

# Are Humans Safe in Public Places? Expansion of Protection Motivation Theory in the Gulf Cooperation Council Countries

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**Objectives:** People regularly face safety threats that are often ignored in day to day life. The knowledge and understanding of the risks posed through unhealthy activities are essential. This realization can change behavior in ways that are effective in mitigating risk. The study aimed to determine the importance of protection motivation theory in studies conducted in Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain, and Oman evaluating the safety and health concerns of people living in the region. **Methods:** This study reviews previous studies that analyzed social protection motivation theory constructs to analyze and improve the health and safety in these countries. **Results:** Several studies were identified, indicating that the protection motivation theory is important in motivating individuals to change behavior. **Conclusion:** Protection motivation theory is a useful construct to understand and mitigate risk. It can aid in developing preventive measures to enhance individual safety.

**Keywords:** Behavior, Humans, Perception, Safety, Self-Efficacy

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## Introduction

People who belong to different cultural backgrounds and experiences possess different behaviors and beliefs regarding illnesses and health [1,2]. The current decade has been termed the Decade of Action for Road Safety 2011–2020 by the World Health Organization (WHO) [3] because millions of people

become the victim of road accidents annually. Children are amongst the most vulnerable and sensitive population groups to these accidents [4]. Persistent challenges and issues are prevailing globally, such as pollution, war, violent extremism, famine, and other natural disasters. The wellbeing of people is affected by such problems [5].

It is estimated that one person out of nine is hungry;

whereas, one out of three is malnourished. Globally, 18,000 people lose their lives due to air pollution; whereas, two million people become the victim of HIV infection. On average, 24 people are being banished from their respective homes per minute. Approximately a billion people live with a disability, and they are sidelined in most societies. They experience discrimination, stigma, and inaccessibility to virtual and physical environments. According to one estimate, 244 million people are living outside of their home countries. Among them, numerous are economic refugees who hope to increase their source of income and send money to their respective countries. People are often faced with hatred, harassment, and violence in their host countries [5].

Achieving occupational safety is considered an essential factor for most employers. This is particularly applicable in labor-intensive industries such as in construction companies where a higher rate of accidents and injuries are recorded. The developing nations, which include Saudi Arabia, are where 52% of the construction industry injuries take place. Therefore, safety has become a significant concern not only for the researchers but also for the construction-based organizations [6].

The protection motivation theory for engaging in protective behaviors is a useful social cognitive model for explaining an individual's motivation. Various theories have been formulated to predict, explain, and modify health behavior. The social protection motivation theory (PMT) was presented by Rogers [4, 7] to explain the impact of fear on behavior and attitude related to health. Rogers revised this theory in 1983 to an extended PMT, emphasizing cognitive processes in mediating behavioral change. The work of Rogers related to PMT was based on the work of Leventhal [8] and Lazarus [9], which result in understanding appraisal and threat processes. The appraisal of threat is determined by the perceived severity of the threat and the probability of its occurrence or vulnerability, and these together give the event its degree of significance. A person's response is focused on the efficacy of their preventative response and their self-efficacy. These govern the person's ability to cope with a threat and implement the steps required to avoid the threat. PMT is used in health-related problems so that the behavior of people relating to drug abuse, smoking, and alcoholism, can be studied.

There are some areas where this theory can be applied and has been proven to be operationally effective. For instance, it can be helpful in promoting water conservation, studying the behaviors

of nuclear war prevention, assertive behavior in interpersonal communications, preventing burglary, and increasing earthquake preparedness. For influencing health behaviors, PTM acts as a framework for preventative health education. Researchers have undertaken studies related to reducing alcohol consumption, increasing a healthy lifestyle, increasing diagnostic health screening, and in the prevention of diseases [1]. Health and public safety have been the major concern in the GCC (Gulf Cooperation Council), an intergovernmental political and economic union, which comprise six gulf countries: Kuwait, Saudi Arabia, United Arab Emirates (UAE), Oman, Bahrain, and Qatar as member states. These countries are, however, are currently experiencing an unprecedented demand for healthcare services due to their population growth [10]. Recent statistics show a population increase of nearly one-third in GCC states through 2020 [11]. The increased size of the expatriate population (48.1%) also accounts for the increase in demand. Accordingly, the increasing population growth, a large number of migrants, and the aging population serve as a substantial challenge to the GCC healthcare system, increasing healthcare costs [12, 13].

