We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

4,800
Open access books available

122,000
International authors and editors

135M
Downloads

Our authors are among the

154
Countries delivered to

TOP 1%
most cited scientists

12.2%
Contributors from top 500 universities

CLARIVATE ANALYTICS BOOK CITATION INDEX INDEXED

WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com

Chapter 16

A New Behavioral Model (Health Belief Model Combined with Two Fear Models): Design, Evaluation and Path Analysis of the Role of Variables in Maintaining Behavior

Alireza Shahab Jahanlou, Masoud Lotfizade and Nader Alishan Karami

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/52966

1. Introduction

With the increased pace of industrialization and higher life expectancy in the present century, lifestyles across the world have changed significantly. Some of these changes include changes in the pattern of diseases and prevalence of chronic diseases, such as diabetes (Narayan et al., 2000). Diabetes is one of the most prevalent noninfectious diseases in the world that affects approximately 6% of the world population (Task Force on Community Preventive, 2002). The prevalence of this condition is at the epidemic level in locations where obesity and inactive lifestyles prevail (Campbell, 2001). Diabetes has several side effects, including retinopathy, renal diseases, neuropathy and critical metabolic disorders (Alavi et al., 2007) and is also recognized as an important and costly health problem both for the patients and for the healthcare systems. Diabetes may also cause irreparable harms such as lost life, amputation, blindness, kidney failure and lost working days which, together with their associated costs, can be avoided through blood sugar level monitoring (Clarke et al., 2002). Patient training is the best method for achieving this goal.

According to the World Health Organization, patient training is the best method to monitor blood sugar level in diabetic patients. WHO, however, reported that ordinary people, healthcare staff and policy makers are inadequately educated and knowledgeable about noninfectious diseases and their associated risk factors (Group, 1997). Diabetic patients as well need guidance to acquire new skills and change their lifestyles so that they can acquire the required attitude and functioning for the control of their blood sugar (Jahanlou et al., 2010). Diabetes management primarily depends on the behavior and self-care of the patient (Clarke et al., 2002). Studies show that there is a gap between what patients actually do and

what they actually need to do to control their diabetes (Kamel et al., 1999). Patient training is shown to have a positive effect on enhancing the knowledge, attitude and performance of patients. Patient willingness and ability to learn depends on their needs and personal beliefs and the presented training can be effective only if the target audience is willing to learn (DeWalt et al., 2007).

2. An overview of behavior training models

Today various models are used to train diabetic patients and make a change in their behaviors so that through acquiring new skills and controlling their blood sugar level they can prevent or delay the side effects of diabetes (Sarkar et al., 2006). Common models and theories include *Health Belief Model*, *Social Behavior Model*. These training models and theories support the basic knowledge about the effective environmental and psychological mechanisms of the patients for acceptance and following of appropriate behaviors which may ameliorate the short-term and long-term effects of diabetes and provide instructions for researchers to develop appropriate training approaches. These instructions greatly enhance acceptance and following of appropriate behaviors (such as nutrition regiment) and eventually lead to the long-term control of blood sugar level in diabetic patients (Campbell, 2001). The authors attempt to develop a model to improve training intervention in diabetic patients and decrease related costs through existing training models or their combination. To create a new model, the developers need to be knowledgeable in the field.

In the present chapter, we introduce an extended training model based on *Health Belief Model* and two models of fear. We have chosen to combine these two models because previous studies have shown no distinction between perceived threat and fear. Health belief model is a behavior prediction model which involves no intervention. Nevertheless, most researchers after using this model and identifying its constructs, such as perceived threat or perceived barriers, attempt to develop an intervention for behavior change in patients. Most studies utilize perceived threat to design the intervention while failing to distinguish between perceived threat and fear arousal. Through making a distinction between perceived threat and fear arousal we attempt to develop a model to help design the appropriate intervention for behavior change in diabetic patients. Among various models of fear, we came to find those of Leventhal and Ruiter to be more suitable for our new model based on health belief. In the last section of this chapter, you will be introduced to how to measure the effect of model components on the behavior change using path analysis.

3. Health belief model

3.1. History

The Health Belief model was first proposed and developed by Godfery Hochbaum, Stephan Kegels and Irwin Rosenstock. This model was initially developed as a structural style for the expression and prediction of health and preventive behaviors (Campbell, 2001). The model underwent modifications in 1977 by Baker et al. and more in 1982 by -Pender (Figure 1).

The different constructs of the model include perceived benefits, perceived barriers, perceived susceptibility and perceived seriousness to be later joined by self-efficacy and guidance for practice.

The early studies using this model included preventive programs for oral and dental diseases, polio and timely identification of uterus cancer (Glanz et al., 1997).

The ground for utilizing this model in the study was denial of health problems by ordinary people and explaining the behavior in individuals who acquitted themselves of any health problems. Further studies concentrated on a wider range of areas, including the study of short-term and long-term health behaviors (including sexual behaviors and AIDS) (Campbell, 2001). PubMed has indexed approximately 1100 academic papers on health belief model to date.

