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Effect of Breastfeeding on Pain after DPT Immunization among the Infants

Manisha S.Kulkarni[1], Vijaya Kumbhar[2], Sunil Kulkarni[3]

[1] Clinical Insrtructor, B.V.D.U. C.O.N, Sangli- 416414

[2]Associate Professor, B.V.D.U. C.O.N, Sangli- 416414

[3]Associate Professor, B.V.D.U. C.O.N, Sangli- 416414

Abstract: ***A study to assess the effect of breast feeding on pain after DPT immunization among the infants in selected immunization clinics of Sangli, Miraj Kupwad corporation area. Background: Infant pain is mostly neglected. Pain has many ill effects on growth and development of child. Objectives: To assess the pain score after DPT immunization in experimental and control group and to assess the effect of breastfeeding on pain after DPT immunization among the infants in experimental group. Methodology: A Quantitative research approach and Non-randomized control group quasi experimental design,(post-test only) was used. The sample size was 140 by using non-probability purposive sampling technique.*** **Tool was developed under the FLACC Behavioral Pain Assessment scale, the criteria which were observed**. ***Collected data were analyzed by using descriptive and inferential statistics. Results: 'Z' values are significant at observation 1 and observation 2.Mean pain score, S.D and Std error mean of experimental group is significantly less than control group after DPT immunization at observation 1 and observation 2. Conclusion: Breast Feeding is safe and effective to reduce the pain of DPT immunization.***

Keywords: Effect, Breastfeeding, Pain, Immunization, Infants

1. Introduction

Breast feeding is the most effective way to provide infant with complete nutrition and caring environment. Breast feeding has many advantages to the baby, mother, family and nation. Infant gets all needed nutrients, protection from infections (lysozyme, IgA, lymphocytes, lactoferin and PABA), and protection from allergy, is well accepted and adopted food, develops emotional bonding, helps in proper growth and development. Mother is benefited and need does not any special preparation as it is always available in lactation period, early involution of uterus, prevents breast diseases (breast engorgement, ovarian and breast cancers), reduce extra body weight and increase mother child bonding. It helps the family by saving time, energy, material, cost i.e. most economical which leads to family bonding and development. Benefit of nation is to reduce cost of health services of mother and child because it prevents health problems. [1]

Many advantages of breast feeding or breast milk are yet to be discovered or explained like breast milk‟s effect on wound healing, analgesic and so on. Breast feeding reduces pain by combined effect of presence of comforting person, diversion of attention (sucking and distraction), physical sensation of skin to skin contact, sweet taste and analgesic and relaxation effect by tryptophan and B-endorphins present in the breast milk.

So breast feeding must be promoted by education, support, guidance and counseling, keeping mother and baby together and happy, providing privacy and creating physical, psychological, emotional, mental situations for it and preventing and management of problems of breast feeding. [2]

Pain is fifth vital sign. Dictionary meaning pain is a very unpleasant feeling caused by illness or injury. [3] Pain is defined as the psychical (pertaining to mind) adjunct (joined to) of an imperative (urgent) protective reflex i.e. pain is sensation which draws attention of individual as whole. [4]

Pain is very subjective phenomenon. It is caused by illness, injury or psychological discomfort. Immunization, invasive procedures like blood sample collection and minor or major operative interventions are common example of pain causing actions. It may characterize as pricking, burning, tearing, cutting, stabbing, crushing and aching. [5]

There are many theories of pain to explain phenomenon or mechanism of pain. Few are listed here as intensive theory (Erb), Specific theory (Von Frey), Strong‟s theory, Pattern theory (Goldschneider) , Central Summation theory (Livingstone), Fourth theory (Hardy and Wolff), Biophysical theory and most commonly used Gate Control theory (Melzack and Wall proposed that large fibers create a gate that open or close the system of pain stimulation). [6]

Caring of child before, during and after immunization also reduces the pain perception. The actions are before the needle: Remain calm and confident, bring your child‟s favorite stuffed toy or blanket, breastfeed your baby before the needle and continue during and after the needle. During the needle: Hold your baby close an older child may sit upright and held on your lap in a hug , distract your baby/child with a favorite toy, singing, cuddling, bubbles, rattles, pinwheels , breastfeed , stay calm, take a few slow, deep breaths if you are nervous and speak to baby/child in a soothing voice , direct an older child to take slow, deep breaths . After the needle: you will be asked to stay for 15 minutes after the needle to watch for any signs of reaction , placing a cold cloth over the site may help , encourage the child to move the limb , cuddle and comfort your child . [8]

