

Language Stimulation in the Neonatal Intensive Care Unit

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Premature infants and high-risk infants, particularly those born into disadvantaged families, are at risk for language delay (Field, 1979; Field, 1980; Parmalee, Beckwith, Cohen, and Sigmund, 1983). Medical, environmental, and social factors all interact to affect language development. Medical complications of prematurity often are associated with later developmental lags. These complications include such factors as hypoxia, very low birth weight, brain damage, and even the life-saving drugs used.

Social factors may place a child at a disadvantage because of the socioeconomic status or the age of the parent. Studies have shown that lower class mothers have more high-risk infants. They also engage in less verbal and imitative behaviour during face-to-face interaction (Field and Pawlby, 1980). Parents' visits to the NICU may be infrequent due to family constraints, their need to return to work, or their transportation problems. In addition, the usual process of neonatal bonding is disrupted by an unexpected and untimely birth. Clearly, the parents of premature and high-risk infants enter into their relationship under stress.

Because of these medical, environmental, and social complications, several researchers have attempted to reduce the risk for developmental delays. These researchers have studied alterations in language stimulation, changes in lighting, different sound levels, and tactile stimulation. It has been suggested that the mark of a mature profession is not only its contribution to treatment, but also its contribution to the prevention of specific disabilities (Marge, 1984).

The environment of the Neonatal Intensive Care Unit (NICU) varies greatly from hospital to hospital and is not conducive to language stimulation. It is an environment filled with lights, beepers, and buzzers. For example, some studies have recorded sound levels of 88 dB in the nursery. Field (1980b) notes the importance of obtaining a baseline of each nursery's environment because it may influence the effectiveness of any program that is implemented. Therefore, if language stimulation programs are to be offered in the newborn nurseries, we must first study the baseline stimulation that is already occurring in that environment.

Because we were piloting a parent-language training program in the Neonatal Intensive Care Unit (NICU) (Jacobsen, in press), we felt it would be important to know how much opportunity nurses have to provide language stimulation to infants and whether the nurses talk to infants when they have the opportunity. We also felt it would be valuable to identify the

amount of language modeling nurses were providing to parents. If nurses could not provide adequate language stimulation, it would support the need for a speech-language pathologist to train nurses and/or parents in appropriate language stimulation techniques. A multi-subject observational study was conducted to study nurse language stimulation in the Level III Neonatal Intensive Care Unit at our hospital. The following questions were posed:

- (1) During specific observations, how many opportunities do nurses have available to talk to infants hospitalized in the NICU?
- (2) What percent of those opportunities include nurses talking to the babies for whom they provide care?

Method

Subjects

Three licensed practical nurses (LPN's) were selected at random from the six full time LPN's employed on the unit. Each nurse had three or more years of experience in the NICU and had completed the hospital neonatal training course.

Setting

Level III was the unit to which premature infants were transferred once stable and growing. Other severely at-risk infants, for example, surgery infants requiring intensive care, also were sent to this unit.

The unit was usually staffed by three LPN's and one registered nurse. The LPN's were responsible for primary care, such as, feeding, bathing, diapering, monitoring of vital signs, charting, and parent instruction. LPN's were chosen for observation because they provided the majority of nursing care in the unit and because they were employed in sufficient numbers for observational purposes. In Level III, the nurse to infant ratios were 1 : 3 or 1 : 4. Therefore, up to four infants could have been involved in each nurse observation.

Eight infants were on the unit during the study. The infants are described in Table 1. Their weight at the time of the study ranged from approximately two and three-quarter pounds to six and one-half pounds. Their length of time on the unit ranged from two days to two months. They were fed by a variety of methods, for example, by mouth, gavage, gastrostomy, or intravenous line. Their nursing management at the time of the study included monitoring for apnea and bradycardia, nutrition support, catheter management, and provision of nursing care while recuperating from surgery or infection.

