



The Effect of Animated Education and Cartoon Video on Children Anxiety during Intravenous Insertion

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ABSTRACT

Intravenous (IV) insertion is one of the most common invasive procedures that causes pain, fear, and even stress for children. Uncontrolled anxiety feeling can develop into excessive anxiety and create a permanent traumatic impact on a child's life. Children need to know about the procedure that they will face in interesting way. This study purpose to identify the effectiveness of providing information through animated educational media about IV insertion on children's anxiety responses. This quantitative research used quasy-experimental design approach to compare three interventions between Animated Educational Video, Cartoon Video and Control Group. The samples of this study were chosen by consecutive sampling which it starts on April until June 2022. It was conducted at emergency unit of three hospitals area in Bali Province. Total respondents were about 90 children divided into three groups. Data was collected using Children Fear's Scale (CFS) as the instrument. This study found that there was a significant difference between three intervention groups ($\alpha=0,008$ $p<0,05$). The animated education video group showed lowest mean anxiety score (1.90) compared to other group interventions. The developed animated education video can be selected intervention to control the anxiety feeling of children during IV insertion.

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ABSTRAK

Insersi intravena (IV) adalah salah satu prosedur invasif paling umum yang menyebabkan rasa sakit, ketakutan, dan bahkan stres bagi anak-anak. Perasaan cemas yang tidak terkendali dapat berkembang menjadi kecemasan yang berlebihan dan menimbulkan dampak traumatis permanen pada kehidupan anak. Anak-anak perlu tahu tentang prosedur yang akan mereka hadapi dengan cara yang menarik. Penelitian ini bertujuan untuk mengetahui efektivitas pemberian informasi melalui media edukasi animasi pemasangan infus terhadap respon kecemasan anak. Penelitian kuantitatif ini menggunakan pendekatan quasy-experimental design untuk membandingkan tiga intervensi antara Video Edukasi Animasi, Video Kartun dan Kelompok Kontrol. Sampel penelitian ini dipilih dengan cara consecutive sampling yang dimulai pada bulan April hingga Juni 2022. Dilakukan di unit gawat darurat tiga rumah sakit di Provinsi Bali. Jumlah responden sekitar 90 anak yang dibagi menjadi tiga kelompok. Pengumpulan data dilakukan dengan menggunakan Children Fear's Scale (CFS) sebagai instrumennya. Penelitian ini menunjukkan bahwa ada perbedaan yang signifikan antara ketiga kelompok intervensi ($\alpha=0,008$ $p<0,05$). Kelompok video pendidikan animasi menunjukkan skor kecemasan rata-rata terendah (1,90) dibandingkan dengan intervensi kelompok lain. Video edukasi animasi yang dikembangkan dapat menjadi intervensi pilihan untuk mengontrol rasa cemas anak saat pemasangan infus.

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INTRODUCTION

Children are one of the age groups that are vulnerable to hospitalization. Various examination and treatment procedures are being a special experience for children when undergoing hospitalization, such as intravenous insertion (Lee et al., 2014). Intravenous insertion is one of the most common invasive procedures experienced by children who receiving treatment at the hospital (Wong et al., 2019). This invasive procedure on the peripheral veins can causes pain, fear and even stress in children (Düzkaya et al., 2021). Children have a complex perception of pain due to behavioral, physiological, psychological factors and their stage of development (Lee et al., 2014). Humphrey et al (1992) stated that when compared to school-age children, the group of children aged 2.5-6 years showed a higher level of distress in response to pain associated with invasive procedures, which is about 83% (Wong et al., 2019). Distress or anxiety behavior that shown by children is a way for children to communicate the pain and worry that they feel about something (Sembiring et al., 2015). Study results show that the pain experienced by children during invasive procedures can provoke excessive anxiety and have a permanent traumatic impact on a child's life. (Kaur et al., 2014; Marsh et al., 2014).

