

**A study on the determinants of performance and  
task analysis of the female health workers,  
South and North-24 Parganas District,  
West Bengal, India, 2007**



By

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**February, 2008**

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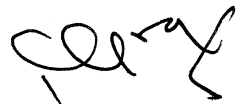
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## CERTIFICATION

This is to certify that this dissertation, entitled '**A study on the determinants of performance and task analysis of the female health workers, South and North-24 Parganas District, West Bengal, India, 2007**', submitted by **Dr.Dipankar Maji**, in partial fulfillment of the requirements for the degree of Master of Applied Epidemiology, is the original work done by him and has not been submitted earlier, in part or whole, for any other (Publication or degree) purpose.

Date : 29.02.2008



**Director**

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## Literature review regarding determinants of performance of female health workers engaged in primary health care

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*The World Health Report 2006* contains both an expert assessment of the current crisis in the global health workforce and an ambitious set of proposals to tackle it. Today's crisis is a major constraint to health improvement in almost 60 countries globally.<sup>1</sup> About 59 million people make up the global health workforce. 37% of them are employed in the Americas, mostly in the USA and Canada, where more than half the world's financial resources for health are to be found. However, only 3% of the world's health workforce is in sub-Saharan Africa, which has a quarter of the global burden of disease, and less than one per cent of the world's financial resources (for health).<sup>2</sup> While the density of health workers in the North Americas is 41.70 per 1000 population, in Asia it is only 4.53 per 1000 population.<sup>2</sup> In the face of such inequities, the question nurturing and utilizing the existing workforce becomes all the more imperative. According to the World Health Report 2006, by actively planning around the working lifespan of a worker, a set of policy options can be developed that would all make a discrete contribution to improving the performance of the health workforce. All countries must also begin to anticipate what lies ahead and acquire the necessary institutional capacity to lead, manage and regulate the health workforce.

Whatever the circumstances, an effective workforce strategy has to focus on three core challenges: (i) improving recruitment, (ii) helping the existing workforce to perform better, and (iii) slowing the rate at which workers leave the health workforce. The strategies to meet the second of these challenges i.e. optimizing the performance of current workers, are critical for four reasons<sup>1</sup>: (a) They will be likely to show results sooner than strategies to increase numbers. (b) The possibilities of increasing the

supply of health workers will always be limited. (c) A motivated and productive workforce will encourage recruitment and retention. (d) Governments have an obligation to society to ensure that limited human and financial resources are used as fairly and as efficiently as possible. It has been clearly expressed in the World Health Report 2006 that however difficult, without changes to support improved performance of existing health workers, any recruitment and retention strategies will have limited effect.

Now, implementation of such changes would require measurement of performance before and after interventions. Quantification of health care has an inherent problem of agreement on the indicators of measurement. R. Perera et al wrote : "It is important that debate occurs between theorists, policy makers, clinicians and service end-users to develop agreement over suitable and appropriate indicators for primary health care."<sup>3</sup> Alfredo L. Fort et al, in their study on maternal care providers in Armenia, used a quality measurement tool based on Measure Evaluation's Quick Investigation of Quality (QIQ).<sup>4</sup> Enrolling new acceptors to the family planning programme was used as an indicator by Amador R. Catacutan for comparing service coverage between two types of health facilities<sup>5</sup>. Thomas Bossert et al, while assessing the degree of decentralization in Zambia, measured district performances by available indicators like utilization of health services, immunization coverage and family planning activities.<sup>6</sup> D. Varatharajan et al quantified P.H.C. performance in the state of Kerala, India in terms of patient load, cost-effectiveness, medicine supply, information and client satisfaction.<sup>7</sup> B.M. Prasad and V.R. Muraleedharan<sup>8</sup> have observed that in studies on community health workers (CHWs) performance is measured in terms of improvement in health status of the population that CHWs serve, increase in the utilization of services provided by them, reduction in the wastage of resources, the presence and accessibility of CHWs to the community members, etc. In their work on monitoring of primary health care in Western Uganda, W. Kipp et al<sup>9</sup> used indicators in relation to management capability,

infrastructure, level of basic knowledge and skills of the health staff as well as community involvement and utilization of health services. Benjamin P. Loevinson et al adopted a different methodology for their study on supervision of primary health care in Philippines.<sup>10</sup> A score from 0 to 3 was assigned on each of 20 indicators, by which the intervention health facilities were compared with control facilities. W.H.O., in its Progress Report on Multi-Country Evaluation of I.M.C.I., states that "Measurement approaches used in the social and behavioural sciences can make important contributions to public health research and evaluation. This is especially important because these studies are often used immediately to guide programme and policy decisions."<sup>11</sup>

In answering the question what a well-performing workforce means, the World Health Report 2006 says, "A well-performing workforce is one that works in ways that are responsive, fair and efficient to achieve the best health outcomes possible, given available resources and circumstances." It identifies four domains to assess health workforce performance, viz. availability, competence, responsiveness and productivity. It proposes indicators under these domains to quantify performance. However, this is only one aspect of the model dealing with improvement of performance. The question remains : what determines how health workers perform? There are examples of health workers producing variable outcome even in comparable settings. In Vietnam, the efficiency with which health workers in each province used the available financial resources to reduce infant mortality was estimated. Controlling for education and poverty, the efficiency ranged from 40% to 99%. Examining performance this way reveals areas where a workforce is performing well and areas where improvements should be possible, but this method does not explain why performance varies or what can be done about it. To understand why health workers perform differently, it is useful to consider the factors known to influence their work. For many years it was assumed that poor health worker performance was primarily caused by a lack of knowledge and

skills. In recent years this perception has changed, and three broad groups of factors are now recognized; i.e. (a) characteristics of population being served, (b) characteristics of health workers themselves and (c) characteristics of the health system. Analogy can be drawn with the work of Marjolein Dieleman et al on rural health workers in North Vietnam,<sup>12</sup> where they identified motivational factors belonging to three different levels – the individual level, organizational level and the larger socio-cultural level. Lynne Miller Franco et al, in their article on health worker motivation in hospitals, wrote : “Health worker motivation reflects the interactions between workers and their work environment.....little is known about the key determinants and outcomes of motivation in developing and transition countries”.<sup>13</sup> They conducted a study in hospitals of Jordan and Georgia and found that while workers themselves stated financial reward to be critical for their work satisfaction, the data suggested a number of non-financial interventions that might be more effective means to improve worker motivation.

According to the World Health Report 2006, the main levers available to support performance include (a) a group that are job related; (b) those related to the support systems that all workers need to do their jobs; and (c) levers that shape and create an enabling work environment. It is rare to find a direct relationship between one specific lever and a desired change. Collectively, they make up a checklist of options for policy-makers to consider, from which various instruments have to be selected and combined to meet specific health workforce challenges. Supervision and monitoring fall under the first group, whereas infrastructure and supplies come under the second group. The third group includes, among others, responsibility and accountability. The said document summarizes some of the key levers and the characteristics of the workforce that they can collectively influence. Some of these instruments have been found to be relatively easy to implement, others are more complex. Some offer the prospect of relatively early results, others are much longer term. Some are low cost, others are expensive. Some

are not exactly policy levers but affect productivity. All of these levers need to be set within a vision for the workforce over the medium to long term. Improvements in workforce performance and productivity usually result from a bundle of linked interventions, rather than uncoordinated or single ones. Selecting the right instruments to use and judging when and where to use them, require not just knowledge of the instruments themselves, but also an understanding of other important issues that can influence how well the levers work, such as the structure, culture and institutional capacity of the organization concerned, and wider social values and expectations. Four issues of concern for decision-makers are considered: the robustness of the knowledge base, what is known about ease of implementation, the cost, and the time frame for effects to take place.

Hard evidence of what works is still limited, but this is no excuse for inaction, given the workforce crisis that is facing many countries. On the other hand, the lack of hard evidence points out the scope of further study. C.G. Victoria wrote in *American Journal of Public Health*<sup>14</sup> that "Randomized controlled trials (RCTs) are essential for evaluating the efficacy of clinical interventions, where the causal chain between the agent and the outcome is relatively short and simple, and results may be safely extrapolated to other settings. However, causal chains in public health interventions are complex, making RCT results subject to effect modification in different populations. In addition, under RCT conditions, programmes are typically implemented under intense, artificial conditions. Both the internal and external validity of RCT findings can be greatly enhanced by observational studies using adequacy or plausibility designs. For evaluating large-scale interventions, studies with plausibility designs are often the only feasible option, and may provide valid evidence of impact."