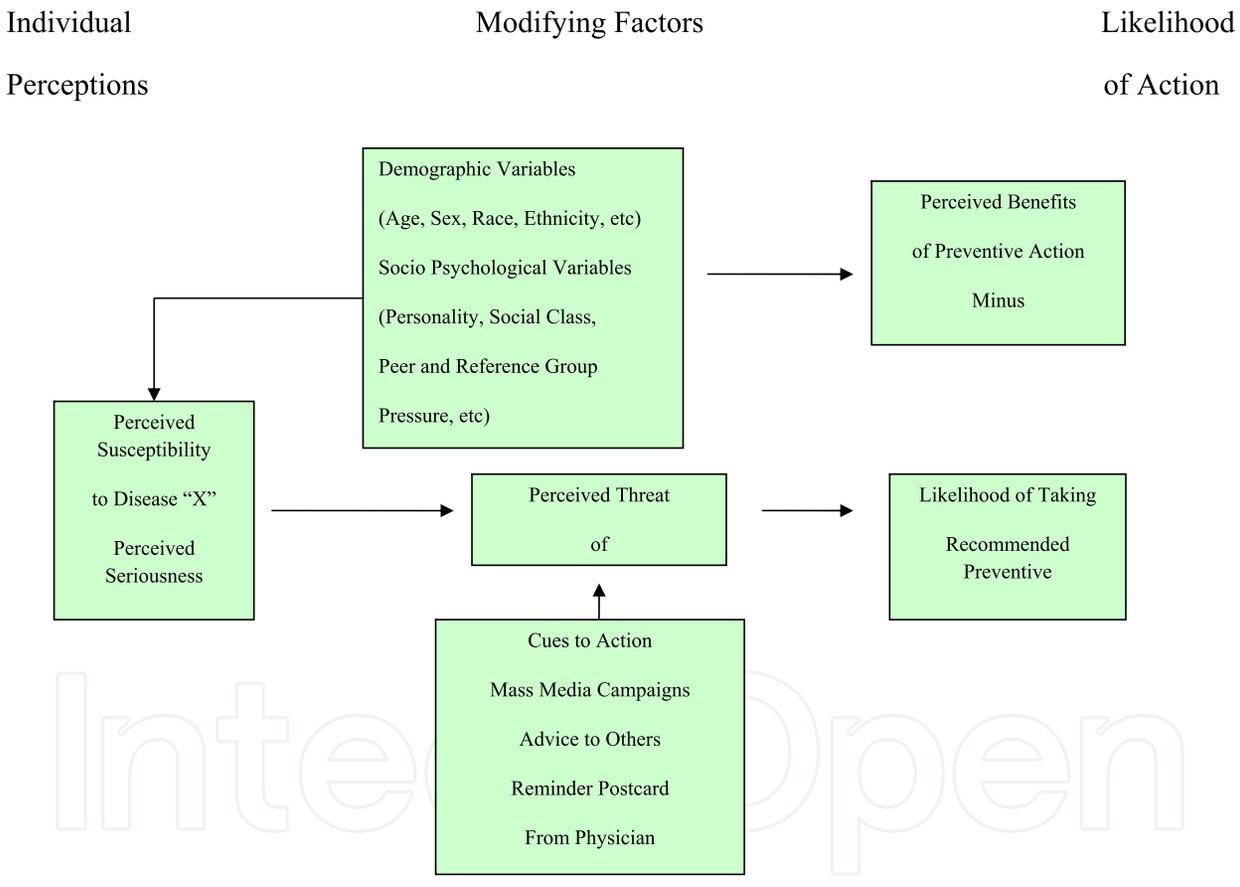


Figure 1. The Health Belief Model (Becker Mh: The Health Belief Model and sick role behavior. In Becker Mh (Ed): The Health Belief Model and Personal Health Behavior, P 89 .Thorrofare, New Jersey, Charles B Slack, (1974) *Fear Drive Model*

This model was first introduced by Leventhal et al in 1983 (Figure 2). This model is based on the assumption that knowledge and understanding are not adequate for creating behavior change in health matters and a feeling of fear is required and essential. Fear is a stimulating factor that causes change in health behaviors or early practices. This model includes several stages. At first, the individual receives a signal of fear, as in the form of pain or a defective

stimulus, which is then followed by an emotional reaction (usually fear). Then the individual experiences a disturbing point in the fear (usually anxiety). This stimulus functions as a change in the individual's lifestyle routine.

Fear Drive model suggests that fear can be utilized as a behavior change agent. In addition, levels of fear are associated with change of behavior. For instance, after learning about the death of their aerobic fellows, overweight middle aged individuals decided to quit this exercise, which shows a change of behavior due to fear (Leventhal et al., 1983).(Figure 2).

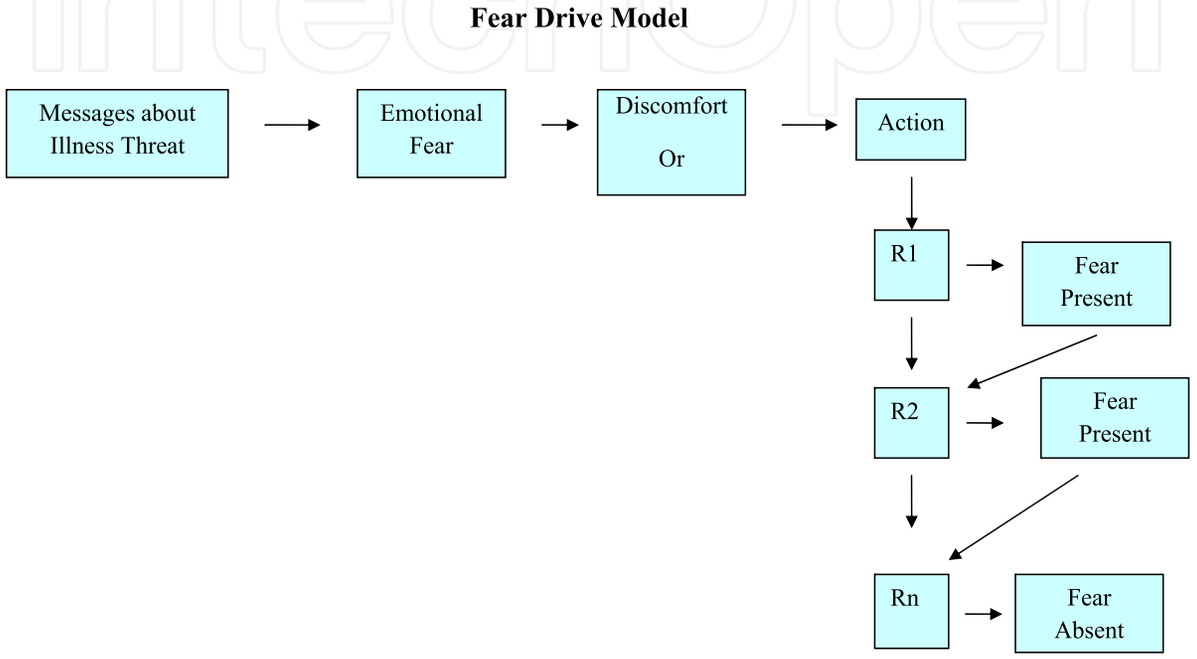


Figure 2. The Fear Drive Model. (Leventhal H, Safer M, Panagis D: The impact of communications on the self – regulation of health beliefs, decisions, and behavior Health Educ Q 10(1):7, 1983

3.2. Fear model

Inspired by earlier studies on fear, Rob Ruiter first introduced this model in 2001. In this model, the effect of fear arousal on perceived threat is identified. Fear arousal causes an individual to look for new information in order to control his fear. Eventually, through analysis of previous and new information the individual reaches an understanding that endows him with the adequate energy to change his behavior (Ruiter et al., 2001). (Figure 3).

3.3. How did the model evolve?

Previous studies on health belief model show that researchers' concentration on one construct and their attempt to combine perceived threat with perceived barriers and perceived benefits into a health motto leads to different expressions of the signal. This model in fact is a prediction model for behavior and includes no construct to receive intervention for. However, researchers consider a construct with the highest effect on the target population and design an intervention accordingly. For instance, Terry et al. showed that an individual would accept a health behavior if felt threatened by a disease.

