

Landscape Analysis of Supportive Supervisory mechanisms in Maternal and Child Health Programs in India

Suruchi Gupta¹, Anirban Chatterjee¹, Ankur Joshi¹, Abhijit Pakhare¹

¹Department of Community and Family Medicine, All India Institute of Medical Sciences, Bhopal, Madhya Pradesh, India

Abstract

Background: Supportive supervision has lately been gaining traction in various national health systems as an effective way of boosting performance of community health workers in a constructive and sustainable way. However, not much is known about the basis/mandate of supportive supervision and its approach in maternal and child health programmes in India. The current analysis contributes to a clearer understanding of the paradigms within which supportive supervision is envisioned to operate within India, and identify potential strengths and areas requiring attention.

Method: Document analysis of implementation documents such as guidelines/ operational manuals/ operationalisation modules/ training modules of nationally implemented maternal and child health programmes, with data extraction according to a pre-determined domain-based template.

Results: Many of the documents reviewed do not mention supportive supervision at all. In the few documents where supportive supervision is mentioned, the paradigms within which it is supposed to operate (who will do it, when will it be done, how to do it, training and logistic support, reporting formats, etc.) has not been clearly identified in most programmes.

Conclusion: Even though supportive supervision is being increasingly identified as an effective way of performative improvement in national health programmes in India, more effort needs to be put into identifying and enforcing the tenets of supportive supervision in practice, in order to bring about the desired change.

Keywords: supportive supervision; health systems strengthening; document analysis; LMICs; maternal and child health

Introduction

Vast health systems in Low- and Middle-Income Countries such as India depend on a cadre of workers selected from the community itself to ensure last-mile coverage for healthcare beneficiaries. These community health workers (CHWs) form an indispensable component of the public health system and act as a vital interface between the community and the healthcare system (1). They are instrumental in initiating and sustaining health promotion activities in the community and therefore, their performance is a key indicator of how well the healthcare system is able to serve the community (2). Although there are many factors which influence the functioning of CHWs (3,4), supportive supervision as a modality of effectively augmenting the performance of CHWs has gained traction in recent years (5–8). As opposed to traditional models of top-down and oftentimes punitive methods of supervision, supportive supervision encompasses a collaborative, participatory approach to problem-solving and skill-building (9).

The Indian health system employs a range of community health workers – including the Accredited Social Health Activists (ASHAs), the Anganwadi Workers (AWWs) and the Peer Educators (Saathiyas). All the CHWs are recruited from their own communities, are a part of the people they serve, and perform crucial roles in healthcare system. ASHAs, for example, are responsible for grassroots implementation of national health programs designed according to the life course concept – viz. targeting beneficiaries from conception all the way to old age (10). Similarly, AWWs and Saathiyas are also charged with specific responsibilities which they are expected to carry out. With around nine lac ASHAs and more than thirteen lac AWWs, India has one of the largest workforces of CHWs in the world (11,12). Ensuring proper implementation of national health programmes therefore necessitates an equally extensive network of healthcare workers involved in monitoring and supervision.

Supportive supervisory mechanisms have been built into health systems in many countries; however, not much is known about how these mechanisms get translated in real-world settings. Limited research into effective supportive supervision has shown that it has the potential to increase the efficiency of CHWs by improving their skills (13), increasing their number of interactions with beneficiaries (14), improving the overall quality of work (15), and boosting their morale (16) among other ways. However, supportive supervision is also hampered by a number of systemic issues, including lack of properly trained supervisors, lack of logistic support, and lack of institutional support (7).

Supportive supervision has recently been introduced as a component of many maternal and child health programmes in India. However, experience from other settings show that the way in which supportive supervision is interpreted varies between policy makers and countries. Some countries have espoused a paradigm shift in the way supervision is implemented in order to veer towards a more supportive and collaborative approach (17). On the other hand, some countries see supportive supervision as a method to implement regular visits for improving performance and as a way of making sure that supervisors do the work assigned to them (7).

