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ABSTRACT

The Infant Care Survey (ICS) was developed to measure new mothers' confidence in their knowledge and skills regarding the care of babies under one year of age. One potential use of this test would be the identification of groups at high risk for health problems or for avoiding medical care. Self-efficacy was an important construct in the development of the ICS; expectations that a behavior will be performed successfully determine which behaviors are attempted or maintained to completion. The ICS originally contained 48 items measuring knowledge or skills in the following areas: infant health, diet, and safety. Following review by nurses and hospital staff, a 51-item scale was finally constructed. Respondents were asked to rate their feelings of confidence on a five-point Likert scale. The ICS was administered, in 5 to 15 minutes, to 142 males and females in hospitals, homes and classrooms. Analyses revealed that test reliability was .975. Component analysis suggested one unifying dimension underlying the scale. The items indicating the greatest confidence included behaviors which are commonly performed and observed. It was concluded that test reliability and test validity were acceptable. The survey form is appended. (GDC)

Infant Care Self-Efficacy[1]

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INTRODUCTION

There has been a recent shift in the nature of health care intervention. Traditionally, health care was sought in crisis situations. Currently, there is an increasing emphasis on prevention of illness and maintenance of wellness. To encourage this trend, health care providers have felt the need to know more about explaining and predicting human behavior. More specifically, they need to know when an individual is likely to enter the health care system, or avoid it, if they are in a state of general wellness. For high risk populations, providers need better predictors of both who is at risk and who will need solicitation into the health care system.

The present research is focused upon a limited group of health care consumers--new mothers and their neonates. The goal of the research was to develop a valid, reliable and easy to use tool to assess mothers' confidence in their knowledge and skills for the care of babies under one year of age. It is hoped that this tool will eventually be found useful in identifying groups at risk for actual health problems or at risk for avoiding health care.

BACKGROUND AND THEORY

Since educators and psychologists have been attempting to predict human behavior for many years, their literature is studied by many health care professionals. Historically, there are two schools of thought and research used by the educators and psychologists to provide the framework for theory and practice. One, behaviorism, stresses external events and one's history of rewards and punishments. The other, cognitivism, is concerned with the internal, unobservable workings of the mind. A more recent framework, social learning theory, attempts to synthesize the earlier approaches. It assumes that both internal and observable, measurable processes interact to produce human behaviors. Social learning theorists maintain that the ability

"...of people to process and store symbolic information

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allows them to perform complex cognitive operations, such as anticipating consequences of actions, representing goals in thought and planning necessary steps to accomplish them, and weighing evidence from different sources to arrive at capability self-appraisals" (Schunk & Carbonari, 1984, p. 230).

The emergence of the construct of self-efficacy has added to the appeal and utility of social learning theory. Self-efficacy research has helped to identify a link between cognitive processes and behavioral outcomes (Bandura, 1977). Self-efficacy theory suggests that predictions of modeling outcomes are most accurate when the learner's expectations are considered (Bandura, 1984). In health care, this idea translates into practice to imply that knowledge of health care facilities and skills is necessary but not sufficient to produce performance. For example, a new mother may attend carefully to a demonstration on taking rectal temperature, but may not attempt performance if she expects failure. If self-efficacy operates as it is proposed to, both knowledge and confidence would interact to predict performance and use of services and facilities.

Bandura (1977) maintained that expectations of personal competence, or the conviction that a behavior required to obtain a desired outcome can be performed with success, determine what behaviors are attempted or maintained to completion. In application, self-efficacy suggests that if people feel able to perform skills needed to accomplish a goal, they are more likely to attempt to reach the goal, spend more time in their efforts, and intensify their efforts rather than give up when faced with failure. In the health care setting, that means practicing prevention, seeking care when recommended or needed, and complying with recommendations for interventions even if success is not immediate.