The purpose of this review article, therefore, is to use the protection motivation theory framework to examine what is known about the safety and health concerns of people in the GCC countries. This review is necessary because few studies have been conducted using this framework in identifying human safety concerns in GCC countries. Most studies concerning human safety have used theories other than PMT. The findings of this review article should be helpful in applying this new framework while focusing on the different factors that lead to its acceptance among the target population. Additionally, it should facilitate the development of useful educational programs and expand the culture of individual safety of different populations.

## Materials and Methods

### Theoretical Framework

PMT was initially developed to promote health safety by providing important measures that contribute to human safety [7]. The core focus of the theory is to provide knowledge regarding the factors that motivate individuals to prevent disease or injury. The framework works through 'threat appraisal,' along with 'coping appraisals,' which are connected to an individual's 'response efficacy' and 'self-efficacy.' The prime objective of the theory

is to identify and evaluate the threat and then counter it with effective measures.

PMT works on four factors that affect the intentions of a person to safeguard him/her from any mishap. These factors include (1) the harshness of the detrimental or damaging event (perceived severity), (2) the possibility of the event occurrence (vulnerability), (3) the effectiveness of planned precautionary steps (response efficacy), and (4) the person's ability to execute the plan to decrease the threatening event's effects (self-efficacy).

### Study Design

This paper provides a review of published studies to identify the human safety and health issues that occur in GCC countries (Saudi Arabia, UAE, Bahrain, Oman, Kuwait, and Qatar). Protection motivation theory is useful to understand human safety issues as this theory helps researchers in interpreting how people create decisions to protect themselves in critical events. Furthermore, this review discusses the human safety issues based on the four factors of PMT independently and comprehensively in each country in the GCC. The causes and effects of human safety challenges in the GCC countries are reviewed using the PMT factors in Section 3. Section 4 presents the justification of applying PMT in addressing human safety issues such as health and well being, homeland security and policing, information security, and natural hazards in GCC countries.

### Search Strategy

The articles in this review were selected from PubMed, EBSCO, MEDLINE, JSTOR, and Cochrane library. The search for the articles was limited to the English language published from 1995 to 2019. Searches were conducted using the keywords protection motivation theory, health concern, safety concern, GCC, Kuwait, Saudi Arabia, Qatar, Oman, Bahrain, and UAE.

### Inclusion and Exclusion Criteria

Based on the search strategy, 71 articles were identified after the removal of the duplicated articles. Forty-seven papers were excluded because they had only abstract and no particular focus on the health and were not relevant to GCC countries. The final sample included 24 articles, which were comprehensively reviewed. The inclusion criteria required studies to be related to health and safety, GCC countries, and include protection motivation theory. The papers were required to be published in English and the intervention or evaluation of humans (not of animals).

## Results

### Safety Concerns in Saudi Arabia

Al-Ghaith [14] conducted a study to develop a theoretical model concerning the factors that people use to avoid using antivirus software on their mobile phones. The central focus was on the subjective norms, including the threat and coping appraisals, among the mobile phone users of Saudi Arabia. The development of the model was undertaken in the framework of the protection motivation theory that helped identify the different threats and coping appraisals within the given context. The major variables of the study included response efficacy, response cost, perceived vulnerability, and self-efficacy. The study found that some factors positively influenced the user's intention of adopting antivirus software on their mobile devices. The perceived harm was studied under the context of the extent of harm that could occur because of a mobile phone virus. Another influential factor was perceived social pressure from others in the same society that apparently affects the user's intention of adopting antivirus software. Similarly, the cost of the response was another important determinant that affected the user's intention. The study was based on the PMT since the variables were aligned

