

Testing health belief model on food safety behaviour in Jordanian restaurants: The moderating effect of willingness to comply

Amany Khalaf Haddad^a and Abdul Hafaz Ngah^{a*}

^aFaculty of Business, Economy and Social Development, Universiti Malaysia Terengganu Kuala Terengganu, Malaysia

ABSTRACT

Article history:

Received May 28, 2023

Received in revised format July 29, 2023

Accepted November 14 2023

Available online

November 15 2023

Keywords:

Willingness To Comply (WC)

Food Safety Behavior (FSB)

Jordanian Restaurants

Health Benefit Model (HBM)

The current study was primarily intended to assess the Health Belief Model on Food Safety Behaviour with the moderating role of willingness to comply in the context of Jordanian restaurants. HBM comprises numerous factors including perceived benefits (PBN), perceived susceptibility (PSU), perceived severity (PSV), cues to action (CA), perceived barriers (PBR), and self-efficacy (SE). A quantitative research design was adopted, and data collection was done via Google Forms from the Amman Chamber of Industry and Jordanian Restaurant Association (JRA). A purposive sampling approach was used, and the target population were the restaurants from Amman, Jordan. Initially, total 500 questionnaires have been distributed of which 302 responses were received as well as after eliminating missing or improper responses, only 296 were processed for the final analysis. Data analysis was done via Smart-PLS. The outcomes enlightened a positive interlinkage between perceived benefits, perceived barriers, perceived susceptibility, cues to action, and self-efficacy with food safety behaviour. However, PSV and FSB didn't show any relation. The moderating analysis of WC revealed the absence of any moderating impact on perceived susceptibility, benefits, and perceived severity on food safety behaviour. Likewise, the demographic details of the participants were utilized as control variables and did not yield any impact on the food safety behaviour. To sum up, the study concludes that public health professionals and legal representatives, including lawmakers, ought to educate food handlers regarding the significance of food safety behaviours due to widespread misconceptions about how current food safety standards promote positive results. Consequently, Jordanian restaurants should strictly adhere to safety-related regulatory protocols to meet the growing demands of consumers. The findings of the current work also offer valuable theoretical as well as practical implications for the practitioners in the field.

© 2024 by the authors; licensee Growing Science, Canada.

1. Introduction

Attributed to the high incidence of food-borne diseases, food safety has emerged as a global health concern, posing challenges for people, food service providers, regulatory bodies, businesses, public health, and tourism (Taha et al., 2020). The alarming incidence of food-borne diseases remains a significant concern, even in advanced nations like the US, where statistics reveal 127839 hospitalizations, 3037 fatalities, and nearly 48 million cases of food-borne illnesses (Scallan et al., 2011). Across industries providing food services, improper food handling practices, such as cross-contamination, inadequate cooking, improper chilling, and inadequate hygiene, contribute to 48.7% of foodborne illnesses in Europe (European Food Safety Authority, 2010). This problem is exacerbated in developing regions like the Middle East, where legislative and monitoring

* Corresponding author

E-mail address hafaz.ngah@umt.edu.my (A. H. Ngah)

ISSN 2291-6830 (Online) - ISSN 2291-6822 (Print)

© 2024 by the authors; licensee Growing Science, Canada.

doi: 10.5267/j.uscm.2023.11.013

controls are limited (WHO, 2020). In Jordan, where food safety is governed by the (Jordan Food and Drug Law No. 30, 2015) under JFDA, significant food poisoning cases persist, with 1600 hospitalizations and one fatality reported in 2006-2007 (El Haddad et al., 2020). This situation persists despite legislative measures, readiness assessments, and examinations (de Andrade et al., 2021). The JFDA's annual reports underscore the pressing issue of food establishments repeatedly flouting food regulations and facing closures, which poses a substantial risk of foodborne disease outbreaks (Haddad et al., 2021).

To understand the intricacies of food safety behaviour in Jordanian restaurants, we turn to the Health Belief Model (HBM), a well-established framework that has been employed for over five decades to elucidate various health-related behaviours (Buglar et al., 2010). HBM considers factors like perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy in shaping individuals' decisions and actions related to health.

In Jordan, small-scale restaurants continue to grapple with frequent food safety violations, which can severely impact their reputation. Intriguingly, empirical explanations for the causes of these infractions remain scarce in the literature. Consequently, the current study intends to bridge this gap by exploring the moderating role of WC and the impact of these violations on food safety practices within Jordanian restaurants. Importantly, this research constitutes one of the few global studies that leverage the HBM framework to investigate the behaviour of food service employees in Jordanian restaurants.

2. Literature Review and Hypothesis Development

2.1 Health Belief Model and Food Safety Behavior

Health Belief Model serves as the cornerstone for modifying behaviour as well as preventing diseases. In accordance with Janz et al. (2002), HBM operates on the premise that individual views play a pivotal role in influencing preventive actions and health-related behaviours. HBM underscores the fundamental idea that an individual's knowledge and attitudes significantly impact their actions. Moreover, HBM emphasizes a core principle that people are more likely to retort favourably to health-related messages and take measures to prevent illnesses when receiving a substantial hazard or risk. The process of decision-making related to health behaviours, as posited by HBM, hinges on two key components: risk perception and behavioural assessment (Yazdanpanah et al., 2015). Perceived severity and susceptibility make up Risk perception, while perceived barriers and perceived benefits are encompassed by behavioural assessment. Subsequently, two cognitive or motivational factors are introduced by researchers, namely self-efficacy and health awareness, to enhance the model's descriptive capacity (Buglar et al., 2010). In particular, self-efficacy and health consciousness exist independently of the typical factors within HBM. Multiple research works have shown that these factors have enhanced the model's predictive accuracy (Buglar et al., 2010). In the subsequent sections, we will delve into the description of these variables and construct a theoretical framework based on them.

2.2 Cue to Action (CA)

Kayani et al. (2021) stated that Health action cues serve to amplify one's readiness for taking action. The HBM is used to simulate the behaviours and perceptions of a specific person (Rosenstock et al., 1988). Cues that promote engagement with various media outlets such as news, research papers, journals, and the internet can spread awareness of the illness of a member of a family of friends and motivate training for behaviour modification. Examples of these cues for fostering safe food habits include listening or watching to news about food-borne illnesses and reading instructions on safe food handling (Kayani et al., 2021). For instance, Syed et al. (2021) observed a favourable relationship between action cues and related to community participation in preventive activities in Kingdom of Saudi Arabia. Furthermore, Huang et al. 2020, recommended a cross-national study on this variable following their study on the HBM, affirming the substantial influence of action cues on food safety behaviour. Consequently, the following hypothesis is formulated:

H₁: Cues to action have a positive relation with food safety behaviour.

2.3 Perceived Susceptibility (PSU)

An assessment of a person to their vulnerability entails perceived susceptibility to a particular ailment (Saghafi-Asl et al., 2020). This assessment can vary from person to person based on their unique circumstances. Knowledge and personal experiences play a pivotal role in shaping one's perception of risk, and the belief in susceptibility to illness can motivate individuals to adopt healthier behaviours. Individuals are more inclined towards risk-reducing behaviours and perceive a greater risk of illness (Muchow, 2021). PSU positively influences risk perception and related health behaviour (Alhalaseh et al., 2020). Individuals with a high perceived susceptibility are more attuned to health concerns and are likely to adopt healthy behaviours for reducing illness threats (Contento & Semancik, 2016). Furthermore, the HBM-related research enlightens the need for additional studies that integrate the model with other theories and explore the same variables within various societal contexts (Huang et al. 2020). Consequently, the researcher formulated the following hypothesis:

H₂: Perceived susceptibility has a positive relation with food safety behaviour.

2.4 Perceived Barrier (PBR)

A perception of a person's difficulties related to specific behaviour is referred to as a perceived barrier (Urbanovich & Bevan, 2020). In health behaviours context, these barriers often carry more weight in influencing individuals compared to the perceived danger of illness or the severity of symptoms (Muchow, 2021). People typically evaluate the perceived benefits of adopting a behaviour against the perceived barriers they anticipate encountering. M. Wang et al. (2021) argued that perceived barriers hold substantial influence over individuals' intentions regarding food handling and, subsequently, their Food Safety Behavior (FSB). The researchers also advocated for further research to refine the model and explore its applicability in varied social and cultural contexts. Hence, the following hypothesis is formulated:

H₃: Perceived Barriers have a negative relation with food safety behaviour.