Bandura (1982) has proposed that our judgements of self-efficacy are based on four sources of information. The most important is our own performance attainments or history of behavior. The second most important is vicarious experiences, or observations of the performance of others. The last two sources are verbal persuasions, usually from others, and one's physiological state. While performance attainment provides the strongest sources of information in establishing feelings of self-efficacy, Bandura (1984) has cited widespread evidence that all four sources can enhance feelings of confidence. Knowledge of the influences of these sources is useful in practice situations where the goal is to attempt to improve attitudes of efficaciousness.

The goal of this research was to develop a self-efficacy instrument addressed to new mothers. An useful scale to assess mothers' feelings of efficacy regarding the care of their new infant must meet basic criteria of any measurement instrument. First, it must show reliability of measurement. Next, it needs

evidence that the construct being assessed has been well sampled. This is usually termed content validity. Finally, evidence of construct validity is necessary prior to responsible use of such a scale. One documentation of construct validity is that a scale claiming to measure a construct can produce a simple, one-dimensional score. The remainder of this paper presents evidence of these requirements for the Infant Care Survey (ICS; Froman & Owen, 1985).

METHOD

ICS Development. The ICS (see Appendix A) was originally constructed and analyzed in this report as a fifty one item scale. Forty eight statements that represented usual and important infant care behaviors were written. These statements were then reviewed by six faculty members in nursing departments at three universities, three visiting nurses at one community agency and two hospital staff on maternity floors in a major hospital. Following review, three items were added and statements were edited to read as shown in Appendix A.

Items were grouped into six sections indicative of either knowledge or skills required to foster feelings of efficacy. The conceptual groupings within the knowledge or skill domains are health, diet and safety behaviors. Respondents are asked to indicate their feelings of confidence about each behavioral statement. Ratings are on a five-point Likert type rating ranging from very little confidence to quite a lot of confidence.

Subjects. Validation data were collected in numerous settings. They included hospitals (regular and high risk obstetrical units), home visits to new mothers, clinical nursing sites and college classrooms. Subjects ranged in age from fifteen to over forty. Caucasian, black and Hispanic groups were represented in the sample as were males and females. Educational preparation ranged from middle school to college graduate. One hundred and forty two subjects' responses were analyzed to generate reliability and validity data.

Data Collection. Data were collected on the original ICS (see Appendix A). The questionnaire was individually explained and administered to all new or prospective mothers in the hospital or home settings. The questionnaire was group administered in the classroom settings. It took between five and fifteen minutes to complete, depending upon the subject. Subject's age, sex, race, number of children, birth order and site of data collection were recorded on all questionnaires.

Data Analysis. Data were analyzed in three steps. First, alpha internal consistency estimates were calculated for the overall scale and two major subscales, knowledge and skill behaviors. Second, a principal components factor analysis was

conducted to verify the dimensions underlying the scale. Finally, two procedures were used to provide evidence of construct validity. Item means were visually inspected to determine how they matched hypotheses regarding which responses should indicate high confidence or low confidence based upon self-efficacy theory. Additionally, stepwise multiple regression analysis was used to determine if predictors of self-efficacy supported Bandura's (1982) sources of information for the construction of efficacy expectations. Three regression analyses were performed to predict confidence in infant care knowledge (health, diet and safety knowledge), skill (again, health, diet and safety), and total scale score. Subscale scores were constructed by calculating the mean item rating given to the group of itemss in the first three sections for knowledge, the last three sections for skill (see Appendix A). Independent variables in the regression analyses were the demographic data, including identification of age, race, sex, number of children, birth order and educational preparation (current college enrollment).

RESULTS

Reliability Data. The alpha internal consistency estimate for the 51-item total scale was found to be .975. The estimates for the two major subgroups of items, knowledge and skill, were .947 and .963, respectively.

Validity Data. A principal components analysis of the 51-item scale yielded nine components with eigenvalues greater than one in the unrotated solution. The first component had an eigenvalue of 23.77, meaning that the component explained nearly 24 times as much variation as did the average item. The next most powerful component had an eigenvalue of 3.64, with remaining component eigenvalues ranging from 2.06 to 1.08. The first component explained 46.6 percent of the variance in responses. The group of eight components explained less than 28 percent of the remaining variance underlying the scale.

