



**ORIGINAL RESEARCH PAPER**

**Pediatrics**

**SUCKING SWALLOWING COORDINATION - ARE LATE PRETERM NEONATES MATURE ENOUGH?**

**KEY WORDS:** Late preterm, feeding difficulties, attachment, sucking and swallowing

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**ABSTRACT**

**Introduction:** Breast feeding is crucial for reducing neonatal morbidity and mortality.<sup>1</sup> With the improvement of neonatal health services, preterm births contributes 84.3% of the total and late preterm contribute about 70%. In total late preterm birth account for 10% of total live births.<sup>2,3</sup> This study aimed to describe the difficulties in Breast feeding in late preterm due to sucking swallowing incoordination.

**Objectives:** - To assess the sucking swallowing coordination in healthy term and late preterm neonates.  
 Design of study: - Prospective cohort study  
 Study setting- This study was conducted at postnatal wards of Pt JNM Medical College and Dr B.R. Ambedkar Memorial Hospital, Raipur, Chhattisgarh

**Materials & methods:** - Healthy term and late preterm neonates born to primi gravida mothers, who were fit, ready and counseled for feeding; and admitted during a period of one year (May 2016 to April 2017) were observed for attachment, eagerness to feed, efficacy of sucking and swallowing.

**Results:** - We studied 177 term and 177 late preterms; the demographic and the social data of the mothers was similar for both the groups. After adequate feeding counseling and supervised feeding, there was a definite delay in the maturation of the swallowing efforts of the late preterms.

**Conclusion:**-The study reveals that late preterm neonates are at increased risk of feeding difficulties so should be kept on regular follow up to avoid increase in morbidity and mortality.

**Introduction**

According to ACOG committee opinion No. 404.(2005), Late Preterm (LP) birth is defined as delivery at 34 0/7 through 36 6/7 gestational weeks since the onset of the last menstrual period.<sup>4,5</sup> 70–75 % of all preterm births, are delivered Late Preterm (LP).<sup>6</sup> Many LP require repeated assistance and support before achieving consistent, nutritive breast feeding.<sup>7</sup>

The neonates born at 34-35 weeks require nutritional enrichment which is no more required at 36-37 weeks. Fewer efforts have been done to study the feeding difficulties in the late preterms. These preterms are at increased risk of complications requiring admissions and readmissions.<sup>8</sup> and also high chances of feeding failure, undernutrition and dehydration. These infants are at risk of hypothermia, respiratory problems (e.g. respiratory distress syndrome, transient tachypnea of the newborn, pneumonia, pneumothorax, apnea of prematurity).<sup>9</sup> and various metabolic abnormalities.<sup>10</sup> Safe oral feeding of infants necessitates the coordination of sucking swallowing and breathing.<sup>11</sup>

Difficulties in oral feedings may be experienced by 25-45% of normal infants<sup>12</sup> but it may be recognized late in term babies and late preterm.<sup>13</sup> So we consider to study the feeding initiation in healthy late preterm and term babies.

**Materials and Methods**

**Objectives:** - To assess the sucking swallowing coordination in healthy term and late preterm neonates.

**Design of study:** - Prospective cohort study

**Study setting:** This study was conducted at postnatal wards of Pt JNM Medical College and Dr B.R. Ambedkar Memorial Hospital, Raipur, Chhattisgarh

**Data collection & method**

All the term and the late preterm neonates whose parents consented for study were enrolled. Only the infants born to primi gravida mothers who were healthy, ready, prepared and trained for breast feeding were examined within first hour of birth. Gestational age at birth was assessed using the modified New Ballard score. Feeding was initiated within first hour of life for the healthy and active neonates, who were ready and eager for feeding. The baby and mothers were under observation to achieve good position and attachment. The sucking efficacy, duration and the position of the baby was seen; and the swallowing was assessed by the presence of gurgling sounds or regurgitation from the mouth. The vitals of the baby especially the Spo2 was observed to watch for any hypoxia due to aspiration. Breast feeding was observed for first 3 days for each feeding. Adequacy of feed was seen by urine output, if decreased then baby was given top milk. A structured questionnaire was used to collect the socioeconomic and demographic data.

**Statistical analysis**

- The data was tabulated using the SSPS version of Microsoft Excel and expressed as percentage.
- The demographic details of the mothers were tabulated and compared in percentage and means of baby weight were taken.
- Paired t-test was used to compare sucking and swallowing in neonates.
- P value <0.05 was considered as statistically significant.
- Fischer's exact test or Chi square test was used to analyze the significance of difference between frequency distribution of the data.

**Observations and Results**

A total of 354 neonates were enrolled in the study out of which

177 were term and 177 were preterm. All the mothers were primigravidae and belonged to lower to medium socioeconomic class and were between 18 to 25 years of age. Most of them were either uneducated or had completed only primary education. The mean age at delivery was 18.5 years.

The average birth weight of terms was 2.84 + 0.32 and that of the preterms was 2.01 + 0.14. At birth average Ballard score of LP was 30 and for term was 40; that was appropriate for the gestational age. The neurological assessment at birth of all term and late preterm neonates was comparable.