2.5 Perceived Benefit (PBN)

Perceived benefits (PBNs) state the advantages or positive outcomes that an individual anticipates from engaging in a particular behaviour, distinct from the prevention of health-related risk (Sheppard & Thomas, 2021). When individuals believe that adopting healthy behaviours will reduce their risk of getting sick, they are more likely to participate in those behaviours. In the context of the PBN, HBM is considered a critical belief dimension which influences the performance of health-related behaviours (Muchow, 2021).

Applying the HBM framework, Huang et al. (2020) asserted that perceived benefits play a role in influencing food safety behaviour and proposed further examination of this in other countries that are developing. Furthermore, research by (Wong et al. 2020) demonstrated that PBN yielded a positive impact on behavioural change as well as vaccination intention. Thus, the current study formulated the following hypothesis:

H₄: Perceived benefits have a positive relation with food safety behaviour.

2.6 Perceived Severity (PSV)

PSV reflects an individual's assessment of how extreme a particular condition or health issue is. People's perceptions of the severity of an illness are often influenced by their medical knowledge and understanding, which can lead them to believe that illnesses negatively impact their lives and difficulties (Andadari et al., 2019).

Prior literature has emphasised the significance of perceived severity in influencing individuals' adoption of preventive behaviours and their willingness to follow recommended precautions. For instance, Fikriana et al. (2021) noted that an individual's perception of the severity of a health issue significantly influences their willingness to adhere to the guidelines of health aimed at avoiding diseases like COVID-19. Drawing from the theoretic foundation of the HBM, a considerable influence on health safety behaviour is due to perceived severity (Febian et al. 2021). This viewpoint was supported by the findings of Muchow (2021) and Febian et al. (2021), both of whom emphasised the role of perceived severity in shaping health safety behaviour. Consequently, the following hypothesis is formulated:

H₅: Perceived Severity has a positive relation with food safety behaviour.

2.7 Self-Efficacy (SE)

Self-efficacy (SE) means the belief in a person's capability of efficiently achieving a definite action or task (Boutros & Roberts, 2020). In the food safety context, food handlers, if they receive proper instruction on "how" to execute their job, can develop SE, rather than just being told "what" to do. Onyango (2016) highlighted the importance of applying the knowledge added in training on food safety to practical situations. Boutros & Roberts (2020) define Food safety SE as the self-assurance of engaging in food safety behaviours (FSB).

Research has consistently shown that healthy habits are more likely to be adopted by individuals when they feel confident in their ability to succeed (Kim & Kim, 2020). Confidence in one's skill to influence outcomes is a factor in change in health behaviour (Boutros & Roberts, 2020). Ramdan et al. (2022) asserted that SE has been found to have a positive influence on attitudes toward health behavior prevention. Based on these insights, the researcher formulated the following hypothesis:

H₆: Self-efficacy has a positive relation with food safety behaviour.

2.8 Moderating Role of WC

The pivotal role of a moderator variable in a study cannot be overstated, as it holds the key to unravelling the intricate relationships and nuances that underlie the observed associations between dependent as well as independent variables. Introducing a moderator to enhance the predictive power of a study is a valuable strategy (Ngah et al., 2020). The moderator

variable influences both the direction as well as strength of dependent and independent variables (Baron & Kenny, 1986). This becomes particularly important when the existing work is inadequate or inconsistent (Aguinis et al., 2017).

Related to the Food Safety Behavior (FSB) context, research has yielded conflicting findings related to the construction of the HBM. The literature on FSB has identified a significant gap, suggesting the need to include additional factors to comprehensively examine the various features that affect FSB (Cho et al., 2013). Below, we delve into the contradictory and mixed findings regarding the HBM constructs.

Regarding perceived susceptibility, previous researchers (Kim & Kim, 2020) have reported a negative relationship with FSB, while others have enlightened its critical importance as a predictor of threat perceptions with a positive outcome on behaviour adoption (Wang X. et al., 2021). On the other hand, perceived severity is reported to positively impact behavioural intention and healthy eating practices (Tsai & Bui, 2021), while posing negative impacts on farmers' intention to engage in farm food safety and prevention practices (Rezaei & Mianaji 2019).

In the realm of perceived benefits, a positive relation has been noted on vaccination intention (Reiter et al., 2020). However, PBN negatively influences dietary behaviours (Khoramabadi et al., 2016). Moving forward, perceived barriers reportedly have a positive impact on health preventive behaviour (Moridi et al., 2021) whereas this aspect negatively influences compliance behaviour and intentions for proper food handling (Wang et al., 2021). CA positively associated with protective and preventive behaviours (Moridi et al., 2021). However, it negatively impacts vaccination intention (Hossain et al., 2021). Finally, similar to CA, self-efficacy is also positively related to protective and defensive behaviour (Ramdan et al., 2022). In contrast, it negatively influences stages of change for BSE and safe driving behaviours (Salman & Adnan, 2021).

As the moderator variable willingness to comply (WC) is selected to determine the relationship between FSB concepts and HBM. Generally, "compliance" means adhering to regulations of food safety (McNeil, 2019). In the dynamic landscape of today's food industry, achieving regulatory standards is imperative (Sharpe, 2017). With food safety regulations factors such as employees who are poorly trained, subpar products, and non-compliance can severely damage the reputation of restaurants that deliver fast food service and result in significant monetary losses (McNeil, 2019). Consequently, well-trained and dedicated staff are required by restaurants to formulate and enforce strategies, specifically food handlers (Taha et al., 2020), with food safety regulations ensuring their compliance is of paramount importance (Taha et al., 2020). Taha et al. (2020) professed that restaurant employees often overlook the impact of their actions, rarely recognizing that regulation of food safety compliance can significantly lessen the risk of foodborne illnesses.

The relationships within the HBM and influence behaviour of food safety can be modified by high levels of compliance (McNeil, 2019). The advantage of adherence improves compliance, while perceived barriers can decrease it. Perceived severity of consequences amplifies the motivation to comply, and susceptibility to risks can motivate individuals to adhere to guidelines. Self-assurance in one's abilities bolsters adherence to food safety practices. In consideration of the above, the following hypotheses have been formulated.

H₇: When willingness to comply (WC) is high, the positive relation will be stronger between cues to action and food safety behaviour.

H₈: When willingness to comply is high, the positive relation will be stronger between perceived benefits and food safety behaviour.

H₉: When willingness to comply is high, the negative relation will be stronger between perceived barriers and food safety behaviour.

H₁₀: When willingness to comply is high, the positive relation will be stronger between perceived susceptibility and food safety behaviour.

H₁₁: When willingness to comply is high, the positive relation will be stronger between perceived severity and food safety behaviour.

H₁₂: When willingness to comply is high, the positive relation will be stronger between self-efficacy and food safety behaviour.

Control Variable

Ngah et al. (2017) defined control variables as the purpose of explaining variations in a dependent variable (DV) by accounting for factors other than the primary theoretical primary constructs of interest. Multiple studies have employed sociodemographic characteristics as control variables (Mansor et al., 2022). In this paper, gender, position, qualification, and experience were selected.

Endogeneity in an econometric model is a concern when a descriptive (independent) variable is linked with the model's error term (residuals), potentially leading to biased results (Mansor et al., 2022). According to Hair et al. (2019), when (PLS-SEM)

is utilized, endogeneity issues are essential to address to ensure the validity of hypothesis testing. Employing appropriate control variables can often be an effective strategy to mitigate endogeneity concerns (Ebbes et al., 2016). In this study, the approach proposed by Barbosa et al. (2021) was adopted to address endogeneity and enhance the reliability of the results.