Component loadings of items on the first unrotated component ranged from .39 to .80, all positive in value. Loadings for the remaining eight components were variable, showing a wide range of values.

Inspection of rotated component matrices supported the single component solution. In both orthogonal and oblique (varimax and oblimin) loading matrices, two smaller groupings of items emerged that distinguished themselves from the single component solution. Items one, two, ten and thirty six, all related to health behaviors, and items sixteen through nineteen, related to diet knowledge, compose the two groups respectively.

Item means are presented in Table 1. The five items showing the highest mean and therefore indicating the greatest degree of respondent self-efficacy in performance of the behavior are as follows:

aying with your baby (X=4.52);
olding your baby (4.46);
anging a diaper (4.40);
alking while holding your baby (4.32); and,
dentifying safety hazards in the home (4.31).

The five items showing the lowest means, indicating the least confidence are as follows:

17. Recognizing croup (X=2.54);
. Knowing immunization schedule (2.64);
3[illegible]. Treating constipation (2.80);
39. Relieving gas pains (2.82); and,
38. Treating diarrhea (2.92).

The multiple regression analysis to predict overall score on the ICS reached a multiple R of .537 (R^2 =.289) with a set of five predictors (df=5,136). The corresponding F value of 9.069 is significant at p<.001. The optimum predictor set for the total ICS score included respondent's sex, age, Caucasian or non-white status, number of children and current enrollment or non-enrolled status in an undergraduate education course.

Prediction of the mean score on the knowledge items reached a multiple R of .532 (R^2 =.283) with a set of five predictors (df=5,136). The corresponding F value of 8.815 is significant at p<.001. The optimum predictor set contained the same independent variables as the equation selected for maximum prediction of the total test score (see above).

Prediction of the mean score on the skill items reached a multiple R of .522 (R^2 =.273) with a set of three predictors (df=3,138). The corresponding F value of 8.384 is significant at p<.001. The optimum predictor set for the skill item means contained the independent variables of sex, age and birth order.

DISCUSSIONF

Reliability Data. The alpha internal consistency estimates for the total and subscale scores are encouraging. They indicate a good deal of consistency in respondents self ratings of confidence in infant care behaviors. The estimates are sturdy enough to allow subsequent discussions of the validity of the scale.

Validity Data. The component analysis results suggest that there is one unifying dimension underlying the scale. Although it was originally thought that there would be at least two substructures within the scale, one reflecting confidence in knowledge and the second confidence in skills, these components were unable to demonstrate sufficient empirical support. While eight minor components did emerge, grossly corresponding to health, diet and safety knowledge and skill groupings, the strength of the single component solution overpowered them.

Two distinctly different groups of items were found in the rotated solutions. Upon inspection, these items appear to require different behaviors by respondents. The first group, reflecting knowledge of immunization and physical exam schedules

and identification and treatment for the croup, are very specific behaviors not easily learned by observation of others. In particular, it may be difficult to observe others performing these behaviors.

The second group are linked closely by their content. Items sixteen through nineteen are preparatory behaviors for feeding a baby. The grouping of those items as slightly distinct and homogeneous supports their grouping on the scale itself. The grouping, or more specifically, the exclusion of item twenty, "knowing how to *use* a baby bottle," suggests a scale revision. Although it is framed in a statement reflecting knowledge, item twenty probably best fits in the group of items distinguished as diet skills rather than diet knowledge.

To summarize the component analysis results, while there is some evidence of minor components within the scale, there is not sufficient empirical support for generating subscale scores. A total test score provides an internally consistent reflection of respondents' overall self-efficacy in infant care behaviors.

The pattern of item means is consistent with theory of how feelings of efficacy are developed. The items showing the highest mean ratings, and thus the greatest sense of efficacy by subjects, are those behaviors of infant care that are most commonly performed or observed. One need not be a parent to play with or hold a baby, change a diaper or walk with a baby. In fact, these are behaviors very commonly performed by siblings, aunts, uncles, baby sitters and others. They are also behaviors frequently depicted in the popular media. Self-efficacy theory suggests that one's estimates of efficacy are based upon reinforcement history and vicarious learnings. The highly rated items are those one is most likely to have succeeded at previously or to have vicariously experienced.

