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Facilitated Tucking: A Simple Technique to Reduce Infant Pain During HB-0 Vaccination

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Abstrak

WHO menyarankan semua bayi baru lahir harus menerima vaksin hepatitis B sesegera mungkin setelah lahir, idealnya dalam 24 jam pertama. Prosedur ini dapat menimbulkan rasa sakit pada bayi hingga membuatnya rewel. Namun, penyedia layanan kesehatan seringkali mengabaikan rasa sakit yang dialami bayi baru lahir. Facilitated tucking merupakan teknik non farmakologi yang efektif meredakan nyeri bayi dengan memberikan rangsangan kehangatan dan sentuhan. Penelitian ini menggunakan desain kelompok kontrol post-test-only. Populasinya adalah bayi baru lahir yang dijadwalkan mendapat suntikan vaksin HB-0 di BPM Lestari. Tiga puluh bayi dipilih menggunakan purposive sampling dan dibagi menjadi dua kelompok. Hasil penelitian menunjukkan bahwa facilitated tucking berpengaruh terhadap respon nyeri pada bayi penerima suntikan HB-0 di BPM Lestari pada tahun 2024, dengan nilai P-value sebesar 0,002 yaitu kurang dari 0,05. Menyelimkan yang difasilitasi membantu menjaga stabilitas sistem saraf otonom dan motorik, mengurangi stres dengan menciptakan batasan fisik dan memposisikan tubuh bayi dalam posisi terselip. Teknik ini dengan lembut menstimulasi sistem sensorik proprioseptif, termal, dan taktil, memodifikasi mekanisme kontrol gerbang dan mengubah transmisi rasa sakit. Suntikan vaksin HB-0 dapat menimbulkan rasa sakit pada bayi, namun pemberian fasilitas penyisipan yang tepat dapat membantu mengurangi tingkat nyeri pada saat penyuntikan.

Kata Kunci: *Penyelipkan yang Difasilitasi, Respon Nyeri pada Bayi, Vaksinasi Hepatitis B*

Abstract

WHO advises that all newborns should receive the hepatitis B vaccine as soon as possible after birth, ideally within the first 24 hours. This procedure can cause pain for the baby, making them fussy. However, healthcare providers often overlook the pain experienced by newborns. Facilitated tucking is a non-pharmacological technique that effectively alleviates infant pain by providing warmth and touch stimuli. This study employed a post-test-only control group design. The population consisted of newborns scheduled to receive the HB-0 vaccine injection at BPM Lestari. Thirty infants were selected using purposive sampling and divided into two groups. The findings indicate that facilitated tucking influences the pain response in infants receiving the HB-0 injection at BPM Lestari in 2024, with a P-value of 0.002, which is less than 0.05. Facilitated tucking helps maintain the stability of the autonomic and motor nervous systems, reducing stress by creating physical boundaries and positioning the infant's body in a tucked posture. This technique gently stimulates the proprioceptive, thermal, and tactile sensory systems, modifying the gate control mechanism and altering pain transmission. The HB-0 vaccine injection can cause pain for infants, but appropriate facilitated tucking can help reduce pain levels during the injection.

Keywords: *Facilitated Tucking, Pain Response in Infants, Hepatitis B Vaccine*

INTRODUCTION

According to the epidemiological data on hepatitis B published by the World Health Organization (WHO) in 2017, the global prevalence of hepatitis B is approximately 3.5% of the world population, or around 257 million people. Most individuals currently living with hepatitis B infection were born before the hepatitis B vaccine was widely available and routinely administered to infants. WHO reported that, as of 2020, hepatitis B prevalence among children under five years old in Indonesia reached 1.3%, the highest rate in Southeast Asia. WHO aims to eliminate hepatitis by 2030, urging countries to meet several targets: reducing new hepatitis B and C infections by 90%, decreasing hepatitis-related deaths from liver cirrhosis and cancer by 65%, ensuring that at least 90% of people with hepatitis B and C are diagnosed, and providing appropriate care and treatment to at least 80% of eligible individuals.

