A time-and-motion analysis of multipurpose healthcare workers from Kashmir

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ABSTRACT

Background: A multipurpose health worker (MPHW) is the pivotal functionary and the first point of contact in health care sector. This study explores the work-related activity of MPHWs in the different domains and also assesses their time utilization pattern.

Methods: A time and motion study was conducted among 12 multipurpose health care workers (MPHWs) from 10 different Subcenters of block Hazratbal. Participants self-reported their daily activities on a time measurement sheet for 6 days. Data were entered in Microsoft Excel and analyzed using SPSS v25.0. Calculations are based on a total of 544.5 person-hours of observation by ANMs.

Results: Time utilization pattern revealed that ANMs spent one-fourth of their time on maintaining registers. Observations on self-reporting were comparable with that of observations made by external observers.

Conclusions: This study reflects the workload in different domains of MPHWs' activities and nature of their work, relevance of their job responsibilities in the context to Indian public health standards for their job.

Keywords: Activity, healthcare, timemotion

Introduction

Public health practices in India have been ever-changing and witnessed barriers to affect the lives of the people of this country. A multipurpose health worker (MPHW) is the pivotal grass root level worker in a subcenter. Auxiliary nurse midwives (ANMs) or multipurpose workers (MPWs) female and HWs male (M) are the first point of inter-action with the community at the grass-root level, providing all the primary health-care services. With every new program, there is a need for collecting additional data from the subcenter area leading to increase in the workload of these functionaries. There is a limited literature on the work-related performance of multi-purpose health workers in the domain of basic health care and implementation of national health programs. The current role played by MPHW in providing health-care services to the community is vital and needs to be analyzed. Very few studies have been reported on HWs in community settings, possibly due to the challenging circumstances in the field and logistic difficulties in conducting such studies. Globally, several time-motion studies of facility-based healthcare professionals have been reported; however, the number of comprehensive time-motion studies of community-based health workers, such as Ethiopia’s HEWs, is limited. A time and motion study is defined as the independent, constant observation, and recording of activities of staff and the time spent on these activities. A 1995 study of the time allocation of health workers in rural health centers in Cameroon revealed that only 27% of health workers’ time was spent on productive, health-related activities, and the majority of waiting/inactive time was spent waiting for patients. In the Cameroon study, productive time included performing administrative tasks, clinical work, promotion/prevention services, and maintaining general hygiene in the health center. Waiting/inactive time included social visits, waiting for patients, tea/lunch breaks, and explained/unexplained absences. A 2014 study of community health workers in peri-urban settings...
Material and Methodology

The data collection regarding utilization of time by HCWs was done by self-reporting of HCWs by giving Time Motion Questionnaire for a whole week except Sundays. A parallel observation was carried by Internal Masked Observers and third-tier {External} observation was carried by the External Masked Observer for the whole working hours per day by keeping eye and vigil on the activities of HCWs by using stopwatch for each activity carried out by them and record it on hard/soft copy.

Study design and population

This was an observational study using time-and-motion study design. All the subcenters of the block Hazratbal which is a field practice area of Department of Community Medicine, Government Medical College, Srinagar was included in the study. Institutional ethical committee clearance was sought from Government Medical College, Srinagar. All eligible HCWs who were working from the last 1 year at that place of posting were included. A total of 12 ANMs will be included in the study. A time-motion study comprising time-motion observations of time consumed in each activity, the content of the activity, structured interviews for data about personal and professional profiles of the respondents, and their insights about the work will be conducted.

Study tool

The time-motion study was conducted by using continuous observation method/work sampling. The internal/external observer meets the respondents at the office or at a prefixed starting point depending upon the schedule of the worker. The observer remained with the worker till the work was over and the health care worker left for home. During the day, all the activities were systematically recorded by the observer, including the nature of and time spent in each activity. During a field visit, the observer traveled with the healthcare worker and continued with similar observations. A preliminary data sheet will be used to elicit the amount of time spent on each activity using participant observation technique, based on job functions assigned under the Indian Public Health Standard guidelines. A structured time measurement sheet was developed to record activities performed and services provided (both by HCWs as well as Internal and External observers), time spent in various activities per day, and the number of beneficiaries catered. In addition, age, training, work experience, and service provision details were collected from the participants.

