

ASSESSMENT OF COMMUNITY MATERNAL CARE PERFORMANCE OF PUBLIC HEALTH MIDWIVES OF A PROVINCE IN SRI LANKA: A MULTI-METHOD APPROACH

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Abstract. The maternal care performance of public health midwives' (PHM) was reviewed using 4 methods in a province of Sri Lanka. The objectives of this descriptive study were to provide a comprehensive assessment of their work and to determine the use of a multi-method system to assess their performance in terms of self-assessed competency, knowledge, attitudes and performance of domiciliary and field clinic services. There were 301 (87.2%) PHMs with good or moderate level of knowledge in antenatal care with only 165 (47.8%) and 238 (69.8%) in natal and postnatal care, respectively. Total knowledge decreased with increasing age and duration of service. Self-assessed competencies were high but not positively correlated with actual knowledge. Attitudes were found to indicate dissatisfaction with the job and a preference of clinic services at the expense domiciliary care. The results indicated that continuing education and enhancement of career prospects were necessary. The methods used in this study could be adopted with appropriate modification for evaluation of personnel in similar settings.

INTRODUCTION

The performance assessment of community based health workers has been a major concern for health authorities since the use of such workers became popular after the mid 20th century (Habicht, 1979; Berman *et al*, 1987). Although use of such workers providing care to communities was evident in many countries decades earlier (Ministry of Health of the USSR, 1967; Sidel, 1972), assessment of their performance became a concern following the Alma Ata conference in 1978 (WHO/UNICEF, 1978), where the use of such workers was better recognized in the context of primary health care. Since then attempts have been made to assess various aspects of their performance using different methods. These include the observation of health workers while at work (Ronaghy *et al*, 1976), the interviewing of clients regarding the quality of services provided by the health care worker (Weerakoon and Fernando, 1990) and the time taken by a worker to perform specific activities (Scholl, 1985; Valadez *et al*, 1990).

Performance assessment is defined as the measurement of an individual's ability to carry out a specific task (Katz and Snow, 1980). The use of the

term "performance" focuses attention on the total behavior of an individual in accomplishing a task including their organization, retention and use of specialized knowledge, as well as their attitudes and interaction with other people. It is also assumed that their knowledge, attitudes and skills influence the service provided by them. Hence, testing of one or few of these aspects is unlikely to produce a complete assessment of an individual's performance. It was speculated that utilizing a combination of methods would lead to a more comprehensive system of assessing the performance of community based health workers as a deficiency in one could be rectified by effectiveness in another (Jajawicramaraj, 1992). So far, globally, not many attempts have been made to use such a combination of methods to assess community based health workers.

The health workers providing care to communities differ considerably from one country to another with regard to their duties, recruitment procedure, level of training and remuneration (Bhatia, 1981; Werner, 1981; Vansitjan and Davis 1986; Walt *et al*, 1990). In the public health services in Sri Lanka, public health midwives (PHM) provide most of the domiciliary maternal and childcare services. In addition to their main duty of providing maternal and childcare, they are also assigned other duties related to primary health care. They are recruited on their performance in the General Certificate of Education Ordinary Level examination held at the end of secondary school education. They are paid by the government and entitled to a pension. Fol-

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lowing recruitment, they receive 18 months training on the theory and practice of basic nursing procedures, midwifery, maternal care, family planning, child care, nutrition and health education, that is, the aspects on which most of their service responsibilities are focused. They are expected to perform these activities through domiciliary visits and in the field clinics in diverse socio-cultural and geographical settings.

The PHMs routinely keep records on their activities in the field, as part of their duties, and periodically furnish data on the number of mothers under their care and related details. Their work is assessed on the basis of these records, taking into account the size of the population they serve. The other current methods of assessment are by inspecting the registers and records kept by the PHMs in their offices and by reviewing the completeness of antenatal records given to pregnant mothers.

This study was conducted in 1996 in the Western Province of Sri Lanka where approximately 26% of the total population of the country live (Ministry of Health, 1995). Availability of sufficient number of PHMs and their relatively easy accessibility in the Western Province was considered in selecting this area for this study. The Western Province includes three administrative districts, namely Colombo, Kalutara and Gampaha. Each administrative district is divided into health unit areas headed by Divisional Directors of Health Services (DDHS). There are 33 such units in the Western Province. PHMs working in the community are attached to one of these units, where they are under the supervision of the DDHS who is responsible to the Provincial Director of Health Services.