Christopher Potter and Richard Borough observed<sup>15</sup> that capacity building of the workforce is not enough to improve the performance in health care. In their opinion, capacity building should not only mean betterment of knowledge and technical skill. Rather it should be seen in an extended perspective, taking capacity building of the whole system in its fold. They conceptualized the health care delivery system as a capacity pyramid having four levels in it, viz.- (a) structures, systems and roles, (b) staff and infrastructure, (c) skills and (d) tools. Output of each level immediately depends on the next lower level. They enumerated nine component elements of systemic capacity building. Personal capacity is one out of the nine elements and it includes, among others, managerial skill and interpersonal skill of the staff. Supervisory capacity has also been identified as another component element. Physical monitoring and incentives have been particularly mentioned under this capacity. They observed that in government health system in India, there were inputs for personal and performance capacities in the form of equipments and technical skill without any inputs in other areas. They identified it to be the reason of failure of capacity building initiatives.

That the World Health Report 2006 states that hard evidence of which interventions actually work is limited, is reflected in an overview of the studies done on health worker performance. These studies are mainly qualitative or descriptive ones. The works of Paula Tavrow et al in Zimbabwe<sup>16</sup>, Marjolein Dieleman et al in North Viet Nam<sup>12</sup> and Joseph Valadez et al in Costa Rica<sup>17</sup>, and the article by J. Ammentorp et al published in Danish in *Ugeskr Laeger*<sup>18</sup> can be cited as examples. Lynne Miller Franco et al, in their article on health worker motivation in Jordan and Georgia hospitals<sup>13</sup>, mentioned that "little is known about the key determinants and outcomes of motivation in developing and transition countries". Alfredo L. Fort and Lauren Voltero have raised this issue<sup>4</sup> by saying that "Little research, domestically or internationally, has been conducted on the actual effects of each of the factors on performance outcomes and most PI (performance improvement) practitioners assume that all the factors are needed in order

for performance to improve.” Their study presented a unique exploration of how the factors, individually as well as in combination, affected the performance of primary reproductive health providers (nurse-midwives) in two regions of Armenia. A multivariate analysis showed that (a) training in the use of the clinic tools; and (b) receiving recognition from the employer or the client/community, are factors strongly associated with performance, followed by (c) receiving performance feedback in postpartum care. Hong R. et al performed quantitative analysis to determine the effect of family planning services quality on the use of I.U.D.<sup>19</sup>

Several works have pointed out the population assigned to the health workers to be a determinant of their performance. A study done on part-time community health workers by Sara Bhattacharji et al<sup>20</sup> way back in 1986 had shown that highest performance scores were associated with (among others) less population to cover and more intense supervision. The Planning Commission also in their draft titled ‘Report on Workforce Management Options & Infrastructure Rationalisation of PHC’ highlighted population size in the context of work-load. B.M. Prasad and V.R. Muraleedharan<sup>8</sup> discussed the optimum population size to be covered by a community health worker (CHW). They wrote : “Experience across countries varies.....There are countries such as Sri Lanka where a CHW covers as low as 10 households offering a set of MCH related services ((UNICEF, 2004). On the other hand, there are countries such as India, where a CHW covers about 1000 households (approximately 5000 populations, usually spread over 5 to 10 villages),.....population-coverage and the range of services offered at the community levels are vital in the design of effective CHW schemes. They opined that in policy formulation, the role of incentives and career prospects should proceed from design elements such as the overall work-load (in term of population coverage, and services offered and the degree of follow up required by the CHWs) (Ofosu-Amaah, 1983). And in this process, the degree of voluntarism that prevails among community

members will also influence the extent to which financial incentives and career prospects need attention in the design of CHWs.

The report of M/s A.F. Ferguson & Co. on 'organization development and human resource'<sup>21</sup> has pointed out that "the population being served by each of the sample sub-centres is more than the norms of one sub-centre per 5000 population. This would have an adverse impact upon service delivery and would be one of the main reasons for overcrowding and long waiting periods."

Community involvement has been dealt with as a determinant in different studies. W. Kipp et al<sup>9</sup> measured community involvement and compared it over time. They also included management capability of the staff in measurements. Rachel N. Manongi et al, in their article on improving motivation of primary health care workers<sup>22</sup>, indicated a need for the staff to feel valued and supported. They mentioned similar findings reported from Uganda, where recognition by both employer and members of the community were found to be important motivating factors. Ammentorp J. et al<sup>18</sup> identified the factors which promote successful communication in health care settings.

Many researchers have described the factors influencing workers' motivation and thereby the performance. Lynne Miller Franco et al developed a conceptual model<sup>23</sup> to clarify ways in which worker motivation is influenced and how health sector reform can positively affect worker motivation. Lynne Miller Franco et al have shown in another study that "while workers themselves state that financial reward is critical for their work satisfaction, the data suggest a number of non-financial interventions that may be more effective means to improve worker motivation". B.M. Prasad and V.R. Muraleedharan<sup>8</sup> cited : "Studies for example in Columbia have also shown that feedback and rewards from the community are more significant in the overall motivation and performance of CHWs (Robinson & Larsen, 1990)."

The World Health Report 2006 has strongly recommended supportive supervision as a strategy to better the health workers' performance. A number of studies have made similar suggestions. Benjamin P. Loevinsohn et al<sup>10</sup> have shown that "systematic supervision using clearly defined and quantifiable indicators can improve service delivery considerably, at modest cost." The report of M/s A.F. Ferguson & Co.<sup>21</sup> has expressed concern about the status of supervision of grassroots workers in West Bengal. It says : "At present it is being observed that the HS (health supervisor) are spending a majority of their time in compilation of various reports prepared at the sub-centres and submitting the same to office of BMOH (block medical officer of health). Thus they are unable to devote adequate time for performing their key function of supporting the HA (health assistant) in their activities."

Time management can be a deciding factor for good performance for a health worker. Time allocation by the workforce against different types of activities has been a concern for those managing the health workers in different parts of the world. S.A. Khoury and S. Mawaideh, in their study on primary health care providers<sup>24</sup>, used an activity sampling technique. The providers' activity over each shift was coded at 3-minute intervals. Patient-provider contact times were also recorded. They determined that overall, the care providers spent the nearly half their time (48.7%) as down time' (waiting, breaks and non-work related activities). In their article on task inventory, E.C. Nelson et al<sup>25</sup> mentioned that to enhance efficient utilization of health providers, medical care researchers are increasingly concerned with the measurement of task performance. They validated the task inventory method using observational technique and found that the results did not support validity. However, I. Jacoby and D. Kindig demonstrated in a study<sup>26</sup> that task inventory could generate data of potential value in improving personnel management in clinics.

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## Abstract

### Background :

Female health workers (FHWs) are crucial for primary health care in India. With their work-load increasing, there is need to formulate strategies to improve their performance. We attempted to identify the determinants of good performance of FHWs in two districts of West Bengal, India.

### Methods :

We did a cross-sectional study among randomly sampled FHWs. The outcome variables were above-average performance in DPT-booster coverage, 3-antenatal check-up coverage and family planning services. We estimated prevalence ratio (PR) of each of these outcomes according to potential performance determinants. We performed a task analysis of FHWs using the activity sampling technique.

### Results :

FHWs spent 26% of their time in data recording and reporting work. P.R. was higher among workers maintaining only family register, compared to those maintaining family register along with subsidiary registers. Subcentre floor space > 142 sq. ft. was associated with above-average coverage of DPT-booster (P.R.2.5; 95% C.I. 1.2-5.2). Monthly monitoring of performance and appreciation of good work were also significantly associated. Provision of privacy for case examination was associated with above-average coverage in antenatal check-up (P.R. 1.9; 95% C.I.) and family planning performance (P.R. 2.5; 95% C.I.). Workers with better performance more commonly used strategies to utilize existing resources and to cope with multi-tasking.

### Discussion :

FHWs had to spend huge time in data keeping and reporting work. Maintenance of less number of registers, certain basic facilities in the subcentre and some planning and

management capabilities of the FHWs facilitated better performance. We recommended analysis and revision of data management system to dispense with subsidiary registers and to save time for the FHWs. We also recommended provision of enough floor space and privacy for examination in the subcentres, as well as development of specific management skills in the FHWs. Monthly monitoring of performance and appreciation of good work also need to be ensured

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## ***Introduction***

The Health Workers are the final common pathway of implementation for all programmes of the primary health care system.. Effectiveness of this workforce is critical for the success of any plan for health promotion or control of disease. W.H.O. has taken into notice a global crisis of the health workforce, starting from the level of training and recruitment to retaining and managing them.<sup>1</sup>

In India, the Female Health Workers (FHWs) who work at subcentres, have to perform 18

different jobs on routine basis. Multi-tasking place them in a demanding situation<sup>2</sup>. The increasing population in their service area and the reducing number of male health workers also contribute to their burden<sup>2</sup>. Compared to many other countries, India offers a wider range of services through community health workers (CHWs). The rationale for this is that it is necessary to integrate a range of services at community level in order to have better health outcomes. But such an approach has also led to criticisms from various quarters that it has increased the overall work-load of CHWs and thereby reducing their performance<sup>3</sup>.

