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Accident Prevention Measures for Hospitalized Children

—Report on the Actual Condition of Safety Control on Nursing—

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Abstract

Accidents during childhood are attributable to characteristics of their developmental stages, and children, healthy and sick, meet with a wide variety of accidents. Though hospitalized children in particular have higher risks for accidents in the course of adjusting to new environment and serious consequences are drawn depending on their medical conditions, no research reports on such a topic can be found. Therefore, we surveyed and considered accident prevention measures in children's hospitals as well as their guardians' awareness about accidents. Accidents in this survey do not mean those of medical practice but those peculiar to children including falling, accidental ingestion, suffocation, bruises, wounds and burn injuries.

After interviewing charge nurses of inpatient' wards about the circumstances of accidents, admission orientation, and accident prevention efforts, we analyzed and discussed the results as follows.

1) Falling accidents and falling from beds happened in every hospital, but no other kinds of accidents. 2) Every hospital made brochures to prevent accidents mostly for guardians, but a few for children themselves. 3) Environmental arrangements for accident avoidance performed are: displays for safe use of intravenous drip and bed fences, five-legged intravenous drip stands, cushioned floor, and safe measures in playing rooms. 4) No predictive tools to prevent children from falling are used.

Key words: child nursing, safety control, falling accident, accident prevention measure

I. INTRODUCTION

Accidents during childhood are attributable to characteristics of their developmental stages, and children, healthy and sick, meet with a wide variety of accidents. According to Population Survey Report conducted by the Ministry of Health, Labor and Welfare, unforeseen accidents have been the biggest killer of children for over 40 years. Compared to other developed countries, Japan has higher rates of death from accidents among children aged between zero and four, and positive steps should be taken to prevent accidents among infants and children.

Comparing unforeseen accidents as the cause of death by age, the main cause of death among children aged zero is asphyxia, and aged from one to four and from five to nine is the traffic accident. Another main cause is the slipping/falling accident. Infant accidents occur outdoor more than indoor and become more serious as their developmental stage advances. The prevention of unforeseen accidents among children is becoming more and more important in this country, which is suffering from

falling birthrate.

Nevertheless, there are few studies on accidents among hospitalized children. Only two studies suggested that “mothers of hospitalized children are hard to understand their children’s behavior modification and tend to fail to predict accidents”¹⁾, and “accidents occur influenced by factors such as their developmental stage and hospital environment”²⁾. In fact, influenced by limited mobility, side-effect of medication and environmental changes, hospitalized children have quite a lot of opportunities to be involved in accidents. Such accidents sometimes evoke bleeding and bone fracture, depending on their medical conditions. However, such accidents have never been publicly reported because of some reasons: accidents are mostly minor and rare in hospitals, where physical activities are limited, and medial employees do not hold responsibility for such accidents because most of them occur under guardian’s supervision.

The objective of this study is to research and clarify how medical facilities prevent daily accidents among children in hospital.

Accidents in this survey do not mean those caused by medical practice but those peculiar to children including slipping, falling, accidental ingestion, suffocation, bruises, wounds and burn injuries.

II. SUBJECTS and METHODS

1. **Subjects:** Representative nurses of general hospitals in the city of S, with over 250 beds and having a pediatric department.
2. **Study period:** August 2005~November 2006.
3. **Study methods:** Documents to request cooperation to the study, the outline of the study and examples of questionnaire were sent to ten facilities, and we obtained consent from three. After that, we visited those hospitals, explain representative nurses the outline of our study, and gained approval. Then, we interviewed charge nurses of inpatient’ wards and obtained data.
4. **Study contents:** We visited hospitals to directly interview charge nurses on accidents which occur with increased frequency, that is to say, slipping, falling, accidental ingestion, suffocation, bruises, wounds and burn injuries. Question items are: 1) how many accidents occurred per year, 2) how they occurred, 3) how they were dealt with, 4) accident prevention manual in each hospital, and 5) accident prevention efforts. Accident prevention manuals were also collected and reviewed.

III. RESULTS

1. Circumstances of accidents (Table 1-1, 1-2)

Slipping accidents and falling from beds occurred in every hospital, but no other accidents occurred.

Accidents occurred the most frequently were those of falling from beds, but circumstances of those accidents, such as the existence of fall prevention fences and the existence of mothers at the time of accidents, varied from accidents to accidents. Some accidents took place when a bed fence was pushed down to the middle stage, or a mother was 30 centimeters away from a bed with her back to her child. Two accidents of falling from baby carriages also occurred.

