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Designing, assessing, and effectiveness a psychological interventions program with a robot for children sexual care

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Abstract

Background Child sexual abuse has deep and profound effects on personality and growth of children so that it is recognized as one of the major health issues in different countries. A psychological interventions program with a robot was designed and its effects on children sexual care was examined.

Results The results showed that experts confirmed and supported 85% of the total content of the program and the sessions, and the program was effective in improving sexual cares in the subjects ($p < 0.01$).

Conclusion The program to protect children against sexual abuse through empowering them by the skills to protect themselves, recognize good and bad physical touches, and find a trustable adult can be considered as a therapeutic method by consultants, psychologists, and authorities.

Keywords Prevention program, Sexual care, Psychological intervention, Children, Robot

Background

Children constitute a major part of the world population, so that they are about 50% of the total population in the developing countries [1]. Children and teenagers are important parts of any healthy society and deserve extensive mental health care to ensure their mental and physical health. Through this, children can assume their social responsibility and role in adulthood. Having the right knowledge and insight into the different physical and mental aspects of this age group and necessity to work hard to provide a decent physical and mental conditions for their emotional, intellectual, and physical growth are beyond any question [2].

Child sexual abuse is one of the most prevalent and complicated psychosocial issues in society. It has undeniable effects on child's mental health. This social issue affects and harms thousands of children in the world. The growing trend of such crimes risks the future of hundreds of children. Doubtlessly, no event like sexual abuse can destroy the future of children. Unfortunately, the extent of the crime is growing all around the world [3]. There is no detailed statistics of child abuse in Iran and the figures announced by some of the media are nowhere close to the reality. The religious culture in Iranian society makes many victims of this crime not to publicly ask for help as way to protect the family's pride. This is more common in the cases that girls are the victims. Child abuse does not usually happen in public and families that experience such crime usually prefer to hide it and this prevents supervision and prevention by the law [4, 5]. Evidences have shown that the risk factors of sexual abuse against children are bullying, sexual abuse by individuals with homosexual traits, childbearing methods of parents, poverty, alcohol abusive use, inequality as a social norm, lack of empowerment of girls and women, ruling power of

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men, and laws and policies that promote gender inequality [6]. Therefore, experts' role to prevent such crimes is more important than ever. Assessing and providing psychotherapy and consultation services to prevent such crimes are more efficient and economic than providing treatments after the crime. Such measures also decrease the level of damage and disorders caused to the victims [4]. Children older than three years have the capability to learn about some of sexual and protective matters. Therefore, it is possible to increase personal safety skills and self-knowledge in these children [7]. Through education and psychological intervention (e.g. behavioral, cognitive, cognitive-behavioral, supportive treatments, interpersonal psychological interactions, mentality and the like) children can learn interpersonal communication and problem-solving skills. They can also learn coping skills to deal with their [8]. Implementing these interventions using robots and game playing can be more efficient as playing are better ways to attract children's attention. Robots are very useful for therapeutic purposes so that their natural attraction makes them an efficient motivational tool for educational purposes [9].

Therefore, educating and informing children is one of the ways to control child abuse. Many countries with successful experience in controlling child abuse have relied on educational and informing measures for children and families [10].

The public bodies in charge of controlling and preventing social damages including child abuse and violence in Iran are Welfare Organization, Municipalities, and Police. In absence of a centralized command center, these organizations have failed to fulfill their responsibility in this regard.

Educating children and parents is one of the ways to fight social damages like child sexual abuse. Sexual care educations using smart robots and other interesting ways of providing education to children seems like an efficient way to attenuate the risk of sexual abuse in the society. A psychological interventions program was developed and implemented using a robot and the effects on sexual care in children were assessed.

Method

In this study, the researcher uses a qualitative method to develop a program or educational package of robot-based psychological interventions. Then, using the quantitative method, he manipulates the independent variable to check its effect on the dependent variables.

A) Qualitative method

The study was carried out as a qualitative work (codification of the program or educational package of

psychological interventions with a smart robot) following Delphi's approach.

Psychological interventions program with a robot

Step 1: theoretical background and literature review The psychological interventions program using a smart robot is one of the ways of providing care to children against sexual abuse. The program was designed based on the literature review results.

