Original Article
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Medical Journal of the Islamic Republic of Iran (MJIRI)
Iran University of Medical Sciences

Application of the theory of reasoned action to promoting breakfast consumption

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Received: 19 February 2015 Accepted: 11 May 2015 Published: 11 November 2015

Abstract

Background: Breakfast is the most important daily meal, but neglected more than other meals by children and adolescents. The aim of this study was to evaluate the effectiveness of an educational intervention, based on the Theory of Reasoned Action (TRA) to increase breakfast consumption among school children in Bandar Abbas, Iran.

Methods: In this quasi experimental study which was conducted in 2012, 88 students of four secondary schools in Bandar Abbas, south of Iran, were enrolled. Multi-stage cluster sampling was performed with random allocation of interventional and control groups. The study tool was a questionnaire which was filled by the students before and two months after the educational intervention. For data analysis, statistical tests including paired-samples t-test, independent samples t-test, Wilcoxon test, and Mann-Whitney test were used through SPSS v.18 software.

Results: The result of the study showed that application of TRA significantly increased scores of behavior of breakfast consumption ($p<0.01$). After the intervention, a significant increase was revealed in all nutrition intakes, except for fat and sugar ($p<0.01$).

Conclusion: The findings support application of the TRA in improving the intention and behavior of breakfast consumption. Applying this theory for designing interventions to increase breakfast eating is recommended.

Keywords: Theory of Reasoned Action, Breakfast, Students.

Cite this article as: Hosseini Z, Gharlipour Gharghani Z, Mansoori A, Aghamolaei T, Mohammadi Nasrabadi M. Application of the theory of reasoned action to promoting breakfast consumption. *Med J Islam Repub Iran* 2015 (11 November). Vol. 29:289.

Introduction

Nutrition is a fundamental factor in health status and educational success of students (1). The negative effect of poor nutritional status on cognitive functioning, especially in early years, is well known. Breakfast, as a main meal, has an important role in meeting the nutritional needs and improving the brain efficiency (2-4). In children and adolescents, breakfast consumption is necessary to sufficient nutritional intake. Brandy et al. observed the highest absorption rate of vitamins A, B6 and B12, thiamine, riboflavin, and niacin; and in parallel, the lowest absorption of total fat in students who eat breakfast regularly (5). Breakfast should supply for 20% of a child's daily energy, and it could contain diverse nutrients like bread, milk, cheese, walnuts, butter, egg, and natural fruit juices (6). Therefore, the quality and quantity of breakfast is substantial in diets (7).

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In recent years, there is a decline in breakfast consumption, and this particular meal is neglected by many children and adolescents throughout the world (8,9). The rate of breakfast skipping is different from 1.7 to 30% among populations (10). According to the studies in Iran, a roughly high percentage of school children skip the breakfast (11,12). In Rahimi and Soheili studies respectively 21% and 8% of students used to go to school without breakfast consumption (11,13). Based on growing evidence, it is proved that not having breakfast has negative effects on alertness, concentration, memory, sight complicated processes, problem solving, and comprehending mathematics (14).

Moreover, the studies show that hunger among the school children has a significant relation with anxiety and depression, and children suffering from malnutrition were more likely to be referred to psychologists and they had less compatibility with their mates (15).

During secondary school under new environment and classmates influence, many new and rather stable eating habits may develop in adolescents. In this period of rapid growth, the psychological and physical changes, plus some self-changes in dietary habits could lead to nutritional vulnerability (9). Due to the high value of breakfast and the influence of family and friends on dietary habits, eating habits should be modified in early childhood. Thus, the eating habits could be improved since the first school years, in order to prevent from health problems in later life (16,17).

Although many educational interventions have been applied for enhancing the behavior of breakfast consumption, the elimination of breakfast from the daily diet of the students is still a matter of concern. To this regard, there are many descriptive studies and experimental studies investigated the problem using traditional methods like making speeches, and using pamphlets in the educational sessions.

