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The Impact of Child Injury Prevention Package (CIPP) on Injury Prevention in Toddler

Retno Puji Hastuti*, Musiana
Nursing Department, Poltekkes Kemenkes Tanjung Karang, Bandar Lampung, Indonesia.

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ABSTRACT

Injuries are a cause of morbidity and mortality in children under five. In Indonesia, the prevalence of injuries to children under five in 2013 was 8.5%, and in 2018, it was 8.2%. Injuries to toddlers derive from not-yet-optimal levels of development, high curiosity, lack of gross motor coordination, and the ability to anticipate danger. Nurses can provide anticipatory guidance to parents to increase parental understanding and prevent injuries to toddlers. The research aimed to determine the effect of CIPP on injury prevention in toddlers. The research method used the One group pre and post-test design with the population of all toddlers in the *Puskesmas* (Community Health Centre) Rajabasa Indah working area. The research sample using Proportional Random Sampling was 120 parents of toddlers. Data collection was done through interviews using screening cards. Data were analyzed using proportions and a T-test. The results of toddler characteristics were male (55.83%), toddler (55.83%), and standard nutritional status (70.8%). The proportion of toddlers who experienced injuries was 41.66%, and the most frequently experienced injuries were falls (37.5%). There was a significant difference in the mean value of knowledge about injury prevention in toddlers (p-value=0.000), environmental modification (p-value=0.000), and injury incidences in toddlers (p-value=0.000) before and after the anticipatory guidance intervention using CIPP. It is recommended to integrate CIPP into toddler health promotion, socialize CIPP with parents, cadres and kindergarten teachers, and develop CIPP-Android based applications.

Corresponding author:

Retno Puji Hastuti
Nursing Department, Poltekkes Kemenkes Tanjung Karang, Bandar Lampung, Indonesia
Email: retnopujihastuti@poltekkes-tjk.ac.id

INTRODUCTION

Toddlers are a crucial phase in a child's growth and development. In this phase, toddlers experience rapid motoric, sensory, and cognitive growth (Mirahmadizadeh, 2020). In cognitive development, toddlers have a high curiosity and desire to explore the environment, but this is not balanced with their ability to understand things or react to danger. In gross motor development, toddlers are actively moving, running, going up and down stairs, climbing, jumping, playing bicycles, and starting to enjoy playing outside the home. Toddlers are also developing fine motor skills that become skilled at grasping, opening, closing, or throwing objects around them. Toddlers have great curiosity, but unfortunately, they have no experience protecting themselves from the dangers of accidents. This condition causes toddlers to be a group that is prone to injury (Hastuti & Musiana, 2024).

Injuries can occur at any time, either at home or while playing outside the house. Injuries to toddlers result in disability and even fatal consequences, namely death. Injuries harm a child's growth and development and their future productivity. These injuries also have a psychological impact or trauma on toddlers. Toddlers will stop doing things that traumatize or fear them, which can result in developmental delays (Hockenberry, 2016). In Indonesia, the prevalence rate of injuries is slightly high. *Riskesdas* (Indonesia Basic Health Research) results generally reported injuries to children aged 1-4 years in Indonesia in 2013 was 8.5%, and in 2018, was 8.2%, with the proportion of places where injuries occurred including at home and the environment at 10% and schools and the environment. Every year, nearly one million children perished due to accidents, and most of them received treatment in hospitals (Ministry of Health Republic Indonesia, 2018).

Several studies showed that injuries happened more to toddlers whose mothers' knowledge levels of injury prevention were low. The more a mother's knowledge increases, the

more capable she will be of identifying the injuries in toddlers. Mothers' knowledge of anticipating injuries in toddlers in Bandung Regency showed that most mothers had sufficient knowledge (44.3%) and a positive attitude (55.7%) toward preventing injuries. There was a relationship between maternal knowledge about injury anticipation and injury prevention practices (p-value <0.05) (Hastuti, 2017).

Parents need education to prevent injuries to their children because it equips them with the knowledge and skills to recognize potential hazards, implement safety measures, and respond effectively in emergencies. Toddlers are naturally curious and cannot assess risks, making them vulnerable to injuries at home, school, or in public spaces. Parents can create safer environments and adopt preventive behaviors. Education also fosters awareness of age-appropriate supervision and first aid techniques, empowering parents to protect their children's health and reduce the likelihood of preventable accidents.

The Child Injury Prevention Package (CIPP) is designed to help parents prevent injuries in children, particularly toddlers. This module provides comprehensive information on common types of injuries, risk factors, and prevention strategies that can be applied at home or in surrounding environments. It also allows parents to monitor their progress in creating a safe environment, increasing their awareness and preparedness to protect children from injury risks. CIPP empowers parents to ensure their children's safety and well-being proactively. This research aims to determine the effectiveness of the child injury prevention package (CIPP) on preventing injuries in toddlers.

