

The objective of this study is to compare the effectiveness of teaching groups of people by nurses with traditional instruction in the home. A related aim was to determine the relative costs of the two methods. Findings are reported and discussed. The impact of this evaluation study on staff is also presented.

# A Comparative Study of Public Health Nurse Teaching in Groups and in Home Visits

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## Introduction

Early in 1969 the nursing service of the Seattle-King County Health Department was feeling the impact of two opposing forces. Due to serious reduction in the city's industry and economy, the concomitant loss of groups seeking employment elsewhere and budgetary restrictions imposed on tax supported agencies caused a marked reduction in the number of public health nursing staff in the Health Department. At the same time, the demands for nursing service were increasing rapidly, with requests for care of the ill at home, of new mothers, and of mentally ill patients alone taxing the Department's nursing resources. The pressure of such conflicts requires reassessment of priorities and service plans: less urgent services have to be reduced and it becomes increasingly important to consider ways of providing nursing care as efficiently as possible.

As had been reported by others,<sup>1,2,5,8</sup> work with a few small groups in Seattle had already indicated there were advantages to be gained through group work. In planning further economies, therefore, more use of the group approach was suggested as a possible means of decreasing the number of home visits to patients, particularly those visits directed toward health education and preventive health practices. When such a change in the delivery of nursing care is considered, however, the critical question is whether nurses function in group settings as effectively as they do in the more familiar one-to-one environment of the patient's home. If they do, the next question is whether group sessions are in fact more economical than home visits.

These ideas were brewing when our Department was invited to be involved in an educational program in the application of epidemiological methods in program evaluation at the University of North Carolina School of Public Health sponsored by the Division of Nursing, Bureau of Health Manpower Education, National Institutes of Health, Department of Health, Education, and Welfare. Through the course of study we were to be assisted in formalizing and carrying out an evaluation study in a program area of our own choosing. We decided to pose our questions regarding the group method of providing service prior to formally introducing this approach into the public health

nursing program of the Seattle-King County Health Department.

## The Study Design

The stated purpose of this study was to compare the effectiveness of nurses' instruction of individuals in groups with the traditional method of teaching in the home. Determination of the relative cost of the two types of service—group teaching versus home visiting—was considered an important but only a secondary goal.

Formulation of the study design required that this first decision be followed by many others. It was necessary, for example, to select the patient study group, to consider influences other than the nursing service which might affect group responses, to specify the areas of instruction and to determine what measures of effectiveness might be used.

No systematic evaluation of health teaching of groups was found in the literature but several references provided information as to why such an evaluation had not been but should be done,<sup>1,3,5</sup> what factors should be considered,<sup>4,7,8,13</sup> and how to develop the study plan.<sup>2</sup> Other references provided guides in developing effective group discussions.<sup>9,11</sup> Many of these suggestions were utilized and helped to strengthen the design.

Mothers of new infants were chosen as the study group because of the earlier, seemingly successful experiences of some of the staff with these patients, because they have priority for nursing service, because instruction in infant care and prevention of illness is a primary focus of the service provided, and because the potential population was large enough to assure adequate numbers for study purposes. Also, since mothers in upper, middle, and lower income levels from all parts of the county are referred to the Health Department, the selection of this group would permit examination of the data for possible differences in nursing effectiveness among various social and economic groups.

About 4,000 mothers with newborns are referred to

the Health Department for nursing service annually by private physicians, hospitals, the Department of Public Assistance, and by the mothers themselves. Their names are listed sequentially in a log kept in each of the eight decentralized nursing offices located throughout the city and county. Following referral, these mothers are visited at home by a public health nurse who assesses the need for care and develops her general plan of care. Whenever the nurse determines there are no needs for nursing service or feels the needs have been met, she closes the case.

Because we consider the nurse's assessment and care of the mother and infant during the infant's first month of life of utmost importance, no change was made in this established service plan. Instead, the study population consisted of those mothers who were still being seen by the public health nurse when the baby was one month of age. Each nursing office obtained its potential study population from the list of mothers entered on the log who met this study criterion.

