Performance assessment of junior public health nurse in maternal and child health services in a district of Kerala, India

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ABSTRACT

Background: Performance assessment of health services provided to maternal and child population is an important area of concern especially in developing countries including India. Aim: This study was conducted to assess the performance of Junior Public Health Nurses (JPHN) on services provided to maternal and child health at sub-centers in Malappuram district of Kerala, India. Methods: Maternal and child health services were assessed based on record analysis and interviewing JPHN in 30 randomly selected sub-centers using a predesigned questionnaire prepared according to Indian Public Health Standards for sub-centers. The work performed by the JPHNs was graded as excellent, very good, good, satisfactory, and poor based on the standard guidelines. Results: Population covered by the 30 JPHNs at their sub-centers ranges from 5050 to 9869. Services were excellent in all the sub-centers for tetanus toxoid immunization and institutional deliveries. Although antenatal care (ANC) registration was excellent in 70% of the sub-centers, it was poor for the 1st trimester ANC registration in 50% of sub-centers. In the case of referral services and postnatal care (PNC), 27% and 33% of the centers were excellent, respectively. 50% of the centers have had poor performance in PNC. Detection of beneficiaries for immunization by JPHNs was excellent in 60% of the sub-centers. Measles and full immunization coverage was poor in 40% of sub-centers. Around 77% JPHNs attended in-service training, and 90% of them could prepare sub-center annual action-plan. Conclusion: There is a variation in performance of JPHNs at a sub-district level which highlights the importance of further studies to elucidate the factors associated with it.

Key words: Child health, India, junior public health nurse, Kerala, maternal health, performance assessment

INTRODUCTION

Improving maternal and child health (MCH) service is an important aspect to reach Millennium Developmental Goals 4 and 5 especially in developing countries. The main challenge is to accomplish interventions based on evidence to improve their health conditions. This requires strengthening of public health system that provide a comprehensive package of interventions to the individual and family. There is a need for concerted action for a large number of countries to achieve the above goals. A substantial variation in services related to coverage exists between interventions and countries.

National Rural Health Mission was launched in India in the year 2005, an extraordinary effort to strengthen the health systems in the country. But, universal health coverage can be achieved only if health systems reach into rural and remote areas of the country. A recent review study highlighted the fact that coverage of MCH care services requires region or area-specific focus in India. In India, sub-center is the most peripheral unit in the public sector which delivers MCH services and...
first place between the primary health care system and the community. Insufficient coverage and suboptimum quality of interventions are important aspects to be considered here.\textsuperscript{[4]}

Kerala state spread across 38,000 square kilometers with 33.3 million people. Most of the health indicators are at top level in India compared to other states.\textsuperscript{[7]} This is mainly because of well-functioning health care system with high accessibility and low cost along with contributions of nonhealth sector which include land reforms, public distribution of food, education and housing. Effectiveness of health care system would depend largely on well-functioning of sub-centers at community level providing services of an acceptable standard to the people.\textsuperscript{[8]}

Sub-center’s population coverage for health care is between 3000 and 5000. Kerala has 4575 sub-centers and 4173 female multipurpose workers.\textsuperscript{[7]} In moving toward Universal Health Care, there is a need to invest in building Health Worker’s skills and involving them as effective members of the health team.\textsuperscript{[5]} At sub-center level, multipurpose health worker (MPW) is the key personnel. In Kerala, female MPW is designated as Junior Public Health Nurse (JPHN). They provide comprehensive primary health care services at community level which vary widely and include promotive, preventive, and curative services. For the sub-center staffs, it will be difficult to adequately deal with the activities of health services in the community because of the large population to be covered in the field area.

The current levels of functioning of the sub-centers in India are much below the expectations. Recently, there is slow progress in performance of immunization coverage surveys in India.\textsuperscript{[9]} Poor performing states have greater inequities with respect to use of services, although there are significant inequities even within better-performing states.\textsuperscript{[10]} In Kerala, public sector was preferred over private sector by women for MCH services, but at country level its utilization varies in different states.\textsuperscript{[11]}

It is important to assess the functions of JPHN at community level so that appropriate corrective measures can be adopted to improve the service delivery to the target groups in the community. A few studies were conducted in this area of the country,\textsuperscript{[11,12]} and with this background, this study was conducted to find out the work performance of JPHNs in Malappuram district of Kerala in South India.

