Factors Predicting the Physical Activity Behavior based on Theory of Reasoned Action among Chronic Low Back Pain of the Patients Referring to Comprehensive Health Service Centers in the Shahid Beheshti University of Medical Sciences in Tehran, Iran.

Short running: Physical Activity behavior of Chronic Low Back Pain prediction

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Abstract

Background: Low-level physical activity (PA) among Chronic Low Back Pain (cLBP) is associated with various biopsychosocial factors. This research aimed to study the predictors of PA behavior among cLBP patients.

Methods: In the present study 300 eligible patients with cLBP who referred to comprehensive health service centers in the Shahid Beheshti University of Medical Sciences (SBUMS) in Tehran, Iran were random selected.To diagnose the predictors of PA behavior, all the Theory of Reasoned Action (TRA) constructs were examined as risk factors to see if they influence on the probability of PA behavior occurrence and were interpreted through odds ratio (OR). SPSS version 19 was used to analyze the data.

Results: Totally 280 cLBP patients with mean age of 57.07 ±13.09 years old participated in the study. This study showed that motivation to comply significant predictor the cLBP patients for subjective norm OR (%95CI): 2.095(0.116-2.792), p-value<0.001), intention was significant predictor for perform the PA behavior OR (%95CI): 1.431(0.138-1.538), p-value <0.001), behavior beliefs could predictor for attitude OR (%95CI): 1.276(0.106-1.355), p-value= 0.002). attitude, normative beliefs, subjective norm ,and evaluation outcome behavior could predictors the cLBP patients for intention to perform the PA behavior OR (%95CI): 1.188(0.032-1.312), p-value<0.001)., OR (%95CI): 1.158(0.076-2.208), p-value=0.003) ., OR (%95CI): 1.104(0.076-1.128), p-value<0.001) ., OR (%95CI): 0.814(0.301-1.440), p-value=0.007).

Conclusions: This study showed that the cLBP patients who were normative beliefs and evaluation regarding PA behavior could effect on the intention to engage in greater PA than those via other constructs (attitude and subjective norm).

Keywords: Exercise, Health Behavior, Referral, Low Back Pain, Health Care.

Introduction

A lot of the population suffers from Chronic Low Back Pain (cLBP). cLBP is a costly and prevalent condition could want to physical disabilities, social and mental health engagement(Brooks et al., 2017), cLBP is determined through a complicated interaction among pain, behavior and biopsychosocial factors(Gardner et al., 2019).

Although, there are several treatment procedures to improve cLBP, cLBP control and management programs to be more effective than others support to change behavior(Gardner et al., 2019). Physical Activity (PA) is observed as an effective intervention in the management of cLBP patients(Gao et al., 2019). Clinical guidelines presented that PA is an integral component of pain rehabilitation services in physiotherapy exercise that is aimed a helping a patient recover from health difficulties(Dayer et al., 2019). Although PA education have been shown to benefit cLBP patients. Physical inactivity is one of the most crucial factors in worldwide(Sequin, Joseph, & Cowen, 2019).

Theory of Reasoned Action (TRA) is one of theory for prediction a significant amount of variance for intentions, investigates that individuals health behaviors are decided by their attitudes toward the behaviors and other its' constructs(Abraham & Sheeran, 2017). This theory claims that individuals consider the implications of their actions before deciding to engage or disengage in any given behavior. They confirm the role of thoughts in decision making about engaging in behaviors(Sharma, 2016).

The individuals who have positive beliefs and evaluation regarding outcomes of PA behavior are much more likely to do healthy behavior(Montano & Kasprzyk, 2015).

However, before designing the programs based on TRA, the efficacy of this theory on

PA Behavior and predicted effective factors should be observed (Montano & Kasprzyk, 2015). this theory check that healthy behaviors will be predicted by the subjective norm(Kautonen, van Gelderen, & Fink, 2015).evidence showed that patients' perceptions of the social cognition and social environment effected on PA(Bosch & Lorusso, 2019).

Social cognitive concept (SCT) proposed that patients' behavior occurred even as each individual-level cognitive factors interacted with the environmental factors(Hoke, Francis, Lehman, Hwang, & Kraschnewski, 2019).In this regard, the present study aimed at the predictors of physical activity behavior among cLBP patients referred to comprehensive health service centers in the Shahid Beheshti University of Medical Sciences (SBUMS) in Tehran, Iran.