Therefore, the researchers in current study tried to use Theory of Reasoned Action (TRA) to predict the intention of and enhance the students' behavior of breakfast consumption.

Thus, we used TRA as a framework. Accordingly, we planned an instructional program to promote the behavior of breakfast consumption. TRA, as a model for prediction of behavioral intention, was developed by Fishbein and Ajzen. The power of an individual's intention in a behavior comes from two factors: a) the attitude toward a behavior, b) subjective norms which stem from social influence. These factors are mainly affected by an individual's beliefs. In other words, the belief about the result of a behavior and the evaluation of the result shapes the attitude (18). Subjective norms are also under the influence of beliefs. An individual's beliefs about others expectations and the motivation to fulfill them forms his/her subjective norms. Besides, the subjective norms of an individual would be positive, if he/she assumes that the people, whom have the motivation to comply their expectations, have affirmative ideas. On the contrary, the negative subjective norms come from the idea that others' attitude towards his/her action is not positive.

Attitudes and subjective norms could be measured by a Likert scale. The intention underlie a behavior depends on both attitude and subjective norms. When the outcome of these two is positive, the intention for doing the behavior will shape (18). Key concepts of the TRA are shown in Figure 1. Among all parts, only "intention" impacts the behavior directly, while others have an indirect effect. It means that attitudes and subjective norms can predict the intention, but not the behavior. The TRA provides a framework to recognize the key beliefs and norms which affect the behavior. Later, one can plan some interventions to change these beliefs (or their position value) and therefore, change the attitudes, subjective norms, and eventually the intention (19). This model has been used in many studies for behavior modification and has proved to be efficient in fields such as preventing testicular cancer among men (20), smoking pre-

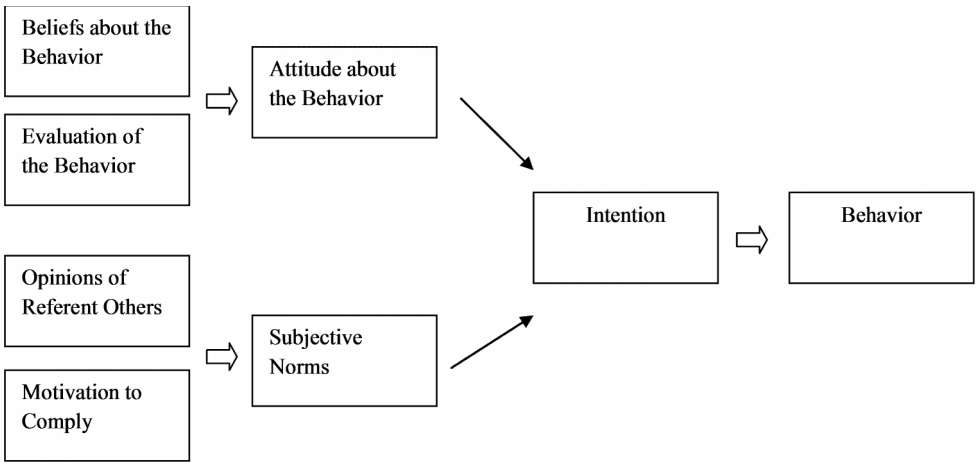

Fig. 1. Theory of Reasoned Action

vention (21) and prevention of ecstasy abuse (22).

The aim of this study was to evaluate the effectiveness of an educational intervention, based on the TRA to increase breakfast consumption among school children.

Methods

Subjects: The current study was an interventional quasi-experiment. The population includes students of secondary schools of Bandar Abbas, located in the south of Iran in 2010-2011.

After obtaining the required permissions from the educational offices, multistage cluster sampling was performed on randomly chosen of two female and two male schools. Using the table of random numbers, one female and one male school was selected as the interventional group and other two as control group. From each of these schools, 25 students were randomly chosen from volunteers, forming two groups of 50 students. Because of incomplete filling of questionnaire, 6 out of 50 students were excluded from each group. Finally, 44 students were enrolled in intervention group and 44 students in control group. The participants entered the study after giving a written consent and there was no obligation for taking part in the study. To follow up with the ethical considerations, the questionnaires were coded and did not contain the names and confidentiality was protected. Regular attendance at training sessions was the inclusion criteria and absence in more than one session during the training period was the exclusion criteria. All participants attended all training sessions and none excluded.