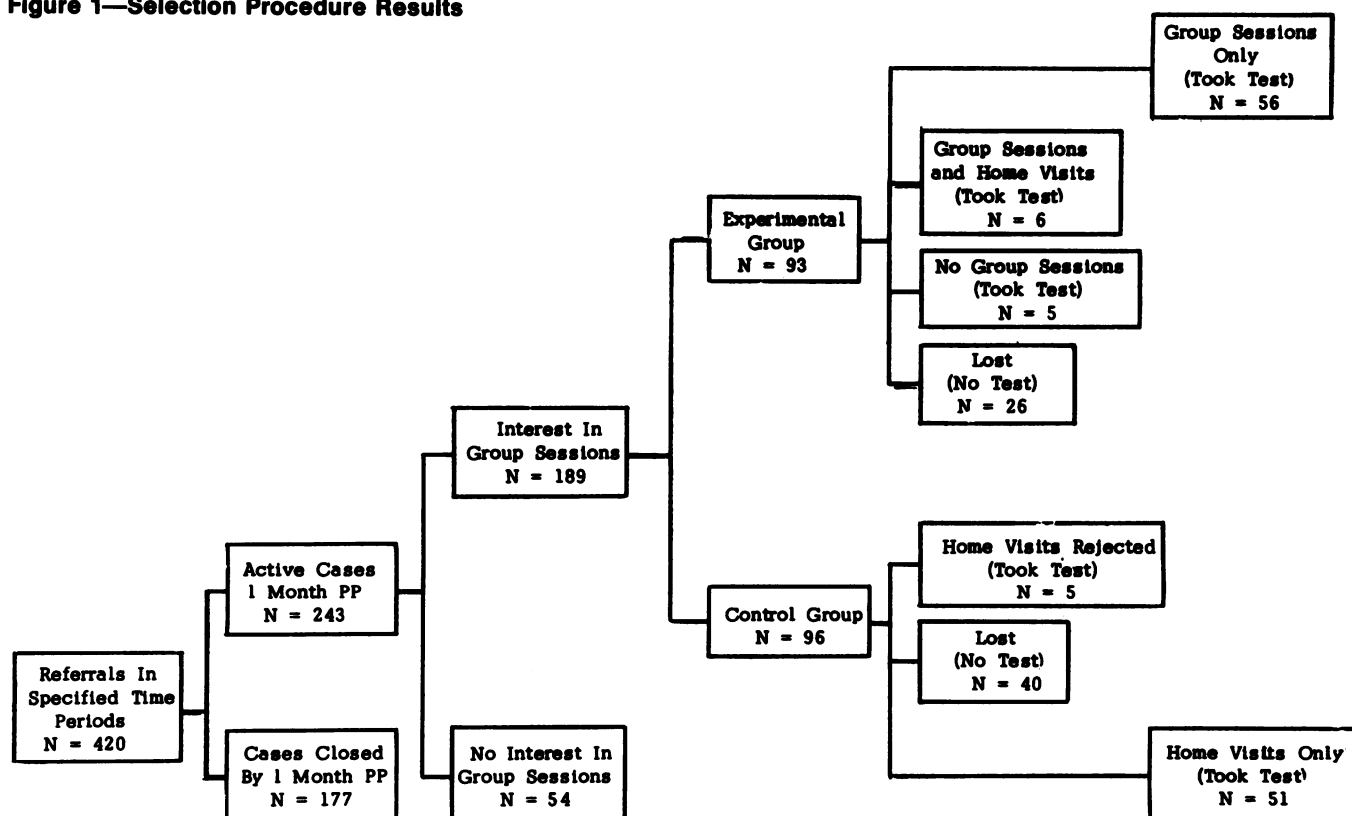
Methods of randomly assigning mothers to experimental and control groups were considered but none seemed feasible or appropriate. Recognizing the limitations involved in the process selected, the study team decided to assign all potential study participants who were referred to service over a consecutive two-month period to one study group and all those referred over the following two-month period to the other study group. This process yielded approximately 30 to 40 possible candidates for the study in each nursing office. About half of the nursing offices developed the experimental group first and the control group sec-

ond. The other nursing offices reversed the order and started with the control group. The order in which an office started depended on its readiness to initiate group discussions.

In order to reduce the risk of biasing the study findings due to including individuals who are characteristically "joiners" of groups along with those who are "non-joiners," one further stipulation was made in selecting the population. Mothers identified as potential candidates for the study were asked by their public health nurse if they would be willing to participate in group discussions as a substitute for home visits. Only those who responded affirmatively comprised the study population. Figure 1 presents a flow chart showing the results of each selection procedure which, from a potential group of 420 referrals, produced an initial study population of 189 mothers.