Very few studies have examined the programmatic landscape which explore the basis/mandate of supervision and its approach in maternal and child health programmes in India. Given that India has one of the largest CHW cadres in the world, it is necessary to assess programmatic documents on supportive supervision so as to understand aspects of mandate of supervision. In our current study, we carry out a document analysis of programmatic documents of select maternal and child health programmes in India in order to identify potential strengths and areas requiring attention.

Methodology

We conducted a document analysis to enumerate and illustrate the methods of supervision embedded in currently existing guidelines for activities to be implemented by first-line supervisors in maternal and child health programmes. We subsequently aimed to identify opportunities for strengthening supportive supervision in national programmes.

Selection of programmes

We selected a representative number of programmes implemented by the Ministry of Health and Family Welfare (MoHFW) based on:

1. Pan-India implementation: National health programmes which are being implemented across the country have been included in the analysis.
2. National health programmes implemented by ASHAs: We aimed to analyse and synthesise information on supportive supervision in programmes implemented by Ministry of Health and Family Welfare; for this purpose, we chose to identify and short-list national health programmes implemented by ASHAs.
3. Programmes relevant to maternal and child health: We selected programmes which represent each demographic group targeted by maternal and child health.

In the end of the shortlisting process, we selected two programmes targeting pregnant women (JSSK, JSY), two targeting infants (HBNC, HBYC), two targeting under five (UIP, RBSK) and two targeting children and adolescents (RBSK, RKSK).

Selection of documents

Within the programmes enumerated, we zeroed in on implementation documents such as guidelines/ operational manuals/ operationalisation modules/ training modules. These documents were subsequently extracted from various public online repositories such as those of NHM (GoI), MoHFW (GoI), and dedicated programmatic websites (when available).

Building framework and synthesizing domains for extraction of relevant information

We synthesized seven domains which for assessing various aspects of supportive supervision in the selected documents. The domains were synthesized using a two-step approach:

Step 1. Retrieving information on supportive supervision from existing literature – we accessed information on supportive supervision for frontline workers from existing literature such as guidelines, research articles, and working papers. Subsequently, we listed out a number of potential domains under which we can assess the current programmatic guidelines on supportive supervision.

Step 2. Expert Committee meeting – we convened a committee of five subject experts with extensive working experience with frontline workers. The committee brainstormed on the current information and guidelines available on supportive supervision, and finalised a number of domains from the list prepared in step 1 to be used for the purpose of our review.

Once the domains were finalised, the reviewers went through the previously selected documents extensively and repeatedly to extract information relevant to each domain. The extracted information was subsequently used to synthesize the result.

Results:

We identified seven domains and 15 indicators under which we assessed the programmatic documents (Box 1). A total of 28 documents from nine national health programmes were finalised and reviewed for the purpose of our landscape analysis. These documents spanned MCH programmes targeting pregnant women, infants, under-5 children, and school-going children and adolescents (Table 1).

In the following section, we elaborate on the findings from the landscape analysis of the enlisted programmatic documents under each domain sub-head.

1. Provision for supportive supervision

All programmatic documents had dedicated sections on monitoring and supervision. Sections on supportive supervision were less common. Programmatic documents on HBYC (one), HBNC (one), JSSK (five), RBSK (two), UIP (two), and RKSK (four) specifically mention supportive supervision. Out of these documents, there was considerable heterogeneity. Three documents – Immunization Handbook for Medical Officers (UIP), Handbook for ASHA facilitators (HBNC), and Operational Framework (RKSK), have explicit chapters where they outline the scope and key activities of supportive supervision.

2. Key stakeholder(s)

Various programmes have various primary supervisory cadre earmarked for them. They range from ASHA to the Block Medical Officer (BMO) and District Programme Manager (DPM). One programme (RKSK) has not specified the primary supervisory cadre. It has instead earmarked two healthcare functionaries – ASHAs (for acting as the first-level resource person for peer educators), and ANMs (for monitoring, training, trouble-shooting, and general handholding on a monthly basis).