Instruments: For data collection, we designed a self-report questionnaire with two parts. The first part contained eight knowledge questions regarding the importance of breakfast consumption and understanding the food groups. By considering one point for each correct answer, the higher score was indicator of better knowledge. In the second part, for TRA, was designed based on existing questionnaires and extensive review of the literature.

To check the content validity, an experts panel was composed and the wordings and sentences were investigated regarding structure, grammar, writing principles, arrangements and placing of items. To check the quantitative validity of the content, content validity ratio (CVR) and content validity index (CVI) were calculated for each item of the questionnaire. Later, to check the internal validity, the questionnaire was filled out by 30 students and Cronbach's alpha was calculated as 0.80. In order to check the external validity, test-re test was applied, so that the designed questionnaire was applied to a sample group of students in two phases and the obtained marks in these two phases were compared with each other and the correlation coefficient was

calculated as 0.85 (p= 0.05).

The final questionnaire contained 13, 17, and 3 questions for attitude, subjective norms, and behavioral intention for breakfast consumption, respectively. Method of scoring the questions of attitude, subjective norms, and behavioral intention breakfast consumption was through multiple-choice questions based on 5-point Likert-scale, ranged was from completely agree to completely disagree. Besides, we evaluated the nutritional intake of breakfast in seven successive days. The form of breakfast intake was completed by children daily. Dietary guidance (23) was used to define food groups. Moreover, dietary guidance was applied to quantify serving food items. For example cheese is defined in dairy groups, and one serving of cheese is the amount equivalent to 60g processed cheese or 45g natural cheese. Then, the average of servings from each food group was calculated.

Intervention: Prior to instructional intervention, needs assessment was performed for evaluating the main hypothesis about the predictability of variables, such as intention and persuasive subjective norms for breakfast consumptions (Table 1). According to the data presented in Table 1, the subjective norms item for breakfast consumptions was the best predictor for intention of breakfast consumption. This was substantial for setting the educational strategies of educational intervention and compiling the educational content. Based on pre-test data, the educational content and the behavioral goals were compiled. All the students of both interventional and control groups received the school routine education. In addition, all the students of interventional group took part in the educational program, which was compiled according to data analysis of pre-test. The instructional program was held in five sessions in focus group discussions, speeches, and questions and answers. Brainstorming and problem solving skills were the methods applied in group discussions. Collaborative learning was the basis of educational program. Throughout the educational intervention, the researchers tried to actively engage in all the students' learning process.

In the current study, due to the prominent role of peers in forming the subjective norms, three students were chosen as candidates by all members of the interventional group. In group discussions, these candidates took the mediator role between instructor and other students. Healthy food guide was compiled as a booklet and was given free to students and their parents. Instructional program on attitude, personal beliefs, intention, and persuasive subjective norms of students for breakfast consumption was evaluated by questions and answers throughout the education process, and by filling questionnaire two months after the educational intervention. All the process was coordinated with educational authorities according to ethical standards.

Data Analysis: Data were analyzed using logistic regression analysis, paired-samples t-test, independent samples t-test, Wilcoxon test, and Mann-Whitney test through SPSS v.18.

Logistic regression was used to examine the predictive power of knowledge and TRA model variables. To assess the intention of breakfast consumption before-after intervention in each of groups the Wilcoxon test and to measure the intention of breakfast consumption between intervention and control groups before- after the intervention the Mann-Whitney test was used. To evaluate variables of knowledge, attitude of breakfast consumption, subjective norms and the breakfast consumption, the t-test analysis to compare the scores between the intervention and control groups, and paired t-test to compare the scores of each of the control and intervention groups before - after the intervention in each group.