Hepatitis B is a potentially life-threatening liver infection caused by the hepatitis B virus, representing a major global health concern. It can lead to chronic infection and significantly increases the risk of death from cirrhosis and liver cancer. Transmission occurs through contact with the blood or bodily fluids of an infected person (Pasaribu et al., 2017). Hepatitis B vaccination is a key preventive measure. WHO recommends that all newborns receive the hepatitis B vaccine as soon as possible after birth, ideally within 24 hours, followed by 2-3 doses to complete the primary series. This vaccination is essential to prevent various clinical

manifestations of hepatitis, including acute hepatitis, chronic hepatitis, and progression to cirrhosis or primary liver carcinoma (Pasaribu et al., 2017).

The vaccination procedure may cause pain, leading to fussiness in infants, yet this pain often goes unnoticed by healthcare providers, partly because infants cannot verbally express their discomfort. Infants exhibit distress behaviors such as grimacing, frowning, kicking, restlessness, whining, or inconsolable crying, which indicate pain. These distress behaviors, including facial expressions, body movements, and vocalizations, can assist healthcare providers in assessing pain in infants and young children with limited speech skills (Susilawati, 2018). Repeated painful procedures early in life can negatively affect the central nervous system's development. Inadequate pain management and distress during invasive procedures can lead to permanently reduced pain tolerance, increased pain sensitivity with age, and even chronic pain. Thus, it is essential for healthcare providers to manage pain effectively during procedures starting from infancy (Khasanah & Rustina, 2017).

One of the main challenges in evaluating pain in newborns is their inability to verbalize discomfort. Pain in newborns impacts heart rate, respiration rate, blood pressure, and oxygenation levels, potentially leading to alterations in these parameters (Joseph et al., 2020). Pharmacological methods to manage pain in newborns may lead to side effects such as respiratory depression, apnea, bradycardia, hypotension, desaturation, partial airway obstruction, and hypersalivation (Kucukoglu et al., 2015).

A non-pharmacological approach known as facilitated tucking involves gently placing the infant in a side-lying flexed position, with one hand supporting the head and hands and the other stabilizing the legs and buttocks (Joseph et al., 2020). According to research conducted by Mercy Joseph and colleagues (2020), facilitated tucking is a highly effective non-pharmacological method for alleviating infant pain by providing warmth and touch. This technique also promotes infant motor development, conserves energy, and helps infants feel secure through positioning. Given this background, the researcher aims to implement the facilitated tucking method to reduce pain levels in infants receiving the HB-0 injection at BPM Lestari.

RESEARCH METHOD

This study employs a pre-experimental design with a post-test-only control group design, where the sample is divided into two groups: an experimental group that receives the intervention and a control group that does not, with only a post-test administered and no pre-test (Surahman, 2016). The study population consists of all patients receiving certain services at BPM Lestari in 2024, using a purposive sampling method comprising 30 samples:

15 in the intervention group and 15 in the control group. Inclusion criteria include patients or parents willing to participate, while exclusion criteria cover patients with specific conditions that could affect the intervention outcome. The independent variable in this study is the intervention provided to the experimental group, and the dependent variable is the patients' response post-intervention.

Research instruments include an adjusted Standard Operating Procedure (SOP) and an observation sheet, with a measurement scale validated in previous research. Data collection was carried out through direct observation at BPM Lestari, with steps including sample selection, intervention administration to the experimental group, and observation of responses in both groups. Data analysis comprises univariate analysis to describe variable characteristics and bivariate analysis to examine the relationship between independent and dependent variables using the Mann-Whitney statistical test. This study also takes ethical considerations into account, including informed consent, data confidentiality, adherence to principles of justice, inclusiveness, and balance between benefits and potential risks for the research subjects.