A nursing study was conducted on the role of breast feeding in pain response during immunization among infants. A quasi experimental study with post test only control group design was used. Pain score was observed. The mean pain score 4.7 in experimental group was lower than control group with mean pain score 6.6. Unpaired "t" computed 2.03 which was higher than table value so there was significant in difference in the pain response in infants who received breast feed than infants who did not receive breast feed during immunization.[9]

Breast feeding has not only many advantages itself which are given above but also have additional benefits as compared to pharmacological measures and other non-pharmacological measures. Benefits over pharmacological measures are they do not of expert presence, no side effects or reactions, costless, total safe and ever available. Benefits over other non-pharmacological measures are 1. It is combination of present comforting person, skin to skin contact (breast, hands and chest), lactose has sweet taste, distraction by words or sounds and massage.[10]

2. Statement of the Problem

"A study to assess the effect of breastfeeding on pain after DPT immunization among the infants in selected immunization clinics of Sangli, Miraj, kupwad corporation area".

3. Objectives of the Study

- To assess the effect of breastfeeding on pain after DPT immunization among the infants in experimental group.
- To assess the pain after DPT immunization among the infants in control group.
- To assess the pain score after DPT immunization in experimental group and control group.

4. Operational Definitions

Assess
According to compact Oxford English Dictionary assess means calculate or estimate the value or importance.[3]

In this study assess means calculated or estimated score of pain after administration of DPT immunization to the infants at 3 minutes and at 10 minutes in experimental and control group through observation with using FLACC behavioral pain assessment scale and expressed numerically.

Effect
In this study effect means observe the change in pain score after DPT immunization among the infants at 3 minutes and at 10 minutes in experimental and control group through observation scale by using FLACC behavioral pain assessment scale and expressed numerically.

Breast Feeding
In this study breast feeding means feed the breast milk to the infant before and during DPT immunization.

Pain
In this study pain means behavioral response observed with the help of FLACC behavioral pain assessment scale as a reaction to DPT immunization.

Infant
In this study infant means a child who comes under 0 to 6 months of age group and who was going to receive DPT immunization.

DPT (Diphtheria, Pertusis, Tetanus) **IMMUNIZATION**
In this study DPT immunization means inoculation of 1^{st} /2^{nd} /3^{rd} dose of DPT vaccine to the infant.

Hypothesis:
H0: There will be no difference in pain score in experimental group and in control group after DPT immunization.
H1: There will be difference in pain score in infants in experimental group and in control group after DPT immunization.

Independent Variable: - Breast feeding.

Dependant Variable: –Pain in infants after DPT immunization

Research Methodology

Research methodology is the activity of research, how to proceed, how to measure progress. And what constitutes success. Methodology decision paves crucial implication for validity and credibility of the study findings. Methodology of research indicates the general pattern for organizing the procedure for the empirical study together with the method of obtaining valid and reliable data for an investigation[7]

Research Approach
A Quantitative quasi experimental research approach was adopted.

Research Design
The research design adopted for this study was Non-randomized control group quasi experimental design. (Post-test only)Intervention (Breast feeding):– Post test (2) observation that is at 3 minutes and at10 minutes after DPT immunization.

Setting of the Study
The setting for this study was adopted from the selected immunization clinics of Sangli, Miraj, Kupwad corporation area. The list of selected immunization clinics as follows:
- B.V.D.U. Medical College & hospital Sangli.
- Padambhushan Dr. Vasant Dada Patil Government hospital Sangli.
- Family planning centre and Sangli, Miraj, Kupwad corporation hospital.
- Government medical college and hospital Miraj.

Population
In this study the population comprised of infants who receive DPT immunization in immunization clinics of Sangli, Miraj, Kupwad corporation area.

Sample
The samples selected for the present study comprised of selected 0-6 months infants who receive 1st , 2nd and 3rd DPT immunization in selected immunization clinics of Sangli, Miraj Kupwad corporation area.

