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The Effect of Nurses' Uniform Color on Situational Anxiety in the School Age Inpatients Children

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ABSTRACT

Introduction: Hospitalization causes anxiety in children, and nurses play an important role in reducing children's anxiety. Nurses' characteristics, including their costumes, are important factors affecting the quality of care through the relationship between the nurse and the child.

Materials and Methods: In this quasi-experimental intervention study, 240 children aged 6-12 years old, admitted to the pediatric ward of Ahvaz Golestan Hospital, were selected and divided into two groups of 120 patients. The data collection tool included a demographic questionnaire and Spielberger's state-trait anxiety inventory (STAI), completed 4 hours after admission and at discharge. Data were analysed using descriptive tests, independent t-test, and covariance analysis using SPSS 21.

Results: The mean level of anxiety in children whose nurses were dressed in pink was smaller (39.99 ± 7.79), compared to children whose nurses were dressed in navy blue uniforms (46.12 ± 4.60). In addition to the pink color of nurses' uniforms, gender, education, and birth rank affected children' anxiety level ($p<0.05$).

Conclusion: The results of this study indicated the effect of the pink uniform of nurses in reducing children's anxiety. Colored nursing uniform can provide a friendly environment for the child and enhance the relationship between nurses and children. Wearing a pink uniform can meet the children's expectations of nursing care and eliminate the need for sedation.

Key words: Situational anxiety, Children, Nurses' uniform, Nurses

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INTRODUCTION

Children are very sensitive to any genetic and environmental stimulus and may respond very quickly and requires proper care at all times, especially during illness [1,2]. The difference between a child and an adult is not only in verbal and behavioral issues but also in disease and treatment. For this reason, children's treatment requires extensive psychological and emotional issues [3]. Hospitals' design and function are very important regarding the provision of medical services and referrals to different groups.

Children's anxiety is reported based on children's perceptions of the environment, including the hospital's equipment, nurses' clothes, physical environment, and hospital's building [2,4]. About 30% of children are hospitalized at least once in childhood, 5% for several times [5]. Several factors such as separation from family, unknown fear, loss of control, and unfamiliar faces, as sources of stress, can cause anxiety in hospitalized children [4,6], the negative results of which are associated with prolonged recovery, pain, infection and the need for sedation. Statistics show that 8%-12% of hospitalized children and 5%-10% of adolescents have one anxiety criteria [5]. In the study by Gomes et al., the results showed that 88.5% reported the highest level of the hospital anxiety in school-aged children [7].

Studies have shown that in the pediatric ward, distraction methods are used in children to distract patients' attention from focusing on pain, frightening processes, and anxiety of treatment; the higher the involvement of different senses in this process, the more effective results will be

obtained [8]. Nursing care is one of the important factors with a significant effect on the level of anxiety in children [9]. Children's expectations of nursing care are significant because high-quality care is related to the appearance and activities of pediatric nurses [9,10]. For this reason, in many developed countries, the design and construction of the hospital environment and clothes of nurses are based on the latest procedures to ensure patient's psychological comfort [11], which is very important for children and infants, as children should be treated and recover in such situations [4].

The nurse's uniform is the first means of therapeutic communication between the patient and the nurse and transmits different messages between them as a means of non-verbal communication. The color and design of a nurse's uniform, a non-verbal communication, can strengthen or change a positive or negative image in the minds of patients and their families toward nursing [12]. It can also increase the nurse's self-esteem and give patients comfort and security [13]. Therefore, choosing the color of nurses' uniform reduces children's stress and fear of diseases and treatment environments returns comfort to children [8]. Numerous studies have shown the effect of doctors' white uniform at the time of attending alongside the patient, compared to their own clothing, which confirmed the negative effect of "white coat syndrome" or "white coat blood pressure" on patient's sense of trust [14,15].

Considering the fact that staying in a hospital is a concern for children, communicating with nurses dressed in happy colored uniforms can show nurses as less official and create a friendly environment for them [16,17]. Colors are energies transmitted through waves, and light receptors in the eye's retina convert this energy to sensing color by the brain [18].

Studies show that small children react to orange, and pink and orange are considered the most appropriate colors for children. Children express their sensitivity to color harmonization at the age of 8 year [19].

Color may affect the perception and reaction of individuals to the environment and directly improves the environmental quality of patients, staff, and families, and the extent of patients' recovery [20]. In this regard, the pink color is, in fact, the same color as red with a calming effect. Despite the fact that the calming effect of the pink color is established, researchers have found that this effect may only appear in the first experience. For example, when this color was used in the prison environment, it became even unpleasant after being accustomed to it [21]. In another study in England, the use of happy colors in dealing with patients reduced their hospitalization period to 1.5 days earlier and in the psychiatric and burning wards by 70%, compared with other environments. Several studies have often reported that the appropriate color of nurses' uniform would increase the efficiency and effectiveness of the staff performance and reduce their fatigue [18].

