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The Effect of Theory-Based Education on the Promotion of Preventive Behavior Among Mothers, Concerning the Self-Medication for Children

Samaneh Mozafari [1], Mohsen Shamsi [2,*], Nasrin Roozbahani [2] and Mehdi Ranjbaran [3]

[1] School of Health, Tehran University of Medical Sciences, Tehran, Iran
[2] Department of Health Education, Faculty of Health, Arak University of Medical Sciences, Arak, Iran
[3] Department of Epidemiology and Reproductive Health, Reproductive Epidemiology Research Center, Royan Institute for Reproductive Biomedicine, ACECR, Tehran, Iran

[*] *Corresponding author*: Department of Health Education, Faculty of Health, Arak University of Medical Sciences, Arak, Iran. Tel/Fax: +98-8633686443, Email: mohsen_shamsi1360@yahoo.com

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Abstract

Self-medication is one of the basic problems in the health system of Iran. The purpose of the present study is to determine the effect of theory-based education on the promotion of preventive behavior among mothers, concerning the self-medication for children. This study is an educational randomized controlled trial research that was designed and implemented for the first time in Iran. The samples consisted of 112 mothers with children under age six who referred to health centers of AzadShahr (a city in the north of Iran) from July 2015 to March 2016. They were selected through convenience sampling and then were randomly assigned to the intervention and control groups. Data collection instrument was a researcher-made questionnaire. Then educational program was performed for the intervention group through four educational sessions. After three months, data collection was repeated for the two groups and the data were analyzed using the SPSS-20 software with inferential statistics (independent *t*-test, paired *t*-test, and chi-square). The findings showed that based on T-test, after the educational program, the mean score ± standard deviation (SD) of knowledge between the intervention and control groups was 66.07 ± 16.58 and 70.45 ± 15.33, respectively (P = 0.149). Moreover, the mean score ± SD of performance was 86.88 ± 14.84 and 93.81 ± 10.36, respectively that there was a significant difference (P = 0.005). Three months after the educational program, based on the chi-square test, the prevalence of self-medication between intervention and control groups was 8.92% and 21.42%, respectively that there was a significant difference (P = 0.02). The educational interventions based on the theory of planned behavior reduced self-medication for children. Therefore, due to the high cost of drug production and the side effects of self-medication, especially in vulnerable periods such as in childhood, it is recommended that educational programs, based on this model, should be carried out in other health care centers in order to provide children health.

Keywords: Self-Medication, Education, Health Promotion, Preventive Behavior, Children

1. Background

Using a medication without a doctor's prescription and based on a person's own diagnosis is called self-medication (1). Self-medication means using a chemical or herbal medication without a doctor prescription, giving one's prescribed drug to other family members and relatives, and using the remaining surplus medicines without a doctor's advice (2). Medication misuse is a global problem. Self-medication is developing around the world and the fourth to eighth cause of mortality among people in different societies is the adverse effect of drugs. One percent of the world death happens because of the adverse effects of drugs.

Annually, over 100000 deaths in the United States are due to drug side effects and millions of people are suffering from that (3). In a systematic review, self-medication incidence ranged from 2% to 92% in different countries (2). Unfortunately despite the high cost of drug production and the side effects of self-medication, especially in vulnerable periods such as in childhood, this problem is very common to children by their mothers. An earlier study conducted in Germany examining 17450 children showed that 25.2% used self-medication (4).

Studies in Mongolia revealed that parents gave medications to the children under age five without a prescription for different reasons, including the age of the children, parents' wrong attitudes toward the effects of antibiotics on upper respiratory tract infections, parents' experiences about self-medication, and antibiotics availability at home (5). Also, the results of another study showed that some parents give drugs to their children to treat an inflammatory bowel disease without consulting a doctor (6).

Many parents have positive attitudes toward self-medication for their children and the lack of required knowledge about self-medication consequences and adverse effects (7). In Iran a qualitative study about self-medication among the elderly showed that factors related to self-medication fall into these categories: "attitudes toward a disease, treatment and physicians", "enabling health system", and "other influential factors". The study emphasized the effect of education on the correct use of drugs (8).