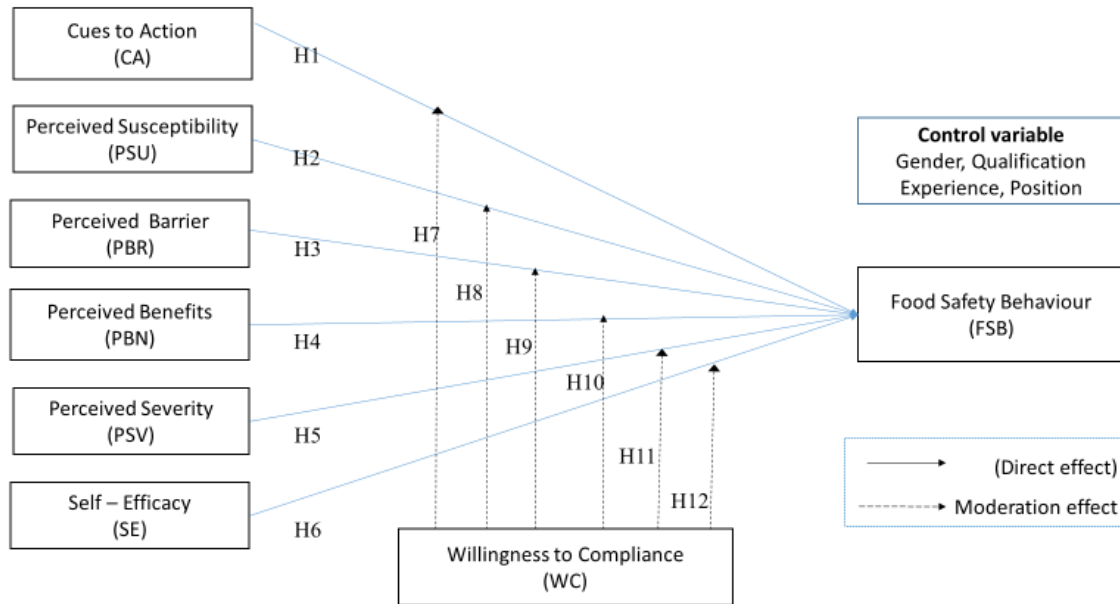


Fig. 1. Theoretical Framework

3. Methodology

3.1 Data Collection and Sample

From restaurants in Jordan, the data was collected from its target population. According to the SSC annual report from 2020, there were a total of 5,074 Jordanian restaurants operating in Amman, with 1,876 of them classified as SMEs (Small and Medium-sized Enterprises). The Chamber Amman of Industry defines restaurants with < 20 employees as (SMEs). Two supervisors and a manager are required by each restaurant, as stipulated by the Jordanian Food and Drug Administration (JFDA) in 2020.

The researchers selected managers and supervisors from these restaurants as their sample group. This choice was made because managers and supervisors are considered key individuals in the context of knowledge sharing, and they can provide neutral responses when completing questionnaires. Because of the effectiveness, a purposive sampling strategy was opted, for when specific expertise within a particular cultural domain is sought, and when the study aims to involve well-informed experts (Tongco, 2007). Additionally, a convenience sampling approach was deemed suitable for this study's design, given the emphasis on validating the theoretical effects (Ngah et al., 2020).

For this, the data collection was done using Google Forms during the period from March to May 2022. Due to its speed, uniformity, and ease of use, Google Forms was chosen as the data collection method (Regmi et al., 2016).

In total, 500 questionnaires to the Confectionery Proprietors (URCP) and Jordanian Union of Restaurants were distributed to gather responses, from the Amman Chamber of Industry, representing Jordan's industrial sector, which represents primarily the local Jordanian restaurants. To the Jordanian Restaurant Association (JRA) additional 250 questionnaires were sent, which primarily represent international food chains operating in Jordan.

The total responses received were 132 from the URCP, while the JRA provided 170 completed responses. However, because the respondents exhibited a pattern of consistently straight-line answers six responses were excluded from the analysis. Consequently, the final dataset used in the data analysis included responses to 296 questions, resulting in a response rate of 58%. Table 1 encompasses the demographic data of the sample respondents.

In comparison to the study of Ngah et al. (2021a), the study employed filter questions to ensure the validity of the respondents. These filter questions confirmed that the respondents were indeed managers and supervisors within the restaurant industry.

All the forms were excluded who did not meet the study's criteria by the system, and participation was voluntary. To share the link of the questionnaire with colleagues who met the same criteria for providing valid responses respondents were also encouraged.

Table 1
Respondents' Demographics

(Group)	(Frequency)	(Percentage)
(Gender)		
Female	113	38
Male	183	62
(Qualification)		
Bachelor	64	21.6
Diploma	49	16.6
Master	109	36.8
PhD	74	25.0
(Experience)		
<5 years	21	6.9
5–10 years	35	12.1
10–15 years	131	44.0
15< years	109	37.1
(Position)		
Supervisor	139	47.0
Manager	157	53.0

(N=296)

3.2 Measurements

The study questionnaire comprised demographic items along with 32 items related to (PSV), (PSU), (CA), (PBR), (SE), (PBN), (FSB), and (WC). To address potential common method bias issues, a 7-point Likert scale was used for items representing the dependent variable, while a 5-point scale was used for those representing the independent variables and the moderator (Ngah et al., 2021a).

All measurement scales were adapted based on previous research. Prior to data collection, the questionnaire's validity was assessed, and modifications were made to enhance objectivity and clarity based on feedback received from pre-testing respondents. During the assessment of the measurement model, Pre-testing serves to prevent issues related to poor quality of data and item removal (Memon et al., 2021).

From relevant literature sources, the measurements used in the study were derived. Specifically, the HBM constructs were adapted from Rezaei and Mianaji (2019), Willingness to Comply (WC) was drawn from Bodas and Peleg (2020), and Food Safety Behavior was based on Taha et al. (2020).

3.3 Sample Size

As per Hair et al. (2017) and Ngah et al. (2021b), the sample size was determined considering the research tool, which is Smart Partial Least Squares. Sample size determination in this context takes into account the power of analysis, which is influenced by the model's complexity. For a single criterion variable, the maximum number of predictors was based on the sample size calculation to ensure suitable statistical power. Ngah et al. (2022a) recommended 80% statistical power provided by the sample size, assuming medium effect sizes. Using G*power, which accounts for the presence of 13 predictors, it was calculated that a minimum of 131 samples would be required. Data were collected from 296 respondents, surpassing the required sample size and ensuring an adequate sample size to effectively test the research model.

4. Results and Analysis

This study to assess the hypotheses within the model employed Smart-PLS, primarily because the research was exploratory in nature (Hair et al., 2019). In the process of confirming the study's model, it's essential to establish two types of validities before moving on to confirm the structural model, as noted by Albtouh et al. (2022).

4.1 Common Method Bias

There was a potential for Common Method Bias (CMB) where the same person answered both dependent and independent variables, which could influence the results. To address the possibility of CMB, both procedural and statistical approaches were employed, following the guidance of Ngah et al. (2022b). To mitigate CMB, a technique proposed by Podsakoff et al.

(2012) was used. This technique involved introducing unobserved marker variables into the analysis. As exogenous factors, these marker variables were treated and were used to forecast the endogenous variables in the model. When the marker variable was incorporated, all effects remained intact. This outcome provides no substantial evidence of Common Method Bias (CMV) influencing the outcomes, indicating that the collected data is less likely to be significantly impacted by this bias.

4.2 Measurement Model

According to Hair et al. (2019), the convergent validity involved examining three key criteria: average variance extracted (AVE), loading and composite reliability (CR), with the threshold values being loading and $CR \geq 0.7$ and $AVE \geq 0.5$. The outcomes, as presented in Table 2, proved that all these measures met the acceptable thresholds. Therefore, based on these findings, for the measurement model, convergent validity has been successfully constructed.

