ORIGINAL ARTICLE

Vanilla extract intervention on neonatal pain and comfort levels during venous blood sampling

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ABSTRACT

Introduction: *Venous blood sampling is always uncomfortable and painful. Especially for neonates. Several impacts, such as rapid pulse, tissue damage, psychological stress, and altered behavior. Improper intervention results in further complications like hyperalgesia and severe pain experience.* ***Objectives:*** *Identify the effects of vanilla extract on neonatal pain and comfort levels of neonates during venous blood sampling.* ***Methods****: Within three months of data collection in a private hospital, the quasi-experiment post-test-only with a control group design used quota sampling with 40 neonates. The Neonatal Infant Pain Scale (NIPS) is used to assess the pain level in newborns, and the Comfort Scale is used to assess their comfort level.* ***Results****: More than half of neonates (64%) were 24 hours old, and 60 % were boys. As many as 76% of them were diagnosed with umbilical cord infection, PROM, Etc. There was no significant difference in the pain scales of the two groups (p=0.51), but there was a significant difference in the results of the comfort level (p= 0.00). These results follow previous research that found that the vanilla concentrations of 0.64% and 2% could not significantly reduce pain.* ***Conclusions****: The nerve response of neonates has not developed correctly, or the asphyxia problem during the intervention, resulting in the smell of vanilla aromatherapy 0.64% applied not being able to overcome pain significantly. It is further recommended to vary the dose to see the impact of pain.*

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1. Introduction

Neonates were also bothered by the procedure for drawing venous blood (Neshat et al., 2016). Venous blood sampling is a standard invasive procedure for hospitalized neonates (Khalid et al., 2019). The adverse effects of this routine procedure are hazardous for newborns. According to several studies, discomfort affects heart rhythm, cortisol levels, crying behavior, oxygen levels, and excessive motor increases (Goubet & Lequien, 2000a). According to anatomical studies, nociceptors receiving pain stimuli in neonates have the same or even denser density than adults (Bouza, 2009). Neonates are more sensitive to pain than older children and adults. C fibers in the peripheral nerves provide unmyelinated and slow conduction for pain transmission in the neonate. Because these fibers transmit pain in a slow and uncontrolled manner, neonates experience more severe pain than adults. Pain is felt in intrauterine life, according to research. According to one study, the infant's ability to respond to pain develops between the 20th and 24th weeks of gestation during intrauterine life (Cirik & Aksoy, 2020).

Pain can also have long-term adverse effects on neonates' behavior and development (Taksande et al., 2005). In neonates, the physiological impact of painful stimuli or stress results in an increase in circulating catecholamine levels, as well as an increase in heart rate, blood pressure, and intracranial pressure (Taksande et al., 2005).

During their hospital stay, neonates are subjected to venous blood sampling for screening purposes. Furthermore, when patients were admitted to the intensive care unit, painful procedures were performed more frequently, with approximately 16 vein punctures performed

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per day (Bellieni et al., 2016). Invasive procedures such as venous blood sampling are performed on more than 90% of hospitalized neonates (Azarmnejad et al., 2017). According to data from the University of Muhammadiyah Malang Hospital in 2017, 93 percent of 115 neonates had venous blood drawn at least once and up to six times during their hospitalization. Room nurses do not yet know how to manage discomfort caused by the venous blood sampling procedure.

According to the pilot study, the average comfort level was 22.5, with the lowest score being five and the highest score in patients not using a ventilator being 25. The highest possible score if a ventilator was used was 30. The NIPS pain scale yielded an average score of 4.94 out of a possible range of 1-7. According to the findings of this study, infants who are hospitalized experience pain and discomfort with an average close to the maximum value when receiving venous blood.

