

Teaching Social safety skills to Autistic children via digital learning

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Abstract

The rise in sexual abuse and abduction incidents has become a persistent societal problem in Pakistan which requires an inclusive response. However, one of the most neglected group out of this vulnerable population is of autistic children. The statistics from South-Asia estimate that there may be 350,000 autistic children in Pakistan. Individuals with ASD may be at an increased risk of danger including abduction or sexual abuse and might face difficulties discriminating between safe and unsafe situations. The aim of this study is to teach social safety skills --abduction and sexual abuse prevention-- to autistic children. This study employs a digital interventional methodology enabling autistic children to learn social safety skills in an easier way. An experimental design framework is selected for the purposes of this research. 6 autistic children, 5 male and 1 female, aged 12-14, sampled through convenience sampling participated in this research. Questionnaires and open-ended surveys were used as data collection tools. Results showed that the video-game methodology was effective in teaching social safety skills to children with autism. There was a significant difference between pre-test and post-test outcomes and results were maintained during a 5 week follow up.

Keywords: Autism, Social safety skills, digital learning, sexual abuse prevention, abduction prevention

In recent times, there has been an alarming increase in sexual abuse and abduction cases in Pakistan. This highlights the crucial need for practical and hands on interventions so that the vulnerable population can be protected. This population consists of women and children. However one of the most neglected group out of this population consists of autistic children.

Autism

It is estimated by the World Health organization (WHO) that around the world, about 1 in 160 children had autism (2017). Autism spectrum disorder (ASD) is a complex disability characterized by social communication and interaction impairments accompanied by repetitive behaviors, and restrictive interests and activities (American Psychiatric Association, 2013). Even though there is no reliable data available on Autism in Pakistan due to social stigmas associated with psychiatric disorders, it is estimated by the Pakistan Autism society that there are approximately 350,000 children diagnosed with ASD in Pakistan.

Pakistan and Autistic children

Child sexual abuse cases along with abductions are on the rise in Pakistan. In a report submitted by Sahil, 12 children suffered sexual abuse every day in Pakistan in the first half of 2023 (Sahil, 2023). Moreover, Pakistan is among the top five most dangerous countries in the world for kidnap according to global security red 24. Unfortunately the risk of getting harmed or kidnapped of children that suffer from developmental disabilities is far greater than typically developing children. The autistic community in Pakistan may come across significant difficulties in navigating social situations and understanding societal norms. This demographic may struggle to recognize and respond to unsafe situations and communicate about their experiences. Despite the critical need for immediate approaches to eliminate these threats, the current resources and support systems in Pakistan, are insufficient, which leaves the autistic community with a lack of necessary skills to guard themselves from unsafe situations.

Furthermore, the Pakistani society is hesitant on providing awareness regarding topics such as sexual abuse, which further obstructs efforts to address these problems. With limited resources in the country, it is essential to equip children with social safety skills so they can protect themselves.

Safety threats

When children are growing up they face numerous threats to their own safety, these are namely physical and social threats that come from interaction with their environment (e.g., drowning, accidents, abduction, sexual abuse etc.). Even though these threats might have a low frequency occurrence and can be highly dangerous (sexual abuse, abduction), they may come from regular events like playing in the park, crossing a street, (e.g., Miltenberger & Gross, 2011). High frequency safety threats are often probable and offer children many opportunities to practice them along with their parents to reinforce skills. For example, checking the signal or looking both ways before crossing a street. Whereas, low frequency/incidence safety threats are not probable therefore no opportunity is given to the children or parents to practice or reinforce skills consistently.

Sexual abuse and abduction

One of these low occurrence but highly dangerous safety threat that a child might face in his childhood is child sexual abuse. Child sexual abuse consists of sexual contact from a perpetrator (e.g., intercourse, oral sex, fondling), or exploitation without physical contact (e.g., video recorded while undressing or in sexual positions, children being subjected to pornography) (e.g., Finkelhor, Hotaling, Lewis, & Smith, 1990). Another low occurrence but highly dangerous social threat is abduction. Kidnapping is carried out by both, family members as well as strangers, but abduction carried out by strangers may have more serious and dangerous consequences such as sexual abuse, death etc (Gunby & Rapp, 2014; Johnson et al., 2005; Kutlu & Kurt, 2020; Miltenberger, 2008). Which is why it is of great importance that children equip themselves with skills in their repertoire, so that necessary action can be taken when faced with an abduction lure or sexual abuse.

