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THE EFFECT OF PHYSICAL INTERVENTION 5S'S (SWADDLING, SIDE-STOMACH, SUSHING, SWINGING, SUCKING) TOWARD PAIN AND THE DURATION OF CRYING IN INFANTS WITH DPT IMMUNIZATION

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ABSTRACT

Background: Diphteria, pertussis and tetanus (DPT) immunization injection can cause pain in infants. As a result infants respond by crying which leads to parent's anxiety and affect the sustainability of the next immunization. The purpose of this study was to analyze the effect of 5S's physical intervention (swaddling, side-stomach position, sushing, swinging, sucking) for pain and the durationof crying in infant with DPT immunization.

Methods: This study was conducted in clinic in the District of Health Sanan Wetan Unit, Blitar-Indonesia, from July to October, 2013. Post - test only control group design was used in this study. The experimental group was given 5S's physical intervention, while the control group was subjected to the usual actions of parents. The sample of 50 respondents divided into 25 respondents as experimental groups and 25 respondents as the control group.

Results: The results indicated that there are effect of 5S's physical intervention (Swaddling, Side – Stomach position, Sushing, Swinging, Sucking) toward pain in infants with DPT immunized on 20^{th} and 30^{th} second after injection (p-value = 0.025, and p-value = 0.017) and there is effect on the duration of crying (p-value = 0.001). Moreover, there is no effect of 5S's physical intervention toward pain on 10^{th} second after injection (p-value = 0.404).

Conclusion: Based on the study, the 5S's physical intervention are effective toward pain and length of crying after DPT immunization injection. By providing effective 5S's physical intervention education and training to parents will contribute to decrease pain after immunizations injection.

Keywords: 5S's Physical Intervention, Infants's pain, the duration of crying, DPT Immunization.

INTRODUCTION

Pain is an unpleasant feeling, it is subjective and it is associated with the senses, as well as an emotional experience related with actual or potential tissue damage (Potter-Perry, 2010). Infants certainly experiences pain when receiving injections. Pain in infants will respond by crying and moving away their body as well as facial expressions or altered breathing was patterns. Thus pain response assessment in infants were suggested using observations signs of behavioral and physiological responses (Wong *et al*., 2009). The pain response in infants will cause anxiety to parents and will impact on the immunization schedule. There a lot of efforts by health workers and parents to deal with complaints of pain. One of non-pharmacological physical therapy in the form of 5S's intervention including swaddling (infant is being wrapped in the blanket), side-stomach, sushing or making soothing sounds, swinging the infants, and sucking can be applied to reduce pain responses after immunization injection. In Cohen (2008), the 5S's physical intervention is the best way of calming the infants and induce sleep. Creating of whistling sound, movement and

comfort environment replicate the atmosphere in the uterus. A previous study reported that 5S's physical intervention reduced pain responses significantly during immunization. Moreover, non-pharmacological intervention is more preferred in light invasive procedure with minimal side effects (Harrington *et al.*, 2012). Based on interview with the staff of clinic Sanan Wetan in Blitar-Indonesia, DPT immunization injection is one of a national programme that is considered painful for infants and leads to parent's anxiety. However, there is no effective intervention in post-immunization to soothe the infants. Mostly parents are holding, cradling and give breastfeeding to their infants. Sushing action or making whistling sound and wrapping the infants with the blanket has been performed but not yet used extensively and the parents are not famialirized with it yet. Furthermore, the researcher aims to identify the the effect of the 5S's of physical intervension toward pain and the duration of crying in infant with DPT immunization.

MATERIALS AND METHODS

This study is Post-test only control group design, carried out with all infants aged 2-4 months who come with their parents to maternity and pediatric clinic in Health District unit of Sananwetan Blitar-Indonesia, from July to October 2013. There were 50 respondents, taken consecutively and randomly. Among the respondents, they were divided as the control group (25 respondents) and treatment group (25 respondents). The control group was given the usual intervention of parents when their infant's cries such as holding them up and giving the infants breast feeding or milk in bottles. The treatment group was given 5S's physical intervention (swaddling, side-stomach position, sushing, swinging, sucking). In this study, inclusion criteria were included normal infants, where there are no congenital abnormalities dormental disorders.

