaning (Buglar et al, 2010) and the prediction of preservatives use (Zhao et al., 2012). The HBM was also applied in studies relating to food handling practices (Schafer et al., 1993; Hanson & Benedict, 2002; Clayton et al., 2002; Clayton & Griffith, 2008; Meysenburg et al., 2014; Hanson et al., 2015). However, most of these studies were applied in western countries, while no study was found in the Middle East region. Furthermore, most of them were carried out on households' food handling practices. In Jordan, in spite there were some studies that investigated food handlers' practices including Osaili et al. (2011), Sharif et al. (2013), Osaili et al. (2013), Habiballah et al. (2017) and Habiballah et al. (2018), they were focusing on the

demographics and/or knowledge and attitudes of food handlers. Accordingly, it can be seen clearly that there is a gap in applying the HBM on professional food handling practices.

3. Model Testing

The current study bridge the aforementioned gap by employing the HBM creatively in explaining food handlers' practices within the hotel industry at Petra city in Jordan. This employment was undertaken by combining the HBM and the Knowledge Attitudes and Practices (KAP) model into one coherent model. The KAP model assumes that the increase of individuals' knowledge will influence their beliefs toward a certain behavior which in turn causes a change in their practices (Zahedi et al., 2014). Accordingly, the present research involved the knowledge construct of the KAP model as a modifying factor in the HBM, it is the first variable which is expected to have an impact on the food handlers' beliefs toward safe food handling practices; these beliefs are the second group of variables within this study which expected to affect food handlers' practices. The study's model constructs were interrelated through the following two hypotheses:

Hypothesis 1:

H₀: there is no significant correlation between food handlers' knowledge of food safety and their beliefs toward safe food handling practices.

H₁: there is a significant correlation between food handlers' knowledge of food safety and their beliefs toward safe food handling practices.

Hypothesis 2:

H₀: there is no significant relationship between food handlers' beliefs toward safe food handling practices and their reported practices.

H₁: there is a significant relationship between food handlers' beliefs toward safe food handling practices and their reported practices.

4. Methodology

The present study adopted a survey strategy of research which covered all food handlers working in all five stars hotels at Petra city, Jordan. Approached food handles include all hotel employees who store, prepare, and/or serve food besides those who work in food production and service areas (such as stewards). In Petra there are 5 five stars hotels where 527 employees are working (statistics of the Jordanian Ministry of Tourism & Antiques (JMTA), 2020). Unfortunately, there were no statistics about food handlers in these hotels; accordingly, it was decided to collect data from the whole population of this study.

To collect data, a self-completed questionnaire was developed involving four parts of measures. In the first part, ten items were included that measures food handlers' commitment to proper food handling practices, these items were built following the safe food handling guidelines developed by three key organizations: Food and Agriculture Organization (FAO) and the World Health Organization (WHO) of the United Nations and the Pan American Health Organization (PAHO) (FAO et al., 2017). Part two of the questionnaire measures the food handlers' beliefs toward proper food handling practices. These beliefs were in three groups: I) beliefs of safe food handling benefits (Harrington, 1992; Yeung & Morris, 2001 & Redmond & Griffith, 2003), II) beliefs of risks (susceptibility & severity) for food handling

malpractices (Harrington, 1992 & USFDA, 2001) and III) the beliefs about barriers against safe food handling (Worsfold, 2001; Clayton et al, 2002 & Taylor, 2003). The third part of the questionnaire was designed to assess the accessibility of food handlers to different types of knowledge sources (such as training courses & various media sources). The aforementioned three parts of the questionnaire were developed using five points Likert scale where 1 equals strongly disagree and 5 equals strongly agree. Finally, in the last part of the questionnaire, the demographics of respondents were identified through four nominal scale questions about gender, age, education, and nationality. After developing the questionnaire, it was subject to a pilot test to enhance its validity. Fortunately, the result of the pilot test did not reveal any major amendments.

After then, the questionnaire was distributed to 155 food handlers working in the five stars hotels in Petra city, Jordan. 130 questionnaires were collected with a response rate of 84%; this response rate is a good one if compared with previous studies within the same context (c.f. Magablih & Al Shiab, 2009; Al-Khasawneh, 2013). Collected data were analyzed using different statistical techniques including descriptive statistics (frequencies & percentages) to describe the study's sample and Pearson correlation and multiple regression analyses to examine the study's hypotheses.