**METHODS**

**Study design and area**

This descriptive study was conducted based on record analysis and interviewing JPHN in 30 randomly selected sub-centers using a predesigned questionnaire prepared according to Indian Public Health Standards for sub-centers. Study was conducted during November 2010 to February 2011 in Mankada block of Malappuram district, Kerala. Malappuram district is located in central region of Kerala state. The total population of Malappuram district is 706,286. Of 48 sub-centers in Mankada block of Malappuram district, 30 sub-centers were selected randomly, which involve 7 health institutions (2 Community Health Centers and 5 Primary Health Centers). The total population of 30 sub-centers was found to be 202,197. Range of population was from 5050 to 9869 per sub-center, and the average population of a sub-center was 6740 ($n = 30$). About 21 sub-centers have above 6000 population.

**Sub-center action-plan**

Junior Public Health Nurses job responsibilities include to estimate the needs of the beneficiaries at community level and look for service requirement for meeting MCH needs. Hence, they have to plan on estimation of required equipment and material for the community regarding MCH services. Supply will be made from PHC level based on this estimate to facilitate JPHNs to provide these services.

**Field level activities and monthly advance tour program**

Area assigned to the JPHNs in sub-center is divided into 40 “Day Blocks” for the purpose of discharging duties. Field area to be covered by a health worker in a day’s fieldwork is called as 1 “Day Block.” Covering this area will be possible in 2 months if a worker covers 20 such day blocks in a month. When JPHN does the field activities in-a-day blocks 1-20 on the scheduled month, the male health worker will work in day blocks from 21 to 40. This will be reversed during the succeeding month which results in visiting of each house by either male or female worker in 2 months’ time period. Hence, each house will be visited once in 2 months period by each JPHN. She enrolls all the pregnant women residing in the area. Antenatal care (ANC) along with domiciliary services and postnatal care (PNC) will be provided to them.

All the antenatal cases and births registered in April and May 2009 in selected 30 sub-centers were taken into consideration for the assessment of mother and child services provided by JPHNs during study period. This was done because of the completeness of records in this cohort pertaining to antenatal, postnatal, and birth registration parameters.

**Parameter studied**

1. The Performance Assessment of JPHNs on MCH Services includes:
   I. Antenatal and PNC
      • Registration
• Registered in 1st trimester.
• Three antenatal checkup.
• Weight recording.
• Blood hemoglobin (Hb)% recording.
• Urine for albumin and sugar examination.
• Two doses of TT (or 1 booster dose of TT).
• 100 tablets of iron and folic acid (IFA).
• Detection of high-risk pregnancies and referral to a higher center.
  • (high risk pregnancies are Anemia-Hb level < 10 g/dl, blood pressure more than 140/90, Abnormal weight gain >3 kg/month, first pregnancy with age <20 years or >30 years, more than four pregnancies, bleeding during pregnancy, previous cesarean section, abnormal or lack of movement, convulsions, urine albumin present).
• Institutional deliveries.
• Postnatal visit at least once.
II. Child health services.
• Birth registered in MCH register in the months of April and May 2009.
• Fully immunized children (0–1 year).
• Children who have received Bacillus Calmette-Guerin (BCG) vaccination.
• Children who have received 3 doses of DPT and polio vaccines.
• Children who have received measles vaccine and at least one dose of Vitamin A supplement.
• Unimmunized children.

2. Assess the ability of preparation of annual action-plan and monthly advance tour program.
• Beneficiary calculations for the preparation of annual action-plan.
• Preparation of advance tour program for the month of December 2010.

