The Effect of Cold Compress Therapy and Breastfeeding on Reducing Pain in Infants During Immunization (PCV) at Separi III Public Health Center

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ABSTRACT

In Indonesia, from 2017 to 2021, there were 1,525,936 children Not yet get immunization base complete, at the Health Center Separi III coverage immunization base complete in 2023 is 83.4 % coverage low immunization is PCV with results baby who has do PCV immunization 73.9%, PCV $_2$ 62.6%. (Health Center Separi III, 2023). Immunization is an effort to give immunity body to disease certain conditions, especially in vulnerable infants and children. to infection. Pain and anxiety moment immunization often become obstacle for parents for finish timetable immunization children they had. The research aimed to analyze influence combination therapy compress cold and breastfeeding decline pain in babies' moment PCV immunization at the Community Health Center Separi III. Study This use method *quasi-experimental* with posttest *only non-equivalent control group design*. Samples were taken in a way *non probability sampling* with total sampling technique, involving 34 babies who were divided into two groups. Group intervention accept therapy compress cold and breastfeeding, while group control only accepts cotton Disinfection level high (DTT) according to procedure Health Center. Research results show existence decline intensity pain in babies' moment immunization from painful heavy become painful medium, light, even no painful the same once. Data analysis using *Mann Whitney Test* show p-value of 0.000 ($p< 0.05$), indicates that There is influence significant combination therapy compress cold and breastfeeding decline pain in babies' moment PCV immunization. Combination cold compresses therapy and effective breastfeeding in reduce intensity pain in babies' moment PCV immunization, so that can become a recommended strategy in practice immunization to increase comfort and reduce anxiety in babies and parents.

I. Introduction

Infancy and toddlerhood, from birth up to 59 months, is period important growth physical and mental. Immunization be one of effort government For guard health they with give immunity body to disease contagious (Ministry of Health of the Republic of Indonesia, 2024). However, many child Not yet get immunization complete. WHO data (2021) shows 25 million children around the world do not get immunization complete, including 1,525,936 children in Indonesia (2017-2021). In the District Kutai Kartanegara , coverage immunization base complete 2024 only reached 79.83% of the target of 100% (Ministry of Health, 2024). Meanwhile Immunization at the Community Health Center Separi III is also not optimal, especially For PCV immunization with PCV1 coverage was 73.9% and PCV2 was 62.6% (Puskesmas Separi III, 2023). One of the reason low coverage immunization is pain and anxiety moment immunization, which makes parents reluctant continue immunization in children them. The pain and trauma if no handled

can cause child traumatized by Needles and Actions medical in the future (Razek et al., 2009 in Nur et al., 2022).

There are some management painful Good *pharmacology* and *non-pharmacological.* One of them that is principle *traumatic care* or with minimize the pain that arises moment immunization. One of the technique for minimize pain the is with giving compress cold and breastfeeding in babies moment immunization injection. Compress cold capable make skin reduce response painful Because existence release *endorphin* which can block transmission on fiber nerve more *A*- beta *sensory* big as well as more fast, thing that too can lower transmission the pain that occurs in C and *delta A* fibers so that result in *gate synapse* close *transmission impulse* pain. (Sulistyani, 2009 in Situmorang, 2022).

Besides Compress cold, breastfeeding is one of action *distraction, relaxation and stimulation* skin that has mechanism control to pain. Cells network brain produce *endogenous opioids* like *ekhapalin* and *endorphin,* in addition the content contained in breast milk, namely *lactose* or sweet solution can also induce track *endogenous opioids* so that result in *transmission* painful No to the brain, besides That breastfeeding can also fulfil need psychological baby that is with touch and hug mother, make baby feel comfortable and safe and feel get attention Mother when done immunization. (Prasetyono, 2010 in Wulansari, 2017). Provision of immunization at the Community Health Center Separi III uses DTT Cotton as procedure before immunization. While therapy compress cold and breastfeeding during immunization Not yet Once used for reduce inflammation and reduce painful moment immunization. Based on studies introduction to giving PCV immunization at the Community Health Center Separi III In 15 babies who received There were 6 babies who experienced PCV immunization painful currently with score pain 3-4, 9 babies experience painful heavy with score pain >4. Based on background behind said, research This aiming For know effectiveness combination therapy compress cold and breastfeeding decline pain in babies moment PCV immunization at the Community Health Center Separi III.