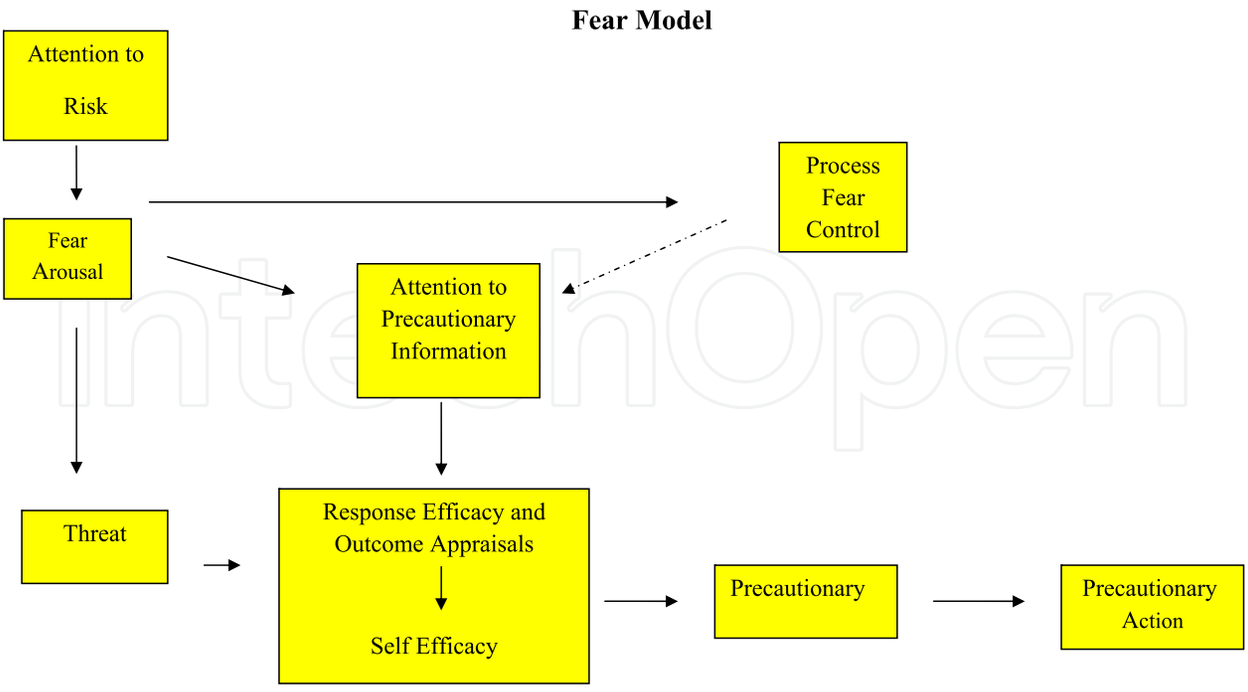


Figure 3. Ruiter RAC, Abraham C, Kok G. Scary warnings and rational precautions: a review of the psychology of fear appeals. Psychol Health 2001;16:613.

A study by Latoya et al. involved Spanish female patients with breast cancer and cervical cancer. Cancer monitoring barriers in Spanish women included a fear of cancer, deterministic judgments on cancer and a culture of self-consciousness. Perceived benefits had the lowest variance among the constructs of the model.

The study showed that cancer monitoring barriers occurred due to a fear of cancer and not the perceived threat by cancer. Of course, the researchers had used the model only as a predictor for the failure to monitor breast and cervical cancer. Latoya found a relationship between perceived benefits and acceptance of treatment program in diabetic patients (Austin et al., 2002). Bond found perceived benefits have a relationship with acceptance of treatment program by diabetic patients (Bond et al., 1992).

However, Ganz et al. and Harris et al. declared perceived barriers and perceived threat as having the strongest and weakest, respectively, predictors. In general, studies using the health belief model for diabetic patients show that priority is given foremost to perceived benefits and next to perceived susceptibility and perceived barriers, in that order, for adopting different behaviors. Perceived seriousness has been shown to have a mediocre effect (Jahanlou et al., 2008).

The foregoing models cannot adequately capture the distinction between affective (emotional) reactions, such as fear arousal, and cognitive reactions such as perceived threat against the impact of fear. In addition, there is yet to be a clear method in using the threat factor in control or induction of fear. There is a hazy intermediate state between fear arousal and perceived threat. The distinction between fear arousal as an emotional state and perceived threat as a cognitive state which is a reaction to fear arousal is not observable and existing models fail to support them (Leventhal et al., 1983).

Most studies based on the fear model show that another difference lies in subject learning which varies according to human conditions and states of the individual. Of course, the results are rather mixed (Witte, 1992) which could be attributed to the differences in measurement scales.

In this section we present the results of studies conducted on fear over the past 60 years to find the differences in these studies.

Janis and Feshback found tremendous changes in attitudes and behaviors associated to oral health in a group of high school students exposed to highly fearful messages. However, these results were not replicated in other experiments (Leventhal et al., 1983). In their study on weight loss, Wilson, Kincey, Ley and Bradshaw found that initiating and maintaining these behaviors over time was challenging. However, Clive et al. did not find any significant relationship between fear arousal and weight loss (Ishizaki et al., 2004). Lanyon et al. examined various fear measurement scales and found that paper-and-pencil self-report may reveal fear behavior in real situations (Lanyon and Manosevitz, 1966). Roland et al. showed that self-report has the highest sensitivity to the fear construct among various similar measurement scales. The most common way for fear arousal is through showing horror films which has a constant effect on measuring fear through paper-and-pencil self-reporting. These data support the validity of self-reporting fear and increase our confidence in fear arousal in various studies (Rogers and Mewborn, 1976). Beck and Davis in their study of smokers and non-smokers showed that attitude change in smokers is higher than in non-smokers and that greater fear leads to greater change in attitude (Montazeri and McEwen, 1997).

In a study on 220 female volunteers, Skilbeck et al. examined the effect of fear arousal, fear situation and exposure to fear on adopting a diet regiment in female participants with 10% overweight. They found that mild fear arousal had a better effect on the participants and that individuals exposed to a single fear-inducing message appear better than those receiving multiple fear-inducing messages (Bond et al., 1992). In a similar research, Sutton et al. studied two smoker groups in which one group was exposed to a film on the harmful effects of smoking and the other group watching a health-related film. The results showed that the film group received an instant effect which was followed by a rapid change of behavior in individuals. Likewise, Montazari (1997) found that smoking individuals preferred fear-inducing anti-tobacco advertisements (Koszegi, 2003). Tatsuro et al. studied individuals referring to ambulatory treatment division of a hospital where a SARS patient had been hospitalized. The results showed a 20% drop in visiting rate for individuals who observed the patient (Witte, 1992).

Werrij conducted a study on the effect of threat information in 2003. He found a significant relationship between threat information and fear and risk control. An individual holding the thought about breast cancer can be regarded as using a fear control measure which eventually decreases the feeling of fear in the patient. In addition, threat information can create an incentive for the patient to perform monthly breast cancer self-assessment. Werrij

showed that threat information can moderate and balance individual's belief on their ability to fight the perceived threat. Although threat information may have a positive relationship with fear control, it shows lower effect compared to risk control. Werrij proposed that individuals need to be convinced without resort to threat information to adapt with health promotion behaviors (Ruiter et al., 2003).

The years from 1980 through 1990 mark the peak time when mass media campaigns inducing fear to change behavior were used, such as using the devil or tombstone images in anti-AIDS campaigns. The effectiveness of these advertisements is doubtful and even a review of interventions used in the related studies show that fear arousal and perceived threat were not clearly distinguished in those studies (Witte, 1992).

Hirschorn asserted that controlling the feelings rising from fear is a pivotal factor in social and health care. These feelings include a set of emotional states that are directed towards different behaviors. Thamson believed those individuals' reactions to fear depended on their understanding of fear arousal while Zagone believed that individual experiences of various fearful situations underlie the main reason for reaction to fear in different situations.