METHOD

The research design used was quasi-experimental, with a one-group pre and post-test Design approach. It provided a set of treatments in the form of guidance on anticipating injury prevention and observing efforts in injury prevention in toddlers (CIPP). Before experimenting, the researcher first prepared a CIPP using the FGD method.

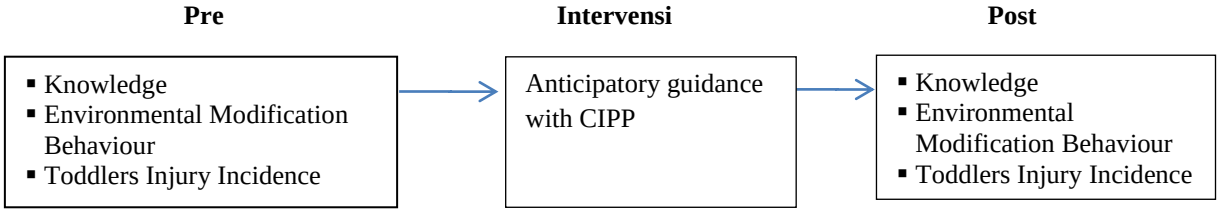

Figure 1. Research design

The research was carried out for eight months (March-November 2023) in seven *Posyandu* (Integrated Services Post) in the working area of the *Puskesmas* (Community Health Centre) Rajabasa Indah, Bandar Lampung – a *Posyandu* for each in the sub-districts of Rajabasa, Rajabasa Pemuka, Rajabasa Nunyai, Rajabasa Jaya, Rajabasa Raya, Gedong Meneng and Gedong Meneng Baru.

The population in this study were toddlers (1-5 years) in the working area of *Puskesmas* (Community Health Centre) of Rajabasa Bandar Lampung. The research samples were toddlers aged 1-5 years in seven *Posyandu* in the working area of *Puskesmas* Rajabasa, which were taken using proportional random sampling, with sample criteria: biological children cared for by biological parents in their own home. Sample calculation used the formula:

$$N = \frac{\alpha Z + Z\beta + 3}{0{,}5 \ln [(1+r)/(1-r)}$$

Meanwhile, the sample size for the Odds Ratio hypothesis test with a significance degree of 5% and a test power of 95%, P2=0.15, and OR=5.00, was 108. Then, the sample was added by 10% to anticipate sample dropouts so the sample size was 118-120 respondents (Arikunto, 2010).

Data was collected using interviews and measuring tools, such as toddler injury prevention screening cards. The injury prevention screening card for toddlers consists of five parts, they are as follows:

1. Part A covered the growth and development characteristics of toddlers, including their names, ages, genders, nutritional status, and development.
2. Part B was about the history of injuries experienced by toddlers
3. Part C was about the characteristics of parents, including parents' names, ages, education, occupation, and number of children.

4. Part D of parents' knowledge about preventing injuries to toddlers consisted of 30 questions, with two options of 'True' or 'False.' Correct answers would get a score of 1, and wrong answers would get a score of 0, so the score range for parents' knowledge about preventing injuries in toddlers was around 0-30.

The knowledge questionnaire covered six aspects of knowledge about preventing injuries in toddlers: preventing falls in 5 questions, preventing burns in 5 questions, preventing aspiration/suffocation in 5 questions, preventing poisoning in 5 questions, preventing drowning in 5 questions, and preventing injuries/wounds in 5 questions.

The environmental modification questionnaire by the family consisted of two options, 'Yes' if it is done, and 'No' if it is not or has not yet been done by the family. The environmental modification questionnaire consisted of 30 statements, including 10 questions on general environmental modification, 10 on environmental modification inside the home, and 10 on outside-home environmental modification to prevent injury to toddlers. This research used frequency distributions (proportions) regarding the toddlers' and parents' characteristics and the incidence of injuries to toddlers. Bivariate analysis assessed differences in mean values of knowledge about injury prevention, environmental modification efforts, and injury incidences in toddlers before and after intervention using CIPP using dependent T-Test.

This research received ethical approval from the Poltekkes Kemenkes Tanjung Karang, Research Ethics Commission No. No.463/KEPK-TJK/VIII/2023.

RESULTS

Table 1 shows that toddlers, in the majority, in the working area of the Community Health Centre Rajabasa Indah were male 55.8%, aged 1-3 years (toddler) 55.8% with a normal nutritional status were 70.8%.