Data collection and analysis

In the time-motion study, data was collected in printed forms. Groups of activities were coded into categories. The study data was coded into categories, and Microsoft Excel was used to analyze the coded activities.

Study procedure

Data were collected at each center for 6 days. The main activities performed each day, along with the number of beneficiaries contacted and time taken for carrying out these activities, were recorded on the time measurement sheet. An internal as well as external observer silently records the activities carried out by the HCWs. This log of activities regarding each type of work was recorded both in the field and in the health center for 6 days. At the end of each day, the staff was contacted and the data sheets were collected.

The selected facility was visited between working hours (10 AM to 4 PM) over a period of 6 days. The investigator (Internal as well as External Observer) accompanied the HW in her day-to-day activities (both in the health Center and in the field). The investigator used a recording sheet and a stopwatch to record each activity and the time spent on it. Based on the activities performed, the time taken, and the number of beneficiaries contacted, the average time spent (in minutes) for each activity was computed. Comparisons were made for the activity profile based on self-reports by the HCWs and the participant observation done by the investigator. (Internal and External).

Results

A total of 12 HCWs participated in this study from 12 SCs. On average, MPHW-to-population ratio is around 1:2900. The mean age of the participants was 33, with a range of 26–54 years. Almost 50% of the participants were in the age group of 30–39 years. All participants had completed their professional training by diploma courses. Mean years of work experience were 10.5 years (3–31 years). Half of the participants had <10 years of work experience. [Table 1] shows the time utilization pattern among the HWs. Time utilization pattern revealed that FMPHWs spent maximum of their time (23.5%) on maintaining registers. HWs (M) utilized 17.0% of their time for break that involved lunch/tea and offering prayers followed by 11.1% travel for work purpose and 9.9% screening for hypertension. Antenatal Care constituted nearly 9.5%. Reporting and uploading of data to higher center consumed 7.2% of time. Other activities that constituted multipurpose worker’s time utilization include vaccination (6.8%), Community Meetings (4.5%) and Screening for Diabetes (4.3%). Observations on self-reporting were comparable with that of participant observations. The HWs utilized 1.6% of their time in other community-based activities like Village Health Nutrition Days, surveys. To get the supplies and commodities for the health centers, HWs utilized 1.4% of their time. For meetings with the higher officials or ASHAs, HWs utilized 0.9% of their time. To visit the ANCs and PNCs...
at their homes, HWs spent nearly 0.5% of their time for each. For providing health education regarding family planning, 0.5% of the time of HWs was spent. Very less (0.2%) time was spent on providing family planning services like distribution of condoms, OCPs.

Table 2 shows the sum, mean and standard deviation (SD) of duration of various activities done by the MPHWs. The ANC-related work was conducted 42 times and the time spent 22 h (1320 min) with a mean of 31.42 min in providing Antenatal care (registration; distribution of iron, folic acid tablets; immunization of the ANCs) to the pregnant women. Among all MPHWs, only 2 times ANC and PNC home visits were reported for 2–3 h with a mean of 60.00 and 80.00 min spent on each activity respectively. Nearly four-fifths times (30) of the task conducted by MPHWs reported utilizing their maximum time (38 h) in vaccination sessions with a mean of 75.5 min. Only one HW reported duration of a half-hour with mean of 30.00 min to provide family planning services. Again, only one MPHW reported utilizing their 1 h with a mean of 30.00 min in providing health awareness regarding family planning services. For screening of NCDs (HTN and DM) HWs (n = 44 and 19) utilized 23 h (mean = 31.25 min) and 11 h (mean = 33.95 min) of their time respectively. Time spent on personal activities (such as having breakfast, snacks, changing uniforms, conversation, and idle time) was repeated 79 times by HWs and was around 76 h with mean of 57.40 min. For traveling purposes, HWs (n = 49) utilized 97 h with mean of 118.80 min. HWs (n = 6) utilized 8 h with a mean of 78.33 min of their time for managing the commodities and supplies of the health center. Time utilized by HWs (n = 32) for record keeping and reporting was reported to be 39 h with a mean of 73.12 min. Meetings with the health workers (ASWAs/AWWs/ZMOs/BMOs) were conducted 4 times with a mean of 60.00 min.