Table 2
Convergent Validity

(Construct)	(Items)	(Loading)	(CR)	(AVE)
(Cues to Actions)	CA1	0.913	0.954	0.839
	CA2	0.912		
	CA3	0.926		
	CA4	0.914		
Food Safety Behavior	FSB1	0.924	0.965	0.848
	FSB2	0.902		
	FSB3	0.935		
	FSB4	0.920		
	FSB5	0.924		
Perceived Benefits	PBN1	0.942	0.966	0.905
	PBN2	0.943		
	PBN3	0.969		
Perceived Barriers	PBR1	0.917	0.955	0.840
	PBR2	0.920		
	PBR3	0.908		
	PBR4	0.922		
Perceived Susceptibility	PSU1	0.910	0.953	0.836
	PSU2	0.908		
	PSU3	0.920		
	PSU4	0.919		
Perceived Severity	PSV1	0.810	0.901	0.752
	PSV2	0.860		
	PSV3	0.928		
Self-Efficacy	SE1	0.908	0.942	0.842
	SE2	0.930		
	SE3	0.916		
Willingness to Comply	WC1	0.911	0.965	0.828
	WC2	0.917		
	WC3	0.911		
	WC4	0.899		
	WC5	0.923		
	WC6	0.901		

Using the Heterotrait-Monotrait correlation ratio (HTMT) method, the discriminant validity was assessed (Henseler et al., 2015). A concern about discriminant validity arises when the HTMT value exceeds 0.85, indicating difficulty in distinguishing between constructs. In relation to this study, the HTMT values for each construct remained below 0.85 (refer to Table 3). Therefore, any issues related to discrimination validity were not obtained from the findings of this study.

Table 3
Discriminant Validity (HTMT)

Construct	(CA)	(FSB)	(PSU)	(PBR)	(PBN)	(PSV)	(SE)	(WC)
(CA)								
(FSB)	0.833							
(PSU)	0.678	0.777						
(PBR)	0.573	0.731	0.482					
(PBN)	0.650	0.728	0.627	0.445				
(PSV)	0.118	0.063	0.274	0.052	0.128			
(SE)	0.701	0.806	0.744	0.478	0.612	0.126		
(WC)	0.246	0.461	0.204	0.272	0.229	0.049	0.222	

4.3 Structural Model

Prior to delving into the structural model, the study conducted tests for multicollinearity. After evaluation, the assessment of the measurement model of multicollinearity was done. The Variance Inflation Factor (VIF) indicated Multicollinearity by

values greater than 5 (Hair et al., 2017). The values of VIF remained below 5, signifying the absence of predictor variable collinearity demonstrated in Tables 4 and 5.

The research hypotheses were subjected to testing during the investigation of the structural model (Nghah et al., 2020). To gauge hypothesis support, the alignment of beta values with t-values and P-values was used. On the confidence interval, hypotheses were considered supported where for lower and upper the levels should not cross zero. Furthermore, following the recommendation of Hahn and Ang (2017), the study employed effect sizes, a combination of p-values, and confidence intervals to assess hypothesis significance. Out of the 12 hypotheses, only H10, H11, H5, and H8 were unsupported by the results indicated in Tables 4 and 5.

In accordance with Hair et al. 2019, the study utilized resampling techniques of 5000, considering beta values (with alignment to the hypothesis direction), t-values (at 1.645), p-values (at 0.05 significance level), and the bootstrapping confidence interval to establish hypothesis support. The insight into both direct and indirect effects is provided in Tables 4 and 5.

The findings revealed a relationship that is positive between CA and FSB ($\beta=0.263$, $t=7.429$, $p=.001$), supporting H1. Perceived Susceptibility (PSU) exhibited a positive relationship with FSB ($\beta=0.199$, $t=5.273$, $p=.001$), supporting H2. Conversely, the Perceived Barrier of Risk Prevention (PBR) displayed a negative relationship with FSB ($\beta=-0.179$, $t=6.278$, $p=.001$), thereby supporting H3. Perceived Benefits of Nutrition (PBN) were positively linked to FSB ($\beta=0.168$, $t=5.960$, $p=.001$), supporting H4. However, with FSB ($\beta=-0.058$, $t=2.341$, $p=.014$) Perceived Severity of Risk (PSV) did not show a significant relationship, leading to the non-support of H5. Lastly, Self-Efficacy (SE) exhibited a positive relationship with FSB ($\beta=0.227$, $t=6.393$, $p=.001$), confirming H6.

The study hypothesized regarding the moderating analysis that the Willingness to Comply (WC) high level would enhance the positive relationship between HBM and Food Safety Behaviour. Dawson's plots (Figures 3, 4, and 5) were utilized to depict between CA, SE, PBR, and FSB the moderating effect of WC.

WC strengthened the positive relationship among CA and FSB ($\beta=0.105$, $t=3.938$, $p=.001$), thereby supporting H7. Conversely, among PBN and FSB ($\beta=0.035$, $t=1.357$, $p=.091$) the WC did not exhibit a moderating effect, leading to the non-support of H8. In contrast, H9 was supported, between PBR and FSB ($\beta=0.049$, $t=2.045$, $p=.022$) WC mitigated the negative relationship. However, between PSU and FSB ($\beta=0.038$, $t=1.313$, $p=.091$) WC did not moderate the positive relationship, and H10 was not supported. Similarly, for H11, WC did not moderate the positive relationship between PSV and FSB ($\beta=0.017$, $t=0.773$, $p=.226$), resulting in the non-support of H11. Finally, H12 found support, the positive connection between SE and FSB was ($\beta=0.069$, $t=2.443$, $p=.008$) which was reinforced by WC.

The obtained R^2 values indicate that the components of the study can account for 90.4% of the variance in coherence. Following Cohen's (1988) categorization, 0.02, 0.15, and 0.35 values of exogenous latent variables can have higher, medium, or minimal impacts. In line with Latan et al. (2019), when f^2 increases, predictors turn out to be more influential. As a result, Cues to Action (CA) emerge as the most significant factor determining Food Safety Behavior (FSB) as evidenced from Table 4.

Table 4
Direct Effect Hypotheses

Hyp	Relationship	SE	Beta	T-Value	P- Values	LL	UL	Effect Size	f ²	VIF	Decision
H1	CA→FSB	0.034	0.263	7.429	0.001	0.263	0.319	Medium	0.201	3.543	Supported
H2	PSU→FSB	0.033	0.199	5.273	0.001	0.188	0.238	Small	0.114	3.294	Supported
H3	PBR→FSB	0.027	-0.169	6.373	0.001	0.168	-0.131	Medium	0.151	1.944	Supported
H4	PBN→FSB	0.028	0.167	5.960	0.001	0.167	0.223	Small	0.128	2.278	Supported
H5	PSV→FSB	0.027	-0.058	2.341	0.014	0.058	-0.008	Small	0.032	1.123	Unsupported
H6	SE→FSB	0.034	0.227	6.393	0.001	0.216	0.279	Medium	0.154	3.206	Supported
-	Gender→FSB	-0.028	0.037	0.74	0.459	-0.1	0.048	-	-	-	-
-	Position→FSB	-0.102	0.038	2.665	0.008	-0.177	-0.028	-	-	-	-
-	Qualification→FSB	-0.155	0.051	3.06	0.002	-0.253	-0.055	-	-	-	-
-	Experience→FSB	0.153	0.046	3.325	0.001	0.06	-	-	-	-	-

Note: Hyp=Hypothesis; LL= lower level; VIF=variance-inflated factor; UL=upper level; f²=effect size.