RESULTS AND DISCUSSION

Table 1 Characteristics of respondents based on gender, weight, and age

Category	Case		Control	
	F	(%)	F	(%)
Gender				
Male	8	53,3	7	46.7
Female	7	46,7	8	53.3
Weight				
2800 g	2	13,3	2	13,3
2900 g	3	20,0	1	6,7
3000 g	1	6,7	0	0
3100 g	1	6,7	2	13,3
3200 g	2	13,3	2	13,3
3300 g	1	6,7	5	33,3
3400 g	2	13,3	2	13,3
3600 g	2	13,3	0	0
3700 g	1	6,7	0	0
3800 g	0	0	1	6,7

Age				
5 hours	0	0	2	13,3
6 hours	4	26,7	2	13,3
8 hours	3	20,0	4	26,7
9 hours	4	26,7	4	26,7
10 hours	3	20,0	2	13,3
11 hours	0	0	1	6,7
12 hours	1	6,7	0	0
Total	15	100	15	100

Source: Primary Data

Table 1 presents the respondent characteristics in terms of gender, weight, and age across case and control groups. In the case group, there is a slight majority of male respondents (53.3%) compared to females (46.7%), whereas the control group has a reversed distribution, with females making up 53.3% and males 46.7%. Regarding weight, both groups show varied distribution, with respondents in the case group ranging from 2800 g to 3800 g, and the control group with a broader distribution in the mid-range, peaking at 3600 g (33.3%). For age, both groups are represented across various hourly age categories, with the case group showing a higher concentration in the 6 to 10-hour range (26.7% each for 6 and 8 hours), and the control group slightly more spread out across similar age categories. These distributions indicate diversity within each group, offering a balanced representation for analysis.

Table 2. Frequency Distribution of Pain Response Variable after Facilitated Tucking

Pain Response	Group			
	Case		Control	
	F	(%)	F	(%)
Mild Pain	0	0	13	86,7
Moderate Pain	15	100	2	13,3
Severe Pain	0	0	0	0
Total	15	100	15	100

Source: Data Processing Results 2024

The results presented in Table 2 indicate a significant difference in pain responses between the case and control groups following the facilitated tucking intervention. In the case group, all 15 respondents (100%) reported experiencing moderate pain, while no individuals reported mild or severe pain. Conversely, in the control group, the majority of participants (86.7%) reported moderate pain, with 13.3% experiencing mild pain and none reporting severe pain. These findings suggest that the facilitated tucking intervention may effectively reduce the incidence of severe pain, as observed in the case group, compared to the control group, which experienced a broader range of pain responses. This highlights the potential benefits of facilitated tucking in managing pain among the studied population.

Table 3 Results of the Mann-Whitney Test

Variable	N	Mean	P
Response of the control group	15	22,00	0,000
Response of the intervention group	15	9,00	

Source: Mann-Whitney Test

The results of the Mann-Whitney test indicate a significant difference in pain response between the control and intervention groups. With a mean rank of 22.00 for the control group compared to 9.00 for the intervention group, the findings suggest that participants in the intervention group experienced less pain after facilitated tucking. The p-value of 0.000, which is well below the conventional threshold of 0.05, further confirms that this difference is statistically significant. These results highlight the effectiveness of facilitated tucking in reducing pain responses among the subjects studied.

Respondent Characteristics

Based on gender data, in the control group, 8 of the 15 respondents were male (53.3%), while in the intervention group, 8 of the 15 respondents were female (53.3%). Badr et al. (2010) explain that gender does not correlate with pain response in preterm infants, as measured by the Premature Infant Pain Profile (PIPP) instrument. This study also suggests that gender does not specifically influence pain response (Badr et al., 2010). However, a study by Guinburg et al. (2000) observed gender-specific pain responses during capillary blood sampling for glucose testing in infants aged 28 to 42 weeks, using the Neonatal Facial Coding Score (NFCS). The findings indicated that female neonates of all gestational ages displayed more expressive facial reactions than male neonates during capillary blood sampling. Based on this research, theory, and related studies, it can be statistically concluded that gender does not correlate with the effect of facilitated tucking on infant pain response

during HB-0 vaccine injections.

In terms of weight, among the 15 respondents in the control group, most weighed 2900 grams (20.0%), whereas in the intervention group, 5 of the 15 respondents weighed 3300 grams (33.3%). According to research by Rahayuningsih and Sri Intan (2012), there was no relationship between nutritional status and the pain level experienced by infants during immunization injections ($p=1.000$). However, field observations indicated that infants with lower weights tended to cry longer during immunization injections, possibly due to thinner thigh fat in underweight infants, making injections feel more pronounced (Atika et al., 2018). Based on the findings, related theories, and previous studies, it can be statistically concluded that weight is associated with the effect of facilitated tucking on infant pain response during HB-0 vaccine injections.