Sexual abuse and abduction prevention skills

In Sexual abuse prevention skills, the child must show 3 skills to stay safe, these consists on (1) saying “No”, as a reply to a sexual abuse trap, (2) running away from the culprit, (3) confiding in a trusted grown up about the event. These are the skills that are taught in sexual abuse prevention skills training programs (Wurtele, 2008, 2009). These 3 safety skills namely “no”, run and tell, possess similar characteristics with safety skills learnt by children as a response to other safety threats like abduction lure (e.g. Johnson et al., 2005; Johnson et al., 2006). Unfortunately, children that have disabilities are exposed to a greater risk than children that do not have disabilities for being abducted by strangers (Clees and Gast 1994). Despite these facts, there is a shortage of research on instructing abduction prevention skills to children with developmental disabilities and only limited research is done on teaching these safety skills to children with autism (e.g., Bergstrom et al. 2012; Gunby et al. 2010; Gunby and Rapp 2014).

Digital Learning

Research has shown that one of the most interactive and engaging learning ways are for teaching autistic children are digital. The reason for that is that they align well with the sensory as well as cognitive likings of autistic individuals. As autistic individuals have strong visual processing skills, this makes digital learning highly effective for them. Even though digital learning is not used for teaching social safety skills to autistic children in previous literature, researches in other subjects shows promising results.

Problem statement

The autistic community in Pakistan may come across significant difficulties in navigating social situations and understanding societal norms, which can expose them to numerous social safety threats. These threats include serious dangers including sexual abuse and abduction. This demographic may struggle to recognize and respond to unsafe situations and communicate about their experiences. Despite the critical need for immediate approaches to eliminate these threats, the current resources and support systems in Pakistan, are insufficient. Moreover, Pakistan is still a developing nation and lacks resources and support systems, which leaves the autistic community with a lack of necessary skills to guard

themselves from unsafe situations. This gap aggravates the vulnerabilities of this demographic, which can further put them at risk of getting harmed or exploited. Furthermore, the Pakistani society is hesitant on providing awareness regarding topics such as sexual abuse, which further obstructs efforts to address these problems. This is why it's necessary to come up with an approach that is efficient and cost effective.

Significance of this study

There are many reasons why this study is significant, a crucial gap is being addressed by concentrating on the safety necessities of children with autism. Also this study aims to protect and empower the vulnerable population, i.e. autistic children, by providing essential skills and education to them so they can recognize as well as respond to potential threats. Moreover, this study adds to the wider discussion on inclusive safety education. By focusing on promoting inclusion and accessibility within the Pakistani society, this advocates for an inclusive approach that safeguards the safety of all children, regardless of their abilities. Furthermore, by stressing on the occurrences of social safety threats as well as the unique challenges faced by autistic individuals, this study will support for better attention as well as resources to be allotted to this problem. Finally this study will add to global efforts in the promotion of safety of the autistic population.

Objectives:

- The main objective of this study is to increase social safety skills, namely sexual and abduction prevention skills, of children with autism.
- Evaluate the feedback of teachers on the approach used in this study for teaching social safety skills to children with autism.

Method

An experimental design framework is selected for the purposes of this research as this aligns with the study as well as accentuates the employment of a controlled and planned intervention to measure its impact. A pretest-posttest design framework has been used as the main research design for this unique population. In this research, the intervention which consists of digital learning, namely videos and games which are employed to teach social safety skills to autistic children is our independent variable. Whereas, on the other hand, the social safety skills of the autistic students that are participating in the study is the dependent variable of this study.

Setting

This study was conducted in a special needs children school that catered to needs of all special children, and had trained teachers, psychiatrists and psychologists that were working together. A classroom was allotted for the study and the intervention was conducted by their respective teachers. A pretest and posttest assessment was conducted as well as teachers feedback in the form of surveys was collected as well after the intervention.

Research participants

6 autistic students participated in the study, sampled via convenience sampling, five males and one female, aged between 12-14 years, on level 1 & 2 of DSM. The choice to focus on this particular age group was because of the importance of initial adolescence as a serious developmental stage. Moreover it was ensured that these participants had no prior knowledge or had participated in any program that was on the topic of social safety skills.

Data collection instruments

The instruments used for collecting data for this study were questionnaires and surveys. Questionnaires were directed to the participants, whereas surveys were given to their teachers. These questionnaires were designed and were rated on a 5-points scale according to the guidelines (Lumley et al., 1998).