Table 5
Indirect effect (Moderating) hypotheses

Hypotheses	Relationship	SE	Beta	T-Value	P-Values	LL	UL	Decision
H7	CA*WC → FSB	0.025	0.105	3.938	0.001	0.105	0.145	Supported
H8	PBN*WC → FSB	0.026	0.035	1.357	0.091	0.032	0.075	Unsupported
H9	PBR*WC → FSB	0.025	0.049	2.045	0.022	0.046	0.084	Supported
H10	PSU*WC → FSB	0.028	0.038	1.313	0.091	0.039	0.088	Unsupported
H11	PSV*WC → FSB	0.024	0.017	0.773	0.226	0.019	0.051	Unsupported
H12	SE*WC → FSB	0.029	0.069	2.443	0.008	0.068	0.117	Supported

Note: UL=Upper level; LL= Lower level

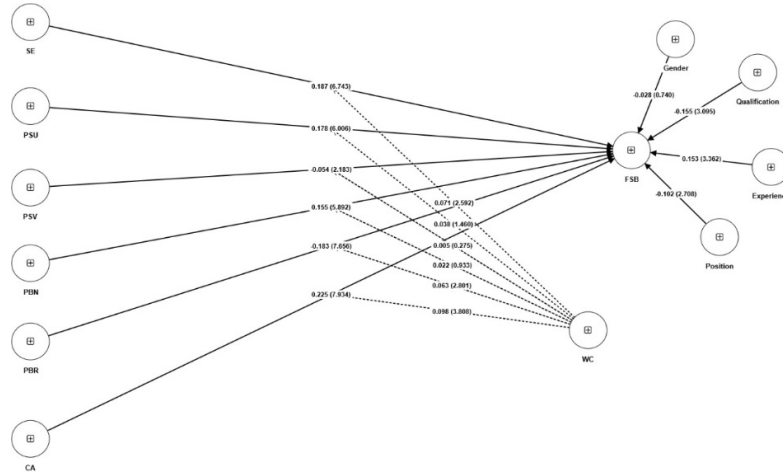


Fig. 2. Structural Model

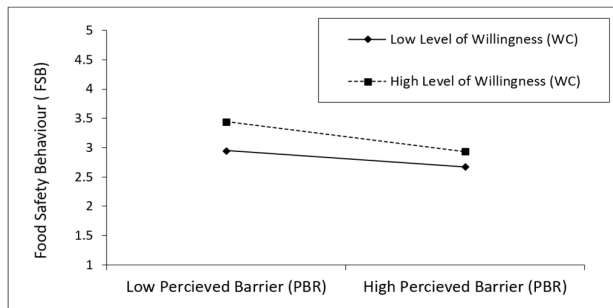


Fig. 3. When WC is high, the negative relation will be stronger between perceived barriers and food safety behaviour.

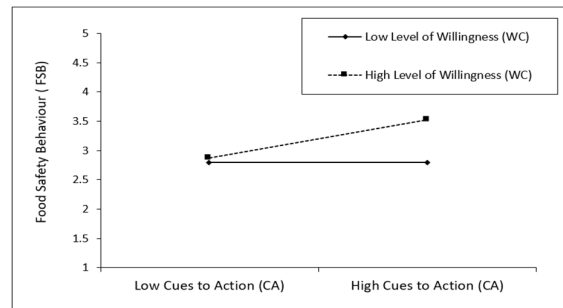


Fig. 4. When WC is high, the positive relation will be stronger between cues to action and food safety behaviour.

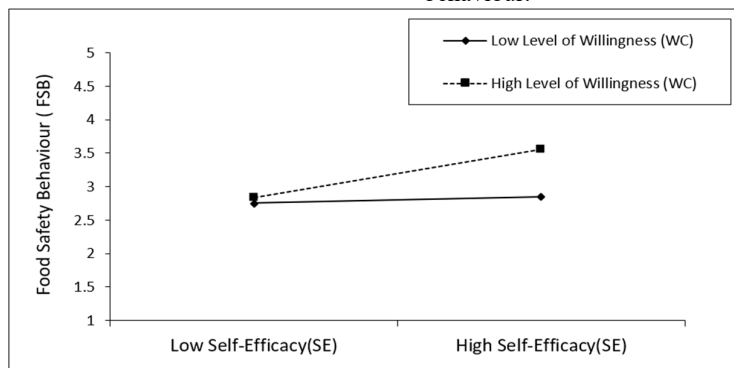


Fig. 5. When WC is high, the positive relation will be stronger between self-efficacy and food safety behaviour

The current research has utilized Partial Least Squares (PLS) to assess errors via designing a comparison between the Root Mean Square Error (RMSE) of PLS with that of Linear Modelling (LM). As discussed by Shmueli et al. (2019), due to limitations in the blindfolding procedure for assessing predictive relevance this approach was adopted. Specifically, the comparison between PLS and LM RMSE values was employed as follows: it indicates a strong predictive capability of the model, when the differences among PLS and LM RMSE are consistently less than 0. In case the majority of these differences are <0, it suggests moderate predictive power, while values below zero signify poor predictive power. Lower RMSE values than the corresponding LM values exhibited when all items for all exogenous variables, the model's exceptional predictive potential is demonstrated. The outcomes of the PLS-predict analysis are presented in detail in Table 6.

Table 6
PLS-Predict

Item	PLS RMSE	Q ² predict	LM RMSE	PLS-LM
FSB5	0.960	0.734	1.484	-0.524
FSB4	0.923	0.728	1.328	-0.405
FSB3	0.894	0.761	1.340	-0.446
FSB2	0.954	0.685	1.511	-0.557
FSB1	0.873	0.761	1.22	-0.347

Control Variables

In the present work, gender, position, qualification, and experience were control variables that are visually represented in the structural diagram. Collectively, these variables in the dependent construct explain 91.1% of the variation. However, the variables of control contribute merely 0.7% of this variation, leaving independent factors that are responsible for 90.4% of the variance. Furthermore, none of the control factors displayed statistical significance, indicating that these demographic variables did not employ any discernible impact on the relationships under examination. This observation echoes findings from prior research, such as Mansor et al. (2022), which highlight that control variables may not always be pivotal in adoption studies at the level of individual units of analysis.

5. Discussion

By introducing several hypotheses this study has significantly advanced the existing literature to investigate food safety behaviour, specifically within the context of small Jordanian restaurants. Moreover, it ventured into uncharted territory by testing the moderating role of WC between the HBM and Food Safety Behavior (FSB). Out of the twelve hypotheses tested, eight received empirical support, yielding valuable insights.

The findings underscore the positive impact of various factors on FSB, reinforcing the importance of CA, PBN, PSU, as well as SE. Kayani et al. (2021) & Alhalaseh et al. (2020) affirmed prior research.

The study employed the Health Belief Model, recognized for examining health behaviours as one of the most valuable frameworks (Alhalaseh et al., 2020). Several hypotheses were formulated and tested, contributing to our understanding of food safety behaviour. The results offered empirical support for four of these hypotheses. H1, which posited CA's positive influence on FSB, received empirical validation. This finding is in line with Huang et al. (2020), who also noted that CA positively influences FSB. H2, suggesting a positive influence of perceived susceptibility (PSU) on FSB, found support in the present work. The outcomes reported by Huang et al. (2020) state that this observation corresponds and is similar to the results of the current research, indicating that PSU contributes positively to FSB. H3 proposed a negative relationship between perceived benefits (PBN) and FSB, and this hypothesis was substantiated. This aligns with past research, including that by Febian et al. (2021), indicating a consistent negative association between PBR and FSB. H4, which posited a positive association between perceived benefits (PBN) and FSB, garnered empirical support. The research work proposed by Kayani et al. (2021) implies that the perception of benefits positively influences FSB. To the current body of knowledge, these findings collectively contribute to surrounding health behaviours and, in particular, food safety behaviour, by providing empirical validation for specific relationships posited by the HBM.

However, it was noted that one hypothesis (H5) was not supported by the outcomes, indicating a discrepancy with previous studies such as Febian et al. (2021). This inconsistency might be attributable to the varying degrees of awareness among people about the severity of illnesses, even when they acknowledge their susceptibility. However, Huang et al. (2020) a reciprocal relationship was reported among them. The willingness to adopt safe handling practices is enhanced by the belief to avoid health problems. The lack of awareness is suggested by unsupported hypotheses regarding the health consequences of poor handling practices, highlighting the complexity of these two interrelated concepts.

Furthermore, H6, proposing a positive relationship between self-efficacy (SE) and FSB, found empirical support, aligning with findings by Kayani et al. (2021). Confidence in one's ability to practice safe food handling indeed leads to the adoption of such practices.

It's important to note that in bolstering self-efficacy (SE) compliance plays a significant role, as perceived benefits (PBN), and FSB. The findings suggest that enhancing SE can have an impact on food safety measures that are positive (Kayani et al., 2021). SE is closely tied to the model of HBM of food safety and health practices and can be bolstered through action plans, goal setting, and taking responsibility.