In this regard, the study by Roohafza et al. showed that children exposed to colored uniforms of the nurses had a lower level of anxiety than nurses wearing white uniforms [4]; similarly, the study by Festini et al. showed that uniforms with unconventional colors were preferred by hospitalized children and their parents, and colored uniforms improved parents' perception about confidence in nurses [22].

In another study, patterned uniforms were compared with blue uniforms, and the children used the word "good" for the patterned uniforms and "bad" for the blue uniforms [23]. In study on children's feeling towards colors by Boyatzis et al. [23], children responded positively to bright colors, including pink and blue [23]. In a study by Mobaraki et al. children chose nurses dressed in happy colors, like pink, more than blue [12].

Considering the interest of children to bright colors [24] and the fact that children are afraid of treatment environments, in which the personnel are dressed in specific and unchanging uniforms; and, also given the importance of this issue in our country, where pediatric nurses' uniform is navy blue, and has not changed, despite several studies on the color of nurses' uniform, this study aimed to determine the effect of nurses' uniform color on situational anxiety in children aged 6-12 years admitted to Ahvaz Golestan hospital.

MATERIALS AND METHODS

This intervention and semi-experimental study aimed to investigate the effect of nurses' uniform color on situational anxiety in 240 school-aged children (6-12 years), admitted to the pediatric ward of Ahvaz Golestan hospital. Available sampling started in spring 2016 and continued for 1.5 years. The samples were divided into two groups of 120 subjects: case and controls, matched based on age and sex. The data collection tool consisted of two parts. The first part of the questionnaire included personal characteristics: age, sex, birth rank, hospitalization date, language, history of hospitalization, medication use, cause of admission, and mother's educational level. The second part was Spielberger's state-trait-anxiety scale (STAI), designed by Spielberger as a self-assessment tool, in two separate forms. This inventory has 40 items, which allow the respondent to express their emotions by a score of 1 (for no anxiety) to 4 (for high anxiety). In this study, only the 20 first questions, related to state trait-anxiety, were used. In recent years, this scale has been used most commonly for evaluation of anxiety in various researches inside the country and abroad [25].

The content validity method was used to determine the validity of the demographic questionnaire. By studying the scientific articles and opinion of the supervisors, the demographic questionnaire was designed and for confirming the validity, appropriateness, purposiveness of this part, ten faculty members of Nursing and Midwifery School reviewed it and their comments and suggestions were applied on the final version. Spielberger's test of state anxiety (current feelings) and trait anxiety (main feelings) is standard with acceptable reliability and validity [25].

Nabavi et al. calculated the reliability of state and trait anxiety based on alpha Cronbach's formula on 600 normal subjects at 0.9418 and 0.9025, respectively. Also, he used a concurrent criterion method to study validity and according to this study, in both state and trait anxiety scales, significant differences were found between the case and the control group (0.01 and 0.05, respectively), based on comparison of means [26].

The inclusion criteria for this study consisted of: being admitted to the pediatric ward for 3 to 5 days, an age of 6-12 years, the presence of parents, and no history of hospitalization due to physical and psychological problems, ability to communicate verbally in Persian.

Exclusion criteria consisted of: an incomplete questionnaire, severe emotional problems (crying or anger) during the interview, unstable hemodynamic signs, and use of anti-anxiety drugs. After patient selection, the researcher obtained permission from the authorities of Ahvaz University of Medical Sciences and the head of Golestan Hospital, coordinated with the supervisor and authorities of the pediatric ward; also according to the instruction of the Ethics Committee, the prepared uniforms (pink and patterned) for nurses were replaced.

At the beginning of the study, the researcher was present in the research environment and informed the nurses about the study goals and reason of replacement of the clothes.

The parents and children were also explained how to complete the questionnaire and that their participation in the study was optional and they could withdraw from the research at any time. The children were divided into two groups: case and controls. During hospitalization, the case group met only nurses with colored uniforms, while the control group was encountered by nurses wearing the routine navy blue uniforms. To do this, nurses changed clothes every two weeks and nurses would wear new uniforms (pink patterned) for two weeks and their usual uniforms (navy blue) for another two weeks, and this procedure continued as long as possible until the number of samples reached the necessary number. It should be noted that children confronted with both types of nursing uniforms were excluded.