The available literature including articles and books were used to assess educational needs of children for prevention of sexual abuse. In addition, available curriculums or similar programs, if any, and available studies on the subject were found and used to determine the factors in education. In addition, strength and weakness point of the available programs with robots were examined. At first, the drawbacks of psychological intervention programs with robots in education and prevention of sexual abuse in children and pertinent cares were determined and used for further planning. In other words, determining the educational needs in terms of emotional (attitude), cognitive (knowledge), and skill needs was the first step for educational programming and the first factor to ensure efficiency and optimization. By taking this step in the right way, a more objective basis for programming can be achieved. There are different ways to determine educational needs and each has its advantages and limitations that make each one a better choice in different settings.

Step 2: examining the syllabus of educational programs The content of the psychological interventions program with a smart robot for children sexual care was designed and represented as a 11-session course (Table 1).

Step 3: designing and codifying the program content To design and interventional program using Delphi method, five experts in clinical and educational psychology were selected to examine the educational content (Table 1). Based on their opinions and analyzing the feedbacks, a pilot design of the intervention program was developed. It is notable that in addition to modifying the content, the number sessions decreased to 10. Afterwards, the final version of the program was designed based on the experts' opinion (Annex 1).

Step 4: revising and finalizing the program Based on the experts' opinions, sessions nos. 3 and 4 were combined and more applied items and instances were added to the educational assignments. Based on these three last steps,

Table 1 A summary of the content [3]

Session	Content
1	Educational program- introducing the robot
2	Introducing, familiarization, and awareness about the body parts
3	Awareness and familiarization with different parts of the body
4	Awareness and familiarization with private parts of the body
5	Recognizing different individuals (family members, acquaintances, and strangers)
6	How to communicate with family members, acquaintances, and strangers
7	Recognizing risky and dangerous situations and moments
8	Recognizing risky and dangerous situations and moments and the way to handle them (family)
9	Recognizing risky and dangerous situations and moments and the way to handle them (acquaintances)
10	Recognizing risky and dangerous situations and moments and the way to handle them (strangers)
11	General review of the course and all the items under consideration

the program was finalized and confirmed by experts. Therefore, the program was finalized with 10 sessions. To review the program and its comprehensiveness, a booklet was developed to be provided to the parents of subjects at the final session.

To examine construct validity of the interventional program, the theoretical foundations were examined in detail and based on the strong theoretical background, construct validity of the tool was supported. The authors and experts who helped us in the design of program supported face validity of the program. To design the program, the authors visited five experts of clinical and educational psychology and their feedbacks and opinions were used to finalized the program. All changes in the program were reported to the experts until finalizing the program. In other words, content validity of the program was supported by the experts.

B) Quantitative method

The study was carried out as a quasi-experimental work with pretest, posttest, and follow-up design and control and experiment groups. The follow-up test was conducted three months after the posttest stage. The study population consisted of all children at age range 8–12 (elementary school) in Ghaenat City, Iran in 2019. The sample group was comprised of 80 children at 8–12 years old range who were selected through cluster random sampling. The participants were allocated to two control groups (boys and girls each with 20 participants) and two experiment groups (boys and girls each with 20 participants). The inclusion criteria were desire to participate, age range 8–12 years, no acute mental and physical disease (based on interviewing and health checklist of students), and informed consent by the parents. The

exclusion criteria were missing one of the educational sessions, using specific medicines, participation in similar educational intervention at the same time, and reluctance to participate. There were no dropouts from the study and all the participants were retained for the follow-up and data analyses of results.

Data gathering was done using an endogenized questionnaire of knowledge and awareness of sexual abuse [11]. The questionnaire contains 33 items and its reliability has been reported equal to 0.65 and 0.74 by Jacqueline et al. and Gangos et al. respectively [12, 13]. The tool was validated for Iranian society by Tahan et al. [14].

The questionnaire is designed to measure information and learning performance of children about the key beliefs of sexual abuse. The tool is designed in a way that respondents can understand the questions without any background.

The Iranian version of the tool has 38 items with two-point Likert's scale (0=yes, 1=no). the minimum and maximum scores of the tool are 0 and 21 respectively. The higher the score the higher the respondent awareness of the concept of sexual abuse. The questionnaire is suitable for children at age range 8–12 years. The tool has two sub-scales of good touch (eight items) and bad touch (30 items). Psychometric data collected from the 80 participants in this study was examined and validity and reliability of the tool were tested using K-R20 test.