Sampling Technique
For this study, Nonprobability purposive sampling technique was adopted. Who fulfill the criteria and were available during the data collection.

Sample Size
The sample size selected for this study was 140.
70 = experimental and 70 = control
P =64.6%
Q =100-P
=35.4%
d = error = 15%
α = level of significance = 1%
Zα= 2.58.

Minimum Sample size
$n = z^2\alpha P/d^2$
n =67.65≈ 70-cases,70-control= 140.

Inclusion criteria
- Infants belongs to 0-6 months age group.
- Infants who receive 1st, 2nd and 3rd DPT immunization.
- Mothers who were willing to participate.

Exclusion criteria:
Infants with
Neurological problems like facial palsy.
- Delayed development.
- Genetic disorder eg. Down syndrome.
- Infants who were going to receive Injection PENTAVAC.

Data Collection Technique and Tool
For this study observation technique was used to assess the pain after DPT immunization.

Description of the Tool
Section – I Demographic data of the samples
Section-II Tool: FLACC Behavioral Pain Assessment Scale. (FLACC: Face, Legs, Activity, Cry and Consolability).

Validity and Reliability
The content validity of tool was done by 29 expertise from different specialties as following – Child health nursing 8, medical-surgical nursing 4, obstetrics and gynecology nursing 3, Dr"s 6, community health nursing 3, mental health nursing 3, English experts 1, and statistician 1. As a whole the suggestions and comments of the experts included in content corrections. The tool was found to be valid. The necessary modification was done with suggestion of guide.

Reliability
Reliability of tool is calculated by Cronbach"s alpha based on standardized items. Following formula was used to measure the reliability.

$$\sum_{j=1}^{k} x_k$$

$$\frac{k}{k-1}\left(\frac{\sum_{i\neq j}^{k} cov(x_i,x_j)}{var(x_0)}\right)=\frac{k}{k-1}\left(1-\frac{\sum_{j=1}^{k} var(x_j)}{var(x_0)}\right)$$

$$\frac{k}{k-1}\left(\frac{\sum_{i\neq j}^{k} cov(x_i,x_j)}{var(x_0)}\right)=\frac{k}{k-1}\left(1-\frac{\sum_{j=1}^{k} var(x_j)}{var(x_0)}\right)$$

r- Calculated was 0.857 the tool found to be reliable.

Pilot Study
The pilot study was conducted in selected immunization clinics at - B.V.D.U. Medical College & hospital Sangli, Family planning centre, Kupwad corporation hospital Sangli.

Prior permission was obtained from Medical superintendent and Medical officer of respective hospitals. Study conducted from 20th to 28th July 2015. Sample size was 15 experimental and 15 control groups among 0 – 6 months infants. The researcher individually approached to the mothers and discussed about study and confidentiality of the data. Consent obtained from mothers for participation in study, data was collected everyday during 9am- 1pm.

Refined and pre-validated tool was used to collect the data. Pilot study was conducted by applying same research methodological steps as mentioned for main study. Pilot study showed that this study was feasible.

Procedure of Data Collection
A formal permission was taken from Dean, Government medical college and hospital Miraj and Padambhushan Dr. Vasant Dada Patil Government hospital Sangli , Medical Superintendent of B.V.D.U. Medical College & hospital Sangli and Medical Officer of Family planning centre and Sangli, Miraj, Kupwad corporation hospital.

The study was conducted from 29th July to 14th August 2015, from Monday to Saturday during 9.00 am to 1pm.Informed consent was obtained after explanation of objectives and details about study from mothers of infants of experimental group and control group by the investigator. Total 140 samples were selected as per sampling criteria and divided in two groups, experimental group (70) and in control group (70).

Demographic data was collected and recorded. Experimental group: The infants were selected who were breast fed 10 minutes before and during DPT immunization.

Control group: The infants were selected who had not been breast fed 10 minutes before and during DPT immunization. Procedure of immunization for control group was the same, except mothers had not breast fed the infant before and during the DPT vaccine .The data was collected using FLACC behavioral pain assessment scale observation one at 3 minutes and observation two at 10 minutes after removal of the needle and immediately data was recorded in the given table.