To study the anxiety level of children, the inventory was completed in both groups at admission (up to 4 hours after admission) and before discharge, while parents could also help their children in this.

Children's anxiety levels were recorded in each group at the time of admission and discharge and compared between the two groups. Finally, along with the research ethics, Ethics code was obtained with the number IR.AJUMS.REC.1395.164 from the university and the researcher explained the study objectives to the subjects and assured them about the confidentiality of their information and their choice to leave the study whenever they wished to. The ethical considerations were met in using references, as well.

The normal distribution of the data was examined by the Kolmogorov-Smirnov test, which revealed that the data had a normal distribution. After collecting data and encoding, the data were analyzed using SPSS-21 software and central and distribution indices, including mean, standard deviation, were used to examine the relationship between qualitative variables, and independent t-test and covariance analysis for quantitative variables. P-values less than 0.05 were considered significant.

RESULTS

In this study, 240 children were enrolled, of whom 65 (54%) of the case group and 49 (40.83%) of the control group were boys. The age range of 79 patients (65%) of the case group and 69 (57%) of the control group was 5 to 9 years. 54 patients (45%) had a positive history of hospitalization and 32 (26%) had a positive history of medication use in the case group. Most parents spoke Persian and the major cause of children's admissions was neurological problems.

All patients in this study were admitted and discharged within two weeks. The chi-square test showed a significant difference in educational level (p=0.05), gender (p=0.03) and birth rank (p=0.04) (Table 1).

Table 1: Distribution of the frequency of demographic variables of the studied population in the case and control groups

Variable		Case group [Number (percent) (N=120)]	Control group [Number (percent) (N=120)]	p-value
Sex	Boy	65 (54)	49 (40.83)	0.03*
	Girl	55 (45)	71 (59.15)	
Age (years)	5-9	79 (65.83)	69 (57.5)	0.311
	10-13	41 (34.16)	51 (42.5)	
History of hospitalization	Yes	54 (45)	66 (55)	0.864
	No	66 (55)	54 (45)	
History of medication use	Yes	32 (26.66)	24 (20)	0.451
	No	88 (73.33)	96 (80)	

Educational level	Illiterate	17 (14)	3 (2.5)	0.05*
	Primary school	25 (20)	20 (16.66)	
	High school	54 (45)	56 (46.66)	
	Bachelor	24 (20)	41 (34.16)	
Language	Persian	80 (66)	90 (75)	0.114
	Arabic	7 (5)	4 (33)	
	Others	33 (27)	26 (21.66)	
Birth rank	1	41 (34)	51 (42.5)	0.04
	2	39 (32)	41 (34.16)	
	3	29 (24)	11 (9.16)	
	4	10 (8)	10 (8.33)	
	5	5 (1)	7 (5.83)	
Cause of hospitalization	Respiratory	25 (20.83)	30 (25)	0.231
	Digestive	12 (10)	11 (9.16)	
	Neurology	34 (28.33)	30 (25)	
	Endocrinology	11 (9.16)	19 (15.83)	
	Cancer	1 (0.83)	1 (0.83)	
	Others	37 (30)	29 (24.16)	
Type of hospitalization	Admission	120 (100)	120 (100)	>0.05
	Discharge	0	0	
*Significance level at 0.05				

Assessment of state anxiety level of patients in this study showed that mean anxiety level in the case group before the test (45.67 ± 3.99) reduced to 43.83 ± 4.49 after the test. Using Independent t-test, it was found that pink uniform had a significant statistical difference before and after the test (p<0.001, T=7.48).

Furthermore, this difference was statistically significant in navy blue color of the nurses' uniform (p<0.001, T=-3.61). However, the mean anxiety level in the control group increased (46.12 ± 4.60) after the test compared to before the test (39.99 ± 7.79) (Table 2).

Table 2: Mean and standard deviation of state anxiety level of the groups before and after the intervention

Variable		Pre-test state anxiety (Mean ± SD)	Post-test state anxiety (Mean ± SD)	p-value, using independent t-test
Control	Navy blue uniform	43.83 ± 4.49	46.12 ± 4.60	<0.001**
Case	Pink uniform	45.67 ± 3.99	39.99 ± 7.79	<0.001**
** Significance level at 0.001				

ANOVA analysis with controlling pre-test scores showed that the difference in state anxiety (F=108.55) was statistically significant in both groups (p<0.001). Therefore, there is a significant difference in the school-aged children's anxiety based on nurses' uniforms color. As a result, the effect of the patterned pink uniform on reducing the school-aged children's anxiety was about 18% (Table 3).