The foregoing studies show that even research on fear has failed to make a clear distinction between fear and perceived threat. Threat is in fact an external stimulus that develops from a message or an environment for the individual even if the individual knows it. If an individual comes to the understanding that he is subject to a threat we say the individual has perceived the threat (Campbell, 2001); but perception of the threat does not necessarily lead to fear. However, fear is an inner emotional reaction which includes both psychological and physiological components (Andersen and Guerrero, 1998). In other words, it is a reaction in a person following an experience or feeling of fearful and horrific content, situation or state(Campbell, 2001) , *(Jahanlou et al., 2008).*

Thus some studies purportedly on the fear of presented messages are in fact studies on perceived threats for the patient. For instance, in Montazari's study, health information on smoking was a perceived threat while the training film on lung cancer produced a type of fear arousal. Ruiter emphatically noted that on some occasions the border between fear arousal and perceived threat is not that clear (Ruiter et al., 2003).

In light of the foregoing discussion, we can see in Figure 4 that in the extended health model and the combined two fear models, the fear arousal box is positioned in the model in a way that has an effect both on perceived threat and on attention to precautionary information.

In order to apply the fear arousal model on patients, we needed different types of patient information. Therefore, we used 11 standardized questionnaires to collect various types of data on patient variables.

The preliminary results of our study showed that diabetic patients have very low information about threat perception of the disease. Fear assessment of these patients of the disease and its side effects (measured by a standard fear assessment scale) showed that patients had very low fear of the side effects of this disease. Next, we planned for fear arousal in these patients through presentation of frightening photos of diabetic feet (Figure 8) accompanied by related health information.

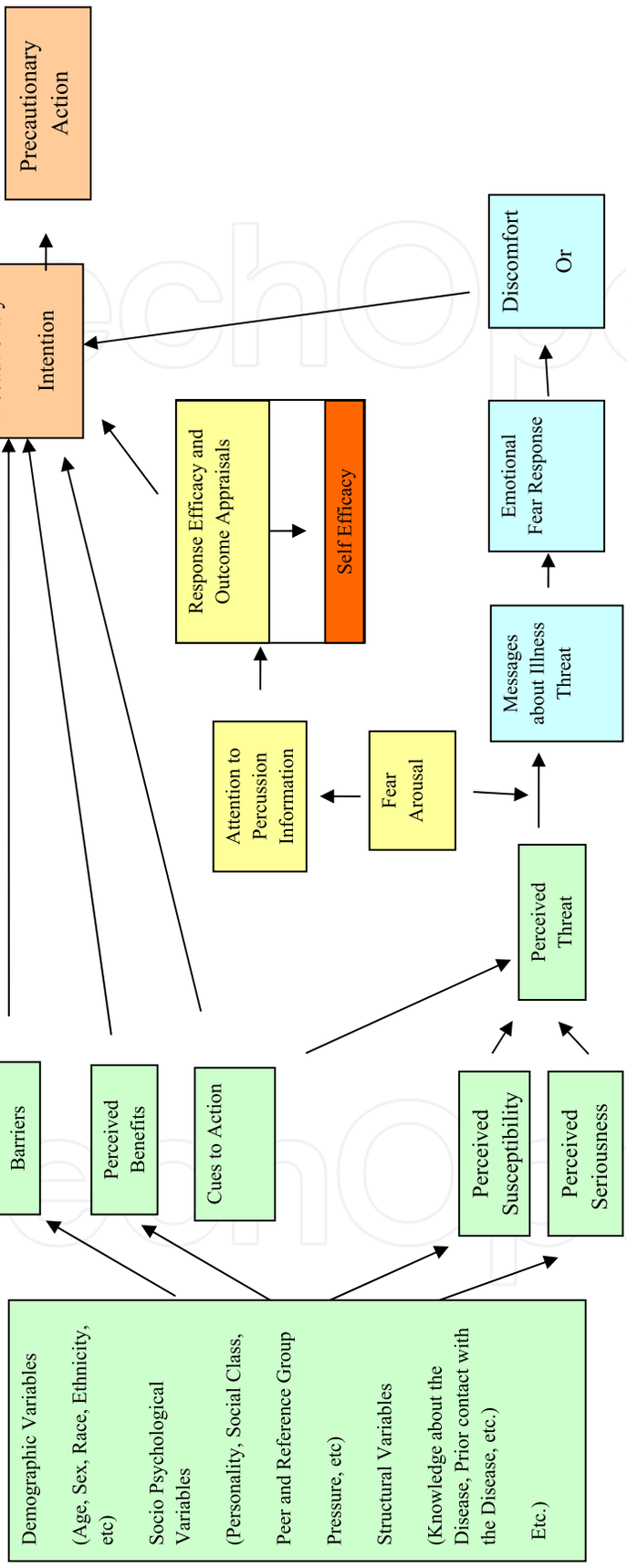


Figure 4. Expanded Health Belief Model Combined with Fear Drive Model & Fear Model

As Figure 2 represents, in this situation patients enter Leventhal's Fear Drive model and express en emotional response to fear, which develops into discomfort and tension in patients. Eventually, through the Leventhal's model patients are directed to precautionary action.

In addition, fear arousal in patients sensitized them to precautionary information, which is the same path predicted in Leventhal's model. Thus patients are placed in both Leventhal's and Ruiter's fear models. In other words, the emotional response of fear in patients leads them to response efficacy and outcome appraisal. The results show that self-efficacy in patient's increases and leads to precaution alongside discomfort or tension. These factors are eventually tantamount to precautionary action in patient.

Intended fear level in patients was set at moderate to be comparable with other studies. Fear inducement method and message type selection were inspired by previous studies using video and specific advertisements.

