Lucinda P. Gurley. THE KNOWLEDGE AND ATTITUDES OF MATERNITY NURSES ABOUT NIPPLE STIMULATION FOR CONTRACTION STRESS TESTING. (Under the direction of Emilie D. Henning, RN, Ed.D.) ECU School of Nursing, April 1987.

The purpose of this study was to explore the knowledge and attitudes of maternity nurses about the use of nipple stimulation for contraction stress testing (CST). Nipple stimulation is a new technique for CST which involves self-manipulation of the breast, a procedure some patients and health care professionals may find embarrassing.

Three groups (N=36) of labor and delivery nurses were asked to respond to a knowledge/attitude questionnaire developed by the investigator. Demographic information was also requested from the respondents.

The demographic analysis indicated that the sample was mostly young, white, married, and with relatively few years of experience in labor and delivery. Most of the sample (89%) had heard about the use of nipple stimulation for CST, though less than half (42%) had actually conducted a CST using this technique.

The findings of the study demonstrated that the group had a fairly positive attitude toward the use of nipple stimulation. The group also possessed some knowledge of the technique, gained primarily through on-the-job experience (58.3%) and from the literature (55.6%). Nurses from the one hospital (n=7) where nipple stimulation was routinely used, scored consistently higher on every scale (significantly different, $p \leq .05$, on all scales

except evaluative subscale) than did nurses from the other two hospitals. Nurses who reported having used nipple stimulation in the past also scored higher on all scales than those who did not ($n=15$, $p \leq .05$).

Knowledge was found to correlate significantly with attitude on all but one scale, the evaluative subscale. Of the demographic variables, significant differences in knowledge and attitudes were found among the nurses in relation to whether the hospital used the technique, experience with nipple stimulation, and marital status. Those who had heard about nipple stimulation for CST differed from those who had not on only one scale, the knowledge scale.

Conclusions drawn from the study were that labor and delivery nurses, generally, have positive attitudes about the use of nipple stimulation for CST. Furthermore, nurses more experienced with the technique have greater knowledge and more favorable attitudes. Age, education, and experience were not found to be responsible for significant differences among the nurses with regard to attitudes and knowledge about nipple stimulation.

Several implications for practice and education may be drawn from this study. These include: encouraging nurses who may conduct nipple stimulation CSTs to examine their attitudes; implementing standard protocols and continuing education courses in all hospitals where nipple stimulation is used, and, including content related to nipple stimulation in nursing courses and textbooks.

THE KNOWLEDGE AND ATTITUDES OF MATERNITY NURSES ABOUT NIPPLE STIMULATION FOR CONTRACTION STRESS TESTING

A Thesis
Presented to
the Faculty of the School of Nursing
East Carolina University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Nursing

by
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April, 1987

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MATERNITY NURSES ABOUT

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Acknowledgements

A very special thank you is given to my family who supported me in every way while I completed this project. Thank you, also, to my thesis director, Dr. Emilie Henning, and thesis committee who helped me to learn and understand the research process. Finally, thank you, Dot, for seeing the best in me and challenging me.

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CHAPTER 1

INTRODUCTION

During the past 15 years contraction stress testing has evolved as an important tool in obstetrics by which fetal wellbeing may be assessed. The traditional method by which to elicit a contraction stress test (CST) is through the use of intravenous oxytocin. Currently, a new technique, nipple or breast stimulation, is being investigated as a means of inducing a CST. This involves having a pregnant woman stimulate her nipples or breasts until an adequate contraction pattern is achieved (three contractions in a ten minute period). Nurses, primarily, are involved in monitoring patients during a CST whether by the traditional or newer method.

The nipple stimulation technique has been reported to be a successful method by which to accomplish several similar objectives in obstetrics. Chayen, Tejani, and Verma (1986) and Jhirad and Vago (1973) utilized nipple stimulation to induce labor. Prevention of postterm pregnancy was achieved with the use of nipple stimulation by Elliott and Flaherty (1984) and Salmon, Kee, Tan, and Jen (1986). A number of investigators report the successful use of nipple stimulation for contraction stress testing (Freeman, 1982; Capeless &

Mann, 1984; Huddleston, Sutliff, & Robinson, 1984; Lenke and Nemes, 1984; Copel, Otis, Stewart, Rosetti, & Weiner, 1985; and Gantes, Kirchhoff, Work, 1985).

The nipple stimulation technique for CST is advantageous in that less time is required, it is less expensive, and is not invasive. However, uterine hyperstimulation is reported to be fairly high in studies utilizing nipple stimulation for CST (Viegas, Arulkumaran, Gibb, & Ratnam, 1984 and Schellpfeffer, Hoyle, & Johnson, 1985). Another disadvantage, quite possibly, lies in the realization that some patients feel embarrassed when performing nipple stimulation for CST (Huddleston, et al., 1984).

A woman's breasts have long been associated with sexual activity in the American culture. Having a pregnant woman stimulate her nipples or breasts, therefore, may be distasteful to some patients and professional people. A number of nurses who responded to this investigator's initial query felt they would have difficulty conducting such a test. No studies have yet been found in the literature specifically linking nurses' attitudes to breast or nipple stimulation nor to any other intimate type of care provided by a nurse. However, nurses' relative lack of knowledge about human sexuality has been well documented (Kuczynski, 1980; Lief & Payne, 1975; and Mims & Swenson, 1978).

Because many nurses lack knowledge about human sexuality and may not have examined their own feelings or attitudes about

sexuality, nursing care involving sexually sensitive areas must be investigated. When a nurse enters the health care system, she brings environmental, cultural, and societal attitudes about many concepts, including sexuality (Payne, 1976 and White, 1977). Those attitudes may be either positive or negative toward sexuality. Strong, prejudicial attitudes can affect the delivery of quality patient health care by interfering with the objectivity a nurse needs in the nonjudgmental care of her patient (Lief & Payne, 1975). With regard to the use of nipple stimulation for the CST, nurses' attitudes should be explored.

Purpose

The purpose of this study was to explore the knowledge and attitudes of maternity nurses about the use of nipple stimulation for contraction stress testing.

Assumptions

For the purposes of this study, the following assumptions were made:

1. Maternity nurses will honestly express their beliefs about the use of nipple stimulation for CST.
2. The responses of maternity nurses on the questionnaire will reflect their knowledge and attitudes about the use of nipple stimulation for CST.

Research Questions

1. What are maternity nurses' attitudes and knowledge about the use of nipple stimulation for contraction stress testing?
2. Is there a relationship between the knowledge and attitudes of maternity nurses about nipple stimulation for CST?
3. Is there a relationship between specific demographic variables and the attitudes and knowledge of maternity nurses about nipple stimulation for CST?

Definition of Terms

The following terms were defined for the purpose of the study:

1. Maternity nurse - a registered nurse actively involved in the care of patients in the labor and delivery setting.
2. Knowledge - the condition of understanding information and principles about a certain topic. (Webster's Dictionary, 1981).
3. Attitude - a learned group of beliefs comprising knowledge, emotion, and behavior about a situation or object (Rokeach, 1972).
4. Nipple Stimulation - the manipulation of the nipple or breast for the purpose of producing uterine contractions.
5. Contraction Stress Test - a test used to evaluate fetal wellbeing in which the fetus is "stressed" by three uterine contractions in a ten minute period while the fetal heart rate is observed on an electronic fetal monitor.

Limitations

The following limitations were acknowledged for the purposes of this study.

1. Since only voluntary subjects from one state in the country participated in this study, the results may not be generalizable to all maternity nurses.
2. The questionnaire used in this study measures knowledge and attitudes which may or may not correlate with behavior in the clinical setting.

Summary

Nipple or breast stimulation for CST is currently being investigated by a number of researchers as a means of reducing the expense, invasiveness, and time involved in obtaining a CST. Nurses, who may or may not have examined their own feelings about such a technique, are being asked to conduct such tests. The purpose of this study, therefore, was to explore the knowledge and attitudes of maternity nurses about the use of nipple stimulation for contraction stress testing.

CHAPTER 2

REVIEW OF LITERATURE

Basic concepts related to the use of the contraction stress test (CST) and the nonstress test (NST) as means of evaluating fetal wellbeing are presented first. Then research pertinent to the current status of nipple stimulation for CST is reviewed and various methodologies compared. No literature has yet been found describing nurses' attitudes about nipple stimulation. Therefore, studies of nurses' attitudes about sexuality will be reported.

Basic Concepts of the Contraction Stress Test and Nonstress Test

Electronic fetal monitoring, which simultaneously records fetal heart rate (FHR) and uterine activity, has become an important tool in modern obstetrical care by which patients with uteroplacental insufficiency may be identified. The two tests which are used to evaluate fetal wellbeing are the nonstress test (NST) and the contraction stress test (CST). In the following section, both tests will be described. Currently a debate is being waged in the literature regarding whether the NST or the CST should be used as the primary tool for fetal surveillance; a discussion of this controversy will conclude the section.

The CST was the first test to gain widespread acceptance for routine antepartum monitoring of fetal wellbeing. The major goals of the CST are to prevent early unnecessary medical intervention and stillbirth (Garite, Freeman, Hochleutner, Linzey, 1978). Certain conditions predispose a pregnant woman to uteroplacental insufficiency and subsequent fetal demise. These include: hypertensive disorders, diabetes mellitus, history of previous stillbirth, clinical intrauterine growth retardation, prolonged pregnancy, and discordant twins (Freeman, 1982).

The CST typically requires a fetal monitor and an intravenous oxytocin infusion (though spontaneous or breast stimulation contractions are acceptable). Three uterine contractions must occur in a ten minute period for the fetus to be adequately "stressed". The fetal heart rate is then observed for periodic changes in response to the stress of the uterine contractions.