Analysis and Interpretation:
It was done with Microsoft Excel statistical software SPSS-22 used for statistical analysis.[53]

Descriptive statistics: Frequency, percentage, mean and standard deviation were obtained.

Inferential statistics: Assess the effect of breast feeding on pain after DPT immunization by un-paired „Z"test.

5. Findings and Discussion

Section I

Distribution of Infants According to Socio-Demographic Characteristics

The data from table showed that there were 140 infants selected for the study. They were divided into experimental group and control group with equal number i.e 70 in each group. Infants were distributed according to age, sex , weight in KG and number of DPT immunization. The age was subdivided into months , less than 2 , 2-4,and 4-6 months. The infants between the 2-4 months, were 40 in experimental group and 47 in control group. Further No. of female infants were 43 in experimental group and 37 in control group i.e. more than male infants in both groups. The infants" weights between the 4-6 kg were 53 in experimental group and 51 in control group. Furthermore the infants received 2nd DPT immunization were 35 in experimental group and 25 in control group.

This study was supported to our study related to age group aspect. Mohammad Hasan Sahebihagh, Mina Hosseinzadeh, Asghar Mohammadpourasl, et.al. (2011)conducted study on the effect of breastfeeding, oral sucrose and combination of oral sucrose and breastfeeding in infant"s pain relief during vaccination .The aim of this study was to compare the pain relieving effect of oral sucrose, breastfeeding and combination of them during the first vaccination of infants with less than 3 months of age. The three primary doses of DPT immunizations are given before 4 months of life. Still 24 out of 140 infants have received DPT immunization after 4 months.[11]

This study was supported to our study related sex and weight of infant as socio-demographic variables. Simin Taavoni , Shadab ShahAli, Hamd Haghani , Leila Neisani Samani (2008) conducted study on Comparison of the effect of breast feeding with routine clinical procedure on pain relieving during immunization injection**.** The objective of this study was to examine the pain relieving effect of breast feeding during immunization injections in healthy neonates. In this control randomized clinical trial, Samples were divided in two groups (by age and sex) of 76 healthy 2- 4 months old term infants. In our study female infants were 80 out of 140. It is a good sign of increase numbers of female infants as well as increased taking care of them. Major results of supporting study were , in breast fed and control group mean of age were 81.53±41.46 and 81.61±40.59 day and for weight were 6.65±1.17 and 6.70±1.14 kg for height were 64.27±5.5 and 63.38±5.06 cm respectively. In our study weight of infants were, 6 infants less than 4 KG, 104 infants 4 to 6 KG and 30 have more than 6 KG. There were significant differences in Behavioral Pain Scores of two groups.[12]

This study was supported to our study related to number of DPT immunizatios. Gaurav Goswami, Amit Upadhyay, Navratan kumar Gupta, et.al. (2012) carried out the study in the immunization clinic of Department of Pediatrics, LLRM Medical College, Comparison of Analgesic Effect of Direct Breastfeeding, Oral 25% Dextrose Solution and Placebo during 1st DPT Vaccination in Healthy Term Infants: A Randomized, Placebo Controlled Trial .The objective was to compare analgesic effect of direct breast feeding, 25% dextrose solution and placebo as we give 1st intramuscular whole cell DPT injection to 6week - 3month old infants. Conclusions made that direct breastfeeding and 25% dextrose act as analgesic in young infants undergoing DPT vaccination in young infants less than 3 month of age. Our study included all the three doses of DPT immunization.[13]

Infants According to Grading of Pain Score after DPT Immunization in Experimental Group.

(Observation 1 was at 3 minutes and observation 2 was at 10 minutes after DPT immunization)

Results from the study showed that 68 infants of experimental group were in mild discomfort at observation 1, whereas only 15 infants were in same grade of pain score at observation 2. Infants belonging to relax and comfortable group were 55 at observation 2. None of the infants fall in severe discomfort grading of pain score.