All the neonates were fed in alert and active state the attachment was good in 100% terms and in 94.3% preterm babies in the first half an hour of birth but all the neonates managed good attachment by 2 hours of birth. The efforts during sucking were good in both the terms and the late preterms. The process of swallowing is very important because before the next bolus appears, the mouth has to be cleared of the previous feed in order to prevent complications like aspiration and choking. On observation of gurgling sounds, leaking of milk from mouth and drop in Spo2 while feeding it was noticed that the sucking and swallowing were affected in 1.1% & 7.3% preterms as compared to 0.56% & 0% in terms respectively, and the difference was significant statistically.

**Table 1 : Neurological assessment of term and late preterm neonates at birth**

| Characteristics     |        | Late-preterm | Term |
|---------------------|--------|--------------|------|
| Tone                | Normal | 177          | 177  |
| Cry                 | IAB    | 177          | 177  |
| AF                  | Open   | 177          | 177  |
| Grasping            | Yes    | 177          | 177  |
| Smile spontaneously | Yes    | 177          | 177  |

Table 1 shows that all term and late preterm neonates have no difference in characteristics like tone, cry immediately after birth, anterior fontanelle open at level, normal shape and pulsatile, grasping and spontaneous smile.

**Table 2: Comparison of Birth weight between study groups (term and late preterm neonates)**

|             | Group        | N   | Mean | Std. Deviation | Std. Error Mean | P* value |
|-------------|--------------|-----|------|----------------|-----------------|----------|
| Weight (kg) | Late preterm | 177 | 2.01 | .14            | .010            | <0.0001  |
|             | Term         | 177 | 2.87 | .32            | .02             |          |

\* using student's t test

Comparison of Birth weight between study groups was performed using student's t test. Birth weight was found to be significantly lower in Late preterm subjects compared to term subjects. (p<0.0001).

**Figure 1: Comparison of Neonates with respect to breast feeding of term and late preterm neonates at birth**



So frequency of swallowing and attachment was found to be poor in significantly higher frequency in late preterm subjects (p<0.0001 and p=0.002 respectively).

**Discussion**

Studies have often revealed that the chances of readmission in late preterms is high as is the incidence of significant morbidity recently there has been evidence that the breast fed late preterm neonates are more prone to complications. Mizuno K et al in his study in 2003 showed that there was significant maturity in the feeding behavior between 33 and 36 weeks after conception and swallowing and respiration coordination improves after 35 weeks of conception;<sup>14</sup> whereas Gewolb IH et al in 2006 showed that although the stabilization of suck-swallow rhythms occur before 36 weeks but the swallowing respiration coordination does not mature by that time.<sup>15</sup> Late preterms are the fastest increasing population in pediatrics; although they were long considered as terms but studies revealed that they are at a increased risk of significant morbidity and mortality. Shapiro and Mendoza CK discovered that there was a doubling of morbidity for every week less than 38 weeks.<sup>16</sup> The importance of early and exclusive breast feeding in reducing the morbidity and mortality has been emphasized in various studies.<sup>17,18</sup> So, this study was done to assess the problems faced by these near term babies in initiating and maintaining the feeds.

Mothers face various problems in the early postpartal days like incorrect positioning latching problems engorgement nipple fissures late coming in of milk; this problem was dealt by proper counseling and skilled help while feeding.

It is essential to understand the motor and neurological process and maturation required for adequate feeding, so that adequate intervention can be done to get proper growth and development of these neonates.

Suction and expression are the two components of sucking.<sup>19,20</sup> A descriptive scale of maturation of suction and expression had been described by Lau C in 1997.<sup>21</sup> and recently various scales had been developed for assessment of maturation of sucking skills like OFS scale,<sup>22</sup> that does not require any skilled staff or special instrument. Although we did not use any of the scales, but these scales may prove better to study the normal developmental variations that may occur in maturation of sucking, swallowing coordination in relation to gestational age.

The process of swallowing can be divided into oral phase, pharyngeal and esophageal phases that would initiate after the formation of substantial bolus volume. Previous studies have shown that different components of each phase mature at different gestational age. The maturation of each phase and coordination between sucking, swallowing is important for adequate feed and growth.<sup>13</sup>

Our study revealed that 2 out of 177 LP had swallowing problems; so these neonates were potential candidates who would later be readmitted with complications. In India it is estimated that 3,519,100 neonates are born preterm each year(WHO; Preterm birth; Facts sheet, nov, 2017), of which 70% are late preterm so it may be estimated that huge population of neonates would face sucking swallowing coordination and feeding problems that can be easily missed. Hence we recommend that a hospital policy of mother education should be there for each hospital and as per IAP guideline (Infant and Young Child Feeding Guidelines, 2016) adequacy of feeding should be checked by regular weight check on the on Day 1, 4, 7, 14 and 28 of life on digital weighing scale (minimum sensitivity of 5 g).

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