

# Effect of Kangaroo Mother Care versus Oral Glucose for Pain Control in Preterm Infant at Neonatal Intensive Care Unit

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**Abstract:** Persistent neonatal pain due to numerous painful procedures like blood sampling can result in serious consequences on the premature neonates. Non-pharmacological pain relieve measures like oral glucose and kangaroo mother care are the recommended modalities to treat acute procedural pain in preterm babies to promote physiologic stability and positive developmental outcomes. This study aimed to: assess the effect of kangaroo mother care versus oral glucose for pain control in preterm infant at neonatal intensive care unit. **Methods:** A quasi-experimental research design was conducted on a sample of 100 neonates at neonatal intensive care unit affiliated to Sandoob Health Insurance Hospital that recruited randomly to receive either kangaroo care or oral glucose during venipuncture. Data was collected using an infant evaluation form and premature infant pain profile tool (PIPP). **Results:** The primary outcome of the study showed that there was significant difference in PIPP score among preterm neonates with in two groups at 30 second after venipuncture ( $P < 0.001$ ). Mean PIPP score were lower in kangaroo group ( $6.84 \pm 1.49$ ) than in oral glucose group ( $9.24 \pm 1.36$ ). In addition the secondary outcomes revealed that kangaroo group preterm infant had less time of crying during blood sample and gain more weight than preterm infant in oral glucose group. **Conclusion:** It was concluded that, both kangaroo mother care and 25% oral glucose solution have analgesic effect during blood sampling but kangaroo care proved to have significantly superior analgesic effect during blood sample, less crying time, increase body weight and no incidence of feeding intolerance among preterm neonates in comparison to oral glucose. **Recommendations:** it is recommended that applying Kangaroo mother care to all preterm neonates before exposure to invasive procedure to control pain and reduce crying duration that consequently reflect positively on preterm infants outcomes.

**Keywords:** Preterm Neonates, Procedural Pain, Sucrose and Kangaroo Care.

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## 1. INTRODUCTION

The World Health Organization (WHO) identifies premature birth like any delivery prior to 37 weeks of gestation, or less than 259 days from the 1<sup>st</sup> day of last menstrual period (Spong, 2013). The international incidence of premature birth is determined to be 11.2% on average, and there are variations in the incidence of premature birth amongst countries and areas, like African countries, it may be around 16%, yet in Europe, it might be as low as 6% (Caserta, Bordi, Stegagno, Filippini, Podagrosi, et al., 2014). Premature birth (PTB) is contemplated one of the main health detectors of a nation, since it's the foremost common reason for neonatal mortality and the 2<sup>nd</sup> most common reason for mortality in pediatrics lesser than five years globally. Moreover, these babies which shall endure have greater rates of long-term morbidities, like neurological and developmental incapacities, matched to infants delivered full term (Frey & Klebanoff, 2016).

Preterm infants are inserted to NICU due to their instability, neurologic immaturity and a seriously compromised clinical status. The requirement for hospitalizing for an elongated duration cause being subjected to many painful procedures (Melo & Cardoso, 2017). Procedure pain, the origin of possible or actual tissues damaging is the short-term pain provoked by the medicinal or nursing care of premature babies. The foremost commonly done processes have been nasal, endo-tracheal, and naso-pharyngeal suction, sticking of heels, intravenous sampling of blood and naso—gastric tubes inserting (Stevens, Yamada, Lee & Ohlsson, 2013).

Till the 1970s, it has been thought that neonates are not able to feel pain because of immature sensory neurons and under developed pain receptors. Thus, painful processes have been performed to babies without using anesthesia or analgesia. Researches demonstrated that neonates may feel the pain and recall it. Additionally, newborns are more vulnerable to pain than grown-ups because of the deficiency of the descending regulation system, that has a part in comforting the pain and they show it via behavior, physiologic, and neural-chemical forms (Azarmnejad, Sarhangi, Javadi & Rejeh, 2015). For now, higher subjection to procedure stresses and pain in the NICUs is accompanied by long-term negative outcomes upon brain development besides intellectual, motor function, might eternally decline a person's pain endurance, elevate pain reactions later in life, share in the advancement of chronic pain, modifies physiologic reactions, pain thresholds, and pain-or stress-linked attitude (Schiller, Allegaert, Hunfeld, van den Bosch, van den Anker et al, 2018).