Figure 1 also describes events which occurred later, during the course of study, which further reduced the population: out of the 93 mothers in the experimental groups, 5 did not attend any group session, 6 attended the group sessions but had difficulties during the study period which necessitated nursing home visits, and 26 mothers could not be located to complete the test questionnaire. Similarly, losses occurred in the control groups. Five mothers refused the nursing home visits and 40 either moved or returned to employment so that they could not be reached for the procedure. As a consequence, the study included a total of 107 mothers, 56 in the experimental group who attended group sessions and 51 in the control group who obtained home visits only.

**Figure 1—Selection Procedure Results**



In addition to considering an individual's interest in and willingness to join group activities, there are many other influences and individual characteristics which might affect the participants' knowledge of infant care besides the method of instruction. Recognizing that we could not control all of these variables, we selected to include at least those which had been demonstrated or are generally presumed by medical and public health practitioners to influence mothers' need for instruction.

Age, years of education, number of children, and marital status of mother represent living experiences which may account for differences in baby care. Income level, ethnic background, and neighborhood of residence were other social influences considered relevant to this evaluation. Actual experience with and participation in civic and other organized social group activities were also included for analysis.\*

A brief description of the study population, using just a few of these attributes, illustrates the various types of persons represented. The 107 mothers ranged in age from 15 through 40 years, but only 11 of them were under 20 years of age. Fifteen of the mothers were single, 89 married and 3 divorced. Ninety-two of the group (86%) were new mothers, in that this was their first baby. Eighty per cent of the group were white, 12 per cent were black and 8 per cent represented other origins.

The study mothers represented a wide distribution of educational levels. Only 12 per cent had not completed high school, 41 per cent were high school graduates, and almost half (47%) had had some college experience. Fifteen of the group reported post-graduate study. This undoubtedly reflects the influence of several large local universities on the educational level of the community.

Hollingshead's Two Factor Index<sup>6</sup> was used to measure the social economic status of the group. Similar to education, all levels of social class were represented in the study. One-fourth of the participants were in the two upper classes, 19 per cent were in the middle class and 60 per cent were evenly divided between the two lower social classes. This is another reflection of the community and of the influence of large engineering and research industries on the population.

Public health nursing contacts with the study mothers were one of the essential aspects of the study. These were measured in terms of 1) the number of home visits made during the infant's first month of life, prior to entry into the study, 2) the number of home visits made following the mother's admission to study, 3) the number of group sessions attended for nursing instruction, and 4) the number of nursing visits made with the mother by phone during the study.

Although differences in teaching competencies of the nurses were recognized as variously affecting mothers' learning, along with other patient-nurse interactions, no attempt was made to examine the staff on teaching ability. Similarity in the nurses' backgrounds, however, should be noted. They all had at least a baccalaureate degree with educational preparation in public health nursing. All provided

maternal and child health care to patients in their districts and were expected to provide a generalized family-focused public health nursing service.

Many possible approaches to measuring the effectiveness of the nurses' instruction of mothers in infant care were discussed. Various evidences of infant health and health care were considered along with health knowledge, observable actions and patterns of care of the mothers. The decision was finally reached to limit this study to a measure of the mothers' knowledge of selected aspects of infant care, specifically the appropriate utilization of health resources for childhood problems, since lack of knowledge of available health resources had been identified in a previous study as one of the causes of unmet health care needs in the community.<sup>7</sup>

In searching the literature an instrument was found, designed by Stine and Chuaqui to measure "Mother's Intended Actions for Childhood Symptoms,"<sup>12</sup> which could be adapted for this study. The instrument consisted of a series of vignettes that measured what a mother said she would do if her child presented certain symptoms under specified circumstances. The tool was modified for the study by selecting 24 of the 38 vignettes and eight possible responses for each which were applicable to our service. The resulting questionnaire is presented in Figure 2.

"Appropriateness of response" to the problems presented in the test instrument was determined by a panel of ten public health nurse supervisors. Each supervisor checked what she thought to be the most appropriate response to each situation given in the vignette. The rationale for this procedure was that the supervisors reflect nursing theory and that nursing instruction of mothers is based on this theory. The distribution of the supervisors' choices is also shown in Figure 2.