Moreover, a descriptive study about factors related to self-medication behavior of mothers of children under the age of two in Iran, who referred to health centers showed that 54.4% of mothers had self-medication behaviors. This study suggested that self-medication should be closely monitored and it warranted an educational program for mothers in Iran and it also suggested an effective intervention program based on a theory that could improve mothers' knowledge about paying attention to the potential harms of self-medication for their children (9). Therefore, with increasing access to medications and the direct role of mothers in choosing medication for their children, it is necessary to design proper educational programs to provide mothers with adequate knowledge in order to change their behaviors in this regard and enable them to help their children live in a long healthy life.

There are many theories concerning health education; however, we must be very careful in selecting them. One of these theories is the Theory of Planned Behavior (TPB) (10). The TPB is applied to determine and understand the effect of environmental and individual factors on behavior. Since the theory measures both direct behavior and intention (they are closely related to each other), through improving the intention the participants (mothers) preventive behavior in self-medication for children can be improved.

Due to the fact that self-medication is one of the basic problems in the health system of Iran, because of the prevalence of self-medication among children by their mothers, the lack of enough education in health centers and providing old educations, the age of self-medication has reduced to under the age of six. Considering the previous studies on this problem (4, 5, 7, 9) that investigated the effective factors on self-medication in qualitative or descriptive studies, this study (an educational randomized controlled trial) was conducted based on TPB and emphasizes constructs (knowledge, attitude, perceived behavior control, subjective norm, and intentional behavior) beside a three month follow-up for the durability of mothers' behavior to prevent self-medication in their children and thus the novelty of this study is not found in other studies.

2. Objectives

In this study, we investigated the effect of education on the promotion of preventive behavior in self-medication based on the TPB among mothers of children under the age of six who referred to the health centers.

3. Methods

3.1. Study Plan

This study is an educational randomized controlled trial. The study population consists of mothers with children under the age of six who referred to four rural/urban health centers in Azadshahr (a city in the north of Iran) from July 2015 to March 2016. The sample size was determined based on the previous studies (3) and with minimal average difference before and after intervention of 12, the maximum standard deviation (SD) of 22.75, test power of 80%, confidence level of 95% and regarding the loss of 10%, the number of samples was estimated 63 for each group. Among the total samples, seven individuals were excluded from the intervention group, because of either not participating in the educational sessions (n = 5) or migration (n = 2), and also seven individuals were excluded from control group for either not completing the questionnaire (n = 6) or migration (n = 1). Hence, the analysis was conducted on 56 individuals in each group. Samples were selected by convenience sampling from mothers with children under the age of six who referred to four health centers in Azad-Shahr, and then were randomly assigned to the intervention (n = 56) and control (n = 56) groups through random allocation rule method.

Inclusion criteria were mothers with children under the age of six; healthy children, both in the intervention and control groups (if the ill children were considered in the intervention group, they would be considered in the control group too). Exclusion criteria were lack of mothers' willingness, losing motivation for participation in the educational sessions, and being absent in more than one educational session.

3.2. Instruments

Data collection instrument was a researcher-made questionnaire consisted of three sections. Section one contained demographic questions, section 2 included the questions related to the knowledge of preventing self-medication for the children (11 questions), and section three included attitude constructs (9 questions), subjective norms (8 questions), the perceived behavior control (11 questions), behavioral intention (6 questions), and performance assessment (14 questions).

Scoring the questionnaire in the knowledge section with 11 items was based on three or four choices, and then a correct choice was scored one and other choices were scored zero while in performance assessment, the correct behaviors were scored one and the wrong ones were scored zero. Questions of attitude, subjective norms, perceived behavior control, and behavioral intention were scored according to the Likert's five scales: from completely disagree (score 1) to completely agree (score 5). The total score in each item was calculated based on 100 scores.

The instrument validity was measured using content validity method. The questionnaire was evaluated by experts and qualified professors based on the TPB as well as the valid resources (2, 5, 6, 8, 10-13). The primary questionnaire was revised so that 6 items were deleted because of low validity. Finally, content validity rate and content validity index were calculated as 0.85 and 0.95, respectively. Then reliability coefficient was calculated for all structures and for each structure separately, using Cronbach's alpha. Three items were removed because of low reliability. Finally, the internal consistency achieved by Cronbach's alpha revealed that all coefficients were favorable and satisfactory; consequently, the coefficient was 0.704 for knowledge, 0.74 for attitude, 0.71 for the mental norm, 0.70 for perceived behavior control, 0.86 for behavior intention, and 0.76 for performance assessment.