Table 1. Selected Characteristics of Infants Cared for by the LPN's Under Observation

Infant/ Weeks Gestation	APGARS 1 min: 5 min:	Birthweight and Weight at Time Observation Made	Time on Team Unit When Observations Made	Type of Feeding/During Observation	Notes on Medical Condition at Time of Observation
1. MC 28-29	3 : 7	1276 gm 2040 gms	8 weeks	P.O. ad lib (by mouth)	Apnea and bradycardia, mild
2. CG 30-31	9 : 9	850 gm 1420 gm	2 weeks	Gavage	NEC (necrotizing enterocolitis) apnea and bradycardia, resolving infection
3. JB 39	8 : 8	2396 gm 1980 gm	1 week	Gastrostomy	Duodenal atresia, Hickman-Broviac catheter
4. DP 39	5 : 7	2920 gm 2700 gm	3 days	P.O. ad lib	Respiratory distress (lung fluid)
5. BB	3 : 6	2700 gm 2500 gm	2 days	IV and gastrostomy	Diaphragmatic hernia, appendectomy, staph infection
6. LC 33	3 : 9	2066 gm (BW) 1720 gm	2 days	P.O. (by mouth)	Hood oxygen, UAC (umbilical artery catheter)
7. JW 33	1 : 4	1220 gm 1350 gm	1 week	Gavage	Respiratory distress, apnea and bradycardia
8. RT 24-25	1 : 1	776 gm 1220 gm	1 week	Gavage	Stridor/oxygen mask

Observers

Three speech-language pathologists observed nurses' interactions with the intensive care infants. One speech-language pathologist was present for primary data recording at every observation. One of the other two speech-language pathologists was present for reliability purposes.

Procedures

An alternating time sampling method of observation was employed. In the alternating method, a ten second observation of one nurse was made, followed by a ten second observation of the second nurse. Observations then alternated between two of the three randomly selected nurses until 200 intervals were recorded. Speech-language pathologists observed a total of 1200 intervals over six sessions. The primary speech-language pathologist kept track of the ten second intervals with a stop watch and indicated the number of the interval as well as when it was time to change from observing one nurse to observing another.

Each ten second interval was scored with one of three possible scores: (1) a plus (+) meant an opportunity to talk was present and talking occurred; (2) a minus (-) meant an opportunity to talk was present but no talking occurred; (3) a zero (0) meant there was no opportunity to talk. *Opportunity to talk* was defined as follows:

- (1) The nurse was capable of speaking to the infant (for example, counting a pulse during an interval was not considered an opportunity);
- (2) For infants in a closed isolette, either one or more port-holes, or the side door of the isolette was open;
- (3) For infants in a closed isolette, the nurse was at the side or at the foot of the isolette; or
- (4) The nurse was holding the infant, or providing other care such as bathing or weighing.

Talking was defined as a phrase, sentence, or question consisting of two or more words directed to the infant.

No opportunity to talk was scored if the opportunity was not present.

Reliability

Interjudge reliability was computed for judges' agreement in scoring. Interjudge reliability for the twelve, 100 interval observations for each nurse ranged from 89 to 100 percent with a mean of 95 percent. On some occasions, due to external noise or the position of the nurse behind an isolette, it was difficult to determine whether talking occurred.

