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Measurement of Anxiety in 3-9 Year Old Children Receiving Nursing Intervention

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ABSTRACT

Introduction: Nurses are in an ideal position to provide special care for anxious children admitted in hospital wards. Thus, the objectives of the study were to identify the common nursing procedures done for children and to measure their level of anxiety.

Methods: A cross-sectional descriptive study was conducted at a district hospital in Philippines. The respondents of the study were 235 children aged 3 – 9 years old admitted in the pediatric ward. The descriptive characteristics of the children were recorded. Venham Picture Test was used to assess the level of anxiety in children. The instrument was validated using the Good and Scates criteria and pre-tested on 30 pediatric respondents. The chi-square test and t-test were used to determine the significance of difference between the scores given by the children across different age groups and the P-value was set at 0.05.

Results: The mean age of the respondents was 5.1 (3.5) years. Males obtained an “average” mean score of anxiety 4.0 (2.0) whilst females demonstrated a “low” mean score of anxiety 3.6 (2.3). There was a highly statistical difference between the mean anxiety scores amongst patients who had a prior experience and those who had none.

Conclusion: Temperature measurement and pulse measurement were the most common procedures performed on children and demonstrated very low level of anxiety. Peripheral cannula insertion caused the maximum anxiety amongst all the procedures performed. Children aged 3 to 4 years old demonstrated the maximum anxiety when compared to children aged 5 to 9 years.

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Introduction

Children experience anxiety when they are away from a familiar comfortable environment.¹ Hospital ward is one such location where children encounter apprehension as they are uncertain about the procedures they may be subjected to. Children have reported that they feel threatened while in contact with the health care system.² Further, there is substantial evidence to infer that children are more anxious than adults when they receive medical treatment and care.³

When afraid, children seek extra support to endure medical procedures and consequently require extra caring interventions. Nurses are in an ideal position to provide this special care

for the fearful child. However, providing extra care for every child would be time consuming and may undermine the child's own coping skills. This raises difficulties for nurses in implementing procedures and can cause delay in the treatment and care. Occasionally, the nurse may not be able to perform the intervention at all. Hence, identifying those children who need additional attention and those procedures that induce high level of anxiety in children would be advantageous. It will not only reduce the time required to perform the procedure but also facilitate in improving the efficiency of the nurse.

Moreover, it will create a positive impact on the minds of young children who would then

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remember and retain the intervention as a pleasant experience rather than an anxious, fearful event. Hence, it is prudent that those procedures that induce anxiety in children be identified.

Anxiety is an internal state that cannot be fully measured by an observer.^{1,4} It has been suggested that the most comprehensive assessment of anxiety should involve the use of a combination of behavioral, physiological and self-report measurement techniques.^{5,6} Nevertheless, one of the best ways to assess anxiety is to ask the particular individual about this state.^{1,4} There are numerous methods to measure general anxiety in children in the preoperative setting. These methods include self-report measurements including questionnaires for the assessment of anxiety. However, the child must have acquired a definite reading level in order to complete this measure; and therefore young children cannot be assessed in this manner. A self-report measure employing pictures would serve better to young children and in situations where there are time constraints. In these categories of self-report evaluations, the child is only required to point to the face displaying the emotions that best represent how she or he feels.¹ Venham picture test is one such established measurement tool that has been employed previously in a number of anxiety measurement studies.⁷⁻¹⁰

Ethnic variations have been known to mediate expression of fear in culturally diverse populations.¹¹ Data on anxiety levels of Filipino children are scarce. Further, there is very limited data on anxiety measurements of Filipino children while performing nursing procedures.^{11,12} Thus, the objectives of the study was to identify the common nursing procedures done for children in a district hospital in Philippines and to measure the level of anxiety when performing those interventions using the Venham picture test.