Selection of videos and game creation

The animated videos selected were by the nonprofit Barbara Sinatra Children's Center Foundation, these videos were carefully developed and scripted by a group of therapists, child advocates

and field experts. The main theme of these educational animations were safe and unsafe touches, appropriate responses to lures, confiding in a trusted adult when face with such inappropriate situations. These educational videos were in alignment with the aim of this study, empowering autistic children with appropriate response to social safety threats.

The next step was localization of videos so that they could be culturally appropriate and accessible. This included transcribing all narrative content and translate into the local language of Pakistan. The transcriptions facilitated in the process of making culturally relevant videos. The next step involved translating the transcribed narrations and dialogues into our local language. The translations were clear and easy to comprehend so that the vital message of the original videos would be effectively conveyed to the targeted demographic. Moreover, cultural appropriateness was enhanced by aligning expressions and cultural references with local norms and values.

Then the original videos were dubbed featuring localized voiceovers, capturing the tones of emotions which were present in the original videos. This was done on Videopad editor, which is a video editing software that allows users to create as well as edit videos. Another effort to make the content more culturally relevant and engaging was to give the characters in the videos local names so that the audience could relate with them. For example “Lenny” was changed to “Ali”. This would hence strengthen the connection among the autistic children as well as give a hint of familiarity, creating an immersive experience. Intentional efforts were made to make the videos not only engaging and impactful but also linguistically and culturally appropriate for our audience which were autistic children.

The platform used developing an educational game was tiny tap and included serious of carefully crafted scenario questions adapted from previous literature that would assess the knowledge of the targeted audience. Photoshop and Ibis Paint were used for creating characters which were then added in Tinytap.

Pretesting

The first step was of pretesting where the teacher tested the initial knowledge of participants and how they would respond to a number of social scenarios. Each participant was tested individually in a separate room so that their answers wouldn't be influenced by others. Moreover, the questions on the questionnaire were presented verbally by the teacher for better comprehension of the participants. It took a week for pretesting to be done as each participant was dealt individually.

Intervention

After a week of pretesting, the intervention began, where each participant viewed the videos and after viewing the videos they were asked to play the game. During game play, the teachers assisted the participants wherever required. Moreover, participants who wanted to view the videos again or play the game again were allowed to do so.

Posttest

After the intervention was performed, a gap of 3 days was given and they were tested again. Same procedure of pre-test was followed for post-test assessment. Moreover after completion posttest, participants were given gifts for participating in the study.

Follow-up

A follow up was conducted, 5 weeks after the posttest to check whether or not impact of the study was maintained over time. Same procedure as pretest and posttest was used for follow up.

Results and Discussion

This chapter discusses the results and discussion of the study on teaching social safety skills to autistic children via game and video based learning. Below is the analysis of 6 participants.

Table 1
 Descriptive statistics of the questions for the three time-points

Time Point/Question	Median	Mode	Min	Max
Pre-test/Q1	2	1	1	3
Post-test/Q1	2	1	1	3
Follow-Up/Q1	↑ 5	↑ 5	↑ 4	↑ 5
Pre-test/Q2	2	2	1	3
Post-test/Q2	↑ 4.5	↑ 5	↑ 3	↑ 5
Follow-Up/Q2	↑ 4.5	↑ 5	↑ 3	↑ 5
Pre-test/Q3	2	2	1	3
Post-test/Q3	↑ 5	↑ 5	↑ 3	↑ 5
Follow-Up/Q3	↑ 5	↑ 5	↑ 3	↑ 5
Pre-test/Q4	2	2	1	2
Post-test/Q4	↑ 5	↑ 5	↑ 4	↑ 5
Follow-Up/Q4	↑ 4	↑ 4	↑ 3	↑ 5
Pre-test/Q5	1.5	1	1	2
Post-test/Q5	↑ 5	↑ 5	↑ 5	↑ 5
Follow-Up/Q5	↑ 4	↑ 5	↑ 3	↑ 5
Pre-test/Q6	2	2	1	2
Post-test/Q6	↑ 5	↑ 5	↑ 4	↑ 5
Follow-Up/Q6	↑ 4	↑ 4	↑ 3	↑ 5
Pre-test/Q7	1.5	1	1	2
Post-test/Q7	↑ 4.5	↑ 5	↑ 3	↑ 5
Follow-Up/Q7	4	4	↑ 3	↑ 4
Pre-test/Q8	1	1	1	1
Post-test/Q8	↑ 4.5	↑ 4	↑ 4	↑ 5
Follow-Up/Q8	↑ 4	↑ 4	↑ 3	↑ 5
Pre-test/Q9	1	1	1	2
Post-test/Q9	↑ 4	↑ 4	↑ 3	↑ 5
Follow-Up/Q9	↑ 4	↑ 4	↑ 3	↑ 5
Pre-test/Q10	2	1	1	4
Post-test/Q10	↑ 5	↑ 5	↑ 3	↑ 5
Follow-Up/Q10	↑ 5	↑ 5	↑ 3	↑ 5
Pre-test/Q11	2	2	1	2
Post-test/Q11	↑ 5	↑ 5	↑ 3	↑ 5
Follow-Up/Q11	↑ 5	↑ 5	↑ 2	↑ 5
Pre-test/Q12	1	1	1	2
Post-test/Q12	↑ 4.5	↑ 5	↑ 3	↑ 5