Table 1. Frequency distribution of toddlers' characteristic

Variable	n	%
Gender		
Male	67	55.8
Female	53	44.2
Ages		
Infant	18	15
Toddler	67	55.83
Pre-School	35	29.17
Nutritional status		
Normal	85	70.8
Undernutrition	8	6.7
Deficiency	15	12.5
Overnutrition	12	10.0

The majority of toddlers did not experience injuries (58.34%), and the proportion of toddlers who experienced injuries (41.66%) and the type of injury that the majority of toddlers experienced was falling (37.5%).

Table 2. Frequency distribution table of events and types of injuries in toddlers

Variable	n	%
Injury incident		
No	70	58.3
Yes	50	41.7
Types of injuries occurred in toddlers before intervention		
Falls	45	37.5
Burns	3	2.5
Chokings	1	0.8
Poisoning	1	0.8

There was a significant difference in the mean value of parents' knowledge about preventing injuries in toddlers before and after the intervention (p-value=0.000).

Table 3. The differences in the mean value of parents' knowledge about preventing injuries in toddlers

Knowledge about injuries on Toddler prevention	N	Mean	Deviation Standard	95% CI	p-value
Pre-Intervention	120	20.7583	3.59971	20.1077-21.4090	0.000
Post-Intervention	120	23.4417	1.66928	23.1399-23.7434	

There was a significant difference in the mean value of parents' environment modification behavior in preventing injuries in toddlers before and after the intervention (p-value=0.000).

Table 4. The differences in the mean of parents' environmental modification behaviour in preventing injuries to toddlers

The environmental modification for toddler prevention injuries	N	Mean	Deviation	95% CI	p-value
Pre-intervention	120	27.9667	3.09223	27.4077-28.5256	0.000
Post-intervention	120	29.7583	0.53446	29.6617-29.8549	

DISCUSSION

According to Gupta (2014) in Asmarawanti & Suhikmat (2023), an accident can be defined as an unexpected and unplanned event that usually causes injury, death, and psychological trauma. Injury can be physical damage that occurs when the body is exposed to energy (mechanical, thermal, or chemical) in amounts that exceed the physiological tolerance threshold or the result of a deficiency or excess of a vital element, such as oxygen.

The prevalence of injuries among Indonesian children aged 1–4 was 8.2%, caused by various causes at home and in the environment. The increase in the incidence of injuries in children under five (1 - 3 years) was closely related to parents' knowledge of ensuring the safety of toddlers (Ministry of Health Republic Indonesia, 2018).

Toddler characteristics

These results were under the data (WHO, 2014) that boys tended to experience injuries more often and more seriously than girls. Boys tended to get injured more often because they were usually more active and aggressive than girls. According to Louise (2020) and Flavin et al. (2006), boys were 1.5 times as likely to be hospitalized for injury than girls (1,708 and 1,168 per 100,000, respectively), but this varied by age—from 1.3 times for those aged 0–4 and 5–9, to 1.8 times among those aged 10–14. boys experience injuries more often due to being more dominant in gross motor and kinaesthetic development, so the risk exposure is considerable. Meanwhile, girls develop fine motor skills more. Injuries such as burns, scratches, bruises, lacerations, sprains, bruises, fractures, and traffic accidents. According to Toddler injury characteristic

In the majority, Toddlers did not experience injuries (58.34%) and experienced injuries (41.66%). The type of injury toddlers experienced, in the majority, was falls (37.5%). These results follow the results of a joint community survey in the Asian region. It showed that fatal injuries that cause death in children under 5 years were falls and drowning. Research showed that falls were the primary cause of injury in children under 3 years old. The causes of toddlers falling were objects such as furniture that was unwell-arranged, falling from stairs, and playing tools (WHO, 2014).

The infancy phase (0-11 months) is a rapid growth and development period. There is a process of maturation of body functions, specifically an increase in the motor nervous system so that mobility skills increase along with improved eye-hand coordination, reflexes, and the ability to hold and roll voluntarily becomes better. Babies learn to turn on their sides, lie on their stomachs, sit, crawl, and become better at walking, standing on one leg, and jumping. Limited independence, lack of coordination, and imperfect balance often cause babies to fall and become injured or strangled (suffocate). Babies are also in the oral phase, where the baby's pleasure is in the mouth. Babies like to put objects in their mouths, which can also be a risk factor that causes babies to suffer injuries such as inhalation of foreign objects and poisoning (Hockenberry, 2016).