During a contraction, the intrauterine pressure increases, leading to a transient reduction of blood flow to the intervillous spaces of the placenta and decreased oxygen transport to the fetus (Hon, 1975). This reduction is generally well tolerated by a healthy fetus. However, when there is insufficient placental reserve (such as with chronic uteroplacental insufficiency) fetal hypoxia and late decelerations will occur in response to the contractions (Freeman, 1982). Late decelerations are repetitive, uniform

decreases in the FHR which have their onset late in the contraction phase of the uterus (Hon, 1975). In the intrapartal period, late decelerations of the FHR have been associated with poor fetal outcome ranging from fetal metabolic acidosis to fetal death (Weingold, 1975).

A CST may be interpreted in several ways. First, a negative CST is one in which no deceleration of the FHR occurs in response to three contractions in a ten minute period (Freeman, 1975). Furthermore, accelerations of the FHR with fetal movement are often noted during the test and are a further indication of fetal wellbeing (Braly & Freeman, 1977). With a negative CST, the fetus is considered to have adequate placental support and the physician can avoid premature intervention for at least another week (Freeman, 1975).

When repetitive, persistent late decelerations occur with most of the contractions, the CST is said to be positive (Freeman, 1975). This is an ominous pattern. Prompt delivery should be considered, especially if the baseline variability is also minimal with no accelerations of the FHR during fetal movement (Braly & Freeman, 1977).

Garite et al. (1978) believe that a positive CST does not appear to be as reliable an indicator of fetal status as a negative one. False positive CST are relatively frequent while false negative tests occur less often. The clearest value of the test, therefore, is the reassurance that a negative test gives the physician by allowing him/her to avoid intervention

and the possibility of an unnecessary premature delivery (Garite et al., 1978). In light of this fact, when a positive test occurs, other parameters of fetal status should be assessed before a decision is made to deliver the patient.

CSTs may also be intepreted as hyperstimulatory, suspicious, or unsatisfactory (Freeman, 1975). Each of these interpretations require repeat testing in 24 hours. A hyperstimulatory test occurs when contractions are less than two minutes apart, last longer than 90 seconds and are associated with FHR decelerations. A healthy fetus may have late decelerations with such excessive uterine activity. Nonrepetitive late decelerations characterize a suspicious CST. When the reading cannot be interpreted or the contractions are inadequate, an unsatisfactory test has occurred.

The NST evolved from the CST when it was noted that FHR accelerations were frequently associated with fetal movements during a negative CST (Rochard et al., 1976). It is often used as a primary screening tool for uteroplacental insufficency because it is more convenient, requires less time, and is not as costly as the CST.

To elicit a NST, the patient is placed on an external monitor and with each fetal movement, the FHR is observed. A reactive test indicates a healthy fetus. The most commonly accepted criterion for a reactive NST is that two fetal movements occur within a 20 minute period and are associated with FHR accelerations of 15 beats per minute for at least 15

seconds (DeVoe, Castillo, & Sherline, 1985). Accelerations of the FHR imply that the central and autonomic nervous systems are not being affected by intrauterine hypoxia (Rochard, et al., 1976). When no acceleration of the FHR occurs in response to fetal movement, the pattern is said to be nonreactive. A CST must then be performed to prove that fetal wellbeing is actually compromised.

While currently both the NST and CST are being used alone or in combination in the clinical setting, there is a controversy concerning which of the two is the more useful and reliable tool for primary surveillance. DeVoe et al. (1985) in an analysis of major NST studies from the past decade, found a lack of "rigorous adherence" to standard criteria for diagnostic testing as well as a wide variance in the population studied. No definite conclusion, therefore, can be drawn with regard to whether the NST provides as adequate data for primary surveillance as the CST. Freeman (1982) believes that late decelerations (noted in CST) are earlier warning signs of decreased uteroplacental function than is loss of fetal reactivity (noted in NST). Freeman's belief is based on animal studies by Murata, et al. (1981) who demonstrated that fetal monkeys chronically monitored from a state of normal oxygenation through deterioration to a hypoxic intrauterine death showed late deceleration prior to the loss of acceleration. In an attempt to evaluate and compare the role of NST and CST as a primary means of fetal surveillance in

patients at increased risk for uteroplacental insufficiency, Freeman, Anderson, and Dorchester (1982) conducted a large prospective, though uncontrolled and nonrandomized study. The findings indicate an eightfold higher antenatal death rate in patients where the NST was used for primary surveillance. The authors, therefore, recommend that CST as a primary surveillance appears to offer a greater safety in the avoidance of fetal death.

The nonstress test continues to be used, however, in clinical settings across the country as is evident from the literature review of DeVoe et al. (1985). Lagrew and Freeman (1986) though favoring the CST, state that when NST is used, it should be performed on a twice weekly basis and any decelerations, regardless of the presence of reactivity, should be followed up with a CST.

With the fate of the NST somewhat in limbo at the present time, clinicians are searching for a more convenient, less time consuming, and more cost effective way to obtain a CST. Perhaps this is one of the reasons the breast or nipple stimulation technique is finding increased use among practitioners.

Nipple Stimulation for Contraction Stress Testing

Physiology

The precise mechanism by which antepartum nipple stimulation causes uterine contractions is unknown. A number

of investigators (Lenke & Nemes, 1984; Huddleston, et al., 1984) have assumed that the action is similar to the postpartum neurohumoral reflex which is stimulated by suckling. In the postpartum woman, nipple stimulation causes sensory nerve impulses from the nipple to travel to the hypothalmus where they trigger oxytocin neurons projecting into the posterior pituitary gland to become activated (Riddick, 1982). Oxytocin is then released, by the posterior pituitary gland, into the vascular system to travel to the uterus where it causes contractions. Significant increases in maternal plasma oxytocin have been documented within two minutes of suckling in the lactating woman (Dawood, Khan-Dawood, Wahi, Fuchs, 1981). Ross, Ervin, and Leake (1986) report similar findings in postpartum women with a 100 percent increase in plasma oxytocin occurring within one minute of breast stimulation and persisting for the duration of the stimulation.

Currently, a controversy exists as to whether the breast stimulation-uterine contraction reflex in antepartum women is governed by oxytocin. Leake, Fisher, Ross, and Buster (1984) found no significant positive oxytocin response (defined as an increase of greater than 1μU/ml above the mean baseline) in 10 nonlaboring pregnant women and 16 labor patients after 12 minutes of breast pump stimulation. Only two of the 26 women demonstrated any increase in plasma oxytocin concentration. The two women were in active labor. The authors found support for their previous findings when testing oxytocin response

during nipple stimulation for CST with 20 antepartum women (Ross, Erwin, & Leake, 1986). No significant changes in plasma oxytocin concentration relative to the baseline level were found in the nine who adequately responded to the test, nor the 11 who did not. The findings of Finley, Amico, Castillo, and Seitchik (1986) differ from these reports. These authors found a significant increase in the plasma oxytocin levels of 19 antepartum women undergoing nipple stimulation for CST when the increase above baseline was defined as less than 1μU/ml (.1-.9μU/ml). Though only ten of the tests were successful in meeting CST criteria, all of the women had significant rises in the plasma oxytocin level. It is well known that the sensitivity of the uterus to oxytocin cannot be predicted and it is therefore quite likely that this small amount of oxytocin could induce uterine contractions. However, it is also possible that factors such as prostaglandins or other hormones may be the initiating factor (Salmon et al., 1986).

Methods of nipple stimulation for the contraction stress test

Currently researchers are working to determine if nipple stimulation is a safe technique which can be used successfully with all types of pregnant patients. This section of the review of literature will compare and contrast the findings of various investigators regarding the methodologies being used in nipple stimulation for CST (Appendix A). Issues being

considered in nearly all of the studies reviewed include: success rates, uterine hyperstimulation, testing effectiveness, and testing efficiency.

The studies in which nipple stimulation for CST was tested have several similarities. Each study reviewed required the use of the electronic fetal monitor and was conducted in a hospital setting. The nipple or breast stimulation was applied by the patient in each study situation.

Success rates for producing adequate uterine contractions to meet CST criteria are promising though the rate varies according to the method used. The investigators in all of the studies reviewed report success rates greater than 60 per cent. The unilateral nipple stimulation techniques (Huddleston et al. 1984; Hill, Moenning, Katz, & Kitzmiller, 1984; Copel et al., 1985; Gantes et al., 1985) had a higher percentage of successful tests than the bilateral methods (Lenke & Nemes, 1984; MacMillan & Hale, 1984; Capeless & Mann, 1984) with success rates from 70 to 100 percent. Perhaps this is because unilateral nipple stimulation can be carried out for a longer period of time with a slower onset of uterine activity and relative avoidance of uterine hyperactivity. No studies were found in which bilateral stimulation was specifically compared to unilateral stimulation, though researchers now seem to be operating on the assumption that unilateral nipple stimulation reduces the risk of exaggerated uterine activity. Lenke and Nemes (1984), for example, found that on repeat testing

hyperstimulation could be avoided by having the patient stimulate only one nipple rather than two.

While it is clear that nipple stimulation can be used to induce contractions for the CST, uterine hyperstimulation remains of great concern to investigators. Fetal heart rate decelerations and prolonged bradycardia have been associated with uterine hyperstimulation. Two rather alarming situations involving uterine hyperstimulation have been reported in the literature. Nipple stimulation resulted in severe fetal bradycardia for three patients according to Viegas, Arulkumaran, Gibb, and Ratnam (1984). Emergency deliveries due to fetal distress were conducted in two of these situations resulting in infants who each had Apgar scores of 9 and 10. The third case was managed more conservatively and three days later a healthy infant was delivered. In a case presented by Schellpfeffer, Hoyle, and Johnson (1985), a 42-week pregnant woman experienced five minutes of profound bradycardia after one and one-half minutes of unilateral nipple stimulation. Operative delivery was being considered when the fetal heart rate returned to baseline. The fetal outcome, ultimately, was good after a vaginal delivery later in the day. Infant Apgar scores were 8 and 9.