II. Methods

Study This is study *quantitative* with method *quasi-experimental* and using design *posttest-only non-equivalent control group design*. Study carried out at the Community Health Center Separi III, Tenggarong Seberang, Regency Kutai Kartanegara, from November 2024 to December 2024. Research This aiming for evaluate influence combination therapy compress cold and breastfeeding decline pain in babies moment immunization *Pneumococcal Conjugate Vaccine (PCV).* Population in study This is all over baby Healthy aged 2-3 months who do PCV immunization at the Community Health Center Separi III, with a total of 34 babies. The technique of taking sample used is *total sampling*, where all population that meets criteria inclusion included in research. The sample was divided into two groups: 17 respondents become group interventions that receive combination therapy compress cold and breastfeeding, as well as 17 other respondents as group control that only accept cotton High Level Disinfection (HLD) according to procedure Health Center. Instruments research used covering sheet *observation* for take notes breastfeeding and compresses cold, and scale *NIPS (Neonatal Infant Pain Scale)* For evaluate painful based on expression face, crying, pattern breathing, movement arms, leg movements and awareness baby. Breastfeeding is done for 2 minutes before and during injection immunization, while compress cold carried out in the area to be injected for 2 minutes before immunization. Data analysis was performed using SPSS software version 20. Analysis Univariate done for describe distribution frequency the variables studied, while analysis Bivariate done use *Mann-Whitney test* for test hypothesis influence combination therapy combination compress cold and breastfeeding decline pain in babies moment PCV immunization

at the Community Health Center Separi III. Research this also pays attention aspect ethics study with honor dignity and honor respondents, guard privacy and confidentiality information, as well as explain procedure study in a way open and fair to Respondents. Respondents given form informed consent before study done.

III. Results and Discussion

Table 1 Distribution Frequency Characteristics Respondents at the Health Center Separi III

No	Characteristics Respondents	Group Intervention	Percentage (%)	Group Control	Percentage (%)
1	Based on Age				
	a. 2 months	4	23.5	7	41.2
	b. 3 months	13	76.5	10	58.8
	Amount	17	100.0	17	100.0
2	By Gender				
	a. Man	10	58.8	9	52.9
	b. Woman	7	41.2	8	47.1
	Amount	17	100.0	17	100.0

Source : Primary Research Data , 2024

Based on the data in table 4.1, it was found that results that respondents in the group intervention 2 months old as many as 4 respondents (23.5 %) and respondents 3 months old as many as 13 respondents (76.5 %), respondents man as many as 10 respondents (58.8%), and respondents Woman as many as 7 respondents (41.2%). While in the group control obtained results that Respondent 2 months old as many as 7 respondents (41.2 %) and respondents 3 months old as many as 10 respondents (58.8 %), respondents man as many as 9 respondents (52.9%), and respondents Woman as many as 8 respondents (47.1%).

Table 2 Analysis Pain Intensity in Groups Intervention

No	Pain Category	Frequency	Percentage (%)
1	Mild Pain	11	64.7
2	Moderate Pain	6	35.3
3	Severe Pain	0	0
Amount		**17**	**100**

Source : Primary Research Data, 2024

Based on the data in table 4.2 in the group interventions that are carried out combination therapy compress cool and give breast milk before PCV immunization at the Community Health Center Separi III obtained results part big baby experience painful light / not painful as many as 11 respondents (64.7%), babies with painful currently as many as 6 respondents (35.3 %) and No There is babies who experience painful heavy.

Table 3 Analysis Pain Intensity in Groups Control

No	Pain Category	Frequency	Percentage (%)
1	Mild Pain	2	11.8
2	Moderate Pain	3	17.6
3	Severe Pain	12	70.6
Amount		**17**	**100**

Source : Primary Research Data, 2024

Based on the data in table 4.3 in group control namely in babies who are not treated combination therapy compress cold and breastfeeding before done PCV injection immunization is obtained results babies who experience painful light / not painful as many as 2 respondents (11.8%), babies with painful currently as many as 3 respondents (17.6 %) and babies who experience painful weight 12 respondents (70.6%).