Implementation

After securing required permissions and an ethical code from the Research Department, Islamic Azad University of Birjand-Iran the authors visited the study site to establish friendly relationships with the officials of Ghaenat-based elementary schools. The school principals were briefed about the objective and importance of the study. Then the parents and teachers (based on

interview and health checklist) were invited to attend a briefing session to discuss the importance of the study. The parents of children signed an informed letter of consent and they were insured that their and their children's personal information and name will remain confidential and their participations entails no cost and damage to the participants. Then, 80 students were selected randomly and allocated to control and experiment groups. At first, the questionnaire was filled out for the participants in the both groups (pretest). The experiment groups, then, received 10 sessions of group therapy (45 min, twice a week) where psychological interventions (using a robot) were implemented. The first session was held at Payam Salamt Clinic. Each session would be started by giving an introduction to the topic of the day and the robot would start the education. Powerpoint slides, movies, and so on were used in the course and after education the students would be motivated and encouraged for better learning. The session would be completed by answering probable questions and removing ambiguities. The sessions would be started by checking the home assignment of the previous session. The participants were required to complete their home assignment if any. Immediately and three months after the intervention the both groups filled out the questionnaire (posttest and follow-up respectively). Since the intervention was free of charge and in clinic under supervision of the authors, all the questionnaires

were completed. In observance of ethical codes, the control group received the same educations after the study. A summary of the sessions content is listed in Table 2. It is notable that the study was registered under the code IR.IAU.BOJNOURD.REC.1398.004 in the Ethics Committee of the Islamic Azad University and International Registry of Clinical Trial (ISRCTN17186302).

Data analyses were done using descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics (ANCOVA and ANOVA with repeated measures) ($P \leq 0.05$). The data included pretest, posttest, and follow-up data and SPSS (v.25) was used for data analysis.

Findings

Question statements 1: how to design and validate a psychological intervention program with a robot?

To validate the interventions program, triple reciprocal interactions and triangulation method were used. The assessment was done by psychologist experts. To validate using triangulation method, the authors provided the content of session along with detailed explanations and a four-item questionnaire to each expert.

The selected experts expressed their opinions based on a questionnaire for the content of each session. The statements of the questionnaire were designed based on Likert's ten-point score. The results are listed in Table 3.

Table 2 Summary of the content of psychological intervention program with robot [14]

Session	Content
Session one	Training program-Introduction to robots
Session two	Introducing, familiarizing and informing about body parts
Session three	Identifying, informing and becoming acquainted with important and private body parts
Session four	Learning to recognize people (distinguishing family members, acquaintances and strangers)
Session five	Learning how to connect with family members, acquaintances and strangers
Session six	Identifying dangerous and harmful situations and moments
Session seven	Identifying and introducing dangerous and harmful situations and moments and how to deal with them (family)
Session eight	Identifying and introducing dangerous and harmful situations and moments and how to deal with them (acquaintances)
Session nine	Identifying and introducing dangerous and harmful situations and moments and how to deal with them (strangers)
Session ten	Overviewing past topics and reviewing all items considered

Table 3 The questionnaire of the content of each session for content validation

1. Are the target, sub-targets, and content of each session are related to each other?	Very low	1	2	3	4	5	6	7	8	9	10	Very high
2. Is the content clear and easy to understand?	Very low	1	2	3	4	5	6	7	8	9	10	Very high
3. To what extent the content of each session is related to sexual care?	Very low	1	2	3	4	5	6	7	8	9	10	Very high
4. To what extent the content of each session is related to children sexual care?	Very low	1	2	3	4	5	6	7	8	9	10	Very high

After summarizing and analyzing the data, the intervention program was validated. To determine reliability of the program, criteria depended reliability tests were used through agreement percentage method.

As listed in Table 4, the mean score of consistency of experts' opinion about each session is higher than 8. In addition, total mean score of consistency about the total content is 8.46 out of 10. That is, the consistency among experts about the content of each session and all sessions is equal to 85%. This indicates a high reliability of the intervention program. To examine content validity in a quantitative way, content validity ratio (CVR) and content validity index (CVI) were used. Lawshe method was used to obtain CVR of the content [15]. To this end, the items of program were examined using three alternatives including "essential," "useful," and "not essential." The panel members judged every pieces of the content in terms of its necessity. The validity of the tool was obtained as follows:

$$CV_R = n_e - N/2 \div N/2$$

$$CR_R = \frac{\text{The experts who selected "essential"} - \frac{\text{Total number of experts}}{2}}{\frac{\text{Total number of experts}}{2}}$$