Data collection
The data collection was started after getting the permission from the district medical officer (Health) of Malappuram District to conduct the study at sub-centers of Mankada health block. Data were collected from MCH register by the principle investigator at sub-center in the afternoon’s session of each day. The interviews were conducted at sub-centers of JPHNs to find out the ability in preparation of annual action-plan and monthly advance tour program.

In this study, it is assumed that births are equally distributed in all months of the year. MCH register for the months of April and May 2009 is selected so that all parameters can be evaluated according to Indian Public Health Standards for Sub-centers. MCH services of JPHNs were examined and noted down on a predesigned format and evaluated.

Assessment of the ability of preparation of annual action-plan based on beneficiary calculations means calculation of expected number of pregnancies in the year 2010-2011 and expected number of infants in the year 2010-2011 in the sub-center service area of JPHN. Preparation of monthly advance tour program was assessed by preparation of advance tour program for the month of December 2010. In interview, JPHN was asked regarding knowledge about the preparation of annual action-plan and monthly advance tour program and also the training session attended for the same. The exercise on beneficiary calculation was given to JPHN and was asked to solve them under observation and asked her to prepare advanced tour program for the month of December 2010.

Data analysis
It is assumed that births are equally distributed in all months of the year. The evaluation was done in maternal services domain and child services domain. Overall, MCH services were assessed by taking average of all the concerned elements in each section.

Expected number of antenatal cases calculated as = Birth rate (in 1000 live births) × population +10% pregnancy wastage.[12]

Expected number of high-risk pregnancies calculated as = 66% of antenatal cases.[12]

Grading of performance of 30 JPHNs at each sub-center level was done based on the formula = Coverage of services/expected coverage of services × 100 for each item. The performance level of each sub-center was graded as excellent (90.1-100%), very good (80.1-90%), good (70.1-80%), satisfactory (60.1-70%) and poor (<60%).[13] Collected data were entered and analyzed using Statistical Package for Social Sciences version 19.0 (IBM Pasw Statistics - 19.0). Data expressed in proportion and depicted in the form of tables.

Ethical consideration
This study was approved by Institutional Scientific and Ethics committee. The study purpose was explained, and all the participants were asked to give written informed consent. District medical officer’s permission was obtained before initiating the study.

RESULTS
The total population of 30 sub-centers was found to be 202,197. Range of population was from 5050 to 9869 per sub-center, and the average population of a sub-center was 6740 (n = 30). About 21 sub-centers have above 6000 population. The average birth rate of a sub-center was 19.5/1000 population (n = 30), and the range of birth rate per sub-center was from 16 to 23/1000 population.
Majority of JPHNs were aged between 36 and 45 years (70%) and had experience of >5 years (90%). But only 40% of them were residing in the center [Table 1]. Overall, mothers who registered at sub-center by the JPHN were found to be 97%, but for the 1st trimester detection of antenatal cases, it was 59.9%. Performance of detection of antenatal cases by JPHN was excellent in 21 out of 30 (70%) sub-centers. 1st trimester registration of ANCs was poor by the JPHNs in 50% (15/30) of sub-centers, and only two JPHNs were performing as excellent in detection of ANCs at 1st trimester. About 76.7% (23/30) of sub-centers were excellent in providing three antenatal checkups to the beneficiaries. Services were excellent (>90%) in all the sub-centers for Tetanus Toxoid immunization and Institutional deliveries. With respect to referral services and postnatal check, only 26.7% and 33.3% of the centers found to be excellent with 50% of the centers were poorly performing for postnatal visit [Table 2].

Detection of beneficiaries for immunization by JPHNs was excellent in 60% sub-centers. Although BCG vaccination was excellent in 60% sub-centers, it was found to be poor in 40% of sub-centers for measles immunization and fully immunized child [Table 3].

About 90% JPHNs could prepare sub-center annual action-plan without any difficulty, and 90% of JPHNs calculated their beneficiaries correctly. All of them were aware of preparation of their monthly advance tour program, all attended in-service training for it, and all of them prepared monthly advance program correctly. All of them felt that they needed regular in-service training to update their knowledge and skill that will help them improve their technical skill pertaining to field activities.