Another study found that 50.3 percent of neonates experienced pain, and only 32 percent received pain relief, both pharmacological and non-pharmacological (Pinheiro et al., 2017). According to these findings, nearly 70% of newborns are not treated for pain management during treatment. Recent research has found that controlling pain during the neonatal period is highly beneficial in preventing physiological, behavioral, and hormonal complications (Witt et al., 2016). Many efforts have been made to mitigate the long-term effects of venous blood collection discomfort (Neshat et al., 2016). Olfactory (smell) stimulation can alleviate pain and discomfort (Goubet & Lequien, 2000b). As a result of drawing venous blood, this olfactory stimulation may act as a long-term or short-term memory eraser. Vanilla extract was chosen because its properties are similar to the smell of breast milk, which is familiar to newborns (Aghagoli et al., 2016).

Providing reassurance to neonates during routine venous blood sampling procedures at the hospital must be an integrated nursing action management component in every inpatient room. Non-pharmacological intervention protocols with no side effects on both the physical and psychological aspects of neonates in inpatient wards are critical to implement. However, the study data found in this study are still minimal and require further investigation (Filippa et al., 2019). Vanilla extract was chosen for olfactory stimulation because it resembles breast milk and has a significant calming effect on neonates during the procedure, particularly in infants not exclusively breastfed. Further research is needed to achieve optimal results from a good research design, such as determining the levels of vanilla extract used in a few drops, the time interval between the procedure for giving vanilla and taking venous blood, and the distance between the last breastfeeding and the procedure for taking venous blood (Wei & Tsao, 2016). The intervention that must be used within the scope of child nursing is the principle of atraumatic care, in which care seeks to provide comfort to the neonate (Witt et al., 2016).

2. Methods

A quasi-experiment non-equivalent control group post-test-only design used quota sampling with 40 participants within three months of the data collection from October to December 2022. The population of this study was newborns who were treated in the neonatal ward of the University of Muhammadiyah Malang General Hospital. After obtaining informed consent from parents, the first 20 participants were assigned as the intervention group and the remaining 20 as a control group. The ethical clearance letter was obtained from the Ethical Committee of Health Research No. E.5.a/181/KEPK-UMM/IX/2022.

The assessment of neonatal pain during venous blood sampling was identified using the NIPS and neonatal comfort was assessed by using a comfort scale (Boudiab & Kolcaba, 2015). Identification of comfort level and pain levels after taking venous blood in the control group who got usual care in the neonatal ward. The implementation of pain management using vanilla extract at 0.64% doses before the completion of the venous blood sampling procedure. Identification of comfort and pain levels of the intervention group was held after taking venous blood collection.

The data obtained was analyzed by descriptive analysis, and a comparative analysis was carried out between the three data collection times with an interval scale so that analysis was used with an independent T-test.

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3. Results and Discussion

3.1 Demographic Data

The study on 40 respondents includes the demographic data, average neonatal comfort and pain level scores, and the results of mean different from independent t-tests between groups.

Table 1 Demographic Data of Neonates (based on age, gender, and level of care in Neonatal Unit)

Demographic Data (n=40)	n	%
Age		
One day old	26	64
Two days old	6	16
Three days old	8	20
Gender		
Boy	28	70
Girl	12	30
Level of care		
1 (umbilical cord infection, PROM, Etc.)	30	76
2 (Asphyxia, AMS, Hyper bilirubin)	10	24

Table 1 shows the demographic data of respondents from the control group and the intervention group, more than half of whom were one day old; during the treatment procedure with at-risk babies, laboratory tests were carried out in the form of complete blood counts and transient blood sugar checks so that in the results of the study all invasive actions were related to these lab tests which shows getting invasive action treatment of the same type. The demographic results of respondents based on gender found that more than half were male, and based on nursing level, most were level 1 with infectious diseases, both the umbilical cord and the risk of premature rupture of membranes.

3.2 Comfort and Pain Scale Level in Intervention and Control Group

Table 2 Comfort and Pain Scale Level

No	Measurement results	Intervention group	Control group
1	Comfort scale	22.4	11.95
2	Pain Scale (NIPS)	5	4.70

Table 2 shows the demographic data of respondents from the control group and the intervention group, more than half of whom were one day old; during the treatment procedure with at-risk babies, laboratory tests were carried out in the form of complete blood counts and transient blood sugar checks so that in the results of the study all invasive actions were related to these lab tests which shows getting invasive action treatment of the same type. The demographic results of respondents based on gender found that more than half were male, and based on nursing level, most were level 1 with infectious diseases, both the umbilical cord and the risk of premature rupture of membranes.