As a moderator Willingness to comply (WC) was introduced, enhancing the predictive study's power. The outcomes indicate that the relationship between HBM constructs and FSB ,WC has an asymmetric impact, with high WC strengthening the correlations. Among SE, CA, and FSB WC showed positive correlations and among PBR and FSB WC showed negative correlations, which were amplified with high WC. This finding underscores the value of WC as a moderator in strengthening the predictive capacity of HBM within the broader spectrum of FSB studies, specifically within the Jordanian context.

However, PSU, PSV, and PBNs had no moderating effect on WC, which could potentially signify compliance challenges within Jordanian restaurants.

In the current paradigm, compliance with preventive behaviours and monitoring are paramount, especially for health policy success. This necessitates executing scientific models like the HBM, to measure compliance with preventive behaviours (Alizadehfard & Alipor, 2021). While HBM, as applied in this study, was instrumental in understanding an individual's safety behaviour during an epidemic, it benefited significantly from insights drawn from the existing literature (Kayani et al., 2021), making a valuable contribution to the field of food safety behaviour research.

6. Research Contributions

6.1 Theoretical Contributions

The present work has enriched our comprehension of food safety by introducing the Health Belief Model (HBM) into the of Jordanian restaurants. It represents a pioneering endeavour within Jordan and the broader Middle East region, as far as our knowledge extends, as HBM has not been previously employed to elucidate Food Safety Behavior (FSB) in Jordanian restaurant settings. Consequently, this paper makes a valuable contribution by demonstrating the potential of HBM in explaining and predicting FSB within restaurant environments.

Despite aligning with the findings of prior research, it's noteworthy that on FSB in our work, perceived severity does not exert a significant influence. Additionally, our research underscores the facilitating role of compliance within the FSB-HBM relationship. This represents the inaugural investigation of this theoretical framework, employing concrete data collected from restaurants in Jordan. Consequently, it offers significant advantages to the local Jordanian restaurant industry, particularly those of smaller scale. Furthermore, this research illuminates the behavioural dimensions of food safety through empirical evidence.

6.2 Practical Contributions

The current research has affirmed the effectiveness of applying constructs to enhance food handling practices from the Health Belief Model (HBM), carrying vital implications for the restaurant industry, communities, and governmental bodies. The insights gleaned from this research offer valuable guidance to the restaurant sector working in Jordan in pinpointing the underlying factors of frequent violations that negatively impact their reputes and financial performance.

By utilizing persuasive strategies and counselling, there is the potential to boost the confidence of food workers in handling a wide array of food-related challenges. Restaurant managers should actively foster a supportive social environment for those food handlers who excel in food preparation while also bolstering the confidence of those feeling less competent. The objective is engaging food handlers in adhering to established rules and guidelines, thereby mitigating violations.

As indicated by this study, regulatory compliance has a moderating role between HBM and Food Safety Behavior (FSB). Compliance significantly impacts the overall food safety of restaurants, underscoring the importance of restaurant management's involvement in training programs focused on public health and food safety. Furthermore, these results hold significance for Food Business Operators (FBOs) as well as policymakers. FBOs must familiarize themselves with the minimum standards that must be upheld to transform their establishments into responsible dining venues, free from potential food-borne diseases and outbreaks. Policymakers can also benefit by organizing regular audits to assess the current infrastructure of food establishments and ensure adherence to safety standards.

Furthermore, the study sheds light on the underlying responsibilities as well as potential challenges associated with the adoption and execution of optimal food safety protocols alongside how those standards can target and impact compliance behaviour. The successful implementation of food safety procedures has the potential of upgrading the public's outlook regarding food safety standards, leading to increased trust, customer satisfaction, and a stronger market position for restaurants.

7. Conclusion

The current research has concentrated on a behavioural problem that is rarely discussed in developing countries. This work expands our understanding and suggests new topics for study. Most of the study's assumptions and hypotheses were validated. As a result, customers' confidence in food safety and quality is expected to rise, fostering confidence, tourism, and economic growth. This work's conceptual framework places a strong emphasis on HBM food safety. The difficulties and dilemmas in executing laws governing food safety as well as how these limitations affect public acceptability are all illustrated in the present work. The public's view of food safety can be enhanced through operative food safety regulations and it is crucial to inform people about food safety. The reputation, dedication, and market presence of restaurants are improved when patrons enjoy a pleasant eating experience. All Jordanian restaurants must go through a food risk assessment to comply with JFDA regulations.

It is possible to improve handlers' FSB-related behaviour. Professionals of public health and legal representatives, such as lawmakers, ought to inform and teach food handlers the significance of food safety behaviours in light of the pervasive misunderstandings about how existing food safety standards function to encourage optimistic outcomes. Thus, Jordanian restaurants ought to show firm adherence to the safety-related regulatory protocols for meeting the ever-increasing consumer needs.

8. Research Limitations and Directions for Future Research

Present research complies with certain limitations that future researchers can use as a roadmap to outline new research ideas and effectively bridge the knowledge gaps in this regard.

- First and foremost, the present findings are only applicable to food service enterprises in the Jordanian context. Hence, future researchers can look forward to designing similar studies focusing on distinct countries to get an insight into the varying food service environments and workers and servers who can potentially influence food safety aspects.
- Secondly, unlike the present work, future research studies can incorporate further food safety factors in the proposed framework to add new dimensions to the topic.
- Moreover, alternative theories can also be integrated into the research model to assess the factors impacting food safety behaviour. Subsequent research endeavours could opt for data acquisition through distinct methods to investigate the diverse proportions of executive preferences and health.
- Finally, a comprehensive scrutiny of Jordanian food safety regulations has been lacking in prior research efforts. Given the potential applicability of the findings to managers and proprietors on a global scale, this study can be replicated in diverse settings, including developing nations.
- The current findings could assist as a catalyst for forthcoming investigations, offering both theoretical and practical insights aimed at enhancing food safety within numerous food service contexts. Furthermore, one last potential limitation might involve the execution of quantitative methods. Therefore, future research endeavours may consider employing mixed-method approaches for acquiring deeper insights and understanding of food safety behaviour.

Funding Statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Authorship Contribution Statement

Amany Haddad: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing, Visualization. Abdul Hafaz Ngah: Conceptualization, Methodology, Writing – review & editing.

Declaration of Competing Interest

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

References

- Aguinis, H., Edwards, J. R., & Bradley, K. J. (2017). Improving our understanding of moderation and mediation in strategic management research. *Organizational Research Methods*, 20(4), 665-685. <https://doi.org/10.1177/1094428115627498>
- Albtoosh, Q., Ngah, A. H., & Yusoff, Y. M. (2022). Training satisfaction relative to turnover intention: the mediating role of employee loyalty. *Industrial and Commercial Training*, 54(4), 545-565. <https://doi.org/10.1108/ICT-06-2021-0047>
- Alhalaseh, L., Fayoumi, H., & Khalil, B. (2020). The Health Belief Model in predicting healthcare workers' intention for influenza vaccine uptake in Jordan. *Vaccine*, 38(46), 7372-7378. <https://doi.org/10.1016/J.VACCINE.2020.09.002>
- Alizadehfard, S., & Alipor, A. (2021). Evaluation of Compliance with Preventive Behaviors of Corona Disease Based on Health Belief Model. *Iranian Journal of Health Psychology*, 4(3), 19-28. <https://doi.org/10.30473/ijohp.2021.55822.1139>
- Andadari, N., Andarini, A., Soemarno, S., & Widjajanto, E. (2019). The Impact of Health Promotion on Healthy Behavior Viewed from Health Belief Model Perspective (Study in Kediri Regency, East Java Province). *International Journal of Health Economics and Policy*, 4(4), 110-121. <https://doi.org/10.11648/j.hep.20190404.11>
- Barbosa, H. F., García-Fernández, J., Pedragosa, V., & Cepeda-Carrion, G. (2021). The use of fitness centre apps and its relation to customer satisfaction: a UTAUT2 perspective. *International Journal of Sports Marketing and Sponsorship*, 23(5), 966-985. <https://doi.org/10.1108/IJSMS-01-2021-0010>
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173. <https://doi.org/10.1037/0022-3514.51.6.1173>