Instrument such as Neonatal Infant Pain Baby Scale (NIPS) was used for identified pain responses which were observed among the infants's behaviour. The instrument was developed by Lawrence *et al.,* cited in Twycross (2009) and has been tested for validity and reliability. The instrument observed infants's pain responses in the first 10^{th} seconds, 20^{th} seconds, and in the 30^{th} seconds both in the control and treatment groups. The instrument were recorded by observing facial expressions, crying, breathing patterns, movement of the arm, leg movements, and the status of the stimulus with the lowest score of 0 and the highest of 7. Meanwhile, to observe the duration of crying, the observation sheet and stopwatch were used. The researcher also used blanket, stopwatch, beds, chair, infants's milk as well as physical intervention like leaflet to inform the 5S's physical intervention technique to the midwife or other health care personnel for tools. Furthermore, comparison between respondents based on the presence of pain response and the duration of crying post DPT immunization injection were analyzed using independent samples test by SPSS version 16 for windows with the significance level *p*-value <0.05.

RESULTS

In general, the result of the study showed that majority (84%) of the parents graduated from high school education and college, 32% are were working mothers and on average they have one child. The parents's respondents in both groups were comparable with regard to age and family income. In addition, based on the Table 1.3 it seems that the respondents had the same number in all of ages, 52% are female infant and more than half of the respondent is the first child.

Table 1.1 Demographic characteristic of the mother (n=50)

No.	Mother's characteristic	Group				n	
		control		treatment			
		f	%	f	%	f	%
1	Education						
	1) Elementary	0	0	1	2	1	2
	2) Junior high school	4	8	3	6	7	14
	3) Senior high school	15	30	14	28	29	58
	4) College/University	6	12	7	15	13	26
2	Working status						
	1) Housewive	16	32	18	36	34	68
	2) Private worker	7	14	2	4	9	18
	3) Government worker	2	4	5	10	7	14
3	Number of child						
	1) One	15	30	12	24	27	54
	2) Two	7	14	9	18	16	32
	3) Three	1	2	4	8	5	10
	4) Four	2	4	0	0	2	4

Table 1.2 Mothers's characteristic based on age and family income (n=50)

No.	Mother's characteristic	Group	
		Treatment	control
1	Age (years):		
	(a) Minimal	18	18
	(b) Maximal	41	39
	(c) Mean	28,96	27,52
2	Family income (a month):		
	(a) Minimal	Rp.300.000 (US$28.72)	Rp.800.000 (US$76.59)
	(b) Maximal	Rp.5.000.000 (US$478.70)	Rp.3.500.000 (US$335.09)
	(c) Mean	Rp.1.524.000 (US$145.90)	Rp.1.540.000 (US$147.44)

**1 US$= Rp.10.445,-(Praditya, 2014)*

Table 1.3 Infant's characteristics based on age,gender, immunization sequence and child sequence number (n=50)

No.	Infant's characteristic	Group				n	
		ontrol		treatment			
		f	%	f	%	f	%
1	Age (month)						
	1) 2	10	20	9	18	19	38
	2) 2,5	1	2	2	4	3	6
	3) 3	6	12	8	16	14	28
	4) 4	8	16	6	12	14	28
2	Gender						
	1) Male	11	22	13	26	24	48
	2) Female	14	28	12	24	26	52
3	Immunization sequence:						
	1) First	9	18	11	22	20	40
	2) Second	11	22	8	16	19	38
	3) Third	5	10	6	12	11	22
4	Child sequence number:						
	1) First	15	30	12	24	27	54
	2) Second	7	14	9	18	16	32
	3) Third	1	2	4	8	5	10
	4) Fourth	2	4	0	0	2	4

Table 1.4 Infant's pain scoreandduration ofcrying post-DPT imunization among control and treatment groups (n=25).