Assessment of neonatal pain is still difficult because newborns are preverbal and cannot clearly express their feelings. For babies and non-verbal pediatrics, their folks, pediatric specialists, nurses and different caregivers are continually challenged to clarify if the neonate's distressed attitudes signify pain, fear, hunger, or a group of different perceptions or emotions. As such newborns can't exhibit the amount of pain they feel, many pain scales were planned in a trial to evaluate pain (Malngiang, Singh, Golmei & Singh, 2016). The most frequently tools utilized in the NICU for acute pain evaluation comprise the Premature Infant Pain Profile (PIPP), Neonatal Pain Agitation and Sedation Scaling (N-PASS), Neonatal Infant Pain Scale (NIPS) and the CRIES scale (Crying, needs O2 Saturation, elevated Vital Signs, Expression, Sleeplessness (Hall & Anand, 2014).

Proper managing of pain in those newborns is crucial from a moral viewpoint and enhancing their short and long-term results. Many techniques mutually pharmacologic and non-pharmacologic were attempted to decline pain. Although an array of pharmacological preparations such as opioid, non-steroidal medications, topical analgesic applications. A group of non-pharmacological pain preventing and relieving methods were demonstrated to be efficient in reducing pain of minor procedure in newborns. Those comprise usage of oral glucose/sucrose, breast feeding, non-nourishing suckling, kangaroo caring (skin-to-skin contact), facilitated tucking (keeping the arms and legs in a flexed placement), wrapping and developmental caring, that involves restricting environmental stimuli, lateral placement, usage of supportive bedding, and consideration of behavior signs (Malngiang et al, 2016)..

The kangaroo mother care technique that is targeted to deliver main care to newborns was broadly utilized in NICU via direct skin to skin contact that is identified like a technique of holding a little nappy neonate in SSC, flat and erect upon the mother's chest. The newborn is surrounded in the mother's clothing to meet baby's requirements for warmth, breast feeding, protecting from infections, stimulations, security and love. Kangaroo caring has positive influences upon autonomic behavior and status (Nimbalkar, 2013). Glucose has broadly been accepted like a non-pharmacological intervention efficient for the management of minor procedural pain in premature babies. Reviews widely documented declined crying, facial grimacing, and motor activities following oral administering of glucose because of minor painful procedures (McPherson & Grunau, 2014).

Neonates cannot speak and advocate for themselves when they experience pain, which makes nurses face enormous challenges and perform a fundamental role in the control of pain and minimizing it. Nurses considered as a constant caregiver for those target group during hospitalization, as well as being directly responsible for invasive and consequently painful –procedures (Martins, 2016). They should learn more effective ways to reduce, control, assessing patients' pain to reduce the morbidity and the cost associated with untreated pain.

#### **Aim of the study:**

The research targeted assessing the effects of kangaroo mother care versus oral glucose for pain control in preterm infant at neonatal intensive care unit.

**Research hypothesis:**

- Preterm neonates in kangaroo group will have lower pain scores after blood sampling than using oral glucose.
- Preterm neonates in kangaroo group will have less time of crying during blood sample than preterm using oral glucose.
- The risk of feeding intolerance or refusal of breast feeding among preterm neonates will decreased after using kangaroo care than oral glucose.

**2. SUBJECTS AND METHOD SUBJECTS****Design:**

A quasi-experimental research design was conducted on sample of 100 preterm neonates that recruited randomly to receive either kangaroo care or oral glucose during venipuncture

**Setting:** This research was carried out at the neonatal intensive care unit (NICU) affiliated to Sandoob Health Insurance Hospital (SHIH) that provide service to preterm infants from Dakahlia and the surrounding governorate.

**Subjects:**

A simple random sample was used to assign them equally into two groups each group contain 50 infant. Admitted to the above mentioned setting and will undergo blood sample procedure Study group I orally administers glucose and study group II received kangaroo care. They selected based on the following criteria.

**Inclusion criteria :** Preterm infants with birth weight  $> 1200$  and  $\leq 2500$  gm and gestational age  $> 28$  and  $\leq 34$  weeks who will subjected to painful procedure (venipuncture) will be included in the study.

**Exclusion criteria:** Preterm on mechanical ventilation, with chest drain, hemodynamically unstable, congenital anomalies, preterm infants who will receive analgesia or sedative medications during 48h prior to the study, preterm with ventricular hemorrhage, and Preterm with necrotizing enterocolitis (NEC).

