Working paper, March 2008

CREHS

Community health workers: a review of concepts, practice and policy concerns

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DFID Department for International Development

This document is an output from a project funded by the UK Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID

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1. Introduction

The global policy of providing primary level care was initiated with the 1978 Alma Ata Declaration. The countries signatory to the declaration considered the establishment of a community health worker (CHW) programme as synonymous with the primary health care (PHC) approach (Mburu, 1994; Sringernyuang et al., 1995). During the 1980s, many countries trained large numbers of CHWs (Matomora, 1989), who were identified as the third workforce of "human resources for health" (Sein, 2006). CHWs are still providing care in the remote and inaccessible parts of the world (WHO, 2006a).

This paper provides an overview of the concepts and practice of CHWs from a range of developing and developed countries and identifies some policy challenges that remain in designing effective CHW schemes, particularly in the Indian context. In the following sections, we review the various ways that CHWs have been deployed in different settings. The review is based on a systematic search of the literature with search terms including: community health worker, primary health care worker, community-based health care worker, and lay health worker. We also used the inclusion criteria that the World Health Organization (WHO) has adopted for describing CHWs (WHO, 2006a), in Pub-Med, Science Direct, WHO and World Bank sources.

A total of 110 studies were identified for this purpose. We have classified these into three groups: those relating to (1) design and role of CHWs (Table 1), (2) management of CHWs (Table 2), and (3) factors influencing the performance of CHWs (Table 3, 4 and 5). We propose this classification for reviewing the literature for analytical purposes. While our review draws upon all these studies, we have indicated only a selection of them in the text.

2. Community Health Workers: an overview of concepts and practice

CHWs have evolved with community-based health care programmes and have been strengthened by the PHC approach. However, the conceptions and the practices of CHWs

vary enormously across countries, conditioned by their aspirations and economic capacity. This review identified seven critical factors that influence the overall performance of CHWs. In discussing these issues, our aim is to highlight particular empirical knowledge and identify gaps in the design, implementation and performance of CHWs.

1. **Gender:** Most countries have largely relied on females as CHWs (Table 1). Although both men and women are employed at grass-roots level, there is a collective impression (particularly amongst policy makers) that female workers are able to deliver care more effectively than male workers at community level. While this may be true of maternal and child health (MCH) related services, the role of male workers in the control of epidemics (in the past), such as cholera, small-pox and plague, at the community level has been substantial across countries.[1] Nonetheless, there has been an explicit policy-shift in India to replace male health workers with female workers at community level (GOI, 1997).

2. **Selection of CHWs**: Most studies highlight the need to recruit CHWs from the communities they serve, but they also point out the difficulties in implementing this approach.[2] CHWs who are from the communities they serve presumably will be not only more accessible but also able to gain the confidence of community members (Ruebush et al., 1994). Experience has shown that CHWs recruited from local communities have had greater impact on utilization, creating health awareness and health outcomes (Bang et al., 1994; Abbatt, 2005; Lewin et al., 2005). Examples from India include AWARE in Andhra Pradesh, CINI in Kolkata, CRHP in Jamked, RUHSA in Tamil Nadu, and SEARCH in Maharashtra (Antia & Bhatia, 1993); see Table 1 for examples from Pakistan (Oxford Policy Management, 2002; Douthwaite & Ward, 2005; see Table 1, sl no. 10), and China (Campos et al., 2004; see Table 1, sl no. 19).

3. **Nature of employment, career prospects and incentives**: Many studies highlight the role of nature of employment, career prospects and other incentives in determining the overall performance of community workers (Ballester, 2005). Experience in the employment of CHWs is quite varied across countries. In several countries, particularly in government health systems, CHWs have been employed

1 Impression drawn from interviews with various officials in India.
2 For example, the social and economic class and caste background of CHWs may influence their acceptance by members of the community they serve (Jobert, 1985).

on a voluntary basis and on a full-time basis (see Table 1). Countries have also employed CHWs on a contract basis or as regular employment with a fixed monthly salary paid by the government, such as in India (GOI, 1956). India also has had experience of CHWs employed on a voluntary basis in the public sector, during the 1980s in particular, (Leslie, 1985). While the experience of NGOs is also quite varied in this respect, we can safely state that there is perhaps more voluntarism in this sector in under-served areas (Antia & Bhatia, 1993).[3] The critical point that comes through the review is that not only would payment or voluntarism per se influence CHWs' performance, but their influence also depends on other factors including those highlighted here (Table 2 and 5).

4. **Educational status:** The review shows that in most countries CHWs have had education up to primary level, with 8 to 10 years of schooling (Table 1). Studies have shown that CHWs with higher educational qualifications have opportunities for alternative employment and therefore migrate from one job to another (Brown et al., 2006; see Table 5, sl no. 8). On the other hand, it has also been highlighted that those with higher education could learn and enhance their skill in the diagnosis of common illnesses (Ande et al., 2004; Bentley, 1989) and thereby deliver better care to the community. Experience from other regions, namely in Uganda, shows that factors like age, sex, education and number of offspring were inconsequential in ability of CHWs to classify pneumonia and provide treatment accordingly (Kallander et al., 2006).