The jobs and responsibilities of FHWs in India have further increased in the recent years, because of changes in the Reproductive and Child Health Programme. Outreach immunization sessions became mandatory since 2005 and referral for medical termination of pregnancy was added to their terms of reference in 2006. National Rural Health Mission started to provide funds to the subcentres (2006), assigning the responsibility of fund management to the FHWs.<sup>4</sup> Public health programmes have also

increased in the last few years. As for example, Annual Mass Drug Administration for filariasis elimination and salt survey under the Iodine Deficiency Disorder Control Programme were initiated in 2004 and 2006 respectively. Integrated Disease Surveillance Programme (I.D.S.P.) that requires weekly reporting, has been introduced in 2007.

Among the health managers in different parts of the world, there is a concern about time management of the health workforce.<sup>5,6</sup> In West Bengal FHWs spend 16% of their time for preparation of reports and 19% of time in meetings<sup>2</sup>. With introduction of new activities including I.D.S.P., the time spent for reporting might have gone further up.

The World Health Report 2006 has proposed strategies to meet the challenges pertaining to the health workforce. It suggested a number of intervention areas (referred to as 'levers' in the report) to optimize performance. These included (a) levers which are job related; (b) levers related to the support systems that all workers need to do their jobs; and (c) levers that shape and create an enabling work environment. However, hard evidence of what works is still limited<sup>1</sup>. Little research has been conducted globally on the actual effects of each of the factors on performance outcomes<sup>7</sup>. A research work on health worker motivation in Jordan and Georgia hospitals<sup>8</sup> suggested that little was known about the key determinants and outcomes of motivation in developing and transition countries. In 2006, an organizational review of the health department of Government of West Bengal identified issues at the subcentre level, related to physical condition and workload in the subcentres, supervision and monitoring, job career of FHWs and involvement of the people's representatives. These empirically suggested some intervention areas. However, no quantification nor any measurement of the effect was available to back up the statements.

To maximize the performance of the Female Health Workers, given the current work load, we need quantitative information regarding the positive and negative determinants of their performance.

We conducted a study to: estimate the proportion of time that a Female Health Worker assigns to key categories of tasks on her terms of reference, identify which of the potential determinants are significantly associated with the performance of the Female Health Workers and identify areas of intervention to improve work output of the Female Health Workers.

## ***Methodology***

**Study population :** The female health workers (FHWs) working in the subcentres of the state health department – in the districts of South and North-24 Parganas.

We conducted the study during August to November, 2007. However, the reference period for performance evaluation was January to July, 2007.

**Study design :** The task analysis was a descriptive cross-sectional study. The study on the performance determinants was an analytical cross-sectional study.

**Inclusion criteria :** We included in the study those female health workers (FHWs) who have been working in the sampled subcentres since before the year of 2007.

**Exclusion criteria :** We excluded the FHWs who worked in subcentres located in any health centre, hospital or a gram panchayat office, as they were in a more privileged position in terms of monitoring, support and frequent contact with the community members – compared to the FHWs of the peripheral subcentres. We also excluded FHWs who were suffering from any chronic major illness, had undergone any major surgery or have been on leave for more than 3 months during the reference period.

### **Operational definitions :-**

Exposure variable : The potential determinants of performance were the exposure variables in our study. The definitions in connection with the specific exposure variables can be seen in Annexure- I.

Performance : (a) coverage of DPT-booster among 16-24 month children vaccinated with DPT-booster dose; (b) coverage of 3 antenatal check-ups among pregnant women; (c) percentage of unprotected couple accepting sterilization, intrauterine device or oral pills. The reference period for considering performance was January-July, 2007. If any

workers were absent for one month or more during the reference period, we would consider pro-rata performance on the basis of the achievements during the period worked.

As evident from the data of five randomly chosen administrative blocks, out of all the vaccine doses given below 2 years, DPT-booster coverage has the maximum variability among the subcentres. Similarly, among the different components of antenatal care, completion of 3 check-ups had the highest variability.

Above-average performance : Coverage in percentage higher than the mean value for the study subjects. We used this indicator as a measure of good performance. This was the positive outcome for the study.

Task : We grouped the activities of the FHW-s into different categories of task, collectively inclusive and mutually exclusive [Table- 1]. Under 'immunization' we included immunization of both children and pregnant women. Under 'health education', we included general health promotional talks, excluding immunization, family planning or antenatal/ postnatal care. Under 'treatment of minor ailments' we included symptomatic or curative care except management of acute respiratory infection and diarrhea in under-5 children. We put the latter ones under 'child care' along with vitamin A in oil administration, treatment of nutritional anemia and nutritional monitoring. In the category of 'data recording and reporting,' we included the filling up of all registers, records and reporting forms, but not the filling up of immunization cards and antenatal cards. Registration of birth and death was categorized under the 'others' head.

Clinic hours : The subcentre clinics were supposed to run for 12 hours in a week. I counted any additional time spent by the worker in the clinic for determining the working hours.

## **Data collected :**

We obtained the target and performance in terms of DPT-booster vaccination and 3-antenatal check-ups. Also, we collected the number of unprotected couples at the beginning and the number of couples who have accepted family planning methods during the reference period.

We collected estimates, wherever applicable, in terms of exposure variables for individual study subjects. The exposure variables belonged to four broad categories; viz.- (a) planning and management, (b) work-load, (c) time-related factors, (d) facilities at subcentre, (e) supervision and monitoring and (f) community support.

We collected data on time spent per week for each phase of duty, namely - clinic duty, outreach sessions, field visit, school visit, meetings and additional time spent in home for data management. We estimated the proportion of time allotted for each category of task at the different phases.

## **Data collection procedure :**

Performance and performance determinants : We interviewed the FHWs to collect data on exposure. We extracted data on their performance from the subcentre records.

Task analysis : For data on clinic duty we performed activity sampling.<sup>6</sup> Every five minutes we recorded the category of work that the female health worker was doing at that instant. To collect data regarding the various phases of duty other than the clinic duty, we interviewed the workers.

## **Sampling procedure :**

For the study on performance determinants, we sampled FHWs randomly from a sampling frame of all the subcentres (exclusion criteria applied).

Out of these selected FHWs, we sampled randomly a subset of FHWs for the task analysis. We observed one 3 hour clinic session out of the four clinic sessions held each week (Monday morning, Wednesday morning and afternoon, and Friday morning) for

each worker in the subset. However, we observed an equal proportion of these four types of sessions.

### **Sample size :**

We determined the sample size with respect to subcentre population  $\leq 6000$  as the exposure variable. To determine the values of the parameters, we based on the data of the subcentres of a randomly chosen block. The ratio of unexposed per exposed was 1.0. For antenatal check-up coverage, the prevalence of positive outcome among the unexposed was 32%. We considered prevalence ratio (P.R.) worth detecting as 2.0. Using EpiCalc software we obtained a sample size of 88 FHWs. The sample size derived with DPT-booster coverage as the outcome was smaller. So we accepted the former one.

For task analysis, we used the principle of cluster sampling. One session observed was a cluster of 36 observations (12 observations per hour x 3 hours). We assumed that we might see a particular category of task in 50% of observations at the maximum. Considering precision to be  $\pm 5\%$  of sample proportion, confidence coefficient to be 95% and design effect to be 2.0, we obtained a sample size of 22 sessions. Adding 10% extra for each of the seven other categories of task, we finally obtained the sample size of 37 sessions.

### **Data collection instruments :**

We used a self-administered structured questionnaire to collect data in regards of the potential performance determinants [Annexure- II(a)]. We used a structured format to extract the performance data [Annexure- II(b)]. We recorded the observations of activity sampling in a structured instrument [Annexure- III]. For the interview about different phases of duty, we used a semi-structured questionnaire.

## **Data analysis :**

We estimated mean, median, range and inter-quartile range for different characteristics of the FHWs. We determined the frequency for exposure variables. We set the cut-off level between exposed and unexposed by taking the mean of exposure of the study subjects [Table- 2]. We used average as the cut-off between good and poor performance, because the programme goals of the government were either too high or too low for the study subjects. In respect of floor space in the subcentre we used the median value as the cut-off, because the individual values were relatively more dispersed. In case of subcentre population, instead of the mean for the study subjects, we took the mean for all the subcentres in the study area and rounded it off.

We performed univariate analysis for each pair of exposure variable and outcome. We determined the association between them in terms of prevalence ratio (P.R.) and confidence interval (C.I.). We performed stratified analysis wherever necessary, to identify effect modifiers and confounding variables. We estimated the power of the study to determine any limitation in this respect.