3.3. Educational Intervention

Before the educational intervention and during the pre-test phase, the questionnaires were completed by the female interviewees. After the primary assessment, the encoded data were applied as input in order to determine the educational requirements and the structures that should be considered in the educational sessions. Then the educational theory was implemented based on the need assessment, and the lesson plan was prepared for four 60-minute weekly sessions. The educational plan was implemented using direct and indirect methods for the intervention group. Direct methods were applied to enhance the knowledge about self-medication, side effects of drugs (the possibility of more vulnerability in children and being at risk), and to correct mother's mistakes through lectures and question and answer sessions, etc. Attitude, which is defined as a mother's belief about self-medication and its consequence for her child, was assessed through group discussion and brainstorming. Perceived behavior control is a mother's beliefs about the factors that may facilitate or prevent self-medication in her child. Perceived behavior control is increased when mothers perceive they have more resources and self-confidence. In the intervention program, it was tried to increase the control of the mothers' perceived behavior by providing information, guidance, verbal encouragement, and reducing their anxiety. Perceived behavior control was assessed through lectures and group discussions. Behavioral Intention is defined as mothers' motivation for a plan or decision to perform preventive behavior of self-medication in their children. In general, the more the mother's behavior is intentional, the greater the probability of doing health behavior is. Subjective Norm in the intervention programs refers to the belief of mothers about whether they find themselves under the pressure of important persons (such as husbands, health employees, physicians, and so on) for self-medication in their children.

In this study, indirect methods were implemented by giving handouts, posters, and handbooks to the mothers with children under the age of six to affect their behavior about their children. The methods helped to use the time perfectly and they were used also as complements for the educational sessions and sources in order to improve the education and make them easier to learn. The control group received no intervention.

According to the Stony Hutu and Stutz Levine's studies, and given the dependency of the follow-up time to the behavior, structures, and the selected educational theory, and because changes of TPB structures are possible in three months (14, 15), the time required to implement the educational methods was three months. After three months, the post-test was administrated to both groups and the pre-test questionnaire was again administrated. The effectiveness of the educational intervention was determined based on two factors: (1) promotion of preventive behavior among mothers concerning the self-medication in children, and (2) reduction of the prevalence of self-medication in children.

3.4. Data Analysis

The data were analyzed with the SPSS software (Statistical Package for the Social Sciences, manufacturer: IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp) using descriptive statistics (mean, SD, frequency, and percent) and inferential statistics (independent *t*-test for comparison of the scores changes between the two groups, paired *t*-test for comparison of the scores changes before and after the intervention, and chi-square test for comparison of the prevalence of self-medication and qualitative demographic variable between the two groups). In order to verify the data normality, Kolmogorov-Smirnov test was applied. The significant level of the tests was determined as $P < 0.05$.

3.5. Ethical Considerations

The present study was approved by the Research Council of Arak University of Medical Sciences (Grant Number:

1136). The Ethics Committee approval code number is (93-163-17). This study has been registered in the Clinical Trial Registry with the code of 1 N20140821188893IRCT. Moreover, written informed consent was obtained from the mothers and all the procedures performed in the study, involving human participants were in accordance with the ethical standards.

4. Results

The results of the study showed that the mean ± SD of age in the intervention and control groups were 29.06 ± 5.33 and 28.20 ± 5.08, respectively (P = 0.358). The mean ± SD of the educational status of mothers in the intervention and control groups was 11.74 ± 3.37 years and 11.60 ± 3.02 years, respectively (P = 0.803). In both groups, the differences in age, parents' educational status, number of children, occupation, and housing and health insurance were not significant, and they were nearly the same in terms of qualitative and quantitative variables (Table 1). Before the intervention, the mean score differences between the two groups was not statistically significant, concerning their knowledge, attitude, subjective norms, the perceived behavior control, behavior intention, and performance. The results revealed a significant difference between the knowledge and the performance variable scores, before and after the intervention, while the difference was not significant for attitude, mental norms, perceived behavior control, and behavior intention. Also, in the control group there appeared just a significant difference regarding the mean score reduction for the perceived behavior change (Table 2).

Moreover, the results of the study revealed no significant difference among the intervention and control groups before and after the intervention, concerning the knowledge, mental norms, perceived behavior control, and behavior intention. Their only difference related to the performance variable (Table 2). A significant difference was found in the prevalence of self-medication before and after the educational program in the intervention group from 32.4% (n = 18) to 8.92% (n = 5), respectively (P = 0.014). However, the prevalence of self-medication in the control group before and after the intervention was 26.78% (n = 15) and 21.42% (n = 12), respectively that showed no significant difference (P = 0.38). Therefore, based on the chi-square test, the prevalence of self-medication between the intervention and control groups was significantly different three months after the educational program (P = 0.02).