Surprisingly, studies advocating the use of breast stimulation for labor induction or cervical ripening report minimal to no uterine hyperactivity even with continuous nipple stimulation up to three hours per day (Elliott & Flaherty,

1984; Salmon et al., 1986). These studies, however, do not always rely on electronic fetal monitoring so it is not possible to clearly document uterine hyperstimulation.

Uterine hyperstimulation is reported in each of the studies utilizing nipple stimulation for CST (Appendix A). Lenke and Nemes (1984) observed a four percent rate of uterine hyperstimulation during a 15 minute period of bilateral nipple simulation. They advocate unilateral nipple stimulation to avoid this possibility in the future. Huddleston et al. (1984) apparently observed hypercontractility to such a degree that they limited stimulation in their study to two minutes on a single side followed by a five minute rest period. The cycle is then repeated as necessary to achieve an adequate contraction pattern. These investigators report a 100 percent success rate and a hyperstimulation rate of only two percent. From studies such as these it is apparent that not only may bilateral nipple stimulation play a role in the development of uterine hyperactivity, duration of nipple stimulation may also increase the number of cases of hyperstimulation as well.

Other factors may also play a role in producing uterine hyperstimulation. An exceptionally high hyperstimulation percentage (45.5%) was found by Hill et al. (1984) even though the method used was similar to others with much lower hyperstimulation percentages (Appendix A). Two factors may have been influential in this situation. First, unless contraindicated, pelvic examinations were performed on all of

the women in the study to assess cervical status. These exams may have contributed to the high rate of hyperstimulation from the release of cervical prostaglandins (Caulder & Gordon, 1979). The pregnant woman's position may have also affected the hyperstimulation rates. In this study, all patients were placed in semi-Fowler's position. In semi-Fowler's position, contractions are generally more frequent but of lesser intensity, while in the left lateral position, the contractions are less frequent but of greater intensity (Steer & Beard, 1982). Hyperstimulation rates were somewhat lower in two of the studies in which the left lateral position was used (Huddleston et al., 1984; Capeless & Mann, 1984).

Clearly, the problem of hyperstimulation needs further investigation. This problem may be expected to continue because there is no way to precisely control the dose of the stimulus nor to predict the sensitivity of the uterus. There are possible dangers in the use of nipple stimulation to induce contractions just as with the use of exogenous oxytocin. The testing or induction procedures, therefore should be done with caution and with careful, constant monitoring of uterine activity and the fetal heart rate.

Another important issue in evaluating the nipple stimulation technique for CST is whether or not it is effective in testing what it is supposed to test. The new test must be at least as sensitive as the former one in predicting fetal wellbeing or fetal distress to consider a change. The

risk of fetal death has been determined to be about 0.4 per 1000 (corrected for congenital anomalies and unrelated causes) in a large prospective study by Freeman et al. (1982). A weekly reactive nonstress test (NST) was found to have a somewhat higher risk of fetal death 3.2 per 1000 in the same study. These findings indicate that the CST could be an earlier predictor of uteroplacental insufficiency than the NST and may be the better tool for primary surveillance.

Current studies are indicating that the nipple stimulation technique is as effective as the conventional oxytocin CST in interpreting uteroplacental insufficiency. Huddleston, et al. (1984) report test interpretation results similar to those reported for the standard CST. In their study of 193 high-risk pregnant women, six perinatal deaths occurred, three fetal and three neonatal. Only one of the deaths followed a reactive negative CST and was due to acute cord torsion. Each of the other deaths was preceded by a suspicious CST, in which intervention was attempted, or accompanied by a congenital anomaly or disease. In a comparison of nipple stimulation and oxytocin infusion CSTs, Capeless and Mann (1984) found only one positive CST; this occurred in the oxytocin only group. Though the growth retarded infant was depressed at birth, it did well in the NICU. No perinatal mortality occurred in this study. MacMillan and Hale (1984) report that three positive CSTs occurred in their study of 156 patients using nipple stimulation. Two of these were regarded as false positives as

the infants were healthy at birth with high Apgar scores. The third positive test occurred in a fetus with multiple anomalies who was the only perinatal mortality in the study. Three perinatal deaths occurred in the investigation of nipple stimulation by Copel et al. (1984) and only one of these followed a reactive, negative CST. The death in this case was due to a sudden complete abruption of the placenta. In each of the reviewed studies, the negative CST was considered to be reassuring and the pregnancy allowed to continue without intervention for another week. A low perinatal mortality rate was found in pregnancies tested with the nipple stimulation CST. This is comparable to the standard oxytocin CST.

Another topic being evaluated in nearly all the nipple stimulation for CST studies is testing time. The nipple stimulation for CST proponents believe there is a significant reduction in testing time with the nipple stimulation technique as compared to the traditional intravenous oxytocin method. The time required for the conventional test is reported to average about 90 minutes (Schifrin, 1979). Current studies are indicating that less time is required with nipple stimulation. Average testing times are reported in Appendix A. Lenke and Nemes (1984) report that most of their patients with satisfactory tests achieved an adequate contraction pattern in 15 minutes. The average total time required was not reported nor was a comparison group with intravenous oxytocin used. The average time needed for subjects in the study by Huddleston et

al. (1984) was 45 minutes, though the investigators report that 49 percent of the tests were completed in 35 minutes. Capeless and Mann (1984) offer support to this claim as their subjects were able to complete the test in 46 minutes. These investigators further report that a comparison group of intravenous oxytocin CST subjects required 83 minutes to complete the test. In this study failed breast stimulation and subsequent oxytocin infusion prolonged the overall testing time only 12 minutes when compared with the oxytocin only group. Copel and coworkers (1985) report the shortest average time required for the nipple stimulation CST, 12.02 minutes. The technique in this study is similar to other methods described (Hill et al., 1984; Gantes et al., 1985) so it is not clear whether the method is responsible for the shorter time period or not. It is obvious from the studies reviewed, however, that the time required for the nipple stimulation CST is indeed shorter than that required for the oxytocin infusion approach.

Factors Influencing the Contraction Stress Test

Factors such as age, parity, and length of gestation may have some influence on the results of nipple stimulation CST. Only a few of the investigators are reporting the influence of these parameters on the CST. With regard to maternal age, MacMillan and Hale (1984) found no statistically significant differences between successful and nonsuccessful nipple stimulation CSTs, while Copel and coworkers report that the initiation of uterine activity and test duration is shorter in

pregnant women less than 20 years old. Curtis, Evens, Resnick, Rimer, Lynch, and Carlson (1986) note a more effective uterine response in younger women as well. A number of studies have reported that parity does not appear to have a significant effect on the success of nipple stimulation for CST (MacMillan & Hale, 1984; Copel et al., 1985; Gantes et al., 1985; Capeless & Mann, 1984).

Reports differ as to the influence of gestational age on nipple stimulation CSTs. MacMillan and Hale (1984) found no statistically significant differences between successful and nonsuccessful groups with respect to gestational age. However, Copel and coworkers (1985) report that a longer time period is required to initiate uterine activity and testing time is longer in preterm gestations (less than 37 weeks) when compared to term (38-42 weeks) or postterm (greater than 42 weeks). Failure of breast stimulation to elicit a CST is greater in the preterm pregnancy according to these investigators. Curtis, Evens, Resnick, Rimer, Lynch, and Carlson (1986) lend support to this finding as they found late gestational age (41-44 weeks) was associated with the most effective uterine response. Conflicting data were reported in a small study by Gantes et al. (1985) who found a reduced uterine response among patients past their due dates in comparison to patients prior to or at their due dates. No controlled study has yet been reported with an adequate number of subjects specifically investigating the relationship between gestational age and response for the nipple stimulation CST.

Advantages/Disadvantages of Nipple Stimulation for CST

The advantages of the nipple stimulation CST are obvious in comparison with the conventional oxytocin infusion CST. It is a simpler test which is easier to perform and less time consuming. A larger volume of patients can be screened in a busy unit because the test can be completed in a shorter period of time. As infusion equipment is not required and nursing personnel are needed for less time, the nipple stimulation technique is more cost effective as opposed to the conventional infusion method. An additional advantage is found by patients who are looking for less invasive and aggressive methods of obstetrical care. The nipple stimulation technique has great appeal for those preferring a natural approach as it involves the production of one's own hormones; no exogenous substances enter the body. Several investigators report that patient acceptance of the nipple stimulation technique is quite high (Lenke & Names, 1984; MacMillan & Hale, 1984; Huddleston et al., 1984; Capeless & Mann, 1984; and, Curtis, Evens, Resnick, Rimer, Lynch, & Carlson, 1986).