Materials and methods

The study was conducted at a district hospital in Negros Occidental, Philippines between August 2015 and September 2015. A cross-

sectional descriptive design was adopted for the study. The nursing procedures as advised by the doctor in-charge were performed for the children admitted in the hospital. Nursing procedures which were commonly requested were identified, listed and implemented according to established protocols.^{13,14} These included pulse measurement, temperature measurement, peripheral cannula insertion, oxygen therapy, oral drug administration, intramuscular injection, intradermal injection and use of nebulizer. The respondents of the study were children aged 3 - 9 years old admitted in the pediatric ward of the hospital. The descriptive characteristics of the children were recorded. Children who had undergone the nursing intervention as a part of their treatment plan were included in the study. However, children who were intubated, in cardio respiratory distress, with developmental and learning disabilities, and with neuro-cognitive or major psychiatric disorders were excluded from the study. The sample size of the study was determined based on the average monthly admissions in the hospital during the preceding year using Slovin's formula (1960): $n = N / (1 + Ne^2)$; where n = number of samples, N = total population admitted in the hospital during the preceding year and e = error tolerance. The margin of error was set at 0.05 which provided a confidence level of 95%.¹⁵ The average number of admissions in the hospital during the preceding year was 339 patients per month. This figure provided a minimum sample size of 184 patients for the current study.

Venham Picture Test was used to assess the level of anxiety in children. The Venham Picture Test comprises eight cards, with two figures on each card, one "anxious" figure and one "non - anxious" figure. The children were asked to point at the figure they felt most like at the time of administering the procedure. All cards were shown in their numbered order. If the child pointed at the "anxious" figure a score of one was recorded, if the child pointed at the "non - anxious" figure a score of zero was recorded. The number of times the "anxious" figure was chosen a score of one

was assigned and then totaled to give a final score (minimum score - zero; maximum score - eight) for each patient. The final score were interpreted as follow: 8 (Very high anxiety), Equal to or more than 6 and less than 8 (High anxiety), Equal to or more than 4 and less than 6 (Average), Equal to or more than 2 and less than 4 (Low anxiety), More than 0 and less than 2 (Very low anxiety) and 0 (No anxiety).

The research instrument was validated using the Good and Scates criteria by a jury of three experts.¹⁶ The chief of a district hospital in Negros Occidental, a specialist pediatrician and a specialist pediatric dentist served as jurors and the mean rating obtained was 3.7 providing a "very good" validity for the instrument. The instrument was pre-tested on 30 pediatric respondents and had a Cronbach's alpha score of 0.8. Approval was sought from the chief medical officer of the district Hospital in Negros Occidental where the study was to be conducted. After the approval was obtained, consent was taken from parents of children admitted in the pediatric ward.

The chi-square test and t-test were used to determine the significance of difference between the scores given by the children across different age groups. The p-value was set at 0.05 and all computations were processed through SPSS v.19.

Results

During the one month period of the study, a total of 266 patients were identified who fulfilled the inclusion criteria. However, parents of only 235 of these children provided

the consent to participate in the study. Thus the response rate for the study was 88.35%. The mean age of the 235 respondents was 5.1 (3.5) years. The highest number of respondents belonged to the 3 year old group (n=83, 35.3%) while the 6 year old group had the least number of respondents (n=11, 4.7%) (Table 1).

There was an almost equal number of male (n=117, 49.8%) and female (n=118, 50.2%) respondents. Males obtained an "average" mean score of anxiety 4.0 (2.0) whilst females demonstrated a "low" mean score of anxiety 3.6 (2.3). There was no statistical difference between the levels of anxiety between males and females (P=0.14) (Table 2). Most of the cases admitted in the pediatric ward of the hospital were in an acute condition (n=214).

There was no statistical difference between the levels of anxiety between acute and chronic cases (P=0.8). The distribution of respondents according to the nursing intervention and prior experience is provided in Tables 2 and 3. There was a highly statistical difference between the mean anxiety scores amongst patients who had a prior experience and those who had none (P=0.001). Temperature and pulse measurement were the most common interventions performed (n=51). Of the eight different procedures performed, pulse measurement and temperature measurement demonstrated the least level of anxiety while peripheral cannula insertion caused maximum anxiety in respondents (Table 3). There was a highly statistical difference between the mean anxiety scores amongst all the different procedures performed (P=0.001) (Table 3).