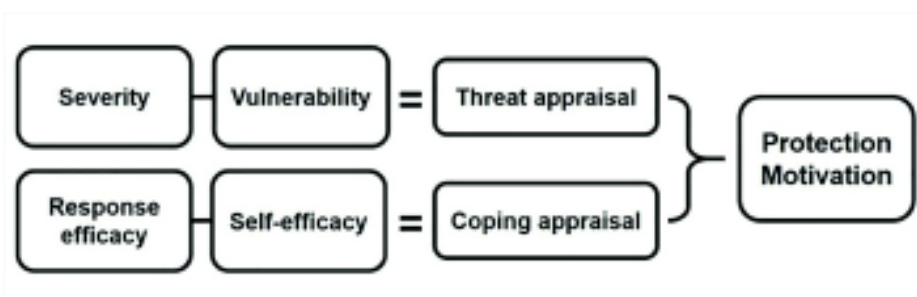


Figure 1. Protection motivation theory (PMT)

to threat appraisal and coping appraisal variables of the PMT.

Al Qahtani et al. [15] replicated the study conducted by Albayram et al. [16] regarding the impact of fear on the use of smart phone screen locks in people in Saudi Arabia. Their investigations focused on the effectiveness of a customized video, captions on an original video, and Arabic dubbing of videos showing the potential for privacy invasion that encouraged them to use their phone's screen lock. The study was carried out by considering the four axes of the PMT and included experimental and control groups. They found that participants' perceptions regarding the use of screen locks were highly influenced by customized videos, as these videos helped them in changing their phone-locking behavior. They identified that the perception of exchanging real-time information, advice, and opinions between experts and people facing threats enabling them to make informed decisions significantly influenced screen locking behavior among the Saudi population.

### **Safety Concerns in Bahrain**

Musaiger et al. [17] studied sedentary behaviors and dietary patterns among the university students of Bahrain. They provided quantitative data indicating that most students had unhealthy dietary habits and were sedentary. They recommended the promotion of healthy dietary patterns and lifestyle through various interventions. The limitations of their study were primarily associated with the high percentage of females. Notably, the study lacked intervention of theory-based findings, which might be useful in determining different types of behaviors that stimulate the consumption of unhealthy meals among young students.

Mukhaimer [18] focused on the perceived and the original health status of the women living in Bahrain. The study was based on Steinwach's framework provided regarding the health assessment measures in policy and research along with the gender-specific views provided by Longino [19]. The central focus of the study was three major constructs that were associated with women's health outcomes, including the social-economic factors, personal factors, cultural factors, and health system factors, based on quantitative methods. Mukhaimer found that most women were unaware of their health status, and problems such as diabetes, anemia, obesity, hypertension, and hyperlipidemia were common among them. The study had three significant limitations. First, problems were identified

in patients' medical records, another was the exclusion of the female minority population, and the last was associated with the use of SF-36 among the Bahraini Arabic population. They recommended a reevaluation of the health of the female population of Bahrain and steps to improve the health of the female population. The study lacked useful findings regarding self-efficacy, perceived risk severity, and response efficacy that are the important factors in protection motivation theory, steps to study these factors potentially would have added value to their study.

### **Safety Concerns in Oman and Kuwait**

Alrawahi et al. [20] explored different factors that were significant in impacting the job satisfaction of various medical laboratory technologists working in the Omani Hospital in Oman. The findings of the study were generated through focus groups. They found that most participants felt major dissatisfaction regarding their health and safety concerns, promotion and workload, and professional status and relationship with professional leaders. The findings of their study can also be effectively explained through different motivation theories proposed in a similar context. A major focus was granted to theories related to job satisfaction, such as Adam's equity theory [21], Locke's goals theory [22], Herzberg's motivator hygiene theory [23], and Maslow's need hierarchy theory [24]. A major limitation was that their study was undertaken at a single hospital in Oman. It can be implied from their methods that their study did not identify the different factors associated with motivating protection behavior, as represented in PMT, that could have had a positive impact on their study's findings.