Table 3. Comfort and Pain Scale Data in the Intervention Group and the Control Group

	t	p	M ± SD
Comfort level	11,650	.000	10,450 ± .897
Pain level	.661	.512	.300 ± .454

The results of Table 3 above obtained a comparison between the average comfort scale in the intervention group and the control group obtained the result p value = 0.00 with an α value of 0.05 so that there was a difference in the average value of comfort in children who had venous blood drawn between the intervention group and control group. The results of the analysis of differences in the average pain in children who were taken for venous blood obtained a p-value of

0.51 so that the value was more significant than α so that it was concluded that there was no difference in value between the two groups.

The average result of the comfort scale using the comfort scale in Table 2 shows that the comfort scale in the intervention group with the application of vanilla aromatherapy during the venous blood sampling was higher, which means it was more comfortable than the group that was not given vanilla aromatherapy when the venous blood was taken. It is because vanilla aromatherapy is a scent like breast milk that smells so that it becomes a familiar smell that babies recognize (Yildiz et al., 2011). This smell will make respondents calm, more relaxed, and comfortable. The results of the comparative analysis of the intervention group and the control group also proved a significant difference where the intervention group was more comfortable than the control group. The results of this study are also supported by other studies, which state that vanilla aromatherapy can relax the nerves, which also functions as hypnosis and has a relaxing fragrance effect (Neshat et al., 2016). Comfort condition is influenced by the balanced state of the physical, psychospiritual, sociocultural, and environmental needs of neonates and mothers to provide relief, ease, and transcendence of the stressors (Lafond et al., 2019). By giving the vanilla intervention, the nurse is helping the neonates achieve optimal comfort at the early stage of their life. So, healthcare professionals must be focused on giving treatments to facilitate comfort to pursue an optimum degree of health (Nur, n.d.).

Even though pain and discomfort are sometimes used interchangeably, pain is a smaller concept than discomfort. When used as a noun, comfort is defined as the pleasant and satisfying feeling of being physically or mentally free from pain and suffering (Harvey & Kovalesky, 2018)." Physical perceptions are what determine physical comfort, which includes physiological aspects like resting and relaxation, illness reactions, nutrition and homeostasis, and bowel movements (Yesim et al., 2015). The results of Table 2 related to the pain scale also stated that there was an average pain scale in the same category, namely a moderate pain scale between the range of 4.7-5 using NIPS in neonates who underwent vanilla aromatherapy interventions and those who did not receive vanilla aromatherapy during invasive procedures. This pain scale is commonly found in neonates when invasive procedures are performed. In previous studies, the average pain was found to be moderate. The NIPS pain scale was chosen because of its good validity value (Da Motta et al., 2015; Hudson-Barr et al., 2002). In the results of the comparative analysis using the t-test, it was also found that there was no significant difference between the two groups. It is because the nerve response to pain in neonates has not developed correctly (Johnston et al., 2011), so it is possible that the smell of vanilla 0.64% has not been able to significantly overcome pain when an invasive procedure is performed to take venous blood. These results are supported by previous studies with the same application and concentration, which did not significantly reduce pain but could reduce the duration of crying in the intervention group (Neshat et al., 2016). It is further recommended to vary the dose to see the impact of pain. In the results of the level of care, it was found that some were level 2, where the patient experienced asphyxia breathing problems, meconium aspiration, and hyperbilirubin. This diagnosis can affect the pain scale and the aromatherapy process, which still has no significant effect between the two groups. Increasingly serious diseases will increase the dynamics process so that it is related to the less optimal function of the effects of aromatherapy.

4. Conclusion

Based on the study, it was found that there was a significant difference in the level of comfort among patients who underwent aromatherapy applications. In contrast, no significant difference was noted in the pain scale of neonates with venous blood drawn. For future research, it is recommended to increase the dosage of vanilla aromatherapy and have a more varied application method. Additionally, increasing the number of respondents will help further evaluate the pain response.

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