Table 1. Demographic Characteristics of the Intervention and Control Groups

Group	Control	Intervention	P Value
Range of mother age, y			0.651
Less than 20 years old	3 (5)	1 (2)	
20 - 25 years	12 (21)	11 (19)	
26 - 30 years	21 (39)	25 (45)	
31 - 35 years	14 (25)	15 (26)	
More than 35 years old	6 (10)	4 (8)	
Range of education mother, y			0.562
Less than 5 years	2 (4)	0 (0)	
5 - 10 years	14 (25)	17 (30)	
11 - 15 years	28 (50)	24 (43)	
More than 15 years	12 (21)	15 (27)	
Total number of children			0.399
One	28 (50)	31 (55.35)	
Two	22 (39.28)	17 (30.35)	
Three	5 (8.93)	6 (10.72)	
Four and more	1 (1.79)	2 (3.58)	
Occupation			0.268
Working mothers	5 (8.93)	9 (16.07)	
Housewives	51 (91.07)	47 (83.93)	
Housing			0.175
Property	24 (42.85)	29 (51.78)	
Tenement	32 (57.15)	27 (48.22)	
Heath insurance			0.679
Yes	43 (76.78)	46 (82.14)	
No	13 (23.22)	10 (17.86)	

[a] Values are expressed as frequency (%).

5. Discussion

The findings of this study revealed that the educational intervention led to a significant enhancement in mothers' self-medication preventive behavior and reduced self-medication for their children in the intervention group. Due to the lack of similar studies on the prevention of self-medication in children based on the TPB theory, the results of this study are compared with other close studies. For instance, Shamsi et.al investigated the effect of health education program based on the health belief on the self-medication preventive behavior among pregnant mothers who referred to health centers. They achieved similar results about the efficiency of the educational program on the improvement of the pregnant mothers' knowledge (11).

The meaningful change of the mean score of knowl-

Table 2. Comparison of the TPB in the Intervention and Control Groups Before and After the Intervention[a]

Group	Control (n = 56)	Intervention (n = 56)	P Value[b]
Knowledge			
Before	63.63 ± 16.354	63.149 ± 16.30	0.875
After	66.07 ± 16.581	70.454 ± 15.334	0.149
P-value[c]	0.332	0.008	
Attitude			
Before	73.80 ± 11.855	74.682 ± 11.501	0.693
After	73.69 ± 11.611	77.500 ± 9.884	0.064
P-value[c]	0.948	0.151	
Subjective norms			
Before	73.08 ± 8.380	73.437 ± 9.671	0.835
After	73.34 ± 7.389	74.821 ± 8.671	0.335
P-value[c]	0.851	0.409	
Perceived behavior control			
Before	76.75 ± 9.436	76.103 ± 8.883	0.708
After	73.66 ± 7.088	76.103 ± 9.573	0.129
P-value[c]	0.021	1.000	
Behavior intention			
Before	84.82 ± 10.008	86.964 ± 11.708	0.300
After	84.10 ± 8.214	86.845 ± 10.998	0.138
P-value[c]	0.630	0.955	
Performance			
Before	84.47 ± 11.385	83.859 ± 13.025	0.790
After	86.88 ± 14.846	93.818 ± 10.363	0.005
P-value[c]	0.312	0.001	

[a] Values are expressed as mean ± SD.
[b] Independent *t*-test.
[c] Paired *t*-test.

edge in the intervention group was expected compared with the control group and it reflects the impact of the educational intervention on the improvement of the mothers' knowledge with children under age six. These findings are in conformity with many intervention studies (16, 17); although the study of Movahed et al. (12) suggested no meaningful difference between the intervention and control groups, before and after the intervention. The reason could be the low level of education of the subjects. Therefore, it is essential that the content of the educational texts be tailored to the characteristics of the participants. Failure to observe health behaviors is common among educated, illiterate, wealthy, and poor societies. The right or wrong behaviors are parts of the culture of every society. The readiness of people to learn and adopt the correct lifestyle for maintaining health in a society requires reforming their behaviors (18).