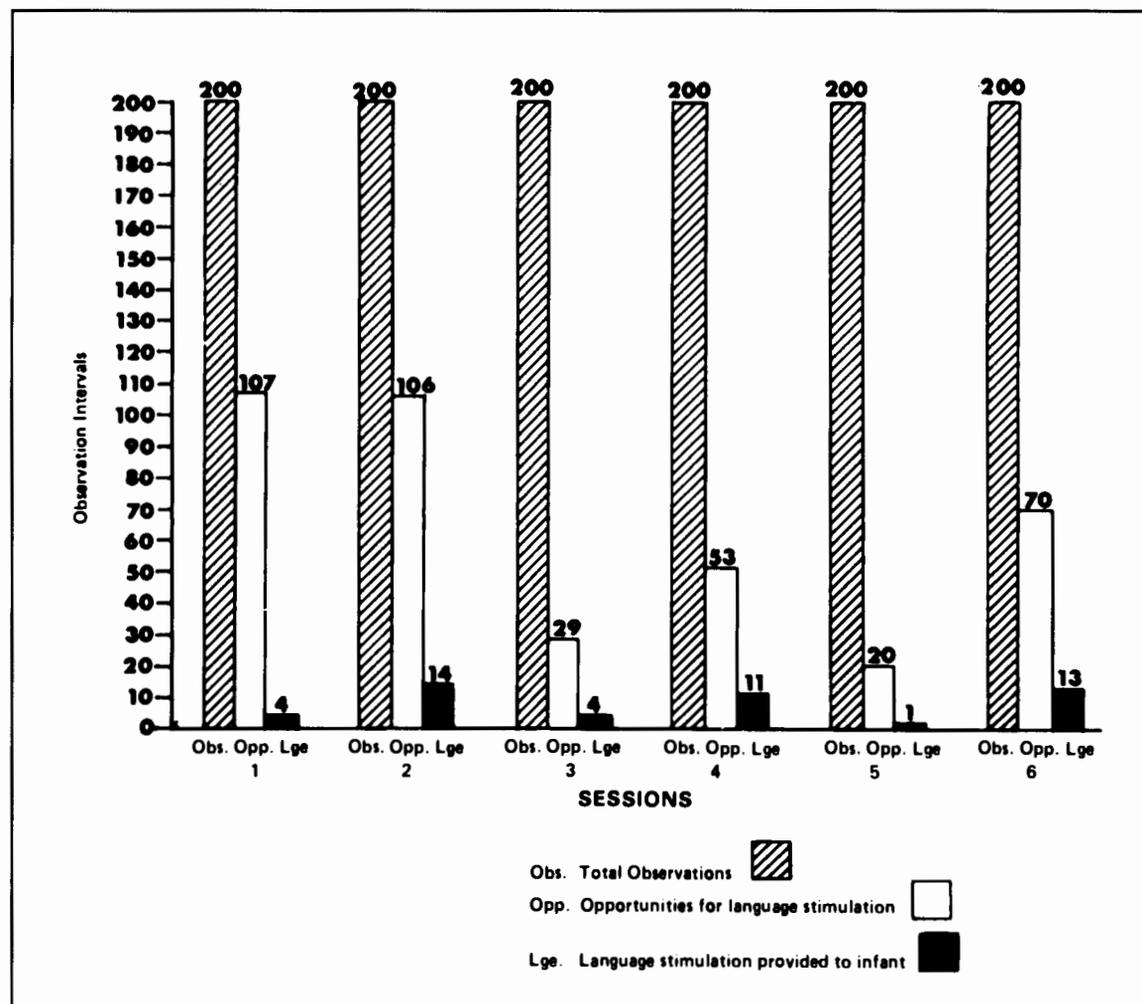
Results

The purpose of the study was to investigate language stimulation provided in the NICU nursery. More specifically, the study investigated the number of opportunities nurses had available to talk to infants and the actual talking that occurred.

Overall, the number of ten-second intervals in which there was an opportunity to provide language stimulation varied widely across sessions. Figure 1 shows that there were 200 observations made at each session. There was an average of 64 opportunities for language stimulation at each of these sessions (as shown by the white bar). However, the range of opportunities varied from 20 to 107 of the 200 observation intervals. Despite the opportunities for language stimulation, actual talking occurred infrequently (as shown by the black bar). Nurses talked on the average of eight intervals per session.

Figure 2 summarizes the data for the six sessions. Language stimulation was possible in 385 of the 1200 total intervals, and talking occurred in 47 of these intervals. This represents 12% of the opportunities.

Figure 1. Opportunities for language stimulation and language stimulation provided across six observation sessions in an intensive care nursery. There were 200 observations per session (hatched bar graph). The white bar graphs represent intervals in which there was an opportunity for language stimulation. The black bar graphs represent intervals in which language stimulation occurred.



There was little variability between nurses. The black bars in Figure 3 show that the most talkative nurse talked an average of 23 intervals, while the other two nurses talked an average of 9 and 15 intervals. This talking was divided among 3 or 4 infants under the nurse's care.

Discussion

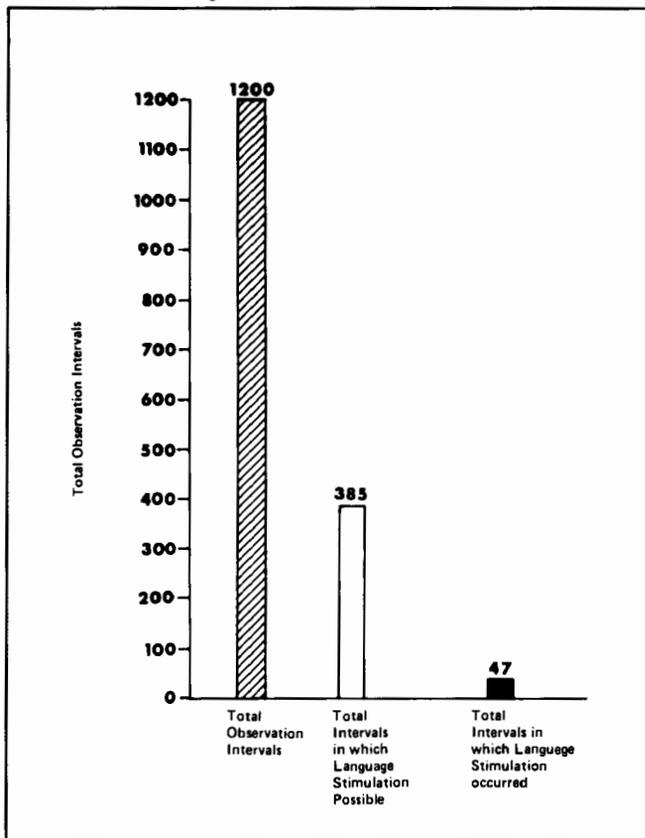
The results of this study provided information concerning the opportunity and the actual use of nurse language stimulation in the Intensive Care Nursery for 3 licensed practical nurses in an urban medical center during the 7 A.M. to 7 P.M. shift. The opportunity to talk to infants appeared to be related, at least in part, to the nursing routine. There was considerable chart documentation, equipment checking, and other responsibilities that did not require direct nurse interaction with infants. The definition of an opportunity to talk, in this study, reflected only the times a nurse was at the side of either an open isolette or a closed isolette with open doors. This definition did not take into