VC_R = content validity ratio

N_e = number of experts that found the session and educational content essential

N = total number of experts

To measure content validity index, Waltz and Bausell was used [16]. The CVI of each item (I-CVI) and total CVI (S-CVI) were obtained [17]. The results supported comprehensiveness of judgements about validity and feasibility of implementation of the final program. To calculate this index, three measure of specificity, simplicity, and clarity were examined for each item of the program using Likert's four-point score. To measure CVI of each

measure, the following formula was used [18]. The S-CVI for each item of the program included total mean scores of the triple measures for that item.

$$CVI = \frac{\text{Number of experts that gave score 3 or 4 to items}}{\text{Total number of experts}}$$

The items with score >0.79, were evaluated as acceptable. The items with 0.70 < score < 0.79 needed improvement and items with score < 0.70 were unacceptable and eliminated [19]. The mean CVI was used to examine total mean CVI (S-CVI/Ave) [17].

Validity coefficients for the 10 sessions are listed in Table 5. In addition, total content coefficient of the sessions was equal to 80%. Since, the closer the validity coefficient to 1, the higher the validity, validity of the intervention program is supported.

Question statement 2: Does psychological interventions program with a robot affect sexual cares in children?

To answer this question, univariable ANCOVA was used and before that the presumptions like normal distribution of the dependent variable, consistency of variances, and consistency of regression line slope were checked.

As listed in Table 6, the KS and Shapiro Wilk tests support normal distribution of all the elements of the study (p value < 0.05). Therefore, the first presumption is supported. with p value > 0.05, consistency of the variance of the groups is supported. Therefore, the presumption is supported. The f value of the interaction in pretest group is not significant ($p=0.34$); therefore, regression line slope of sexual care for the experiment and control groups is identical and the presumption of consistency of regression line slope is supported.

As listed in Table 7, $F_{1,75} = 24.80$ indicates that the effect of independent variable is significant ($p=0.00 < 0.01$).

Table 4 Experts' opinions ranking to determine consistency among the opinions or reliability of the sessions

Groups	n	Session no									
		1	2	3	4	5	6	7	8	9	10
Score of each session 1–10											
Psychologist	1	10	10	7	8	9	8	7	8	8	10
	1	9	8	9	9	8	7	8	9	7	9
	1	8	9	7	8	9	8	9	8	8	8
	2	9	10	9	8	9	9	7	7	9	8
	3	8	10	9	8	8	9	8	8	9	9
Mean		8.8	9.4	8.2	8.2	8.6	8.2	8.2	8	8.2	8.8
Reliability score		88%	94%	82%	82%	86%	82%	82%	80%	82%	88%
Total mean	8.46										
Total reliability	85%										

Table 5 Ranking by the experts to determine content validity of sessions

Items of the program	CVR		I-CVI			
			Relationship	Clarity	Simplicity	Total items
Training program -Introduction to robots	1	1	0.8	1	0.93	Appropriate
Introducing, familiarizing and informing about body parts	0.6	1	1	0.8	0.93	Appropriate
Identifying, informing and becoming acquainted with important and private body parts	0.6	0.8	0.8	0.8	0.80	Appropriate
Learning to recognize people (distinguishing family members, acquaintances and strangers)	1	1	1	0.8	0.93	Appropriate
Learning how to connect with family members, acquaintances and strangers	1	0.8	1	0.8	0.86	Appropriate
Identifying dangerous and harmful situations and moments	0.6	1	0.8	0.8	0.86	Appropriate
Identifying and introducing dangerous and harmful situations and moments and how to deal with them (family)	1	0.8	1	0.8	0.86	Appropriate
Identifying and introducing dangerous and harmful situations and moments and how to deal with them (acquaintances)	0.6	1	0.8	1	0.93	Appropriate
Identifying and introducing dangerous and harmful situations and moments and how to deal with them (strangers)	0.6	1	0.8	0.8	0.86	Appropriate
Overviewing past topics and reviewing all items considered	1	1	1	0.8	0.93	Appropriate
Total validity	0.8					
S-SCI/AVE					0.88	Appropriate

Table 6 Data distribution of the variable “children sexual care”

Result	Probability	Statistics	Test	Stage
Posttest	KS	Posttest	0.20	Normal
	Shapiro Wilk	Posttest	0.56	Normal

Table 7 Covariance analysis of the effects of psychological interventions program with a robot on sexual care of children

Cause of variation	Sum square	Df	Sum square	F	Sig
Pretest	1013.83	1	1013.83	116.21	0.00
Group	216.39	1	216.39	24.80	0.00
Gender	15.71	1	15.71	1.80	0.18
Gender*group	0.00	1	0.00	0.00	0.98
Error	654.33	75	8.72		

In other words, there is a significant difference between the mean score of sexual care in posttest stage between the experiment and control groups.