For each study subject in task analysis, we calculated the proportion of time assigned to the various category of task in each phase of duty. I weighted those proportions according to the time allotted for the individual phases of duty and determined the average of time proportion spent for the different categories of task. We then estimated the mean and 95% confidence interval, and also the median and range where applicable, of the over-all proportion of time assigned to each task category.

We used Epi Info 3.3.2 and MS-Excel software for data analysis.

## **Quality assurance :**

We subjected my study protocol to peer review. We translated the questionnaire into Bengali and back-translated it to English to check for conformity. We pilot-tested the questionnaire and the data recording formats on four FHWs of three different blocks.

None other than the investigators collected the data. Before administering the questionnaire we explained what was expected of them. We made double entry of the data into software and cleaned the data where necessary.

### **Control of bias and limitation :**

Before administering the questionnaire we explained to the subjects that the instruments were anonymous. We assured them of confidentiality of all the data. We handed them a written signed statement in connection with these issues. While administering the questionnaire, we did not allow there anybody of the supervisory tiers. We mentioned that only summary figures and no individual data would be published or disclosed.

### **Human subject protection :**

We obtained clearance from the Ethical Committee of National Institute of Epidemiology (I.C.M.R.), Chennai before starting the study and written informed consent from each respondent before collection of data (Annexure-III).

## ***Results***

### **Descriptive characteristics (Table- 1, 2, 3) :**

The study determined that data recording and reporting took 26% (95% C.I. 23.1 to 28.6%) of the total work time of the FHWs, the largest proportion of time they allocated to any single category of work. Immunization required the second highest allocation (20%). Time allocated to family planning and general health education was 5% and 2% respectively. The FHWs spent 13 hours per week on average in the subcentre clinic. During those hours, they used 0.7% of the time (95% C.I. 0.4 to 1%) on general health education and 25% of the time (95% C.I. 18 to 32%) for data recording and reporting.

They spent on average 3.6 hours per week (range: 0 to 10 hours; median: 3.57 hours) for the latter type of work, while at home. The time share for fund management was 1%. The population served by a female health worker ranged from 3,100 to 10,232, with the mean of 6495. Male health workers were in position in 15 of 42 (36%) subcentres. Only one of the 42 female workers resided within her subcentre area. Four of 42 workers had to travel for more than 1 km on foot or by private vehicle in order to reach the subcentre. They spent on an average 16.4 hours per week on to and fro journey from their residence and an average of 27.3 hours per week at work.

Out of the 42 workers, 38% spent more than the average time on journey and 43% spent more than the average time at work.

Of all the FHWs surveyed, eight (19%) prioritized the houses for their visits. Ten of the workers (23%) did not utilize opinion leaders for community motivation. In seven of 42 subcentres, the trained birth attendants visited the health worker at the subcentre or the outreach camp at least once a month. The number of immunization sessions was adequate in 91% of 42 subcentres and optimum in 41% subcentres. 21 (50%) of the subcentres had an arrangement for privacy for case examination. In 8 of the rest 21 subcentres (38%), according to the respective workers, such arrangement was not available because of lack of space or lack of other amenities like adequate illumination or an examination table in usable condition. For 28 FHWs (67%), the supervisors or the block-level managers monitored the individual performances every month. 11 of the health workers (26%) stated that individual performances were not at all monitored in their block-level meetings. Only 5 workers (12%) stated that their supervisors visited them more than once a month.

### **Results for DPT-booster outcome (Table- 4, 5) :**

The results indicate that FHWs holding optimum number of immunization sessions were more likely to perform better than average in DPT-booster coverage (P.R. 1.96; 95%

C.I. 1.07-3.59). Holding only adequate number of sessions did not have such relationship with the coverage. For the subcentres serving a population of 6000 or less, the DPT-booster coverage was relatively low. However, the results also suggested that subcentres covering such population size were less likely to hold optimum number of immunization sessions (P.R. 0.2; 95% C.I. 0.1-0.7). FHWs prioritizing houses and FHWs not prioritizing houses for their visit did not significantly differ in DPT-booster coverage. Above-average performance in family planning was more common among those who followed a time-saving strategy for motivating for contraceptives. We found that they performed better also in DPT-booster coverage. Those who were monitored monthly for individual performance, as well as those who saw good work to be appreciated by superiors, rendered better coverage of the same vaccine. Coverage was likely to be more than average in subcentres having more than a certain floor space (>142 sq. feet). Those FHWs who updated the family register every 1-3 weeks, performed better in comparison to those who maintained the additional registers over and above the family register (Table- 5). Stratified analysis indicates that effect modification existed between more time at work and prioritization of houses. Among workers spending more than average time at work, prioritization had significant positive association. Among workers spending less time at work, the association was negative.

### **Results for antenatal care outcome (Table- 6, 7) :**

The FHWs, who utilized clinic attendance for health education, were more likely to have above-average performance in 3-antenatal check-up coverage. Monthly visit of the trained birth attendants at the subcentre was also similarly related with better service coverage. Results of bivariate analysis suggested that workers spending less time (< 16.4 hours per week) on journey had better performance more often. However, we identified that utilization of clinic attendance for health education was a confounder for less time spent on journey (Table- 7). The adjusted P.R. indicated that performance did

not significantly differ with less or more journey time. Prioritization of houses for visit also did not have any relationship with above-average performance. Chances were more that FHWs, who had provision of privacy for case examination, rendered better coverage of 3-antenatal check-up. Workers under such health centres, where good work was appreciated, were more likely to have low performance in antenatal check-up coverage. 18 FHWs (31%) updated both the family register and the additional registers every 1-3 weeks. The likeliness of better performance among these workers and the same among all the FHWs regularly updating the family register were not practically different (Table- 7).

### **Results for family planning outcome (Table- 8) :**

For FHWs serving a population of 6000 or less, chances were more that the family planning performance would be more than the average. Those workers, who had the provision of privacy for case examination in their subcentre, performed above average more often. Performance did not significantly differ with prioritization of houses for visit. Monthly monitoring of performance as well as appreciation of good work also did not have any significant relationship with better performance.

On stratified analysis, the P.R. according to updating of family register every 1-3 weeks was zero in one of the strata. Hence comparison between the two strata was not possible. However the P.R., among those regularly updating the additional registers alongside the family register (0.92; 95% C.I. 0.44-1.9), was not significantly different from the crude P.R.(0.80; 95% C.I. 0.40-1.6).

Supervisory visits more than once a month did not have any significant relationship with better performance in any of the three services [Tables- 4, 6, 8]. Likeliness of better performance did not significantly differ with presence of the panchayat head in the meetings, or with involvement of panchayat in community motivation [Tables- 4, 6, 8].

However, the power of test for these variables was in the range of only 12 to 38%. So, the results here could not actually rule out any association.

## ***Discussion***

The study identified three groups of determinants that were related with above-average performance in DPT-booster coverage, 3-antenatal check-up coverage and family planning services. Under one group there are several issues related to physical facilities; namely- space in the subcentre and provision for privacy. The second group includes certain factors pertaining to planning and management at the subcentre level itself; namely- utilization of clinic contact, time-saving strategy, monthly attendance of the trained birth attendants and the system of data keeping. The third group is related to monitoring and recognition issues. The results suggested that each of the above group of factors might allow certain areas of intervention to improve the performances of FHWs.

We determined that better performance in both antenatal check-up coverage and family planning services were more common where the subcentre had arrangements for privacy for case examination. In a study in Egypt<sup>9</sup>, the use of intrauterine contraceptive device among women, who obtained the service from public sources was associated with quality of family planning services, independent of distance to the facility. The criteria of quality included, among others, the examination room also. Provision of privacy is a factor amenable to easy intervention. The National Rural Health Mission (N.R.H.M.) has been working on improving the amenities in the subcentres. They provide fund support for making subcentre buildings and supply of equipments and furniture. Privacy was not a necessity in case of D.P.T. immunization. However, we identified floor space in the subcentre to be a supportive factor for this service. Lack of floor space caused over-crowding and discomfort for the attendees and the worker as well. Whereas, adequate area allowed her to focus on individuals one by one and

communicate to them peacefully. This could be a motivating element for service utilization. Although floor space alone did not appear as a significant factor for antenatal check-up or family planning, one cannot overlook it at the intervention level. Because a separate place for examination cannot be ensured in absence of adequate floor space. Among the female health workers who did not have private space for examination, more than one-third cited lack of space as the reason of no privacy. The subcentre buildings that are being made under N.R.H.M. contain one separate examination room in each and are supposed to have 550 sq. feet of floor space (more than the cut-off value used in our study). However, it would take a long time to make buildings for 850 subcentres which are presently located in rented accommodation in the two districts.