The vignettes were scored by awarding points for each response in accordance with the number of supervisors who had also selected that response. For example, if a mother chose #8 for vignette #7, she received a score of 2 for that vignette. Under this system, the highest possible score was 150.

A pretest was given to mothers and to public health nurses to determine, among other things, if the words "would" or "should" in the vignettes made a difference in the responses. Essentially no difference was found.

The administration of the questionnaire was considered "before" and "after" the nursing service was given to measure change in mothers' knowledge but, because of time limitations, problems of "test recall," and because there was little reason to expect that the method of assigning mothers to groups would selectively result in those with more, or less, knowledge on the test items in either experimental or control groups, the idea was rejected. Therefore, only one test was given following the period of nursing instruction.

The testing instrument was administered to the experimental groups during the final session of their group. After each mother had completed her questionnaire, it was collected by volunteers for the study. If a mother was absent for the last sessions, the volunteer went to her home to administer the test. A volunteer also went to the home of each mother in the control group to have her questionnaire completed.

In order to avoid any influence in the nurses' teaching of mothers, in groups or in their homes, no infor-

\*A social participation score was developed to measure this variable by combining the number of organizations a mother belonged to (one point per organization), the number attended regularly (two points per organization), the number of committee assignments (four points per committee), the offices held (five points per office), and the number of people in the area considered to be friends (one point per friend).

Figure 2—Vignettes of Health Related Situations and Weighted Scores

SELECT ONE OF THE FOLLOWING 8 ANSWERS FOR THE QUESTIONS BELOW:

- |   |  |
|---|--|
| 1. SEEK MEDICAL CARE IMMEDIATELY.             | 5. TRY ASPIRIN OR ANOTHER MEDICINE THAT YOU HAVE IN THE HOUSE. |
| 2. TAKE THE CHILD TO THE DOCTOR THE NEXT DAY. | 6. PUT THE CHILD TO BED UNTIL HE OR SHE IS BETTER              |
| 3. ASK A NEIGHBOR OR RELATIVE FOR ADVICE.     | 7. KEEP THE CHILD IN THE HOUSE,                                |
| 4. ASK THE DRUGGIST FOR MEDICINE.             | 8. DO NOTHING.   |

WHAT WOULD YOU DO IN THE FOLLOWING SITUATION?

MARK THE ANSWER YOU THINK BEST FITS THE SITUATION.

EXAMPLE: YOUR CHILD FELL OFF HIS TRICYCLE AND BROKE HIS ARM.