Results

The current study showed that 50%of students in the intervention group and 50%of students in control group were male. The mean age of participants in intervention and control group was 13.88

Table 1. Logistic regression analysis of theory of reasoned action variables and knowledge predictor of intention to breakfast consumption before the intervention in the two study groups

Variables		p	OR(95%CI)
Before intervention	knowledge	0.939	0.987 (0.67,1.6)
	attitude	0.297	1.033(0.77,1.82)
	Subjective norms	0.017	1.147(1.12,3.17)

Table 2. Statistical analysis of score changes of knowledge, positive attitude and subjective norms to breakfast consumption variables after intervention

Group Score change after intervention	Intervention group Mean(SD)	Control group Mean (SD)	t	p
Knowledge to benefits of breakfast consumption	5.34(1.5)	3.97(2.16)	-3.43	0.001
Positive attitud	57.63(6.53)	53.88(5.95)	-2.814	0.006
Subjective norms	51.84(10.37)	44.88(5.03)	-2.13	<0.001

(SD=0.84) and 13.9 years (SD=0.66), respectively; and there was no significant difference between them.

Based on Table 1, prior to educational intervention, the variables of the TRA were analyzed by logistic regression analysis for predicting the intention of students for breakfast consumption. As the findings indicates, the structure of motivating subjective norms of having breakfast was the best predictor of the intentional breakfast consumption, and this is highly important in the performance of the interventions and preparation of educational content (OR=1.147, p=0.017). The coefficient of variation of mean awareness variables, positive attitude towards breakfast, and encouraging norms for breakfast consumption is shown in Table 2, which were calculated by the subtraction of the scores before instructional interventions from after intervention. As shown in Table 2, there is a significant difference between the scores, before and after intervention (p=0.001). The data indicate that the educational program for increasing breakfast consumption was effective for improving the attitude, subjective norms, and raising the students' awareness.

According to the results obtained two months after educational intervention, there revealed a decrease in percentage of students, who first had no intention or were doubtful about eating breakfast. The Mann-Whitney test confirmed the significance relation between the interventional group and the intention to breakfast consumption (p=0.001) (Table 3).

We evaluated the rate of breakfast consumption on the basis of 7 successive days of food records. The results showed that the average nutritional intake of breakfast was low in both interventional and control groups, with no significant difference. However, after educational program, the average nutritional intake of all food groups (except for fat and carbohydrates) was significantly higher in interventional group in comparison with control group (p=0.05). Besides, according to the result of paired-samples t-test, after instructional intervention, the consumption of milk, dairy products, fruits, and vegetables was significantly higher in interventional group in compar-

Table 3. Statistical analysis of students intention of breakfast consumption before and after of intervention in intervention and control group

	Before (%)			After (%)			p
	Have intention	Uncertain	No intention	Have intention	Uncertain	No intention	
Intervention	27(41.4%)	11(25%)	6(13.6%)	44(100%)	0	0	<0.001
Control	27(41.4%)	16(36.4%)	1(2.3%)	23(52.3%)	13(29.5%)	8(18.2%)	(0.058)
p		0.68			<0.001		

Table 4. Comparison breakfast consumption between intervention and control groups

Food groups	Intervention		Control		Paired (Intervention)	Paired (Control)	t-test
	Before	After	before	after			
Milk and dairy products (0.05)	0.54(0.43)	0.82(0.44)	0.62(0.4)	0.52(0.55)	0.009	0.4	0.006
Grain (0.05)	1.25(0.92)	1.58(0.8)	1.21(0.92)	1.18(0.85)	0.1	0.8	0.02
Meat and eggs (0.05)	0.58(0.4)	0.72(0.44)	0.56(0.4)	0.48(0.34)	0.009	0.2	0.01
Fruit and vegetables (0.05)	0.69(0.53)	0.98(0.38)	0.78(0.52)	0.73(0.54)	0.007	0.6	0.01
Fat and sweets (0.05)	0.63(0.79)	0.75(0.69)	0.66(0.64)	0.54(0.82)	0.25	0.17	0.4

ison with control group (Table 4).