Similarly supportive of theory, the lowest rated items are those least likely to have been commonly performed or observed. While croup is experienced by as many as one third of all children under age three, with the majority of cases being found in infants (Whaley & Wong, 1985), most prospective or new parents indicated lack of confidence in recognizing it. It is not an ailment commonly diagnosed by non-medical personnel. Knowledge of an immunization schedule is another behavior not commonly practiced or observed. Parents must know the schedule to provide good care for children, but few commit it to memory. Doctors send reminders to parents when shots are due and give written immunization booklets so parents will not have to rely on their memory.

The other items receiving low ratings reflect behaviors that are difficult to succeed at, for both parents and non-parents. Treating constipation or diarrhea or relieving gas pains in infants are challenging tasks, and so do not offer easy opportunity for success or vicarious reinforcement. Without success, strong, positive feelings of self-efficacy are difficult to generate.

The regression analyses offer continued support of

theory. In each regression, sex was the single most powerful predictor. Females in the sample felt more efficacious about infant care behaviors. Regardless of current trends toward androgeny and sharing of care, females in society continue to be the people most likely to be actively involved in infant care or planning for (vicariously experiencing) care situations. This finding offers evidence of construct validity. Infant care, for which females have a greater chance to perform with success and to observe similar models succeeding, reveals a greater measurable sense of efficacy in females than in males.

Age and number of children as predictors of efficacy also support theory. Both increasing age and having children make it more likely that one will have actively experienced or have been vicariously reinforced for caring for a neonate.

Racial status, either white or non-white, and current educational activity are not as obviously supportive of theory. These variables may be proxy measures for a broader construct of advantage in society. If this is the case, then the relationship between these variables and self-efficacy is likely to be more general than just the relationship with the ICS described here. If success experiences and vicariously experienced successes lead to enhanced feelings of self-efficacy, it is predictable that college students and whites in our society would feel more efficacious than others.

CONCLUSIONS AND REMARKS

The validity and reliability data on the ICS are supportive for its use. A single, reliably measured construct is being tapped by the scale. Sources of information leading to the formation of feelings of efficacy in subjects support self-efficacy theory. However, because stepwise regression procedures tend to overestimate relationships, cross validation on a new data set will be necessary to confirm these findings.

Directions for future research are clear. The goal of developing a self-efficacy scale for use with new parents is to promote prevention of health problems. With supportive evidence for the validity and reliability of the scale, its predictive worth needs to be documented. Infants offer a unique subject pool for study. To be in compliance with American Academy of Pediatrics (AAP; 1982) guidelines and requirements found in most states, infants must be seen four to five times by some health care provider during their first year of life. They receive a blood test to determine the presence of phenylketone urea at two weeks of age and immunizations and exams at two, four and six months of age. Each of these health care visits offer an opportunity to study longitudinally the relationship between parents' feelings of efficacy and their actual health care actions toward their infants. A proposal is currently before the review board of a major teaching hospital to conduct just such a research study. Specifically, mothers will complete the ICS after giving birthand prior to discharge. These mothers will be

contacted when their babies are three weeks, three months, five months and seven months old. Compliance with AAP guidelines will be assessed. The predictive strength of mothers' ICS scores in identification of infants at risk for noncompliance will be determined.

Some unanticipated outcomes of the validation of the ICS deserve comment. Student nurses and public health nurses were data collectors in this study. Originally it was hoped by the researcher that the ICS would be found useful by nurses in their plans for instruction of new mothers. Unsolicited comments from data collectors revealed that they were using the scale to organize their instructional efforts even before they talked to the subjects.