Table 3: Univariate covariance analysis for comparing groups in terms of state anxiety scores

Source of variance	Mean squares	F	Size of the effect	p-value
Total pre-test anxiety score	2257.06	55.03	0.188	0.001
Group	444964.8	108.54	0.979	0.001
Error	41.009		-	

DISCUSSION

The present study aimed to compare the effect of pink and navy blue nurses' uniforms on anxiety of school-age children in Ahvaz Golestan Hospital. The results showed that children in touch with nurses with pink colored uniforms had lower levels of the anxiety than those with nurses who dressed in navy blue, at 18% in the study. In this regard, the study of Roohafza et al. can be mentioned, indicating lower levels of anxiety in children with nurses wearing colored uniforms than white uniforms [4].

Currently, the patient's response and view towards changing nurses' uniforms is an issue to be considered in hospitalized children, due to higher vulnerability to hospitalization stress [4].

In the study of Albert et al., children showed a low level of anxiety with a positive feeling to nurses dressed in pink and blue colors [27]. In study by Meyer, children experienced greater anxiety levels with nurses in white compared to colored clothes [28]. In the study of Annamary et al., children showed less anxiety in the dental environments covered in blue and pink colors than other colors [29]. The general rule shows that colors produce and secrete hormones. Colors without light shades and fairly mild, such as pink, blue, and gray used in nurses' uniforms, induce secretion of serotonin, endorphin, dopamine, which are sedative hormones. These colors help children resist violence and avoid emotional excitement and anger.

However, sharp colors used in nurses' uniforms can stimulate the sensory nerves and secretion of cortisol and epinephrine hormones, which cause feelings of distress and tension and increase heart rate and blood pressure in patients [8,18].

The cultural perspective on nurses' uniforms is a traditional and religious view in Iran. This view limits free change in nurses' uniform. However, in recent years, evidence-based approaches to health and health care have been used to promote the quality of health care services and provide an opportunity to review and make changes.

Nurses also can increasingly recognize the importance of professional and effective communication with their patients. However, in Livingstone study, most hospitalized children preferred traditional uniforms [30], which is not consistent with the present study. The reason for this inconsistency could be that patients expected better care from nurses wearing white uniforms. In the study of Westrate, the adult patients referring to the emergency department had higher confidence in the care of nurses with white uniforms than colored [31].

The results of the study by McCarthy et al. showed that the color and design of nurses' uniforms affect the perception of patients and his/her family of the professional work of nurses. The lower the age of the participants, the more they were interested in bright and colored uniforms of nurses, while the elderly were interested in a range of blue colors; and white color was of interest to the very old patients. Moreover, in the pediatric ward, children aged 1-7 years old were more interested in bright colors, such as blue and pink [32]. It should be noted that in the present study and Mobaraki et al. [12], children liked colored uniforms of nurses more and did not like the existing color (navy blue).

Although in many countries, nurses' uniforms are used in a variety of colors, in Iran, traditional navy blue is still used, indicating the time to change this color according to the new situation and perspective on the nursing profession [4,12]. In this study, the color choice of nurses' uniforms by participants of the pediatric ward was pink.

Studying the effect of variables on anxiety levels of children showed higher levels of anxiety in girls, which is consistent with the study of Roohafza et al. [4], but inconsistent with the study by Bögels et al. [33].

Our study showed that children who were the first child of the family reported higher levels of anxiety, which is consistent with the study of Bögels et al., reporting that reducing family population or the first child due to the anxiety of separation from parents or because of more intense care pattern and family worries about their child is associated with more anxiety [33]. In terms of education, children of families with a bachelor's degree had a lower level of anxiety, which is consistent with the study conducted by Bögels et al. [33].

Studies have shown that higher age and education of parents are effective in controlling children's anxiety [4]. In the present study, there was no significant relationship between the age of children and the level of anxiety, but in the study of Roohafza et al., younger children were more susceptible to anxiety.

The reason for this, based on the theory of Piaget's cognitive development theory, maybe the increase in the level of anxiety in this age group [4] and most children in the present study aged 5-9 years. One of the limitations of this research was the mental engagement of children during the implementation of the study.

CONCLUSION

The results of this study showed that nurses' dressing in pink color was associated with less anxiety in children than navy blue color. Several factors such as gender, educational level, and birth order can affect the level of this anxiety. Providing a friendly environment for the child using colored nursing uniforms can enhance the relationship between nurses and hospitalized children and remove the need for sedation by a pink nursing uniform.

It is suggested that a clinical trial is designed to evaluate the effect of different patterns, colors, and design of pediatric nurses' uniforms on the anxiety and cooperation of hospitalized children.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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