Table 1. Distribution of respondents according to age and their mean anxiety score

Age of the child	N (%)	Mean (SD)	Chi-square test
3-4 <year olds	83 (35.3)	4.8 (2.0)	P = 0.009
4-5 <year olds	37 (15.7)	4.2 (2.4)	
5-6 <year olds	36 (15.3)	3.6 (2.0)	
6-7< year olds	11 (4.7)	3.3 (1.8)	
7-8< year olds	14 (6.0)	3.0 (2.4)	
8-9 <year olds	36 (15.3)	2.7 (2.2)	
9-10 year olds	18 (7.7)	1.6 (1.5)	

Table 2. Distribution of respondents according to sex, medical illness and prior experience and their mean anxiety scores respectively

Variable	Number	Mean (SD)	t-test
Sex			P = 0.14
Male	117	4.0 (2.0)	
Female	118	3.6 (2.3)	
Medical illness			P = 0.8
Acute	214	3.7 (2.2)	
Chronic	21	4.6 (2.2)	
Prior experience			P = 0.001
Yes	123	4.8 (1.9)	
No	112	2.6 (1.9)	

Table 3. Distribution of respondents according to the procedure performed and their mean anxiety scores

Procedure	Prior experience		N	Mean (SD)	Chi-square test
	Yes	No			
Medication: administration by inhalation using a nebulizer	19	3	22	4.6 (1.8)	P= 0.001
Medication: intradermal injection	15	1	16	5.5 (2.5)	
Medication: intramuscular injection	2	0	2	3.5 (4.5)	
Medication: oral drug administration	2	36	38	3.7 (2.2)	
Oxygen therapy	7	0	7	4.6 (2.2)	
Peripheral cannula insertion	42	6	48	5.7 (1.9)	
Pulse measurement	18	33	51	2.4 (2.3)	
Temperature measurement	18	33	51	2.4 (2.3)	

Discussion

As far as it could be ascertained, this is the first study that measured the anxiety levels of Filipino children as young as 3 year old and receiving nursing interventions. This study was undertaken to identify nursing procedures that induced high level of anxiety in children using the Venham Picture Test. The Venham picture test was originally developed to measure the anxiety level in children in a dental setting. The test is a self - report evaluation which allows young children to describe their emotions just before receiving clinical intervention.

This instrument has been used several times in dental operatories^{17,18} as well as medical settings.¹⁰ In the present study the instrument demonstrated a sound validity and reliability and was used in a pediatric medical-surgical ward of a district hospital where the procedure conducted was explained to the children.

Anxiety is considered a normal aspect of children's behavioral and emotional deve-

lopment.¹⁹ Children aged 3-4 years demonstrated a significantly higher level of anxiety than children aged 5-9 years. Further, children aged 9 years exhibited a "very low" level of anxiety compared to children of all other age groups. These findings are concurrent with the results of previous studies that indicated that the level of anxiety is inversely proportional to the age of the child.²⁰⁻²² Many important cognitive shifts occur between three to four year old.^{23,24} Three year olds are considered pre-operational thinkers and rely solely only on the concrete appearance of the objects rather than ideas. Hence, objects like face mask, gloves, thermometers and particularly needles would induce anxiety in them.²³ Likewise, concept development is an important aspect of the cognitive expansion of four year olds.²⁴ They tend to catalogue information into concepts based on attributes that define the idea or the object.²⁴ The idea of visiting a hospital and undergoing a procedure as trivial as pulse

measurement can be perceived as being harmful and can raise anxiety levels in these children.

Contrarily, examination of gender differences demonstrated that males had "average" anxiety scores whilst females had a "low" anxiety. However this difference did not meet statistical significance. These results contrasts with much of the literature relating to older children in whom it has been widely concluded that girls manifest higher levels of anxiety and anxiety disorders than boys.^{25,26} Gender differences in anxiety may be observed due to a number of factors including the age of the child, method of assessment and the aspect of anxiety measured.^{25,26} Nevertheless, some self-report measurement studies have observed that females obtained a higher anxiety score than males.²⁷⁻³⁰

Different theories have been proposed to explain why females are more likely to develop anxiety disorder than males. Environmental upbringing of the child and hormonal differences between males and females has been suggested as differentiating factors.^{27,28} However, the child's age and developmental level are considered important factors that influence the anxiety levels between sexes. Puskar et al.,³¹ in their study of 193 adolescents aged 14-17 years demonstrated that females' mean self-reported anxiety score was significantly higher than their male counterparts. Conversely, there was no difference in anxiety levels between 252 girls and boys aged 5-10 years attending a dental hospital.³² Further, it has been suggested that up until the age of 11 years, girls and boys are equally likely to develop anxiety disorders.³³ Thus, differences in the level of anxiety between sexes vary depending upon the age group investigated.