5. **Results:**

a. **Participants**

Most of the 130 food handlers who participated in the current study were males (84.6%) and the majority were Jordanians (92.3%). Also, nearly all of the participants' age (98.2%) were below 45; 70% of them had an undergraduate education. The comparison of these results to those published by the JMOA (2020) of the study's population, confirmed the representativeness of the study's sample to its population. A clear example of such comparison relates to the official statistics about Petra five stars hotel employees' gender (93.1% are males) and nationality (98.8% are Jordanians); as can be seen, these statistics are very close to those of this study's sample.

b. **Reliability**

To assess the reliability of study's dimensions, Cronbach's alpha tests were carried out to assess the internal consistency of different scales. The results of Cronbach's alpha test for different dimensions are shown in table (1). According to these results, it was confirmed that all of the study's dimensions were reliable with internal consistency levels between 0.824 and 0.894.

Table (1): study's dimensions reliability

No	Scale's name	Cronbach's alpha value
1.	Food handlers' practices	0.841
2.	Knowledge of proper food handling	0.870
3.	Beliefs about the benefits of proper food handling	0.894
4.	Beliefs about risks of malpractices in food handling	0.867
5.	Beliefs about barriers against proper food handling	0.824

c. **Hypotheses testing:**

In this study, a modified HBM was adopted composed of two parts. Within the first one, a knowledge construct from the KAP model was involved; the study's model proposed that knowledge correlates with

the food handlers' beliefs toward safe food handling (hypothesis 1). The second part of the model proposes that these beliefs can predict the variance in food handlers' reported practices (hypothesis 2). This section depicts the results of different analyses used to test the study's hypotheses and the applicability of its model. *Hypothesis 1*

To examine the first hypothesis of the current study, a Pearson correlation test was applied; it analyzed the correlation between food handlers' knowledge of proper food handling and their beliefs toward proper food handling practices. The results of this correlation test are shown in table (2). **Table (2): Pearson correlation analysis of food handlers' knowledge and their beliefs toward proper food handling practices**

Variable	Knowledge
Beliefs about the benefits of proper practices	0.743***
Beliefs about barriers against proper practices	-0.439***
Beliefs about risks of malpractices	0.719***

*** $p < 0.001$

The results presented in table (2) revealed that food handlers' knowledge about proper food handling practices correlate strongly with their beliefs about the benefits of proper food handling practices ($r = 0.743$, $n = 130$, $p < 0.001$) and their beliefs about risks from malpractices of food handling ($r = 0.719$, $n = 130$, $p < 0.001$), while it has a moderate negative correlation with their beliefs toward barriers against proper food handling practices ($r = -0.439$, $n = 130$, $p < 0.001$). These results confirmed the alternative hypothesis and reject the null one for hypothesis 1.

Hypothesis 2

The second part of the current study's model evaluates the predictability of HBM constructs to food handlers' practices. To accomplish this evaluation, a standard multiple regression analysis was applied; the results of this analysis are shown in table (3) below:

Table (3): standard multiple regression of HBM and food handlers' practices

Variable	"Beta"	Sig.
Beliefs about risks of malpractices	0.238	0.18
Beliefs about the benefits of proper practices	0.438	0.000
Beliefs about barriers against proper practices	-0.188	0.007
R square	58.9%	
Sig	0.000	

The statistical results of the multiple regression analysis shown in table (3) revealed that the HBM was able to predict significantly food handlers' practices; it explained 58.9% ($p \leq 0.001$) of the variance in

food handlers' practices. Furthermore, the results pointed out that all of the HBM variables (beliefs about benefits of proper food handling, beliefs of risks related to malpractices in food handling & beliefs about barriers against proper food handling) contributed significantly in the explanation of food handlers practices; amongst these variables, food handlers beliefs about the benefits of proper food handling made the largest contribution ($\beta=0.438$, $p\leq 0.01$) in explaining the variance in food handlers practices, whereas the food handlers' beliefs about barriers against proper food handling practices made the weakest contribution ($\beta=-0.188$, $p\leq 0.05$). However, his contribution was a negative one, implying that food handlers' beliefs about barriers affect negatively their tendency to take proper action in handling food. Based on these results, the alternative hypothesis was accepted while the null one was rejected for hypothesis 2.