Additional supervisory cadre are not mentioned explicitly in all the programmes. They range from the ASHA facilitator to the BMO. Two programmes (HBNC and JSSK) do not earmark any additional supervisory cadre.

3. Timing for conducting supervision

There is significant variation in the periodicity of supportive supervision – they may range from as frequently as twice per week (for DPMs in JSSK) to at least once every quarter (HBYC). Periodicity of supportive supervision is not mentioned in the reviewed

programmatic documents of RBSK. Most programmes however stipulate a monthly to bi-monthly schedule.

4. Rationale

Most programme documents enlist mentoring, supporting, and problem-solving as the key objectives of undertaking supportive supervision. However, there is a variation in the quality of information on the key objectives. The Handbook for ASHA Facilitators (HBNC) and Immunization Handbook for Medical Officers have clearly outlined the key objectives of supportive supervision in their respective programmes. On the other hand we could not identify the key objectives of supportive supervision for two programmes (JSSK and JSY).

5. Content of supervisory approach

The programmatic documents were scanned for information on the key activities warranting supportive supervision. One programme (JSSK) did not clearly outline the key activities. The other programmatic documents showed uniformity in this regard, and clearly earmarked the key activities which required supportive supervision. However, these activities were often labelled as “roles”, “tasks”, and “responsibilities” (Table 2).

6. Modalities

We devised four indicators to assess for provision of logistics and modalities in place to augment supportive supervision efforts. There were considerable differences amongst the various documents under both the indicators.

Financial support

No logistic support in terms of financial/non-financial incentives or mobility support were explicitly stipulated for any of the primary supervisory cadre in any of the programmatic documents that we scanned. Provision for incentive for primary supervisory cadre (here: ASHA/ ASHA facilitator) was made for in only two programmes – RKSK and HBYC. In HBYC, a flat incentive amount of Rs. 500 per month was fixed for the primary supervisory cadre (here: ASHA facilitator/ ANM/ Anganwadi Services Supervisor). In the RKSK no fixed incentive amount was stipulated. Instead, flexibility was provided to the district level officials (under the auspices of District Nodal Officer – Adolescent Health) for fixing the incentive amount.

Mobility support

Mobility support has been stipulated for in only one programmatic document (UIP) although it has only been provided for district and state level officials. The other documents do not mention any provision for mobility support.

Tools of supervision

Most programmatic documents provided checklists to aid in the process of supportive supervision. In addition, some programmes also had provision of meetings at regular intervals for ensuring supportive supervision. Two programmes (RBSK and JSSK) did not explicitly identify any modality for carrying out supportive supervision in the scanned documents. On the other hand, the UIP programmatic documents had SOPs, monitoring formats, checklists, job aids, as well as training materials in order to systematise and standardise supportive supervision. Mobile phone-applications as a

means of conducting and recording the supportive supervision sessions were not explicitly mentioned in any of the programmatic documents.

Convergent supportive supervision

Most supportive supervision visits are clubbed with other activities – most common being the village health, sanitation and nutrition days (VHSNDs). JSSK and JSY do not have any specific days mentioned for supportive supervision. In case of UIP, supportive supervision is mandated to be carried on days on routine immunization/ (Supplementary Immunization Activities (Mission Indradhanush) sessions.

7. Quality assurance

Supportive supervision specific HMIS Indicator

An HMIS indicator would effectively be able to monitor the activities of primary supervisory cadre. Only one of the reviewed programmes (HBYC) had a specific HMIS indicator reflecting supportive supervision – the number of ASHAs who received supervisory visits.

Provision for dashboard

A dashboard would allow for centralised tracking and monitoring of supportive supervisors at the block and district level. None of the reviewed programmatic documents had any provisions for a centralised dashboard. Therefore, the outcomes of supportive supervision visits need to be compiled manually.