The major disadvantage of the nipple stimulation technique for CST as reported in the literature is the high incidence of hyperstimulation (Huddleston, et al., 1984). With this in mind CSTs must continue to be performed in the hospital within easy reach of the delivery suite as fetal distress may occur. Hospitals are typically associated with sick patients and though the pregnant woman is not sick, she may, indeed, assume

a sick role when exposed frequently to the hospital environment. Though patient acceptance of this technique is high, when asked some patients report feelings of embarrassment. Occasionally patients refuse to participate in studies of this method. Most of the studies require that a woman's breast be exposed during the test procedure. Huddleston et al. (1984) tested a nipple stimulation method which did not involve exposure of the breast but found that when several women were asked to bare one breast and gently rub the nipple with a warm moist cloth until contractions began, the women were embarrassed and hesitant to comply. On two occasions, the first contraction was hyperstimulatory after this type of stimulation. Patient embarrassment was also reported by Gantes et al. (1985) in four of their 30 patients though this psychological factor did not seem to affect the CST; they all had successful tests. Only one other study spoke of patient embarrassment. Curtis, Evens, Resnick, Rimer, Lynch, & Carlson (1986) noted that 13 percent of their subjects were embarrassed or somewhat embarrassed by the stimulation. However, over 98 percent of the women said that they would accept the use of breast stimulation again.

As indicated by the studies reviewed, the evidence is strong that nipple or breast stimulation leads to uterine activity. Clearly, the CST can be elicited by these means. Why this clinical phenomenon, which seems so obvious in practical terms, has not been used in pregnancy before now,

is not known. One reason for ignoring nipple stimulation, according to Curtis, Resnick and Evens (1986), may be that social and professional attitudes, such as those toward sexuality and professional control of patient care, may have inhibited its acceptance by physicians. Now that some physicians are recognizing the benefit of using this technique with their patients, nurses must begin to explore their attitudes regarding its use.

Nurses' Attitudes Toward Sexuality

Nurses' lack of knowledge about human sexuality is well documented in the literature (Kuczynski, 1980 and Lief & Payne, 1975). Failure of nursing schools to incorporate human sexuality courses in the curriculum may be partly responsible for this lack of knowledge. Lief and Payne (1975) report that both nursing students and graduate nurses were less knowledgeable and more conservative in regard to sexuality than college graduates. Fontaine (1976) surveyed nurse educators and found that though they rated themselves very knowledgeable about sex education, they rated themselves much lower on their ability to discuss sexual concerns with patients or to incorporate sexual education into the curriculum.

Payne (1976) developed an instrument called the Professional Sexual Role Inventory (PSRI) designed to measure nurses' degrees of comfort with sexual situations. The test is based on the belief that the more knowledge a nurse has about

human sexuality, the more favorable will be her attitude toward it and the more comfortable she will be in professional situations with sexual connotations. The PSRI and the Sex Knowledge and Attitude Test were administered in groups to 107 professional family planning nurses and 64 senior nursing students. The author found significant positive correlations between sexual knowledge and attitudes and written responses indicating comfort in handling sexual situations. In an analysis of demographic factors related to comfort in sexual situations, nurses over 40, who attended church frequently, who considered themselves very religious, and who worked in nonurban areas were identified as possibly needing in-service training related to knowledge, attitudes, and comfort about sexuality as these factors were associated with lower scores on the tests.

Conceptual Framework

The conceptual framework for this study has three basic elements: attitude definition and acquisition, the nonjudgmental atmosphere, and nursing behavior. Nurses must possess a self-awareness of their attitudes about nipple stimulation in order to create a nonjudgmental atmosphere within which to conduct a nipple stimulation CST.

Attitudes are defined by Rokeach (1972) as "a relatively enduring organization of beliefs around an object or situation predisposing one to respond in some preferential manner" (p. 112). Three components comprise an attitude: cognitive,

affective, and behavioral (Rokeach, 1972). The cognitive component includes a person's knowledge "about what is true or false, good or bad, desirable or undesirable" (Rokeach, 1972, p. 112). The negative or positive emotions aroused under certain conditions and centered around the attitude comprise the affective component. The behavioral component is concerned with what a person does related to the knowledge or feeling of an attitude.

It is generally believed that attitudes are learned and are products of culture and experience. Past experiences, reference groups, and factual knowledge each play a role in the development of an attitude. When a person enters the nursing profession, it is important to realize that the person has been shaped by previous experiences. Some of the experiences are those of "living life in our society, being a part of a family, reading, and going about in our world" (White, 1977, p. 16).

Though a person entering nursing school has a number of attitudes already in place, it is important to note that attitudes are not fixed or permanent. Because attitudes are learned, they can also be unlearned and relearned (Krizinoski, 1973). During a nurse's educational process, one has the opportunity to learn factual knowledge, explore meaningful clinical situations, and become accustomed to the various roles of a nurse. Existing attitudes may be modified, while new ones are developed. White (1977) proposes that when a new experience occurs (such as nursing education), a person tries

to fit it in with his/her past experiences to make sense out of what is happening. Ultimately, the outcome of such a process may involve a redefinition of one's attitudes.

While it is important to consider the mechanism through which attitudes develop, another issue of great importance is the relationship of attitudes to behavior. Currently, the literature reflects a controversy about how attitudes influence behavior. Some experts believe that while a person may have a definite attitude about something, he may choose to behave in a manner completely opposite to it (Bettinghaus, 1986). An example of this is the smoker who knows and feels that smoking is bad for his health yet continues to smoke. Proponents of another perspective believe that our attitudes about persons, ideas, and the situation in which we are interacting are all communicated in our behavior (White, 1977).

Nurses, in particular, have accepted the notion that one's attitudes may be communicated through behavior. An old adage often repeated in freshmen nursing classes is that "one cannot not communicate". Johnson (1986) notes that communication is always present and occurring. "Even if an individual tried, he could never not communicate; his lack of verbalization, eye contact, and so forth would communicate something to others" (Johnson, 1986, p. 25). Lief and Payne (1975) suggest that attitudes may interfere with objective listening or lead to "dispassionate management" of patients. These authors further contend that strong feelings and prejudicial attitudes may

interfere with the acquisition of knowledge and may ultimately interrupt the development of necessary skills.

The nursing profession has long advocated that a nurse examine her attitudes (including values, biases, and prejudices) and develop an awareness of them. Burgess (1985) adds that once an awareness of attitudes is obtained, the nurse should seek to accept them and realize that it is not excessively harmful to have such attitudes. However, it may become harmful if the judgmental attitudes are suppressed and then unconsciously acted upon. Without this acceptance of self, the nurse's effectiveness is limited; information conveyed on a verbal level may be contradicted on a nonverbal level. The acceptance of one's own attitudes enhances the establishment of a nonjudgmental atmosphere for working with patients.

A nonjudgmental atmosphere, in which a patient and nurse interact, also acknowledges the importance of the attitudes a patient brings into the relationship and may help prevent a nurse's attitudes from influencing the patient. White (1977) suggests that patients do perceive the attitudes of nurses especially during the routine process of interaction. Furthermore, the author contends that patients may be thrust into patterns of behavior different from their own desires by the behavior of others toward them. From a "negative point of view, patients may lack the strength or will to resist the patterning and expectations put on them by persons in the

environment" such as nurses (White, 1977, p. 18). In this situation, the patient feels he has no choice, he must conform. A warm and friendly atmosphere of acceptance will provide for personal integrity for both the patient and nurse thus enhancing their relationship.

The nurse who conducts nipple stimulation for contraction stress testing must, in particular, examine her attitudes and adopt a nonjudgmental approach during the procedure. Though nurses, traditionally, have had social approval to invade a patient's private body space, to touch, look at, and minister to the body, some nurses may feel uncomfortable with the notion of having a woman expose her breast and perform self stimulation. A woman's breasts are frequently associated with sexual activity in the American culture.

In a nipple stimulation-contraction stress testing situation, the nurse assumes the role of client teacher. The patient is taught the proper technique of self stimulation by the nurse. The nurse who is unaware of her own attitude about nipple stimulation may well convey it to the patient. Certainly, a negative attitude could influence the patient's feelings about such a technique. Even a positive attitude about nipple stimulation may be communicated to a patient, who feels uncomfortable with nipple stimulation, in such a way that she feels as if she has no choice but to conform to the nurse's expectations. Ultimately, in either situation, it is conceivable that test results could be affected either by

uterine hypo- or hyperstimulaton. The nurse who has accepted her own attitude and acknowledges the attitude of the patient enhances the establishment of a nonjudgmental atmosphere and allows for testing to be conducted in a manner free of bias and prejudice.

Summary

A review of the literature revealed that the CST is a widely accepted means by which to assess fetal wellbeing. A number of researchers are now exploring new ways to conduct the CST which will be less invasive, reduce costs, and require less time than the traditional oxytocin infusion. The nipple stimulation technique appears to be an effective way to meet these objectives.

Patients sometimes have reported feeling embarrassed when asked to perform nipple stimulation. No studies were found in which the attitudes of patients or health care professionals were explored in relation to the nipple stimulation technique of CST.

Nurses, in general, have had an inadequate knowledge of human sexuality. Studies of nurses attitudes about sexually sensitive procedures, such as nipple stimulation, were not found in this review of literature. This study explores the attitudes and knowledge of maternity nurses about the use of nipple stimulation for CST.

CHAPTER 3

METHODOLOGY

Design

In order to discover the knowledge and attitudes of maternity nurses about the use of nipple stimulation to elicit a contraction stress test, 4 groups of labor and delivery nurses were asked to respond to a questionnaire developed by the investigator.

Setting

Four southeastern United States hospitals with labor and delivery units were selected to participate in this study. Two of the hospitals were classified as regional health care centers and two as community health care centers.

Sample

Registered nurses who work in the labor and delivery setting were asked to complete the questionnaire. The participants in the study were volunteers.

Instrument

The questionnaire to be used in this study was constructed by the investigator (Appendix B). The questionnaire is designed with statements about attitudes. Attitudinal responses were given in a Likert-type scale with responses from

"strongly agree" to "strongly disagree". In order to avoid response bias, positively and negatively worded statements were interspersed. A set of true/false questions was constructed to test the nurses' knowledge about the nipple stimulaton contraction stress test. A "don't know" option was added to the knowledge question responses in order to avoid guessing and increase the likelihood of a valid response.