Infants condition	Group	n	Mean	Min.	Max.	*Mann Whitney U* Significance level*
Pain score in 10th second	control	25	6,52	5	7	0,404
	treatment	25	6,32	4	7	
Pain score in 20th second	control	25	5,44	3	7	0,025
	treatment	25	4,60	3	7	
Pain score in 30th second	control	25	3,88	0	7	0,017
	treatment	25	2,84	0	6	
Duration of infants's crying	control	25	65,68 second	30 second	120 second	0,001
	treatment	25	41,76 second	23 second	77 second	

**significance level at 0.05 (p<0.05)*

Table 1.4 showed that the decrease of pain score among treatment and control group were varied between 10th, 20th and 30th seconds. It appears that in the 20th and 30th seconds in both groups have the same minimum score, but on average it were different, while the duration of crying between the control group is higher than the average of the treatment group (*p*-value= 0.001). Based on the Mann Whitney U test, there were differences in pain scores in the both groups in the 20th and 30th (*p*-value = 0.025 and *p*-value = 0.017). Meanwhile, there was no significant difference in the pain scores among the control group with treatment group in the first 10th second (*p*-value= 0.404). The differences in pain score between treatment groups and the control group was shown in Figure 1.1. On average pain score post-immunization for the control group was always higher rather than the treatment group in the first 10th second, 20th second and 30th second. It showed that the treatment group has a faster reduction in pain post immunization injection.

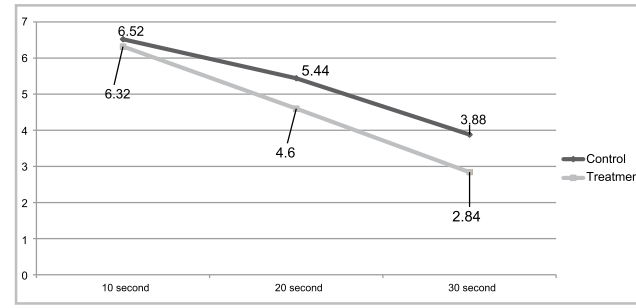

Figure1.1Diagramline of the average difference between the decrease in pain score among groups (n=25)

Based on Table 1.5, the most frequent actions of parents in the control group was holding the infant, lying side on the mother's chest, followed by swingingthe infant, clapping on the infant's buttocks and giving breast feeding or with a milk bottle. Only 8% or 2 parents performed shushing and provided a suitable positionon of the stomach or placed the chils on the shoulders. Moreover, only 4% are communicate certain words to soothe the infants. None of the parents wrapped their infant in the blanket. Regarding to type of distraction intervention, most of the parents were doing 3 (three) type of distraction such as holding, swinging and giving the infants breast feeding or milk bottle.

Table1.5.Parents actions taken in the control group (n=25).

Action	f	%
Holding	25	100
Swinging	21	84
Lying side on the mother's chest	25	100
Sushing (making soothing sound)	2	8
Clapping on the infants's buttocks	13	52
Giving breastfeeding/milk bottle	8	32
Communicating to soothe the infants	1	4
Providing prone position on stomach or parent's shoulder	2	8
Type of Distraction		
2 type distraction intervention	7	28
3 type distraction intervention	12	48
4 type distractionintervention	6	24

DISCUSSION

The results showed that majority of the parents graduated from high school and college, indicating that respondent were well educated and have awareness to their children immunization schedule. In addition, more than a half were housewives, so they have much time to taking care of their children.

The effect of physical intervention of 5S's toward pain.

The results showed that there were significant difference in pain scores in the treatment group and the control group (p-value=0.025 and p-value= 0.017) in the 20th and 30th second post immunization injection. This result was similar with the opinion of John W. Harvey Karp cited in Harrington (2012). He reported that to reduce pain due to injection, the methods of physical intervention like 5S's can be used including wrapping the infants in the blanket. The infants will feel comfortable sensation as they felt in the womb. In addition, it leads to continous sensation of touch and induced the babies to sleep. The second intervention is like side-stomach position, this action reminds of the mother's womb, the infants while in the mother's abdomen in a tilted position left or right. However, if the infants are asleep place them in a supine position in regard to prevent the respiratory distress. The sushing intervention was reflected the sound of blood stream noises in the uterus and helps to soothe the infants.