Nurses as health workers who are in most frequent contact with patients and perform intravenous insertion on pediatric patients must be aware of their important role in developing strategies to control pain and anxiety felt by children as a form of applying the principles of atraumatic care (Cahyani et al., 2018). One of the pain and anxiety control strategies that is effective, fast and easy to implement in preschool children during invasive procedures is the distraction technique (Bagheriyan et al., 2012; Pourmovahed et al., 2013). Distraction techniques aim to refocus the child's concentration from feelings of threat or anxiety about the invasive procedure that will be undertaken so that the child's attention becomes diverted (Guducu Tufekci et al., 2017). Some of the distraction techniques that are often applied include: inflating balloons, listening to music, parent-child interaction, playing video games and watching animated cartoons (Düzkaya et al., 2021; Moline et al., 2021).

In addition to the application of these distraction techniques, it is also recommended to provide information that is appropriate to the child's age and developmental level regarding the medical procedures that will be undertaken. The information that the child gets will help the child adjust their expectations of the situation they will face. However, many health workers do not provide information about the procedures that children will undergo because they think that children have cognitive limitations to understand (Hughes, 2012). This often has an impact on increasing the child's fear of the procedure and results in a lower child's pain tolerance. Thus, it is necessary to have the right information media for children so that it can attract attention and increase children's understanding, one of which is with educational media in the form of animated videos (Düzkaya et al., 2021). However, studies that identify the effectiveness of providing information through animated educational media on children's fear and anxiety responses are still limited, especially in Indonesia. Based on this, it is important to conduct research that examines the effectiveness of providing animated educational videos compared to commonly used distraction techniques such as watching cartoon videos to control children's anxiety during the intravenous insertion procedure.

MATERIALS AND METHOD

This quantitative research used quasy-experimental design approach to compare three groups intervention between Animated Educational Video, Cartoon Video and Control Group. The samples of this study were chosen by consecutive sampling during three months period of research which it starts on April until June 2022.

The study took place in emergency unit of three hospitals area in Bali Province, they were RSAD Udayana in Denpasar City, RS Mangusada in Badung regency, and RSUD Sanjiwani in Gianyar Regency because of the volume of pediatric patients and they are in the same level of hospital type. Monthly, about 20-30 pediatric patients come into the unit in various age and most of them experienced the IV insertion procedure in this unit. Each hospital used different intervention to reduce ethical conflict of the pediatric patients. This study got Ethical Approval by the Institutional Review Board and Ethics Committee of STIKES Bina Usada with the number is 049/EA/KEPK-BUB-2022.

The inclusion criteria of this study are children aged 3-6 years, cooperative parents and children, and do not have any problem with sight or hearing function, categorized in green triage. The exclusion criteria was the children with behavioral and mental disorders, decreased of consciousness or unconsciousness, under influence of any sedative or analgesic. Total amount of the samples were about 90 children who were divided into three groups (n = 30 for each group).

This study used Children Fear's Scale (CFS) as the instrument to evaluate the anxiety response of the children during intravenous insertion procedure. The CFS is a 0-4 scale that showing 5 faces in cartoon picture that range from neutral expression (0 is mean no anxiety) to a frightened face (4 is mean severe anxiety). This instrument has been declared validity and reliability (McMurtry et al., 2011).

Data collection had involved 3 nurses as the research team on this study. The nurses had same perception about how to evaluate the anxiety level of the children because we did the discussion before do the research. The parents and children were informed clearly about the study, and we obtained their verbal and written consent before the procedure. Vascular access was established by the same level nurse to all children in the sample group who had experienced in IV insertion for children at least 5 years. The duration of IV insertion were about 1-5 minutes according to the appearance of the the children IV. During the IV insertion, we used 24-gauge peripheral catheter according to the respondent's age. The anxiety level of the respondents were evaluated by the nurse who performed the IV insertion.