Provision of training for supportive supervisors

Two programmes – HBYC and RKSK – has made provision for training explicitly for supportive supervisory purposes. Whereas HBYC stipulates a period of two days for enhancing supervisory skills, RKSK mandates training of ASHAs as peer educator (PE) coordinator. The other reviewed programmes do not explicitly make provision for training of supportive supervisors.

Compliance of supportive supervision with principles of supportive supervision

The WHO module for supportive supervision for mid-level managers lays out the parameters within which supportive supervision is supposed to operate (9). HBNC and UIP have provided parameters of supportive supervision, and demarcate the desired characteristics of a supportive supervisor. UIP has also provided a supervisory matrix in order to further facilitate a step-by-step approach to supportive supervision. RKSK also emphasizes on supportive supervision as a crucial element of making the programme successful. Although the reviewed documents of RKSK do not outline the parameters of supportive supervision, it does stipulate training of ASHAs as PE facilitator, thereby allowing for hands-on supportive supervision skill-building exercises.

Discussion:

Supportive supervision is proven to increase efficiency of frontline workers and improving the quality of services provided (18,19). In our study, we have reviewed the various methods by which supportive supervision has been integrated in the programmatic ecosystems.

We found that even though all the programmes mandated supportive supervision as a vital component, most of them did not specify the roles and activities supportive supervisors are supposed to undertake. They also did not specify training or refresher schedules or modules for

supportive supervisors. There were no specific indicators to assess the quality supportive supervision, nor were there any standardised feedback mechanisms in place. Instead, these programmes mostly relied on checklists for accomplishing supportive supervision, though at least one (UIP) also provided monitoring formats and job aids.

Most health professionals who undertake supportive supervision are not aware of what it entails (20,21). Usually, tools such as checklists, job aids, guidelines and sometimes mobile-based applications are used to maintain data records, facilitate record keeping and identifying problems (22), which may end up generating too many indicators. Since multiple health programmes employ the same or similar primary supervisory cadre, not clearly delineating job responsibilities may obfuscate the purpose of carrying out such activities. Moreover, health workers who perform supportive supervision are also carrying out a number of other unrelated activities at the same time. This also lead to them feeling confused and burdened (17,23). Due to these reasons, supportive supervisors tend to adhere to traditional supervisory approach, which are usually top-heavy, authoritarian, and primarily transactional in nature (17,24,25). Supervisory systems which are not well-organised and delineated may be counter-productive, as they may end up fostering poor or authoritarian supervisory models. Such supervisory efforts may become unproductive, unsupportive and demotivating (7,19). Current insights into the effect of supervision have necessitated shifting traditional models of authoritative or purely transactional supervision to a more collaborative and participatory one (5,26). Providing standardised training and augmenting supportive supervision by encouraging collaboration through mobile and eHealth technologies such as dashboards has been found to increase overall productivity (27–29). Presence of well-defined job roles and responsibilities and concrete indicators for supportive supervision have also been perceived to be more efficient and effective (19,28,30). Therefore, inclusion of processes which promote high-quality,

collaborative and personalised supportive supervision in these programmes is highly recommended.

We also found that there was a need to extend logistic support in order to expedite supportive supervision. Logistic constraints – such as financial and mobility – have been found to be a common bottleneck across settings (8,23,28,30,31). Supportive supervisors usually have to travel long distances, and therefore lack of dependable supervisor transport can lead to decreased efficiency. Financial constraints also impact supportive supervision efficiency as it may lead to cancellation or rescheduling of visits, and may also impact the morale of the supervisors (17). It has been suggested that instituting a mechanism of internal supportive supervision would prove to be of use in resource limited settings, such as that of Low- and Middle-Income Countries (LMICs) (7). It is hypothesized that adopting such structures of supportive supervision may help in cutting down time associated with travelling to supervision sites, and also reduce dependency on transportation for supportive supervision. But these measures may in turn throw up their own challenges (17). While operating within the current set-up of supportive supervision, making sure that financial and mobility supports are in place should prove to be beneficial.