Table 4 Results of Man Whitney Post Test Analysis on Groups Interventions and Groups Control

No	Pain Category	Group Intervention	Group Control	*p-value*
1	Mild Pain	11	2	0,000
2	Moderate Pain	6	3	
3	Severe Pain	0	12	
	Amount	**17**	**17**	
	Mean Rank	**10.88**	**24.12**	
	Sum of Rank	**185.00**	**410.00**	

Source : Primary Research Data , 2024

Based on table 4.5 is obtained results of 34 respondents who were divided become group intervention and group control, in the group intervention results analysis after done combination therapy compress cold and breastfeeding before PCV immunization. Babies who experience painful light as many as 11 respondents, babies experience painful while 6 respondents and no There is baby who is experiencing painful heavy. While results analysis on groups control that is not done combination therapy compress cold and breastfeeding before PCV immunization, namely babies who experience painful light as many as 2 respondents, babies who experienced painful while 3 respondents and baby with painful heavy as many as 12 respondents. The Man withney test was obtained mark *The P-value* is 0.000, which means p value < 0.05.

1. *Univariate Analysis*

a. Intensity in Babies During Immunization Pcv In Group Intervention

Based on analysis obtained in the group baby who gets combination therapy compress cold and breastfeeding before PCV immunization at the Health Center Separi III obtained results part big baby experience painful light as many as 11 respondents (64.7%), babies with painful currently as many as 6 respondents (35.3%) and not There is babies who experience painful heavy.

Research result This in line with study previously by (Nur, *et al* , 2022) Conducted compress cold moment will done immunization and results study the average pain felt was obtained respondents given ice compress namely 4 with painful medium and standard deviation 1.05, while the average pain felt without ice compress is 6.9 with standard *deviation* 1.37. p. This has also been proven by research conducted by Resdiastuti et *al,* (2024) which provides compress cold for 3 minutes before immunization in infants, results study This is compress cold effective lower intensity pain in babies moment immunization with results existence decline intensity pain in babies from painful heavy become painful currently.

In line with research conducted Permatasar i *et al,* (2020) Results of study show that level painful group intervention more low compared to with level painful group control. Babies who are breastfed with method breast-feed moment immunized can lower risk the occurrence

painful weight (scale 7-10) by 80%. This was also proven by research conducted by Viggiano

et al, (2021) with give intervention in the form of breastfeeding breastfeeding and giving formula milk to babies before and during the immunization process The results of study This is There is his effect *analagesi* k from breast-feed to painful injection, and the same effect also occurs in babies who receive formula milk so that can be concluded that breast-feed or giving formula milk has the same effect , namely on breastfed babies or given formula milk experienced more pain little and duration short cry compared to right with in group control.

Handling techniques painful moment immunization can in the form of giving therapy *pharmacologist* i and *non- pharmacological.* Therapy *pharmacology* can in the form of giving drug *non-steroidal analgesics* (NSAIDs), *Analgesics narcotics* or *opioids*, or drug additional (*coanalgesic*). whereas therapy *non- pharmacological* can in the form of *cutaneous* stimulation and *massage*, therapy compress Cold , compress warm, *Transcutaneous Electric Nerve Stimulation* (TENS), *distraction* (breastfeeding), relaxation, imagination guided and *hypnosis*, therapy music (Ministry of Health , 2022).

For lower pain in babies moment immunization Researcher use combination therapy compress cold and breastfeeding in babies moment immunization. Administration compress cold to do 2 minutes ago before it is done immunization (Sitomorang et. al, 2022) and breastfeeding is carried out for 2 minutes before giving immunization and during the immunization process ongoing (Permatasari et. al, 2020). technique the can hinder system nerve in to deliver response pain received.