In the intervention group of Animated Education Video (group 1), the children watched the education video about IV insertion before and during the procedure. The video education content was prepared according to the development level of children aged 3-6 years or more which was determined by the researchers. The video had edited by the computer programmer with specified content. The animated video showed "Gek Cening" as the narrator who explained everything about the procedure and this video was reviewed by 2 pediatric nursing experts and finished in line with their recommendations. The video duration is about 2 minutes 47 seconds which explained the the purpose of IV insertion, the equipment used for procedure and how the procedure will be performed (figure 1).



Figure 1. “Gek Cening” explained about the IV Insertion Procedure

The children in group 2 (cartoon video) watched a cartoon during the IV insertion procedure. Three popular cartoons that children aged 3-6 years like to watch had been selected based on the opinions and requests of the 15 children in the age group of 3-6 years. The children were asked to choose one of the cartoons that she/he likes before the procedure, and they watched the cartoon during the procedure by mobile phone screen.

In this control group, parents were allowed to stay with the child and do some communication and interaction (parent-child interaction) during the IV insertion procedure to make the child feel better. No pharmacologic methods are used routinely in hospital to reduce the anxiety of the IV insertion procedure. All the parents in this study stayed beside their children during the IV insertion procedure.

RESULTS

The characteristics of respondents

Table 1 shows that the most dominant respondents characteristics are indicated by male in two groups (balance in cartoon video group), got first experience in IV insertion, and the average age of the respondents are about 3 – 4 years

Table 1. The differences of respondent’s characteristics between three groups (n= 90)

Characteristics	Animated Education Video (n=30)		Cartoon video (n=30)		Parent-child interaction (n=30)	
Gender						
Male (f%)	21	70%	15	50%	25	83.3%
Female (f%)	9	30%	15	50%	5	16.7%
The frequency of IV insertion						
1 (f%)	23	76.7%	25	83.3%	26	86.7%
2 (f%)	3	10%	4	13.3%	3	10.0%
3 (f%)	4	13.3%	1	3.3%	0	0%
>4 (f%)	0	0%	0	0%	1	3.3%
Age						
Mean (SD)	4.56 (0.90)		4.39 (1.06)		3.65 (0.98)	
Median (Min-max)	4.22 (3 – 6)		4.00 (3 – 6)		3.10 (3 – 6)	

Multivariate analysis

The result of difference in posttest score between three groups was shown in table 2 (p value < 0.05) by Kruskal Wallis test (Yanti, 2010). The animated education video shown the lowest mean rank score of anxiety scale compared to other group interventions. It means that the animated educational video intervention is the most effective in alleviating the anxious responses felt by child respondents.

Table 2. The Result Test of Normality Data and Kruskal Wallis Test on Anxiety Responses in Each Intervention Group (n = 90)

	Mean±Std. Deviasi	Median	Min-Max	95% CI	Normality data test	Mean Rank	Kruskal Wallis
Animated Education Video (n=30)	1.90 ± 0.885	2	0-4	1.57 - 2.23	0.000	37.08	0.008
Cartoon video (n=30)	2.13 ± 0.937	2	0-4	1.78 - 2.48	0.001	42.93	
Parent-child interaction (n=30)	2.67 ± 0.994	3	0-4	2.30 - 3.04	0.000	56.48	

DISCUSSION

In this study, male respondents showed a dominant number than female in the two groups, but in the animated cartoon group it was an equal number between male and female gender. This is in line with the survey results obtained by the Ministry of Women’s Empowerment and Child Protection of the Republic of Indonesia in 2019 which showed that more boys experienced illness and had to undergo treatment at the hospital compared to girls in both urban and rural areas. (Profil Anak Indonesia, 2020). These results can be related to differences in the immune system between the two genders, where female tend to have a lower susceptibility to the virus than male (Heny Purwati et al., 2022).

