

Original Paper

Effect of Animation Display of Urinary Catheterization on the Anxiety of Mothers With Hospitalized Children: A Quasi-experimental Study



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ABSTRACT

Introduction: The performance of invasive methods, such as urinary catheterization in children, usually creates emotional distress in their parents. It is necessary to use appropriate interventions to reduce the anxiety of mothers and hospitalized children.

Objective: The present study aimed to investigate the effect of the animation display of urinary catheterization on the anxiety of mothers with hospitalized children in 2021.

Materials and Methods: This quasi-experimental study was conducted on 60 mothers (30 mothers in each group) of children aged 1 month to 12 years in the emergency ward of one of the children's teaching hospitals affiliated with Mashhad University of Medical Sciences, Mashhad City, Iran. They were selected by convenience sampling. Mothers were grouped into intervention and control by random allocation. In the first stage, animation videos on inserting a urinary catheter were prepared separately for male and female children. In the second stage, in the intervention group, mothers watched the animation related to the procedure before the urinary catheter insertion. In the control group, the mothers of hospitalized children were provided face-to-face explanations about the method before urinary catheterization. The Spielberger state-trait anxiety inventory was completed before and after the intervention for both control and intervention groups. The obtained data were analyzed using descriptive (Mean±SD) and inferential (the independent t-test and chi-square test) statistics.

Results: The Mean±SD ages of mothers in the intervention and control groups were 36.9±10.87 and 34.44±9.27, and the mean ages of the children in these two groups were 3.5±6.29 and 2.89±6.73 years, respectively. The results of the present study demonstrated no statistically significant difference between the two groups in the mean anxiety score of mothers before watching the animation video. Nonetheless, after watching that animation, there was a significant difference between the two groups (P=0.001), and watching the animation video of urinary catheterization significantly reduced mothers' anxiety.

Conclusion: The present study pointed out that educational animation videos of urinary catheterization reduce mothers' anxiety levels. It seems that the use of educational animation as an effective, quick, accessible, and easy intervention can be helpful in the reduction of anxiety and enhancement of knowledge among mothers of hospitalized children.

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Highlights

- Catheterization is a painful and traumatic experience for most children, and some parents are deeply worried about their children's experiences of painful procedures.
- Medical animation videos can increase the quality of medical services in different sectors.
- Educational animation videos of urinary catheterization reduce mothers' anxiety.

Plain Language Summary

The performance of invasive methods, such as urinary catheterization, in children is usually a source of emotional distress for their parents, causing a considerable amount of stress and anxiety. Therefore, it is necessary to use appropriate interventions based on modern educational methods to reduce the anxiety of parents of hospitalized children. Today, we are witnessing a rise in the use of technology to increase the quality of medical services. The present study aimed to assess the effect of animation display of urinary catheterization on the anxiety of mothers with hospitalized children in Mashhad City, Iran. To conduct the research, an animation was prepared in collaboration with the university and approved by expert professors. Before performing urinary catheterization, mothers watched this 5-minute animation. The results showed that the anxiety of the mothers in the group that watched animation was significantly lower than that of the control group.

Introduction

Urinary catheterization is a common and, at the same time, an uncomfortable procedure for hospitalized children. It is used to drain urine or inject an x-ray solution to study the anatomy or function of the urinary system [1]. Common diagnostic methods (such as urinalysis and urine culture) to test urinary tract infections in children require a urine sample, usually obtained in younger children by urethral catheterization or suprapubic aspiration. These invasive and potentially painful methods may be uncomfortable for parents and children; nonetheless, they are more popular than non-invasive options, such as urine collection bags [2]. Catheterization is a painful and traumatic experience for most children, and the avoidance of urinary catheterization may affect the desired clinical management [3].

Some parents are deeply worried about their child's experiences of having painful procedures and do not approve of these operations [4]. The performance of invasive methods, such as urinary catheterization, in children is usually a source of emotional distress for their parents, bringing them a considerable amount of stress and anxiety [5]. Parents' anxiety is often associated with the severity of their children's illness and treatment methods and is more frequently observed during treatment procedures [6]. They always complain about the

incomplete information provided by the medical staff about their child's condition and treatment [7]. Parents must be informed of diagnostic and treatment options to make wise choices about their child's care. The key components of family-centered care include parental involvement in care decisions, incorporating their knowledge and preferences into the treatment plan, and communicating diagnostic and treatment information in understandable language [2].