Compress cold make skin reduce response painful Because existence release *endorphins* that can block transmission fiber nerve more *A*- beta *sensory* bigger and more fast , thing that too can lower transmission pain in the fibers *C* and *delta A* so that gate *synapse* close transmission impulse pain , besides That compress cold capable become *anesthesia* local that has profit *therapeutic* For reduce painful local like painful injection and can lower production *prostaglandins* so that sensitivity receptor painful decreased (Agustiningrum , 2015 in Situmorang *et al,* 2022). How to close defense the is base theory reduce pain, gain compress cold capable reduce pain moment injection from scale heavy become scale medium, light even No painful the same once and able for lower anxiety moment done immunization, compress cold which is done at the time immunization No own Lots risk, and is anesthesia effective local as well as including cheap safe and easy method done. In addition, the compress cold can also prevent expansion inflammation caused by Because puncture needle (Situmorang *et al,* 2022)

Whereas breast-feed is one of action *distraction*, *relaxation* and *stimulation* skin that has mechanism control pain. Cells network brain produce *endogenous opioids* like *ekhapalin* and *endorphins*, when *endogenous opioids* the released so end cell *presynaptic interneurons* in the *posterior horn* can prevented the exit P factor at the end *presynapticsensory afferent* and occurs *synaptic inhibitor* so that stimulus painful No continued. In addition The content of breast milk is: lactose or sweet solution can also induce track *endogenous opioids* so that transmission painful No reaches the brain, breastfeeding can also fulfil need psychological baby that is with touch and hug mother, make baby feel comfortable and safe and how much get it attention Mother when done immunization. This is also a therapy *non- pharmacological measures* that can be taken for reduce pain in babies moment injection immunization (Prasetyono , 2010 in The Jewels et.all 2020).

Researcher assume that combination therapy compress cold and breastfeeding in babies moment PCV immunization at the Community Health Center Separi III can lower level pain felt by the baby during the immunization process and from study as well as results observations that have been average response is done pain in babies reduce or No painful The same very matter It is known that one of the his with crying baby more little and duration cry

short as well as there are also babies who don't cry when done immunization in groups intervention .

b. Intensity in Babies During Immunization Pcv In Group Control

Based on analysis obtained in the group control namely in babies who are not treated combination therapy compress cold and breastfeeding before done PCV injection immunization is obtained results babies who experience painful light / not painful as many as 2 respondents (11.8%), babies with painful currently as many as 3 respondents (17.6%) and babies experienced it painful weight 12 respondents (70.6%).

Immunization in infancy and childhood is source the most important pain and suffering that can cause anxiety and trauma that occurs in the family The pain and trauma must minimized Because can cause child traumatized by needles and medical procedures in the future come (Razek, et al 2009 in Nur, *et al* 2022).

Pain is mechanism in body that involves the function of body organs, especially the nervous system which is receptor response pain. Organs of the body that play a role as response painful is end nerve free in responsive skin only under strong stimuli potential damaging (Wahid, et.al 2015 in Agustiningrum, 2019).

A and C delta neurons release *substance P* For *transmit impulse* through mechanism defense, flow nerve *descendant* release *endogenous opiates*, for example *endoprin* and *denoperrin* second his is remover painful experience from in body. Release technique *endorphin* via, redirection attention and counseling (Perry et, al, 2014 in Agustiningrum, 2019).

Mechanism painful pass a number of stage that is *stimulation, transduction, transmission, modulation, perception*. *Perception* is results interaction system nerve sensory, information cognitive, and alone experience emotional about impulse pain received. Perception determine heavy lightness the pain felt. After until to brain , pain felt in a way aware and cause response in the form of responsive behavior and speech existence pain. Behavior done with avoiding painful stimuli, while saying consequence response like " ouch ", " auw ", "ah". (Perry et, al, 2014 in Agustiningrum, 2019).

Research result This in line with study previously by (Nur, *et al* ,2022) Conducted compress cold moment will done Immunization and Research Results the average pain felt was obtained respondents given ice compress namely 4 with painful medium and standard deviation 1.05, while the average pain felt without ice compress is 6.9 with standard deviation 1.37.

Research result this is assumed researcher the pain felt baby moment immunization is consequence from the occurrence damage to body organs consequence needle injection. The body organs that play a role as response painful is end nerve free in responsive skin only under strong stimuli potential damaging, *Neuro delta A* and *C* release *substance P* For transmit impulse through mechanism defense, flow nerve *descendant* release *endogenous opiates*, so that No existence release *endorphins* that can block transmission fiber nerve higher A - *beta sensory* bigger and more fast. In fiber C *and delta A gate synapse* No close transmission impulse pain and no lower production *prostaglandins* so that sensitivity response painful No decreased. This is result in the occurrence pain felt by the baby can in the form of painful currently until painful heavy.