1	2	3	4	5	6	7	8
✓							

	1	2	3	4	5	6	7	8
1. YOUR CHILD FELL OFF THE STEPS ONTO HIS (HER) HEAD AND BEGAN VOMITING ABOUT AN HOUR LATER?	10	10						
2. YOUR CHILD HAS HAD SIGNS OF A COLD DURING THE DAY BUT NOW IS BREATHING VERY RAPIDLY AND WITH DIFFICULTY?	9	9	1					
3. YOUR CHILD PLAYED OUTDOORS ALL AFTERNOON AND NOW HE COMPLAINS OF A PAIN IN HIS FOOT?	7				1		7	2
4. YOU WERE POLISHING A TABLE AND YOUR CHILD TOOK THE BOTTLE OF POLISH AND DRANK PART OF IT?	10	10						
5. YOUR BABY, WHO USUALLY SPITS UP A LITTLE BIT, VOMITED MOST OF HIS EVENING FEEDING WITH GREAT FORCE?	9						1	9
6. YOUR CHILD BEGINS TO COUGH?	6						4	6
7. YOUR CHILD IS STUNG BY A BEE?	5	1			5		2	2
8. YOUR BABY ATE TWO CIGARETTE STUBS FROM AN ASH TRAY?	4	4	1				1	4
9. YOUR CHILD HAS BEEN CRYING, HELD HIS (OR HER) BREATH, AND THEN "FELL OUT"?	7		1			2		7
10. YOUR CHILD CRIES EVERYTIME HE (OR SHE) PASSES URINE?	6	4	6					
11. YOUR CHILD FELL ON THE PLAYGROUND AND CAME HOME WITH A BUMP ON HIS FOREHEAD ( 1 INCH ACROSS)?	4		1			2	3	4
12. YOUR CHILD IS HAVING A CONVULSION (FIT) THAT HAS LASTED MORE THAN 5 MINUTES?	7	7	1			2		
13. YOUR BABY JUST LIES FLAT; HE (OR SHE) SEEMS TOO WEAK TO LIFT HIS HEAD?	4	4	4					2
14. BOTH OF YOUR CHILD'S EYES ARE WATERY AND RED AND HIS (OR HER) NOSE IS RUNNING WITH THIN MUCUS?	4		2		2	4	2	
15. YOUR SCHOOL CHILD TELLS YOU THAT IT HURT WHEN HE MOVED HIS BOWELS AND THAT THERE WAS BLOOD AND PHLEGM ON THE TOILET PAPER WHEN HE WIPED HIMSELF?	7		7				1	2
16. AT SUPPERTIME, WHEN YOUR BABY IS USUALLY WIDE AWAKE, YOU NOTICE THAT HE (OR SHE) IS VERY TIRED AND DROWSY?	6					6		4
17. YOUR CHILD'S KNEE HAS BECOME RED, SWOLLEN, AND SO PAINFUL THAT HE (OR SHE) DOES NOT WANT TO WALK?	6	4	6					
18. YOUR CHILD VOMITS HER (OR HIS) BREAKFAST BEFORE GOING TO SCHOOL.	4					4	3	3
19. YOUR BABY HAS DIRTIED 8 DIAPERS WITH BOWEL MOVEMENTS BETWEEN BREAKFAST TIME AND SUPPERTIME?	4	1	2		2	1		4
20. YOUR BABY HAS BEEN CRYING MORE THAN USUAL AND HAS BEGUN TO WET ITS DIAPER SEVERAL TIMES EVERY HOUR?	4	4	3					3
21. FOR NO APPARENT REASON YOUR BABY DOES NOT SEEM HUNGRY FOR SOLID FOOD OR FOR HIS EVENING BOTTLE?	9					1		9
22. YOUR CHILD HAS HOT DRY SKIN (IF YOU TAKE ITS TEMPERATURE, THE THERMOMETER READS 101.5)?	4		3		3	4		
23. YOUR CHILD HAS A RASH (THAT YOU HAVE NEVER SEEN BEFORE) ON HER FACE AND CHEST?	6					2	6	2
24. AT BEDTIME YOU REALIZE THAT YOUR BABY HAS NOT HAD A BOWEL MOVEMENT SINCE YESTERDAY MORNING?	8		1		1			8

TOTAL 150

mation was given to either group leaders or generalized public health nurses in regard to the content of the testing tool. In fact, early in the study it was decided that the content of the nurses' parental instruction and counseling would continue to be based on the established objectives for service to postpartum mothers. No attempt, therefore, was made to influence the content, timing, or frequency of the home visit during the study. These nursing visits were patient-centered, based on the recognized need of the mother for help, rather than on any set time period or pre-determined frequency. The content of the visit was recorded as usual in the family record.

Applying this same concept as closely as possible to the group sessions, mothers in the experimental groups were encouraged to determine the content of the sessions, to ask questions, to share in solving the problems raised by the members, and to plan with the nurse group leader what would be discussed at each succeeding meeting. Thus the nurses functioned primarily as resource to the groups. To prepare them for these new functions, prior to initiating the study, the group leaders had taken part in a specially planned in-service program in the use of group process. No other teachers or consultants were involved in the sessions but the nurses did use audio-visual aids when appropriate to the subject requested. For recording purposes, the group leader kept a record of the general areas of content covered in each session and this information was added to the family records of all members attending the sessions.

The entire study took from August 1969 to July 1971. The group meetings included a series of 10 sessions, approximately one week apart, and visits to mothers in the control groups also covered a period of approximately 10 weeks following their admission to the study. The test data were collected from January to April 1971.

## Findings

The distributions of the vignette test scores for the

experimental and control groups are shown in Table 1. Out of the possible 150 points, the scores ranged from 47 to 123. The mean for the total in-study group was 83.4 with a standard deviation of 18.9. It was of interest to note that the five mothers assigned to the experimental group but who did not attend the group meetings tended to score in the lower ranges. At the same time, the five tested mothers in the control group who did not feel the need for continued public health nursing home visits scored in the middle ranges.