Follow-Up/Q12	4	4	3	5
Pre-test/Q13	3	4	1	4
Post-test/Q13	4	5	3	5
Follow-Up/Q13	4	5	3	5
Pre-test/Q14	1.5	1	1	2
Post-test/Q14	4.5	5	2	5
Follow-Up/Q14	4	4	3	4
Pre-test/Q15	2	2	2	2
Post-test/Q15	4	4	3	5
Follow-Up/Q15	4	4	4	5

implies an increase in the value of a statistic as compared to the pretest value.
 implies a decrease in the value of a statistic as compared to the posttest value.

One can note that for all the questions, the score in the posttest and follow-up has increased as compared to the pretest score. For 9 cases (in percentage terms, it is roughly 8% of all cases), the score of follow-up has decreased as compared to the post-test. Note that a higher score on any question means a more rational response to harassment behaviour measured by the questions. Next, we applied the “Analysis of Variance,” or ANOVA, procedure to test the hypothesis that the average score of median, mode, minimum, and maximum is the same for all time points (pretest, posttest, follow-up). The result is given in the table given next. One can note that the significance value (or p value) of mode, median, minimum, and maximum is less than 0.05; hence, we conclude that for all of these statistics, the average score is not the same for the three time points.

Table 2
Anova Table

		Sum Squares	ofF	Sig.
Mode	Between Groups	84.133	60.784	.000
	Within Groups	29.067		
	Total	113.200		
Median	Between Groups	69.478	97.269	.000
	Within Groups	15.000		
	Total	84.478		
Min	Between Groups	41.378	55.701	.000
	Within Groups	15.600		
	Total	56.978		
Max	Between Groups	60.844	84.805	.000
	Within Groups	15.067		
	Total	75.911		

To comment on which average score has changed for the above-mentioned statistics, post-hoc analysis was applied. The results are given in the table given next. It is observed that for all the cases where the p-value is less than 0.05, the average score for the later period is higher than the earlier period.

Table 3
 Post hoc analysis

Dependent Variable	(I) VAR00011	(J) VAR00011	Mean Difference (I-J)	Sig.	Remarks
Mode	1.00	2.00	-2.93333*	.000	Average score for posttest is higher than pretest
		3.00	-2.86667*	.000	Average score for follow-up is higher than pretest
	2.00	1.00	2.93333*	.000	Comparison already done.
		3.00	.06667	.827	Average score for follow-up is higher than posttest.
Median	1.00	2.00	-2.70000*	.000	Average score for posttest is higher than pretest
		3.00	-2.56667*	.000	Average score for follow-up is higher than pretest
	2.00	1.00	2.70000*	.000	Comparison already done.
		3.00	.13333	.544	p-value is insignificant.

As the goal of this study was to examine the efficacy of a video-game-based intervention customized to teach social safety skills, that means that in this context, the intervention has been fruitful. This is based on the results presented in the above tables. In light of these findings, it is observed that the intervention fulfilled one of its goals, i.e., to increase the social safety skills, namely sexual and abduction prevention skills, of children with autism.

Analysis of Teachers' Data

When evaluating feedback of teachers there were a total of 19 questions asked and were rated on a 5 point likert scale, ranging from strongly disagree to strongly agree. Results concluded that the teachers were affirmative about the use of the video game intervention as an effective tool to teach social safety skills to children with autism.

