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The Effect of Training Health Care Providers Using Gamification Method on Social Skills of Preschool Children

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Abstract

Background: Preschool is one of the most important ages in learning and developing social skills in children. One of the most important issues in the education of healthcare providers is to improve their knowledge about children's social skills because healthcare providers, as an important part of a health team, are at the forefront of communication with families.
Objectives: This study was done to investigate the effect of education to health care providers with the gamification method on the social skills of preschool children.
Methods: In the present quasi-experimental study, 71 female healthcare providers working in selected collective health centers in Shiraz, Iran, were included in the study. The educational content of this study was an educational software as question games based on gamification, which was provided to healthcare providers. Data collection tools were two questionnaires, including a demographic information questionnaire and a researcher-made questionnaire on social skills in preschool children. To analyze data, the effectiveness of the intervention was measured using Wilks' lambda multivariate test. The relationship between knowledge score and participants' demographic variables was assessed by the linear regression analysis. Data were analyzed using SPSS software (version 22).
Results: There was an increase in the knowledge of healthcare providers at three-time points, including before, immediately after, and one month after the educational intervention. Significant relationships were also observed between mean knowledge scores of the participants in all components of the questionnaire before, immediately after, and one month after the intervention ($P < 0.001$), with significant increases in mean post-intervention scores. The knowledge scores at three-time points, before, immediately after, and one month after the intervention, had significant associations with the educational level of participants ($P < 0.001$).
Conclusions: Increasing the awareness of health care providers through the gamification method showed that this method has an important role in implementing social skills training for children.

Keywords: Education, Game, Healthcare Providers, Knowledge, Social Skills

1. Background

Social skills are referred to a series of special behaviors that occur in specific situations and are followed by the judgment of others (1). These skills are a set of socially accepted behaviors that, while creating the best possible interaction between people, enable them to avoid inappropriate behaviors (2, 3). Children are the important future builders of any country (4). Preschool is one of the most important stages for learning and developing social skills in children (5). In this period of life, children should learn the social skills necessary to communicate and interact with others in the living environment (5, 6). The development of social skills in children helps them to communicate properly with others (3). Increasing the development of social skills in children leads to a better performance in social life (7). If social skills are not established sufficiently in the early stages of development, it will cause problems in the preschool period and will additionally have undesirable consequences for children (3, 8). Experts believe that behavioral and social problems usually persist in preschool ages (9). Some of the social skills include cooperation, assistance, communication with peers and adults, problem-solving, maintaining friendship, empathy, and self-control (2, 10, 11). Although some social skills are acquired through observation and conversation with others, some children have difficulty in performing these behaviors (12). It should be noted that it is not easy to rec-

ognize the social skills of children and is dependent on the extent of a trainer's knowledge of children (8).

Education acts as a factor in changing and developing humans (13). Today, digital education is one of the most common ways of advancing education and learning in the field of health education (14). When people use a combination of pictures and words instead of texts and speeches alone, they understand and memorize subjects better. Multimedia education as the core of multimedia learning indicates that learning increases in individuals using words and images (15).

Today, the wide use of mobile phones is on the rise, with about 30% of users worldwide. At present, mobile phones are also rapidly used in health programs (16). In this regard, gamification is an intellectual and mechanical game-making process used by people for solving problems (17). This is a common process in teaching that uses the principles and methods of gaming in a non-game environment such that it motivates and actively involves people in learning; gamification also influences the behavior of participants (18-21). This method provides a pleasant environment for learners during the training (22) and makes the participants satisfied with their activities (23). In the health system, a group of people with sufficient knowledge and skills in the field of health services who provide the general public with health services is known as a health team; healthcare providers are part of a health team (24, 25). The health team emphasizes using empowerment methods to promote health and quality of life (26). In this regard, training can make employees behave more effectively at work (27).

Unfortunately, no studies have been found in the literature on the knowledge of health care providers and the ways to increase this knowledge in relation to children's social skills.

2. Objectives

This study was done to assess the effect of training health care providers using the gamification method on the social skills of preschool children.

3. Methods

In the present quasi-experimental study (pre- and post-intervention), the statistical population consisted of all healthcare providers who were active in general health centers in Shiraz, Iran, in 2020. In this research, a sample size of 71 female people was calculated by considering a loss of 20%, according to Barzegar Bafrooei and Amogadiri (28).

In each center, people who met the inclusion criteria, namely having an associate, bachelor's, or master's degree in midwifery or general health and full-time workers with at least one year of experience, were invited to participate in the study through random sampling.