The mean test scores along with other study variables are presented for the experimental and control groups separately in Table 2. As shown, there was a statistically significant difference in the mean test scores of the experimental and control groups, 89.8 points versus 76.4, indicating that those mothers who attended the group sessions were found to have more knowledge about the appropriate use of health care for their infants, on the average, than did those mothers who received only home visits.

However, before concluding that group teaching was the more effective approach, it was important to determine whether the difference in average test scores might be due to other characteristics unequally represented in the two groups. Tables 2 and 3 compare the experimental and control groups on variables which were considered as possible influences on the test scores. These analyses showed that significant differences were found between the groups in the number of home visits made by the public health nurses, the mothers' social scores, and the location of the nursing office serving the family.

The average number of home visits was higher for the control mothers (4.3) than for the experimental mothers (3.1) but this was to be expected because home visits to the experimental group were discontinued as part of the study design. The experimental mothers tended to participate more in social activities as reflected by their higher mean social score (7.5 points versus 5.1) than control groups. Although an equal number of experimental and control

**Table 1—Test Scores by Type of Study Participation**

Study groups	Test score*									
	N	45-54	55-64	65-74	75-84	85-94	95-104	105-114	115-124	
<i>In study</i>										
Experimental	56	2	3	8	8	12	6	12	5	
Control	51	6	8	14	9	6	7	3	0	
Total	107	6	11	22	17	18	13	15	5	
<i>Lost to study†</i>										
Experimental										
Home visits required	6	0	0	1	2	2	1	0	0	
No sessions attended	5	1	1	2	0	0	0	1	0	
Control										
No home visits	5	0	0	0	2	2	1	0	0	
Total	16	1	1	3	4	4	2	1	0	
Grand total	123	7	12	25	21	22	15	16	5	

\* Maximum possible score = 150 points

† Includes only those mothers lost to study who were tested

**Table 2—Comparison of Experimental and Control Groups on Selected Variables by Means and Standard Deviations**

Variable	Experimental (N = 56)		Control (N = 51)		t Value
	Mean	S.D.	Mean	S.D.	
*Test score	89.8	18.71	76.4	16.69	3.908
*No. of home visits	3.1	1.89	4.3	2.42	2.753
*Social score	7.5	7.01	5.1	3.92	2.159
Maternal age	24.9	4.47	24.3	4.74	0.648
Maternal education	13.7	2.31	13.0	2.94	1.365
No. of children	1.1	0.29	1.3	0.95	1.829
Socioeconomic class (Hollingshead)	3.3	1.48	3.6	1.33	1.311
No. of phone visits	0.1	0.52	0.3	0.65	1.511
No. of group classes	5.1	2.08	—	—	—

\*t test of difference between means significant at alpha = .05 level or less.

**Table 3—Chi Square Tests of Differences in Experimental and Control Groups on Categorical Variables**

Variable	$\chi^2$	D.F.
Office location	19.576*	6
Marital status	0.718*	2
Ethnic background	5.375*	4

\* p < .05

mothers were planned for each nursing office, because of differing rates of loss, some offices were represented with greater numbers in one group and others had more mothers in the comparison group. For example, as shown in Table 4, in Office #5 there were twice as many mothers in the control group as in the experimental group while this situation was reversed in Office #7. Office #3 had no control group.

In order to determine whether those characteristics which were differentially distributed in the experimental and control groups might be responsible for the observed mean test score differences, the control variables were examined for their relationship to the test scores. The variables of a continuous nature were correlated with the test scores using Spearman correlation coefficients. Table 5 shows the mothers' educational level and social class were

significantly related to test scores at the alpha = .05 level. As could be expected, the higher the social class and the more educated the mother, the higher the test score tended to be. But, since these variables were distributed similarly in the experimental and control groups, it is unlikely that they account for the difference in the test scores. Interestingly, the mothers' knowledge about the appropriate use of health services was not correlated with age or with previous experiences in raising children. Although the groups were dissimilar on social participation scores and on the number of nursing home visits, their lack of significant association with the test scores indicate that neither of these variables explain the test score differences.

The associations between the categorical variables and the test scores were examined by using simple one-way analysis of variance (Table 6). Average test scores did differ significantly by office location, marital status, and ethnic background. Those mothers who were white and married attained higher scores but, like education and social class, these variables were comparable in the two groups so that they are unlikely explanations for the experimental-control test score differences.