Methods

2. 1 | Design

In this cross section study, the demographic questionnaire, questionnaires based on TRA regarding PA behaviors were used. TRA constructs questionnaire consist of 8 subscales according to TRA constructs (Figure 2). The PA behavior questionnaire was discerned using a 14-item questionnaire. Sufficient PA behaviors were defined as 3 times per week more than half an hour.

Qualitative and quantitative approaches were applied by 15 patients with cLBP to assess facial validity of TRA constructs questionnaire through which all their recommendations were inserted into the questionnaire. To confirm the content validity of the questionnaire, the expert panel including 12 experts in different fields of health

education, health psychologist, psychometric, physical medicine, and pain experts checked all the survey items by which The CVI value of ≥0.79 was observed acceptable for each item. The reliability was determined through Cranach's alpha coefficient that was in acceptable range of 0.87 to 0.94 in 8 subscales according to TRA constructs. Cranach's alpha was obtained as 0. 90. The study was questionnaire questions with 7-point scale except behavioral intention structure that was questions with 4-point scale.

2.2 | Setting and sample

This study was done among the patients who referred to comprehensive health service centers in the five health networks and centers of North, East, Shemiranat, Pardis and Pakdasht area of Tehran and were affiliated to Shahid Beheshti University of Medical Sciences (SBUMS) in Tehran, Iran, from 13 January to 27 August 2019. All ethical subjects were considered. After describing the aims and methods, all patients were satisfied to be studied and voluntarily signed the written consent form. Research Ethics Committee of Tarbiat Modares University approved the study on January 2019 with ID: (Ethical approval number was IR. MODARES.REC.1398.163) and Trial Identification Number in Thai Clinical Trials Registry was TCTR20190728001. It is confirm that all methods were performed in accordance with the relevant guidelines and regulations.

In the present study 300 eligible patients with cLBP who referred to comprehensive health service centers in the SBUMS in Tehran, Iran from 13 January to 27 August 2019 were random selected who totally 280 cLBP patients with mean age of 57.07 ±13.09 years old participated in the study. Figure 1 shows the procedure of patients sampling.

2.3 | Procedures

Inclusion criteria were as have at least reading / writing ability in Persian language /Patients with chronic low back pain for at least 12 weeks/ having mental health. Excluding criteria were as Patients who are mentally retarded/ patients with acute or proprioceptive low back pain/ patients with a history of surgery, fracture and inflammation in their spine/ patients suffering from congenital tumors or congenital anomalies, rheumatoid diseases and constriction history in the spine/ Psychological Problems/ Pregnancy/ Infection/ Depression. To identification the predictors of PA behavior(Figure 2), all the Theory of Reasoned Action (TRA) constructs were examined as risk factors to see if they influence on the probability of PA behavior occurrence and were interpreted through odds ratio (OR). SPSS version 19 was used to analyze the data. The odds ratio was used to determine whether particular exposures like TRA constructs could be risk factors for occurrence of the outcome like PA(Ajzen, 2011). Based on the existed reference the sample size was estimated on the basis of five individuals for each item(Knapp & Brown, 1995). Therefore for a 60 item questionnaire a sample size of 60 × 5 = 300 were calculated.

2.4 | Statistical analyses

To determine the relationship between different TRA constructs with each other and with PA behavior, R Spearman was apply because K-S test displayed the data were non parametric. To predict the factors influencing PA behaviors logistic regression analysis was applied. Lower odds of PA (P <0.05) was considered statistically significant.

Results

3.1 | Socio-Demographic Variables

Totally 300 patients with cLBP recruited of which 280 persons who were visited by the physician and they had inclusion criteria of the study, took part in the study and filled the questionnaires. The means age of the patients was 57.7 years (SD=13.09) and most of them were between 40 and 49 years old (39.6%). Overall, 31.4% of the patients with cLBP (N=88) were housewives. Table 1 show all socio demographic data as well as the Mean (SD) of all studied variables based on TRA.

3.2 | Statistical analyses Results

Logistics' correlation tests were used to evaluate the relevance between the constructs of TRA with each other and with PA behavior .Table 2 shows these correlations. As this table shows, there were a direct significant correlation between behavior beliefs and attitude with intention. So that the patients who normative beliefs were more likely to the predictor for subjective norms significantly (p-value < 0.001).