Al-Hemoud and Al-Asfoor [25] conducted a study following initiatives undertaken to improve the safety performance among the Kuwaiti population. A framework concerning the behavior-based safety process and the prevention of accidents was proposed. The testing of the framework in the educational settings was undertaken among a control group and the experimental group. They found that a well-designed behavior-based safety initiative created a lasting impact on the safety behaviors of the study population. Their study findings were crucial and can be implemented at various industrial, educational, and training organizations. Since their topic was associated with human behavior, intervening with PMT in the given framework may have added value to their study.

### Safety Concerns in Qatar and UAE

Shibani et al. [26] conducted a study to determine the value of improved health and safety standards in the construction management of the UAE. The major focus of the study on the impact of health and safety concerns on construction projects. They indicated that most developing countries lack the ability to implement health and safety standards due to ineffective organizations. Their findings were based on a thorough review of previously published literature, which helped in the formation of their questionnaire and interviews. The overall findings indicated that managers of the construction companies were more concerned about the cost rather than the health and safety of workers. Their findings were obtained using the repertory grid technique, which is an integral part of the personal construct theory proposed by Kelly [27]. Though the results were concrete, the study failed to mention the critical aspects of human behavior that are valuable in promoting human safety.

Hadian and Abdullah [28] conducted a study regarding the lack of safety culture awareness in the XYZ company of Qatar. The study involved the analytical hierarchy process method for the selection of best approaches that might improve the safety culture of the ambulance services in Qatar. They found that the ambulance service of the XYZ company failed to show a strong sense of commitment to safety. Several factors, such as the commitment of senior management, and the operational approach strategy, were identified as lacking. The major limitation of their study was that the findings were not proposed by the framework of behavior theory or the PMT to provide more concrete results.

### Health Concerns in Saudi Arabia

Sabra et al. [29] assessed Saudi patients' knowledge level concerning avian flu. It used a cross-sectional study design to assess the link between knowledge and sociodemographic characteristics. It surveyed 1420 patients at primary health care centers and evaluated their knowledge of avian flu and deployed the use of the protection motivation theory to find the factors that promote improved understanding. The findings of the survey showed that the knowledge level of the participants concerning avian flu varied based on gender education and age. Primarily, young male participants, at a higher level of education, had good knowledge scores compared to others.

In another study, Alselaimi [30] assessed the adolescents'

intentions and behavior regarding participation in leisure-time physical activities in Saudi Arabia. It used a mixed-method approach using qualitative and quantitative analysis of some factors that influence the individual's participation in leisure-time physical activity. Their study used different theoretical models for determining the factors, such as social cognitive theory [31], the health belief model [32], theory of reasoned action [33], PMT, self-determination theory [34], the theory of planned behavior [35], and the trans theoretical model [36]. The qualitative findings of their study were that physical activity was predicted by attitudes to subjective norms and behavioral control perception. The findings showed no impact on self-identity, but the significant impact of descriptive norms, self-efficacy, and past behavior.

Halimic [37] conducted a study using the protection motivation model to identify the factors that impact a students' choice for healthy food items at a university. Halimic examined three empirical factors using different models for identifying type 2 diabetes behavioral risk factors and their association with a participant's knowledge level. The study tested the factors based on two conceptual frameworks, i.e., PMT and the health belief model [7, 32]. They found that health-related behavior (dietary patterns) was not significantly linked with physical activity. Empirical studies showed a great response to cost. Halimic also concluded that health messages had no impact on food purchasing behavior. Despite its significance, the study did not highlight concerns or problems which may affect their health behavior.