With the exception of group teaching, only one of the control variables, office location, remained as a possible explanation for the differences in test scores. As mentioned earlier, mothers in the two groups were not equally distributed among the nursing offices. Using univariate F tests, the

**Table 4—Comparison of Mean Test Scores of Experimental and Control Groups by Office Location**

Office location	Experimental (N = 56)			Control (N = 51)		
	N	Mean	S.D.	N	Mean	S.D.
Office 1	8	93	19.10	14	77	14.51
Office 2	8	92	16.97	5	75	21.05
Office 3	13	95	19.20	0	-	-
Office 4	5	68	10.83	4	73	26.00
Office 5	6	91	18.83	12	70	16.12
Office 6	9	91	22.72	13	80	13.27
Office 7	7	89	12.48	3	88	24.79

effect of being in the experimental versus the control group and the effect of office location on test scores were examined (Table 7). Both were found to be significantly associated with the scores. At the same time a test for an interaction effect was done to see whether combinations of office and experimental-control groups produced a significantly higher score but such interaction was not found. Office location, therefore, does not explain the experimental-control score differences just as the other control variables do not. Therefore, after these analyses the evaluation study findings were accepted as supporting the efficacy of the group method for public health nursing instruction to mothers.

This conclusion raised other questions. Those who participated in the group method attended an average of 5.1 meetings with a range of attendance from one to nine meetings. It was of interest to know whether the mothers' test scores increased with increasing attendance. No linear relationship was found between the number of meetings attended and the test scores (Pearson  $r = .047$ ). Also when test scores were plotted against the number of group sessions attended there was no indication that a threshold phenomena existed, i.e. there was no critical number of visits which appeared to result in higher scores. As described, the mothers in both the experimental and control groups received home visits up until their babies were one month of age. Although the 51 control mothers actually received 43 visits more than the experimental mothers, it was thought that perhaps the combination of home visiting and group sessions which the latter group received might explain their higher test scores. However, when the number of visits and group meetings were combined they were not found to correlate with the scores either. So, although the experimental mothers had a higher level of knowledge regarding the area of child care tested by the study instrument, it did not appear to be a function of the number of nursing contacts at home, or the number of group meetings, attended, or the combination of these two.

### Cost Analysis

The nursing group leaders kept an account of the time they spent related to the mothers' meetings. This time was devoted to preparing for the group work and holding the sessions as well as carrying out other needed activities. The total time spent was 189.1 hours. This resulted in 356 mother contacts through the group methods. The hourly cost for a public health nurse in the agency was \$8.44. Travel cost was not involved because most group meetings took place in the local nursing office. The cost of giving service in the group setting was found to be \$4.41 per mother contact as opposed to the \$13.55 cost of making a home visit.

### Discussion

This study supported the hypothesis that the group discussion method of giving nursing service to postpartum mothers was effective and showed that it is less costly than home visiting.

Characteristic of all program evaluation efforts, circumstances tended to work against carrying out as tight a design as necessary to provide definitive answers. The

changing economic situation in Seattle, which accelerated population mobility, early re-employment of new mothers, and reduction in nursing staff, prompted the study but militated against its scientific rigor. In spite of these limitations, this service trial has generated several interesting questions and it is important to consider them for their inferences for further evaluation endeavors and for planning methods of providing nursing care.

One question concerns what is involved in a mother's interest in participating in group meetings and promotes her faithful attendance. We do not know fully what influenced those mothers who refused to participate in group meetings. Clearly, these mothers and others who find it impossible or undesirable to attend such groups will not be reached through this type of service.

**Table 5—Correlations of Selected Variables with Test Scores (N = 107)**

Variable	Spearman correlation coefficient
Educational level	0.2616*
Socioeconomic class	-0.2165*
Maternal age	0.0714
No. of children	-0.0398
No. of children under 1 year	-0.1319
No. of children 1-5 years	0.0394
No. of children 6-21 years	-0.0876
Social participation score	0.1246
Home visits	-0.1399
Phone visits	0.0061

\* Correlation significant,  $p (.05, 105) = .19$

**Table 6—Analysis of Variance with Test Score<sup>1</sup> (N = 107)**

Variable	Degrees of freedom	F value
Office location	6,100	2.2640*
Marital status	2,104	5.5862*
Ethnic background	2,104	11.7025*