As Table 3 shows, this study showed that motivation to comply significant predictor the cLBP patients for subjective norm OR (%95CI): 2.095(0.116-2.792), p-value<0.001), intention was significant predictor for perform the PA behavior OR (%95CI): 1.431(0.138-1.538), p-value <0.001), behavior beliefs could predictor for attitude OR (%95CI): 1.276(0.106-1.355), p-value= 0.002). attitude, normative beliefs, subjective norm ,and evaluation outcome behavior could predictors the cLBP patients for intention to perform the PA behavior OR (%95CI): 1.188(0.032-1.312), p-value<0.001)., OR (%95CI): 1.158(0.076-2.208), p-value=0.003) ., OR (%95CI): 1.104(0.076-1.128), p-value<0.001) ., OR (%95CI): 0.814(0.301-1.440), p-value=0.007).

Discussion

To better understand why adult individuals do not engage in PA is currently guaranteed for researchers and professionals (McEachan, Conner, Taylor, & Lawton, 2011).This study was carried out to address this challenge through predicting factors of PA behavior among Iranian patients with cLBP Referring to Comprehensive Health Service Centers of SBUMS. According to the results of this study, Intention was the most important predictors of PA behavior among patients with cLBP. Only some results of this study are in the line of results protected from previous study(Heidari & Tavafian, 2017; McEachan et al., 2011). As well as the role of subjective norm and attitude were determined as influencing factors for PA behavior via Intention.

Subjective norm refers to one's belief that most of the significant others in one's life think one should or should not perform the PA behavior(Adams & Shambaugh, 2019). The results of the present study are completely in the line of theoretical assumptions of the theory of reasoned action(Adams & Shambaugh, 2019).On the other hand, Attitude means the overall feeling of like or dislike toward any given PA behavior(Ajzen, 2011; Thiel et al., 2020).

In Carvalho's study, people who did not have a good attitude toward physical activity prevented their physical activity(Carvalho et al., 2017). Moreover, in accordance with the present study, numerous studies have revealed that subjective norm has been as the best predictor variable for actual PA(Kim, Eys, Robertson-Wilson, Dunn, & Rellinger, 2019; Úbeda-Colomer, Ginis, Monforte, Pérez-Samaniego, & Devís-Devís, 2019). Therefore, strategies for raising subjective norm, such as strengthening subjective norm through Role Playing and focus groups discussion could lead to more effective health

promotion programs for Iranian cLBP patients and should be considered in future intervention(Wyer Jr, 2019). Motivation to comply was as the predictor variable for subjective norm.

Normative beliefs means how a person thinks that other people beliefs who are significant in his or her life would like him or her to behave(Lee et al., 2020) and Motivation Degree means to which a person wants to act to comply in accordance with the perceived wishes of those significant in his or her life(Lee et al., 2020). These programs could propose that highly individuals has normative beliefs and evaluation outcome behavior exert greater efforts to master PA behaviors via Intention and persist longer in the face of obstacles to such the intention of doing PA behavior and PA behavior. Sweeney in their study showed that normative beliefs are predictors of persistence of physical activity(Sweeney, Wilson, & Van Horn, 2017). Thus, studies have shown that positive social life is a good predictor of PA(Frey, Frank, & McCabe, 2019).

Behavioral Beliefs means that performing a given PA behavior beliefs leads to certain outcomes(Gehlert & Ward, 2019). Behavioral beliefs with higher human self-concept are more engaged in PA(Garn et al., 2019). Furthermore, in the present study, it was verified that the patients' behavior beliefs could be a predictor of patients' towards PA via Attitude likes Kirks study(Kirk & Haegele, 2019). Ajzen noted that behavior beliefs Increase the chance of PA involvement(Ajzen, 1991).

This finding is supported by many preceding researches which found that individuals who more patients' beliefs about PA and they're self- evaluation regarding the outcome

of PA to the performance of PA are more likely to do this behavior(Benyamini & Leventhal, 2019; Lang et al., 2019).

Outcome evaluations mean Value a person places on each outcome resulting from performance of the PA behavior(Samdal, Eide, Barth, Williams, & Meland, 2017). Outcome evaluation emphasizes that; encouraging patients with cLBP to do preventive behaviors of chronic low back pain, it is better to highlight the benefits and positive outcomes of doing preventive PA behaviors to improve chronic low back pain. Previous evidence verified that preventive behaviors of chronic low back pain behavior could influence CLBP improvement (Hein, Koka, Tilga, Kalajas, & Raudsepp).