Injuries to toddlers (aged 1-3 years) are caused by high curiosity. Toddlers are developing fine and gross motor skills. Toddlers also enjoy exploring the environment, such as running, jumping, standing on one leg for a few seconds, kicking a ball, and opening a goal. Some toddlers can ride a bicycle, climb stairs, and run fast. Skills and rudimentary abilities with great desire can cause the danger of injury from falling from stairs, burns, drowning, and poisoning. In toddlerhood, the child's cognitive function improves, and the child has been practicing independence: learning to feed himself, wearing clothes and shoes, and toilet training. Toddlers become increasingly aware of their ability to exert control, and children will be satisfied with the results achieved through these new skills. If a child succeeds in doing something, it will make them repeat it (Hockenberry, 2016). However, if they fail, it can cause them to behave negatively and have an unpleasant temper (tantrums) that risks injuries such as collisions and abrasions (Jones et al., 2021).

Furthermore, their movement speed increases at pre-school age (4-6 years) as they are involved in activities far outside the home. They will work hard to perfect a skill and engage in gross motor activity, be alert but not afraid, and enjoy trying new things, leading to increased independence. The risk of injury that often occurs in pre-school children decreases from bicycles, accidents, poisoning, and injuries due to sharp objects, heat/fire, or scratched animals (Hockenberry, 2016). Parents must know the unique characteristics of toddlers and their risk of injury. So, parents can implement parenting patterns, supervision, and prevention of dangers that can occur in toddlers (Gadsden et al., 2016).

Parental knowledge about injury prevention

This study showed a significant difference in parents' knowledge about preventing injuries in toddlers before and after anticipatory guidance with CIPP (p-value: 0.000). The mean value before the intervention was 20.7583, and 23.4417 after the intervention. Knowledge results from 'knowing,' appearing after someone is exposed to specific information. The knowledge a person has about an object will underlie the formation of behavior. Parents having correct knowledge about the characteristics of toddler growth and development and the risk of injury that can occur in toddlers enable the formation of parental behavior to prevent injuries in toddlers. Education about injury prevention, including training sessions at home, home visits, group discussions, and interviews as the educational tools (Abbassinia et al., 2019).

Several studies showed a significant relationship between maternal knowledge and injury prevention actions in toddlers. Mothers' good understanding of the injury risk suggested that a positive impact prevented toddler injury. Therefore, health workers (nurses) providing anticipatory guidance regarding injury risk prevention in toddlers was in line with the characteristics of toddlers' growth and development (Tsitsimpikou et al., 2021).

The differences in the mean value of environmental modification to prevent toddler injuries

There was a significant difference between environmental modification actions before and after anticipatory guidance with CIPP (p-value: 0.000). The mean value of 27.9667 environmental modifications before intervention and 27.966 after intervention increased to 29.758. In developing countries like Indonesia, housing conditions on the outskirts of cities are generally not well-organised. Many settlements are in emergency or marginal conditions, such as house construction, electrical installations, and non-standard waste disposal. This condition often results in children living in unsafe conditions and is very vulnerable to causing injury to toddlers (Banerjee et al., 2022).

In pediatric patients, the chances of mortality were significantly higher when injured at home (Davoudi-Kiakalayeh et al., 2017). According to Stewart et al. (2016), the main problem of injuries to toddlers is a poorly organized home environment, inadequate play space, and exposure to rubbish and chemicals. Most injuries are preventable by modifying the child's environment and having parents engage in safety practices (Schnitzer, 2013). Parents can reduce the risk of injury through effective planning and adequate knowledge about injury prevention, such as planning a home environment and safe areas for toddlers to play. Parents must pay attention to various risk factors that influence the effectiveness of injury prevention interventions in toddlers to get positive results (Bhatta et al., 2023).

LIMITATION OF THE STUDY

The CIPP module was developed by researchers through FGD activities with research subjects and reviewed by external experts specializing in child nursing. However, the content of this module still needs development and refinement, especially adding the following age stages—school-aged children and adolescents—as well as material on emergency management of injuries in children in a standard house.

CONCLUSION

Toddlers are highly vulnerable to injuries due to their curiosity, developing motor skills, and limited coordination, with falls being the most common. Unsafe environments further increase the risk, highlighting the importance of parental knowledge in injury prevention, including supervision, restricting hazards, and protecting against heights. The CIPP module has proven effective in enhancing parental awareness, modifying environments, and reducing injuries. Nurses play a key role in educating parents and communities, ensuring

safer environments, and reducing injury risks for children.

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CREDIT AUTHOR STATEMENT

RPH: Writing Original Draft, Visualization, Funding Acquisition, Conceptualization, and Supervision (lead); **MM:** Writing original draft (supporting), Formal analysis, validating data, and Funding acquisition.

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