**DISCUSSION**

This study highlights the situational analysis of functioning of maternal with child health services by JHCPNs at a sub-district level, which may help to adopt appropriate corrective measures in the future. Furthermore, it was found that there is a regional

### Table 1: Baseline characteristics of JPHNs (n = 30)

| Parameters                      | Categories | Number of JPHNs | Percentage |
|---------------------------------|------------|-----------------|------------|
| Age of JPHNs (in years)         |            |                 |            |
| 26-35                           | 3          | 10              |            |
| 36-45                           | 21         | 70              |            |
| 46-55                           | 6          | 20              |            |
| JPHNs residing at sub-center    |            |                 |            |
| Resident                        | 12         | 40              |            |
| Nonresident                     | 18         | 60              |            |
| Experience of JPHNs (in years)  |            |                 |            |
| 0-5                             | 3          | 10              |            |
| 5-15                            | 19         | 63.3            |            |
| 15-25                           | 8          | 26.7            |            |

**Table 2: Performance of JPHNs on maternal health services**

| Activities                       | Excellent (%) | Very good (%) | Good (%) | Satisfactory (%) | Poor (%) |
|----------------------------------|---------------|---------------|----------|------------------|----------|
| ANC registration                 | 21 (70.0)     | 6 (20.0)      | 2 (6.7)  | 0 (0.0)          | 1 (3.3)  |
| ANC registration (1st trimester) | 2 (6.7)       | 2 (6.7)       | 7 (23.3) | 4 (13.3)         | (15 (50.0)     |
| 3 ANC checkups                   | 23 (76.7)     | 3 (10.0)      | 2 (6.7)  | 1 (3.3)          | 1 (3.3)  |
| Weight                           | 22 (73.3)     | 2 (6.7)       | 2 (6.7)  | 1 (3.3)          | 3 (10.0) |
| Hemoglobin test                  | 15 (50.0)     | 5 (16.7)      | 3 (10.0) | 2 (6.7)          | 5 (16.7) |
| Urine examination                | 15 (50.0)     | 4 (13.3)      | 1 (3.3)  | 2 (6.7)          | 8 (26.7) |
| Referral services                | 8 (26.7)      | 11 (36.7)     | 3 (10.0) | 5 (16.7)         | 3 (10.0) |
| Tetanus toxoid injection         | 30 (100.0)    | 0 (0.0)       | 0 (0.0)  | 0 (0.0)          | 0 (0.0)  |
| 100 tablets of IFA               | 21 (70.0)     | 3 (10.0)      | 5 (16.7) | 1 (3.3)          | 0 (0.0)  |
| Institutional deliveries          | 30 (100.0)    | 0 (0.0)       | 0 (0.0)  | 0 (0.0)          | 0 (0.0)  |
| PNC                              | 10 (33.3)     | 2 (6.7)       | 2 (6.7)  | 1 (3.3)          | 15 (50.0) |
| Overall performance              | 9 (30.0)      | 11 (36.7)     | 3 (10.0) | 6 (20.0)         | 1 (3.3)  |

**Table 3: Performance of JPHNs on child health services**

| Activities                       | Excellent (%) | Very good (%) | Good (%) | Satisfactory (%) | Poor (%) |
|----------------------------------|---------------|---------------|----------|------------------|----------|
| Birth registration               | 18 (60.0)     | 6 (20.0)      | 3 (10.0) | 2 (6.7)          | 1 (3.3)  |
| BCG vaccination                  | 18 (60.0)     | 9 (30.0)      | 0 (0.0)  | 1 (3.3)          | 2 (6.7)  |
| 3 doses of DPT and OPV           | 6 (20.0)      | 12 (40.0)     | 6 (20.0) | 1 (3.3)          | 5 (16.7) |
| Measles vaccination and Vitamin A solution | 1 (3.3) | 7 (23.3) | 5 (16.7) | 5 (16.7) | 12 (40.0) |
| Fully immunized                 | 1 (3.3)       | 7 (23.3)      | 5 (16.7) | 5 (16.7)         | 12 (40.0) |
| Overall performance              | 4 (13.3)      | 12 (40.0)     | 5 (16.7) | 3 (10.0)         | 6 (20.0) |
variation with respect to services which requires further analysis for identifying the associated factors with it. Another study in Madhya Pradesh also found that variation exists in the use of maternal health services in the community. At the same time, it is important to understand that field workers work mainly for national health programs and thereby giving less importance to other health-related programs.