The majority respondents in three groups were being in their first experience for IV insertion. It is related to their previous experience of hospitalization and the type of the disease. In children with chronic diseases, most of them can undergo the IV insertion procedure more than 4 times. It will be related to the pain threshold and anxiety felt by the children (Triana et al, 2021). The repeated IV insertion procedure can create scar and it can affect the successful of canulation. The successful canulation in children is greatly influenced by several factors including visible veins, palpable veins, and the presence of scarring from previous IV access (Al-Awaisi et al., 2022). Besides that, children aged 24-59 months (2-5 years) have a less than 64% risk of experiencing failure during the first IV insertion procedure if it compared to children aged less than 24 months (2 years). This is related

to the condition that it is easier to access veins in older children than younger children (under 2 years) (Ayteneu et al., 2022).

Based on the age of the respondents, the average age of the respondents are between 3 to 4 years. This is related to the immune system of children under 5 years old who are still susceptible to various diseases so that they require treatment at the hospital. World Health Organization (WHO) also states that children aged under 5 years are more at risk of various diseases and even contribute to a high child mortality rate in the world with a mortality rate 37 deaths per 1000 births globally in 2020 (World Health Organization, 2023). In addition, the risk of children who are younger (less than 1 year) to experience various symptoms due to their disease is also greater than the older, so they need more treatment (Kanté et al., 2015).

The result of this study shown that there were a significant difference between three groups with the most effective intervention is animated education video than others. Although the animated education video showed the lowest anxiety score compared to the other 2 interventions, the difference in the scores shown was not much different. The average post-procedure anxiety scale that shown by the three groups ranged from 1-2 which was classified as mild anxiety. According to Duzkaya et al. (2020) study showed that watching cartoon and animated information video (animated education video) was effective to control pain and fearness (anxiety) of the children during IV insertion procedure. Both of them with the same purpose to distract the children during the invasive procedure. Nonetheless, animated educational videos can be an intervention option to increase children's knowledge about invasive procedures that have an impact on reducing children's anxiety responses (Düzakaya et al., 2021). These results can be influenced by the diversion of the child's attention to other stimuli which can help reduce pain so that it has an impact on reducing children's anxiety (Chavan & Naregal, 2021; Rezai et al., 2016). Therefore, the intervention of educational media in the form of animated cartoons makes children more interested not only in audio but also in visualization of the animated education so that children are not only educated about IV insertion procedure but also entertained.

Utilization of cartoon movie videos as a comparison group can also be an option in controlling children's anxiety when undergoing medical procedures because it can help divert children's focus from the discomfort they feel (Ayu Habiba et al., 2021; Kaur et al., 2014). Inan (2019) mentioned different results, where the use of video games was said to be more effective in reducing pain and anxiety in pediatric patients compared to watching cartoons. This is related to the multisensory involvement of the player which can require great attention, so that the player feels the surrounding environment is not there and this active distraction technique has the potential to block many senses in reducing pain and anxiety from children (Inan & Inal, 2019).

Besides that, the control group of this study implement the parent-child interaction as a routine intervention to reduce children anxiety. Having a parent by the children side during painful procedures is known to allow the child to more easily cope with pain and anxiety (Inan & Inal, 2019). Nurses should ensure that parents are there beside their children during painful medical procedures and they should provide their support by teaching parents how to distract the child's attention away from the procedure. It should be noted that in this study, the parents only stood and talked to their child and were not involved in any other form of distraction

technique. This suggests that instead of having parents passively stand and talk to their child only, encouraging parents to use any distraction techniques may be more effective at alleviating child anxiety.

CONCLUSIONS

This study developed an animated education video with "Gek Cening" as the narrator of the IV insertion topic. The children who received the education about IV insertion procedure by animated video showed a lower anxiety level outcome compared to cartoon movie and routine intervention. Pediatric nurse should promote the animated education video to support the children alter their presumption of the condition they will face so they can alleviate their fear and anxiety during an IV insertion.

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ETHICAL CONSIDERATIONS

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Conflicting Interest:

The authors declare no conflict of interest.

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