5. **Population and service coverage**: Two inter-related critical questions being faced at grass-roots level are: (1) what is the optimal population size that a CHW could cover, and (2) what is the optimal range of services that a CHW could deliver? Experience across countries varies (Table 2). There are countries such as Sri Lanka where a CHW covers as few as 10 households offering a set of MCH related services (UNICEF, 2004; see Table 1, sl no. 14). On the other hand, there are countries such as India where a CHW covers about 1000 households (approximately 5000 population, usually spread over 5 to 10 villages; see Table 1, sl no. 39) (UNICEF, 2004). In most countries, CHWs offer more preventive services than curative services (Salmen, 2002) (Table 2). Studies have also shown that such an approach

3 Conclusions drawn from interviews with various NGOs on their role in the revised national tuberculosis control programme

may have reduced the confidence of the community in the effectiveness of CHWs (Bentley, 1989; Menon, 1991). CHWs in India offer a wider range of services. 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 (Table 3). But such an approach has also led to criticisms from various quarters that it has increased the overall work-load of CHWs, thereby reducing their performance (SARDI, undated).

6. **Training**: The induction of and continuing training programmes for CHWs have received considerable attention, as CHWs are often selected without any prior experience or professional training in community health (Abbatt, 2005). In Nicaragua in the 1980s, CHWs were as young as 15 years old and had a short training period of no longer than 2 weeks, focused on curative services (Bender & Pitkin, 1987; see Table 2, sl no. 6). These were exceptions necessitated by the political turmoil of that period in such countries. Despite these exceptions, CHWs in countries such as India receive about 3 months of training, while in other countries such as Brazil they receive 6 to 8 months of training at the beginning of their career (Campos et al., 2004; Leslie, 1985; see Table 2, sl no. 11 and 23). Career prospects for CHWs and their aspirations do influence their performance. For example, some studies from the United States (Ballester, 2005; Scott & Wilson, 2006) have shown a significant drop out of CHWs due to lack of career prospects. Thus career prospects along with salaries are strong incentives in both retaining CHWs, and enhancing their performance. There has been little empirical analysis of the content and approach of various training programmes and their influence on CHW performance. For example, the algorithm developed by WHO on managing multiple childhood illness was found to be ineffective as CHWs reported serious difficulties in understanding training manuals (Kelly et al., 2001); similar findings were reported in India by an Oxfam study about the difficulties for CHWs in understanding training manuals (Ramprasad, 1988). The findings from a national survey of CHWs in the US recommend on-the-job training to overcome these difficulties (Kash et al., 2007).

7. **Feedback, monitoring mechanisms and community participation**: Referrals and record-keeping are often highlighted for establishing a good monitoring system (Jerden et al., 2006). However, only a few studies have demonstrated the importance of building healthy “inter-relationships” and “trust” among health professionals for developing an effective feedback and referral system (Bhattacharyya et al., 2001;

see Table 4). For example, a study in South Africa describes the relationships between professional nurses and CHWs, and how one viewed the other as a "threat" in their career (Doherty & Coetzee, 2005; see Table 4, sl no. 18). We argue that in such unhealthy competitive situations, it is not possible to have an effective "referral system" in place (May & Contreras, 2006). However, the Namibian experience shows that through mutual understanding on agreed roles and responsibilities, it would be possible to have positive inter-personal relationships (Low & Ithindi, 2003). Studies, for example in Colombia, have also shown that "feedback and rewards from the community" are more significant in the overall motivation and performance of CHWs (Robinson & Larsen, 1990; see Table 5, sl no. 2). The critical issues that still remain in this respect are (Arole, 2007):

(a) How does a feedback mechanism from the community work?

(b) What kinds of rewards do the CHWs expect from the community?

(c) How do they reflect the degree of trust and confidence that CHWs have gained from the community?

3. Policy challenges in design of Community Health Worker programmes

The above review highlights several aspects to be kept in mind in designing and implementing effective CHW schemes. The review emphatically shows that (a) selection of CHWs from the communities they serve and (b) population-coverage and the range of services offered at the community levels are vital in the design of effective CHW schemes. It should be noted that the smaller the population coverage, the more integrated and intensive the service offered by the CHWs.

The extent to which other factors should be taken into account is contingent on local conditions, including economic and socio-political factors. While the review has highlighted the role of gender, education, training, feedback and monitoring system, and incentives and career prospects, the economic resource base and political commitment will largely determine the amount of attention these receive in the design and implementation of CHW schemes (Haines et al., 2007). For example, while it is obvious that good training is essential for CHWs, the content and duration of training that is decided upon will be influenced by

the range and nature of services to be offered by the CHWs, and the level of education that they already possess. It has been highlighted that in general there has been a lack of performance due to inadequate capacity of training institutions and lack of capacity of trainers to understand the local community structure (Global Health Trust, 2004). Studies have shown that many CHW schemes do not provide primary curative care. Caution is needed in deciding the range and nature of services that CHWs should provide in a given population. It is essential to strike a balance between preventive and curative services to be provided by them. Likewise, the role of incentives and career prospects should proceed from other design elements, such as the overall work-load (in terms of population coverage and services offered and the degree of follow-up required by the CHWs) (Ofosu-Amaah, 1983). 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 CHW programmes. This was highlighted in a study of a Doulas community health care programme in the US, where more than half of the CHWs were looking forward to being a qualified health professional preferably a nurse (Low et al., 2006).