Although most programmatic documents provide for convergent supportive supervision, multitasking may prove to be counter-productive especially in settings with large population coverage. Multitasking and workload issues have been found to have a major impact on work performance (31–34). On the other hand, in resource-limited settings like that of India, multitasking is one of the only ways of ensuring supportive supervision. Given this apparent dichotomy, supportive supervision which is focused on a few key indicators would serve to reduce the workload of the supportive supervisors, all the while maintaining the quality of supportive supervision. Using a dashboard, for example may help to increase the efficiency

and impact of supportive supervision measures, and act to monitor supportive supervisory cadre themselves.

A number of factors – such as low coverage, lack of motivation, lack of transport and financial support, inadequate training of supervisors, lack of appropriate tools, and poor staff attitude (7,8,35–38) work to limit the effectiveness and impact of supportive supervision in LMICs. There is therefore a need to review the implemented frameworks of supportive supervision. Focussing on quality of each supervisory visit would prove to be more beneficial than increasing the total number of visits (8). On the other hand, lengthy supportive supervisory sessions may themselves prove to be counter-productive (8,39,40). A balance therefore needs to be struck between the number of visits and the tasks to be performed at each visit. Quality supportive supervision entails recording a limited number of indicators, while providing avenues for overall collaborative learning and growth.

This document review highlights the need to revisit supportive supervision guidelines of maternal and child health programmes in India. There is a need to devise clear procedures and key activities which every supportive supervisor should be trained in. Care should be taken to ensure that supportive supervision is a participatory, collaborative process and not a top-down and fault-finding one. Supportive supervisors more often than not act as role models, and this fact should be taken into consideration.

References:

1. Schaaf M, Warthin C, Freedman L, Topp SM. The community health worker as service extender , cultural broker and social change agent: a critical interpretive synthesis of roles , intent and accountability. *BMJ Glob Heal.* 2020;5:e002296.
2. Lehmann U, Sanders D. Community health workers: What do we know about them? The state of the evidence on programmes, activities, costs and impacts on health outcomes of using community health workers. 2007.
3. Sundararaman T, Ved R, Gupta G, Samatha M. Determinants of functionality and effectiveness of community health workers: results from evaluation of ASHA program in eight Indian states. *BMC Proc [Internet].* 2012 Sep [cited 2021 Nov 17];6(S5):O30. Available from: [/pmc/articles/PMC3467631/](#)
4. Sharma R, Webster P, Bhattacharyya S. Factors affecting the performance of community health workers in India: A multi-stakeholder perspective. *Glob Health Action [Internet].* 2014 [cited 2021 Nov 17];7(1). Available from: [/pmc/articles/PMC4197397/](#)
5. Kok MC, Vallières F, Tulloch O, Kumar MB, Kea AZ, Karuga R, et al. Does supportive supervision enhance community health worker motivation? A mixed-methods study in four African countries. *Health Policy Plan.* 2018;33(9):988–98.
6. Ludwick T, Turyakira E, Kyomuhangi T, Manalili K, Robinson S, Brenner JL. Supportive supervision and constructive relationships with healthcare workers support CHW performance: Use of a qualitative framework to evaluate CHW programming in Uganda. *Hum Resour Health.* 2018;16:11.
7. Avortri GS, Nabukalu JB, Nabyonga-orem J. Supportive supervision to improve