The fourth intervention is swinging the infants on the arm with forward-backward movement. It was similar with the constant movement in the uterus because of mother's movement. A study reported that the movement of shaking the infants are effective to reduce pain by decreasing the duration of crying infants (Tywcross, 2009). The fifth intervention is sucking action that triggers a calming reflex and releases natural chemicals in the brain. Sucking milk from bottle or breast feeding also helps reduce pain and soothe the infants due to skin contact and could distract the infants. Sucking has been done since the infants in the womb. Besides, milk contains sugar which is known to have pain-relieving effect. According to Freud's psychosexual theory, the infants is in the age of oral-sensory stage, which is characterized by activities involving the mouth such as sucking, biting as well as chewing as a major source of pleasure (Wong, 2009).

Furthermore, pain arises as a result of injections resulted in injury to the tissues that stimulate pain receptors A delta and C fibers (nociceptor). It transmits the stimuli to the brain through the substantia gelatinosa which is perceived as pain. The 5S's physical intervention had been applied in non pharmacologic pain management, namely cognitive-behavioral distraction. As all these intervention will stimulate nerve fibers A beta (non-nociceptor) resulting in the closure of pain gate control, and is not perceived as pain. In the term of distraction, the 5S's physical intervention worked well for pain in short intensity and lasted for a few minutes, such as during the procedure of invasive factors including an injection (Kazanowski and Laccetti, 2002; DeLaune and Ladner, 2002). Moreover, the 5S's physical intervention involves more than one sensory stimulation. In the method of distraction, the more sensory modalities are used more effectively it will decrease the pain more effectively (Smeltzer, 2002).

The results also show that in the first 10th second of observation, there is no significant difference in pain among the treatment and the control groups (p-value=0.404) and the average score of pain in the treatment group was lower than the control group. Based on these observations of researchers, it can be because of the 5S's physical intervention treatment were incomplete. In this study, the average length of giving injection was 4 seconds, and the length of 5S's physical intervention on average takes more than 10 seconds, while the observations were made in the first 10 seconds.

The influence of Physical Intervention 5S's on duration of crying

The results showed no significant difference between the duration of crying in the treatment group and the control group after administration of DPT injection (p-value= 0,001). After injection, the infants still felt discomfort and it was reflected with their crying. The technique to soothe or stop their crying depends on many factors such as the parent's habit, patience and the closeseness of the family bondings. However, the 5S'S physical intervention shortens the duration of the crying. As seen in the Table 1.4, on average the duration of crying in the treatment group was under 45 seconds. Although, this could shorten the duration of crying, but some respondents were crying longer than the control group. It could be because the infants feel sleepy, irritated, hungry or due to other factors. In other hand, there were some infants in the control group who had shorter period of crying duration rather than infants in the treatment group. Characteristics of level of education of the parent and their awareness could be an explaination for this result. In addition, the way the parents comfort their infants and the bonding also influences the duration of crying. According to Mc.Grail (2005), some of the action can be taken when the infants crying were includes listening to music or singing, swinging the infants, wrapping

with the blanket and giving them a drink.

Furthermore, in this study the intervention that most parents demonstrated in the control group was holding the infants, swinging the infants, and then followed by giving breastfeeding or milk bottle. Based on this observation, it can be explained that the 5S's physical intervention actually had been carried out by mothers. However they were not performed completely or sequentially, as they just tried as many as possible ways to calm the infants.

CONCLUSION

It is noticeable that 5S'S physical intervention (swaddling, side – stomach position, sushing, swinging, sucking) have effect towards pain management among infants post DPT immunization in the 20th and 30th seconds after injection and there is no effect on duration of crying. Thus proper training and knowledge to parents and health worker are necessary to properly implement the intervention so that it is beneficial for the community and healthcare services.

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