Slipping accidents occurred when children stepped on their nightwear while walking, casters

Table 1-1 The number of accidents by ages

n=26

	Age Accident	1	2	3	4	5	6	Total
Hospital A (hospital days : 5.7 bed capacity : 24)	Slipping	—	—	—	—	—	—	—
	Falling	2	4	1	1	1	—	9
Hospital B (hospital days : 4.5 bed capacity : 20)	Slipping	1	—	—	—	—	1	2
	Falling	6	1	1	—	1	—	9
Hospital C (hospital days : 37 bed capacity : 45)	Slipping	One accident but the age is not known.						1
	Falling	Five accidents but the ages are not known.						5

Table 1-2 The number of falling accidents

n=23

	Kinds of accidents	Number
Hospital A	Falling from baby carriages	1
	Falling from beds	8
Hospital B	Falling from baby carriages	1
	Falling from beds	8
Hospital C	Falling from baby carriages	—
	Falling from beds	5

of a drip stand thumped against their legs, or children knocked against a drip stand.

2. Admission orientation

Every hospital had admission brochures or videos to prevent accidents mostly for guardians, but few for children themselves.

The admission brochures for children hospitalized without their guardians indicate that scissors, knives and sharp-pointed toys are prohibited. Meanwhile, attendant guardians receive an explanation about some cases when falling accidents tend to occur: 1. when looking aside from children to take something while changing diapers or cleaning their bodies, 2. when moving away from beds for laundry, 3. when feeling relieved with their children sleeping, and 4. when children stand on a bed and lean over on curtain. Many admission brochures explained beds and bed fences shown with some pictures. In case of oral explanation for guardians, hospitals explained precautions for the use of bed fences and drip stands, and guardians' responsibility for falling accidents. Nurses in the university hospitals called attention about bruise for children with bleeding disorders.

3. Efforts to improve environment and equipment for accident avoidance

Nurses in the three hospitals were making efforts to improve environment for accident avoidance. Environment about cushioned floor, play rooms, and corridors are shown in Table 2. Warning boards saying "Be careful not to fall from a bed" were displayed in a hospital. Types of beds were selected depending on their developmental stage, i.e. circle beds for two years old and younger, and beds with fence for three years old and over. Obstacles were eliminated from corridors, cushioned floor was used in play rooms, and tables with rounded corners were used. In play rooms, small toys that might be swallowed by children were eliminated and the storage to keep toys was ensured. A drip stand was improved from three-legged to five-legged to prevent slipping accidents.

Table 2 Structural improvement by hospital

		Hospital A	Hospital B	Hospital C
Cushioned floor	Hospital room			○
	Play room	○	○	○
	carpet			○
	flooring	○	○	
Play room	Should be accompanied by guardian		○	
	Warning sign		○	
	Table	○		○
	Storage place for toys	○	○	△
	Toy smaller than 4cm			○
	Hard toy			○
Corridor	Storage place	○	○	○
	Carpet		○	

Table 3 The height of beds, bed fences and medical tables by hospital

	Hospital A	Hospital B	Hospital C
Circle bed	67cm	59.5cm	60cm
Fence of circle bed	60.5cm	63cm	Middle : 29cm Upper : 58cm
Bed for adults	48cm	46cm	Minimum : 45cm Adjustable
Fence of bed for adults	24cm	29cm With cover : 37.5cm	22cm
Medical table	61cm	Minimum : 44.5cm Adjustable	

The height of various beds and medical tables is shown in Table 3. The height of medical tables in a hospital was adjustable. The height of fence of circle beds in two hospitals was higher than that of the breast of one to two year olds. The height of fence of beds for adults in two hospitals was only about a quarter of minimum height of three years old and over, who are subject to such beds.

4. Accident prevention manuals in hospitals

Accident prevention manuals in three hospitals were compared along with "items to be reported" presented by Health Policy Bureau, Ministry of Health, Labor and Welfare (Table 4 and 5).

1) Slipping/falling prediction tools

Assessment sheet was used with modified age classification, items and scores, but manuals only for children were not found. One hospital added an item limited to children in the action area, "extremely restless." Another hospital did not use assessment sheet but gave a warning against accidents for six years old and younger.

Slipping and falling accidents were included in manuals of two hospitals, but bruises, wounds, accidental ingestion, suffocation, and burn injuries, which are peculiar to children, were not mentioned.