- service delivery in low-income countries: is there a conceptual problem or a strategy problem? *BMJ Glob Heal.* 2019;4:e001151.
8. Hill Z, Dumbaugh M, Benton L, Kallander K, Strachan D, Asbroek A ten, et al. Supervising community health workers in low-income countries - a review of impact and implementation issues. *Glob Health Action.* 2014;7:24085.
 9. World Health Organization. Training for mid-level managers (MLM) - Supportive supervision [Internet]. 2008. p. 26. Available from: http://www.who.int/immunization/documents/MLM_module4.pdf
<http://www.ncbi.nlm.nih.gov/pubmed/24815075>
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC4016747>
 10. Kuruvilla S, Sadana R, Montesinos EV, Beard J, Vasdeki JF, Carvalho IA De, et al. A life-course approach to health: Synergy with sustainable development goals. *Bull World Health Organ* [Internet]. 2018 Jan 1 [cited 2021 Nov 17];96(1):42–50. Available from: [/pmc/articles/PMC5791871/](https://pubmed.ncbi.nlm.nih.gov/32811871/)
 11. Bisht R, Menon S. ASHA Workers Are Indispensable. So Why Are They the Least of Our Concerns? *The Wire* [Internet]. 2020 May 1 [cited 2021 Feb 3]; Available from: <https://thewire.in/rights/asha-workers-coronavirus>
 12. Ministry of Women and Child Development. Integrated Child Development Services (ICDS) Scheme [Internet]. 2021 [cited 2021 Nov 17]. Available from: <https://icds-wcd.nic.in/login.aspx>
 13. Aftab W, Rabbani F, Sangrasi K, Perveen S, Zahidie A, Qazi SA. Improving community health worker performance through supportive supervision: a randomised controlled implementation trial in Pakistan. *Acta Paediatr.* 2018;107(Suppl. 471):63–71.

14. Frimpong JA, HELLERINGER S, Awoonor-Williams JK, Yeji F, Phillips JF. Does supervision improve health worker productivity? Evidence from the Upper East Region of Ghana. *Trop Med Int Heal*. 2011;16(10):1225–33.
15. Madede T, Sidat M, McAuliffe E, Patricio SR, Uduma O, Galligan M, et al. The impact of a supportive supervision intervention on health workers in Niassa, Mozambique: a cluster-controlled trial. *Hum Resour Health*. 2017;15:58.
16. Rabbani F, Shipton L, Aftab W, Sangrasi K, Perveen S. Inspiring health worker motivation with supportive supervision: a survey of lady health supervisor motivating factors in rural Pakistan. *BMC Health Serv Res*. 2016;16(1):1–8.
17. Bradley S, Kamwendo F, Masanja H, de Pinho H, Waxman R, Boostrom C, et al. District health managers' perceptions of supervision in Malawi and Tanzania. *Hum Resour Health* [Internet]. 2013 Sep 5 [cited 2021 Feb 3];11(1):1. Available from: Human Resources for Health
18. Panda B, Pati S, Nallala S, Chauhan AS, Anasuya A, Som M, et al. How supportive supervision influences immunization session site practices: A quasi-experimental study in Odisha, India. *Glob Health Action*. 2015;8(1).
19. Purity M, McAuliffe E, Ogenna U, Honorati M, Henry M. The Impact of Supportive Supervision on the Implementation of HRM processes ; A Mixed- Methods study in Tanzania. *Heal Syst Policy Res*. 2017;4(1):47.
20. Haines A, Sanders D, Lehmann U, Rowe AK, Lawn JE, Jan S, et al. Achieving child survival goals: potential contribution of community health workers. *Lancet*. 2007;369:2121–31.
21. Global Health Workforce Alliance, World Health Organization. Global Experience of