A few studies were conducted to assess the performance of JPHNs in India. Overall registration of ANCs in our study is comparable to Kerala state (99.8%) and other studies. But the 1st trimester registration is low for antenatal cases (60%) compared to Kerala. However, in India, the 1st trimester registration of antenatal cases by the JPHN was 45%. Three ANC to pregnant mothers in our study (93.7%) was comparable to the state level performance (95.2%). However, at district level and national level, it was 61.1% and 49.8% respectively. District Level Household Survey-3, 2007-2008 found the performance of JPHN on Maternal Health Care at sub-center level in Kerala to be excellent and percentage of three ANC by state was 72.3%, 99.4% of deliveries took place in health institution and 99.4% of mothers had a PNC. A recent study highlighted that during pregnancy about 61.7% of the subjects had ANC at least once, whereas within 2 weeks after delivery, only 37.4% women had PNC. Another study also found that PNC given for the mothers was 56.7%. A Nigerian study revealed that ANC at least once was received for 60.3% of the pregnant mothers, skilled attendants at delivery for 43.5% and PNC for 41.2% of nursing mothers. Ethiopia study revealed that about 77.4% and 37.2% of the mothers, respectively, had received ANC and PNC services.

Performance of JPHNs regarding TT injection for ANC was 100%, however national performance was 73.4%. Intake of 100 IFA tablets for ANC (80.1%) was found to be comparable to state level (73.3%), district level (71.3%), and a study done at Haryana (83.3%) (17), but at the national level, it was as low as 46.6%. Similarly, pregnant mothers who delivered at health institution were 100% in the present study, and in India, it was as low as 47%. In contrast to this, only 49.8% mothers in Madhya Pradesh study and 40% in Haryana study were assisted by skilled personnel. The difference in study findings may be because of the difference in methodology adopted in data collection process, regional variation and performance in the health care delivery system in the area.

Fully immunized children of <1-year-old were 64.3% in the present study, and in Kerala and India, it was 79.5% and 54.1%, respectively. Regarding measles vaccination, it was 64.3% in the current study. However, state level performance was as high as 87.9%. It is known that there are many factors involved with utilization of health services by the target groups like mother’s and husband’s education, status of marriage, income of household, employment of women, exposure to media, obstetric complications, cultural factors about pregnancy, parity, which may be responsible for observed variation of services.

A study found that sub-center action-plan was known to all the ANMs, but 41.7% of them calculated correctly the calculation of the pregnant women in an area. Only 25% of the ANMs calculated the number of beneficiary children correctly. The fact that 90% JPHNs could prepare sub-center annual action-plan and calculated their beneficiaries correctly is a positive sign in the present study.

Since it is a record-based study, there may be a chance for over-reporting and under-reporting of MCH services in the MCH register by the JPHN. As only 2 months of the MCH register, registered for antenatal and birth were followed up in this study, it may not represent the cohort of those registered for the whole year. In spite of these limitations, it gives valuable information which can be utilized for further planning and strengthening of services to this vulnerable group.

CONCLUSION

There is a variation in performance level of JPHNs based on record analysis at a sub-district level which highlights the importance of further studies to elucidate the various factors associated with it. Services for maternal and child population should be improved through strengthening of in-service training and evaluation of JPHN performance along with other parameters. Overall, some of the services should be improved like identifying high risk pregnancy and referral services, registration during first trimester of pregnancy, diagnostic tests, and full immunization of children, which requires concerted efforts by the concerned authorities at regional level.

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