In this study, the mean score of attitude was increased in the intervention group; however, this increase was not significant. In contrast, the control group did not show any increase in this variable. The increase may be due to the educational courses hold on self-medication for the intervention group. Having knowledge about the risk of the problem improves this attitude among the group members. In fact, researchers believe that knowledge by itself does not suffice for the adoption of preventive behavior, but the attitude and opinion about a disease or a non-health behavior are important in preventive activities. In a study on self-medication among students, 56.3% of the interviewees accepted to study guidelines to refrain from self-medication (12). This is in conformity with the findings of the present study. Therefore, the guidance of the health centers employees and the TPB in the form of educational classes would be effective in this regard.

The interesting result of the study is that the perceived behavior control remained unchanged in the intervention group. Hence, one may conclude that deciding to do the preventive behaviors faces some barriers (19) and since self-medication is rooted in the wrong ideas and culture of a society, the unchanged perceived behavior control may be a sign of the inefficiency of educational courses to overcome the barriers. However, the structure reduced in the control group significantly. The reason may be the profound effects of the cultural factors on self-medication.

Concerning the behavior intention, the results of the present study revealed no significant difference in the intervention group before and after the intervention; meanwhile, it is reduced in the control group significantly. This may be related to the role of influential environmental factors on mothers' intention of self-medication. These factors can be due to the effects of endemic diseases of the winter and summer seasons. Zhang et al. reported the improvement of mothers' perceived behavior control and behavior intention following the interventions (20). Moreover, a qualitative study about self-medication among the elderly was conducted in Iran and emphasized that all social groups need proper education in the field of proper drug use (8). In this study, the prevalence of self-medication before the educational program in the intervention and control groups was 32.4% and 26.78%, respectively. These findings showed that unfortunately in spite of the risks and potential harms that can be caused by self-medication, previous epidemiological studies have revealed that self-medication is common among children by their mothers. For example, in a systematic review, self-medication prevalence ranged from 2% to 92% in differ-

ent countries (2) and another study conducted on children in Germany indicated that 25.2% had used self-medication (4).

The results of the present study showed that self-medication was reduced significantly three months after the educational program in the intervention group, which is confirmed by many intervention studies results (13, 20, 21). However, this study relies on the researchers' knowledge and is based on the TPB, where the self-medication for the children is considered to be an influencing index of educational efficiency. Actually, the effectiveness of the intervention in this study can be related to the educational methods such as using the handouts and handbooks, holding educational courses, etc., which led to the promotion of the TPB structures, a considerable knowledge enhancement, and finally the reduction of self-medication. Hence, comparing the current study with other ones seems difficult. Nevertheless, the efficiency of the interventions is obvious in other health behavior areas. For instance, Mohammadi Zeidi et al. suggested that educational intervention improved workers' safety performance (22). Zhang et al. also stated that this model increased women's motivation for feeding their infants and for natural delivery as well (20).

5.1. Limitations and Strengths of the Study

Some limitations of this study could be the difficulty of measuring the performances due to the use of self-reports (questionnaire). Therefore, the performance of mothers in self-medication for children over the past three months was assessed. Another limitation was the lack of complete cooperation of the mothers during the intervention and some individuals were excluded from the intervention and control groups. One of the strengths of this study could be conducting an educational intervention according to the need assessment based on the TPB model and following up the samples for the effectiveness of the educations in reducing self-medication for children.

5.2. Conclusions

The present study was conducted based on maternal education and training. The results showed that TPB-based education for mothers of children under age six can improve their knowledge and attitudes and increase their understanding and can also improve practices related to the lack of self- medication for their children. Therefore, due to the high cost of drug production and the side effects of self-medication, especially in vulnerable periods such as in childhood, it is recommended that educational programs based on this model be carried out in other health care centers in order to maintain the health of children.

Footnotes

Authors' Contribution: Study design: Mohsen Shamsi, Nasrin Roozbahani, and Samaneh Mozafari; data collection: Samaneh Mozafari; analysis and interpretation of the data: Mehdi Ranjbaran; drafting of the manuscript: Samaneh Mozafari, Mohsen Shamsi, and Nasrin Roozbahani; critical revision of the manuscript: Mohsen Shamsi, Nasrin Roozbahani, and Mehdi Ranjbaran; study supervision: Mohsen Shamsi. All authors read and approved the final manuscript.

Clinical Trial Registration: This study has been registered in the Clinical Trial Registry with the code of 1 N20140821188931RCT.

Conflict of Interests: The authors declare that there is no conflict of interests.

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