- Community Health Workers for Delivery of Health Related Millenium Development Goals: A Systematic Review, Country Case Studies, and Recommendations for Integration into National Health Systems. 2010.
22. Vasan A, Mabey DC, Chaudhri S, Epstein H-AB, Lawn SD. Support and performance improvement for primary health care workers in low- and middle- income countries: a scoping review of intervention design and methods. *Health Policy Plan.* 2017;32:437–52.
 23. Manongi RN, Marchant TC, Bygbjerg IC. Human Resources for Health Improving motivation among primary health care workers in Tanzania : a health worker perspective. *Hum Resour Health.* 2006;4:6.
 24. Bosch-Capblanch X, Garner P. Primary health care supervision in developing countries. *Trop Med Int Heal.* 2008;13(3):369–83.
 25. Vallières F, Hyland P, McAuliffe E, Mahmud I, Tulloch O, Walker P, et al. A new tool to measure approaches to supervision from the perspective of community health workers: A prospective, longitudinal, validation study in seven countries. *BMC Health Serv Res.* 2018;18:806.
 26. John Clements C, Streefland P, Malau C. Supervision in Primary Health Care - Can it be Carried Out Effectively in Developing Countries? *Curr Drug Saf [Internet].* 2008 Apr 18 [cited 2021 Jan 29];2(1):19–23. Available from: <https://pubmed.ncbi.nlm.nih.gov/18690946/>
 27. Whidden C, Kayentao K, Liu JX, Lee S, Keita Y, Diakité D, et al. Improving Community Health Worker performance by using a personalised feedback dashboard for supervision: a randomised controlled trial. *J Glob Health.* 2018;8(2):020418.

28. Karuga RN, Mireku M, Muturi N, McCollum R, Vallieres F, Kumar M, et al. Supportive supervision of close-to-community providers of health care: Findings from action research conducted in two counties in Kenya. *PLoS One*. 2019;14(5):e021644.
29. Braun R, Catalani C, Wimbush J, Israelski D. Community Health Workers and Mobile Technology: A Systematic Review of the Literature. *PLoS One*. 2013;8(6):e65772.
30. Djibuti M, Gotsadze G, Zoidze A, Mataradze G, Esmail LC, Kohler J. The role of supportive supervision on immunization program outcome - A randomized field trial from Georgia. *BMC Int Health Hum Rights*. 2009;9(Suppl 1):S11.
31. Jaskiewicz W, Tulenko K. Increasing community health worker productivity and effectiveness: A review of the influence of the work environment. *Hum Resour Health*. 2012;10:38.
32. Ndimba SD, Sidat M, Give C, Ormel H, Kok MC, Taegtmeyer M. Supervision of community health workers in Mozambique: a qualitative study of factors influencing motivation and programme implementation. *Hum Resour Health*. 2015;13:63.
33. Kalyango JN, Rutebemberwa E, Alfven T, Ssali S, Peterson S, Karamagi C. Performance of community health workers under integrated community case management of childhood illnesses in eastern Uganda. *Malar J*. 2012;11:282.
34. Bagonza J, Kibira SPS, Rutebemberwa E. Performance of community health workers managing malaria , pneumonia and diarrhoea under the community case management programme in central Uganda: a cross sectional study. *Malar J*. 2014;13:367.
35. Tavrow P, Kim YM, Malianga L. Measuring the quality of supervisor-provider interactions in health care facilities in Zimbabwe. *Int J Qual Heal Care*. 2002;14(SUPPL. 1):57–66.

36. Dieleman M, Cuong PV, Anh LV, Martineau T. Identifying factors for job motivation of rural health workers in North Viet Nam. *Hum Resour Health*. 2003;1:10.
37. Mathauer I, Imhoff I. Health worker motivation in Africa: The role of non-financial incentives and human resource management tools. *Hum Resour Health*. 2006;4:24.
38. Manzi F, Schellenberg JA, Hutton G, Wyss K, Mbuya C, Shirima K, et al. Human resources for health care delivery in Tanzania: A multifaceted problem. *Hum Resour Health*. 2012;10:3.
39. Suh S, Moreira P, Ly M. Improving quality of reproductive health care in Senegal through formative supervision: Results from four districts. *Hum Resour Health*. 2007;5:26.
40. Suraratdecha C, Venkata Ramana CBS, Kaipilyawar S, Krishnamurthy JVG, Sivalenka S, Ambatipudi N, et al. Cost and effectiveness analysis of immunization service delivery support in Andhra Pradesh, India. *Bull World Health Organ*. 2008;86(3):221–8.