According to the results, utilizing clinic contacts for health education did not help to render better DPT-booster coverage or family planning performance. However, FHWs following this strategy, more often performed better in antenatal check-up coverage, compared to those not using such strategies. For family planning motivation, a section of the health workers adopted a time-efficient strategy. They identified the newly wed couples and recently delivered women. They targeted them at clinic appearance for any purpose or contacted them through birth attendants, and talked specifically on family planning if they visited their house. The time-saving strategy was linked with not only better family planning performance, but also better coverage of DPT-booster immunization. Adopting such a strategy pointed a particular mindset of the concerned workers which inspired targeted action and utilization of existing resources. It might be the reason why DPT-booster performance was also better more often in those workers. Our study results did not indicate any relationship between time-saving strategy and antenatal check-up coverage. This could be due to the fact that a different set of other factors might work here; e.g. influence of alternative service providers like quack practitioners, which we have not considered in our study. However, we determined that coverage of 3-antenatal check-up was linked with regular contact of the worker with the

trained birth attendants at the subcentre clinic or outreach camps. The time-saving strategy for family planning essentially required prioritization of potential beneficiaries and utilization of the existing opportunities to communicate with them. Making the birth attendants visit the subcentre is also based on the latter principle. Utilization of clinic contact for health education is a similar strategy too. Here the basic concept is mental mapping of things to be done and leveraging the contacts. All of these constitute several parts of basic management skill. As a whole, the results underscore the importance of capacity building to use the same or similar techniques according to the local situation. It would enable the workers to leverage the time they work for and to handle multiple tasks together.

Task analysis of FHWs determined that the workers had to spend the largest share of their time for data recording and reporting. They had to devote time for these activities even beyond their stay at the work place. The time-share utilized for general health education was small. Of the three major activities of the R.C.H. Programme, namely-immunization, maternal care and family planning, the time allocation for the last one was the least. The workers might consider fund management as a difficult load, because of their unfamiliarity with the job. However, the time required for the work was actually small.

Data recording and reporting do not produce any care as such for the people. Spending more than one-fourth part of the time on these might reduce the actual performance of the health workers. Intervention to reduce the load of this type of work would be beneficial for their output. The study results indicated that maintenance of an additional register over and above the family register (also known as E.C.C.R. i.e. eligible couple and child register) was deleterious in terms of DPT-booster coverage. For antenatal check-up coverage, regular updating of the additional register was not deleterious, but did not give any added benefit either. Basically the additional registers were for individual services. They provided no extra information over and above the family

register. Still the workers maintained them, even in absence of any programme guideline to do so. Lack of user- friendliness of the family register could be a reason of this. The issue requires further analysis and revision of the data keeping system. In general the FHWs have to submit a 10-page performance report and five other reports on monthly basis. Also, they have to give two weekly reports – one on I.D.S.P. and another on measles surveillance. With initiation of RCH-2<sup>nd</sup> Phase, another monthly report relating to child nutrition monitoring has been introduced. If the reporting workload can be minimized, it would save time for the health workers and would enable them to allot more time for services like health education and family planning.

The issue of some of the jobs of FHWs (like family planning) not getting importance comes up again, when we discuss about performance monitoring. Our observation in the study was that DPT-booster coverage was more likely to be better where individual performances were monitored monthly. However, antenatal check-up and family planning performances were not similarly related with performance monitoring. The usual practice of the health managers is to review individual performance for immunization only. The principal investigator has seen in his working experience that family planning performance by subcentre was often not available in the block health record. It corroborated the notion that services other than immunization were not usually monitored by individual performances. Performance review done in that manner might have focused the workers' attention to immunization in particular, compromising the other services. Similar phenomenon might have occurred with appreciation of good work. It did not suggest that performance monitoring or appreciation was deleterious for coverage of antenatal care or family planning. Rather it emphasized that if individual monitoring and appreciation are ensured, it could improve performance as has happened with DPT-booster immunization. In different parts of the world, monitoring, feed-back and non-financial incentives are certain positive determinants of better performance of health workforce.<sup>7,8,10,11</sup>

## **Limitation :**

On account of a small sample taken, the power of the study was low for a number of sets of exposure variable and outcome. Due to this shortcoming the study might have failed to determine an association between a potential determinant and an outcome, where an association is really existent. The study was powered for a P.R. of 2. However, 69 of 84 prevalence ratios were below 2 and in 66 of 84 instances, the prevalence ratio was non-significant because of the confidence interval crossing the limit of 1. The study being a cross-sectional survey, it was not possible to ascertain the cause-effect relationships. For availability of female toilet in the subcentre, the results could not ascertain whether the toilet facilitated better performance in family planning, or the gathering of many female cases led to the construction of a toilet.

The validity of the data in this study depended on the quality of response of the health workers. There were chances of information bias, particularly in respect of the data on time spent and distances traveled, and also in the responses about the supervisors and the panchayat. However, we strictly maintained anonymity of data to minimize such biases. Also we assured the respondents verbally as well as in writing about the confidentiality and anonymity before administering the questionnaire. The measurements of floor space and distances were approximate and hence lacked precision. Data on time spent on journey or work depended on the respondents' daily experience. So they were likely to be influenced by recent happenings, leading to recall bias. In order to control it we asked them to think of the approximate average of last six months and to overlook any unusual occurrence.

For the task analysis, we visited some of the FHWs on their immunization days and some on non-immunization days. Though we visited both the groups in their clinics, the clinic activities were different for immunization days and non-immunization days. So, we

could not estimate the range and median for the time consumed by those particular activities.

### **Conclusion :**

Adequate floor area in the subcentre was a facilitating factor for DPT-booster immunization, For antenatal check-up and family planning, where a confidentiality element was attached with the service, adequate floor area alone was not enough to influence the coverage. Availability of private space for case examination supported good coverage of those services. However, adequate floor area was necessary to make private space available in the subcentres. Spending much time in data keeping and reporting was a constraint for the FHWs. Maintenance of subsidiary registers did not facilitate better performance; rather it increased the burden of data keeping. Multiplicity and lengthiness of reporting formats were also contributory to the load of paper-work. Planning and management strategies, based on utilization of existing opportunities and techniques to cope with multi-tasking, were positive determinants of female health workers' performance. Management skill at the subcentre level can be a useful area for intervention to improve performance. Monitoring by individual performance and recognition of good work also helped to get better service coverage from the FHWs.

### **Recommendation :**

Each subcentre need to have an arrangement of privacy for case examination. A separate examination room or an enclosure within the clinic room would serve the purpose. Over-all the subcentre building need to have an adequate floor space. The N.R.H.M. norm of subcentre building satisfies the requirements of privacy and floor area. However, the initiative to make subcentre buildings all over the districts is a long term affair. For the time being, the subcentres which are functioning in rented accommodation may be supported to hire a larger and better space where necessary. At the policy level, a fund may be apportioned for this purpose.

The data management system needs to be revised to do away with any duplication of records or registers. The reporting system and the prevailing formats need to be analyzed so as to identify redundant and/or time-consuming areas, if any, and to optimize accordingly.

Programme managers will arrange to develop basic planning and management skills among the Female Health Workers so that they can prioritize activities, handle multiple tasks and utilize existing opportunities. Superiors need to ensure the use of attained skill by the workers. Health managers and supervisors will monitor individual performances at frequent intervals (at least monthly) and recognize good works done by the FHWs.

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**Table 1 : Proportion of time allocated for different categories of tasks by female health workers,  
South and North-24 Pargnas, West Bengal, India, 2007**

Category of task	Range (%)	Median (%)	Mean (%)	95% confidence interval
Recording and reporting	-	-	26	18 - 33
Immunization *	-	-	20	14 - 27
Maternal care #	-	-	11	8 - 15
Meetings	8-15	11	11	7 - 15
Treatment of minor ailments	-	-	10	6 - 13
Family planning	-	-	5	3 - 07
Child care	-	-	5	3 - 06
Care for malaria, leprosy and tuberculosis	-	-	2	1 - 03
Health education	-	-	2	1 - 02
School health	0-12	1	1	1 - 02
Fund management	1-02	3	1	1 - 02
Others	-	-	6	4 - 08
<b>Total</b>			<b>100</b>	

\* Immunization of children and also pregnant women

# Maternal care does not include immunization

**Table 2: Characteristics related to the work of female health workers, South and North-24 Parganas, West Bengal, India, 2007**

Characteristics	Mean	Median	Range		Inter-quartile range	
Subcentre population <sup>1</sup>	6495	6422	3100-	10232	5225-	8037
Average distance from the villages (km) <sup>2</sup>	2.6	2.6	0.9-	6.0	1.8-	3.0
Time spent on journey per week (hours)	16.4	14.5	5.8-	38.0	11.6-	19.9
Time spent at work per week (hours)	27.3	25.9	18.8-	40.0	24.5-	30.0
Floor space in subcentre clinic (sq feet)	162	142	40-	475	114-	192
Meetings attended by Panchayat Head <sup>3</sup> (%)	80	80	0-	100	60-	100