<sup>1</sup> Simple one way analysis of variance: test score the dependent variable  
\*  $p < .05$

**Table 7—Effect of Test Scores by Experimental/Control Group and Office Location**

Variable	D.F.	F Value	P Value
Experimental/control group	1,93	9.850	.002
Office location	6,93	2.456	.030
Interaction	5,93	.923	.470

Socioeconomic status influences the appeal of the group method. Mothers of lower status seemed to prefer to drop in to the sessions rather than be committed to weekly attendance. In general this experience agreed with Hereford's contention that there is no way to control group attendance even when transportation and baby sitter services are provided.<sup>5</sup>

The greater potential benefit of group sessions for some groups over others is also suggested by the effect of office location on test scores. This variable may reflect socioeconomic and other characteristics associated with neighborhoods. The group leader serving a given location might certainly influence the scoring but this does not seem to be the full explanation because in one instance a group leader taught two groups, one of which scored the highest mean while the other scored the lowest. The assumption had to be made that the beginning levels of knowledge in the experimental and control mothers were similar. This assumption might be incorrect in which case existing knowledge rather than the group experience might have been responsible for the higher test scores of the experimental mothers. This needs to be examined.

Another question concerns those mothers who were lost to the study population: the 37, for example, assigned to the experimental group. Did the experimental mothers who remained in the study tend to be those who utilized more sources of information of all types thus getting higher scores as a result of knowledge gained elsewhere and not just at the group meetings? Did they also differ in a favorable direction on other characteristics not included as control variables in the study? Similarly, how did the characteristics of the 45 mothers lost to the control groups differ from those who remained? These questions need to be considered in interpreting the findings reported here and should be examined in future studies in the use of group methods.

Also, future evaluations of the comparative effectiveness of group sessions and home visits would be strengthened if the service input were made more similar. In this study differences in the content of the group sessions and in home visits were not taken into account. The number of home visits during the first month varied from patient to patient as did the timing of the visits in relation to the birth of the child. The content of the group sessions were purposely permitted to vary because, just as others have found,<sup>9,2,10</sup> parents were able to say what they want to learn, and learning is facilitated when based on participants' expressed concerns. Most of the study groups found it necessary to talk about nutrition at each session before going on to new topics. Other topics frequently discussed were birth and delivery, postpartum depression, care of the sick child, mouth-to-mouth resuscitation, child growth and development, play and stimulation of the infant, discipline, toilet training, family planning, safety in the home, and interpersonal relationships.

The test instrument used to measure mothers' knowledge facilitated the evaluation but it only measured one aspect of the nurses' instruction. A tool more specifically designed to reflect public health nursing instruction in the two settings would be more desirable. It would also have been advantageous if the mothers' actual behavior as well as knowledge in child care could have been included as a variable influenced by teaching.

The results of this study show a relationship between

knowledge and type of instruction but no association was found between the test scores and the number of nurse contacts. This may be due to the test's inability to reflect the benefits of cumulative contacts. It may indicate that knowledge of child care is, in fact, not related to the number of contacts a mother has with her peers or with a nurse. Or these findings may indicate a mother's lack of knowledge promotes continued contacts, just as nurses continue to visit those mothers whom they perceive lack knowledge in child care. Likewise group sessions may tend to lose those mothers who feel knowledgeable and hold those who are less well-informed. These possibilities require further study before the results here can be fully understood.

This evaluation effort has been valuable in demonstrating the feasibility of utilizing group method of teaching in public health nursing services. There was no doubt that the sessions were well-received by many of the new mothers; many groups continued even without a nurse leader after the series was completed.

The results of the cost study are promising. Since the cost of the group method per contact is one-third or less than that of a home visit, more group work would allow for needed expansion of service without additional funds. The cost of each session would no doubt decrease as nurses become better prepared and groups more easily formed. The help of additional volunteers might further reduce the cost. Those mothers who have been group members are likely candidates as volunteers for subsequent groups and would require less orientation and little or no recruitment effort.

The most exciting outcome has been the impact of this evaluation of effectiveness on supervisors and staff who have a new interest in seeking ways to measure effectiveness, especially when different methods are initiated into service. An evaluation study, done in a relatively short time period, completed by the agency's regular staff with prompt reporting of results, has brought about a positive climate for evaluation and eagerness to tackle new studies of service effectiveness.

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