

## **Development and Trial of a Paediatric Falls Screening Tool for Use in an Indonesian Context**

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### **ABSTRACT**

**Background:** Falls in the hospital have become an important issue internationally with numerous studies and assessment tools developed with a focus mainly on elderly adults. However, little has been written about falls in children in the hospital, which reveals evidence that falls and the sequels are significant problems.

**Purpose:** This study aimed to develop a culturally-based instrument for paediatric falls prevention.

**Methods:** In this action research study, participants, in this case, clinical nurses, joined the researcher in progressive problem-solving in two phases, starting with composing tool items based on the previous tools and research, then conducting validity and reliability tests. The instrument, the Paediatric Risk of Falls (PROF) Scale, was developed based on a literature review, contemporary models and the local context, and its content validity. In phase two, the staff of one local hospital participated in an education programme in the use of the tool, then were involved in the screening of all falls within two months on 156 paediatric patients in the paediatric ward in a local hospital in Indonesia. Data were analysed to examine the validity and reliability of the PROF Scale using Pearson Product Moment and Cronbach's alpha coefficients.

**Results:** Two of nine items related to medication and surgery were judged as not valid, possibly because of study parameters and technical problems in completing the items. One item on parental involvement, which was developed based on cultural practice in Central Java, was judged as a valid item. All items demonstrated acceptable reliability statistics.

**Conclusion:** The PROF Scale demonstrates satisfactory validity and reliability as a scale for assessing falls in pediatric settings in an Indonesian context, but needs to be tested in other settings to further test validity and reliability as well as its application and acceptability.

**Keywords:** Culture; Indonesia; pediatric falls; prevention; safety

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## **BACKGROUND**

Safety is noted as a basic human need in the theories of Maslow (Dewit & O'Neill, 2014; Maslow, 1943) and Henderson (Mason, Isaac, & Colby, 2011). These theories are complemented by regulatory bodies' requirements for practice, such as the International Council of Nurses Code of Ethics, which states that "The nurse's primary professional responsibility is to people requiring nursing care." ( International Council of Nurses [ICN], 2012). World Health Organization [WHO] (2013) defined patient safety as the prevention of errors and adverse effects to patients associated with health care. Both the Joint Commission International and Minister of Health Regulation set the prevention of falls as the sixth goal of patient safety (Joint Commission International [CJI], 2012; Ministry of Health Republic of Indonesia [MoHRI], 2011).

Patients who fall off beds can experience a worsening of their condition, or worse further injury (WHO, 2013) therefore improving human resources and facilities plays an important role in patient safety (Black, Car, Pagliari, Anandan, Cresswell, Bokun, & Sheikh, 2011; Tzeng, 2011).

Problems such as old furniture, rails, and wheels of beds that do not work yet are still used for patients, need to be addressed systematically. Nurses must take responsibility for the prevention of falls, and families can be educated to decrease risk by being with their child in the hospital; however, in the absence of a systematic fall screening tool and implementation of a model, the unwanted incidence of falls remains.

While safety has become a significant economic and health issue in developed countries, and prevention of falls a major drive, this has yet to become a prominent issue locally where there is a lack of hospital models or programs to reduce falls such as those developed in overseas countries (Choi, Lawler, Boenecke, Ponatoski, & Zimring, 2011; Miake-Lye, Hempel, Ganz, & Shekelle, 2013; Raeder, Siegmund, Grittner, Dassen, & Heinze, 2010; Razmus & Davis, 2012; Tzeng, 2011). There is disagreement in the literature which models are most beneficial, and there is a clear need to review the overseas work and synthesise the findings into a tool and a model which is suitable for the Indonesian context. In the absence of any publications or known applications related to the Indonesia situation, this study is most timely.

## **PURPOSE**

This study aimed to develop and test a pediatric falls scale and test it in an Indonesian cultural context, specifically in Central Java, to reduce falls-related injuries in hospitalized children.

## **METHODS**

This study was approved and a Permit was granted by the Department of Infection Control and Prevention of the Local Public Hospital. The data collection was conducted with strict adherence to principles of confidentiality - all patient information was de-identified. Head nurses were invited from the Emergency Room, Outpatient Unit, PICU, and the Paediatric ward to be trained in the use of the PROF Scale, which was developed for the study.

The initial meeting consisted of brainstorming the possible factors and issues that would be included in the study such as the development of the tool to be used within the study: age, gender, length of stay (LOS), medical condition, intravenous, surgery, medication, parental/guardian involvement, and environmental factors.