Another study of Almutairi et al. [38] empirically evaluated the factors that promote a healthy lifestyle among college students. The author used a descriptive cross-sectional study design to gather data from 1656 students from November 2016 to January 2017 at King Saud University in Saudi Arabia. The study found that students were leading an unhealthy life by having unhealthy eating habits and low levels of physical activity. It showed that the university motivated the participants to engage in healthy eating habits. It suggests that different programs can be instigated for promoting healthy eating habits. A similar approach can be integrated into the protection motivation theory, which helps enhance its value.

### Health Concerns in Bahrain

Borgan et al [39]. assessed the well being of the patients and

their lifestyle habits using a cross-sectional study design. They employed the use of a self-administered questionnaire on a sample of 175 physicians. The findings showed that most physicians had unfavorable lifestyle habits. It highlighted that poor physician wellbeing adversely impacted patient-physician interaction. Moreover, it recommended the healthcare institutions take proactive actions to help physicians to adopt healthy lifestyles. A similar benefit can be induced by the protection motivational theory framework, which can be used to reduce health issues.

The study of Husain et al. [40] determined the awareness level of the individuals concerning human papillomavirus infection and their attitude concerning vaccination using a cross-sectional qualitative study. They found that participants were willing to be immunized upon recommendation and that they believed that vaccination was important for both the genders. Minimizing possible side effects and the assurance of efficacy were identified as the factors leading to a favorable attitude to wards the human papilloma virus immunization. Although the study contributes by highlighting the factors that can help prevent a health problem, it did not include behavioral aspects to prevent human papilloma virus transmission.

Zolait et al. [41] examined the acceptance of the e-health system among users in Bahrain, as well as the factors that impacted its adoption. They used a mixed approach, along with the technology acceptance model and the theory of reasoned action framework [42, 33]. The variables from both theories were integrated into a research model. The finding showed that health literacy, trust, as well as attitude impact the use of the e-health system. The factors identified can be integrated into the PMT to help develop their awareness concerning e-health and its adoption. Also, though the findings were accurate, these do not address the concerns which might be related to its lack of use.

Hamadeh et al. [43] studied knowledge concerning tobacco smoking and previous related behavior. It recruited 339 male attendees from tobacco cessation clinics from September 2015 to September 2016. Through quantitative analysis, it showed that individuals lack the appropriate understanding and knowledge concerning tobacco's hazardous effects. It proposed that policy initiatives at the national level should be introduced to reduce its adverse health consequences. The findings of this study lacked the factors that could help improve knowledge or reduce the

barriers to knowledge.

### **Health Concerns in Oman and Kuwait**

Mabry et al [44]. addressed the barriers and solutions related to the physical inactivity among adults in Oman. It collected data through semi-structured interviews from October 2011 to January 2012. The data were systematically analyzed using the ecological model of health behavior [45]. They found that interpersonal traits (e.g., awareness, motivation, and time), social (restricted outdoor activities and decreased value of physical activity), environment (inactive place, weather conditions), as well as policy (limited resources and inactive health communication), serve as barriers. Cultural sensitivity and policy interventions were identified as solutions. They suggested introducing gender-relevant health policy for addressing health concerns and barriers.

Al-Wahaibi and Zeka [46] evaluated how nearness to an industrial park (Sohar Industrial Zone) impacted an individual's health in Oman. They conducted an area-wide visit concerning acute respiratory diseases, asthma, dermatitis, and conjunctivitis and used generalized additive models based on age, gender, and socio-economic status. It showed that acute respiratory diseases risk increases with nearness to the industrial park, following asthma, conjunctivitis, and dermatitis. The findings identified a severe environmental health problem and recommended solutions, including a sustainable development policy.

Al Khamis [47] evaluated dental health and dental health interventions for pregnant women in Kuwait. The study incorporated a meta-analysis following a qualitative study and a randomized control trial. The findings were that dental treatment during pregnancy had no detrimental impact. At the same time, the results of their qualitative analysis showed that unhelpful cultural beliefs and unawareness concerning dental health evaluation impacted the treatment. The randomized control trial showed that women lacked motivation regarding seeking dental treatment during pregnancy.