**Tools of data collection:** Data collection of this study performed by using the following two tools:

**Tool 1: An Infant Evaluation Form** that developed by the researcher. It included data about neonate's name, sex, gestational age, birth weight, Apgar score, postnatal age, group type, type of feeding ,signs of feeding intolerance , type of respiratory support and outcomes after using kangaroo mother care and oral glucose like duration of crying, refusal of breast milk ,weight gain and incidence of feeding intolerance or NEC

**Tool 2: Premature Infant Pain Profile (PIPP)**

It is a behavioral measure of pain for premature infants developed by **(Black, Lord &Wright, 2014)**. It compromised of 7 items as gestational age, behavioral state, change in heart rate, change in oxygen saturation, brow bulge, eye squeeze and naso-labial furrow.

Scoring for premature infant pain profile

The total score equal 21 points for all 7 indicators each items scored from 0-3 points.

Score 0-6 mean that infant have minimal or no pain

Score from 6-12 mean infant have slight to moderate pain

Score from  $>12$  mean infant with severe pain

**Methods:**

- Before conducting this study, an official approval was obtained from the responsible authorities.
- The developed tools were tested for their validity assurance by being proposed to a jury of 5 experts in the area of pediatrics & pediatrics nursing.
- an oral consent was obtained from parents to allow their preterm neonates share in the study

- A pilot study was carried out on ten infants (10% of the sample) to test the practicability, applicability and timing of data collection. No necessary modification was done. Therefore, the sample of the pilot study included in the sample.
- For the study group I, newborn infants received 1 ml oral glucose 25% was administered with a syringe placed on the anterior portion of the tongue 2 min prior to the procedure.
- For the study group II, newborn infants received kangaroo care for 10 minutes before venipuncture. They wore only a diaper and positioned on skin-to skin contact with their mothers. After a 2-minute baseline period of monitoring, the heel lanced for blood sample collection.
- Premature neonates of groups I and II were evaluated for physiological and behavioral pain indicators before, at 30 seconds and 2 minutes after blood sample extraction.

### 3. STATISTICAL ANALYSIS

Collected data were coded, computed and statistically analyzed using SPSS (statistical package of social sciences), version 16. Data were presented as frequency and percentages (qualitative variables) and mean  $\pm$  SD (quantitative continuous variables). Chi square ( $\chi^2$ ) was used for comparison of categorical variables, and was replaced by Fisher exact test (FET) or Mont Carlo Exact test if the expected value of any cell was less than 5. Student's t test was used for comparison of continuous quantitative variables (two groups). For continuous quantitative variables which were not normally distributed, Median was used as a central tendency measures and Mann Whitney test (Z) was used for comparison of two groups. The difference was considered significant at  $P \leq 0.05$ .

### 4. RESULTS

Characteristics of the studied preterm infants in both group are presented in **table (1)** it was clarified that (64%) of studied neonates in oral glucose group are males and about half of them in kangaroo group are males and females. It was found that more than one third of kangaroo group neonates (38%) and near to half of oral glucose group (48%) have gestational age from 32wk to 34 wks. There was no statistical significant differences between neonates in glucose and kangaroo care group regarding their mean gestational age ( $31.34 \pm 4.64$ ,  $31.52 \pm 2.16$ ) and post-natal age ( $5.08 \pm 4.20$ ,  $5.20 \pm 5.84$ ) respectively.

**Table (2)** This table revealed that about half of the studied neonate in kangaroo group (48%) have birth weight from 1200gm to 1500gm while in oral glucose group more than one third of them (40%) have weight from 1500gm to 2000gm. The majority of the studied neonates was born by CS, it represented in 82% in kangaroo group and two third in oral glucose group (70%). Concerning to maternal risk factor, it was found that, slightly more than half of kangaroo mother care group (54%) and half of them in oral glucose group (50%) have premature rupture of membrane. While more than third of mothers in both groups (kangaroo 40%, oral glucose 38%) have urinary tract infection.

**Figure (1)** shows the distribution of premature neonates according to their diagnosis. It was revealed that (48%) of neonates had respiratory distress syndrome in both group. The second diagnosis in kangaroo group is Transient tachypnea of newborn in (22%) of them while neonatal jaundice represent the second diagnosis in oral glucose group in (16%) of them. Also it was founded that intra uterine growth retardation represent the less common diagnosis in both groups (2%).