Today, we are witnessing a rise in the use of technology to increase the quality of medical services [8]. Medical animation videos can increase the quality of medical services in different sectors [9]. Paton et al. demonstrated that multimedia education significantly reduced parents' anxiety during the informed consent process before surgery. This method improves the knowledge and awareness of parents; moreover, it reduces anxiety and may improve parents' long-term understanding and satisfaction in the healthcare process [10].

Cohen et al. examined short video interventions for parents of children undergoing vaccination. The results of the stated study pointed to a significant improvement in parents' behavior [11]. Based on the Brown et al. study, there is insufficient research on parents' anxiety, which is an essential aspect of designing interventions [12]. Currently, in pediatric departments in hospitals, urinary catheterization typically provokes anxiety in

children’s parents, and they wonder whether the catheterization will cause harm to their children or not.

Despite the usual explanations doctors and nurses provide about this procedure, sometimes, parents do not consent to insert a urinary catheter. Therefore, it is necessary to use appropriate interventions based on modern educational methods to reduce the anxiety of parents of hospitalized children [10]. To the best of our knowledge, few studies have been conducted on this matter; therefore, the present study aimed to assess the effect of the display animation of urinary catheterization on the anxiety of mothers with hospitalized children in Mashhad City, Iran.

Materials and Methods

This quasi-experimental study with an intervention and control group was conducted on 60 mothers of hospitalized children aged 1 month to 12 years in the emergency wards of

one of the children’s teaching hospitals affiliated with **Mashhad University of Medical Sciences** between February 2022 and September 2022. A total of 72 mothers were included in the research and allocated to intervention and control groups (n=36 in each group). Among these, 7 samples from the intervention group and 5 from the control group were excluded from the study for reasons mentioned in **Figure 1**. Finally, 30 mothers were included in the study in each group.

The “comparison of two independent population means” formula was used to determine the sample size. Since no exact similar research regarding intervention and dependent variables was found, the sample size was estimated based on the parameters obtained in the pilot study. The sample size was determined considering a significant level of 0.05 and test power (B=0.20) of 80%, and the Mean±SD anxiety of 10 mothers from the control and intervention groups were 14.33±6.24 and 5.88±4.62. Finally, 60 children and their mothers (30 in each group) entered the study.