- Bodas, M., & Peleg, K. (2020). Income assurances are a crucial factor in determining public compliance with self-isolation regulations during the COVID-19 outbreak – cohort study in Israel. *Israel Journal of Health Policy Research*, 9(1), 1–10. <https://doi.org/10.1186/s13584-020-00418-w>
- Boutros, B., & Roberts, K. (2020). Self-Reported Food Safety Behaviors in Independent Chinese and Mexican Restaurants in Kansas. *Food Protection Trends*, 40(5), 296-313.
- Buglar, M. E., White, K. M., & Robinson, N. G. (2010). The role of self-efficacy in dental patients' brushing and flossing: Testing an extended Health Belief Model. *Patient Education and Counseling*, 78(2), 269-272. <https://doi.org/10.1016/j.pec.2009.06.014>
- Cho, S. K., Im, W. T., Kim, D. H., Kim, M. H., Shin, H. S., & Oh, S. E. (2013). Dry anaerobic digestion of food waste under mesophilic conditions: Performance and methanogenic community analysis. *Bioresource Technology*, 131, 210-217. <https://doi.org/10.1016/j.biortech.2012.12.100>
- Cohen, J. (1988). Set correlation and contingency tables. *Applied psychological measurement*, 12(4), 425-434. <https://doi.org/10.1177/014662168801200410>
- Contento, N. M., & Semancik, S. (2016). Thermal characteristics of temperature-controlled electrochemical microdevices. *Sensors and Actuators B: Chemical*, 225, 279-287. <https://doi.org/10.1016/j.snb.2015.11.019>
- de Andrade, M. L., Stedefeldt, E., Zanin, L. M., Zanetta, L. D. A., & da Cunha, D. T. (2021). Unveiling the food safety climate's paths to adequate food handling in the hospitality industry in Brazil. *International Journal of Contemporary Hospitality Management*, 33(3), 873-892. <https://doi.org/10.1108/IJCHM-09-2020-1030>
- Ebbes, P., Huang, Z., & Rangaswamy, A. (2016). Sampling designs for recovering local and global characteristics of social networks. *International Journal of Research in Marketing*, 33(3), 578-599. <https://doi.org/10.1016/j.ijresmar.2015.09.009>
- El Haddad, R. F., Yahfoufi, N., Abou Haidar, M., & Hoteit, M. (2020). Knowledge, Attitude and Practices of Lebanese Married Women Towards Food Safety. *Atena Journal of Public Health*, 2, 1-1. Available at: <https://atenajournals.com/>
- European Food Safety Authority. (2010). Application of Systematic Review Methodology to Food and Feed Safety Assessments to Support Decision Making. *EFSA Journal*, 8(6), 1637. <https://doi.org/10.2903/j.efsa.2010.1637>
- Febian, F. I., Nurafizah, S., Annuar, S., & Memon, M. A. (2021). *Functional food consumption among older consumers in Malaysia: A Health Belief Model perspective*. 2880–2892. <https://doi.org/10.1108/BFJ-07-2020-0663>
- Fikriana, R., Fahrany, F., & Rusli, S. A. (2021). Health belief associated with adherence to health protocol in preventing coronavirus diseases on patients' family. *Open Access Macedonian Journal of Medical Sciences (OAMJMS)*, 9(B), 1011-1015. <https://doi.org/10.3889/oamjms.2021.6762>
- Haddad, M. A., Yamani, M. I., Da'san MM, J., Obeidat, M., Abu-Romman, S. M., & Parisi, S. (2021). *Food Traceability in Jordan: Current Perspectives*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-66820-4>
- Hahn, E. D., & Ang, S. H. (2017). From the editors: New directions in the reporting of statistical results in the Journal of World Business. *Journal of World Business*, 52(2), 125-126. <https://doi.org/10.1016/j.jwb.2016.12.003>
- Hair Jr, J. F., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2017). *Advanced issues in partial least squares structural equation modelling*. Sage Publications.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2-24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- Hossain, M. B., Alam, M. Z., Islam, M. S., Sultan, S., Faysal, M. M., Rima, S., ... & Mamun, A. A. (2021). Health belief model, theory of planned behavior, or psychological antecedents: what predicts COVID-19 vaccine hesitancy better among the Bangladeshi adults?. *Frontiers in Public Health*, 9, 711066. <https://doi.org/10.3389/fpubh.2021.711066>
- Huang, X., Dai, S., & Xu, H. (2020). Predicting tourists' health risk preventative behaviour and travelling satisfaction in Tibet: Combining the theory of planned behaviour and health belief model. *Tourism Management Perspectives*, 33, 100589. <https://doi.org/10.1016/j.tmp.2019.100589>
- Janz, K. F., Dawson, J. D., & Mahoney, L. T. (2002). Increases in Physical Fitness During Childhood Improve Cardiovascular Health During Adolescence: The Muscatine Study. *International Journal of Sports Medicine*, 23(S1), 15-21. <https://doi.org/10.1055/s-2002-28456>
- Kayani, Z. K., Fatima, T., Ramayah, T., Awan, T. M., & Khan, R. (2021). *Antecedents of individual safety behavior during the pandemic times*. Pp. 1-21. <https://doi.org/10.21203/rs.3.rs-892477/v1>
- Khoramabadi, M., Dolatian, M., Hajian, S., Zamanian, M., Taheripanah, R., Sheikhan, Z., Mahmoodi, Z., & Seyedi-Moghadam, A. (2016). Effects of education based on health belief model on dietary behaviors of Iranian pregnant women. *Global journal of health science*, 8(2), 230. <https://doi.org/10.5539/gjhs.v8n2p230>
- Kim, S., & Kim, S. (2020). Analysis of the impact of health beliefs and resource factors on preventive behaviors against the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, 17(22), 8666. <https://doi.org/10.3390/ijerph17228666>
- Latan, H., Chiappetta Jabbour, C. J., & Lopes de Sousa Jabbour, A. B. (2019). 'Whistleblowing triangle': Framework and empirical evidence. *Journal of Business Ethics*, 160, 189-204. <https://doi.org/10.1007/s10551-018-3862-x>
- Mansor, T. M., Mohamad Ariff, A., Hashim, H. A., & Ngah, A. H. (2022). External whistleblowing intentions of auditors: a perspective based on stimulus–organism–response theory. *Corporate Governance: The International Journal of Business in Society*, 22(4), 871-897. <https://doi.org/10.1108/CG-03-2021-0116>