**Table (3)** showed the number and percentage distribution of studied preterm infants regarding time taken during procedure, duration of cry and weight gain after using oral glucose versus kangaroo care procedure. It was showed that 64% in kangaroo care group take time less than 30 second to withdraw the blood sample, while more than half of oral glucose (56%) take more time from 30 to 60 second. Regarding to gaining weight during the day of blood sample, it was observed that, the majority of oral glucose group (88%) gain less weight (less than 15 gm/day), while 34% of kangaroo group neonate gain more weight from 30 to 60 gm/day. There was a statistical significant difference between the studied neonates in both groups regarding to their weight gain.

Concerning to duration of cry **table (3)** and **figure (2)** clarified that about three fourths of the studied preterm (76%) in kangaroo group take less time of cry (less than 15 second ) after procedure, while 40% in oral glucose group take more time of crying from 30 to 60 after the procedure that result in presence of significant statistical differences in both studied group.

According to PIPP score in the studied groups **Table 4** clarified that, all neonates in both studied group have mild pain before blood sampling, while about more than one third of the studied kangaroo care (40%) have mild pain after half minutes and 60% of them have moderate pain. Whenever all oral glucose group have moderate pain after half minute of the painful procedure (100%). After 2 minutes of the procedure all the studied neonates in both group have mild pain (100%).

**figure (3)** revealed that, there was no significant statistical differences of PIPP total score before blood sample procedure in both studied group. However, there were statistically significant differences of PIPP total score between both groups after half a minute and 2 minutes of blood sampling procedure.

**Part I: Characteristics of the studied preterm infants in both group**

**Table (1) Number and percentage Distribution of the premature neonates regarding their characteristics in both group.**

Variables	Items	Kangaroo Group (50)		Oral glucose Group (50)		Significance test	
		No	%	No	%	Test	P
Sex	Males	24	48.0	32	64.0	$\chi^2=2.601,$	P0.107
	Females	26	52.0	18	36.0		
Gestational age	28-	14	28.0	7	14.0	$\chi^2=3.026,$	P0.220
	30-	17	34.0	19	38.0		
	32-34	19	38.0	24	48.0		
	Mean $\pm$ SD	31.52 $\pm$ 2.16		31.34 $\pm$ 4.64		t=0.248,	P0.389
Post-natal age (days)	Range	1.0 – 30.0		1.0 – 20.0		Mann Whitney Z = 2.419	P0.016
	Median	3.0		5.0			
	Mean $\pm$ SD	5.20 $\pm$ 5.84		5.08 $\pm$ 4.20			

**Table (2) Number and percentage distribution of studied preterm infants regarding their Birth weight, type of delivery and maternal risk factors in both group.**

Variables	Items	Kangaroo Group (50)		Oral glucose Group (50)		Significance test	
		No	%	No	%	$\chi^2$	P
Birth weight /gm	1200-	24	48.0	16	32.0	$\chi^2=2.930$	P0.231
	1500-	17	34.0	20	40.0		
	2000-2500	9	18.0	14	28.0		
	Mean $\pm$ SD	1616.0 $\pm$ 371.5		1799.6 $\pm$ 414.7		t=2.332	P0.022
Type of delivery	Normal delivery	9	18.0	15	30.0	$\chi^2=1.924$	P0.160
	Cesarean section	41	82.0	35	70.0		
Maternal Risk factors of infection	Urinary tract infection	20	40.0	19	38.0	$\chi^2=0.04$	P0.838
	Premature rupture membrane	27	54.0	25	50.0	$\chi^2=0.16$	P0.689
	Chorioamnitis	1	2.0	5	10.0	FET	P0.102