The importance of the service of PHMs as midwives, for which they have been primarily trained, has declined with increasing proportions of institutional deliveries. In 1997, 89.3% deliveries in the Western Province of Sri Lanka were carried out in the public hospitals. If those deliveries taking place in private hospitals were included the figure would be higher. Nevertheless, antenatal care and postnatal care remain as very important components of their duties.

This paper presents an investigation of the performance of maternal care by PHMs in the Western Province of Sri Lanka using four methods of inquiry. The diversity of circumstances in which PHMs in Sri Lanka deliver their services makes it impossible to assess their performance using a single method. Concurrent assessment of several impor-

tant aspects of performance was carried out in order to make the assessment more comprehensive. Data routinely collected by PHMs was not used as a source of information as it was considered opportune to identify other methods that could be used to assess the work performance of this category of health workers. It was also expected that a combination of these methods could be used for more efficient assessments of PHMs in similar circumstances in future.

The objectives were:

1. To carry out a comprehensive assessment of the competence, knowledge, attitudes, accomplishment of domiciliary and clinic activities of maternal care by PHMs of the Western Province of Sri Lanka.
2. To determine the ability of a multi-method system to more comprehensively assess the performance of the PHMs.

MATERIALS AND METHODS

The study design was descriptive and cross sectional. PHMs' self-assessed competency, knowledge, attitudes, accomplishment of domiciliary and clinic services were tested using four methods. The activities of the PHMs (Table 1) were identified by performing a task analysis of their duties as specified by the Ministry of Health. These activities were then used as the basis on which assessment of performance was made.

Sampling

At the time of study the total number of PHM employed in the Western Province was 809 with 222 (27.4%) in Colombo, 265 (32.8%) in Kalutara and 322 (39.8%) in Gampaha administrative districts. One aspect of their performance (self-assessment of competency) was assessed for the whole of the study population. Other aspects of performance were assessed on selected samples only.

Methods of performance assessment

a. Self assessment of competency: The PHMs were requested to rate their own level of competency in performing each of the activities listed in a self-administered questionnaire. They were requested to indicate their responses on a graded scale ranging from "very competent" (I am confident in performing this activity and I can teach some one else how to do it), "competent" (I am confident in performing this activity but unable to teach some one else how to do it), "less competent" (I usually perform

Table 1

List of activities of public health midwives related to maternal care as identified by task analysis of their duties.

Activities			
Antenatal care	Natal care	Postnatal care	General
- Registration of pregnant mothers	- Performing a delivery	- Identification of abnormalities of lochia	- Delivering a health education talk in the clinic
- Abdominal examination for: Assessing fetal growth Determining the lie of fetus	- Managing a post partum hemorrhage	- Identification of involuted uterus	- Friendly and helpful manner
- Counting fetal heart sounds	- Management of retained placenta	- Examination of perineum	- Favorable attitudes
- Measuring maternal blood pressure	- Assessment of progress of labor	- Cleaning episiotomy wound	
- Identifying impending eclampsia	- Performing an episiotomy	- Examination of breasts for infection	
- Weighing mothers	- Deciding when to perform an episiotomy in multipara	- Measuring mothers' temperature	
- Recording weight in maternal record	- Aseptic severance of umbilical cord	- Teaching a family member to care for mother	
- Advising on maternal nutrition	- Clearing of airway of newborn	- Advising on maternal nutrition	
- Testing urine for reducing substances			
- Testing urine for albumin			
- Correcting retracted nipple			
- Determining expected date of delivery			
- Appropriate action regarding varicose veins			
- Diagnosis of onset of labor			
- Giving appointments to come to the clinic			
- Instructing how to take the nutrition supplementary			

this activity but do not feel confident) and “*not competent*” (I am unable to do this activity). The questionnaire was developed in the native language and was pre-tested in an area away from the main study area. It included all the maternal care activities that the PHMs were expected to perform and was administered to the whole of the study population.

b. Assessment of knowledge and attitudes: Knowledge and attitudes were tested in a sample selected by the cluster sampling method. Each health unit area headed by a Divisional Director of Health Services was considered a cluster. Sixteen of the 33 clusters in the Western Province were selected randomly to represent the whole of the study area.