- McNeil, R. H. (2019). *Investigating regulatory compliance: Key issues in the management of food safety risk in the fast food industry in Jamaica*. Edinburgh Napier University, Edinburgh, Scotland. Available at: <http://researchrepository.napier.ac.uk/Output/2386568>
- Memon, M. A., Ramayah, T., Cheah, J. H., Ting, H., Chuah, F., & Cham, T. H. (2021). PLS-SEM statistical programs: a review. *Journal of Applied Structural Equation Modeling*, 5(1), 1-14. [https://doi.org/10.47263/JASEM.5\(1\)06](https://doi.org/10.47263/JASEM.5(1)06)
- Moridi, E., Fazelnia, Z., Yari, A., Gholami, T., Hasirini, P. A., & Khani Jaihooni, A. (2021). Effect of educational intervention based on health belief model on accident prevention behaviours in mothers of children under 5-years. *BMC Women's Health*, 21, 1-8. <https://doi.org/10.1186/s12905-021-01573-1>
- Muchow, C. A. (2021). *An Integrated Framework of Health Beliefs and Health Behaviors: The Impact of Socio-Cultural Factors in the Case of Type II Diabetes* [PhD Dissertation]. Columbia University.
- Ngah, A. H., Anuar, M. M., Rozar, N. N., Ariza-Montes, A., Araya-Castillo, L., Kim, J. J., & Han, H. (2021). Online sellers' reuse behaviour for third-party logistics services: An innovative model development and E-Commerce. *Sustainability*, 13(14), 7679.
- Ngah, A. H., Jeevan, J., Salleh, N. H. M., Lee, T. T. H., & Mhd Ruslan, S. M. (2020). Willingness to pay for halal transportation cost: The moderating effect of knowledge on the theory of planned behavior. *Journal of Environmental Treatment Techniques*, 8(1), 13-22.
- Ngah, A. H., Kamalrulzaman, N. I., Mohamad, M. F. H., Rashid, R. A., Harun, N. O., Ariffin, N. A., & Osman, N. A. A. (2022). The sequential mediation model of students' willingness to continue online learning during the COVID-19 pandemic. *Research and Practice in Technology Enhanced Learning*, 17(1). <https://doi.org/10.1186/s41039-022-00188-w>
- Ngah, A. H., Rahimi, A. H. M., Gabarre, S., Saifulizam, N. I. F. C., Aziz, N. A., & Han, H. (2021a). Voluntourism sustainability: a case of Malaysian east coast island destinations. *Asia Pacific Journal of Tourism Research*, 26(12), 1364–1385. <https://doi.org/10.1080/10941665.2021.1983622>
- JFDA. (2021). Jordan Food & Drug Administration (JFDA). Retrieved From: <http://www.jfda.jo/Pages/viewpage.aspx?pageID=151>
- Ngah, A. H., Thurasamy, R., Mohd Salleh, N. H., Jeevan, J., Md Hanafiah, R., & Eneizan, B. (2022). Halal transportation adoption among food manufacturers in Malaysia: the moderated model of technology, organization and environment (TOE) framework. *Journal of Islamic Marketing*, 13(12). <https://doi.org/10.1108/JIMA-03-2020-0079>
- Ngah, A. H., Zainuddin, Y., & Thurasamy, R. (2017). Applying the TOE framework in the Halal warehouse adoption study. *Journal of Islamic Accounting and Business Research*.
- Onyango, D. A. (2016). *Determinants of Food Safety Management in Selected Hotels in Eldoret Town, Kenya*. Moi University, Kenya.
- Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, 63, 539-569. <https://doi.org/10.1146/annurev-psych-120710-100452>
- Ramdan, I. M., Candra, K. P., & Sultan, M. (2022). Perception of preventing behavior against COVID-19 among Indonesian industrial workers. *International Journal of Public Health*, 11(1), 98-105. <https://doi.org/10.11591/ijphs.v11i1.21071>
- Regmi, P. R., Waithaka, E., Paudyal, A., Simkhada, P., & Van Teijlingen, E. (2016). Guide to the design and application of online questionnaire surveys. *Nepal Journal of Epidemiology*, 6(4), 640. <https://doi.org/10.3126/nje.v6i4.17258>
- Reiter, P. L., Pennell, M. L., & Katz, M. L. (2020). Acceptability of a COVID-19 vaccine among adults in the United States: How many people would get vaccinated? *Vaccine*, 38(42), 6500–6507. <https://doi.org/10.1016/j.vaccine.2020.08.043>
- Rezaei, R., & Mianaji, S. (2019). Using the health belief model to understand farmers' intentions to engage in the on-farm food safety practices in Iran. *Journal of Agricultural Science and Technology*, 21(3), 561-574. Available at: <https://jast.modares.ac.ir/article-23-15517-en.html>
- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social Learning Theory and the Health Belief Model. *Health Education Quarterly*, 15(2), 175-183. <https://doi.org/10.1177/109019818801500203>
- Saghafi-Asl, M., Aliasgharzadeh, S., & Asghari-Jafarabadi, M. (2020). Factors influencing weight management behavior among college students: An application of the Health Belief Model. *PloS One*, 15(2), e0228058. <https://doi.org/10.1371/journal.pone.0228058>
- Salman, N., & Adnan, K. A. N. (2021). Predicting career decision-making difficulties: the role of barriers, self-efficacy, and decision status. *Turkish Psychological Counseling and Guidance Journal*, 11(60), 49-66. Retrieved from: <https://dergipark.org.tr/en/pub/tpdrd/issue/61022/905994>
- Scallan, E., Hoekstra, R. M., Angulo, F. J., Tauxe, R. V., Widdowson, M.-A., Roy, S. L., Jones, J. L., & Griffin, P. M. (2011). Foodborne illness acquired in the United States—major pathogens. *Emerging Infectious Diseases*, 17(1), 7. <https://doi.org/10.3201/eid1701.P11101>
- Sharpe, C. L. (2017). *Building Resilience in Jamaica—Community Experiences at the Intersection of the Food System, Climate Change and Natural Disasters in a Small Island Developing State*. Rutgers The State University of New Jersey-New Brunswick.
- Sheppard, J., & Thomas, C. B. (2021). Community pharmacists and communication in the time of COVID-19: Applying the health belief model. *Research in Social and Administrative Pharmacy*, 17(1), 1984-1987. <https://doi.org/10.1016/j.sapharm.2020.03.017>

- Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J. H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. *European Journal of Marketing*, 53(11), 2322-2347. <https://doi.org/10.1108/EJM-02-2019-0189>
- Syed, M. H., Meraya, A. M., Yasmeen, A., Albarraq, A. A., Alqahtani, S. S., Syed, N. K. A., Algarni, M. A., & Alam, N. (2021). Application of the Health Belief Model to assess community preventive practices against COVID-19 in Saudi Arabia. *Saudi Pharmaceutical Journal*, 29(11), 1329-1335. <https://doi.org/10.1016/j.jsps.2021.09.010>
- Taha, S., Osaili, T. M., Vij, A., Albloush, A., & Nassoura, A. (2020). Structural modelling of relationships between food safety knowledge, attitude, commitment and behavior of food handlers in restaurants in Jebel Ali Free Zone, Dubai, UAE. *Food Control*, 118, 107431. <https://doi.org/10.1016/j.foodcont.2020.107431>
- Tongco, M. D. C. (2007). Purposive sampling as a tool for informant selection. *Ethnobotany Research & Applications*, 5, 147-158. Available at: <http://hdl.handle.net/10125/227>
- Tsai, F. M., & Bui, T. D. (2021). Impact of word of mouth via social media on consumer intention to purchase cruise travel products. *Maritime Policy & Management*, 48(2), 167-183. <https://doi.org/10.1080/03088839.2020.1735655>
- Urbanovich, T., & Bevan, J. L. (2020). Promoting environmental behaviors: Applying the health belief model to diet change. *Environmental Communication*, 14(5), 657-671. <https://doi.org/10.1080/17524032.2019.1702569>
- Wang, M., Huang, L., Pan, C., & Bai, L. (2021). Adopt proper food-handling intention: An application of the health belief model. *Food Control*, 127, 108169. <https://doi.org/10.1016/j.foodcont.2021.108169>
- Wang, X., Lai, I. K. W., Zhou, Q., & Pang, Y. H. (2021). Regional travel as an alternative form of tourism during the COVID-19 pandemic: Impacts of a low-risk perception and perceived benefits. *International Journal of Environmental Research and Public Health*, 18(17), 9422. <https://doi.org/10.3390/ijerph18179422>
- WHO. (2020). Responding to Community Spread of COVID-19. *World Health Organization (WHO)*. Retrieved From: <https://www.who.int/publications/i/item/responding-to-community-spread-of-covid-19>
- Wong, J., Goh, Q. Y., Tan, Z., Lie, S. A., Tay, Y. C., Ng, S. Y., & Soh, C. R. (2020). Preparing for a COVID-19 pandemic: a review of operating room outbreak response measures in a large tertiary hospital in Singapore. *Canadian Journal of Anaesthesia*, 67(6), 732. <https://doi.org/10.1007/s12630-020-01620-9>
- Yazdanpanah, M., Forouzani, M., & Hojjati, M. (2015). Willingness of Iranian young adults to eat organic foods: Application of the Health Belief Model. *Food Quality and Preference*, 41, 75-83. <https://doi.org/10.1016/j.foodqual.2014.11.012>



© 2024 by the authors; licensee Growing Science, Canada. This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).