Buabbas et al. [48] study assessed stakeholders' (physicians and patients, firm's policy developers, and technical infrastructure) readiness to adopt a telemedicine system. Using a mixed research design, they showed that telemedicine usage was related to patients being referred to medical providers who were overseas, and there were concerns related to confidentiality and privacy. The Kuwaiti physicians showed a willingness to adopt telemedicine system, although the present

information and communications technology infrastructure were lacking in Kuwait. It also suggests deploying different strategies for promoting trust as well as policies for using telemedicine systems.

### Health Concerns in Qatar and UAE

Alkuwari et al. [49] determined the influenza A/H1N1 vaccination rate that occurred at primary health care and emergency departments in Qatar. They studied 523 healthcare workers and found that only 13.4 percent of them were vaccinated. They identified that self-protective feelings and fears of adverse effects led to the rejection of the vaccine. They suggested that health authorities promote the benefits of the vaccine and how it helps to prevent influenza A/H1N1.

Another study by Al-Thani et al. [50] examined the oral health status as well as the preventive and curative needs of the children in Qatar. By analyzing the secondary data of six-year-old students from Qatar National Oral Health Survey, it showed that dental carries had an increased prevalence among girls as compared to boys. The odds for developing carries were high for the children from Qatar children in contrast to non-Qatari children. Overall, poor periodontal health conditions were found. Their study suggests that different strategies targeting the improvement of oral hygiene should be promoted.

Al-Jenaibi et al. [51] assessed the perception and knowledge concerning the government's services offered in Abu Dhabi. It used a face-to-face questionnaire for collecting data from 981 women. They found that the government provided improved and better services concerning education and educational training where equal employment opportunities are provided to both the genders. Their study highlights that women's employers must be encouraged to provide adequate, flexible, and favorable leaves of absence to ensure their work participation because of the high fertility rate in the region. Al-Jenaibi et al. also recommended creating favorable laws for promoting employee participation. The findings of their study provide crucial results that can be deployed using the protection mode theory.

## Discussion

PMT has been widely used in most of the western regions when investigating different health-related behaviors [52]. Several ecological studies have also used PMT to examine different

behaviors such as protection of human health, self-care, physical activity, protection and safety behaviors at work sites, safe computing practice behaviors, parental protective behaviors, alcohol consumption, and environmental hazard reduction [53-54]. The application of the PMT has been significant and effective among studies that were conducted concerning any of these topics.

### Implementation of PMT in GCC Countries

The application of the PMT in the present study is important to propose valuable findings with a more in-depth analysis of the problem. As evident from the above literature, the health, as well as the safety conditions of people living in GCC countries, are poor. One of the common reasons behind this is the lack of knowledge among the GCC's population. Al-Ghaith [14] investigated factors responsible for avoiding the use of antivirus software. Most of the mobile phone users lack the ability to take measures concerning the safety of their personal information that might be easily stolen through malware or data theft software. The problem is common in Saudi Arabia, giving credence to the idea that Saudi's are least concerned about their data safety. Another study conducted by Al Qahtani et al. [15] investigated the impact of fear on using the smart phone lock technology. Hamadeh et al. [43] also found similar issues related to health in a GCC country.

Moreover, Musaiger et al. [17] examined the dietary patterns of university students in Bahrain. Other studies were related to the health conditions of women in Bahra in focus on the difference between the original health status and perceived health status of the selected population. Shibani et al. [26]. determined the value of improved health and safety standards in the construction project management of the UAE. The primary focus related to the safety concerns of individuals working in the construction industries. According to Rogers [7], individuals that are fearful and knowledgeable about the expected outcomes are more likely to implement safety measures [7]. The factors that create a sense of positive motivation among individuals combine the six important elements of the theory, including response efficacy, perceived vulnerability, perceived severity, self-efficacy, response cost, and perceived reward. The above discussion of the literature studies indicates that the population of GCC countries are less concerned about their safety in multiple domains, be it the use of safety software, healthy diet or individual perceptions

about their health conditions. Under all these dimensions, people are less concerned about their safety that their negligence may create.