A questionnaire containing, in the first section, nine structured questions tested the knowledge of PHMs on the practical situations they would encounter in the course of their duty. The second part of the questionnaire was designed to assess attitudes in general and those relating to specific

duties. Twelve statements were included and the PHMs were requested to indicate the level of agreement with each statement on a five point scale from strongly agree to strongly disagree. Questionnaires were administered during a monthly conference under close supervision of the principal investigator or his representative.

c. Assessment of domiciliary care: This part of the study was carried out in the district of Gampaha. The PHMs were also assessed on the work done with the recipient population by investigating the perceptions of the mothers in the recipient families regarding the care received. The recipient population included families with a married woman between the ages of 15-49 and families with a child less than 5 years of age. A sample of 1,408 families was selected from the district of Gampaha using the prevalence of most important group in the study population needing care of the PHM (Lwanga and Lemeshow, 1991). The stratified cluster sampling method was used and correction made for the effect of clustering (Kish, 1987).

Data were collected using an interviewer-administered questionnaire which included the basic socio-demographic information about the family, the nature of its relationship with the PHM, and the quality of care received from the PHM. The questionnaire was administered by interviewers with a medical background following training in the relevant interviewing skills. Interviewers visited the families and interviewed married women between the ages of 15-49 years and the mothers of children under 5 years of age. Measures were taken to minimize inter-observer and intra-observer bias in administering the questionnaire.

d. Observation of the activities of the field clinics:

Direct observation of a representative sample of clinic sessions was done in 8 (50.0%) randomly selected Divisional Director of Health Services areas in the district of Gampaha. Two clinic sessions were randomly selected from each of the 8 areas. A total of 16 sessions of antenatal clinics were therefore observed focusing on maternal care activities. Each activity was observed with regard to 10 mothers and the results presented as "always" when performed in all 10 observations, and as "5-9 times", "1-4 times" and "never". A checklist was developed including activities identified by task analysis of duties that PHMs were expected to perform in the clinics. Observers were trained to use the checklist minimizing the change of behavior of PHMs during observation.

As this study included several methods of inquiry, the study instruments were administered with sufficient time intervals to minimize the influence these might have on each other.

Data analysis

Data were analysed using the Epi Info computer software program. Entry validation was done for appropriate variables. On entry of 500 questionnaires, 100 records were selected at random and rechecked to minimise errors in data entry.

Frequencies for each level of the scale of self assessed competencies were calculated and tabulated with percentages. A composite score was developed for each PHM. As self-assessment of competencies are subjective measures, it was thought appropriate to validate it against knowledge, which is a more objective assessment. The coefficients of correlation were calculated between competency scores and the scores obtained for knowledge.

The distribution of the knowledge scores was

examined and divided into three arbitrary levels: poor, moderate and good. In each component of service, a number of questions were considered to test knowledge essential to perform routine duties (Ministry of Health, 1979; 1983; 1986) at minimum efficiency. The aggregate of marks of these questions was indicated as a percentage of the total and was considered the demarcation between poor and moderate. Upper level was decided on the marks obtained for the questions testing advanced knowledge.

RESULTS

Socio-demographic profile of PHMs

Of the total 809 public health midwives, 795 participated in the study. Fourteen (1.7%) were on leave on the day the questionnaire was administered and were excluded from the study. The age of the study population ranged from 22 years to 57 years with 571 (70.5%) between 30 to 49. More than 70% were currently married and more than 95% had passed General Certificate of Education at Ordinary Level or an equivalent examination. Although they were expected to live within the area of service, only 450 (55.6%) did so. Two hundred and eighty-six (35.3%) PHMs had a duration of service of 5 years or less and 401 (49.6%) between 6-15 years.