We reviewed the overall performance of CHWs that may determine the enthusiasm and motivation for and continuity of the CHW schemes. Often 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 community members, etc (Stock-Iwamoto & Korte, 1993) (Table 3). Computing each of these measures is data intensive and also requires careful effort in documentation and analysis over a period of time. However, what is eventually important in sustaining the motivation of CHWs to function with commitment and effectiveness, as the experimentation in Parinche (FRCH-PUNE Project - Antia & Bhatia, 1993) and SEARCH (Gadchiroli, Maharastra - Bang et al., 1994; Gryboski et al., 2006), is the degree of trust and confidence that CHWs have gained from community members over a period of time.

Table 6 summarizes our summary of the strengths, weaknesses, opportunities and threats in the concept of CHWs from the literature we have reviewed. Such a classification of roles of CHWs may have some pedagogic value. Our review shows that the evidence we already have lends support to the view that a carefully designed and implemented community health worker scheme could have far reaching implications for the whole society beyond generating

better health outcomes (WHO, 1989). For example, it could improve their self-esteem (Roman et al., 1999; see Table 4, sl no. 12), substantially empower women from low-income countries (Sundararaman, 2007; Kovach et al., 2004; see Table 3, sl no. 8), and help them to earn respect from the community (Brown et al., 2006; Swider, 2002; see Table 6). Thus a well-designed and well-implemented CHW scheme could help reduce social inequity.

Appendix

Table 1. Profile of Community Health Workers across different countries

Sl no.	Author	Country	Year	Name	Age	Gender	Coverage	Employ*	Level of Education
1	Lehmann et al., 2004	Ghana Nigeria Kenya Tanzania Somalia	1970 1974	VHW	20-45	M:F F M	-	FT	Literate Primary Schooling
2	Hathirat, 1983	Thailand	1979	CHW	Varied	Male	--	FT	Graduates
3	Couper, 2004	Iran	1979	Behvarz	Varied	M/F	1200-1600 indi	FT	Secondary graduates
4	Scholl, 1985	Nicaragua	1981	Brigadista	15-19	F 55.5% M 45.5%	-	-	-
5	Bender & Pitkin, 1987	Costa Rica Nicaragua Colombia	-	RHA Brigadista HP	- 13-40 -	M/F M/F M/F	1/400 HHS - 1/300 indi	FT	-
6	Reis et al., 1991	Indonesia	1990	Kader	20-40	-	1/100 indi	FT	Educated
7	Nyonator et al., 2005	Ghana	1990	VHW	-	-	3000 indi	FT	-
8	Ruebush et al., 1994	Guatemala	-	CVs	12-76	M	1/100 indi	FT	-
9	Perez et al., 2006	USA	2000	CHW	20-29	F	300 indi	FT	High school
10	Oxford Policy Management, 2002, Douthwaite & Ward, 2005	Pakistan	2002	LHW	29 mean	F	1000 indi	FT	50% metric
11	WHO, 2006b	Algeria	2002	CHW	-	-	-	-	-
12	UNICEF, 2004	Nepal	2003	FCHV	>20	F	1/400; 1/250; 1/150 indi	FT	Educated
13	UNICEF, 2004	Bhutan	2003	VHW	-	M/F	20 -30 HHS	FT	--
14	UNICEF, 2004	Sri Lanka	2004	CHW		M/F	1/10 HHS		Educated
15	Magongo, 2004	Gautang	2004	CHW	-	-	200 HHS	FT	-
16	Friedman, 2005	South Africa	2004	CHW	-	-	80 to 100 rural & 100- 150 urban HHS	FT	-
17	UNICEF, 2004	Bangladesh	2004	Shastho Shebikas	25-35	F	150-300 HHS	PT	Educated
18	Campos et al., 2004	Brazil	2004	CHA	-	M/F	150- 250 HHS	FT	Educated
19	Campos et al., 2004	China	-	Bare foot doctor	-	-	-	-	-
20	___, 2005	Egypt	2005	CHWs	-	75% M	-	FT	-
21	WHO, 2006c	Papua New Guinea	2005	CHWs	-	-	-	FT	
22	Ismail & El Sheikh, 2005	Sudan	2005	CHWs	-	-	-	FT	-