Other important notions are associated with the use of protection motivation theory in achieving the aim of this study. Most of the studies done in GCC countries lack the implementation of PMT in determining the safety issues, considerations, and preventive measures to refrain from individual safety hazards. These hazards might be in the form of health-related diseases such as cancer, or ineffective safety measures in an individual's employment, as discussed by Alrawahial [20] and Shibani et al. [26]. Other issues are associated with the individual's lack of ability to realize the impact of negligence, as discussed by Hadian and Abdullah [28]. These studies determine that people are less concerned about their safety and are ignorant towards factors such as perceived severity, perceived vulnerability, perceived reward, self-efficacy, etc. The implementation of PMT is itself a diverse area. Guo et al. [55] conducted a study to determine the individual's acceptance behavior of mobile health (m-health) services by applying PMT. Findings indicated that perceived vulnerability and self-efficacy were the significant factors that affected the acceptance of m-health among individuals with different genders and age groups.

In the view of Babazadeh et al. [56] and Ghahremani et al. [57], certain elements of the PMT are of ultimate value when predicting the preventive behaviors for chronic diseases such as cancer [58, 59]. Similarly, Milne et al. [52] conducted a meta-analysis of 65 PMT-based studies to examine 20 health-related behaviors. They found that PMT is of greater significance in creating a positive impact on behavior prediction [34]. Since the core aim of the theory itself is to determine the safety concerns of individuals at different dimensions, the use of PMT is effective in successfully gathering information regarding the safety concerns of individuals [58-60].

### **Effectiveness of Protection Motivation Theory in Broader Perspective**

PMT has shown its validity in several studies that were conducted on the idea of human safety, as Floyd et al. [61] indicated that PMT could be implemented to any threat that includes an effective response that can be carried out by any individual. The utilization of the PMT is more important when implied in the methodology of any study. For instance, Al-Ghaith

[14] developed a model by intervening some of the major components of PMT, including; response efficacy, response cost, perceived vulnerability, and self-efficacy. These variables were effective in developing useful findings related to the avoidance of the use of antivirus in mobile phones. Mac Donell et al. [62] on the other hand, evaluated the use of tobacco among Chinese youth. The study used a 21-item measurement scale for cigarette smoking by using the seven different parameters of the PMT, which included perceived threat, perceived reward, perceived efficacy, response efficacy, perceived costs, perceived severity, and response costs. The preceding constructions of the PMT were highly effective in measuring different parameters that were important about the increased usage of tobacco.

Determinants such as self-efficacy of an individual are important, as, in the view of Maddux and Roger's [63], self-efficacy serves as the most powerful tool in determining the behavioral intentions of any individual about a certain activity. They further indicated that it acts as an important factor that precedes the actual behavior of an individual. Paton [64] added that a robust self-efficacy is strong enough to stimulate the protective action of an individual in the required time frame. It further helps in influencing the degree of receptivity to any useful information, while promoting the individual likelihood for taking the effective preventive measures.

The findings of these studies are important since they propose the value of a problem and different factors associated with it. Most of the important findings of these studies relate to the safety concerns of individuals in different dimensions as determined using PMT. For instance, Musaiger et al. [17] conducted a study to determine the dietary patterns of university students of Bahrain. They found that most of the participants do not consume breakfast daily. Besides, most participants consumed large amounts of carbonated beverages and habitually spent most of their time in unhealthy activities such as watching TV, using their mobile phones, and surfing the internet, etc. Other than this, most of the female participants were more likely to go to sleep late, resulting in different health issues. Their study did not use the PMT, which makes it less competent in proposing important findings. A more detailed understanding of their results might be produced if they conducted their intervention using the framework of PMT. Different variables for self-efficacy, response efficacy, perceived vulnerability might be utilized to propose important recommendations. In addition,



these factors may be important to develop positive behavior among individuals regarding their health safety.