The project was comprised of two phases: 1). Composing items for the tool based on the existing validated tools, and 2) Conducting validity and reliability test for the tool. In phase one, the tool to be used was developed by reviewing other protocols used for child safety in acute care settings as well as gathering information from the nurses and medical staff working at Salatiga Local Public Hospital where the pilot study was to take place. Pediatricians and paediatric nurses from other hospitals and academics from other institutions of higher education provided the content validity for developing the tool. The final product being the Paediatric Risk of Falls Scale (PROF Scale) with nine items.

The PROF Scale was checked against existing tools such as the Royal Darwin Falls and Prevention Protocol, Falls Prevention Policy at Westmead Children's Hospital in New South Wales, the Humpty Dumpty Fall Assessment Tool as well as established tools, the GRAF-PIP, Humpty Dumpty, CHAMPS, and PFRA. It was discovered parts of these tools were relevant and appropriate for local use, however other sections and items were not relevant to our study as they tended to reflect issues existing in developed countries rather than those of a developing country. In higher and middle-income countries, it is common for parents to leave their hospitalized children alone in the hospital. Roberts (2010) revealed that one-third of hospitalized children were not accompanied by their parents for at least part of the hospitalisation. A qualitative follow-up study was conducted, and it was discovered that financial issues and not being able to leave work were the main reasons for not being with the child in the hospital (Roberts, 2012). These findings contrast with typical Indonesian hospitals where a guardian must stay with the hospitalized child. This might be the child's parents, grandmother, or caregiver.

Hospital facilities also differ remarkably between developed and developing countries. In rural hospitals in some developing countries, it is often observed that wheel(s) or rail(s) of hospital beds do not function. In some cases, patients share beds and even have makeshift mattresses or couches as beds in corridors. Patient and occupational health and safety policies in developed countries are strong and adhered to, and facilities must be in good condition. Therefore, the PROF Scale added items related to guardian presence, and wheels and rails of bed condition as an item/subitem. Once developed, the tool was translated into Indonesian.

In phase two, head nurses from the Emergency Room, the Outpatient Unit, the Paediatric Ward, and PICU were trained to use the PROF Scale. They were asked to teach nurses in their own unit how to use the scale. The PROF Scale tool was piloted by being placed in the front of children's medical records on arrival at the Emergency Room (ER), the Outpatient Paediatric Unit, and in the ward. The Emergency Room nurses had difficulties with this as there were too many admissions and not enough staff, so very few admissions came from the ER with paperwork completed or armbands on. The Outpatient Clinic also proved to be difficult until research assistants were placed there for two hours in the morning. On the ward, paperwork was often filled out retrospectively as the nurses did not see this as a priority. Reasons used by the nurses were; too many patients to care for or the patient was deteriorating. Once again, the use of a research assistant was needed.

The sample was comprised of 156 paediatric patients who were chosen using purposive technique sampling, all with parents/guardians involvement, as it is typical of Indonesian hospitals to have them present with their children.

## RESULTS

The PROF Scale consists of 9 items. The items are age, gender, current LOS, medical condition, intravenous, surgery, medication, parental/guardian involvement, and related environmental factors. There is also a section on the scale which consists of several open-ended questions about details of IV location, other medications received by the patient, bed condition, room features, falls events, and nurse-patient ratio. Patients were assessed twice a day at 10 a.m. and 10 p.m. as at those times, the routine activities had been done, and the nurses would have sufficient time to examine the child's condition and complete the scale. The attending nurses were also requested to complete the open-ended questions. After several-day's trial, the number of scales completed was low; therefore, research assistants were recruited to conduct the assessments and complete the scale while the nurses were able to perform their care usual related tasks.

After a one-month trial, there were 156 patients on whom the PROF Scale was administered. The patient's age ranged from infancy to adolescence years old, male and female, with acute diseases, such as typhoid fever, acute respiratory disease, diarrhea, dengue fever, post-surgery. The face and content validity were addressed based on the literature review and the pilot study with experts, while the reliability of the scale was tested using the Pearson Product Moment coefficient. Five items were found to be acceptable, while two were problematic (Table 1). All items proved reliable, and the overall scale reliability was acceptable (Table 2).

*Table 1. Item to item total correlations of PROF scale*

| No. | Indicators        | r Score to r Total | r Table $\rightarrow$ $\alpha=0.05$ | Probability | Interpretation |
|-----|-------------------|--------------------|-------------------------------------|-------------|----------------|
| 1   | Current Los       | 0.308              | 0.148                               | 0.000       | Valid          |
| 2   | Medical Condition | 0.463              | 0.148                               | 0.000       | Valid          |
| 3   | Intravenous       | 0.274              | 0.148                               | 0.000       | Valid          |
| 4   | Surgery           | 0.033              | 0.148                               | 0.669       | Invalid        |

| No. | Indicators                    | r Score to r Total | r Table $\rightarrow$ $\alpha=0.05$ | Probability | Interpretation |
|-----|-------------------------------|--------------------|-------------------------------------|-------------|----------------|
| 5   | Medication                    | 0.023              | 0.148                               | 0.768       | Invalid        |
| 6   | Parental/guardian Involvement | 0.185              | 0.148                               | 0.017       | Valid          |
| 7   | Environmental Factor          | 0.964              | 0.148                               | 0.000       | Valid          |