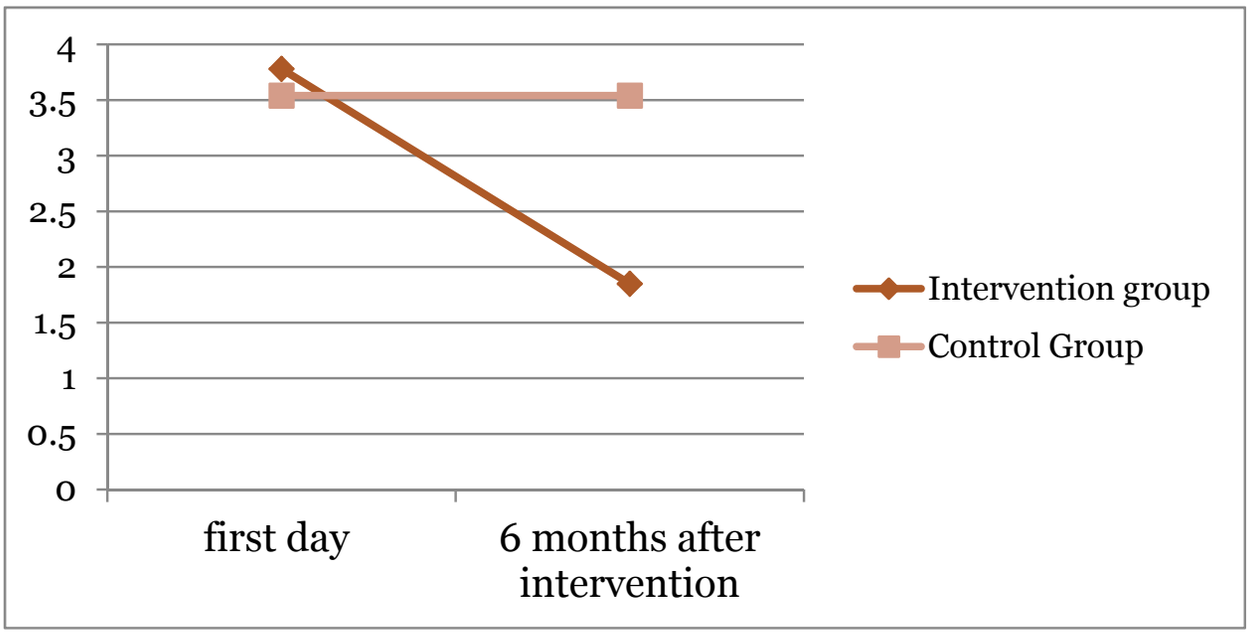
The results showed that 100% of diabetic patients who underwent this training model showed a significant behavior change in blood sugar control six months after the intervention. On average, patients cut down on two pills. In addition, 30% of Type II diabetes stopped using insulin and resorted only to diet and exercise to control their blood sugar. The mean number of pills in the intervention group was 3.78 at the outset, which decreased to 1.86 in six months after the intervention, which was a significant change. However, the medication in the control group increased in three months mainly due to failure to control their blood sugar. The mean level of HbA1c hemoglobin at the outset was 8.8 which decreased to 6.23 in six months with a concomitant decrease in their medication from an average number of 3.78 pills to 1.85 (mean: 1.93 pills). Moreover, insulin treatment was ceased in 30% of experimental patients. The initial average HbA1c hemoglobin in the control group was 8.2 which decreased to 7.81, which was not statistically significant though. However, the medication level in the control group significantly decreased six months after the intervention. In the intervention group, the average insulin dosage decreased from 63 units to 27.5 units within six months of the treatment, which is a significant change. However, no significant similar change was observed in the control group.(Graph1-2)

The foregoing results suggest that the new combined model intervention, consisting of three models, had a positive effect on behavior change in diabetic patients within six months of the intervention. In addition, using a stepwise multiple regression analysis we could obtain a formula to predict the effect of various variables on behavior change.

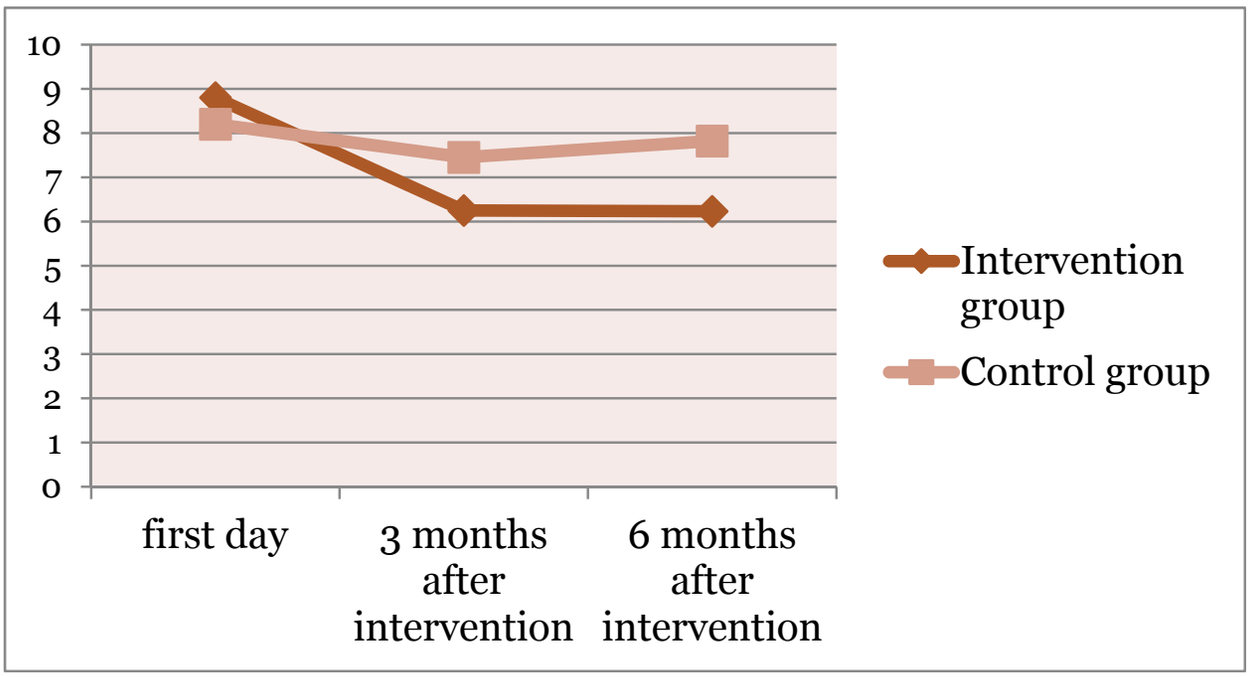
3.4. Resultant variables in the final model and their weights

After the intervention based on fear arousal , we selected 9 variables includes Health Belief Model's dimensions , knowledge and attitude, Outcome Appraisals, Response Efficacy, self-efficacy, intention, behavior maintenance, duration of affection, and satisfaction from treatment were selected to be assessed by Path Analysis method. In terms of theoretical aspects, Precautionary Intention and behavior maintenance, and in terms of practical aspects, the rate of HbAc1 were used. Five different data entry methods for the Path Analysis have been discussed in the next pages. In this part, it is intended to find the maximum association

between the constructs by including or excluding a variable. Numbers on the fletchers demonstrate the Beta value, and all the associations are significant (Figure 5-9)



Graph 1. Mean of Metformin pills consumption by 2 groups of patients in the first day of survey and 6 months after intervention



Graph 2. Mean Hba1c in 3 times: First day of the survey, 3 months after intervention, and 6 months after intervention