Malmir et al. [60] conducted a study to determine the impact of the educational intervention to reduce the prevalence ratio of cervical cancer by incorporating preventive measures through education. The study was quasi-experimental design, and participants were randomly divided into two groups. Participants were provided with a self-administered questionnaire based on the PMT constructs. Findings indicated that educational manipulation was significant in affecting the utilization of preventive measures for cervical cancer. Also, the average responses for perceived severity, perceived vulnerability, perceived rewards, self-efficacy, response efficacy, response cost, and protection motivation were obtained. From the above examples, PMT is of greater significance in proposing the valuable findings that are important in altering the individual's unhealthy and unsafe behavior.

The effectiveness of the PMT is not limited to a certain dimension or parameter. Rather it is the overall process that helps to develop the positive behavioral conditions among human beings. PMT, in a broader dimension, is valuable in proposing useful recommendations in any study. As in the case of the previously discussed study proposed by Malmir et al. [60], they recommended that educational intervention is important to develop positive habits among different individuals. It further indicated that educational intervention was effective in increasing the individual's intention for protection motivation. The idea is supported by other researchers such as Babazadeh et al. [56] Khiyali et al. [65], and Dehdari et al. [66]. The observations of the study further indicated that individuals were more motivated to control harmful behaviors. Also, it is important to develop a willingness to accept behavior modifications that are being recommended. In addition, individuals tend to consider a threat as harmful when they are highly aware of its potential ability for harm and its impact on their future. Other recommendations were proposed regarding the use of PMT in studies to develop positive changes in human safety behavior. In the case of the above study, PMT was effective in emphasizing the need for educational programs to prevent diseases.

The theory is also effective in proposing useful suggestions on the part of the clinical experts that are effective in controlling the development and high prevalence of disease. Different variables of the PMT help in formulating the coping appraisals, which are

connected to the idea that by undertaking the recommended behavior, one can remove the threat. It further enhances a sense of confidence in individuals that the recommended course of action will be successful in providing the desired results.

The above discussion clearly indicates the value of PMT when implemented in different conditions. The promotion of the PMT may help in developing a sense of self-efficacy among individuals leading towards avoiding hazardous conditions. The present study is limited since it covered the effectiveness of PMT from a general perspective.

Roger's protection motivation theory [7] serves as one of the important theories that have associations to health psychology. The fundamental aim of the theory is to improve the health and safety behaviors among individuals that are ignorant of the great impacts created by unhealthy or in effective everyday tasks. It is further important in justifying the cognitive mediation process of behavioral change among different individuals. This behavior change is developed through the individual's threat and coping appraisal. Gaston and Prapavessis [67] modified the PMT framework by including an implementation intention and the post-intentional process for a certain behavior. The post-intentional process helps in developing individual intentions to perform by the recommended response, whereas, implementation intention motivates one to switch from the conscious behavior to the effortful control of unhealthy activities [60]. Both the factors are important in improving the safety concerns among individuals by undertaking the recommendations. PMT, in its broader view, provides the real picture of the everyday activities that are risky and unsafe. It further enables individuals to acquire relevant knowledge that is important to reduce the functionality of different harmful conditions [68].

Components of the PMT are important in determining the value of certain behaviors; for instance, the perceived severity helps provide the individual an estimate about the severity of any disease or problem. Perceived vulnerability, on the other hand, helps in determining the approximate chances of developing a disease. These predictors are important in influencing the intention of individual behavioral performance. Thus, the present study recommends that individuals' lack of safety concerns about different dimensions, such as health, technological usage, work place activities, etc. must be taken seriously to reduce the problems associated with individual safety concerns. This study further recommends developing an awareness campaign to

stimulate a sense of perceived severity, perceived vulnerability, response efficacy, and self-efficacy among people leading towards the development of individual self-care habits. It is important to conduct the studies by using PMT to emphasize the value of developing positive behavioral constructs. The utilization of the theory is vital in developing behavioral changes that promote health and safety.

## Conflict of Interest

The author states no conflict of interest.

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