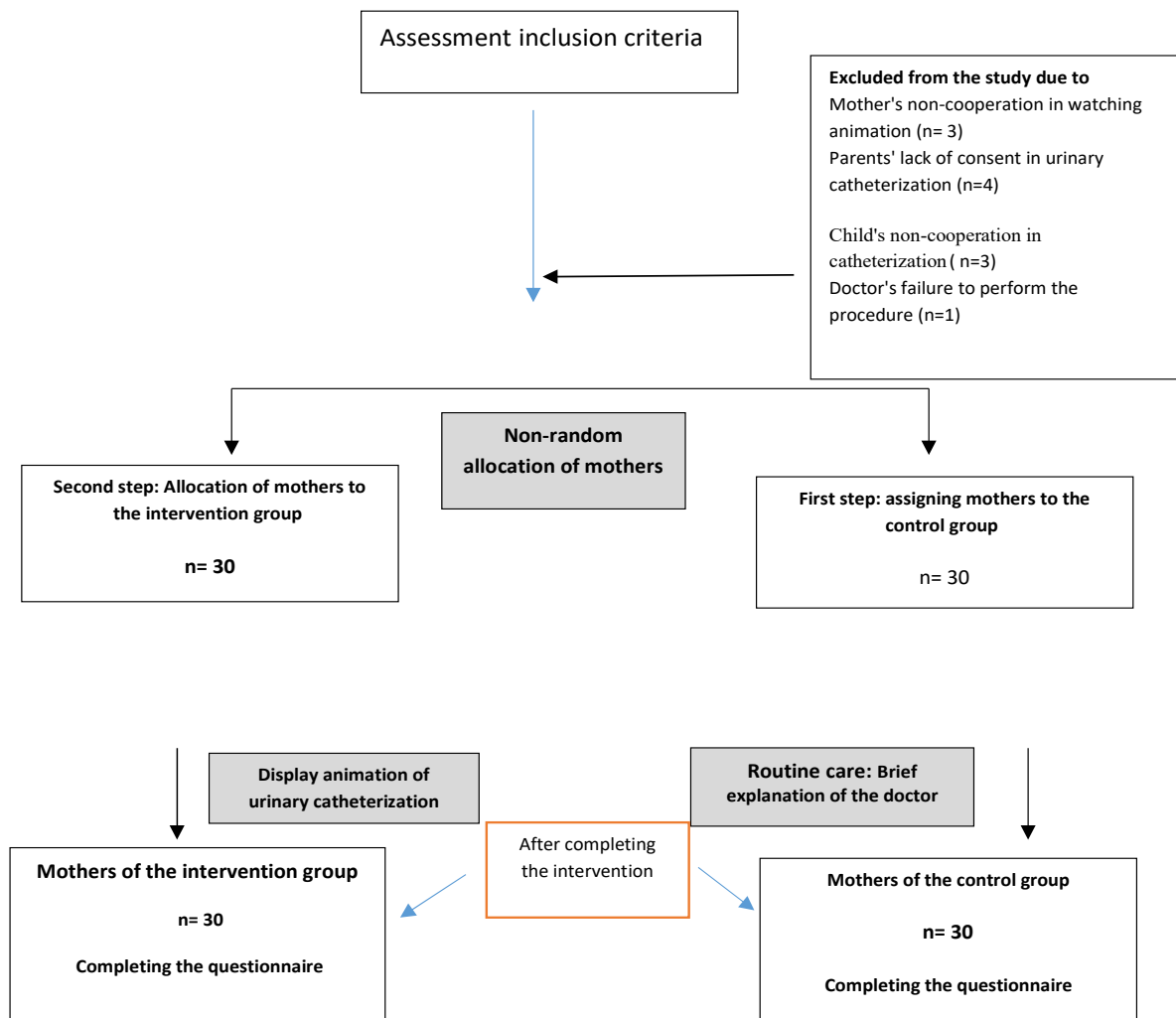


Figure 1. CONSORT flow study diagram

Children and mothers were included in the study if they met the inclusion criteria. The inclusion criteria included a physician's prescription to insert a urinary catheter for the child, no previous experience with urinary catheterization, mothers' willingness and consent to participate in the study, no prior training on how to perform urinary catheterization, mother's reading and writing literacy, and the presence of mothers in the treatment process. The exclusion criteria at the beginning of the study were the presence of any known mental disorders in the mother (such as depression and attention disorder, bipolar disorder by self-expression) and major anomaly in the child (immune deficiency, other digestive abnormality, metabolic disease, heart disease based on medical records). The exclusion criteria during the study were withdrawal from the study, occurrence of any emergency condition during catheter insertion, or urinary retention.

The research instruments included a demographic characteristics form, an informed consent form to participate, and Spielberger state-trait anxiety inventory (STAI). Demographic characteristics form included questions about age, sex, employment status, mother's education, and economic situation. The STAI includes 40 self-reporting questions, from which the first 20 are state questions measuring state anxiety. The subjects must express their feelings at the present moment when the researcher fills out the form. The items are rated on a 4-point Likert scale, ranging from 1 to 4. A score of 4 correlates with greater anxiety and 10 scales of state anxiety are scored accordingly. A higher score indicates no anxiety for scoring other items (10 items on state anxiety). The scores range from 20 to 80 (20-40=mild anxiety, 41-60=moderate anxiety, and 61-80=severe anxiety) [13]. Mahram translated the questionnaire into Persian and examined its reliability and validity; we used this Persian version of the tool [14]. In the present study, the internal consistency was measured by the Cronbach α coefficient, which was equal to 0.89.

This research consisted of two stages: In the first stage, animation videos on inserting a urinary catheter were prepared separately for male and female children. This 5-minute animation video included images, sound, text, and relaxing music. Moreover, the reasons for catheterization, the complications caused by avoiding catheterization, as well as the disadvantages and advantages of catheterization were referred to in the videos. These videos were prepared with the help of animation experts at the Ferdowsi University of Mashhad. They were used after approval by the Faculty of Nursing and Midwifery professors of Mashhad University of Medical

Sciences. The animation content was prepared based on the latest valid references [15, 16] and with the approval of expert professors, including a pediatrician and two members of the Pediatric Nursing Faculty. In preparing this educational animation, such standards as setting educational goals, content simplicity, short but comprehensive sentences, and removing unnecessary or specialized sentences were considered.