2) Items to be reported and their management

Items reported in case of accidents shown in manuals of three hospitals and the manual referred by Japan Nursing Association (the manual in Nagasaki University Hospital of Medicine and Dentistry) were compared with “items to be reported” presented by Health Policy Bureau (Table 4). Accident information is managed and reported as follows:

Hospital A: Accident reports were managed and analyzed by computers. By analyzing accident-prone conditions, the hospital prevented the same kind of accidents. The hospital planned countermeasures against medical accidents during normal business hours and nighttime/holidays, and countermeasures against slipping/falling accidents. The hospital had safety reports and the medical accident reporting system to regulate how to submit reports after accidents.

Hospital B: The number of accidents and circumstances of accidents were reported to draft measures. The hospital had countermeasures only against slipping/falling accidents, depending on conscious level, subjective/objective opinion and time in each injured part of head, four limbs and the trunk.

Hospital C: Though the hospital had the accident reporting system and managed accident information, the number of accidents has never been officially announced and we could not obtain the

Table 4 Items to be reported

Items \ Hospital	Hospital A	Hospital B	Hospital C	Nursing Association*
Date of the accident	○	○		○
Day of the accident			○	
Time of the accident		○	○	
Place of the accident	○		○	○
Treatment department concerned	○		○	○
Sex of the patient	○		○	
Age of the patient	○	○	○	○
Classification of the patient			○	○
Name of disease		○	○	○
Job description of the party involved	○	○	○	○
Years of experience of the party involved	○		○	○
Period of assignment in the department for the party involved	○			○
Working conditions of the party involved				○
The person to find	○		○	○
Details of the accident	○	○	○	○
Situation of the accident	○	○		
Extent of the accident	○	○	○	
Factors of the accident		○	○	○
Psychosomatic state of the patient	○	○	○	△
First aid treatment	○			
Causes of the accident		○	○	
Examination of the accident		○		
Improvement plan	○	○	○	○

*Items on manuals of Nagasaki University Hospital released as a reference manual by Nursing Association

Table 5 Slipping/Falling assessment score sheet

Classification	Characteristics	Score	Hospital A	Hospital B	Hospital C
Age	Aged 70 or over, aged under 9 or younger	2	○	◎	
Sex	Male	1			
Anamnesis	• Experienced slipping/falling accidents • Experienced fainting	2	◎	○	◎
Aesthesia	Visually-impaired, or hearing-impaired	1	◎	◎	◎
Functional disorder	• With paralysis or feeling of numbness • With bone or joint abnormality (contracture, deformity)	3	◎	◎	◎
Active regions	• Becoming disabled or developing muscle weakness • Using wheelchair, cane, or walker • Need to be helped for walking • Staggering gait • Confined to bed	3	○	○	○
Cognitive abilities	• Suffering disorientation, disordered consciousness, or confusion • Demented • Impaired judgment or understanding • With motor restlessness • With debilitating memory loss, difficulty in relearning	4	◎	○	○
Medication	Analgesic	1 each		○	○
	Narcotic drug		○	○	○
	Sleeping pill, stabilizer		○	○	○
	Antiparkinson drug				○
	Antihypertensive diuretic			○	○
	Enema, aperient		○		○
	Chemical therapy		○		○
Excretion	Urinary or faecal incontinent	2 each	○	○	○
	Frequent urination		○	○	○
	Getting to a bathroom with assistance			○	○
	Having urethral catheter			○	
	Going to a bathroom at night		○	○	○
	Having to travel far to reach a bathroom		○	○	○

◎... perfect matching

○... partial matching (including scores)

permission of having data. The hospital had countermeasures against serious accidents and after the accidents, and countermeasures and reports exclusively for pediatric services.

IV. DISCUSSION

1. Hospital environment and the situation when accidents occurred

It is easily expected that hospitalized children have higher risk for accidents than healthy ones because of changes of living environment, limited mobility involved in therapy and drug's side-effects. In medical facilities for inpatients and outpatients, however, nurses take so much time for diagnostic treatment, and sometimes have to leave children's safety involved in daily lives to their medical orderlies or guardians who visit them.

The prevention of accidents among hospitalized children is one of the most important issues in child care because they are prone to bleeding and can be seriously damaged by bone fracture, and accidents may have more impact on their quality of life than their present diseases do. However, as the excessive limitation of mobility may disturb development of children and lead to an increase in stress in their hospital life, the environmental improvement and the education for patients according to their developmental stage are thought to be important.