Self assessed competencies

Antenatal care: More than 95% of the PHMs assessed themselves as being "very competent"/ "competent". In this area the activities included assessing fetal growth by abdominal examination, determining the lie of the fetus, counting fetal heart sounds, identifying impending eclampsia, correctly using weighing scales, testing urine for reducing substances and albumin, determining the expected date of delivery using the last menstrual period and the diagnosis of onset of labor.

Natal care: Ninety-five percent indicated they were "very competent"/ "competent" in performing a delivery without the assistance of a senior PHM. However, with regard to other activities of natal care many indicated they were "less competent" (Table 2). Seventy-five percent indicated that they were either "not competent" in performing an episiotomy or "cannot perform". Two hundred and forty-two (30.4%) also indicated that they were either "not competent" or unable to decide when a mother needs an episiotomy during labor.

Table 2
Distribution of PHM by the level of self assessed competencies related to natal care (percentages are in parentheses).

Activity	Level of competency					Total
	Very competent	Competent	Not competent	Cannot perform	Not responded	
Performing a delivery without assistance from a senior PHM	565 (71.1)	188 (23.6)	36 (4.5)	2 (0.3)	4 (0.5)	795 (100.0)
Taking action when there is a post partum hemorrhage	540 (67.9)	194 (24.4)	38 (4.8)	16 (2.0)	7 (0.9)	795 (100.0)
Action to be taken when there is a retained placenta	501 (63.0)	197 (24.8)	52 (6.5)	39 (4.9)	6 (0.8)	795 (100.0)
Assessment of progress of labor	522 (65.7)	199 (25.0)	56 (7.0)	9 (1.1)	9 (1.1)	795 (100.0)
Performing an episiotomy	89 (11.2)	89 (11.2)	220 (27.7)	379 (47.7)	18 (2.3)	795 (100.0)
Deciding when a mother needs an episiotomy during her second labor	352 (44.3)	190 (23.9)	141 (17.7)	101 (12.7)	11 (1.4)	795 (100.0)
Aseptic severance of umbilical cord	718 (90.3)	65 (8.2)	4 (0.5)	3 (0.4)	5 (0.6)	795 (100.0)
Clearing of airway of newborn	453 (54.7)	180 (22.6)	87 (10.9)	85 (10.7)	8 (1.0)	795 (100.0)

Table 3
Distribution of PHM by levels of knowledge and components of service (percentages are in parentheses).

Level of knowledge	Component of service		
	Antenatal care	Natal care	Postnatal
Poor	44 (12.8)	180 (52.2)	107 (31.0)
Moderate	248 (71.8)	108 (31.3)	200 (58.0)
Good	53 (15.4)	57 (16.5)	38 (11.0)
Total	345 (100.0)	345 (100.0)	345 (100.0)

Postnatal care: In this area more than 90% were "very competent" / "competent" in identifying abnormalities of lochia, diagnosing uterine involution, cleaning an episiotomy wound, examining breasts for infection, measuring mothers' temperature, teaching a family member to provide care to the postnatal mother and advising the mother about her nutrition at a level which the mother could understand.

Knowledge

Knowledge of antenatal care was better than natal care and postnatal care with 301 (87.2%) in

the good or moderate level. Nevertheless, 180 (52.2%) and 107 (31.0%) were in the poor knowledge category for natal and postnatal care respectively (Table 3). Total knowledge decreased with increasing duration of service (Chi-square for linear trend = 8.89, $p = 0.003$) and the age (Chi-square for linear trend = 11.5, $p = 0.0007$).

The correlation coefficient between self assess competency and knowledge in antenatal care was - 0.03 (95% confidence limits - 0.14 to 0.08) and the coefficient for postnatal care was - 0.05 (95% confidence limits - 0.16 to 0.06). The correlation

Table 4
Distribution of clinics by number of times selected activities in antenatal care was performed (n=16).