### Table 1: Time utilization pattern among the Health Workers

| Task                                    | Frequency (n) | Percent (%) |
|-----------------------------------------|---------------|-------------|
| Maintaining registers                   | 104           | 23.5        |
| Break (including lunch or tea)          | 79            | 17.8        |
| Travel for work purposes                | 49            | 11.1        |
| Screening of Hypertension               | 44            | 9.9         |
| Antenatal care                          | 42            | 9.5         |
| Record keeping and reporting (e.g., IDSP)| 32            | 7.2         |
| Vaccination                             | 30            | 6.8         |
| Community Meeting - Health-related      | 20            | 4.5         |
| Screening of Diabetes Mellitus          | 19            | 4.3         |
| Other community-based activities        | 7             | 1.6         |
| Manage commodities and supplies         | 6             | 1.4         |
| Meet with ASHAs/AWW/ZMO/BMO             | 4             | 0.9         |
| Pregnancy home visit                    | 2             | 0.5         |
| Postnatal Care home visit (no possible severe bacterial infections (PSBI) in children<2 months of age) | 2 | 0.5 |
| Health Education on Family planning     | 2             | 0.5         |
| Family planning services (OCP/ECP/Condoms) | 1             | 0.2         |
| Total                                   | 443           | 100.0       |

### Table 2: Duration of activity as per the task conducted

| Task                                                      | n   | Minimum | Maximum | Sum   | Mean  | Std. deviation |
|-----------------------------------------------------------|-----|---------|---------|-------|-------|----------------|
| Antenatal care                                            | 42  | 20.00   | 45.00   | 1320.0| 31.4286| 6.17684        |
| Pregnancy home visit                                      | 2   | 60.00   | 60.00   | 120.00| 60.0000| 0.00000        |
| Postnatal Care home visit (no possible severe bacterial infections (PSBI) in children<2 months of age) | 2 | 80.00 | 80.00 | 160.00 | 80.0000 | 0.00000 |
| Vaccination                                               | 30  | 30.00   | 120.00  | 2265.0| 75.5000| 26.30557       |
| Family planning services (OCP/ECP/Condoms)               | 1   | 30.00   | 30.00   | 30.00 | 30.0000| 0.00000        |
| Health Education on Family planning                      | 2   | 30.00   | 30.00   | 60.00 | 30.0000| 0.00000        |
| Screening of Hypertension                                | 44  | 15.00   | 55.00   | 1375.0| 31.2500| 8.49932        |
| Screening of Diabetes Mellitus                           | 19  | 15.00   | 85.00   | 645.00| 33.9474| 18.52768       |
| Break (including lunch or tea)                            | 79  | 30.00   | 90.00   | 4535.0| 57.4051| 16.30756       |
| Travel for work purposes                                  | 49  | 30.00   | 270.00  | 5820.0| 118.7755| 81.23096       |
| Manage commodities and supplies                           | 6   | 60.00   | 90.00   | 470.0 | 78.3333| 14.37591       |
| Record keeping and reporting (e.g., IDSP)                 | 32  | 20.00   | 270.00  | 2340.0| 73.1250| 55.96298       |
| Meet with ASHAs/AWW/ZMO/BMO                              | 4   | 60.00   | 60.00   | 240.00| 60.0000| 0.00000        |
| Community Meeting - Health-related                       | 20  | 180.00  | 330.00  | 2410.0| 245.5000| 49.97373       |
| Other community-based activities                          | 7   | 30.00   | 85.00   | 380.00| 54.2857| 24.90458       |
| Maintaining registers                                     | 104 | 30.00   | 180.00  | 8000.00| 76.9231| 32.95560       |

*n*: no of times activity was repeated
officials and other staff, HWs (n = 4) utilized 6 h with mean of 60.00 min of their time. For health-related community meetings, HWs (n = 20) utilized 82 h with a mean of 245.50 min. Other community activities utilized almost 6 h with mean of 54.30 min of the time duration of the HWs (n = 7). Documentation and maintaining registers took up almost 133 h (mean = 76.92 min) of the maximum HWs (n = 104) time.