This survey showed that many slipping/falling accidents occurred in all hospitals surveyed. They recognized there were many slipping/falling accidents among children, and understood the obligation of security. Even under such perfect security control, falling accidents from baby carriages were included in the survey. In hospitals, places other than patient's rooms, are thought to be the same as outdoors, and it is suggested that environmental improvement and safety regulations in play rooms, corridors and treatment rooms be needed, such as: 1) securing space for walking corridors by eliminating obstacles and keeping the storage space for wheelchairs and stretchers; 2) making and complying with rules which ban running in corridors and can lead children who have not established ambulatory ability by the hands; and 3) using shoes and clothes which do not hinder their mobility. The administrators of hospital wards consider adopting nonslip floor materials, should educate employees not to leave the slippery conditions from water and obstacles as they are, and provide safety education for hospitalized children and their guardians.

Compared to this, any bruises, wounds, accidental ingestion, suffocation, and burn injuries were not reported in this survey. Though bruises and wounds resulted from slipping/falling accidents actually occurred, they were thought to be too minor to be recognized as accidents. It is predicted that they were not reported as accidents because people generally think that "children in the immature state of athletic ability come to concern about avoiding injuries by experiencing painful injuries several times, and minor injuries and accidents that can be cured without leaving any scars after receiving first aid at home are unavoidable"³⁾.

This study also showed that things at home, such as medicine, cigarettes and batteries, which could result in accidental ingestion or suffocation, and heating device, hot tap water, stoves and hot-water bottles, which could result in burn injuries, were thoroughly managed.

The report on such accidents in hospital will be effective in formulating a measure to prevent the same kind of accidents. In that case, the description of the developmental stage of children, the

name of diseases, factors/causes of accidents, their sexes and their characters would be important to clarify the factors different from those caused in healthy children. It is thought that such kind of report is important in making a measure which takes economic and operational aspects into consideration because hospitals are responsible for the maintenance of safe environment.

2. Function of prediction tools and nurses

As it is indicated that problems of accidents “[B]efore an accident occurs, an prevention is important, and first aid is important when an accident occurs. Furthermore, after an accident’s occurring, medical treatment and rehabilitation are important. In these approaches, the prevention is economically excellent”⁴⁾, the prevention of accidents is important for children’s health control. It was recognized that slipping/falling accidents were caused by “factors of patients, care providers and environment (facilities and equipment)”⁵⁾ and every hospital in this study included these factors in their slipping/falling accidents prediction tools.

Nevertheless, when children are subject to these tools, measures should be made focusing on their developmental stages, especially their ages, considering that “slipping/falling accidents among children are caused by actions associated with their growth and development”⁶⁾. Concretely speaking, besides measures by risk levels based on slipping/falling prediction tools, items unique to children such as “extremely restless” should be added to prediction tools. No items concerning children’s characters were found in slipping/falling prediction tools collected in this study. As “accident-prone children are restless, curious about everything, rough, dependent, inattentive, quick-moving or slow-moving”⁷⁾, their characters, closely related to their concentration and actions, could be a meaningful information to predict slipping/ falling accidents.

In daily nursing-care activities, nurses have charge of multiple children and are hard to take much time for a particular child. Meanwhile, the prevention of accidents involved in medical practice is the responsibility of the whole medical service. However, in case of children, the prevention of accidents in daily life in hospital should not be left to their guardians but be treated as nurses’ responsibility. It is said that the biggest problem of accident avoidance is that “people do not take accidents as their own problem”⁸⁾. Nurses need to raise families’ awareness about accidents through the orientation on admission and slipping/falling prevention measures. Also, it is thought to be important to assess the risk for each child by utilizing prediction tools on accident prevention, and implemental measures from the specialized viewpoint.

V. CONCLUSION

1. Slipping/falling accidents occurred most frequently of all accidents among children in hospital.
2. The environmental improvement to prevent slipping/falling accidents among children has been conducted as safety control of nursing care. But it was cleared that safety control of children’s daily activities tended to be left to their guardians.
3. There were few accident prediction tools reflecting the characteristics of children.

It has been clarified that, though various measures to prevent accidents peculiar to children in

hospital were conducted, there is no unified safety standard for children's hospitals and each hospital is left to make efforts on its own way. It was also noted that, at the time of admission orientation, hospitals shifted responsibility of children's accidents on to their guardians.

Unfortunately we could not gain cooperation from enough hospitals to show general accident prevention measures for hospitalized children. We hope to gain information from more hospitals in the future. From our study, we think that the establishment of specific methods to prevent accidents, including observation and environmental improvement reflecting children's medical conditions, formulation of safety standard, and education for children and their guardians, is needed for children's nursing care in Japan where the average length of hospital stay is long.

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Other references were omitted.

(Note: The inside of a parenthesis is English translation by writers.)