Because of the independent variable (psychological interventions with a robot), the dependent variable (sexual care in children) to measure the effect of interventional programs in pretest, posttest, and follow-up stages on the two groups (experiment and control), frequent measures ANCOVA was used. The results supported the effect of intervention.

As listed in Table 8, the significant effect in a specific stage indicates that the mean scores of children sexual care in pretest and follow-up stages in the experiment and control groups were significantly difference. In other words, posttest and follow-up scores were significantly different between the two groups ($p < 0.01$). In addition, there was a significant difference between the two groups throughout the study in terms of sexual care. That is, by removing the effect of pretest stage, the increase in sexual care in children in the two groups is notable. Therefore, the psychological interventions with a robot Was effective in improvement of children sexual care ($p < 0.01$).

Discussion and conclusion

A psychological interventions program with a smart robot for child sexual care was designed and assessed. Child abuse is a social damage and one of the first priorities of social hygiene and health in many countries. Many children become victims of war, sexual abuse, family violence, and human organs trafficking in the world every year. Child abuse (physical, emotional, sexual, and negligence) is not accepted in any society and it is a crime in many countries with heavy punishments [3, 20]. Children older than three years can learn about sexual matters and pertinent cares. Therefore, they can improve their personal safety skills and knowledge about safe relationships [7]. Through educational and consultation process using psychological interventions (behavioral, cognitive, cognitive-behavioral, supportive treatment, interpersonal

Table 8 Frequent measure ANOVA to compare posttest and follow-up scores of children's sexual care elements in the control and experiment groups with controlled pretest variable

Factors	Cause of variation	Sum square	Df	Mean square	F	Sig	Eta square	Effect size
Intragroup factors	Stage	78.31	1	78.31	17.17	0.00	0.19	0.98
	Stage*pretest	44.53	1	44.53	9.82	0.00	0.12	0.87
	Stage*gender	3.24	1	3.24	0.72	0.40	0.01	0.13
	Stage*group	117.49	1	117.49	25.90	0.00	0.26	0.99
	Stage*gender*group	1.54	1	1.54	0.34	0.56	0.01	0.08
	Error	340.24	75	4.54				
Intergroup factors	Pretest	1471.19	1	1471.19	134.29	0.00	0.64	1.00
	Gender	14.47	1	14.47	1.32	0.25	0.02	0.21
	Group	1001.29	1	1001.29	91.39	0.00	0.55	1.00
	Group*gender	1.35	1	1.35	0.12	0.73	0.00	0.06
	Error	1.35	75	10.96				

psychological interaction, mentality, and so on) children can learn communicational skills, interpersonal problem solving, and coping skills to deal with challenges [8]. Education is the most serious and influential way of preventing child sexual abuse. It is emphasized that children and teenagers who have learned these skills in early ages can employ such skills efficiently in their lives.

In examining the first research question based on “design and validate psychological intervention program with a robot” the findings showed that the proposed program can be used as one of the methods to prevent sexual abuse in children. The program was designed based on literature review [3, 5, 13, 21–25]. After implementing the opinions of psychology experts and modifications, the program was finalized. The key point of this finding is that to determine reliability of the program, criteria depended reliability tests were used through agreement percentage method. The agreement percentage in experts about the final content and total sessions was equal to 85%. The purpose of prevention program was to save children from sexual abuse by self-protection educations and teaching them how to recognize good and bad touches or how to find a trustable adult to seek help. As to the limitations of the study, paucity of similar studies in Iran about the intervention program is notable. As the results showed, future works can focus on skill learning with the help of robots and pilot education design.

In examining the second research question that “does psychological interventions program with a robot affect sexual care in children?” The results showed that the mean score of sexual cares in posttest stage in the experiment group increased compared to pretest stage ($p=0.00<0.01$; $F_{1,75}=24.80$); while the change in the control group was not significant. Therefore, the program affected the sexual care performance of children. This finding is consistent with Nevena et al., Shamsuddin,

Kozima et al., and Robins who showed that robots helped treatment performance in children [26–29]. Langevin, Czerwinski, Martin, Ladapo et al., and Jin showed that through timely and efficient sexual education to children, the negative effects of child sexual abuse can be avoided [22, 23, 30–32]. Ahmadi and Jaberzadeh showed that using proper and timely sexual education, it is possible to improve knowledge of individuals about sexual matters [3, 33]. Khanjari et al. reported that awareness, attitude, and performance of parents affected prevention of sexual misbehaviors in children [34]. Meinck et al., Abeid et al., Citak et al., Gangos et al. showed that educations to prevent child sexual abuse was possible and such measures increased child's knowledge about preventing and coping skills in the case of any risk of abuse [13, 21, 35, 36]. These results are consistent with our findings except for the fact that the present study examined the effect of psychological interventions using a robot on children sexual care and other studies have focused on specific element or variable separately. There has been no study on all the variables and their interaction so far, and this is a distinguishing feature of the present work.