Children with acute and chronic condition both exhibited "low" level of anxiety. An exploratory study on children's anxiety related to disease characteristics found that there was a significant difference

in the level of anxiety related to disease characteristics; where fatally ill children showed highest level of anxiety followed by chronically and acutely ill children respectively.³⁴ Further, the findings of the present study showed that children with prior experience to medical procedures had "average" level of anxiety which is statistically higher than children undergoing the procedure for the first time who had "low" level of anxiety. Prior studies have suggested that children with no previous hospital experience are more anxious than children who had been hospitalized.³⁵ Children with previous exposure to hospital settings and procedures seem to have an advantage during subsequent visits; however, the defining factor may be whether previous experiences were positive or negative.³⁶⁻³⁸ In the current study, it is apparent that most of the procedures done in children induced a negative experience. Nurses are the primary professionals who can help children lessen the distress drastically during a hospital stay. Therefore, nurses who are assigned in a pediatric setting should have proper training and excellent skills in handling children and offer them a hospital stay which is non - traumatic.

Vital signs (VS) measurements are indicators of physiological functioning and include recording of temperature, pulse rate, respiratory rate and blood pressure (BP). Health care professionals measure VS to assess, monitor, evaluate, and document an individual's physiological status or change in condition.¹³ Among the components of VS, only pulse rate and temperature were recorded in the current study. BP and respiratory rate were omitted as it required bulky equipment and taking BP of already anxious children may induce unnecessary distress.³⁹ In the current study, both pulse and temperature measurement induced "low" levels of anxiety in children. Thus, nurses should be able to perform these measurements easily and efficiently even in children as small as 3 years old.

The second most common procedure done in the pediatric ward was peripheral cannula insertion. Peripheral cannulation is a fundamental part of contemporary medicine as it allows for access to procuring blood samples and blood products, fluid administration, medications, parenteral nutrition and chemotherapy. This procedure is commonly done in the emergency room (ER), but majority of the children who go off the ER may have possible complications such as dislodgement of the cannula, often when the child becomes restless. Peripheral cannula insertion recorded the highest mean anxiety score amongst all the procedures carried out during this investigation. Children as young as six months of age can form memories of painful procedures that then influence their reactions to future painful procedures.^{40,41}

Therefore, parents or care taker of the child must be briefed to take special care of the site to avoid dislodgement of the cannula. Further, nurses from the ER must properly secure the site with bandage and remind parents or care taker to protect it at all times to avoid re-doing the procedure that would cause more apprehension in children. Nurses in the pediatric ward should be made aware that children who have undergone peripheral cannulation in the ER, if required to undergo the same procedure in the ward would still be anxious even though they already have had prior experience.

Oral drug administration is a part of routine medical care service in the hospital. Pediatric patients are given oral medicines that have been appropriately calculated and evaluated for their use. Oral drug administration induced a "low" mean anxiety score amongst children but it was significantly higher than the temperature and pulse measurement. One possible explanation for this finding was that children would be skeptical of the taste of the oral medicine and expected it to be sour or bitter. Medication administration

through nebulization is another common procedure done in the pediatric ward. Nebulizers have been used for years in alleviating asthma and other respiratory difficulties.⁴² Similar to all forms of inhalation therapy, the goal of nebulized drug therapy is to deliver a therapeutic dose of drug via an aerosol of respirable particles. Inhalation through nebulization induced an "average" mean anxiety score amongst children in this study. Treatment through nebulization is known to be noisy, cold and lengthy. Placing a tight-fitting mask can cause children to feel scared or suffocated. Difficulties in the physical and cognitive abilities and age of the patients to use the mouthpiece and co-ordinate the breathing efforts determine the anxiety levels of the children to this procedure.⁴³