This study showed that the patients who were positive beliefs and evaluation regarding outcomes of PA behavior respectively via attitude and subjective norms were more like to perform this behavior. Therefore, Cognitive, behavioral, and psychological factors can contribute to the experience of pain among patients with cLBP. One of the psychotherapy interventions is cognitive-behavioral therapy (CBT), which is an effective treatment for chronic general pain, especially low back pain(Gromisch et al., 2019). Cognitive-behavioral interventions are very useful in modifying health beliefs and behaviors as well as eliminating risk factors(Rahimian Boogar & Tabatabaeian, 2012). Consequently, there is a need for cognitive-behavioral educational intervention based on the theory of reasoned action on changing the beliefs and preventive behaviors of chronic low back pain.

Behavioral intention means the thought to perform the behavior, which is an immediate decide and determinant of the given PA behavior(Banerjee & Ho, 2019). So the final structure of the above theory is Behavior. Behavior means Single, observable action

performed by a cLBP patient, or a class and category of actions with a characteristic of a target, action, context, and time (TACO)(Banerjee & Ho, 2019).

But behavioral intentions are interpreted as a key predictor of action in several health behavior theories(Carroll & Whyte, 2003). Somehow health-related intentions could inhibit habits. Consistent this study prediction, the Carroll study showed a significant and positive correlated between the health behavioral intentions of cLBP patients with low back pain prevention behaviors(Carroll & Whyte, 2003).

4.1 | Study strengths and limitations

4.1.1 | Study strengths; what is already known on this subject?

The goal of health education and health promotion is to bring about change behavior in individuals, groups, and the wider population about behaviors that are assumed to be determinants of health to behaviors that guarantee future and future health. The logical theory of practice or "Theory of Reasoned Action" provides a framework for identifying behavioral beliefs and normative beliefs affecting behavior. Based on this information, interventions can be designed for the intended purpose and can change the beliefs or values that affect them. We know that the Predictor Factors for Physical Activity Behavior include there are various biopsychosocial factors. The magnitude of association for each of these the Predictor Factors has previously been demonstrated. However, the cumulative effects of the combination of identifying factors on the promotion of PA behavior based on the Theory of Reasoned Action have been difficult in the cLBP patient's population. The findings of the analysis can identify factors that are relevant to promoting intervention messages in individuals, groups with significant

predictors for performing the PA behavior by behavioral beliefs and normative beliefs and other factors.

4.1.2 | Study strengths; What does this study add?

The (Theory of Reasoned Action)TRA constructs questionnaire could be a validated and reliable instrument to determine the factors that influence Physical Activity Behavior among 280 cLBP patients who Referring to Comprehensive Health Service Centers in the Shahid Beheshti University of Medical Sciences in Tehran, Iran. it is also suggested that the TRA constructs questionnaire should be justified to other languages and cultures so that it could be applied in other countries. Given that our study has found effective factors for physical activity in patients with low back pain, it is possible to focus on these factors for more effective training to make training more effective and cost-effective.

the proper intervention based on these predictors should be designed to motivate the cLBP patients to do the Physical Activity. Using TRA constructs is more effective than the models. However, doing more studies to ensure these results are recommended.

4.1.3 | Study limitations

In this study, there are several limitations. First, the data used were collected through self-report that might interfere this study results. The cLBP patients were randomly selected from one university. However a number of key factors like large sample size and the diversity of the subgroups were considered to ensure the representation of the population under study but precaution should be applied if the results of this study could be extended to other patients with cLBP who work in other locations. Psychological

tests for the studied cLBP patients were not done. So, it is proposed to consider this evaluation in future studies to see if there would be some correlations with the prediction of the PA behavior. Despite the above limitations, this study has the potent points to display the factors that could influence on PA among patients with cLBP in Iran.

Conclusion

Findings of this study revealed that normative beliefs and evaluation regarding PA behavior could effect on the intention to engage in greater PA than those via another constructs (attitude and subjective norm). Therefore, it is proposed latter studies should be done to confirm these findings and consequently, proper interventions based on these predictors be designed for the patients with cLBP to do more PA behavior. Attitude by the patients with cLBP may promotion those from engaging in PA intention while being their behavior beliefs cause in the attitude of doing PA behavior.