2. *Analysis Bivariate*

Based on results analysis obtained results of 34 respondents who were divided become group intervention and group control, in the group intervention results analysis after done

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combination therapy compress cold and breastfeeding before PCV immunization. Babies who experience painful light as many as 11 respondents, babies experience painful while 6 respondents and no There is babies who experience painful heavy. While results analysis on groups control that is not done combination therapy compress cold and breastfeeding before PCV immunization, namely babies who experience painful light as many as 2 respondents, babies who experienced painful while 3 respondents and baby with painful heavy as many as 12 respondents. Analysis use *Man withney test* obtained mark *The P-value* is 0.000, which means mark $p < 0.05$ so that concluded Ha accepted or There is influence combination therapy compress cold and breastfeeding subtraction pain in babiesmoment PCV immunization at the Community Health Center Separi III.

Research conducted Already in accordance with the existing SOP . Significant differences between group control and group intervention because of existence several factors between his is effectiveness therapy given that is combination therapy compress cold and breastfeeding have great benefits to decline the pain felt by the baby , because compress cold lower scale painful with reduce response *inflammation* and sensitivity receptor painful as well as breastfeeding is beneficial provide a sense of security and comfort as well as content in breast milk which plays a role as *analgesic* natural . Giving therapy that is done before and during the immunization process can also make second the therapy given give effect maximum in decline pain stimulation in babies moment immunization. In addition other factors that influence significant results between group control and group intervention is Every baby own threshold different pain. However, because in the group intervention get addition therapy that can in a way significant reduce pain while in the group control No given therapy besides use DTT cotton so that results analysis show significant difference between group control and group intervention.

Research result This in line with study previously by (Sudirman, *et al*, 2021) Conducted compress cold moment will done Immunization and Research Results obtained that respondents given compress cold experience decline painful with results data analysis using *t test* obtained mark *p-value* 0.001 or p<0.05 so can concluded that existence influence compress cold to subtraction intensity pain in babies moment immunization. This has also been proven by research conducted Situmorang *et al,* (2022) which provides compress cold before immunization in infants , results study This is compress cold effective lower intensity pain in babies moment immunization with results No There is baby showing intensity painful heavy , almost triples percentage baby with intensity painful light that is babies (77.03%) compared with baby with intensity painful currently that is as many as 17 babies (22.97%) with *p-value* 0.001.

In line with research conducted Mukhopadhya et.al (2020) Results of study show that time cry baby during immunization in groups intervention more low compared to with level painful group control (p= 0.001 / < 0.05) p. this is proven with duration cry baby in group intervention t= 6.22 while in the group control baby cry longer, namely an average of t = 95.95. Babies who are given breast milk with method breast-feed moment immunized can lower risk the occurrence painful weight (scale 7-10) by 80%. This was also proven by research conducted by Viggiano et all (2021) with give intervention in the form of breastfeeding breastfeeding and giving formula milk to babies before and during the immunization process. The results of study This is existence effect *analgesic* from breast-feed to painful injectio , and the same effect also occurs in babies who receive formula milk so that can be concluded that breast-feed or giving formula milk has the same effect, namely

on breastfed babies or given formula milk experienced more pain little and duration short cry compared to right with in group control .

Giving compress cold can increase release *endorphins* that can block transmission fiber nerve more *A*- beta *sensory* bigger and more fast, thing that too can lower transmission pain in fiber *C and delta A* so that *gate synapse* close transmission impulse pain (Sulistiyani, 2009 in Asisanti , 2023). Meanwhile breast-feed is one of action *distraction, relaxation* and *stimulation* skin that has mechanism control pain. Cells network brain produce *endogenous opioids* like *ekaphalin* and *endorphin,* when *endogenous opioids* the released so end cell *presynaptic interneurons* in the *posterior horn* can prevented the exit P factor at the end *presynapticsensory afferent* and occurs *synaptic inhibitor* so that stimulus painful No continued. In addition The content of breast milk is: *lactose* or sweet solution can also induce track *endogenous opioids* so that transmission painful No reaches the brain, breastfeeding can also fulfil need psychological baby that is with touch and hug mother, make baby feel comfortable and safe (Prasetyono , 2010 in The Jewels et.all 2020).