6. Discussion

After collecting data, the HBM was exposed to two phases of analyses. Firstly, the effect of proper food handling knowledge of food handlers on their beliefs toward these practices was examined using a Pearson correlation test. Results shown in the previous section confirmed that food handlers' knowledge plays a significant role in shaping their perceptions of different aspects of the proper food handling practices. These perceptions include perceived benefits expected from committing to proper food handling practices, perceived barriers against that commitment, and the expected risks from malpractices of food handling. The correlation test results also demonstrated that while knowledge has a positive influence on food handlers' beliefs of benefits and risks it has a weaker negative influence on their beliefs toward barriers. These findings support the rationale of the KAP model about the knowledge impact on food handlers' beliefs (Griffith, 2013). However, the aforementioned negative effect of knowledge on food handlers' perception of barriers can be explained by the argument of some scholars (c.f. Tracey and Cardenas, 1996; MacAuslan 2003) that the increase of knowledge for hospitality employees will enable them to overcome many work-related challenges. During the second phase of analysis, the HBM predictability of food handlers' practices was examined using standard multiple regression analysis. The results of this analysis revealed that the HBM can explain significantly 58.9% of the variance in food handlers' practices. The results also showed that all of the HBM dimensions contributed significantly to the explanation of food handlers' practices. Among different HBM constructs, the beliefs of expected benefits from proper food handling practices has the strongest contribution in the model's predictability; while food handlers' perception of barriers against proper food handling has the weakest contribution. In general, previous studies were uneven in employing different HBM constructs within the food handling context. For example, there was only one study (Meysenburg et al., 2014) that investigated the role of perceived benefits in explaining food handling practices, while there were a number of these studies (c.f. Hanson & Benedict, 2002; Clayton et al., 2002; Clayton & Griffith, 2008 & Hanson et al., 2015) that considered the influence of food handlers beliefs of barriers against proper food handling; at the same time, all of the previous studies investigated the effect of perceived risks on food handlers practices. Nevertheless, the present study's finding consists for the most part with all of the previous studies findings. However, there was one exception for the aforementioned consistency; this study contradicts with the studies of Hanson and Benedict

(2002) and Clayton and Griffith (2008) regarding the effect of perceived risk construct on food handlers' practices, the two studies excluded this effect while the current one has confirmed its effect on food handlers' practices.

7. Conclusion

The current study contributed significantly to the knowledge about food handlers' behavior. It applied successfully an adapted HBM which borrowed the Knowledge (K) construct from the KAP model as a modifying factor. Furthermore, this examination is considered to be the first of its research nature in Jordan and the Middle East region; to the knowledge of researchers, there has not been any study that applied the HBM in explaining food handlers' practices before in this region. Such implementation of the HBM enhances its usability globally. Nevertheless, the findings of the study's model examination discussed above revealed two key conclusions: firstly, the knowledge of proper food handling practices affect significantly food handlers' beliefs about the benefits of these practices and their beliefs of risks for not following these practices. However, the knowledge of proper food handling also improves food handlers' confidence to overcome many of the barriers against good practices of food handling. Secondly, it can be concluded that the HBM constructs represent an effective mechanism to explain and improve food handlers' practices.

8. Implications and suggestions for future research

The present study's findings that confirmed the applicability of HBM constructs and its modifying factor (knowledge of proper food handling) in explaining food handlers' practices provide many aspects of implication within the hotel industry. If complied, these implications can help many bodies within the hotel industry and in other food service industries to enhance the proper handling of food. Examples of these implications include: firstly, governmental bodies can utilize from the positive influence of the knowledge on food handlers' beliefs toward proper food handling practices, by increasing the knowledge about proper food handling among food handlers; this can be achieved through many channels such as public and social media and different types of education and/or training.