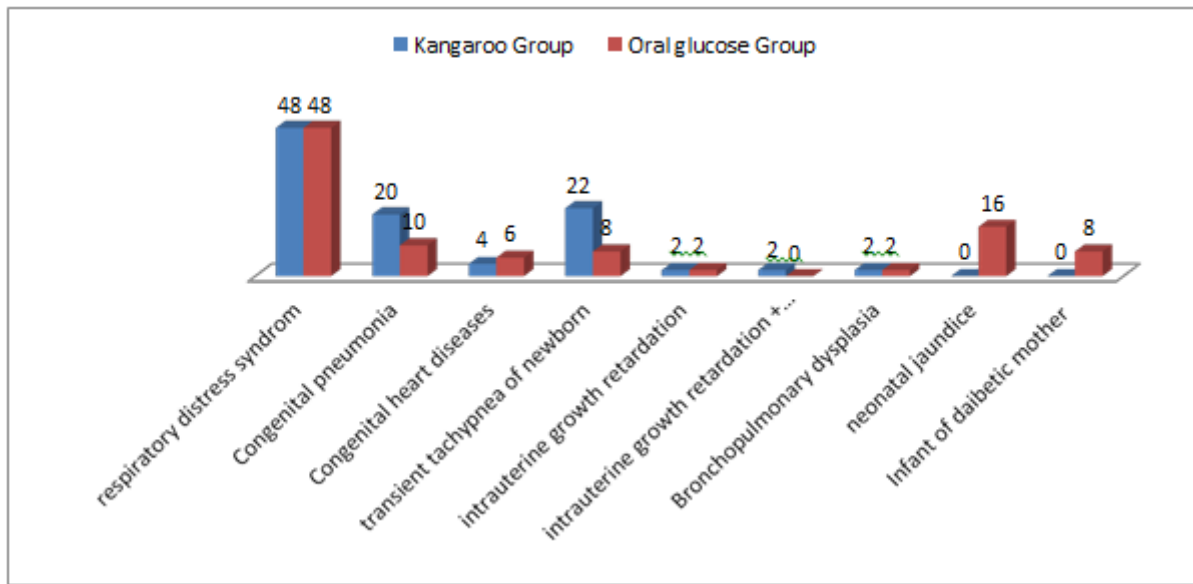


Figure 1: Percentage distribution of the preterm newborns regarding their diagnoses in both factions.

Table (3) Number and percentage distribution of studied preterm infants regarding time taken during procedure, duration of cry and weight gain after using oral glucose versus kangaroo care procedure

Outcomes	Items	Kangaroo Group (50)		Oral glucose Group (50)		Significance test	
		No	%	No	%	$\chi^2$	P
Time taken during procedure	0-30seconds	32	64.0	22	44.0	$\chi^2=4.030,$	P0.045
	30-60seconds	18	36.0	28	56.0		
	>1 minute						
	Mean $\pm$ SD	33.00 $\pm$ 10.30		35.70 $\pm$ 11.02		t=1.266,	P0.209
Duration of cry (seconds)	0.0-	38	76.0	13	26.0	$\chi^2=25.420,$	P 0.000
	15.0-	7	14.0	17	34.0		
	30.0 – 60.0	5	10.0	20	40.0		
	Range	0.0-35.0		0.0-60.0		Mann Whitney Z= 5.006	P 0.000
	Median	10.0		22.5			
Mean $\pm$ SD	9.34 $\pm$ 9.52		22.10 $\pm$ 12.62				
Weight gain during the day of procedure (gm)	0.0-	28	56.0	44	88.0	$\chi^2=12.891,$	P 0.002
	15.0-	5	10.0	2	4.0		
	30.0 – 65.0	17	34.0	4	8.0		
	Range	0.0-65.0		0.0-60.0		Mann Whitney Z= 2.933	P 0.003
	Median	0.0		0.0			
Mean $\pm$ SD	16.80 $\pm$ 20.77		5.14 $\pm$ 12.86				