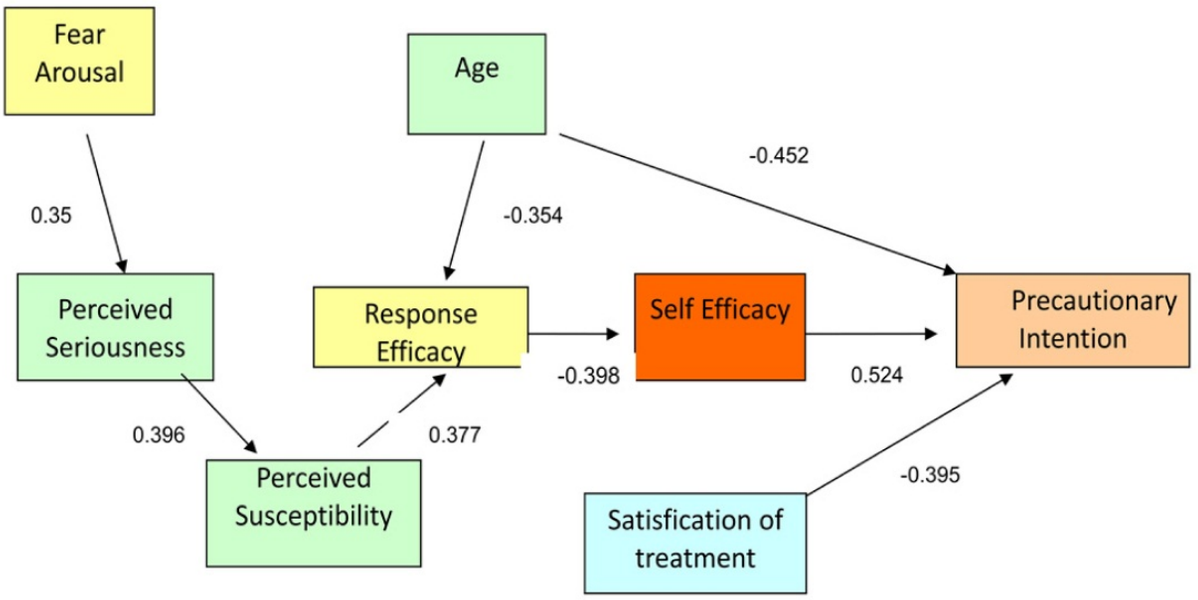


Figure 5. Path analysis for precautionary Intention based on: age, duration of diabetes, perceived benefits, perceived barriers, perceived seriousness, perceived susceptibility, response efficacy, self efficacy, satisfaction of treatment after itervention and fear arousal

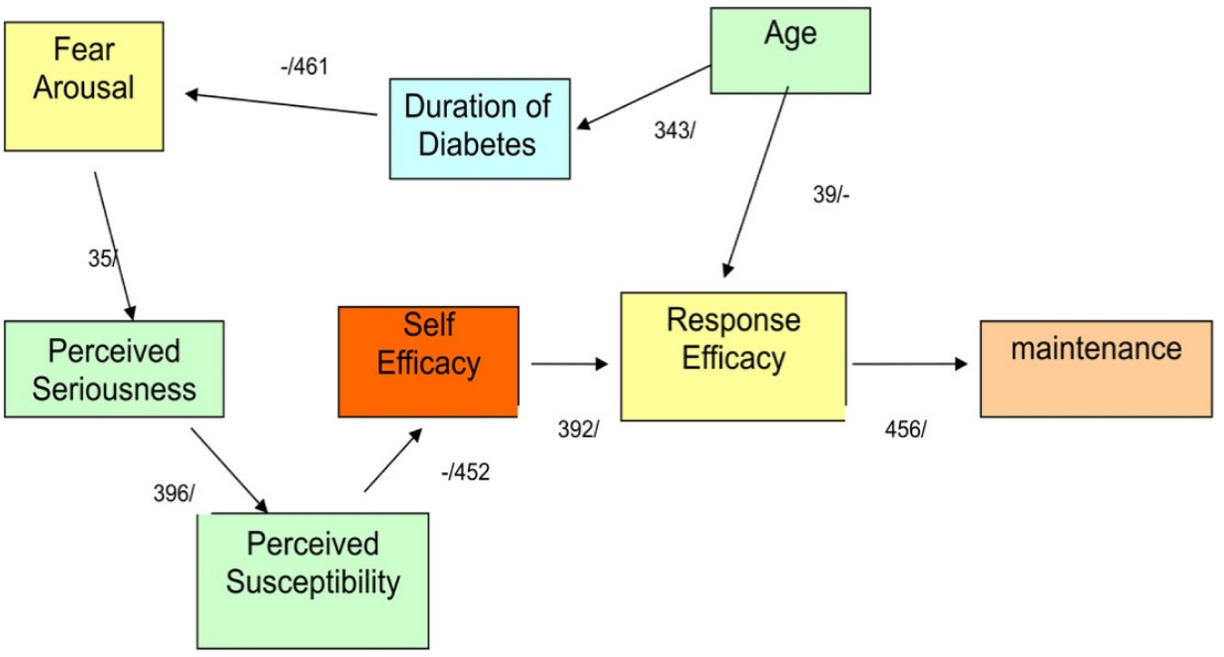


Figure 6. Path analysis for Behavioral Maintenance based on: age, duration of diabetes, perceived benefits, perceived barriers, perceived seriousness, perceived susceptibility, response efficacy, self efficacy, satisfaction of treatment after intervention and fear arousal

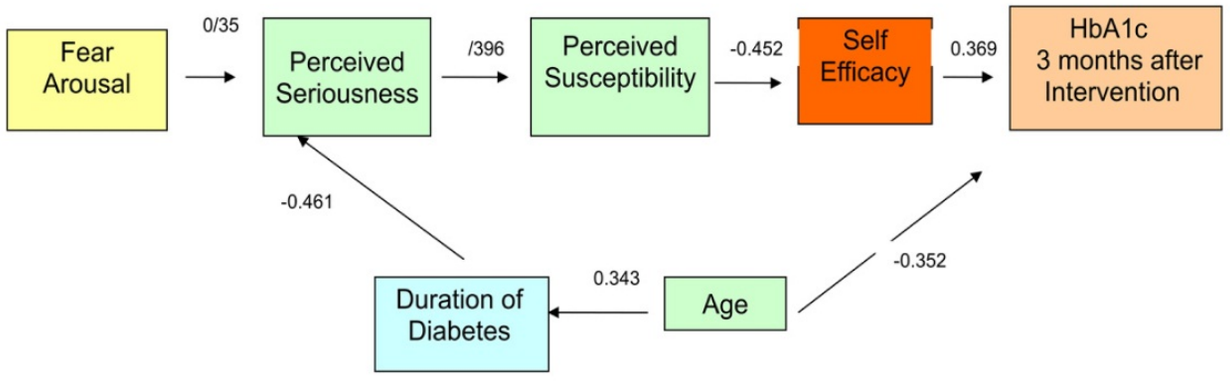


Figure 7. Path analysis for Behavioral Maintenance based on HbA1c 3 months after intervention: variables including age, duration of diabetes, perceived benefits, perceived barriers, perceived seriousness, perceived susceptibility, self efficacy, satisfaction of treatment , Knowledge, fear arousal after intervention and fear arousal