1- Population enumerated by the health workers in April-2007

2- Average distance between subcentre and the different villages served by the subcentre

3- Meeting of the Gram Panchayat with the health staff held on the 4<sup>th</sup> Saturday of the month

**Table 3: Prevalence of selected performance determinants among the female health workers, South and North-24 Parganas, West Bengal, India, 2007**

Determinants		Prevalence among female health workers (n = 42)		95% confidence interval
		#	%	
<b>Planning and management</b>	Prioritized houses to be visited	8	19	14-24
	Met Anganwadi Workers > once a month	32	76	71-82
	Visited by trained birth attendants once a month <sup>1</sup>	7	17	12-21
	Adequate number of immunization sessions	38	91	88-93
	Optimized immunization sessions	17	41	33-48
	Updated family register every 1-3 weeks	26	62	55-69
	Updated additional registers every 1-3 weeks	20	48	40-55
	Utilized clinic contacts for health education	20	48	40-55
<b>Work-load</b>	Subcentre population > 6000	25	60	52-67
	Distance of villages > average (2.6 km) <sup>2</sup>	21	50	42-58
	Male health worker in position	15	36	29-43
<b>Time factor</b>	Residence of worker within the block	17	41	33-48
	Time spent on journey < average (16.4 hrs./ week)	26	62	55-69
	Time spent at work > average ( 27.3 hrs./ week)	18	43	35-50
<b>Facilities at the subcentre</b>	Private enclosure available for case examination	21	50	42-58
	Lack of space preventing privacy	8	19	14-20
	Toilet for female attendees	12	29	22-35
	<1 km from the stoppage of public vehicle	38	91	88-93
<b>Supervision and monitoring</b>	Individual performance monitored every month	28	67	60-74
	Problem solving by supervisor	31	74	68-80
	Visit by superiors > once a month	5	12	9-15
<b>Community support</b>	Panchayat involved in community motivation	11	26	20-32

1- Female health worker visited by trained birth attendants at the subcentre or the outreach camp

**Table 4 : Prevalence of above-average performance of female health workers in DPT-booster coverage among 16-24 month children— according to selected performance determinants, South and North-24 Parganas, West Bengal, India, 2007**

Determinants	Workers with DPT-booster coverage > average						Prevalence ratio	95% confidence interval		
	Among exposed			Among unexposed						
	#	Total	%	#	Total	%				
<b>Planning and management</b>	Prioritized houses for visit	4	8	50	12	27	44	1.1	0.50	2.5
	Adequate immunization sessions per month	20	38	53	1	4	25	2.1	0.38	12
	Optimized the number of immunization sessions	12	17	71	9	25	36	2.0	1.1	3.6
	Updated additional registers at 1-3 week intervals	16	31	52	5	11	46	1.1	0.55	2.4
	Updated family register at 1-3 week intervals	8	14	57	13	28	46	1.2	0.67	2.3
	Opportunistic planning before outreach sessions	18	29	62	3	13	23	2.7	0.96	7.6
	Utilized clinic attendance for health education	13	20	65	8	22	37	1.8	0.94	3.4
	Time saving strategy for family planning motivation	9	11	82	12	31	39	2.1	1.3	3.6
	Met Anganwadi Workers > once a month	16	32	50	5	10	50	1.0	0.49	2.0
	Visited by trained birth attendants at least once a month	5	7	71	16	35	46	1.6	0.86	2.8
Utilized opinion leaders for community motivation	17	32	53	4	10	40	1.3	0.58	3.0	
<b>Work-load</b>	Population of subcentre within 6000	5	17	29	16	25	64	0.46	0.21	1.0
	Male health worker in position in the subcentre	9	15	60	12	27	44	1.4	0.75	2.4
<b>Time-factors</b>	Time spent on journey < average (16.4 hours/ week)	12	26	46	9	16	56	0.82	0.45	1.5
	Time spent at work > average (27.3 hours/ week)	13	18	72	8	24	33	2.2	1.2	4.1
	Residence within the block	8	17	47	13	25	52	0.90	0.48	1.7
<b>Facilities at subcentre</b>	Floor space > median (142 sq. feet)	15	21	71	6	21	29	2.5	1.2	5.2
	Articles can be securely kept	17	32	53	4	10	40	1.3	0.58	3.0
	< 1 km from stoppage of public vehicle	20	38	53	1	4	25	2.1	0.38	12
<b>Supervision and monitoring</b>	Involvement of health supervisor in problem solving	15	31	48	6	11	55	0.89	0.46	1.7
	Visit of superiors > once a month	2	5	40	19	37	51	0.78	0.25	2.4
	Individual performance monitored at least once a month	18	28	64	3	14	21	3.0	1.1	8.5
	Saw good work being appreciated	17	25	68	4	17	24	2.9	1.2	7.1
<b>Community support</b>	Panchayat head attended 80% or > meetings	13	21	62	8	21	38	1.6	0.86	3.1

Table- 5 : Results of stratified analysis on prevalence of above-average performance of female health workers in DPT-booster coverage, according to different exposure variables, South and North-24 Parganas, West Bengal, India, 2007

Exposure variable	Stratification variable	Stratum 1					Stratum 2					Crude prevalence ratio (95% C.I.)
		Workers with above-average performance				Prevalence ratio (95% C.I.)	Workers with above-average performance				Prevalence ratio (95% C.I.)	
		Among exposed		Among unexposed			Among exposed		Among unexposed			
#	%	#	%	#	%	#	%	#	%			
Updating family register at 1-3 week intervals	Updating additional registers <sup>@</sup> at 1-3 week intervals	7	54	9	50	1.1 (0.54-2.1)	1	100	4	40	2.5 (1.2-5.3)	1.2 (0.67-2.3)
Prioritization of houses for visit	Spending > average time at work	3	100	7	58	1.7 (1.1-2.8)	1	20	5	33	0.60 (0.09-4.0)	1.1 (0.50-2.5)

<sup>@</sup> Separate registers for vaccine coverage, antenatal services and temporary contraceptives in addition to family register

**Table 6 : Prevalence of above average performance of female health workers in antenatal care – according to selected performance determinants, South and North-24 Parganas, West Bengal, India, 2007**

Determinants		Workers with coverage of antenatal check-up > average						Pre- valence ratio	95% confidence interval	
		Among exposed			Among unexposed					
		#	Total	%	#	Total	%			
<b>Planning and management</b>	Prioritized houses for visit	3	8	38	20	34	59	0.64	0.25	1.6
	Optimized the number of immunization sessions	10	17	59	13	25	52	1.1	0.65	2.0
	Updated additional registers at 1-3 week intervals	18	31	58	5	11	46	1.3	0.63	2.6
	Updated family register at 1-3 week intervals	5	14	36	18	28	64	0.56	0.26	1.2
	Opportunistic planning before outreach sessions	17	29	59	6	13	46	1.3	0.66	2.5
	Utilized clinic attendance for health education	15	20	75	8	22	36	2.1	1.1	3.8
	Time saving strategy for family planning motivation	7	11	64	16	31	52	1.2	0.70	2.2
	Met Anganwadi Workers > once a month	20	32	63	3	10	30	2.1	0.78	5.6
	Visited by trained birth attendants at least once a month	7	7	100	16	35	46	2.2	1.5	3.1
	Utilized opinion leaders for community motivation	20	32	63	3	10	30	2.1	0.78	5.6
<b>Work-load</b>	Population of subcentre within 6000	12	17	71	11	25	44	1.6	0.94	2.7
	Male health worker in position in the subcentre	5	15	33	18	27	67	0.50	0.23	1.1
	Average distance of the villages < mean (2.6 km)	11	21	52	12	21	57	0.92	0.53	1.6
<b>Time-factors</b>	Time spent on journey < average (16.4 hours/ week)	18	26	69	5	16	31	2.2	1.0	4.8
	Time spent at work > average (27.3 hours/ week)	9	16	56	14	26	54	1.1	0.60	1.8
<b>Facilities at subcentre</b>	Private space available for case examination	15	21	71	8	21	38	1.9	1.0	3.5
	Floor space > median (142 sq. feet)	12	21	57	11	21	52	1.1	0.63	1.9
	Articles can be securely kept	17	32	53	6	10	60	0.89	0.49	1.6
	Toilet for female attendees	8	12	67	15	30	50	1.3	0.78	2.3
<b>Supervision and monitoring</b>	Technical supervision of worker by health supervisor	21	36	58	2	6	33	1.8	0.55	5.6
	Involvement of health supervisor in problem solving	20	31	65	3	11	27	2.4	0.87	6.4
	Visit of superiors > once a month	3	5	60	20	37	54	1.1	0.51	2.4
	Individual performance monitored at least once a month	14	28	50	9	14	34	0.78	0.45	1.3
	Saw good work being appreciated	10	25	40	13	17	77	0.52	0.30	0.9
<b>Community support</b>	Panchayat head attended 80% or > meetings	9	21	43	14	21	67	0.64	0.36	1.2
	Panchayat involved in community motivation	6	11	55	17	31	55	0.99	0.53	1.9