While communicating with the mothers of children hospitalized in the emergency room, the researcher obtained their written consent to participate in the research. The samples received oral explanations about the goals and research method for 15 minutes. Demographic characteristics form, and STAI were completed for mothers of hospitalized children in the control and intervention groups before the intervention.

To prevent the exchange of information between mothers, after the draw, the control group and the intervention group were first entered into the study. In the control group, mothers of hospitalized children were given general explanations about the method used by the doctor or nurse at the patient's bedside before performing urinary catheterization. In the intervention group, mothers watched the animation video about this procedure before catheterization via the researcher's laptop in the hospital's conference room. Animation videos were prepared separately for male and female children and lasted 5 minutes. They were displayed to mothers according to the gender of their children. After the intervention, STAI was completed for mothers of hospitalized children in both control and intervention groups.

After entering data in SPSS software version 23, data were analyzed using descriptive (frequency, Mean \pm SD) and inferential (the independent t-test, the chi-square test) statistics to compare between-group and within-group mean differences. Also, the Kolmogorov-Smirnov test assessed the normality of data distribution. The level of significance of statistical tests was considered $P < 0.05$.

Results

The Mean \pm SD ages of mothers in the intervention and control groups were 36.9 \pm 10.87 and 34.44 \pm 9.27 years, respectively. The Mean \pm SD ages of children in the intervention and control groups were 3.5 \pm 6.29 and 2.89 \pm 6.73 years, respectively. Other demographic data of mothers and children are presented in Table 1.

Table 1. Demographic characteristics of samples (60 children and 60 mothers)

Variables	Dimensions	No. (%) / Mean \pm SD		P
		Control (n=30)	Intervention (n=30)	
Child gender	Girl	16(53.3)	17(56.7)	0.68*
	Boy	14(46.7)	13(43.3)	
Employment status	Employed	10(33.3)	12(40.0)	0.38*
	Housewife	20(66.7)	18(60.0)	
Mothers' education	Under diploma	6(20.0)	9(30.0)	0.18*
	Diploma	17(56.7)	13(43.3)	
	University	7(23.3)	8(26.7)	
The economic situation	Less than enough	11(36.7)	9(30.0)	0.27*
	Enough	17(56.7)	20(66.7)	
	More than enough	2(6.6)	1(3.3)	
Age (y)	Mother	34.44 \pm 9.27	36.9 \pm 10.87	0.33**
	Children	2.89 \pm 6.73	3.5 \pm 6.29	0.42**

*Chi-square test, **Independent t-test.

The Kolmogorov-Smirnov test was used to assess the distribution of quantitative variables. The test results indicated that all quantitative demographic and intervening variables in this research had a normal distribution.

The result of the independent t-test revealed no statistically significant difference between the two groups in terms of the mean age of hospitalized children and their mothers. Moreover, the chi-square test result found no significant difference between the two groups of mothers in terms of their children's gender and their level of education. Therefore, the two groups of mothers of the

studied children were homogeneous regarding these variables.

The independent t-test within the group illustrated that in the stage before watching the animation video, the mean anxiety score of the mothers of hospitalized children in the two groups did not significantly differ ($P=0.480$), and the two groups were homogeneous regarding this variable. Nonetheless, the independent t-test results indicated a significant difference between the two groups after displaying the animation video ($P=0.001$). In

Table 2. Mean \pm SD of anxiety scores of mothers of hospitalized children

Variable	Group	Mean \pm SD		
		Before the Intervention	After the Intervention	The Difference After Compared to Before the Intervention
Anxiety	Intervention	67.45 \pm 15.65	53.12 \pm 17.23	14.33 \pm 6.24
	Control	65.45 \pm 17.92	59.62 \pm 187.29	5.88 \pm 4.26
	P	0.48*	0.001*	0.001**

*The Independent t-test, **The Mann-Whitney U test.

the intervention group, the mean anxiety score decreased from 65.45 ± 5.65 to 53.12 ± 17.23 (Table 2).