In general, children have a limited knowledge about their safety and prevention of sexual abuse. Without efficient education, they are not able to tell abusive behaviors from normal behaviors. Studies have shown that increasing one's knowledge about sexual abuse is the best way to improve self-protection skills [37]. According to UNESCO, the primary goal of sexual education to children is to equip children and teenagers with the knowledge and skills so that they can learn specific values to make reasonable choices about their social and sexual interactions [38]. Despite the alarming statistics of child sexual abuse and children's need for education in this field, not all parents are ready to talk to their children about such potential risks. Those parents who may talk to their children

about sexual abuse tend to have a higher education level or be engaged with the issue more than others (e.g., those who know more about the victims of child sexual abuse or the victims). Personal safety educations to children are as important as education about road traffic or safety. When this education is coordinated with other aspects of growth and cogitation level, it becomes integrated to other aspects of safety and protection [5]. Statistics show that children with more extensive knowledge about sexual topics like good and bad touches, know the name of their sexual organs, and the like are at a lower risk of sexual abuse [20, 39]. Gangos et al. showed in their study that sexual care education affected physical and mental health in children [13]. Wilen et al. reported that psychological interventions helped underaged victims of sexual abuse [40]. To elaborate on this finding, children tend to be less interested in direct education, while combining psychological interventions and playing with a smart robot adds to the attraction of education. In addition, the robot can act as a role model for children. Robots add to the attraction and purposefulness of creativity development in children, which adds to the efficiency of education as children will find the education as an entertainment. Children love playing and eagerly follow the education that is integrated into a game. Psychological interventions program using a smart robot for sexual care education improved mental picturing in children and the depth of learning in them. The intervention emphasized on active participation of children in education based on enabling children to control behavioral change in them and accept their responsibility for their choices [3]. In addition, the interventions alter children's feelings and attitudes about good and bad touches. The program was a framework for children to express part of their emotions, thoughts, and feelings. Demonstration of narrations about sexual matters, sexual cares, and familiarity with sexual organs enabled children to deal with such issues with more awareness and find creative solutions for them. They could also learn from the experiences shared with them in the course to protect themselves against sexual hazards and control their situation [13]. Therefore, sexual care education not only helps children with their reaction, but also affects their assessment of emotions when experiencing a threatening situation. The program also tried to make the children understand that like physical growth, sexual aspect of their life has its own stages and each stage requires a specific behavior and education. The children also learned about the necessity of preventing sexual abuse [24]. In fact, children tend to have no knowledge about sexual issues and how to deal with individuals who have ill will towards them. In addition, social and religious boundaries are

obstacles to proper educations in this field to children. In many cases, children become victims of sexual abuse only because they do not know how to avoid the risks or how to deal with such issues. Such experiences may lead to acute disorders in adulthood and disrupts physical and mental health of children [3]. The program is a new way deal with such challenges. Children can learn the efficient resistance style from the robot and learn about the ways to fight sexual abuse and the risks using the demonstrations in the course. Therefore, the program positively affected sexual cares performance in children.

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Authors' contributions

MT designed the study and conducted the literature searches, wrote the first draft of the manuscript. MT, GA, and JB assisted in the methodology and planning of the clinical trial. GA and JB revised the draft of the manuscript. All authors approved the final version of the manuscript.

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Availability of data and materials

The raw data supporting the conclusions of this manuscript will be made available by the authors, without undue reservation, to any qualified researcher.

Declarations

Ethics approval and consent to participate

To adhere to ethical considerations, In the present study, the parents who were interested in participation in the study were asked to sign a written letter of consent for their child's participation in the study. The participants were ensured that their personal and private information will remain confidential and that the study is in compliance with religious and cultural code. It is notable that the current research was approved by the ethics committee of the Islamic Azad University with the code if IRIAU.BOJNOURD.REC.1398.004 and this study registered in International Clinical Trial Registry Platform by number ISRCTN17186302.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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