**Table- 7 : Results of stratified analysis on prevalence of above-average performance of female health workers in antenatal check-up coverage, according to different exposure variables, South and North-24 Parganas, West Bengal, India, 2007**

Exposure variable	Stratification variable	Stratum 1				P.R.** (95%C.I.)	Stratum 2				P.R.** (95%C.I.)	Crude P.R.** (95%C.I.)	Adjusted P.R.** (95%C.I.)
		Workers with above-average antenatal check-up coverage*					Workers with above-average antenatal check-up coverage*						
		Among exposed		Among unexposed			Among exposed		Among unexposed				
#	%	#	%	#	%	#	%						
Updating family register at 1-3 week intervals	Updating additional registers at 1-3 week intervals	5	39	13	72	0.53 (0.25-1.1)	0	0.0	5	50	0.0	0.56 (0.26-1.2)	
Time spent on journey < average@	Utilizing clinic contact for health education	13	81	2	50	1.6 (0.59-4.5)	5	50	3	25	2.0 (0.63-6.4)	2.2 (1.0-4.8)	1.8 (0.84-3.9)

\* Coverage of antenatal check-up = proportion of antenatal cases having 3 check-ups by the female health worker

\*\* P.R. means prevalence ratio

@ Average time spent on journey = 16.4 hours per week

**Table 8 : Prevalence of above average performance of female health workers in family planning – according to selected performance determinants, South and North-24 Parganas, West Bengal, India, 2007**

Determinants		Workers with above-average performance in family planning						Prevalence ratio	95% confidence interval	
		Among exposed			Among unexposed					
		#	Total	%	#	Total	%			
<b>Planning and management</b>	Prioritized houses for visit	4	8	50	17	34	50	1.0	0.46	2.2
	Optimized of number of immunization sessions	8	17	47	13	25	52	0.91	0.48	1.7
	Updated additional registers at 1-3 week intervals	15	31	48	6	11	55	0.89	0.46	1.7
	Updated family register at 1-3 week intervals	6	14	43	15	28	54	0.80	0.40	1.6
	Opportunistic planning before outreach sessions	13	29	45	8	13	62	0.73	0.40	1.3
	Utilized clinic attendance for health education	13	20	65	8	22	36	1.8	0.94	3.4
	Time saving strategy for family planning motivation	9	11	82	12	31	39	2.1	1.3	3.6
	Met Anganwadi Workers > once a month	14	32	44	7	10	70	0.63	0.36	1.1
	Visited by trained birth attendants at least once a month	4	7	57	17	35	49	1.2	0.57	2.4
	Utilized opinion leaders for community motivation	18	32	56	3	10	30	1.9	0.69	5.1
<b>Work-load</b>	Population of subcentre within 6000	12	17	71	9	25	36	2.0	1.0	3.9
	Male health worker in position in the subcentre	8	15	53	13	27	48	1.1	0.60	2.1
<b>Time-factors</b>	Time spent on journey < average (16.4 hours/ week)	15	26	58	6	10	60	1.5	0.75	3.1
	Time spent at work > average (27.3 hours/ week)	12	28	67	9	24	38	1.8	0.96	3.3
	Residence within the block	11	17	65	10	25	40	1.6	0.89	2.9
<b>Facilities at subcentre</b>	Private space available for case examination	15	21	71	6	21	29	2.5	1.2	5.2
	Floor space > median (142 sq. feet)	11	21	52	10	21	48	1.1	0.60	2.0
	Articles can be securely kept	18	32	56	3	10	30	1.9	0.69	5.1
	Toilet for female attendees	9	12	75	12	30	40	1.9	1.1	3.2
<b>Supervision and monitoring</b>	Technical supervision of worker by health supervisor	19	36	53	2	6	33	1.6	0.49	5.1
	Involvement of health supervisor in problem solving	15	31	48	6	11	55	0.89	0.46	1.7
	Visit of supervisors > once a month	2	5	40	19	37	51	0.78	0.25	2.4
	Individual performance monitored at least once a month	14	28	50	7	14	50	1.0	0.53	1.9
	Saw good work being appreciated	13	25	52	8	17	47	1.1	0.59	2.1
<b>Community support</b>	Panchayat head attended 80% or > meetings	11	21	52	10	21	48	1.1	0.60	2.0
	Panchayat involved in community motivation	6	11	55	15	31	48	1.1	0.59	2.2

## Annexure- I : Operational definition of exposure variables

Exposure variables	Operational definition
Prioritizing houses for visit	Planning to visit those houses as priority where a defaulter is there or where some particular service needs to be given
Adequate immunization sessions per month	At least 4 immunization sessions held per month, including at least 2 outreach sessions
<b>Planning and management</b> Optimization of number of immunization sessions	Holding adequate number of immunization sessions, but the average number of children and pregnant women expected to attend per session is not below 17*
Updating of additional registers at 1-3 week <sup>#</sup> intervals	Additional register means separate subsidiary register for immunization/ antenatal care/ oral pill and condom
Updating of family register at 1-3 week <sup>#</sup> intervals	Family register means the so-called eligible couple and child register
Opportunistic planning before outreach sessions	Planning to utilize the outreach session for services other than immunization e.g. contacting the defaulters of antenatal check-up or temporary contraception
Utilization of clinic attendance for health education	Utilization of the contact in clinic for motivation or awareness generation on issues other than immunization or antenatal check-up
Time saving strategy for family planning motivation	Strategy to prioritize potential beneficiaries and to use existing opportunities to contact and motivate them consuming less time
Trained birth attendants visiting at least once a month	Trained birth attendants working in the service area of the subcentre – visiting the health worker in the subcentre or in outreach camps
<b>Work-load</b> Population of subcentre	Population (as in April 2007) served by the subcentre
Average distance of the villages	Average distance between the subcentre and the distal end of the villages served by the subcentre
<b>Time-factors</b> Time spent on journey	Time used for journey from residence to the place of duty and back to residence, inclusive of any sort of duty
Time spent at work	Time spent at work place, inclusive of meetings and house visits

*Contd. to next page*

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Exposure variables		Operational definition
<b>Facilities In subcentre</b>	Private space available for case examination	A separate room or an enclosure within the clinic room with arrangements for case examination
	Articles can be securely kept	Articles kept within lockers in a room which is not used by others in absence of the workers
<b>Supervision and monitoring</b>	Technical supervision of worker by health supervisor	Supervision for technical knowledge or skill, or proper method of report preparation
	Involvement of health supervisor in problem solving	Problem in work (including non-acceptance of service) or with person related to work; excludes participation of supervisor in immunization session to help a lone worker
	Visit of superiors > once a month	Visiting the female health worker in her subcentre clinic, outreach camp or field
	Individual performance monitoring	Monitoring of worker-wise performance by health managers and/ or supervisor
	Seeing good work being appreciated	Appreciation of the worker herself or a peer of her. Appreciation may be in any form
<b>Community support</b>	Panchayat head attending 80% or > meetings	Meeting means monthly meeting of the Gram Panchayat-Level Health Committee

\* The number 17 is derived with subcentre population 5000, birth rate 20 per thousand and taking number of sessions per year as 66

# 1-3 weeks is the average for the study subjects

**Annexure- II (a) : Questionnaire regarding performance determinants**

Please note : There is no need to sign or write your name/ subcentre name.

Put a  $\checkmark$  mark against the answer applicable to you. Fill in the gaps where indicated.

In some of the questions there may be more than one answers.

Q. No.

1.A

When you go to an area for house visits, which houses do you visit?

- 1- All / almost all houses in the area
- 2- The houses which have an under-5 child or an eligible couple
- 3- The houses where some particular care need to be given or which have some defaulter case

1.B

If your choice is 1 or 2 in Question 1.A above, please answer the following:

What is the usual time interval between two visits in the same houses?

- 1- Less than 2 months
- 2- 2 to 3 months
- 3- More than three months

If your choice is 3 in Question 1.A , then answer the following:

What is the usual time interval between two visits in the same area?

- 1- Less than 2 months
- 2- 2 to 3 months
- 3- More than three months

1.C

When you make a round in the community, whom of the following do you usually visit? [You may put one or more ticks as applicable for you ]

- 1- Trained dais
- 2- Untrained dais
- 3- Local leaders
- 4- Local practitioners
- 5- Organizer of Self Help Group
- 6- None of the above

1.D

How many houses have you visited on your last day of house visit?