Intramuscular injections were required by only two patients and the mean anxiety demonstrated by them was "low". Likewise, oxygen therapy was a part of the treatment plan of only seven patients who exhibited a mean "average" level of anxiety. Despite the statistical significance in the mean levels of anxiety amongst different procedures, the sample size for both these groups is very small to draw any relevant deductions. Intradermal injection is the common route of administration when testing for allergies to medicines especially before delivering antibiotics. Since most of the children admitted in the pediatric ward require antibiotics, skin testing was necessary to avoid hypersensitivity reaction. The children exhibited an "average" level of anxiety to this procedure.

Needle related procedures such as intradermal and/or intramuscular injections, intravenous injections, cannula insertion and immunization have been known to induce high levels of anxiety in children.⁴⁴⁻⁴⁹ These procedures though routinely performed for many children, cause considerable distress. In the current study, peripheral cannula insertion and intradermal injections generated a significantly high level of anxiety in

children. It has been suggested that these procedures, if causing a traumatic experience, can deter parents and children from subsequently visiting medical health facilities which would eventually have a negative impact on the child's health outcome.^{50,51} Hence, it is critical that nurses recognize these characteristics and manage their patients appropriately while conducting all procedures, especially needle related procedures. They may allow parents to be present at the time of the procedure which would help to alleviate the anxiety of children.

Traditionally, theories of anxiety have reflected the enduring debate between genetic component and environmental influence.^{52,53} Based on these aspects of etiology, anxiety has been broadly classified as either a trait (a genetic based variable) or a state (a context-dependent aspect that is variable in different environments). A more useful view though recognizes anxiety as a product of a complex interplay of both these entities. This study however, addressed the situational anxiety that the children encountered while being subjected to nursing procedures as a part of their medical care. Besides, most of the state-trait anxiety inventory for children cannot be used to measure the parameters in children as young as 3 years old.⁵⁴ The primary objective of the investigation was to obtain appropriate anxiety measurements for common nursing interventions in very young children and to use the data to assist nurses in developing an effective approach to implement these procedures.

In spite of the simple methodological approach to obtain scores of anxiety level, the study has certain limitations. The anxiety levels of children are influenced by the type of disease children are affected with. The current study did not measure the anxiety levels according to the type of disease as the sample size of children according to their medical conditions was insufficient to produce any reliable and significant results. Instead, children were

broadly categorized into groups of those with acute conditions and those with chronic conditions and anxiety measurements were then taken. While Venham picture test has been used successfully in patients as young as three years, the ability of some of these young patients is uncertain. Nevertheless, the large sample size and the unequivocal results improve the understanding of the emotions children experience whilst they undergo difficult nursing interventions.

Conclusion

Temperature measurement and pulse measurement were the most common procedures performed on children and demonstrated very low level of anxiety. Peripheral cannula insertion caused the maximum anxiety amongst all the procedures performed. Children aged 3 to 4 years old demonstrated the maximum anxiety when compared to children aged 5 to 9 years. The sex of the child and the type of illness (acute or chronic) had no influence on the anxiety levels expressed by the children. Children with prior experience had a remarkably higher level of anxiety than those with no prior experience.

How might this information affect nursing practice?

The anxiety children face when undergoing clinical procedures is well documented.

Whilst various techniques exist to measure anxiety, there are a limited number of resources available to measure anxiety in children as young as 3 years. Further, a precise measurement of anxiety is critical in clinical pediatric settings to accomplish the determined treatment plan. The current study uses Venham picture test- a simple, easy-to-perform approach to measure anxiety in young children. Often, nurses are the primary caregivers that the child directly comes in contact with. Knowledge of the procedures that raise the anxiety levels of children will assist the nurses to approach the treatment plan suitably. It

shall not only improve the co-operation of the patient but also improve the outcome of the treatment. Further, this study identifies and highlights the fact that needle related procedures require special skill and attention particularly when implemented on young children. Irrespective of the experience, nursing staff must be well trained to perform all clinical techniques specially those involving needles.

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Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

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