Similar study and similar results were observed in this study of Maryam Modarres, Azam Jazayeri ,Parvin Rahnama et.al, (2013) conducted on Breastfeeding and pain relief in full-term neonates during immunization injections: a clinical randomized trial .The aim of this study was to examine the effect of breastfeeding on pain relief in full-term neonates during injection of hepatitis B-vaccine. This was a randomized clinical trial. A sample of full-term neonates was randomly allocated into two groups: the experimental group and the control group. Neonates in the experimental group were breastfed two Minutes before, during and after the hepatitis B-immunization and in control group neonates were in the mothers" arms but not fed. Pain was assessed using the Douleur Aiguëdu Nouveau-né (DAN) scale. The assessments were carried out after hepatitis B-immunization. Results were, One hundred thirty healthy full-term neonates were studied (65 in the experimental group and 65 in the control group) .Gestational age, birth weight, Apgar score and gender did not differ between the two groups. The mean total pain score as measured by the DAN scale was 3.52 (SD=1.37) for the experimental group and it was 6.78 (SD=1.69) for the controls indicating a significant lower pain score for the experimental group (P<0.001). Also, there were significant differences for the three measures of DAN scale that are facial expressions, limb movements and vocal expression, between the two study groups (P<0.001). The findings confirm that breastfeeding reduces pain and is effective way for pain relief during hepatitis B-vaccine injection.[14]

Infants according to grading of pain score after DPT immunization in control group.

Results from study showed that 61 from control group infants were in mild discomfort at observation 1 whereas only 57 infants were in same grade of pain score at observation 2. Almost equal numbers of infants were present at both observations but there was no breast feeding to the infants. None of the infants fall in severe discomfort grading of pain score.

Similar study and reports of control group is mentioned here. Dilli , I . Küçük , Y . Dallar (2010) conducted study on „how can I ease the pain of injections?" . Breast feeding during the shots has been shown to reduce pain. This is because breast feeding releases endorphins, the body's natural pain killer and it also comforts the baby. The objective was to investigate interventions that affect pain reduction during vaccination in infants and children attending a well-child unit. A consecutive sample of 243 children between age 0 and 48 months receiving their routine vaccinations was randomly assigned to 1 of the study groups and other in control group. A total of 158 infants under age of 6 months were randomly assigned to breast-feeding or no breast-feeding during immunization, and 85 children of age 6 to 48 months were randomly assigned to receive 12% sucrose solution, lidocaine-prilocaine cream, or no intervention. All children were evaluated for crying time and pain score by a pediatrician using the Neonatal Infant Pain Scale (NIPS) for those under age 12 months and the Children's Hospital of Eastern Ontario Pain Scale (CHEOPS) for those over age of 12 months. The results were breast-feeding in infants under age of 6 months and use of sucrose or lidocaine-prilocaine in children of age 6 to 48 months significantly reduced crying time and pain scores compared with controls. Study conclusions were, we expand on previous findings by demonstrating that breast-feeding may have an analgesic effect up to age 6 months.[15]

Assess Pain Score After Dpt Immunization in Experimental Group And Control Group.

The results from the showed that „Z" values are significant at observation 1 and observation 2. Mean pain score (1.61 and 0.21), S.D (0.77 and 0.41) and Std error mean (0.09 and 0.05) of experimental group is significantly less than control group Mean (2.57 and 1.19) , S.D.(0.93 and 0.41) and Standard error mean (0.11 and 0.09) after DPT immunization at observation 1 and observation 2 respectively .i.e. breast Feeding is effective to reduce the pain of DPT immunization.