Demographic information about the nurses was collected. This portion of the questionnaire included: age, marital status, race, type of nursing degree, experience in nursing, experience with contraction stress testing, and experience with nipple stimulation.

As this tool was developed by the investigator, it was necessary to test for reliability and validity. Content validity was determined by having two maternal-child nursing specialists evaluate the statements for appropriateness. A pilot study was conducted in order to test the questionnaire. Nurses, similar to those to be surveyed in the main study, participated in the pilot study. Items which reflected disagreement or seemed ambiguous were corrected or eliminated from the final questionnaire. Internal consistency reliability was examined using coefficient alpha.

Procedure

After receiving ECU Human Subject Review Committee Approval, the investigator contacted the appropriate nursing service administrator at each hospital to request permission to survey nurses in the work setting. When permission was received, the

unit manager or head nurse was asked to recommend a 24-hour period in which a majority of the nurses could be contacted. Groups of labor and delivery nurses were then approached and given a letter explaining the study. When the nurses agreed to participate in the study, they were given the questionnaire.

Once the questionnaire was completed, it was either returned directly to the investigator or placed in a designated sealed box. The completion and return of the questionnaire constituted consent to participate in the study.

Data Analysis

The demographic data collected in this study were analyzed first. The total group was described according to the information obtained from questions 1 through 12.

In order to describe the total group's attitude and knowledge about nipple stimulaton, it was necessary to use two procedures. First, coefficient alpha internal consistency reliability for each of the attitude subscales (evaluative, affective, and competence), the overall attitude scale, and the knowledge scale were determined. Second, when internal consistency reliability of these scales was found to be adequate, scale means and standard deviations were computed to describe the total group's attitude on each subscale, their overall attitude, and their overall knowledge. If internal consistency reliability had been inadequate, individual item scores would then have been computed to characterize the group.

Pearson correlation coefficients were used to determine the relationship between knowledge of and attitude toward nipple stimulation for CST. The relationship of the demographic variables to attitudes and knowledge was also obtained. One way analysis of variance was used to determine the effect of these demographic variables upon each subscale, overall attitude scale, and the overall knowledge scale.

Summary

In this study, registered nurses working in labor and delivery units were surveyed to determine their knowledge and attitudes about the use of nipple stimulation for CST. A questionnaire developed by the investigator was used. The data were collected by the investigator and analyzed using descriptive and inferential statistics.

CHAPTER 4

FINDINGS

In this study, registered nurses working in labor and delivery units at three southeastern United States hospitals were surveyed to determine their attitudes and knowledge about the use of nipple stimulaton for contraction stress testing (CST). In this chapter, demographic data and data collected from the Gurley's Nipple Stimulation Questionnaire (Appendix B) are presented and analyzed.

Description of the Sample

Four southeastern U.S. hospital nursing directors were contacted for permission to survey nurses working in labor and delivery; three agreed to have their nurses participate in the study. Upon the recommendations of the labor and delivery head nurses from each of three hospitals, the investigator contacted potential subjects during staff meetings. From a potential sample size of 68, a total of 36 registered nurses participated in the study (Table 1).

Table 1

Number of Available Labor and Delivery RNs and Respondents by Hospital

Groups	Employed RNs	Respondents	%
Hospital 1	20.0	7	35
Hospital 2	24.6	16	65
Hospital 3	23.5	13	55

The ages of the respondents varied from 20 to 64 years, with the mean age being 31.4. Fifty-seven percent of the group were 29 years of age or younger. Of the 34 nurses who responded, 100% were white. The majority of nurses (80.6%) in this sample were currently married. Respondents in the study were fairly evenly divided according to basic nursing education (Table 2). The highest degree in nursing obtained by this group was the BSN degree (46%). One nurse held a nurse practitioner certificate (2.8%) and one subject failed to answer this item. The figures are shown on Table 2.

Table 2

Respondents by Basic Education and Highest Level of Education

Variable	n	Valid %
Basic Education		
AD	10	27.8
Diploma	13	36.1
BSN	13	36.1
Total	36	100
Highest Level of Education		
AD	11	31.4
Diploma	7	20.0
BSN	16	45.7
Nurse Practitioner	1	2.9
No response	1	----
	36	100

Participants were asked to report the total number of years of practice in nursing as well as the total number of years working in labor and delivery. Fifty percent of the group had six or fewer years of total nursing experience and 50% had three or fewer years of experience in labor and delivery (Table 3).

Table 3

Experience in Nursing Practice and in Labor and Delivery by Years and Percent

Variable	n	%	Cumulative %
Practice Years			
1-3	12	33.3	33.3
4-6	6	16.7	50.0
7-10	5	14.0	64.0
Over 10	13	36.0	100.0
Labor and Delivery Years			
1 or less	12	33.3	33.3
2-3	6	16.7	50.0
4-6	7	19.4	69.4
7-10	7	19.4	88.9
Over 10	4	11.2	100.0

When subjects were asked if they had heard about the use of nipple stimulation for CST, 32 (89%) indicated they had heard about it. The majority of these nurses reported having heard about the use of nipple stimulaton for CST from on-the-job training and/or experience (58.3%) and from literature (55.6%). The sources of information are shown in Table 4.

Table 4

Reported Sources of Information on the Use of Nipple Stimulation

Source	n	%*
Basic nursing education	15	41.7
Graduate nursing education	2	5.6
Hospital inservice education	4	11.1
On-the-job training and/or experience	21	58.3
Literature	20	55.6
Workshops or seminars	12	33.3

*Sum of the percentages exceeds 100% because multiple sources could be cited.

The entire group (100%) reported having had experience with patients receiving oxytocin for CST while 42% (n=15) stated they had cared for patients receiving nipple stimulation for CST. The various techniques of nipple stimulation were listed and nurses who responded affirmatively to having had experience with nipple stimulation were asked to check all the techniques which they had used. These nurses reported that the technique most often used involved having the breast covered while the patient rolled her nipple(s) (Table 5).

Table 5

Techniques Used by Nurses Who Had Experience With Nipple Stimulation for CST

Technique	% Using the Technique*
Unilateral nipple stimulation	19.4
Bilateral nipple stimulation	22.2
Breast exposed	11.1
Breast covered	33.3
Nipple rolling	33.3
Breast massage	8.3
Warm, moist cloths	16.7
Breast pump	0
Other	2.8
Nurse does stimulation	5.6
Patient does stimulation	36.1

*Sum of the percentages exceeds 100% because multiple sources could be cited.

Immediately prior to administering the questionnaire to the groups of nurses, the investigator asked the head nurse if nipple simulation was being used in the hospital. Only one head nurse (Hospital 1, n=7) reported that nipple stimulation was used routinely for CST and that a protocol was in place. However, 11

(30.6%) of the total sample of nurses reported that nipple stimulation for CST was currently being used in their hospital (Table 6). Of the 11 who said their hospital used nipple stimulation, 7 (64%) were aware of a standard protocol.

Table 6

Nurses' Report of Hospital's Use of Nipple Stimulation by Number and Percent

Groups	n	%
Use of Nipple Stimulation		
Use	11	30.6
Do not use	22	61.1
Don't know	3	8.3
Protocol		
Have	7	63.6
Do not have	4	36.4

Reliability of Questionnaire

Since the questionnaire (Appendix B) used in this study was developed by the investigator and first tested with this group, it was necessary to examine the reliability of the total attitude scale, each of the attitude subscales (evaluative, competence, affective), and the knowledge scale. After adjustments were made on the evaluative and affective subscales (items A1 and A21 were deleted), the coefficient alpha internal consistency reliability was determined to be adequate (Table 7). The reliability statistics and other analyses were based on a total number of 24 attitude statements rather than 26. With the 10 knowledge questions, the total number of attitude and knowledge statements for analysis was 34.

Table 7

Coefficient Alpha Internal Consistency Reliability for the Total Attitude Scale, Attitude Subscales, and the Knowledge Scale

Scale	Number of Items	Coefficient Alpha Reliability
Total Attitude Scale	24	.87
Evaluative Attitude Subscale	7	.71
Competence Attitude Subscale	8	.83
Affective Attitude Subscale	9	.63
Knowledge Scale	10	.87

Findings

Descriptive statistics were used to analyze the scores of the Gurley Nipple Stimulation Questionnaire in order to answer the first research question: What are the attitudes of registered nurses toward nipple stimulation for CST? Results for the total group and for subgroups by hospital are reported in Table 8. The group, as a whole, and the hospital groups, individually, were found to have positive attitudes toward the use of nipple stimulation for CST. The score set for a positive attitude was one that was greater than three. The mean knowledge score was 4.7 of a possible 10 for the total group, including both those with and without experience using nipple stimulaton for CST. The group from Hospital 1, who have a standard protocol and use nipple stimulation routinely, scored higher than the other two groups on every scale. Because of the variation in the range of scores on each of the scales, the minimum and maximum scores are also reported in Table 8.