consideration whether an infant was alert at the time of opportunity. It is important to note that premature infants on this unit probably slept at least 17 to 18 hours a day. They may have slept even longer, particularly if not fed by mouth. Therefore, actual opportunities available for nurse language stimulation were probably less than the numbers obtained in this study. Infants who were fed by mouth and, in particular, infants who could be removed from their isolettes were more likely to have nurse interaction and additional opportunities for language stimulation. Other factors also affected the opportunity for language stimulation. Procedures for maintaining a sterile environment probably limited the opportunity to provide language stimulation. Talking also may have been limited by the nurse's perception of responsibilities. In this NICU, it was felt that minimizing stimulation helped small, premature infants conserve calories and gain weight faster. In addition, the data did not actually reflect the quality and quantity of language stimulation. Any

talking which occurred within the ten-second interval was scored positively. At times, only a brief phrase was spoken during the interval. Finally, interactions reflected a nurse talking to any one of three or four infants in her care. The amount of talking per infant is, therefore, a fraction of the total numbers obtained.

In summary, there is wide variability in the amount of opportunity to provide language stimulation in the NICU. This variability is partly controlled by nursing routine, staffing patterns, and the philosophy of the nurse. In this nursery, there seemed to be some individual variability but, in general, talk-

Figure 2. Summary of intervals in which language stimulation was possible and in which language stimulation occurred for three nurses in the intensive care nursery.

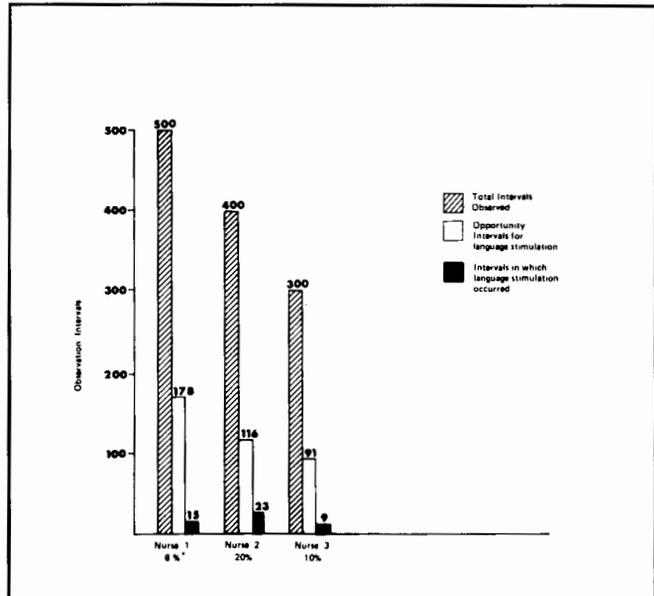


ing was infrequent even when opportunities existed. The speech-language pathologist's practice of providing frequent and varied stimulation which is timed to the infant's alert state was not a common practice in this intensive care nursery.

Subsequent to this study, a program of parent language training was initiated in the nursery (Jacobsen, in press). As part of this program, speech-language pathologists trained parents in the NICU to observe their infants behavior and to describe their infant's actions, mood, appearance, and location. The frequency and quality of language stimulation were included in

the training. Nurses were invited to observe parent training sessions and it was felt they were supportive of parent training. Address all correspondence to:

Figure 3. Total opportunity intervals and intervals in which language stimulation was provided to high risk infants by three nurses. Percentages refer to percentage of opportunity intervals in which language stimulation occurred.



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