Secondly, hotel managers and/or F&B managers can also affect food handlers' beliefs toward committing to proper food handling practices in many ways, among which offering on-the-job training or conducting consultation sessions. Such consultation might help in managing food handlers' beliefs toward proper food handling practices by increasing their awareness of the benefits of these practices and to the risks of not following them. Moreover, the consultation can enhance food handlers' confidence in overcoming most of the perceived barriers against good practices of food handling.

In addition, the current study was the first in applying HBM on food handlers' practices in Jordan and the Middle East and among a very few numbers of studies from all over the world; this invite researchers to repeat a similar research experience on a wider range of food handlers within various food industries. Nevertheless, in spite of this study's success in applying HBM to explain food handlers' practices, the study's findings raise some research questions which need to be answered via more research. Examples of these questions include: besides knowledge, are there any other modifying factors affecting HBM constructs? Are there any intervening variables that may influence the relationships among different

constructs of this study's model? Hence, future researches are invited to answer these questions in a trial to gain a better understanding of the mechanism of HBM in predicting food handlers' practices. In spite that this study was able to achieve its aim and to examine its hypotheses successfully, some constraints were faced that limited its scope. These constraints include the limitations of funds and efforts; the present research was carried out by the researchers only depending on their personal savings, without any kind of sponsorship. These limitations lead to a shrinking in the study's sample to five stars hotels food handlers within one tourism destination (Petra). The small sample size, in turn, delivered a new constraint, which is the disability of undertaking a confirmatory factor analysis to examine the study's scales' validity. Accordingly, future researches are recommended to repeat the current research on a wider sample of food handlers. This sample might be in various food industries.

9. References

- Abdel-Dayem, M., Al Zou'bi, R., Bani Hani, R., and Amr, Z. S. (2014). Microbiological and parasitological investigation among food handlers in hotels in the Dead Sea area, Jordan. *Journal of Microbiology, Immunology and Infection*, 47(5), 377-380.
- Abu-Madi, M. A., Behnke, J. M., and Ismail, A. (2008). Patterns of infection with intestinal parasites in Qatar among food handlers and housemaids from different geographical regions of origin. *Acta Tropica*, 106(3), 213-220.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Process* 50, pp. 179-211.
- Al-Khasawneh, A. (2013). Effect of organizational climate on job turnover of employees at tourism hotels in Petra region of Jordan. *American Journal of Social and Management Sciences* 4 (2), pp. 54-62.
- Armitage, C. J and Conner, M. (2001). Efficacy of the theory of planned behaviour: a meta-analytic review. *British Journal of Social Psychology* 40, pp. 471-499.
- Aziri, B., and Nedelea, A. (2013). Business strategies in tourism. *ECOFORUM*, 2(1-2), 5-11. [Online] Available: <http://www.ecoforumjournal.ro/index.php/eco/article/view/21/12>
- Buglar, M. E., White, K. M and Robinson, N. G. (2010). The role of self-efficacy in dental patients' brushing and flossing: testing an extended Health Beliefs Model. *Patient Education and Consulting* 78, pp. 269-272.
- Clayton, D. A., and Griffith, C. J. (2008). Efficacy of an extended theory of planned behaviour model for predicting caterers' hand hygiene practices. *International Journal of Environmental Health Research*, 18(2), 8398.