Discussion

Healthy nutrition, proper eating habits and constant health protection ensures the natural growth of children and adolescents (24). One important factor is breakfast consumption, which improves the cognitive functioning, learning abilities, memory and the power of focus (25).

To this regard, we applied the TRA for designing effective program with the aim of increasing breakfast consumption. The results were positive and could be applied in schools. The scores of questionnaires, before and after the intervention, revealed that our instructional intervention was the main cause of significant increase in knowledge score of interventional compared with the control group which demonstrated the effectiveness of educational program to increase knowledge about the importance of breakfast consumption and beneficial nutrients. Our data is in consistent with similar studies with regards to improving nutritional status (26).

One of the main focuses of nutrition research is on building the right attitude for a desired behavior. In this regard, education plays an important role. Education should create the right atmosphere in which people can compare the results of the current behavior and the suggested approach. Relying on the positive outcome of a suggested behavior, people will decide to follow it. In the current study, the students' attitude towards eating breakfast was improved by using the TRA derived application Similar to our study, Davis et al by using the role playing method, and Kothe et al by using a brief theory-based intervention improved the attitude of the interventional groups (27,28).

Considering the fact that in this study subjective norms were considered as stronger anticipator of breakfast consumption, enhancing these norms was one of the main objectives of this educational program. Subjective norms are considered as one of the main predictive factors for breakfast consumption. Subjective norms, including normal ideas and motivation for obedience is influenced by peers and friends. As mentioned previously, the three candidate student played as mediators in group discussions. Health improvement programs which are based on peer education, provide an opportunity for the children to obtain the health information through collaborations (29). Besides friends and parents have an effective role on the children's choice of food and the children's nutritional behavior is closely linked with the food prepared by mothers for different meals. Food such as bread and cheese with walnut or almond, bread and eggs, bread and butter and jam or honey, along with a glass of milk can be considered as a healthy and nutrient breakfast for school children. In the case that parents consider breakfast as an important meal and try to set breakfast for the family every day, children are motivated to have breakfast. This study tried to engage parents in having breakfast through designing healthy nutrition booklets.

Our results proved the effect of educational intervention on subjective norms to promote breakfast consumption, and were inconsistent with other studies (30).

Analysis regarding the behavioral intention of students for breakfast consumption indicated the positive effect of theoretical interventions on increasing the behavioral

intention of breakfast consumption. The positive effect of theoretical approach for promoting health behaviors was also reported in other studies (31).

A breakfast meal, including all main food groups, has positive impact on mental health and also improves the lifestyle (32). In this study, before intervention, the average food intake of breakfast was low in both intervention and control groups. However, after the intervention, the food intake (except for fats and sugars) increased significantly in intervention group. Moreover, the consumption of dairy products, fruits and vegetables increased significantly after the intervention. Fruits and vegetables are rich in antioxidants and are very healthy for digestive system. In addition, these food groups are among the main sources of minerals and vitamins (33,34). Regarding the intake of fats and sugars groups, the results of this study were not in accordance with the results of Farivar et al study, in which 90% of the study samples consumed sugars on a daily basis (35).

Conclusion

Regarding the TRA, there was no difference between the main variables of intervention and control group before the intervention. Therefore, it could be deduced that the increase of intention and behavior of breakfast consumption in intervention group are due to the effect of educational program.

One of the limitations of this study was the lack of parents' collaboration. For future studies, the following points are recommended. First, parents and popular teachers participate in the study for improving the efficiency of the educational program and enhancing the cultural norms of breakfast consumption. Second, we followed up the students just two months, and the longer follow-up may lead to more accurate results. Third, our subjects filled the questionnaires in a self-reported manner, but in future the questionnaires could be filled under parental supervision.

Acknowledgements

The authors would like to thank all who participated in or collaborated with the current study, especially the teachers and students of secondary schools.

Conflict of interest

The authors declare that they have no conflict of interest.

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