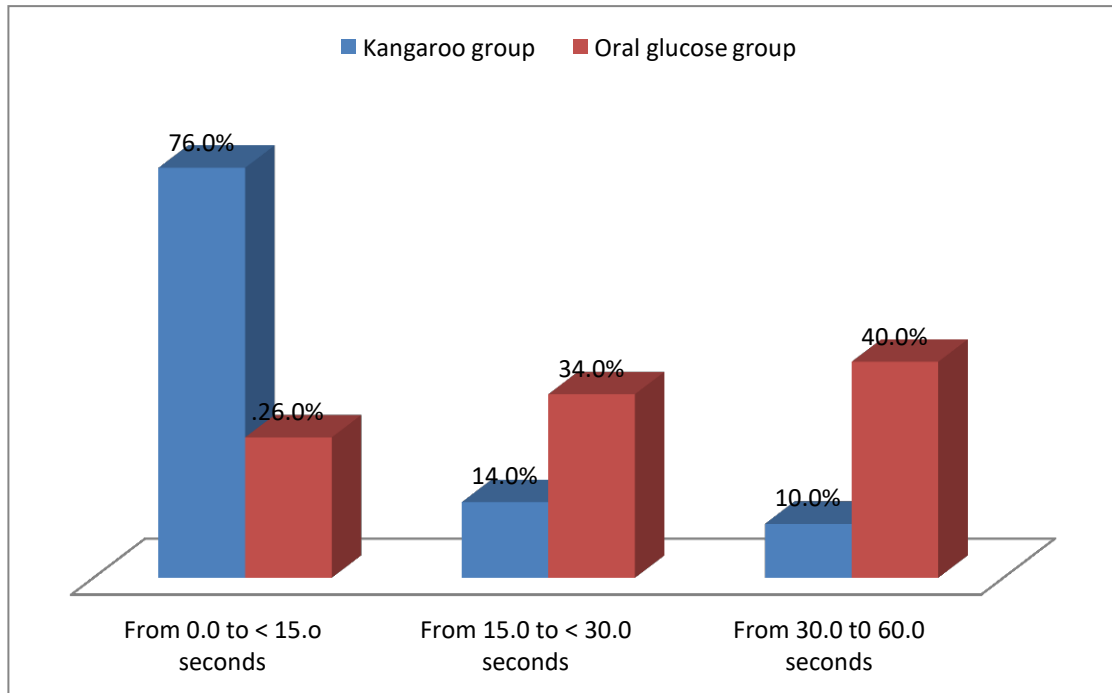
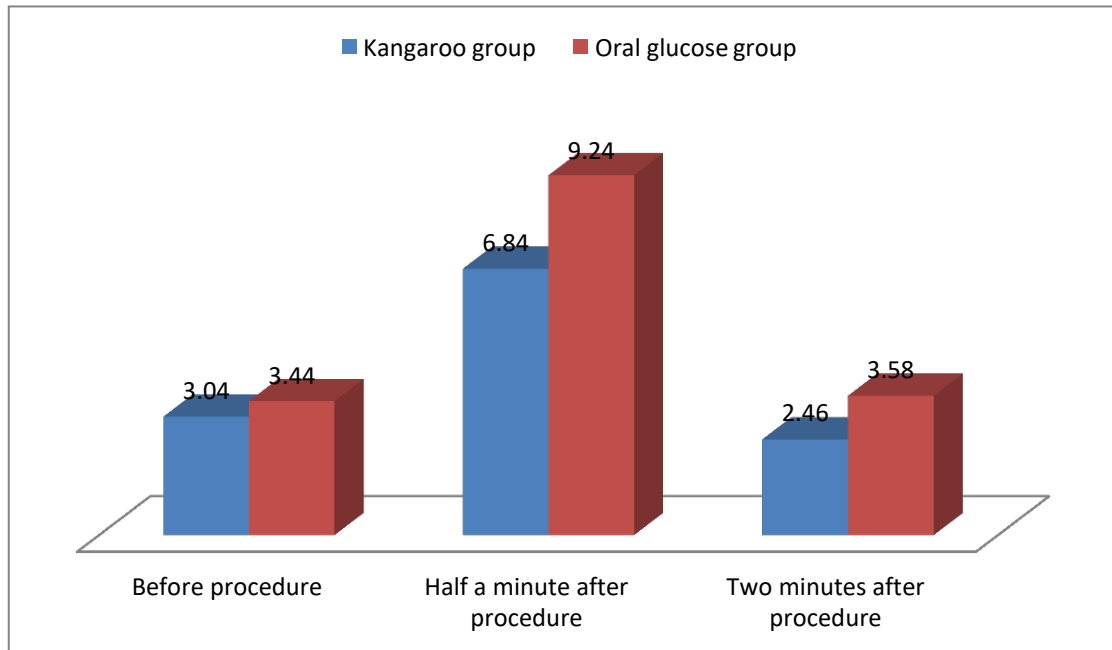


Figure (2): percentage distribution of studied preterm infants regarding their Duration of cry in both groups after procedure.