Table 8

Responses of the Total Group and Hospital Subgroups in Relation to Attitude Toward and Knowledge of Nipple Stimulation for CST

Scale/Group	n	Mean	Standard Deviation	Minimum	Maximum
Total Attitude Scale					
Hospital 1	7	4.01	.35	3.33	4.42
Hospital 2	16	3.45	.43	2.67	4.21
Hospital 3	13	3.46	.30	3.04	3.96
Total	36	3.57	.43	2.67	4.42
Evaluative Attitude Subscale					
Hospital 1	7	3.73	.46	2.86	4.14
Hospital 2	16	3.26	.53	1.71	4.00
Hospital 3	13	3.29	.43	2.71	4.00
Total	36	3.36	.50	1.71	4.14
Competence Attitude Subscale					
Hospital 1	7	4.45	.48	3.50	4.87
Hospital 2	16	3.64	.60	3.00	5.00
Hospital 3	13	3.64	.35	3.00	4.25
Total	36	3.80	.58	3.00	5.00
Affective Attitude Subscale					
Hospital 1	7	3.84	.32	3.55	4.33
Hospital 2	16	3.44	.45	2.33	3.89
Hospital 3	13	3.44	.41	2.78	4.11
Total	36	3.52	.43	2.33	4.33
Knowledge Scale					
Hospital 1	7	7.43	.79	6.00	8.00
Hospital 2	16	3.75	3.19	.00	8.00
Hospital 3	13	4.46	2.44	1.00	10.00
Total	36	4.72	2.90	.00	10.00

To further characterize the attitudes of nurses in the sample group, one way analysis of variance was used to determine if the scores on each of the scales differed across the hospitals. The null hypotheses for this portion of the study was that the attitudes and knowledge of each group would be

similiar. For two of the attitude subscales, the evaluative and the affective, the null hypothesis was accepted; no difference was found between the three hospitals. The null hypothesis was rejected, however, for the competence attitude subscale, F (2,33) = 7.22, p = .003; the total attitude scale, F (2,33) = 6.11, p = .005; and the knowledge scale, F (2,33) = 4.87, p = .04. At the $p \leq .05$ level, a significant difference was found between the three hospitals. The Scheffe procedure at the .05 level found that Hospital 1 differed from Hospitals 2 and 3 for both the competence attitude subscale and the total attitude scale. On the knowledge scale, the Scheffe procedure at the .05 level found that Hospital 1 differed from Hospital 2 only.

Pearson correlation coefficients were computed in order to answer research questions 2 and 3: Is there a relationship between knowledge and attitudes of maternity nurses about nipple stimulation for CST? and Is there a relationship between specific demographic variables (age, practice years, years in labor and delivery) and the attitudes and knowledge of these nurses about nipple stimulaton for CST? Results are reported in Table 9.

Findings from the correlational study indicated that several of the relationships were significant at the $p \leq .05$ level. The three attitude subscales were found to be significantly related to each other and to the total attitude

scale. The knowledge scale had a significant relationship to all attitude scales with one exception; the evaluative subscale was not significantly related to the knowledge scale. Age was not found to correlate significantly with either the attitude or knowledge scales. However, age was positively correlated with practice years and years in labor and delivery as one might expect. Practice years and years in labor and delivery were positively correlated but neither was significantly related to any of the attitude scales or knowledge scale.

Table 9

Pearson Correlation Coefficients of Attitudes, Knowledge, Age, and Length of Practice

		EVAL	COMP	AFFECT	TOTAL ATT	KNOW	AGE	PRAC YRS	LD YRS
1.	Evaluative								
2.	Competence	.54*							
3.	Affective	.77*	.46*						
4.	Total Attitude	.88*	.82*	.85*					
5.	Knowledge	.21	.56*	.31*	.44*				
6.	Age	.00	.09	.04	.06	.10			
7.	Practice Years	-.04	.06	-.03	.00	.08	.98*		
8.	Labor & Delivery Years	.12	.08	.07	.10	-.03	.77*	.80*	

* $p \leq .05$

Selected demographic data were further analyzed to determine what effect, if any, these factors had on knowledge and attitudes of labor and delivery nurses toward nipple stimulation for CST. First, a t-test was used to determine if differences in attitudes or knowledge existed between nurses who currently were married (M) and those who were not currently married (S). A significant difference between the two groups was found on the competence subscale, as well as the total attitude scale and the knowledge scale (see Table 10). The married nurses scored higher on each of these scales.

Table 10

Comparison of Attitude and Knowledge Scores by Marital Status of Nurses

Scale/Marital Status	n	Mean	Standard Deviation	t Value	Degree of Freedom	p
Evaluative Attitude Subscale						
S	7	3.14	.33	-1.29	34	.20
M	29	3.41	.53			
Competence Attitude Subscale						
S	7	3.41	.44	-2.04	34	.004*
M	29	3.89	.58			
Affective Attitude Subscale						
S	7	3.27	.38	-1.74	34	.09
M	29	3.58	.43			
Total Attitude Scale						
S	7	3.28	.29	-2.06	34	.05*
M	29	3.63	.43			
Knowledge Scale						
S	7	2.71	.63	-2.14	34	.04*
M	29	5.20	.79			

$p \leq .05$

Two separate tests using one way analysis of variance were conducted in an attempt to determine if nurses with educational differences had significantly different mean scores on the attitude and knowledge scales. The null hypothesis in both instances was that no differences would exist between the groups on the scales. For both tests, the null hypothesis was accepted as no significant differences were found between any educational group at the $p \leq .05$ level.

One way analysis of variance was also used to determine if the mean scores of nurses who reported that their hospital used nipple stimulation (Group 1) differed from the mean scores of the nurses who reported that their hospital did not (Group 2) or from the mean scores of those who did not know (Group 3). The mean scores of each of these groups were compared for the attitude and knowledge scales. The null hypothesis for this portion of the study was that no differences would exist between the three groups. On the evaluative attitude subscale, the null hypothesis was accepted. However, on each of the other subscales, the total attitude scale, and the knowledge scale, the null hypothesis was rejected. A significant difference was found between the groups on these scales (Table 11). The Scheffe procedure at the .05 level found that for the competence subscale and the knowledge scale, Group 1 (or those reporting that their hospital used nipple stimulation) differed significantly from Groups 2 and 3. No simple difference between the means of any two groups was

found by the Scheffe procedure at the .05 level for the affective subscale. On the total attitude scale, Group 1 was found to differ significantly from Group 2, only.

Table 11

Differences in Attitudes and Knowledge of Nurses in Relation to Report of Hospital's Use of Nipple Stimulation

Scale/Group	n	Mean	Standard Deviation	Degree of Freedom	F Ratio	p
Evaluative Attitude Subscale				2,33	3.20	.053
Use NS	11	3.66	.48			
Don't use	22	3.22	.49			
Don't know	3	3.28	.28			
Competence Attitude Subscale				2,33	16.09	.00*
Use NS	11	4.41	.51			
Don't use	22	3.52	.38			
Don't know	3	3.58	.44			
Affective Attitude Subscale				2,33	3.65	.03*
Use NS	11	3.79	.31			
Don't use	22	3.41	.45			
Don't know	3	3.30	.13			
Total Attitude Subscale				2,33	10.16	.00*
Use NS	11	3.96	.37			
Don't use	22	3.39	.35			
Don't know	3	3.57	.19			
Knowledge Scale				2,33	7.51	.00*
Use NS	11	7.09	1.30			
Don't use	22	3.82	2.88			
Don't know	3	2.66	2.52			

* $p \leq .05$

Finally, two separate t tests were conducted. The first t-test was designed to determine if differences existed between nurses who had heard about nipple stimulation (n=32) and those

who had not (n=4) on the attitude and knowledge scales. A significant difference ($p \leq .05$) was found on only one scale, the knowledge scale. Knowledge was significantly higher (mean score = 5.21) for nurses who had heard about nipple stimulation than for those who had not (mean score =.75).

The next t -test was conducted to determine if nurses who had used nipple stimulation (n=15) differed from those who had not (n=21). Results indicated that nurses with experience differed significantly on every scale from those with no experience (Table 12).

Table 12

Comparison of Respondents Reporting Experience and Nonexperience With Nipple Stimulation

Scale/Group	n	Mean	Standard Deviation	t Value	Degrees of Freedom	p
Evaluative Attitude Subscale				2.97	34	.005*
Experienced	15	3.63	.39			
Not experienced	21	3.17	.50			
Competence Attitude Subscale				5.31	34	.000*
Experienced	15	4.26	.54			
Not experienced	21	3.47	.35			
Affective Attitude Subscale				2.52	34	.000*
Experienced	15	3.72	.32			
Not experienced	21	3.37	.45			
Total Attitude Scale				4.54	34	.000*
Experienced	15	3.87	.36			
Not experienced	21	3.35	.33			
Knowledge Scale				3.88	34	.000*
Experienced	15	6.60	.80			
Not experienced	21	3.38	.82			

$p \leq .05$

Summary

This chapter presented the analyzed data from the Gurley Nipple Stimulation Questionnaire. The demographic analysis indicated that the sample (N=36) was mostly young, white, married, and with relatively few years of experience in nursing and in labor and delivery. Most of the sample had heard about the use of nipple stimulation for CST, though less than half had actually conducted a nipple stimulation CST.

The reliability of the questionnaire was shown to be adequate using coefficient alpha internal consistency reliability. Content validity had been verified.

The findings of the study showed that this group had a fairly positive attitude toward the use of nipple stimulation. Nurses in the hospital where nipple stimulation was being used or who reported that they had used nipple stimulaton in the past scored consistently higher on every scale. Married nurses scored higher on all but one scale while education had no effect on the responses of the nurses.

CHAPTER 5

DISCUSSION OF FINDINGS

This study was designed to explore the knowledge and attitudes of labor and delivery nurses about the use of nipple stimulation for CST . This chapter presents a discussion of the findings.

Discussion

Several findings from this study merit closer examination and discussion. First, the demographic data indicated that the sample group was relatively young (57% less than 29 years of age). Fifty percent of this group had six or fewer years of experience in nursing; and, 50% of the respondents had three or fewer years of experience working in labor and delivery. From these data, it appears that young nurses may be making a decision to specialize early in their careers. Furthermore, the question of whether experienced nurses are choosing to continue working in hospitals or in labor and delivery units may be raised.