- Clayton, D., Griffith, C., Price, P. and Peters, A. (2002). 'Food handlers' beliefs and self-reported practices'. *International Journal of Environmental Health Research* 12, pp. 25-39.
- Coleman, P., Griffith, C and Botterill, D. (2000). Welsh caterers: an exploratory study of attitudes towards safe food handling in the hospitality industry. *International Journal of Hospitality Management* 19, pp. 145-157.
- FAO, WHO and PAHO. (2017). Food handlers manual instructors. Washington. FAO, WHO and PAHO. Retrieved in March 2020 from: <http://www.fao.org/3/a-i5896e.pdf>
- Friedman, L. C., Neff, N. E. Webb, J. A and Latham, C. K. (1998). Age-related differences in the mammography use and in breast cancer knowledge, attitude and behaviours. *Journal of cancer Education* 13 (1), pp. 26-30.
- Grace, D. (2015). Food safety in low and middle income countries. *International Journal of Environmental Research and Public Health* 12, pp. 10490-10507
- Green, L. R., and Selman, C. (2005). Factors impacting food workers' and managers' safe food preparation practices: qualitative study. *Food Protection Trends*, 25(12), 981-990.
- Griffith, C. (2002). Good practices for food handlers and consumers. In Blackburn, C. W and McClure, P. J, (ed).
- Food borne pathogens: Hazards, risk analysis and control*, Woodhead Publishing Limited, Cambridge-UK, pp. 257-274.
- Griffith, C. (2013). *Advances in microbial food safety*. Cambridge-UK: Woodhead Publishing Limited.
- Griffith, C. J., Mullan, B and Price, P. E. (1995). Food safety: implications for food, medical and behavioural scientists. *British Food Journal* 97 (8), pp. 23-28.
- Habiballah, M. A. Al-Shakhsheer, F. J and Al-Ababneh, M. M. (2017). Restaurant employees' food handling practices in Irbid city, Jordan. *Journal of Tourism and Hospitality Management*, 5(1), pp. 1-27
- Habiballah, M. A., Al-Shakhsheer, F. J., Al-Sabi, S. M and Masadeh, M. A. (2018). Food safety training: a study of food handlers working in hotels in the North of Jordan. *European Scientific Journal*, 14(26), pp. 127-148.
- Hanson, J and Benedict, J. (2002). Use the health belief model to examine older adults' food-handling behaviours. *Journal of Nutrition Education and Behaviour* 34 (1), pp. 25-30.

- Hanson, J., Hughes, S and Liu, P. (2015). Use of health belief model variables to examine self-reported food handling behaviours in a sample of U.S. adults attending Tailgate event. *Journal of Food Protection*, 78 (12), pp. 2177-2183.
- Harakeh, S., Yassine, H., Gharios, M., (2005). Isolation, molecular characterization and antimicrobial resistance patterns of Salmonella and Escherichia coli isolates from meat-based fast food in Lebanon. *Science of the Total Environment* 341 (1-3), pp. 33-44.
- Harrington, R. E. (1992). The role of employees in the spread of food borne disease-food industry views of the problem and coping strategies. *Dairy, Food and Environmental Sanitation* 12 (February), pp. 62-63.
- Imam, N. F. A., Abdulbaqi, Z. B., and Fahad, R. A. (2016). The prevalence of intestinal parasitic infections among foreign workers in Madinah, Kingdom of Saudi Arabia. *Saudi Journal of Medicine and Medical Sciences*, 3(2), 112-117.
- Janz, N. K., Champion, V. L and Strecher, V. J. (2002). The health belief model. In Glanz, K., Rimer, B. K and Lewis, F. M, (ed). *Health behaviour and health education: theory, research, and practice*. San Francisco: John Wiley & Sons, Inc. Ch. 3.
- Jordanian Ministry of Tourism and Antiquities (JMTA). (2020), *Statistical newsletter 2016*, available at: <http://www.mota.gov.jo/Contents/Statistics.aspx>
- Kiswani, H and Nsour, H. (2007). The curse of shawarma is chasing the government. *Al-Ghad Newspaper*.
- MacAuslan, E. (2003) *Effective food hygiene training: a guide of owners and managers of food businesses, enforcement officers and potential trainers*. Doncaster: Highfield.
- Magablih, K and Al Shiab, A. (2009). The implications of hotel employee satisfaction in promoting quality tourism at the cultural heritage site of Petra-Jordan. *Team Journal of Hospitality and Tourism* 6 (1), pp. 36-45.
- McIntyre, L., Vallaster, L., Wilcott, L., (2013). Evaluation of food safety knowledge, attitudes and self-reported hand washing practices in FOODSAFE trained and untrained food handlers in British Columbia, Canada. *Food Control* 30 (1), pp. 150-156.
- Medus, C., Smith, K. E. Bender, J. B., Besser, J. M., and Hedberg, C. W. (2006). Salmonella outbreaks in restaurants in Minnesota, 1995 through 2003: evaluation of the role of infected food workers. *Journal of Food Protection*, 69(8), 1870-1878.