Activity	Always	5-9 times	1-4 times	Never	Total
Discussed mothers' problems individually	14 (87.5)	1 (6.3)	1 (6.3)	0 (0.0)	16 (100.0)
Gave appointments for the next visit	16 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	16 (100.0)
Prepared mothers for examination	13 (81.2)	0 (0.0)	0 (0.0)	3 (18.8)	16 (100.0)
Instructed how to use tablets provided	3 (18.8)	1 (6.3)	1 (6.3)	12 (75.0)	16 (100.0)
Recorded weight immediately after weighing	10 (62.5)	0 (0.0)	0 (0.0)	6 (37.5)	16 (100.0)
Recorded weight herself	11 (68.8)	1 (6.3)	0 (0.0)	4 (25.0)	16 (100.0)
Explained to the mother about adequacy of weight	4 (25.0)	1 (6.3)	7 (43.8)	4 (25.0)	16 (100.0)
Testing urine for reducing substance n = 11					
Took correct amount of Benedict's solution	2 (18.2)	4 (36.4)		1 (9.1)	11 (100.0)
Added correct amount of urine	0 (0.0)	2 (18.2)	5 (45.5)	2 (18.2)	11 (100.0)
Boiled for correct duration	0 (0.0)	3 (27.3)	4 (36.4)	4 (36.4)	11 (100.0)
Recorded results	0 (0.0)	2 (18.2)	2 (18.2)	7 (63.6)	11 (100.0)
Testing urine for albumin					
Took correct amount of urine	7 (43.8)	2 (12.6)	16 (100.0)	5 (31.3)	16 (100.0)
Heated the correct place of tube	14 (87.5)	1 (6.3)	0 (0.0)	1 (6.3)	16 (100.0)
Added acid	0 (0.0)	3 (18.0)	2 (12.6)	11 (68.8)	16 (100.0)
Recorded results immediately	6 (37.5)	1 (6.3)	1 (6.3)	8 (50.0)	16 (100.0)

coefficient for natal care was 0.13 (95% confidence limits 0.02 to 0.24).

Attitudes

More than 50% indicated that "poor health is due to one's own fault, and the health services cannot help much". Approximately 20% favor increasing clinic activities at the expense of field visits. Ten percent indicated they were ready to accept another job for the same salary, while 30% expressed no opinion on this. It is noticeable that more than 75% were ready to take responsibility for maternal deaths in their areas, indicating a strong sense of accountability towards their primary responsibility, which is maternal care.

Assessment of domiciliary care

The majority (85.5%) of the selected 1,408 families had contact with the PHM. Some 184 (13.1%) respondents did not know the PHM of their area and 190 (13.5%) stated that they had never met her. Of those who had met her, 45.5% had only met her within the past month. The PHM had never visited 234 (16.6%) houses.

There were 21 pregnant mothers in the study sample. Of them 12 (57.1%) had been registered during home visits, while 8 (38.1%) had been registered in the clinic. The PHM had visited 20 (95.2%)

of these mothers at home.

There were 58 postnatal mothers in the study sample. The PHM was expected to visit the mother and baby 3 times within the first 10 days after delivery. Forty-five (77.6%) of mothers have been visited only twice or less, 11 (19.0%) of mothers three times and 2 (3.4%) of mothers four times. Relationship between the socio-demographic variables and whether the homes were visited or not were studied using chi-square for linear trend and there were no significant associations.

Observation of clinic activities

The performance in clinic activities showed wide variation. Appointments for the subsequent visits were given in all 10 observations made in each clinic observed. All other activities were done in varying frequencies from 9 times to never. In 12 (75%) clinics, instructions were not given as to how the tablets provided should be taken. In 8 (72.8%) clinics, in testing for reducing substances, boiling of the test solution was done for the correct duration of time only 4 times or less out of 10 observations. In 7 (63.6%) clinics the result was never recorded at the time of testing. In the test for albumin, acetic acid was never added in 11(68.8%) clinics and was never recorded at the time of testing in 8 (50.0%) clinics (Table 4).

DISCUSSION

Different aspects of the performance of the PHMs have been assessed in this study using methods not used previously in routine evaluations. This new approach has the advantage of not relying entirely on the information collected by the PHMs themselves as in the routine evaluation. Hence, it is likely to be more valid and reliable than the current methods of evaluation of the PHMs.