The majority of respondents (89%) had heard about the use of nipple stimulation for CST. This group reported that on-the-job training and/or experience (58.3%) and literature (55.6%) were major sources of information. This finding indicates that over half of the respondents are self directed in their approach to learn about new techniques in nursing practice. Only 11% of the group credited the hospital inservice department with providing information related to this new technique. The question of whether employers do or

should provide information about new techniques for use in specialized units may be raised from this finding.

Forty-two percent of the respondents reported having had experience with nipple stimulation for CST. The techniques of nipple stimulation reported most frequently by this group involved having the patient roll her nipple(s) while the breast was covered. This is consistent with the method reported by Huddleston et al. (1984) who reported a 100% success rate for eliciting CSTs by nipple stimulation with minimal uterine hyperstimulation. Huddleston et al. (1984) recommended unilateral nipple stimulation, The respondents in this study reported using both unilateral and bilateral nipple stimulation to a similar degree.

Overall, the sample group had a positive attitude about nipple stimulation for CST. The scores were not highly positive, however, and the variation in the 36 individual scores was great. This may be related to the fact that nipple stimulation is a new technique and was only being used in one of the hospitals surveyed. The nurses may not have had time to develop a definite opinion about nipple stimulation, either positive or negative. This premise is further supported by the finding that neither practice years nor years in labor and delivery were significantly related to any of the attitude scales nor to the knowledge scale. Though the internal consistency reliability of the questionaire was adequate, the questionaire needs further testing to determine its accuracy in determining the attitudes and knowledge of nurses about nipple stimulation for CST.

The nurses from the one hospital which reported using nipple stimulation for CST routinely and has a standard protocol, scored higher than those from the other two hospitals on all scales. The differences between hospitals were statistically significant on the competence subscale, the total attitude scale, and the knowledge scale. Certainly, nurses who routinely perform such a test would have more positive attitudes especially with regard to competence. The knowledge of this group would be expected to be higher also. Other hospitals anticipating the use of nipple stimulation for CST would do well to implement a standard protocol as a reference for nurses.

Knowledge was found to have a significant positive relationship with all scales, except the evaluation subscale. From this finding, two posibilities are apparent. It was possible, first of all, that when a person is knowledgeable about the procedure, his attitude is positive. Next, it is equally possible that persons with more favorable attitudes toward nipple stimulaton for CST are more likely to seek and retain information about it.

Several interesting findings were discovered in terms of the relationship of certain demographic variables to attitudes and knowledge about nipple stimulation for CST. Married nurses in the study had higher scores on the competence subscale, the total attitude scale, and the knowledge scale than those nurses not currently married. This finding, most likely, is not highly meaningful as the number of currently not married nurses (n=7) was much smaller than the married group (n=29). Other characteristics inherent in the married group such as age, experience in nursing,

and experience with nipple stimulation probably influenced this finding.

With regard to basic education and highest level of nursing education, no significant differences were found between the levels. This finding is not surprising as only a very few nursing textbooks contain information about nipple stimulation for CST. Because nipple stimulaton for CST is such a new technique, the procedure may not be a part of nursing curricula at any level.

Finally, as one might expect, nurses who reported their hospital's use of nipple stimulation or who had experience with nipple stimulation for CST scored significantly higher on nearly all scales than those who did not have such an experience. (In only one situation was no significant difference observed. Nurses reporting their hospital's use of nipple stimulation were not significantly different from those reporting their hospital's non-use on the evaluative subscale.) This finding generally supports the assumption that experience influences knowledge positively. Furthermore, in this situation, experience also had a positive relationship with attitudes toward nipple stimulation for CST.

Summary

A discussion of the major findings of the study was presented in this chapter. Overall, labor and delivery nurses have positive attitudes and some knowledge about the use of nipple stimulation for CST. Nurses more experienced with the technique have more favorable attitudes and greater knowledge.

CHAPTER 6

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

A summary of this study which was designed to explore the knowledge and attitudes of labor and delivery nurses about the use of nipple stimulation for CST is presented in this chapter. The conclusions, implications for practice and education, and recommendations for further study conclude the chapter.

Summary

In this study, the Gurley Nipple Stimulation Questionnaire was used to survey 36 registered nurses working in labor and delivery units in three southeastern United States hospitals. The purpose of the study was to investigate the attitudes and knowledge of maternity nurses about the use of nipple stimulaton for CST. The study also analyzed the relationship of the knowledge and attitudes about nipple stimulation for CST. Furthermore, several demographic variables were compared to the nurses' knowledge and attitudes to determine if significant relationships existed. The independent variables included: age, practice years, years in labor and delivery, marital status, education, report of hospital's use of nipple stimulation, having heard about nipple stimulation for CST, and having actually conducted a nipple stimulation CST. The scores of the Gurley Nipple Stimulation Questionnaire were analyzed using descriptive and inferential statistics.

The registered nurses responding to this questionnaire were found to be mostly young, white, married, and with relatively few years of experience in nursing practice and in labor and delivery. Though most of the nurses had heard about the use of nipple stimulation for CST, less than half had actually conducted a CST using this technique.

The findings of the study indicated that this sample of nurses had a somewhat positive attitude toward the use of nipple stimulation for CST. The group also possessed some knowledge of the technique, gained mostly thorough on-the-job experience and from the literature. Nurses from the one hospital where nipple stimulation was routinely used scored consistently higher on every scale than nurses from the other two hospitals. Nurses who reported having used nipple stimulation in the past also scored consistently higher on every scale than nurses who had not used the technique.

Knowledge was found to correlate significantly with attitude on all but one scale, the evaluative subscale. Of the demographic variables, significant differences in knowledge and attitudes were found among the nurses in relation to whether the hospital used the technique, experience with nipple stimulation, and marital status. Those who had heard about nipple stimulation differed from those who had not on only one scale, the knowledge scale. Age, years in labor/delivery and nursing, and education were not found to be significantly related to attitudes and knowledge about nipple stimulation for CST.

Conclusions

This study was conducted to gain information regarding the attitudes and knowledge of registered nurses working in labor and

delivery settings about the use of nipple stimulation for CST. When assessing the data, it must be remembered that the sample used was relatively small. In addition, the sample was taken from three hospitals in one region of the country. Therefore, it would be inappropriate to generalize beyond this population.

The following conclusions are based on the findings of this study:

1. Labor and delivery nurses, generally, have positive attitudes about the use of nipple stimulation for CST.
2. Nurses more experienced with the technique have greater knowledge and more favorable attitudes.
3. Age, education, and years of nursing/labor and delivery experience were not responsible for significant differences in the nurses' knowledge of and attitudes toward nipple stimulation for CST.

Implications

The following implicatons for nursing practice and education are based on the findings from this study:

1. Nurses who may conduct a CST utilizing nipple stimulation should undertake a self-examination of their attitudes regarding nipple stimulation.
2. Continuing education and standard protocols for nipple stimulation CSTs are needed in institutions where nipple stimulation for CST is used.

3. Nipple stimulation as a means of eliciting a CST should be included in maternity nursing courses at all levels of nursing education.
4. New maternity textbooks should include the nipple stimulaton technique.

Recommendations

Based on the findings of this study, the following recommendations for nursing research are presented:

1. Further testing and refinement of the Gurley Nipple Stimulation Questionnaire is needed.
2. A study to determine patients' attitudes about the use of nipple stimulation should be conducted.
3. A study should be conducted to determine if a nurse's attitude has an effect on the outcome of a patient's nipple stimulation CST. Such a study is predicated upon the belief that nurses with negative attitudes may not be able to provide a nonjudgmental atmosphere which may affect patient outcome.
4. Further study, with a larger sample, is needed to explore the knowledge and attitudes of nurses who actually use nipple stimulation for CST.

Summary

This descriptive study was undertaken to explore the knowledge and attitudes of maternity nurses about the use of nipple stimulation for CST. The nurses were found to be somewhat knowledgeable and had favorable attitudes about this procedure.

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APPENDIX A

A COMPARISON OF THE VARIOUS METHODS OF NIPPLE STIMULATION FOR CST

Appendix A: A Comparison of the Various Methods of Nipple Stimulation for CST

	Investigators	N	Methods	Success Rate	Incidence of Hyperstimulation	Average Time Required
1.	Freeman 1982	Not Reported	Patient applies warm cloth to both breasts for 5 minutes followed by unilateral nipple roll for 10 minutes. If no contractions occur, begin bilateral stimulation. When contractions occur, decrease stimulation to "titrate" contractions.	60%	Not Reported	Not Reported
2.	Lenke & Nemes 1984	194 patients 323 tests	Patient performs bilateral nipple massage.	54%	4%	15 minutes
3.	MacMillan & Hale 1984	156 patients 266 tests	Bilateral self nipple stimulation with gentle pulling and twisting of the nipple and areola for 4 minutes continuously. If only 1 contraction occurs, continue for another 4 minutes.	57%	13% successful tests 8% unsuccessful tests	53% in 60 minutes 32% in 90 minutes 15% 90 minutes
4.	Capeless & Mann	346 tests	Patient rolls nipples bilaterally until contraction occurs. Stimulation is then stopped until the uterus relaxes. Continue this process for 20 minutes or until adequate CST.	69%	10.4%	46 minutes
5.	Huddleston, Sutliff, & Robinson 1984	193 patients 345 tests	Gentle unilateral stroking by patient with the palmar surface of the fingers for 2 minutes. Rest for 5 minutes and repeat the stimulation for 2 minutes. Repeat this cycle until 3 contractions in 10 minutes. All stimulation stops when a contraction occurs.	100%	2%	45 minutes
6.	Hill, Moenning, Katz & Kitzmiller 1984	101 patients 185 tests	Patient rolls 1 bare nipple until a contraction occurs, then stops until uterus relaxes. Continue this pattern for 10 minutes. If adequate CST not obtained, begin bilateral stimulation. Continue for 20 minutes or until adequate CST.	95.6%	45.5%	Average time not reported. 90% of patients had uterine activity in 8 minutes.