New mothers, when asked if they need information about child care, often deny concerns before leaving the hospital. The hospital nurses collecting data for the study said that completing the instrument frequently served to motivate the mothers to ask questions and seek instruction. It seemed to orient the subjects to common concerns faced by most new mothers. It gave them a place to *start* asking questions, something the nurses hypothesize may have been missing previously.

Finally, the ICS seems to be basic enough so that even the most anxious new mother can find some behavior she feels efficacious about. Nurses reported that referring to items such as "holding your baby" or "playing with your baby," those getting high confidence ratings across all subjects, allowed them to boost confidence in anxious moms. That identified feeling of efficacy provided the starting point for the nurses to work from in instruction and reducing primiparous anxiety.

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APPENDIX A

INFANT CARE SURVEY

DIRECTIONS: Your responses are confidential and will help us to improve our services. There are no right or wrong answers.

How much confidence do you have about doing each of the behaviors listed below?

A very little — B — C — D — E quite a lot

CONFIDENCE

Health Knowledge

A B C D E 1. Knowing immunization schedules.
A B C D E 2. Knowing schedule for physical exam.
A B C D E 3. Recognizing signs of an ear infection.
A B C D E 4. Identifying diaper rash.
A B C D E 5. Knowing when to get help from the clinic, emergency room, or doctor.
A B C D E 6. Recognizing teething.
A B C D E 7. Knowing regular breathing sounds of babies.
A B C D E 8. Recognizing congestion.
A B C D E 9. Recognizing an allergic response.
A B C D E 10. Recognizing croup.
A B C D E 11. Knowing expected weight gain patterns for an infant.
A B C D E 12. Recognizing constipation.
A B C D E 13. Recognizing diarrhea.
A B C D E 14. Recognizing gas pains.
A B C D E 15. Knowing normal growth and development patterns.

Diet Knowledge

A B C D E 16. Knowing how much to feed your baby.
A B C D E 17. Selecting the best formula.
A B C D E 18. Selecting baby foods.
A B C D E 19. Planning a balanced diet for your baby.
A B C D E 20. Knowing how to use a baby bottle.

Safety Knowledge

A B C D E 21. Identifying safety hazards in the house.
A B C D E 22. Choosing safe baby toys.
A B C D E 23. Choosing safe baby furniture.
A B C D E 24. Choosing safe baby clothes.
A B C D E 25. Knowing which medications are dangerous.
A B C D E 26. Knowing safe positions for a baby after feeding.
A B C D E 27. Knowing what articles are safe to leave with your baby in the crib or baby seat.

A	B	C	D	E
very little	<---------- CONFIDENCE ---------->			quite a lot

Health Skills

A	B	C	D	E	28. Treating diaper rash.
A	B	C	D	E	29. Burping your baby.
A	B	C	D	E	30. Weighing your baby.
A	B	C	D	E	31. Taking your baby's temperature.
A	B	C	D	E	32. Changing a diaper.
A	B	C	D	E	33. Relieving pain from teething.
A	B	C	D	E	34. Relieving congestion.
A	B	C	D	E	35. Giving your baby a liquid medication.
A	B	C	D	E	36. Relieving croup.
A	B	C	D	E	37. Treating constipation.
A	B	C	D	E	38. Treating diarrhea.
A	B	C	D	E	39. Relieving gas pains.
A	B	C	D	E	40. Establishing a sensible sleeping schedule.
A	B	C	D	E	41. Soothing your crying baby.

Diet Skills

A	B	C	D	E	42. Breast or bottle feeding your baby (whichever way your baby is fed).
A	B	C	D	E	43. Spoon feeding your baby.
A	B	C	D	E	44. Preparing baby food.
A	B	C	D	E	45. Introducing new food into baby's diet.
A	B	C	D	E	46. Establishing a sensible feeding schedule.

Safety Skills

A	B	C	D	E	47. Holding your baby.
A	B	C	D	E	48. Bathing your baby.
A	B	C	D	E	49. Using a car seat.
A	B	C	D	E	50. Walking while holding your baby.
A	B	C	D	E	51. Playing with your baby.