That matter in accordance with *gate control* theory put forward by Melzack and Wall, (2003) in Astuti (2023), *gate control theory* This explain mechanism transmission pain. Activities the depends on activity fiber nerve *afferent* diameter big or small that can influence cell nerves in *substance gelatinosa* . Activity fibers with diameter big functioning hinder transmission which means door closed whereas fiber nerves that are in diameter small functioning make it easier transmission which means door opened. Mechanism Gate Control that occurs in *the dorsal horn of the spinal cord* play a role important in mechanism said. Fiber nerve small (receptor) pain) and fiber large (normal receptors) shine on the next *projector cell* (P) will going to *spinothalamic* to brain and *inhibitory interneurons* (i) located in *the dorsal horn*. The relationship the determine When impulse painful distributed to brain.

However There is research that is not in line with results research conducted by researchers that is research conducted by Setyaningsih et al (2023) who conducted study with compare three therapy to three group that is group First with therapy compress alcohol obtained results Respondent experience painful currently until heavy with scale 8-10 as many as 10 people (84%) and a small part Respondent experience No painful until painful light with scale 1-3 as many as 2 people (6%). Group second use therapy ice pack, respondent with No pain / pain light as many as 2 respondents, respondents with painful currently as many as 6 respondents and responders with painful heavy as many as 7 respondents. While in the group third use therapy with EMLA obtained results all over Respondent No feel painful as many as 8(100%) and no there are those who feel painful Good painful light and is . That is due to because EMLA acts as inhibitor pain *mediators*, which EMLA contains *lidocaine* which is capable of block *impulse* nerves and release *prilocaine sodium block* for avoid pain with make numb to temporary time (coumo et al, 2015 in setyaningsih, 2023). The *p-value* of study This is **0.000,** which indicates that there is very significant difference between third group in matter subtraction pain in babies moment immunization. EMLA has proven to be the most effective in reduce painful compared to with compress alcohol and ice packs .

Researcher assume that combination therapy compress cold and breastfeeding in babies moment PCV immunization at the Community Health Center Separi III can lower level pain felt by the baby during the immunization process matter the because of compress cold give effect anesthesia local in infants with existence release *endorphins* that can block transmission fiber *nerve* more *A*- beta *sensory* bigger and more fast , thing that too can lower transmission pain in C and *delta* fibers A so that *gate synapse* close transmission impulse pain , breastfeeding breast-feed give effect safe and comfortable and the sweet taste it produces from breast milk to make focus baby against pain diverted . From research as well as results

observations that have been average response is done pain in babies group intervention reduce matter It is known that one of the his with crying baby more little and duration cry short as well as there are also babies who don't cry when done immunization in groups intervention. Other variables in study This in a way overall No meaningful to response pain in babies like age and type sex .

Research results also show that in giving immunization injections for babies, every Respondent experience painful although level the pain that is felt different different. That is because of Immunization in infancy and childhood is source the most important pain and suffering that can cause anxiety and trauma that occurs in the family. The pain and trauma must minimized Because can cause child traumatized by needles and medical procedures in the future come .

IV. Conclusion

Study This show that combination therapy compress cold and effective breastfeeding in reduce pain in babies moment PCV immunization at the Community Health Center Separi III. Analysis results with *Mann-Whitney test* produce mark *p-value* of 0.000, indicating influence significant from combination therapy this. In the group intervention, part big baby experience painful light or No painful The same once, while in the group control, part big baby experience painful currently until weight. Findings This show that hypothesis study proven Correct. Therapy compress cold Work with reduce *sensitivity receptor* pain and production *prostaglandins* , whereas Breastfeeding provides a sense of security and comfort as well as divert attention baby from pain. Combination from second therapy This proven effective in reduce pain in babies, and can applied in practice immunization ffor increase comfort and reduce anxiety in babies and parents. With existence therapy compress cold and breastfeeding is expected power Health Center special his midwife can apply his in action immunization so that parents No feel worry to the pain that occurs in children his moment immunization as well as achieving the target of 100% Complete Basic Immunization.

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