The scatter plots [Figure 1] shows the activities reported by the HWs (self) and the observers. According to it, there is not much difference in the activities reported by the HWs (self) and the observers in subcenters 1, 5, 6, 7, 8, 9, and subcenter 10. Subcenters 2, 3, and 4 show a slight difference in the activities reported by the HWs (self) and the observers.

The scatter plots [Figure 2] show the duration of activities reported by the HWs (self) and the observers. Accordingly, there is not much difference in the duration of activities reported by the HWs (self) and the observers in subcenters 1, 3, 4, 5, 6, 7, 8, 9, and subcenter 10. Subcenter 2 shows a slight difference in the duration of activities reported by the HWs (self) and the observers.

**Discussion**

This was an observational study that was done in all the subcenters of the block Hazratbal using time-and-motion study design. A total of 12 MPHWS were observed for time consumed in each activity at the subcenters. Time utilization pattern reveals that most of the time of the ANM is spent on Maternal and Child Health and related paperwork activities (34.7%). Most of the registers maintained by the ANMs are related to MCH and family welfare, so this has been accounted under MCH activity. However, this is lesser when compared to other studies where majority of the MPHWs role is on MCH (65%–78%).[8] However, a recent study reported that around half of Health Workers time was spent on MCH related activities.[7] Nearly 80.0% of time of ANMs is spent in clinic-based activities which is higher when compared to another study and this may be due to their predominant domain of work that involves clinics conducted every week for MCH and also cater to minor ailments in outpatient departments.[8]

MPHWs spent 14.2% of their time on NPCDCS activities only. Other program services are not carried out by the MPHWs in our study; the workers perceived that lack of training and poor availability of services were the main reasons. This was also observed by Kapoor et al.[6] that other communicable disease control programs are not getting priority for MPHWs. Regular sensitization and training programs can be conducted for MPHWs on family welfare, etc., and ANMs in order to increase their efficiency. Task management and restructuring of job responsibilities of MPWs may be another option for provision of new services such as NCD and geriatric care, both in clinics and community. In our study, maintaining registers and documentation constituted nearly 23.5% of time spent by MPHWs. They maintain nearly 22 registers. Efforts to reduce time expenditure in maintaining documents and registers can be done through information technology which can be piloted. Reducing data documentation and duplication of reporting may provide additional time for the MPHWs, thereby allocating more time for the existing and additional services. Time spent on personal activities by MPHWs (such as having food and tea and changing uniforms) was 17.8%. However, a study done in
Ahmedabad, Gujarat, among three MPHWs showed that most of the time was spent while sitting idle and for consuming lunch, and the main activities related to work and immunization were given much less time. Self-reporting though a cheaper means of quantifying the duration of activity has its own merits and demerits. However, in our study, we noted that most of the observations on self-reporting were comparable with that of participant observation and there was less discrepancy. Higher duration of activity related to documentation and underreporting in personal activities were noticed by both self as well as external observers. This was similar to a study where MPHWs overreport their activities in comparison with reporting done by field surveys. Another study reported that though comparable amounts of total time were reported within the various activities, mean activity times were significantly longer as per self-reporting compared with time-and-motion method by observer. Hawthorne effect or observer bias may be because of being aware of being observed followed by behavioral change in line with the researcher’s expectations leading to conformity and social desirability. This is one of the few studies that capture time utilization among MPWs in India which documents the real-life work performance. However, there are a few limitations to this study. Self-reporting may have led to overreporting of some activities and duration of activity. Hence, external observation method was utilized to assess bias due to self-reporting and these findings correlated with external observation in this study.

**Conclusions**

This study reflects the workload in different domains of MPHWs activities and the diverse nature of their work, relevance of their roles and responsibilities in the context of Indian public health standards and therefore gives an insight into the workload assigned to the multipurpose health care workers.

**What the study adds**

In this study, some essential points have been highlighted with regard to the time management concerns of health care workers. The policymakers should frame strategies that would decrease the redundancy of data entries on paper and then online. Further, strategies should be framed more in line with priorities of work as per the essentiality. As far as possible, real-time data entries should be encouraged at all levels which would save time essentially.

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**Conflicts of interest**

There are no conflicts of interest.

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