Si No	Author	Country	Year	Name	Age	Gender	Coverage	Employ*	Level of Education
23	Rosenthal, 2005	USA	2005	CHW	30-39	F	-	75% Full Time	High School
24	___, 2006	Myanmar	2006	CHW	-	-	-	FT	Graduation
25	Keni, 2006	Republic of Marshall Islands	2006	HA	26	M	-	FT	High School
26	WHO, 2006d	CAR	2006	CHW	-	-	--	FT	-
27	WHO, 2006e	Zimbabwe		VHW	-	-	1-3 villages	FT	--
28	Brown et al., 2006	Peru	2006	CHW	19-70	M 75%	Varied	FT	Illiterate – Graduates
29	Sein, 2006	DPR Korea	1955	Sanitary Monitor	-	F	20-30 HHS	FT	-
30		Myanmar	1976	CHW	-	F	200 HHS	FT	-
31		Timor Leste	1978	Posyandu	-	F	10-20 HHS	FT	-
32		Indonesia	1978	Posyandau	-	F	10-220 HHS		
33		USA	1960	CHW	30-50	F 80%	-	FT/PT	Graduates
CHWs in India									
34	(Dave, 1991)	India / Maharastra (Sewagram)	1972	VHW	-	M			
35	(Dave, 1991)	India / West Bengal (CINI)	1975	CHW	-	F	-	-	
36	(Dave, 1991)	India / Gujarat (Tribhovandas Foundation)	1980	CHW	-	F			
37	(Kumar et al., 1978)	India	1978	CHV	-	M/F	-	PT	-
38	(Leslie, 1985) (Maru, 1983)	India	1977	CHV	>30	M/F	1/1000 ind	P/T 2-3 hrs	Primary schooling
39	(Bhattacharji et al., 1986)	India/Vellore	1983	CHWs		F	1/1000 to 1500/ PTCHW	PT	Higher primary
40	(UNICEF, 2004)	India	2000	VHGs		M	1/1000 HHS	PT	Literate
41	(Mistry & Antia, 2003)	BANWASI* / Uttar Pradesh/ India	2003			F	15/100 villages	PT	Primary education
42		AWARE*/ Andra Pradesh/India	2003			F	2/20 villages	PT	Primary education
43		CINI* / West Bengal / India	2003			F	1/400 families	PT	Primary education
44		RUSHA*/ Vellore / India	2003			F	1/1000 individuals	PT	Primary education
45		FRCH* / Pune / India	2003	Gramsakhi		F	1/village	PT	Primary education

Abbreviations: * Nature of employment; FT: Full Time, PT: Part Time; indi: Individual; VHW: Village Health Worker; HHS: Households; LHW: Lady Health Worker; RHA: Rural Health Assistant; CV: Community Volunteer; HA: Health Assistant; VHG: Village Health Guide

Source: Compiled from Various Sources.

Table 2. Management of Community Health Workers under various programmes

Sl no.	Author	Country	Programme	Training	Service provided	Monitor	Incentives
1	Hathirat, 1983	Thailand	Abbots	3 weeks	PHC	-	Volunteer
2	Scholl, 1985	Nicaragua	Brigadista	8 days	PHC, curative tasks	Health professionals	Volunteer/paid
3	Berman, 1984	Java/ Indonesia	CHD	Days/ weeks	-	-	Volunteer
4	Bender & Pitkin, 1987	Costa Rica	RCHP	16 weeks	Updating census, immunization, treating malaria, health education, promoting FP, referral, participation in community organization	Physician	State government for training and supported by community
5	Bender & Pitkin, 1987	Nicaragua	IOPAA	-	Nutrition, sanitation, treat common disease, MCH care and occupational health	-	Voluntary, but report to the health system
6	Bender & Pitkin, 1987	Colombia	-	-	First aid, child care, sanitation, treatment of common diseases, monthly visits to all households in the catchments area	-	The resources were from the Ministry of Health, municipal and communities own resources
7	Robinson & Larsen, 1990	Colombia	Colombia research national health care	3 months	PHC	By auxiliary nurse	Rewards: salary from health system
8	Reis et al., 1991	Indonesia	Kader	-	GOBI, ORT	Health professionals	Paid by the system
9	Stekelenburg et al., 2003	Kalabo/ Zambia	PHC	-	PHC	-	Volunteer
10	Campos et al., 2004	China	Barefoot Doctor	3-6 months	Primary health care	MMT	Volunteers/ Kind
11	Campos et al., 2004	Brazil	CHA	6-8 months	Health education, referrals	Municipal co-operation	Municipal co-operation
12	UNICEF, 2004	Bangladesh	BARC	21 days	PHC	POs	Profit by sale of drugs
13	UNICEF, 2004	Bhutan	VHW	12 days	PHC	Block development committee	Voluntary
14	UNICEF, 2004	Nepal	FCHV	15 days	PHC	No supervision	Voluntary
15	____, 2005	Egypt	CHWs	5-6 days	GOBI-FFF	TAHSEEN trainers	MOHP
16	Douthwaite & Ward, 2005	Pakistan	LHWP	3 months	MCH service, FP, health promotion and education, first aids	-	MOH
17	Ismail & El Sheikh, 2005	Sudan	-	-	Community based heath service	-	Supported by the community
18	Mack et al, 2006	Ingham County / USA	PITCH	-	Health insurance enrollment, smoking cessation,	-	Ingham county health department, Cost for the fiscal year 2005 = $ 252000
19	Whitley et al., 2006	USA	-	-	Providing primary health care and health education	-	Volunteer
20	Perez et al., 2006	USA	Community voices CHW Prog	2-3 months	Health insurance enrolment, Immunization, Asthma Management	-	Community voices organization (NGO)