Self-assessment of competencies was carried out using a self-administered questionnaire. In this kind of inquiry, where self-assessment of one's competency is sought, one may be prompted to overestimate the level of competency. This study has demonstrated that the results of such self-assessment do not correlate with the actual knowledge. Hence, the results of this study provide the opportunity for feedback to the health workers concerning their false sense of confidence. To perform activities related to the duties of PHMs, a sound knowledge of practical aspects of maternal care is essential. Hence if self-assessment of competency correlates well with the level of knowledge, such a situation would mutually enhance the validity of both measurements. Failure to demonstrate such a correlation between self-assessed competency and the more objective assessment of knowledge in the present study strongly indicates that self-assessment has major limitations as a method of assessing competencies. This conclusion is further supported by the lack of correlation between competencies and knowledge of specific content areas.

In some instances, observation may give more accurate information than interviews or questionnaires (Moser and Kalton, 1979). To collect information regarding clinical activities, observation could be considered more appropriate than the use of a questionnaire or interview. One disadvantage is that this method is time consuming, and can only be conducted in a limited number of situations on limited number of persons or activities.

Knowledge was poor in natal and postnatal care. As almost all deliveries take place in hospitals, knowledge of natal care is required infrequently. This may explain why the knowledge of natal care is lower than antenatal and postnatal care. Deterioration of knowledge with increasing duration of service and age may also indicate lack of continuing education and inadequate evaluation.

Expressed attitudes may not be synonymous with private beliefs. However, reported attitudes at

least indicate trends and have the advantage of being simple to assess (Green, 1995) although differences can exist in the results when the same variables are assessed by more than one mode of inquiry (Donovan *et al*, 1997). A substantial proportion of PHMs did not seem to be satisfied with their job as was indicated by the willingness of 10% to accept another job with the same remuneration and 30% expressing no opinion on that statement. The level of job satisfaction can influence attitudes as well as performance (Berman, 1984). Service-related factors such as the comparatively low level of remuneration and absence of a definitive career structure may also have influenced their attitudes (Berman *et al*, 1987). The participants in this study have shown that they are genuinely concerned about maternal mortality as a large majority expressed their willingness to take responsibility for maternal deaths in their areas. The reluctance of PHMs to visit homes was indicated in their attitudes as well as their practices. Many had not carried out the domiciliary services as expected; *eg* 18 (31.0%) postnatal mothers who delivered during the previous 3 months had been visited only once in the first 10 days. These data demonstrate a state of diminished motivation of PHMs in performing their duties. Prompt action should be taken as poor attitudes influence the work performance in many ways, including creating communication barriers (Aubel *et al*, 1991).

Bandaranayake and Singh (1997) have demonstrated the use of the results of performance assessment to modify the training curriculum of health workers. Relevant changes might also be made to the training curriculum of the PHMs using the results of this study as a guideline. Revision of the curriculum appears to be a prevailing requirement in the light of diminishing practice of midwifery in the community due to a large proportion of deliveries taking place in institutions.

The results of this study point to the managerial aspects of career structure and job prospects for this important category of health workers. It is well documented that updating knowledge and enhancing skills of health care workers could be achieved through continuing education (WHO, 1990), but in Sri Lanka there is presently no organized program of continuing education for PHMs. The only formal assessment of the competencies of a PHM after obtaining their basic qualifications is at the non-compulsory "Efficiency Bar" examinations. By creating a career structure on the basis of educational improvement and performance, the overall motivation of present and future PHMs might be enhanced.

The results of this study may be useful to the regional health administration within the Western Province to emphasize more on continuing education of PHMs and to recognize and reward good service. Such action will help to improve their knowledge, attitudes and skills and will enhance job satisfaction. It will also be possible to incorporate one or more of these methods into the routine supervision and evaluation programs. Although the results of this study may not be generalized beyond Western Province, the methods developed can be readily used to assess the PHMs in other areas of the country and with appropriate modification they can be adopted in similar settings outside Sri Lanka.

The 1993 Presidential Task Force Report on the Formulation of a National Health Policy for Sri Lanka (Government of Sri Lanka, 1993) identified several factors that contributed to poor human resource development. These include lack of systematic planning for human resources development and lack of career development facilities for certain categories of health workers. The findings of the present study agree with those observations with regard to PHMs and provide evidence which emphasises the need for implementation of the policy recommendations made by The Presidential Task Force on the Formulation of a National Health Policy for Sri Lanka.

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