The above findings were supported by Tisvy Thomas, Prof. Asha Shetty, Praveen V Bagali (2011) who conducted study on „Role of breastfeeding in pain response during injectable immunization among infants" . Majority of infants (55%) in the experimental group and 45 percent in the control group received the 1st dose of DPT immunization. Considering feeding pattern, 95 percent in experimental group and 90 percent in control group reported exclusive breast feeding. When the time of previous feed was assessed, in the experimental group, 50 percent were breastfed more than one hour before the immunization and 55 percent in the control group were breastfed within half an hour prior to the immunization. All the infants in the experimental group i.e. 100 percent and majority in the control group i.e. 95 percent did not report any complaints after previous dose of the immunization. Analysis of pain score in experimental group and control group reveals that highest percentage of infants in the experimental group i.e. 40 percent had pain score in the range of 4-5, whereas in the control group all of the infants i.e. 100 percent scored in the range of 6-7 during the 1st minute score. In the 5th minute, majority in the experimental group i.e. 95 percent and in the control group i.e. 75 percent had a pain score in the range of 0-3 . The mean pain score 4.7 of the 1st minute in the experimental group was lower than the mean pain score 6.6 in the control group, whereas the standard deviation of pain scores are 1.525 and 0.502 in the experimental group and control group respectively. The mean pain score at 5th minute in the experimental group was 0.55 which is lower than that of the control group score of 1.95. The standard deviation of pain scores at 5th minute are 1.31 and 2.064 in the experimental and the control group respectively .The study examined the following hypothesis: H1 - The pain response of infants who are given breastfeeding during immunization will be significantly lower than that of those who are not breastfed at 0.05 level of significance. The mean difference between pain scores in the experimental group and control group are 1.9 and 1.4 at 1st and 5th minute respectively. In order to find out the significant difference between the means of pain scores in the experimental and control group, unpaired „f" value was computed, t(38) = 2.03, p d"0.05. There was found to be a significant difference in the pain response of infants who were given breastfeeding than those who were not breastfed during injectable immunization.[16] .

6. Conclusion

Present study was concluded with the major results finding .Infants belong to mild discomfort grade of pain score in experimental groups were 68 and 15 as compared to infants of control group were 61 and 55 at observation 1 and observation 2.

„Z" test values were highly significant at both observation i.e. breast feeding is effective to reduce pain of DPT immunization.

7. Nursing Implications

a) Nursing Practice

This study demonstrates that breastfeeding is an effective, convenient, safe to implement, and readily available method to reduce the pain in infants during immunization injections, which can be implemented as a routine practice in the immunization clinics. Present study helps nurses to improve the evidence-based practice on pain management during immunizations. The implications of the study are that, the practice of breastfeeding during immunization can become a routine in the immunization clinics as it is a cost effective intervention and it is easy to implement in any setting as it does not require any extra facilities. It also encourages exclusive breastfeeding and it will be easily accepted by the mothers as it reduces pain in infants during immunization.

b) Nursing Education

The result of this study is breast feeding reduced pain of DPT immunization so it must be included in curriculum of all nursing program. This additional advantage of breast feeding must be part of breast feeding included in child health nursing, obstetric and gynecological nursing and community health nursing. Nursing faculty must consider this pain management in health education at all health settings. Nurse educator must give emphasis on this topic as pain reduction not only helps for growth and development but also prevents ill effects of the same. This topic may be

included in new editions or books. Teaching of this topic needs good IPR , guidance and counseling skills and use of effective teaching -learning methods.

c) Nursing Administration

Role of nursing leaders at various health settings is to provide special facility and supervision for breast feeding during immunization or any invasive procedures with infants or children. This is cost effective and most applicable measure in pain management of infants. Nurse leaders should make a policy, manual and procedure on this topic. Also nurse managers must deal with legal and ethical issues of breast feeding as pain management.

d) Nursing Research

This study gave new dimension for pain management in infant during immunization and painful procedures. This study recommends for further studies with new research methodologies. This study validates the tool and result that breast feeding reduces pain of infant.

8. Limitations

Data is collected through inspection by using FLACC behavioral pain assessment scale. Single investigator limit the settings and sample size .INC assigned study period was 6 weeks.

9. Recommendation

1) Comparative studies can be done for testing both pharmacological and non-pharmacological measures.
2) Studies can be done by using multiple non-pharmacological measures.
3) Studies can be done to find out effects of breast feeding on wound healing/other invasive procedures.
4) Studies can be conducted on effect of breast feeding on pain by using different pain scales.
5) Study can conducted to assess the effects of pain on infants‟ development of various health aspects.
6) Study can conducted to assess pain perception variation causing factors of infants.
7) Study can be conducted on assessment of pain during single and multiple vaccines administration.

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Author Profile

Manisha S.Kulkarni, Clinical Instructor, B.V.D.U. C.O.N, SANGLI- 416414

Vijaya Kumbhar, Associate Professor, B.V.D.U. C.O.N, SANGLI- 416414

Sunil Kulkarni, Associate Professor, B.V.D.U. C.O.N, SANGLI- 416414