Data collection tools were two questionnaires: (1) demographic information (level of education, age, marital status, number of children, type of employment (contractual & fixed-term), field of study, job experience); and (2) a researcher-made questionnaire related to social skills of preschool children (game, group activities, communication, dialogue, emotional, assistance/cooperation of the child, assertiveness, imitation, and modeling).

To evaluate the knowledge of healthcare providers concerning social skills of preschool children, a researcher-made questionnaire with 25 items was designed and scored on a 5-point Likert scale: I strongly agree (5), I agree (4), I have no opinion (3), I disagree (2), and I strongly disagree (1). In this questionnaire, two questions were also included negatively. The minimum and maximum total scores of the questionnaire were 25 and 125, respectively.

The validity of the questionnaire was evaluated via the content validity method (0.89) using comments of 10 experts who were the faculty members of Shiraz University of Medical Sciences. The reliability of the questionnaire was determined by the test-retest method on 20 samples with a 2-week interval, and after calculating the correlation coefficient, these individuals were excluded from the main study. This questionnaire had very good reliability with a correlation coefficient of 0.9.

In this study, the participants first completed the questionnaires as a pretest. In the next stage, the teaching content was provided to participating healthcare providers in the form of software designed using gamification-based questions, which was prepared with the unity game-making engine in C sharp language. This software comprised 40 questions in eight areas of social skills of preschool children and was designed with serious game elements for mobile phones with an Android operating system, developed with at least version 4.1 and above. At the beginning of the game and the loading of the questions, the questions and the answers were arranged differently using the Knott or Fisher-Yates shuffle algorithm, except for the skill arrangement. During answering the questions, feedback was also given to the participants through the software at each stage. The subjects re-completed the questionnaire immediately after the game and one month later.

After obtaining a code (IR.SUMS.REC.1398.89) from the ethics committee of Shiraz University of Medical Sciences, the research goals were first explained to the subjects, who

completed informed consent forms. Participants were then assured that all personal information would remain confidential, and they were free to withdraw from the study with no professional consequences at any part of the study, meaning that they would not face difficulties at their jobs. The questionnaires were provided in coded form to the participants.

To analyze data, the effectiveness of the intervention at intervals was measured using Wilks' lambda multivariate test. The relationship between knowledge score and participants' demographic variables was assessed by the linear regression analysis. Data were analyzed using SPSS software (version 22) at a significance level of 0.05.

4. Results

in this study, 71 participants from two large and main health centers in one of the southern cities of Iran were included, of whom 76.1% (n = 54) and 23.9% (17 people) were married and single, respectively. Most of the participants (35.2%, n = 25) had two children, and the majority (56.3%, n = 40) had a bachelor's degree. A public health degree and a midwifery degree were recorded in 50.7% (n = 36) and 49.3% (n = 35) of the participants, and most of them (60.6%, n = 43) were employed on a contract basis. The age of participants averaged 38.39 $\pm$ 7.26 years, with a job experience of 12.62 $\pm$ 7.58 years.

The results of Wilks' lambda multivariate test showed that the average score of knowledge of individuals in all components increased significantly after the intervention, which means that the educational intervention was effective ($P < 0.001$). After one month of the intervention, the participants' knowledge score decreased slightly, but it was still significantly higher than before this study (Table 1).

According to analytical results of the linear regression test to measure the relationship between knowledge scores and demographic variables of participants, there was a relationship between knowledge scores before, immediately after, and one month after the intervention with the level of education ($P < 0.001$). The knowledge scores of people with a master's degree were significantly higher than the other groups. In addition, a significant relationship was found between knowledge scores and the type of employment (contract and permanent) one month after the intervention ($P = 0.023$) (Table 2).

5. Discussion

This study was conducted to assess the knowledge of health care providers about the social skills of preschool children after using the gamification method. The results of the study showed significant increases in mean post-intervention scores. There was also a significant relationship between the mean total score of health care providers' knowledge about children's social skills before, immediately after, and one month after the intervention. The average total score of individuals increased after the intervention, which indicates the effectiveness of gamification on the knowledge of health care providers. No similar study was found in the literature review. However, the findings of some studies are comparable to our study; for example, studies that have examined the impact of social skills training programs. In one study, the level of knowledge of teachers about children's social skills was measured after social skills training. In this study, 17 teachers were in the control group, and 12 teachers were in the experimental group. The final results showed that the 4-session training program was effective and its effects were sustainable (29). Also, other researchers reported that an educational program increased teachers' knowledge regarding the social needs of students with attention deficit hyperactivity disorder (ADHD) (30).