Table 2. The reliability of PROF scale

| Reliability Statistics |            |
|------------------------|------------|
| Cronbach's Alpha       | N of Items |
| .882                   | 9          |

## DISCUSSION

The study set out to develop a pediatric falls scale, based on those developed and with proven reliability and validity in overseas studies, for use in a local Indonesian hospital. Several protocols and tools were examined, and after discussion and comments from local experts, in Phase one, the nine-item PROF Scale was developed.

The PROF Scale was developed based on previous established paediatric falls measurements, namely GRAF-PIP, Humpty Dumpty, CHAMPS, and PFRA. Ryan-wenger, Kimchi-woods, & Erbaugh (2012) study indicated that the accuracy of these tools was insufficient as their items were based on adult falls tools. Furthermore, the study also showed that the toddlers and male patients who were having musculoskeletal problems; in fact, did not experience falls. An integrative study by DiGerolamo and Davis (2017) uncovered similar findings – that there was a lack of fall screening tools that were valid and reliable across institutions and diverse populations. However, a recent literature review (Chromá, 2016) argued that the Humpty Dumpty measuring scale was the most suitable tool to measure the risk of falls for hospitalized children.

Accordingly, Jamerson et al. (2014) described that most of the falls of hospitalized children were, in fact, occurred when the floor was clean and dry while the parents were present, also when the light was good. In addition, the study also revealed that most of the incidents occurred during the time the children were trying to grab an object. However, another study which implemented the Humpty Dumpty Falls Scale in paediatric specialty care showed that the scale had low accuracy in measuring falls risk among children in specialty care. Consequently, the study recommends identifying in more detail the characteristics of all paediatric patients who had experienced falls in all hospitals ( Ryan-wenger, Kimchi-woods, & Erbaugh, 2012), as well as in specialty paediatric hospitals (Pauley & Houston, 2014).

The pilot testing revealed difficulties with the tool being accepted by the hospital nurses, and completing the tool in a timely and complete manner proved difficult. Therefore, research assistants were employed to help with the administration and correct completion of the scale.

There were two items on PROF Scale, 'surgery' and 'medication', which were shown to be problematic. It is likely this was caused by the sampling imbalance (Polit & Beck, 2012) in this study, where there were only 5 out of 156 paediatric patients who underwent surgery, and only 18 of 156 paediatric patients had received particular medications which were listed on the scale.

In accordance with Indonesian culture, the item identifying parental presence was important, and the PROF Scale provides an additional choice for guardian involvement in the item, as some paediatric patients were not always accompanied by their parents. Although valid and reliable in this study, Jamerson et al. (2014) found that the falls occurred when parents were present, and this issue is important locally as nurses tend to rely on parental involvement to help promote their child's safety. A study of nurses' perception of unaccompanied hospitalized children suggested that nurses were concerned about their patients' safety during the absence of their parents. The nurses were placed in a difficult situation by having to put toddlers into cribs to keep them safe, which caused them to feel sorry for the child or by placing the child on a regular bed with a high risk of fall (Roberts, 2012).

Another typical condition in Indonesian rural hospitals is the condition of the bed. Therefore, three sub-items in environmental factors were added: wheel on cot/bed is damaged, infant or toddler, and >3 years old child in cot/bed without cotsides. The item was considered valid and reliable as some of the beds lacked functioning wheels or rails.

The nine-item PROF Scale developed for the study was found to be reliable and valid; once two items were removed. Having the scale adopted as a routine part of the nursing notes and completed on time proved difficult for the regular nursing staff, and the challenge for nursing administration is to provide sufficient education on falls and falls risk so that the nurses feel motivated and sufficiently knowledgeable about falls, and their impact on the health of patients and the economic impact of falls on the hospital.

## **CONCLUSION**

The PROF Scale demonstrated internal consistency, and the statistical correlations of the items contributed to the validity alongside the content and face validity from phase one and pilot testing. Since there were two invalid items, the scale needs further testing in similar settings, and also in a homogeneous sample of patients undergoing surgery and taking medication. Further studies should include a more in-depth analysis of pediatric patients' characteristics in the hospital where the falls occurred. Nevertheless, the PROF Scale presents as credible and easy to use, and future studies could address ways of raising nurses' and family awareness of the importance of systematically preventing falls through the adoption of such tools.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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