Table (4): Level of pain according to PIPP score in the studied groups

Time	Level of pain	Kangaroo Group (50)		Oral glucose Group (50)		Significance test	
		No	%	No	%	$\chi^2$	P
Before procedures	Mild	50	100.0	50	100.0	-----	
	Moderate	0	00.0	0	00.0		
	Severe	0	00.0	0	00.0		
After half a minutes	Mild	20	40.0	0	00.0	$\chi^2 = 22.600,$	P <0.001
	Moderate	30	60.0	50	100.0		
	Severe	0	00.0	0	00.0		
After 2 minutes	Mild	50	100.0	50	100.0	-----	
	Moderate	0	00.0	0	00.0		
	Severe	0	00.0	0	00.0		



**Figure (3): Total mean score of preterm infant pain scale (PIPP) in the studied groups**

## 5. DISCUSSION

Extracting of blood in newborns for assessment is a frequent process throughout their stay in the hospital and those processes are recognized to result in pain. An optimum technique or medication for decreasing pain in newborns must be simple to utilize and well accepted; technique of administering must be a traumatic and must have a rapid onset of analgesics (Malngiang, Singh, Golmei et al. 2016).

The current study demonstrated that, near half of the studied preterm neonates in oral glucose group and more than third in kangaroo group had gestational age between 32 to 34 weeks (table 1). From the researcher's point of view, the preterm who had gestational age between 32week or more have more stable respiratory condition that result from more lung maturation and need less respiratory support measures as CPAP and nasal cannula and didn't have need for mechanical ventilation and this confirmed from the Apgar score assessment. These findings were supported by the study of Abou-Faddan & Abdelaziz (2018) about "Respiratory Distress and Its Outcome among Neonates Admitted to Neonatal Intensive Care Unit of Assiut University Children Hospital, Egypt who revealed that respiratory distress (RD) commonly occurs in premature babies, with an occurrence and seriousness conversely related to gestational age and birth weight. The incidence of RD is 1% of all births, however increases to 50% at 30 weeks gestation, 75% at 28 weeks and 90% at 26 weeks. The more premature the baby is, the higher the chance of RDS after birth.

Regarding the diagnosis of preterm infants in the oral glucose and kangaroo caring group, the current review showed that around half of the assessed newborns in the 2 group have been preterm having respiratory distress (figure 1). From the researcher point of view This can be because of declined surfactant material in lungs of preterm newborns it contemplated the primary reason for respiratory distressing disorder in preterm newborns. The diagnoses and severity of RDS has been founded upon clinical, lab and radiological characters: clinical characters (onset of manifestations in six hours from delivery) involved a respiratory rate 60/min, dyspnea distinguished by inter-costal, sub-costal or supra-sternal retracting, grunting or cyanosis there is 3 grades of respiratory distress syndrome its severity is affected by Gestational age, mode of delivery, Apgar score at 1 and 5 min, birth weight. These findings were supported with Sawires, Ghany, Hussein & Seif, (2015) in a study about "Usage of lungs ultrasound in detecting of adverse outcomes of respiratory distress disorder". Also Spillane, Zamudio, Alvarez-Perez, Andrews, et al. (2018) was in agreement with the results of the current study who reported that Respiratory distressing disorder is mainly a disorder of preterm babies. It's distinguished via developmental inadequacy of surfactant formation and functions besides lung structures non-maturity. The occurrence is inversely proportional to gestational age (GA), happening in >90 percent in neonates lesser than 28 weeks respiratory distress disorder has been the foremost frequent health issue in preterm neonates.



The present study showed about half of studied neonate in kangaroo group have birth weight between 1200gm to 1500gm and more than third of them on oral glucose have birth weight between 1500gm and 2000gm (**table2**). From the researcher's point of view, this result due to the major number of neonate included in the study with gestational age more than 32 week which have appropriate birth weight more than 1200gm. These findings were supported by the study of **Restrepo-Méndez et al, (2015)** about "The relation of age of the mother with weight of birth and age of gestation", which highlighted the weight of birth is a marker of the health status of the neonate.