Ans. \_\_\_ houses; Day of the visit : \_\_\_ days back from today.

Out of the above-mentioned houses, how many houses had such cases :

Child missing one or > vaccine doses / unprotected couple whom you targeted for motivation / antenatal case –defaulter or in last trimester/ postnatal case/ newborn / D.O.T.S. defaulter/ M.D.T. defaulter/ recent acceptor (within last 2 months) of I.U.D. or sterilization ?

Ans. \_\_\_ houses

- 2.A How many immunization sessions for children do you usually organize at the subcentre clinic in a four week period?  
Ans.- \_\_\_\_ sessions
- 2.B How many outreach immunization sessions do you usually organize in a four week period?  
Ans.- \_\_\_\_ sessions
- 2.C When you find time in the clinic in between two immunizations or check-up of two antenatal cases, which of the following do you discuss with the people gathered there? [There may be one or more answers]
- 1- General hygiene
  - 2- Other facilities (e.g. sputum exam., test for malaria, birth & death registration, maternal benefit scheme etc.)
  - 3- Minor ailments of the people present there
  - 4- Next date of immunization session
  - 5- Any other point ; mention if there is any: \_\_\_\_\_  
\_\_\_\_\_
- 3.A At what intervals do you usually update the additional registers (antenatal register, immunization register and oral pill register)?
- 1- Less than one week
  - 2- One to two weeks
  - 3- Within a month
  - 4- More than a month
  - 5- Do not maintain such registers
- 3.B At what intervals do you usually update the family register (E.C.C.R.)?
- 1- Less than one week
  - 2- One to two weeks
  - 3- Within a month
  - 4- More than a month
- 4.A Which of the following do you do before holding an outreach session?  
[You may tick one or more answers as is true in your case]
- 1- Make a list of immunization defaulters
  - 2- Make a list of expected beneficiaries of immunization
  - 3- Make a list of defaulters of O.P./C.C. use
  - 4- Hold regular meetings in the community
  - 5- Make a list of antenatal cases pending 2<sup>nd</sup> or 3<sup>rd</sup> check-up
  - 6- Note the names of irregular/ defaulter cases of D.O.T.S. & M.D.T.
  - 7- None of the above

4.B Which of the following do you do to catch new beneficiaries of family planning?

- 1- Hold regular meetings of mothers or opinion leaders
- 2- Find out unprotected couples by regular house to house visits
- 3- Motivate eligible people attending the clinic for any purposes
- 4- Talk on family planning to the people we meet during field visits
- 6- Any other point ; mention if there is any: \_\_\_\_\_  
\_\_\_\_\_

5.A At what interval do you and your Anganwadi Workers usually meet each other?

- 1- Every week with \_\_\_ of them
- 2- 2 to 3 times a month with \_\_\_ of them
- 3- Once a month with \_\_\_ of them
- 4- Not even once a month with \_\_\_ of them

5.B Do all the Trained Birth Attendants of your area come to the clinic or outreach session? [Consider all of them here except the subcentre-attached T.B.A.]

- 1- They come occasionally
- 2- They are fairly frequent
- 3- Some of them come frequently and some occasionally or not
- 4- All of them come often
- 5- No more T.B.A. is there except the subcentre-attached one

5.C Please name 2 opinion leaders who help you (except C.H.G., T.B.A., A.W.W., Link Person of Immunization or Panchayat Member) for each of the villages served by your subcentre; also mention their identity or occupation:

[If there is no or only one such opinion leader; please also mention that]

a) Village- 1

(i) \_\_\_\_\_, \_\_\_\_\_

(ii) \_\_\_\_\_, \_\_\_\_\_

b) Village- 2

(i) \_\_\_\_\_, \_\_\_\_\_

(ii) \_\_\_\_\_, \_\_\_\_\_

c) Village- 3

(i) \_\_\_\_\_, \_\_\_\_\_

(ii) \_\_\_\_\_, \_\_\_\_\_

d) Village- 4.....

(i) \_\_\_\_\_, \_\_\_\_\_

(ii) \_\_\_\_\_, \_\_\_\_\_



8.A How many block monthly meetings have been held in your block in January to July this year?

Ans.- \_\_\_ meetings

8.B Whether individual performances are discussed against the targets in the block monthly meetings?

- 1- Yes; in every meeting
- 2- Yes; in some of the meetings
- 3- Occasionally

8.C Whether individual performances are discussed against the targets in the weekly (Saturday) meetings?

- 1- Yes; in every meeting
- 2- Yes; in some of the meetings
- 3- Usually not

8.D Is good work appreciated by the superiors in front of others while monitoring performances?

Ans.- Yes / No

9.A How many monthly meetings of the Gram Panchayat Health Committee have been held during January to July this year?

Ans.- \_\_ meetings

9.B In how many of those meetings the Panchayat Head or the Deputy Head was present?

Ans.- \_\_ meetings

9.C Do the Panchayat functionaries actively help to motivate people or to catch up the defaulters?

- 1- Yes; whenever I seek their help
- 2- Sometimes only
- 3- Usually no

9.D Do the Panchayat functionaries monitor the attendance of the Health Staff?

Ans.- Yes / No

10.A Is there any Health Assistant (Male) in this subcentre?

Ans.- Yes / No

10.B If yes, does he work in this subcentre only?

- 1- Yes
- 2- No, he has to work \_\_ days a week in another subcentre also
- 3- He has to work \_\_ days a week in the P.H.C./ B.P.H.C.

- 11.A Where do you reside on most of the days?
- 1- Within the subcentre area
  - 2- Within the block, though not within the subcentre
  - 3- Outside the block
- 11.B How much time do you need to spend on journey per week on average?  
[Journey includes all sorts of commutation for duties – both to and fro, from residence, inclusive of journey to reach the villages for house visit ]
- (a) For duty in clinic : \_\_\_\_\_ hours
- (b) For outreach session : \_\_\_\_\_ hours (c) For field visit : \_\_\_\_\_ hours
- (d) For meeting and official work : \_\_\_\_\_ hours
- (e) Others (if any) : \_\_\_\_\_ hours (Mention purpose : \_\_\_\_\_ )
- Total : \_\_\_\_\_ hours per week on average
- 11.C How much time do you usually spend actually on work – per week?
- (a) For duty in clinic : \_\_\_\_\_ hours
- (b) For outreach session : \_\_\_\_\_ hours (c) For field visit : \_\_\_\_\_ hours
- (d) For meeting and official work : \_\_\_\_\_ hours
- (e) Others (if any) : \_\_\_\_\_ hours (Mention purpose : \_\_\_\_\_ )
- Total : \_\_\_\_\_ hours per week on average
- 11.D How well connected is your subcentre?
- 1- Within 1 km from nearest bus stop or railway station
  - 2- More than 1 km from nearest bus stop or railway station, but connected with regular local transport
  - 3- More than 1 km from nearest bus stop or railway station, but not connected with regular local transport
  - 4- More than 1 km from nearest bus stop or railway station and not connected with regular local transport, but I have personal vehicle
- 11.E Walk from bus stop/ rail station/ stoppage of local transport :
- 1- More than 1 km
  - 2- Less than or equal to 1 km
- 11.F How much are the distances of the different villages under you subcentre from your subcentre clinic?
- Village (a) : \_\_ km      Village (b) : \_\_ km
- Village (c) : \_\_ km      Village (d) : \_\_ km
- Village (e) : \_\_ km

\* No mention of name/ subcentre name or signature is required



### Annexure-III: Consent Form

The purpose of this study is to find out the work load that the Female Health Assistants currently bear in the different categories of work and also to determine to what extent some particular factors are affecting their performance. The study may guide us to rearrange the working system of the subcentre in a more convenient way and may point out possible areas of intervention to improve performance, without increasing the burden.

Participation in this study is completely voluntary. If you choose not to participate, it does not affect your service career in any way.

We assure you that the answers will remain confidential and anonymous. No name, subcentre no. etc. have been asked for in the questionnaire. Your answer sheet will be taken in an envelope (without any name or number) and closed in front of you. Later it will be opened with many other sheets; so it will not be possible to identify the answer sheets by person.

The opened answer sheets will not be handled by any official at your block, subdivision or district. The answers of all respondents will be analyzed in total and the averages will only be presented. So there is no chance for a person to be pointed out.

Therefore, feel free to give the true answers – without any apprehension, and help the investigators to bear some fruitful results for the sake of the Health Workers and the health system as a whole.

Thanking you again,

Dr. Dipankar Maji,  
Principal investigators of the study;  
National Institute of Epidemiology,  
Chennai.  
August, 2007

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After obtaining all relevant information about the above-mentioned study, I agree to participate in it as a study subject on a completely voluntary basis.

Signature and date :

Name :

Designation :