Sl no.	Author	Country	Programme	Training	Service provided	Monitor	Incentives
21	US Department of Health and Human Services, 2007	USA	CHW prog	On job	Member of delivery services, navigator, screening and health education, outreach enrolling informing agent and organizer for camps in community	Employer	Paid /Volunteer Employed, paid per hour $13 to $15
22	Kumar et al., 1978	India	CHW scheme, 1978	6.6 weeks	PHC	-	Honorarium by government
23	Leslie, 1985 Maru, 1983	India	CHW scheme, 1977	3 months course Stipend 200/ month	PHC	Voluntary workers from their village	Voluntary
24	Leslie, 1985	India	CHW scheme INDIA		PHC	-	Rs. 200 during training, Rs. 50 per month
25	Bhattacharji et al., 1986	India	Project / Vellore INDIA	20 days PTCHW One year Health Aide	PHC	Two PTCHW by one Health Aide	-
26	Mistry & Antia, 2003	India	NGO management of CHWs INDIA		PHC	-	FRCH- 100/worker
27	UNICEF, 2004	India	VHG Scheme	3 months	PHC	Community	Voluntary

Abbreviations: RCHP: Rural Health Care Programme; IOPAA: Operational Integration from bottom ; PITCH: People Improving the Community Health; MMT: Mobile Medical Team; CHA: Community Health Assistant; MOH: Ministry of Health; LHWP: Lady Health Worker Program; CHD: Community Health Development; FCHV: Female Community Health Volunteer; PO: Program Officers, VHG: Village Health Guide.

Table 3. Summary of research articles showing health outcomes with introduction of Community Health Workers

Sl no	Author	Country	Research questions/ Conceptual frame	Methodology	Results/issues
1	(Zeighami et al., 1977)	Iran	To determine the health workers knowledge, attitude and practice about family planning and also to know the gender differences in effectiveness of family planning	A KAP survey was conducted after 14 months of training. The total sample of 1308 eligible couples was from two sites, project (658) and control site (650).	The health workers were able to double the usage of pills among the eligible couples and this was true for both sexes of health workers, maximum between the age groups 25 to 34 years.
2	(Bender & Pitkin, 1987)	Costa Rica	The paper examined the evolution and current status of VHWs	An analysis of the country's progress is done using sidels hypothesis of fundamental shift of wealth and power considering the PHC programme	IMR 61.5/1000 in 1970 decreased to 19.1/1000 1980; U5 mortality decreased from 5.1/1000 in 1970 to 1.1/1000 in 1980
3	(Bender & Pitkin, 1987)	Nicaragua	The paper examined the evolution and current status of VHWs	An analysis of the country's progress is done using sidels hypothesis of fundamental shift of wealth and power considering the PHC programme	Malaria decreased 39% from 1977-1983, polio eradicated, measles, whooping cough and tetanus extinct
4	(Bender & Pitkin, 1987)	Colombia	The paper examined the evolution and current status of VHWs	An analysis of the country's progress is done using sidels hypothesis of fundamental shift of wealth and power considering the PHC programme	1978-1982, extend basic service to 82% of popln. Polio vaccination 23% - 43%, DPT 22% - 37%, BCG 36% - 71% and measles 21%-50%
5	(Chopra & Wilkinson, 1997)	Rural South Africa	Evaluate the immunization coverage among the rural South African children with use of CHW	Study took place in Hlabisa health district of KwaZulu/Natal, South Africa, population of around 205,000 people. The programme has been running for 9 years, 1 CHW/100 households.	The immunization coverage was generally high. Immunization coverage was highest for all antigens in children who lived in areas with CHWs. There are no significant differences b/w two groups for BCG and measles coverage.
6	(Homer et al., 2000)	Australia	Evaluation/ St George Outreach Maternity Project (STOMP)	A randomized controlled trial was conducted with 1,089 women (550 in the experimental group and 539 in the control)	STOMP group women also reported a higher perceived 'quality' of antenatal care compared with the control group. STOMP group women saw slightly more midwives and fewer doctors than control group women did.
7	(Wayland, 2002)	Brazil	Evaluation of PACS program to improve PHC coverage. CHW regular performing their basic duties, health education and liaison b/w community and public health system	Data of maternal and child health survey in Triunfo was used, that had a section designated to evaluate the performance of CHWs	35% of caregivers reported a CHW visit in previous month and 22% reported never having been visited by a CHW, 34% reported they had never received hypochlorite solution, 49% never discussed their health problems with CHWs 45% discussed water treatment (major problem in the area) Sample of 180 households surveyed, only 4 reported to have consulted CHW when their child fell ill.
8	(Kovach, et al., 2004)	Philadelphia/ USA	Relationship b/w CHWs and low income pregnant women	Both qualitative and quantitative data; 1st focus group interviews 3 MOMobile sites in north Philadelphia Self determination, decision-making ability, self-sufficiency were defined as empowerment Sample 168 in Phase I, 80 in Phase II	The mean self determination score postpartum, decision-making ability score postpartum, and self sufficiency score postpartum were significantly greater than their respective means at the time of program registration