Discussion

To determine the effect of display animation of urinary catheterization on the state anxiety of mothers with hospitalized children, the results demonstrated a significant decrease in their anxiety after the intervention. Moreover, a more marked reduction occurred in state anxiety scores after the intervention in the intervention group compared to that in the control group. In a literature review, a study similar to the current research was not found; therefore, the researcher tried to use the results of other studies in this section.

The findings of the present study indicate the high levels of anxiety among mothers in the intervention group before the intervention. Therefore, appropriate interventions must be made to alleviate their stress and enhance the informed consent process. The anxiety experienced by mothers before their children undergo invasive procedures can affect the treatment process [6]. Parental anxiety is associated with distress and problematic behaviors in children during and after hospitalization. In addition, unanswered questions and misinformation about invasive procedures can increase parental anxiety [12]. Children and their parents prefer to be informed about surgical intervention, anesthesia, possible pain problems, and other invasive procedures they may undergo during hospitalization [17, 18].

In this regard, according to a study by Paton et al., multimedia education significantly reduced parents' anxiety during the informed consent process. According to the stated research, this method improves the knowledge and awareness of parents, lowers anxiety, and may improve parents' long-term understanding and satisfaction in the healthcare process [10]. The results of the present research are consistent with the results of their study; nonetheless, the present study used animation videos to show urinary catheterization to the intervention group to control their anxiety.

The study by Book et al. demonstrated that the display of a 6-minute online video significantly reduced the anxiety of parents of children with inguinal hernia before surgery compared to the control group. Moreover, it enhanced the consent process and increased parental knowledge [19]. The present research results are consistent with the results of their study. The similarity in the research population (parents of children) can justify this consistency. However, it differed from the present

study in which the educational animation video was not presented online, and the procedure performed on children differed. In general, the provision of accurate information can be a positive factor in reducing the anxiety of parents before their children undergo any aggressive procedure.

On the other hand, the study by Torres-Lagares et al. reported that watching a video of the removal of an inferior third molar surgery increased patients' anxiety levels [20]. One of the reasons for this discrepancy is the difference in the content of the educational video, signifying that the educational content plays a key role in the anxiety level of people. In their study, all the surgical steps were shown, which can cause anxiety. It seems the most appropriate is to provide patients with the information they require in an adequate format.

The results of a study titled «parental educational intervention to facilitate informed consent» by Lin et al. showed that educational video-assisted informed consent was superior to the conventional process of obtaining parental consent in the emergency department and reduced anxiety [21]. The results of the present research were consistent with their results. This consistency can be ascribed to the use of educational animation videos, although the treatment procedure was different in the study by Lin et al. Modern portable electronic devices, such as smartphones and tablets, as well as access to the Internet, open up new opportunities for information transfer. The good feature of the animation video used in the current study was its small file size and comprehensibility. Therefore, it can be easily accessed by parents through mobile phones. Also, they can be localized and provided in the native language of every country in medical centers. Further research is recommended to assess the effect of these variables. In a meta-analysis study conducted by Feeley et al. on 21 articles published from 2009 to 2020, the findings indicate an overall positive impact of using animation in improving viewers' learning in various health and clinical fields, including surgery and diabetes [22]. Providing appropriate educational content and allowing parents to decide when and how often to watch the video will reduce their anxiety [23]. It is suggested that the effectiveness of this intervention be tested over other invasive methods, and its effect on anxiety should be investigated.

One of our limitations in this study was that during the COVID-19 pandemic, access to samples was difficult. The individual and cultural differences of the mothers participating in the research were other limitations of the present study, and it is suggested that the effect of

this intervention on mothers' anxiety in other cultures be evaluated as well.

The present study indicates that displaying an animation of urinary catheterization before the procedure reduces mothers' anxiety levels. It is suggested to use this educational method before urinary catheterization in children, and because it reduces maternal anxiety, it may improve parental satisfaction with the healthcare process.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of [Mashhad University of Medical Sciences](#) (IR.MUMS.NURSE.REC.1400.054), receiving the letter of introduction and making necessary coordinating with the officials of this hospital. Written informed consent was obtained from all participants.

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Authors' contributions

Data collection: Hadi Mazloum and Nafiseh Pourbadkshian; Writing the original draft: Naghmeh Razaghi; Study design, methodology, data analysis and final review: All authors.

Conflict of interest

The authors declared no conflict of interest.

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