Another study was conducted to investigate the relationship between teachers' level of knowledge about teaching social skills and social skills of the students. The results indicated that the teachers' level of knowledge about teaching social skills and social skills of students with special needs was moderately correlated, while the teachers' level of knowledge about social skills training and social skills of regular students was highly correlated (31). No educational intervention was performed in the mentioned study. According to the findings of this study and the results of the present study, it is expected that training health care providers through the gamification method can increase students' social skills. Another finding of our study was the relationship between participants' level of education and their knowledge scores on children's social skills. Accordingly, the average knowledge score of people with a master's degree was significantly higher than others, which showed the effect of the academic degree as a variable on the level of health care providers' knowledge. However, these results were not parallel to the findings of Yildiz et al., who reported that the academic degree of teachers was not an effective variable on the level of knowledge of teachers (31).

Regarding the educational method, the results obtained in studies conducted by Fernandez-Rio et al. on 290 students and by Ferriz-Valero et al. on 62 and 65 people in the case and control groups, respectively, have been shown that gamification has an influential role in increasing motivation, attention, and learning with a positive effect on

Table 1. Relationships Between Knowledge Scores in Various Areas at Different Times of the Intervention [a]

Skills Domain	Knowledge Scores			P-Value
	Pre-intervention	Immediately After Intervention	One Month Post-intervention	
Game	16.16 ± 2.32	23.00 ± 1.88	22.25 ± 1.63	< 0.001
Group activities	9.73 ± 2.10	13.67 ± 1.27	12.92 ± 1.43	< 0.001
Communication (nonverbal)	11.81 ± 2.73	18.33 ± 1.38	17.59 ± 1.56	< 0.001
Dialogue	8.26 ± 2.21	13.63 ± 1.33	13.00 ± 1.34	< 0.001
Emotional	6.01 ± 1.89	9.18 ± 0.91	8.74 ± 1.09	< 0.001
Assistance/cooperation of the child	15.21 ± 3.27	22.71 ± 1.82	22.04 ± 1.70	< 0.001
Assertiveness	6.25 ± 1.65	91.18 ± 0.86	8.67 ± 1.05	< 0.001
Imitation and modeling	3.29 ± 1.28	4.54 ± 0.58	4.35 ± 0.67	< 0.001
Total knowledge score	76.76 ± 8.98	114.28 ± 5.40	109.59 ± 5.77	< 0.001

[a] Values are expressed as mean ± SD.

Table 2. Relationships Between Average Knowledge Scores and Demographic Variables of the Subjects

Intervention Time/Demographic Variable	β	T	P-Value
Pre-intervention			
Level of education	0.736	9.028	> 0.001
Age	0.053	0.643	0.523
Marital status	0.036	0.434	0.666
No. of children	-0.039	-0.475	0.636
Field of study	-0.105	-1.292	0.201
Type of employment (contractual & fixed-term)	0.140	-1.734	0.087
Duration of job experience	-0.059	-0.724	0.471
Post-intervention			
Level of education	0.631	6.753	> 0.001
Age	0.125	1.347	0.182
Marital status	0.079	0.831	0.409
No. of children	0.086	0.907	0.368
Field of study	-0.154	-1.669	0.100
Type of employment (contractual & fixed-term)	0.141	1.520	0.133
Job experience	-0.067	-0.713	0.478
One month post-intervention			
Level of education	0.589	6.082	> 0.001
Age	-0.025	-0.250	0.803
Marital status	0.101	1.006	0.318
No. of children	0.022	0.214	0.831
Field of study	-0.053	-0.531	0.597
Type of employment (contract & permanent)	0.225	2.321	0.023
Duration of job experience	-0.140	-1.417	0.161

the performance of students. Also, in another study conducted by Lo et al., it was shown that compared with traditional learning, gamification has a more significant effect on learning (32-34). The results of these studies, which have indicated the positive educational effect of the gamification method, are consistent with our findings. However, these studies were performed on students, and our study was performed on health care providers.

5.1. Conclusion

Increasing the awareness of health care providers through the gamification method showed that this method has an important role in implementing social skills training for children. The significance of the results of this study is that health care providers act like teachers in the health system. Informing health care providers and increasing their knowledge will lead them to a better

understanding of children, proper assessment of their social skills, and better education to children, parents, and teachers.

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Footnotes

Authors' Contribution: All authors had substantial contributions to the design of the literature search, drafting the article, and reviewing.

Conflict of Interests: The authors declare that they have no conflict of interests.

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Informed Consent: Participants completed informed consent forms.

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