Sl no	Author	Country	Research questions/ Conceptual frame	Methodology	Results/issues
9	Campos et al., 2004	China and Brazil	Issues related to reorganization of CHWs, past, present and future with two case studies	In-depth case study analysis of barefoot doctors of China and community health agents in Brazil	Barefoot doctor: CDR- 40/1000 in 50s came to 10/1000 in 1974, IMR 160/1000 in 50s came to 25/1000 in 1974
10	Jokhio et al., 2005	Pakistan		Cluster randomized control sampling of 7 subdistricts randomly assigned delivery kits to TBAs and LHWs. PHC outcome were perinatal and maternal mortality	The maternal deaths and perinatal deaths reduced in the intervention area. Referral to public health services was also encouraged, and correspondingly, a higher proportion of women in the intervention group than in the control group were referred to an emergency obstetrical care facility
11	Kotecha & Karkar, 2005	India	Health status of integrated child development service workers	280 anganwadi workers (AWW)	- Anemia prevalence was 72.3% - Prevalence of severe, moderate and mild anemia among AWWs was 0.7%, 15.7% and 55.8% respectively. The fundamental question raised was the capability of ICDS AWWs to provide for all the services and their capacity to take in the training provided to them for NHED.
12	Delacollette et al., 1996	Katana health zone Zaire	Evaluate the potential to reduce malaria morbidity and mortality	Quantitative, simple random sample of households	Increase in health seeking behavior CHWs desired further training and to be a part of health system. CHWs increased the workload of health care staff. Community expectations were higher, often dissatisfied with the limited service, least interested in contributing to the efforts of CHWs, administrative control over CHWs, no motivation by CHWs with regard to community participation in malaria control
13	Schmeller, 1998	East Africa/ Dermatosis	Objectives were to determine the extent and severity of diseases in school and pre-school children in a rural community in western Kenya which includes treatment by trained CHWs	1993 & 1995 two separate epi surveys, 40,000 popln, 13 primary schools, 5780 children from 4-16 years were examined for skin disease. Only typical cases were counted and were treated by 12 CHWs. The evaluation was done in 1995	Slight decrease in dermatoses b/w 1993 (32.4%) and 1995 (29.6%), bacterial skin infections reduced from 12.7% to 10.8%. The most impressive change was a marked reduction in the extent and severity of skin diseases This study demonstrates that CHWs are able to deal successfully with the most important dermatoses in rural areas after a short training period.
14	Kelly et al., 2001	Kenya/ Childhood Illness	Objectives: to characterize CHW performance using an algorithm for managing common childhood illness	3 cross sectional hospital based evaluation Observations of consultations using a check list CHW documentation of assessment findings, classification, and treatment for each sick children in standard form. Repeat examination by clinician.	Each CHW was evaluated with 1 or 2 OP / IP cases depending on the availability. 90% of CHWs made correct diagnosis of malaria. Many failed to identify symptoms, illness and to administer correct drugs. Lack of regular supervision by professionals, continued education, complexity of the training modules led to poor performance.
15	Islam et al., 2002	Bangladesh	To compare the cost-effectiveness of the tuberculosis (TB) programme run by the Bangladesh Rural Advancement Committee (BRAC), which uses CHWs, with that of the government TB programme which does not use CHWs.	TB statistics and cost data were collected from July 1996–June 1997 and cost per patient cured was calculated.	185 and 186 TB patients were treated by BRAC and government respectively. It was found that the cost per patient cured was US$64 in the BRAC area compared to US$96 in the government area. It was also found that the BRAC and government TB control programmes appeared to achieve satisfactory cure rates using DOTS and the involvement of CHWs was found to be more cost-effective in rural Bangladesh.