Ethics approval and consent to participate

All participants were satisfied to be studied and voluntarily signed the written consent form. Research Ethics Committee of Tarbiat Modares University approved the study on 2019.01.05 (IR. MODARES.REC.1398.163).

Competing interests

"The authors acclaimed that they have no rivaling interests".

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Author's contributions

M H D conducted whole study and had full access to all data for analysis. AH, supervised the study and also she was involved in drafting the article

FP verified the data analysis. All authors confirmed the final version of the manuscript

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Table1. Socio-demographic characteristics of the studied the Patients

Studied variables and Constructs	Sufficient	N (%)	Mean (SD)
Age	30-39 40-49 50-59 60-69 70-79	20(7.2) 111(39.6) 92(32.8) 39(13.9) 18(6.5)	57.07 ±13.09
Years of education	12years 14 years 16years(Bachelor) 18 years(Master)	34(12.4) 76(27.1) 80(28.6) 90(32.1)	12.08±10.87
Marital status	Single Married Widow Divorced	53(18.9) 178(63.6) 24(8.6) 25(8.9)	-
Occupation	Housewife` Manager Employed Non-employed Farmer Worker Retired	88(31.4) 12(4.3) 57(20.4) 43(15.4) 14(5) 34(12.1) 32(11.4)	-
Intention			4.80±1.18
Attitude			40.62±10.22
Behavior beliefs			6.38±2.42
Evaluation outcome behavior			7.26±2.46
Normative beliefs			6.39±2.87
Motivation to comply			8.34±12.84
Subjective norms			48.02±8.12

Mean (SD): Mean (Standard Deviation)

Table 2. Correlation matrix of the constructs of Theory of Reasoned Action in Physical Activity in the Patients Referring.

Variables	1	2	3	4	5	6	7
1.Intention	1.000						
2.Attitude	r =0.728**	1.000					
3.Behavior beliefs	r =0.413*	r =0.696**	1.000				
4.Evaluation outcome behavior	r =0.486**	r =0.635**	r =0.057	1.000			
5.Subjective norms	r =0.718**	r =0.024**	r =0.013**	r =0.112*	1.000		
6.Normative beliefs	r =0.566**	r =0.021	r =0.082	r =0.053	r =0.514**	1.000	
7.Motivation to comply	r =0.212*	r =0.011	r =0.133*	r =0.062	r =0.714**	r =0.554	1.000

Spearman's** Correlation is meaningful at 0.01 levels (2-sided).

* Correlation is meaningful at the 0.05 level (2-sided).

Table 3. Predictors of Physical Activity behavior based on Theory of Reasoned Action through logistic regression analysis.

Independent Variable	Variables predictors	B	S.E	P	OR(%95CI)
Intention	behavior	0.358	0. 044	<0.001	1.431(0.138-1.538)
Attitude	Intention	0.173	0.072	<0.001	1.188(0.032-1.312)
Behavior beliefs	Attitude	0.244	0.058	0.002	1.276(0.106-1.355)
Motivation to comply	Subjective norms	0.740	0.044	<0.001	2.095(0.116-2.792)
Normative beliefs	Intention	0.099	0.078	0.003	1.158(0.076-2.208)
Evaluation outcome behavior	Intention	-0.206	0.076	0.007	0.814(0.301-1.440)
Subjective norms	Intention	0.146	0.046	<0.001	1.104(0.076-1.128)

Fig.1. Flow diagram of participation sampling among the Patients Referring to Comprehensive Health Service Centers of Tehran, Iran.