The current study stated that neonates in kangaroo group about two third of them take the least time taken during procedure below 15 second while more than half of oral glucose group take more time from 15 to 30 second (**table 3**). There was limitations in the studies which support this item of the current study. From the researcher point of view skin to skin contact improve infant temperature that improve skin perfusion that facilitate visibility of blood vessels and reduce baby stress which facilitate blood sampling procedure and result in less time taken for the procedure than in oral glucose group. These findings were supported by **El Shall, Korraa, Mohamed & Abo El-Hagag, (2017)** in a study about "Influence of Kangaroo Placement upon Serum NO in Premature babies", which declared that there has been marked increment in nitric oxide (NO) instantly following 60 mins of Kangaroo maternal caring. Kangaroo placement can surge body hotness in premature babies averting the non-beneficial outcomes of hypothermia in these babies through Nitric Oxide dependent mechanisms. , peripheral oxygen saturation and mean arterial blood pressure immediately after 60 min of Kangaroo mother care is effective in improving all vital signs especially temperature Regarding to the duration of crying after blood sampling. The outcomes of the present research stated that the majority of the studied preterm infant about three quarts of kangaroo group have the least time of crying less than 15 second while the majority of oral glucose group more than three quarts of them have more time of crying after blood sampling procedure with significant statistical differences between both studied group. This results was supported by **El- Nagger, El-Azim & Hassan, (2013)** in a study about "influence of kangaroo maternal caring upon Preterm babies' physiologic, behavior and psycho-social results in Ain Shams Motherhood and Gynecological institute", which revealed that direct SSC among baby and mom may steady the baby's body temperature in the neutral scope, vitals, respiratory outline, and oxygenating, causing declined apneic incidents, , provoke more homogenous sleeping patterns and decrease crying .

On studying the influence of kangaroo caring or oral glucose on the premature neonates' weight gain after blood sample procedure , the outcomes of the current review showed that there has been statistical noteworthy variations among both groups .As about one third of the studied neonate in kangaroo group and only 4 cases from 50 neonates in oral glucose group have an increase of body weight between 30 to 65gm per day (**table 3**) . This finding is congruent with many studies as **Evereklian & Posmontier,. (2017); Conde-Agudelo, Belizán, & Diaz-Rosello (2011); Lee & Bang (2011)** which revealed that the KC faction has a greater gain of weight, the outcomes of this research denoted that the investigational faction of preterm babies demonstrated more gaining of weight matched to controls.

Concerning Premature infant pain scale, the present study revealed that premature neonates administered kangaroo care showed lower pain scores at 30 and 120 seconds of blood sampling procedure compared to premature neonates received oral glucose. This result in significant statistical differences of Premature infant pain total score after blood sample procedure at half a minute and after 2 minutes of procedure in both studied group (**table 4**). Preterm Infants Pain Profile scoring among 0-6 points reflect minimal, 7-12 medium and 13-21 sever pain. In such setting, babies in the kangaroo group, about third of them had mild pain after half minutes of the painful procedure and about two third of them had moderate pain while all babies which got oral glucose had medium pain at the half min of the painful process, and the both of the assessed group had minimal pain at the second min of the process.

There was no significant statistical differences of PIPP total score before blood sample procedure in both studied group (**figure 3**). However, there were statistically significant differences of PIPP total score between both groups after half a minute and 2 minutes of blood sampling procedure. These finding was in agreement with **Gad et al .(2019)** in a study about "Oral Sucrose Versus Breastfeeding in Managing Infants' Immunization-Related Pain", who showed that, there have been noteworthy variations in pain scoring and crying time throughout and following immunization for the breastfeeding faction matched to the sucrose and control groups. Also **Singh, (2017)** was in agreement with the study who showed in their comparative study of analgesic effect of breast feeding versus dextrose during heel lance in neonates and revealed that breast feeding have more analgesic effect more than oral dextrose.

These findings was in contrary with **Ghoneim,(2016)**, who revealed that sucrose is the foremost efficient interference for alleviating of procedure pain in newborns than kangaroo caring. thus, sucrose is a suggested analgesia for preterm newborns. such Thing might be linked to, maternal' unawareness about kangaroo caring and its method and They have been scared to manage and carry their sick infant.

## 6. CONCLUSION & RECOMMENDATIONS

**Based on the finding of the current study, it is included that:** among the two methods of intervention in this study, both kangaroo mother care and 25% oral glucose solution have analgesic effect during blood sampling but kangaroo care proved to have significantly superior analgesic effect during blood sample, less crying time, increase body weight and no incidence of feeding intolerance among preterm neonates in comparison to oral glucose.

### Recommendations

Based on the results of the present study , the following recommendations are suggested:

- Nurses in NICUs should include kangaroo mother care as a pain relief measure for preterm infants undergoing invasive procedures.
- Mothers who have preterm baby inside NICU should have the permission and available place inside the hospital all the time

**Further study** is required to determine the effect of oral glucose on pain and its pharmacological safety on preterm neonates.

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