Sl no	Author	Country	Research questions/ Conceptual frame	Methodology	Results/issues
16	Joel et al., 2003	South India	This study attempted to examine the knowledge of chronic psychosis among health workers of a rural community health program in South India.	Site: The Rural Unit for Health and Social Affairs (RUHSA), 80 CHWs volunteered to take part in the study. A vignette describing a typical patient with chronic psychosis was developed for the study.	Seventy (87.5%) subjects from the whole sample had at least one non-biomedical explanation for the psychosis (e.g. black magic, evil spirits as cause, non-disease concept, seeking treatment from traditional healers or temples and not seeking medical help).
17	Ramos-Crequeira et al., 2005	Brazil	The aims of the present study were to apply and evaluate a simple and potentially cost-effective method of dementia case finding by CHWs	25 CHWs were trained to identify dementia cases in 2,222 people aged 65 and older in Piraju, a Brazilian town with 27,871 inhabitants.	CHWs identified 72 elderly people as being possible cases of dementia. Thus, 45 cases were confirmed according to the diagnostic examination, indicating a PPV of 62.5% for the procedure. The overall frequency of dementia was 2% in this population.
18	Leinberger-Jabari, 2005	multinational	Review of 25 years of work in the community	The study included community-based organizations, hospitals and community clinics	CHWs were increasingly effective in providing outreach health care for population who were missed by the main stream. It was also found that CHWs were effective in providing health education and appropriate referrals for clients.
19	Douthwaite & Ward, 2005	Pakistan	To asses the impact of the LHWP on the uptake of modern contraceptive methods	Interview with HHS and LHWs, complete profile of HHS was collected. A sample of 4277 currently married women in the LHW served areas.	Higher levels of the use of contraceptives was seen in rural areas with LHWs
20	Bang et al., 2005	Gadchiroli, India	Observation of cohort of neonates in pre-intervention of home-based neonatal care in rural Gadchiroli.	Retrospective analysis of data from 39 villages compared between pre-intervention year 1995 to 1996 and intervention years 1996 to 2003	The low birth neonates declined from 11.3 to 4.7 % and preterm neonates by 33.3 to 10.2%, incidence of the sepsis, asphyxia, hypothermia and feeding problems declined significantly, due to repeated visits made by village health workers (intervention periods) to houses educating mothers on hygiene, breast feeding, thermal care. Prevention and management of infections, management of neonatal sepsis with antibiotics, administration of Vitamin K injections by VHWs and refereeing cases to SEARCH hospital.
21	Catalyst/ TAHSEEN ____2005	Egypt	Evaluation of outreach health workers	In-depth interviews of 816 outreach health workers were carried out.	Increase in knowledge of OC from 41% to 88%, breast lumps not as a result of menopause 48% to 95%, FGM 46% to 96%, Counseling of FP 48% to 91% --reference to local clinics.
22	Norris et al., 2006	Review	A systematic review was conducted to examine the effectiveness of community health workers in supporting the care of persons with diabetes	Review was done using medical text words, CHWs, LHWs, volunteers, promoters and others in the electronic databases, especially in Medline, till 2004	The 18 primary studies were published between 1986 and 2003 and included eight RCTs. Most of the studies were conducted in the USA. The majority of intervention participants were female (range 53–100%) and middle-aged. Health care utilizations decreased in emergency visits by 38% and admissions by 53% and hospital admissions related to diabetes decreased from 25% in 1999 to 20% in 2002.
23	Onwujekwe et al., 2006	South east Nigeria	Timelines of appropriate treatment for malaria with implementation of CHWs	An intervention village (N=597 households) and non intervention village (N=600 households).	Pre and post intervention showed the preference of CHWs over self-treatment at homes. The use of CHWs increased from 0% to 26.1% ($p < 0.05$), while self-treatment in homes decreased from 9.4% to 0% ($p < 0.05$) after the implementation of the CHW strategy. Use of patent medicine dealers also decreased from 44.8% to 17.9% ($p < 0.05$) after CHW strategy was implemented.

Table 4. Organizational issues that influence Community Health Workers performance

Sl no	Author	Country	Research questions / Conceptual frame	Methodology	Results/issues
1	Kumar et al., 1978	India	- administrative response, to CHW scheme - community attitude to and perceptions of CHW scheme; mainly on participation	Interview : 544 officials, 203 village level workers, 299 CHWs, 6013 community members, 604 community leaders	1. Fairness in selection of CHWs 2. Training of CHWs were satisfactory for e.g. CHWs scored 3 out 5 in malaria control tests 3. Hurdles: non-availability of medical officer, no stipend, non-availability of manuals and lack of clarity by the government 4. Gradual decline in the number of kits and drugs 5. Majority of CHWs maintained records
2	Hathirat, 1983	Thailand	Follow up evaluation of the health care training for Buddhist abbots and ecclesiastical heads	A sample of 1600 Buddhist abbots and 400 ecclesiastical heads were selected and interviewed	- 82% of Abbots and ecclesiastical heads had understood about primary health care; - 66% provide health education; - 57% improve or educate on nutrition, - sanitation and environmental problems; - 75% dispense modern drugs and 40% dispensed herbal drugs; - 29% gave medical care
3	Berman, 1984	Indonesia	An evaluation of coverage and equity	Household survey of two sub-districts, Glagah and Beran	Coverage: 71% of all children under five were weighed; 32% in Beran and 39% in Glagah contacted VHWs for illness Equity: children under five in poorer community have above average probability of attending weighing sessions.
4	Scholl, 1985	Nicaragua	An assessment of CHWs in two sites	One urban and one rural site was selected, these were 2 PHCs among 33 which had brigadista working successfully according to standards set.	These brigadistas seem to be more a part of the professional health delivery team, than community-based workers who work semi autonomously and are accountable to the community first. It was also found that they were more dependent on auxiliary nurse midwives for directions.
5	Twumasi & Freund, 1985	Zambia	Analyze the problems and issues arising with regards to community participation approaches to PHC	Theoretical issues through community participation research, literature review, and case study of CHWs	- 1 CHW / 17 villages, no means of transport - Completely political issue of conflict b/w different actors and ways to tackle it.
6	Bhattacharji et al., 1986	India	To evaluate the effectiveness of part time community health worker program	Sample 80,000 population	Educational status, experience, population covered, the degree of supervision and the scatter of houses all seemed to influence performance. The age of the worker and the test scores did not seem to affect performance to a great extent. Supervision had an effect on performance
7	Sauerborn et al., 1989	Burkina Faso	Recording utilization pattern of CHWs in a district of Burkina Faso	Household survey of N=715 HHS, 4 CHWs, 4 nurse midwives,	- 8.8 % of mild disease cases were seen by CHWs - villagers bypassed CHWs in 96.5% of serious disease cases - no referral linkages b/w professionals and CHWs
8	Bentley, 1989	Northwestern Somalia	Problem initiating a new health care programme: CHWs	A case-control study; a village with a CHW service and one without Candidates – literate, preference female, b/w 20-40 yrs of age	Results revealed inadequate training, service bias, poor motivation. CHWs were satisfied with job and received in-kind from villagers for service but were not supported by health system.
9	Menon, 1991	Gambia	Utilization of VHWs for PHC program	A household survey of mothers whose child had died in last three years; n=23	VHWs provided preventive care. Mothers were not aware of VHW services and expected curative services and a high percentage of non-availability of VHWs was reported