	Investigators	N	Methods	Success Rate	Incidence of Hyperstimulation	Average Time Required
7.	Copel, Otis, Stewart, Rosetti, & Weiner 1985	112 patients 164 tests	Patient massages and rolls 1 nipple to make it erect and continues until a contraction occurs. If no contraction occurs in a 10 minute period or if no nipple tender, use alternate breast. If no contractions in 10 minutes begin bilateral stimulation until a contraction occurs.	94%	4.8%	12.02 minutes
8.	Gantes, Kirchhoff, & Work 1985	30 patients 30 tests	Patient unilaterally massages breast with mineral oil. Alternate breasts every 10 minutes until adequate CST.	70%	10%	10.8 minutes
9.	Curtis, Evens, Resnick, Rimer, Lynch & Carlson 1986	202 patients in 4 groups	Group I - Bilateral manual self stimulation Group II - Unilateral breast pump Group III - Heating pad Group IV - Placebo/crossover manual stimulation	77.3% 63.1% 35.8% 20.5%/ 73.5%	75.6% 40.5% 36.8% 56.0%	15 minutes

APPENDIX B

GURLEY'S NIPPLE STIMULATION QUESTIONNAIRE

NIPPLE STIMULATION FOR CONTRACTION STRESS TESTING (CST)

QUESTIONNAIRE

Please indicate your response to the following statements by either writing in your answer or making a check on the appropriate blank space.

1. Age _____ 2. Race _____

3. Marital status: single ___ married ___ divorced ___ widowed ___

4. Basic nursing education: A.D. ___ Diploma ___ B.S.N. ___

5. Highest level of nursing education attained: A.D.__ Diploma__ B.S.__ M.S.__

6. Have you heard about the nipple stimulation technique for CST?
   YES ___ NO ___
   If yes, check the sources of information which apply to you.

   Basic nursing education ___
   Graduate nursing education ___
   Hospital inservice education ___
   On-the-job training and/or experience ___
   Literature (journals, books) ___
   Workshops or seminars___

7. Total number of years in nursing practice: ___

8. Total number of years working in labor and delivery: ___

9. What shift do you primarily work?
   7-3 ___ 3-11 ___ 11-7 ___ other _____

10. Have you cared for patients receiving oxytocin for contraction stress testing?
    YES ___ NO ___

11. Have you cared for patients receiving nipple stimulation for contraction stress testing? YES ___ NO ___
    If yes, check the procedure(s) you have used:

    A. unilateral nipple stimulation ___
       bilateral nipple stimulation ___

    B. breast exposed ___
       breast covered ___

    C. nipple rolling ___
       breast massage ___
       warm, moist cloths ___
       breast pump ___
       other (please explain) _____.

    D. nurse does stimulation ___
       patient does stimulation ___

12. Is nipple stimulation currently being used in your hospital?
    YES___ NO___ I DON'T KNOW___
    If yes, do you follow a standard protocol? YES___ NO___

Indicate your responses on each of the following statements. Draw a circle around the words which best describe your agreement. The word code is as follows. SA = strongly agree, A = agree, UD = undecided, D = disagree, SD = strongly disagree.

1. Contraction stress testing (CST) is a useful tool in helping to determine fetal wellbeing.	SA	A	UD	D	SD
2. Nipple stimulation should not be used as an alternative to intravenous oxytocin as a means of eliciting a CST.	SA	A	UD	D	SD
3. Intravenous oxytocin is a more accurate means by which to elicit a CST than nipple stimulation.	SA	A	UD	D	SD
4. The dangers associated with the CST are not appreciably reduced with the nipple stimulation technique.	SA	A	UD	D	SD
5. The use of nipple stimulation for CST is safer than the use of intravenous oxytocin because it involves normal physiological processes.	SA	A	UD	D	SD
6. A CST from nipple stimulation is not as clearly interpreted as CST from intravenous oxytocin stimulation.	SA	A	UD	D	SD
7. The financial cost of a CST can be significantly reduced with the use of nipple stimulation.	SA	A	UD	D	SD
8. In terms of times, the nipple stimulation technique requires more time than the intravenous oxytocin technique.	SA	A	UD	D	SD
9. A nipple stimulation CST probably causes less anxiety for a patient than an intravenous oxytocin CST.	SA	A	UD	D	SD
10. Nipple stimulation is an intrusion on a patient's privacy and should not be used for CST.	SA	A	UD	D	SD
11. Patients should be allowed to choose whether they prefer to have a nipple stimulation CST or an intravenous oxytocin CST.	SA	A	UD	D	SD
12. I believe I am qualified to conduct a nipple stimulation CST.	SA	A	UD	D	SD
13. I believe I am qualified to conduct an intravenous oxytocin CST.	SA	A	UD	D	SD

14. I believe I am able to assess a patient who is having an intravenous oxytocin CST. SA A UD D SD

15. I believe I am not able to assess a patient who is having a nipple stimulation CST. SA A UD D SD

16. I am prepared to interpret the results of a nipple stimulation CST. SA A UD D SD

17. I am not prepared to interpret the results of a nipple stimulation CST. SA A UD D SD

18. I could help to reduce a patient's anxiety about the intravenous oxytocin CST. SA A UD D SD

19. I could not help a patient reduce her anxiety about a nipple stimulation CST. SA A UD D SD

20. The idea of having a pregnant woman stimulate her own nipples is distasteful to me. SA A UD D SD

21. The breasts should not be exposed during a CST. SA A UD D SD

22. Most patients undergoing a nipple stimulation CST would not be embarrassed. SA A UD D SD

23. I would feel comfortable assisting a patient perform nipple stimulation on herself for CST. SA A UD D SD

24. I would not feel comfortable performing nipple stimulation on a patient's breasts for CST. SA A UD D SD

25. If I were a pregnant patient in need of a CST, I would agree to nipple stimulation. SA A UD D SD

26. A woman's breasts are integrally related to her sexuality and should not be used to help elicit a CST. SA A UD D SD

* *

For the following statements, please indicate your answer by circling true, false, or I don't know.

27. The nipple stimulation CST has the potential for causing fetal bradycardia.

TRUE FALSE DON'T KNOW

28. The nipple stimulation CST has been found to be an effective, convenient alternative to the costly, time consuming oxytocin challenge test.

TRUE FALSE DON'T KNOW

29. During a nipple stimulation CST, the stimulation should be continued throughout a contraction.

TRUE FALSE DON'T KNOW

30. The left lateral position may decrease the possibility of uterine hyperactivity during the nipple stimulation CST.

TRUE FALSE DON'T KNOW

31. Intermittent stimulation with rest periods may decrease the incidence of hyperstimulation and increase the success of testing.

TRUE FALSE DON'T KNOW

32. Nipple stimulation during late pregnancy is thought to result in an endogenous release of oxytocin from the posterior pituitary which causes uterine contractions.

TRUE FALSE DON'T KNOW

33. The contractions elicited by nipple stimulation should be sufficiently strong for the operator to palpate in order to ensure an adequate test of placental reserve.

TRUE FALSE DON'T KNOW

34. A nipple stimulation CST should only be conducted in a hospital in order to provide adequate safety for the patient.

TRUE FALSE DON'T KNOW

35. The average time required for a nipple stimulation CST is less than one hour.

TRUE FALSE DON'T KNOW

36. Patient acceptance of the nipple stimulation technique is reported to be quite high.

TRUE FALSE DON'T KNOW

* *

If you have comments about the study or questionnaire, please write them on the back of this page.

APPENDIX C

LETTER TO NURSING DIRECTORS

Dear Nursing Director:

I am a graduate student in nursing at East Carolina University. My interest and clinical backgrond is in maternal and child health. Therefore, I have planned a study which will investigate knowledge and attitudes of maternity nurses concerning new techniques for conducting a contraction stress test. I hope to be able to give questionnaires to nurses employed in labor and delivery settings in North Carolina, and am very interested in including your hospital in this study.

Anonymity of any participant and hospital in the study will be maintained, and results of the study will be available to participants on request.

I would like an opportunity to discuss this further with you. I plan to call your office later this week for an appointment.

Sincerely,

Lucinda Gurley

Lucinda Gurley

APPENDIX D

LETTER TO PARTICIPANTS

Dear Registered Nurse:

As many of you are aware, a new technique for eliciting a contraction stress test is being used in some hospitals in this country. It involves the use of nipple stimulation to achieve an adequate contraction pattern for the contraction stress test. I am interested in studying the knowledge and opinions of registered nurses working in labor and delivery settings regarding the use of the nipple stimulation technique. Your responses will help us to better understand the feelings of nurses concerning the use of nipple stimulation.

The questionnaire includes a list of statements about contraction stress testing and asks that you circle the words indicating your agreement with the statement. Your opinions are requested. A short section of true/false statements are included to indicate your current knowledge about nipple stimulation. There is also a brief background information page.

Participation in this study is voluntary. All information is confidential and no individual responses will be reviewed by anyone other than the researcher. I am interested in groups of responses. You may refuse to participate, or withdraw at any time, without consequence.

Completion of the questionnaire and background page will take approximately ten minutes. Please put the completed questionnaire in the box provided. Return of these questionnaires constitutes informed consent to act as a subject in this study.

Thank you for your participation.

Sincerely,

Lucinda P. Gurley

Lucinda P. Gurley, RN, BSN