Analysis of Interviews of Teachers. Guidelines by Guba and Lincoln (1994) were kept in mind to ensure the four key traits of sound qualitative research, i.e., transferability, dependability, credibility, and conformability. The Braun and Clarke (2019) method was used to apply reflexive thematic analysis to the analysis of the transcribed interviews. Codes were generated and revised after consulting an expert in mixed methods research.

Table 4
 Thematic Analysis

Questions	Codes
<p>Please share specific examples or instances where you found the game and video-based intervention particularly useful or challenging in teaching social safety skills to children with autism.</p> <p>Teacher 1: While working with autistic child it is very beneficial for us to teach them skills with physical prompt and video based intervention as they see the video and side by imitate you and implement those skills.</p> <p>Teacher 2: while using videos and games, the attention span and engagement of participants was better than in traditional classes. However,</p>	<p>T1: Practical skills, T2: Improved Attention Span T2: Students Excited T3: Active Participation of Students T3: Personal Cyber-Harassment Information Shared by Students</p>

they were getting impatient to play the game.

Teacher 3: better engagement was seen during the intervention, one student while watching the video, confided in us that someone was sending him inappropriate pictures on his Facebook account, which he did not know was wrong.

What recommendations do you have for improving the effectiveness of the game and video-based intervention in the context of teaching social safety skills to children with autism?

Teacher 1: can be collaborated with parents and can be implemented by them at home as in class there is limited time. 1 on 1 time can be done at home or with private teachers. More interactive activities can be added so skills can be reinforced.

Teacher 2: more visual cues can be added. Bright colors can be used for more engagement, include more real life scenarios and other aspects can also be taught, like how to cross a road etc.

Teacher 3: interface should be simpler so autistic students can navigate easily. Each video/game can be customized for autistic children as they have different sensory sensitivities, students that are disturbed with loud noises should have videos or games where subtle sound effects are used.

What do you think were the limitations of this intervention?

Teacher 1: Screen time is a major drawback. Its time consuming when conducted on autistic students as you have to give them 1 on 1 time, and there aren't many computers available.

Teacher 2: too much technology

Teacher 3: sensory sensitivities should be kept in mind.

T1: Need to include parents

T2: Improvements in video game design features

T3: Need to have accessory tools in the video game

T1: Lack of Infrastructure

T1: Screen use stress for children

T2: Overreliance on technology

T3: Need to have accessory tools in the video game

Following four themes were generated in the light of codes: “Positive about the Intervention”, “Accessory Features Needed”, “Reservations About Technology”, and “Need to Expand the Scale”. In the previous table, all matching codes are highlighted in corresponding color. Overall, the intervention was well-received and it has the potential to meet its stated research objectives. Both objective questionnaires and in-depth interviews provided an overall positive attitude towards the video-game-based intervention. The teachers suggested some modifications to the video game design features. In the objective questionnaires, some questions’ (8%) scores did not increase even after the intervention.

Limitations

This research understands the limitations of determining if participants would actually apply the learnt social safety skills effectively. Keeping in mind that human behavior is complex, there is a possibility that the participants might not regularly display the skills learnt in the intervention, when encountered with a real life situation. Another limitation of this study was the limited sample size of 6 children. This overall effects the generalizability of the findings as well as the statistical results of the study. The cultural context of this research impacted the readiness of centres, schools and parents to participate in this study.

Conclusion

To conclude, this research investigated the effect of teaching social safety skills which namely abduction and sexual abuse prevention by employing a video and game-based intervention. A pretest-

posttest design framework was applied on a sample size of 15 participants. Considering the limitations of this study such as time constraints, cultural sensitivity, hesitancy of possible participants and much more, the research was able to produce positive results. The potential of this intervention to improve social safety skills was verified as the study demonstrated enhancements in the knowledge and awareness of the participants.

For strengthening the evidence, future research could focus on comparative studies. This intervention can be used for other topics that are crucial for the development of special children, e.g hygiene. As educational technology progresses by the day, avenues like augmented reality and virtual reality could improve the engagement as well as the immersion in the learning experiences of special children. Moreover virtual reality can also be used as a substitute for in-situ assessments, this can as a result minimize the cost as well as time of the researcher. Comparisons of the efficacy of this game and video based intervention across different contexts and cultures could show a more inclusive comprehension of the effects on special children all around the globe.

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