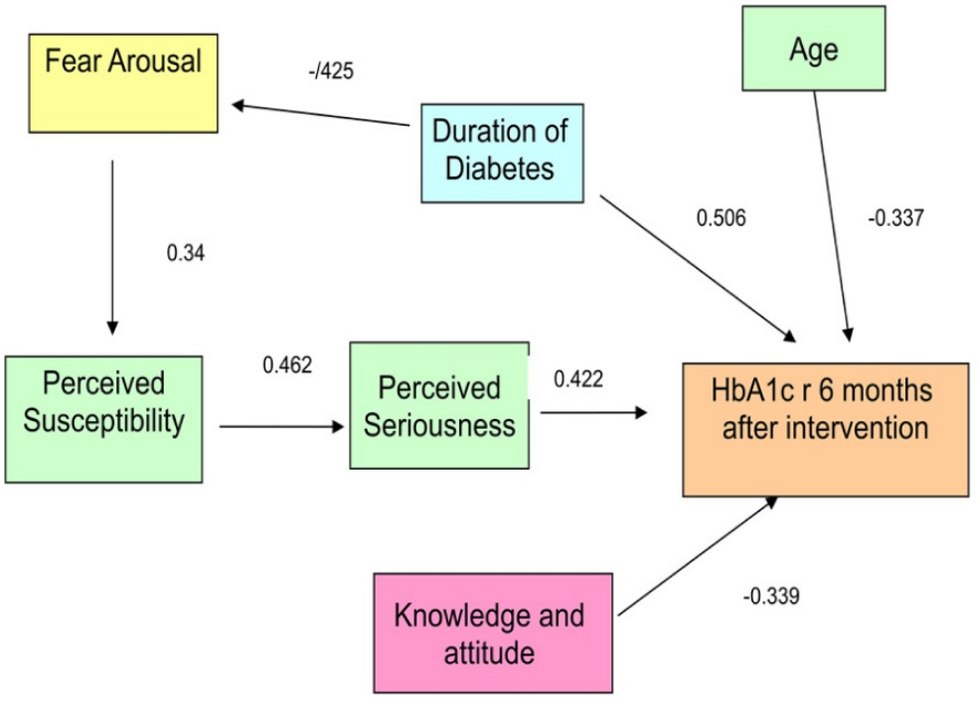


Figure 8. Path analysis for Behavioral Maintenance based on HbA1c 6 months after intervention: include 10 variables age, duration of diabetes, perceived benefits, perceived barriers, perceived seriousness, perceived susceptibility, self efficacy, satisfaction of treatment , Knowledge, fear arousal after intervention and fear arousal

After the completion of the research, which took one year, we used a path analysis to specify the role of 13 variables in maintaining behavior(Figure 9). The variables included patient age, duration of diabetes, treatment satisfaction, perceived benefits after intervention, perceived barriers after intervention, perceived susceptibility after intervention, , self-efficacy, and knowledge after intervention, fear arousal, response efficacy, and intention. In

the following section, we discuss each of the foregoing variables in the final model and specify their values on the basis of the model.

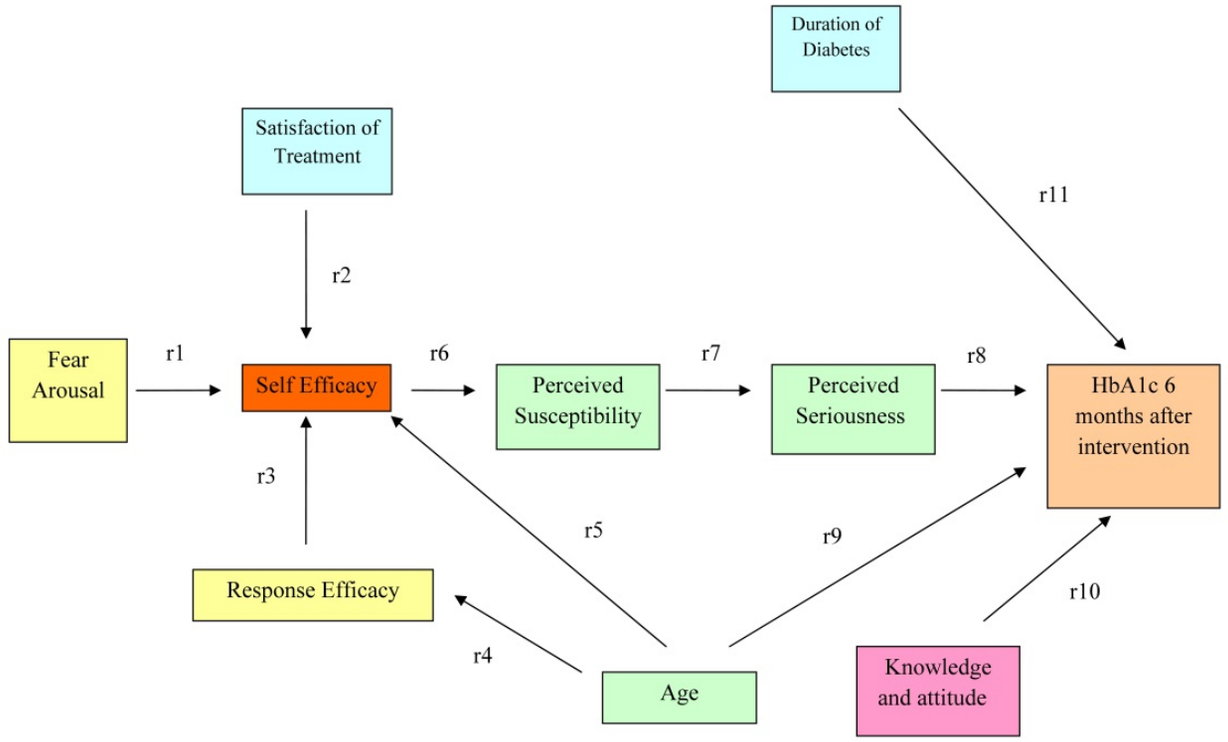


Figure 9. Path analysis for Behavioral Maintenance based on Hba1c 6 months after intervention: include 13 variables (age, duration of diabetes, perceived benefits, perceived barriers, perceived seriousness, perceived susceptibility, self efficacy, satisfaction of treatment , Knowledge, fear arousal , intention, behavioral maintenance, response efficacy after intervention and fear arousal)

According to the results of the path analysis and the initial model which was based on theoretical studies, we can observe that the principal form of the model consists of nine variables on behavior maintenance within six months of the study.

1. *Fear arousal*: This variable had a negative and direct effect on self-efficacy. We label this variable x1 and attach a value of e1 to it. This is an independent variable which is not affected by any other variable. The value of this variable is x1 = e1.
2. *Treatment satisfaction*: This variable had a positive and direct effect on self-efficacy. We label this variable x2 and assign a value of e2 to it. This is an independent variable which is not affected by any other variable. The value of this variable is x2 = e2.
3. *Response efficacy*: This variable, which is affected by age, had a positive and direct effect on self-efficacy. We label this variable x3 and attach a value of e3 to it. The value of this variable is x3 = e3+ [r4*X5].
4. *Self-efficacy*: This variable is affected by treatment satisfaction, fear arousal, age and response efficacy. We label this variable x4 and attach a value of e4 to it. The value of this variable is X4=e4+{[r1*X1]+[r2*X2]+[r3*X3]+[r5*X5}
5. *Age*: This variable, which was produced in the final model [Figure 5 in path analysis], had direct effect on self-efficacy, negative and direct effect on response efficacy and negative and direct effect on blood sugar control. We name this variable x 5 and give it

a value of e5. This is an independent variable which is not affected by any other variable. The value of this variable is x5 = e5.