- Meysenburg, R., Albrecht, J., Litchfield, R and Ritter-Gooder, P. (2014). Food safety knowledge, practices, and beliefs of primary food preparers in families with young children. A mixed methods study. *Appetite* 73 (1), pp. 121-131.
- Osaili, T. M., Abu Jamous, D. O., Obeidat, B. A., Bawadi, H. A., Tayyem, R. F., and Subih, H. S. (2013). Food safety knowledge among food workers in restaurants in Jordan. *Food Control*, 31(1), 145-150.
- Osaili, T. M., Obeidat, B. A., Abu Jamous, D. O., and Bawadi, H. A. (2011). Food safety knowledge and practices among college female students in north of Jordan. *Food Control*, 22(2), 269-276.
- Paulson, D. S. (2000). Handwashing, gloving and disease transmission by the food preparer. *Dairy, Food and Environmental Sanitation* 20 (1), pp. 838-845.
- Redmond, E. C. and Griffith, C. J. (2003). Consumer food handling in the home: A review of food safety studies. *Journal of Food Protection* 1 (66) , pp. 130-161.
- Sagoo, S. K., Little, C. L., Griffith, C. J., and Mitchell, R. T. (2003). Study of cleaning standards and practices in food premises in the UK. *Communicable Disease and Public Health*, 6(1), 3-4.
- Scott, J. (2000). Predicting medication non-adherence in severe affective disorders. *Acta Neuropsychiatrica*, 12 (3), pp. 128-130.
- Sharif, L., Obaidat, M. M., and Al-Dalalah, M. (2013). Food hygiene knowledge, attitudes and practices of the food handlers in the military hospitals. *Food and Nutrition Sciences*, 4(3), 245-251.
- Schafer, R. B., Schafer, E., Bultena, G. L. and Hoiberg, E. (1993). Food safety: an application of the health belief model. *Journal of Nutrition Education* 25 (1), pp. 17-24.
- Simsek, Z., Koruk, I., Copur, A. C., and Gurses, G. (2009). Prevalence of staphylococcus aureus and intestinal parasites among food handlers in Sanliurfa, Southeastern Anatolia. *Journal of Public Health Management and Practice*, 15(6), 518-523.
- Taylor, E. (2003). Moving on from bureaucracy to behaviour change in food businesses. *Communicable Disease and Public Health* 6 (2), pp. 3-4.
- U.S. Agency for International Development. (2017). USAID building economic sustainability through tourism. (accessed 15 April 2020) retrieved from: <https://www.usaid.gov/jordan/fact-sheets/usaid-buildingeconomic-sustainability-through-tourism>
- Tracey, J. and Cardenas, C. (1996), 'Training effectiveness: an empirical examination of factors outside the training context'. *Hospitality Research Journal* 20 (2), pp 113-123.

- Uyttendaele, M., Franz, E and Schlüter, O. (2016). Food safety, a global challenge. *International Journal of Environmental Research and Public Health* 13 (1), pp. 67-73.
- Wakid, M. H. (2006) Distribution of intestinal parasites among food handlers in Jeddah, Saudi Arabia. *Journal of Parasitic Diseases*, 30(2), 146-152.
- Worsfold, D. (2001) FSB in butchers' shops. *Nutrition and Food Science*, 31(1), 13-18.
- Yeung, R. M. W., and Morris, J. (2001). Food safety risk: Consumer perception and purchase behavior. *British Food Journal*, 103 (3), pp. 171-188. Retrieved June 15, 2007, from Emerald Library database.
- Zahedi, L.; Sizemore, E.; Malcolm, S.; Grossniklaus, E.; Nwosu, O. (2014). Knowledge, attitudes and practices regarding cervical cancer and screening among Haitian health care workers. (2014). *International Journal of Environmental Research and Public Health* 11 (11), pp. 11541–11552
- Zhao, J., Song, F., Ren, S., Wang, Y., Wang, L., Liu, W., Wan, Y., Xu, H., Zhou, T., Hu, T., Bazzano, L and Sun, Y. (2012). Predictors of condom use behaviors based on the Health Belief Model (HBM) among female sex workers: a cross-sectional study in Hubei province, China. *PLOS one*, 7 (1), pp. 1-7.