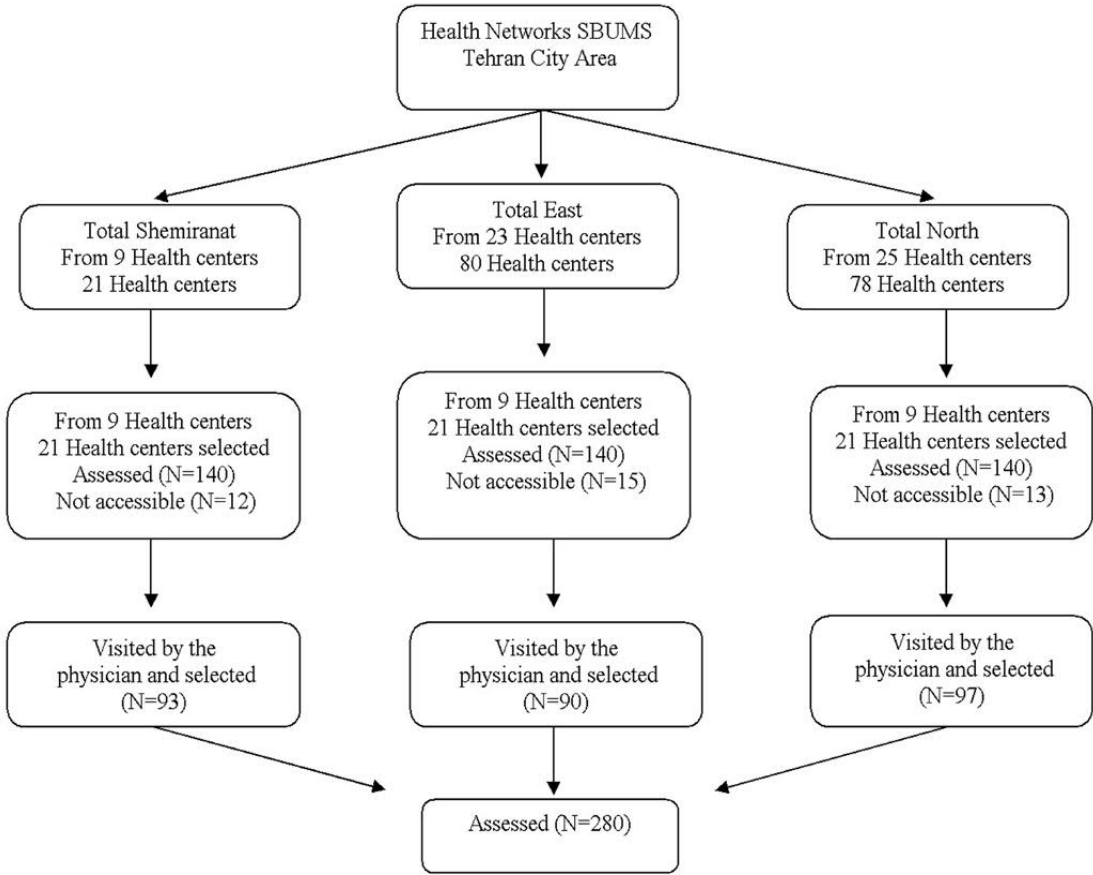
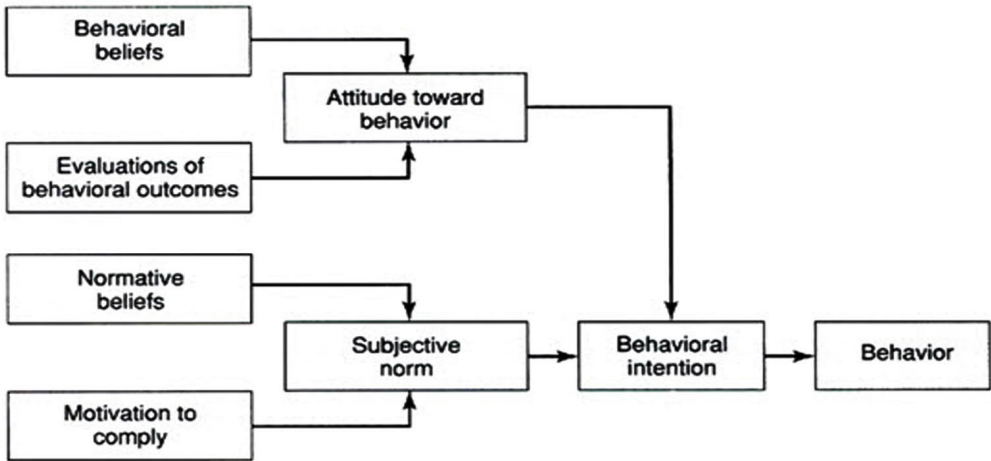



Fig.2. Schematic representation of Theory of Reasoned Action (Ajzen, 2015).

The TRA framework is based on the Theory of Reasoned Action (TRA) by which health behavior predicting factors have been shown.