According to the frequency distribution data, in the control group, most respondents were aged 6 and 9 hours, with 4 respondents each (26.7%). In the intervention group, the majority of respondents were 8 and 9 hours old, with 4 respondents each (26.7%). Brommeg (1998), as cited in Sri Intan (2012), suggests that a child's level of development influences their cognitive perception of pain, meaning pain tolerance tends to increase as a child ages. Based on this research, theory, and related studies, it can be statistically concluded that infant age does not correlate with the effect of facilitated tucking on pain response during HB-0 vaccine injections.

The Influence of Facilitated Tucking on Infant Pain Response During HB-0 Vaccine Injection

Data analysis comparing the intervention and control groups showed that all 15 respondents in the control group experienced moderate pain. In contrast, only 2 respondents in the intervention group experienced moderate pain, while 13 experienced mild pain. According to the Mann-Whitney test, the P-value was 0.000, indicating that facilitated tucking significantly influences infant pain response during HB-0 vaccine injections at BPM Lestari. Pain, an unpleasant sensation often experienced by individuals, is a fundamental issue in healthcare, as freedom from pain is a basic need that midwifery care aims to address (Supriadi & Rahmawaty, 2022). Pain is a protective mechanism triggered when tissue damage occurs, prompting individuals to remove the source of discomfort (Saifullah, 2015). In this study, pain responses were measured using the Neonatal Infant Pain Scale (NIPS), a behavioral assessment tool for evaluating pain in premature and full-term infants. NIPS assesses six parameters: facial expression, crying, breathing patterns, arm and leg movement, and alertness, with scores indicating pain categories: 0 (no pain), 1-2 (mild pain), 3-4 (moderate pain), and 5-7 (severe pain) (Kyle & Carman, 2015).

As noted by Malkin (2008), a common complication of intramuscular injections is pain from tissue trauma. Research by Anand et al. (2004), as cited in Kucukoglu (2015), suggests that pain in infants can lead to variations in heart rate, respiration rate, blood pressure, and oxygen levels. Additionally, Gomella et al. (2013) found that inadequate pain management during invasive procedures can permanently reduce pain tolerance and increase pain response with age, potentially contributing to chronic pain development (cited in Khasanah & Rustina, 2018). Facilitated tucking involves positioning the neonate's limbs flexed at the midline in a lateral, prone, or supine position. This gentle positioning, close to the infant's body, is designed to recreate a fetal posture and enhance comfort by reducing movement, stimulating tactile and thermal sensory systems, and influencing the body's pain-gating mechanisms (Kucukoglu, 2015; Helti & Ariski, 2019). This technique has shown positive effects on autonomic and motor stability, reducing stress by providing proprioceptive input that modulates pain transmission.

This study aligns with Leksono's (2020) findings on facilitated tucking for pain response during Vitamin K injections, where 100% of the control group experienced moderate pain, while 86.7% of the intervention group experienced mild pain ($p=0.000$). Likewise, Tondale (2019) found facilitated tucking effective for reducing pain in infants during DPT vaccinations. Diab's (2023) study also reported that facilitated tucking significantly lowered pain intensity during invasive procedures in premature infants. In the intervention group, 64.4% experienced mild pain, whereas in the control group, 48.9% experienced moderate pain, indicating facilitated tucking reduces pain severity and stabilizes heart rate and oxygen levels. In summary, this study assumes that facilitated tucking reduces pain during HB-0 vaccine injections by providing thermal and tactile stimulation. Additionally, it promotes comfort and supports motor development, enabling infants to conserve energy during crying episodes.

CONCLUSION

Based on the results of this study at Demang Sepulau Raya Hospital, it can be concluded that infants who received facilitated tucking during the HB-0 vaccine injection tended to show a milder pain response compared to infants who did not receive this intervention, with the majority of infants in the intervention group experiencing mild pain. Meanwhile, infants in the group without facilitated tucking consistently experienced pain in the moderate category. These findings indicate that facilitated tucking has a significant effect in reducing pain levels in infants during the HB-0 injection procedure.

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