6. *Perceived susceptibility*: This variable had a positive and direct effect on perceived seriousness. We label this variable x6 and assign a value of e6 to it. The value of this variable is x6 = e6+ [r6*X4].
7. *Perceived seriousness*: This variable had negative and direct effect on blood sugar control within six months of the treatment. We label this variable x7 and give it a value of e7. The value of this variable is x7 = e7+ [r7*X6].
8. *Knowledge*: This variable had positive and direct effect on blood sugar control within six months of the treatment. We label this variable x8 and give it a value of e8. This is an independent variable which is not affected by any other variable. The value of this variable is x8=e8.
9. *Duration of disease*: This variable had positive and direct effect on blood sugar control within six months of the treatment. We label this variable x9 and give it a value of e9. This is an independent variable which is not affected by any other variable. The value of this variable is x9=e9.
10. *Behavior maintenance*: This variable was affected by disease length, knowledge, patient age and perceived seriousness. We call this variable x10 and compute it as below:

$$X10= [[r9* X5] + [r8* X7] + [r10*X8] + [r11*X9]]$$

We also learn that fear arousing messages had a significant effect on behavior change, especially when they are accompanied by effective solutions, recommendations and methods (Witte et al., 2001).

4. Conclusion

With regard to the topics discussed earlier we showed that the fear box, which acts bilaterally, actually play the role of a relational bridge between the 3 models. In fact, the differentiation between fear and threat was clarified in this way in the new model. After examining the new model in practice (our study) and considering the previous studies, we can conclude that an average level fear can pave the ground for the patients to make the best decision for glycemic control.

In our study, we did not arouse a high level fear in our cases because 1)its effect disappears in the long run and/or 2) it may disappoint the hopes of patients for treatment.

Recommendations

Researchers are recommended to use the model for other chronic disorders too. Before intervention, the researcher should carefully evaluate their patients by the use of standardized questionnaires like WHOQOL, self-efficacy, self-care, self-management and etc. They should plan for fear arousal and be well prepared for proper response to patients' reactions seeking for precautionary information. After fear arousal it is better to provide the patients with the educational material he/she needs for controlling the aroused fear.

The researchers are also recommended to arrange the 2nd visit one week after fear arousal to fully meet the patient's information needs. Because during this week, the patients may receive inappropriate information which need to be corrected.

Author details

Alireza Shahab Jahanlou *
Health Education Unit, Cardiovascular Research Center,
Hormozgan University of Medical Sciences, Iran

Masoud Lotfizade
Public Healt Department, Shahre Kord University of Medical Sciences, Iran

Nader Alishan Karami
Healt Information Management Department, Hormozgan University of Medical Sciences, Iran

5. References

Alavi, N. M., Ghofranipour, F., Ahmadi, F. & Emami, A. 2007. Developing a culturally valid and reliable quality of life questionnaire for diabetes mellitus. *Eastern Mediterranean Health Journal,* 13.

Andersen, P. A. & Guerrero, L. K. 1998. *Handbook of communication and emotion : research, theory, applications, and contexts,* San Diego, Academic Press.

Austin, L. T., Ahmad, F., Mcnally, M. J. & Stewart, D. E. 2002. Breast and cervical cancer screening in Hispanic women: A literature review using the health belief model. *Womens Health Issues,* 12.

Bond, G. G., Aiken, L. S. & Somerville, S. C. 1992. The health belief model and adolescents with insulin-dependent diabetes mellitus. *Health psychology : official journal of the Division of Health Psychology, American Psychological Association,* 11.

Campbell, C. 2001. *Health Education Behavior Models and Theories-- A Review of the Literature - Part I* [Online]. Mississippi State University. Available: URL: http://msucares.com/health/health/appa1.htm [Accessed 2nd September 2012].

Clarke, J., Crawford, A. & Nash, D. B. 2002. Evaluation of a comprehensive diabetes disease management program: progress in the struggle for sustained behavior change. *Disease Management,* 5, 10.

Dewalt, D. A., Boone, R. S. & Pignone, M. P. 2007. Literacy and its relationship with self-efficacy, trust, and participation in medical decision making. *American Journal of Health Behavior,* 31.

Glanz, K., Lewis, F. M. & Rimer, B. K. 1997. *Health behavior and health education : theory, research, and practice,* San Francisco, Jossey-Bass.

Group, W. 1997. *Whoqol: measuring quality of life* [Online]. World Health Organization. [Accessed 2nd September 2012].

* Corresponding Author

Ishizaki, T., Imanaka, Y., Hirose, M., Hayashida, K., Kizu, M., Inoue, A. & Sugie, S. 2004. Estimation of the impact of providing outpatients with information about SARS infection control on their intention of outpatient visit. *Health Policy,* 69.

Jahanlou, A. S., Ghofranipour, F., Sobhani, A., Kimmiagar, M. & Vafaei, M. 2008. Evaluating curvilinear hypothesis in quality of life and glycemic control in diabetic patients. *Arak University of Medical Sciences Journal,* 11, 27-34.

Jahanlou, A. S., Sobhani, A. & Alishan, N. 2010. A comparison of two standard quality of life questionnaires for evaluation of the relationship between personality characteristics and glycemic control in diabetic patients. *Arak University of Medical Sciences Journal,* 13, 28-34.

Kamel, N. M., Badawy, Y. A., El-Zeiny, N. A. & Merdan, I. A. 1999. Sociodemographic determinants of management behaviour of diabetic patients. Part I. Behaviour of patients in relation to management of their disease. *Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-ṣiḥḥiyah li-sharq al-mutawassiṭ,* 5.

Koszegi, B. 2003. Health anxiety and patient behavior. *Journal of Health Economics,* 22.

Lanyon, R. I. & Manosevitz, M. 1966. Validity of self-reported fear. *Behaviour research and therapy,* 4.

Leventhal, H., Safer, M. A. & Panagis, D. M. 1983. The impact of communications on the self-regulation of health beliefs, decisions, and behavior. *Health education quarterly,* 10.

Montazeri, A. & Mcewen, J. 1997. Effective communication: Perception of two anti-smoking advertisements. *Patient Education and Counseling,* 30.

Narayan, K. M. V., Gregg, E. W., Fagot-Campagna, A., Engelgau, M. M. & Vinicor, F. 2000. Diabetes - a common, growing, serious, costly, and potentially preventable public health problem. *Diabetes Research and Clinical Practice,* 50.

Rogers, R. W. & Mewborn, C. R. 1976. Fear appeals and attitude change: effects of a threat's noxiousness, probability of occurrence, and the efficacy of coping responses. *Journal of personality and social psychology,* 34.

Ruiter, R. A. C., Abraham, C. & Kok, G. 2001. Scary warnings and rational precautions: A review of the psychology of fear appeals. *Psychology & Health,* 16.

Ruiter, R. A. C., Verplanken, B., Kok, G. & Werrij, M. Q. 2003. The role of coping appraisal in reactions to fear appeals: Do we need threat information? *Journal of Health Psychology,* 8.

Sarkar, U., Fisher, L. & Schillinger, D. 2006. Is self-efficacy associated with diabetes self-management across race/ethnicity and health literacy? *Diabetes Care,* 29.

Task Force On Community Preventive, S. 2002. Recommendations for healthcare system and self-management education interventions to reduce morbidity and mortality from diabetes. *American journal of preventive medicine,* 22.

Witte, K. 1992. Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs,* 59, 329-349.

Witte, K., Meyer, G. & Martell, D. 2001. *Effective health risk messages : a step-by-step guide,* Thousand Oaks, Sage Publications.