Sl no	Author	Country	Research questions / Conceptual frame	Methodology	Results/issues
10	(Ruebush et al., 1994)	Guatemala	The purpose of this investigation was to evaluate the criteria used by NMS workers to select volunteer community malaria workers and compare those criteria with the opinions of the residents about the qualities and characteristics they would prefer in an 'ideal' worker.	27 NMS, 7 sector chief and 100 residents of the Pacific Coast were selected. Interview as well as observational data was collected by spending half a day with 27 evaluators. CVs = Community volunteers	11 qualities of an ideal CV were brought out through open ended interview with households: - takes care of patient at all times of the day even when busy - is at home all of the time - has general knowledge of medicine - is a responsible person - is interested in the welfare of his neighbors - recognizes the importance of his work as a CV - has the ability to learn the duties of a CV - is friendly - treats everyone equally - is widely known in the community - is well liked
11	(Curtale et al., 1995)	Nepal	The study tested the hypotheses that volunteers can provide effective PHC	One intervention and one control area, 2160 children total. In-depth interview with mothers of children was done to know the first contact with CHVs for the past 12 months. A total of 208 CHVs were also included in the sample.	95% of mothers in the intervention met CHVs at least once compared to 24% in the control group. 35% of mothers brought children to CHVs in the intervention group. The ORS utilization was 78% in the intervention group and 64% in the control group. The CHVs received double supervision and felt "not being" left alone.
12	(Roman et al., 1999)	Michigan/USA CISS program	Describe the perceptions of the benefits and stressors of helping as experienced by CHWs in a nurse-coordinated maternal & child health intervention. Helpers Perception Measures, developed to assess benefits and stressors, were examined.	Part of community integrated service system program had two types of CHWs, paid and volunteers. Were given training to provide services to pregnant women who were at greater socio-demographic and psychosocial risk than the staff had anticipated.	Highest ranking benefits included positive feelings associated with being involved in good work (95%), a sense of belonging (94%) and greater self esteem (91%). They felt energized by helping others (81%). There are helper therapy benefits for CHWs who function in a maternal support program for low-income pregnant women.
13	(Ansari & Phillips, 2001)	South Africa	Aim: to compare the views of participants from four stakeholder groups as regards their voluntary status: the token-paid CHWs; the full-time employed projects' core staff; unpaid 'solo' community members and, representativesof NGOs	Self-administered questionnaire using snowballing' technique Benefits and costs of participation, satisfaction with partnership, sense of ownership, community representation, commitment and contribution Out of 427 participants from various groups there were 70 CHWs	Benefits exceeded the costs General atmosphere of satisfaction Stakeholders and beneficiaries perceived a sense of ownership
14	(Dieleman et al., 2003)	Vietnam	Develop strategies influencing staff motivation for better performance	53 semi structured questionnaire interviews were carried out, included 24 health staff and 6 receivers	Motivating factors for health workers were appreciation by managers, colleagues and the community, a stable job and income and training. The main discouraging factors were related to low salaries and difficult working conditions.
15	(Sibley & Sipe, 2004)	---	Meta analysis 1971-1999, Difference b/w trained and untrained birth attendants on maternity care; KAP studies.	60 studies were included of 44 developing countries, TBA assisted deliveries ranged from <1% to 66% live births	The results for TBA attributes were all positive, fairly uniform and significant. The lowest estimate of 0.52 for 'behaviour' represents a 63% 'improvement' for trained TBAs over the untrained TBA baseline.
16	(Brown et al., 2006)	Peru	Describing the profile of CHWs in Peru	Qualitative and quantitative research, community health projects from 1997- 2002, 40 Andean communities, sample of 171 CHWs	CHWs were mostly young males, high school graduates, with high drop out rates, employed on a voluntary basis. All these attributes were in contrast with those of traditional healers

Sl no	Author	Country	Research questions / Conceptual frame	Methodology	Results/issues
17	(Pahan et al., 2007)	Bangladesh	To compare the advantages and disadvantages of local CHWs versus government practice contributing to improved service delivery for poor.	The study was conducted at the LAMB Integrated Rural Health and Development Project in North-West Bangladesh. 34 local CHWs compared with 11 externals; followed by 6 FGDs with community; in-depth interview with 17 representatives of two groups of CHWs	The community preferred local CHWs. NGOs preferred more qualified external health worker than a less qualified internal health worker, for the simple reason that internal less qualified worker would reduce the performance of the NGOs.
18	(Doherty & Coetzee, 2005)	South Africa	Relationship b/w CHWs and professional nurse	16 interviews and 1 FGD; with nurses and CHWs. Age of nurses was 25-53; CHWs 30-55; predominantly women	Nurses were unsure of the CHW role and CHWs experienced being undermined initially. They were unaware of the training that CHWs had received. Nurses didn't accept CHWs because they were not professionally trained. CHWs wanted government to recognize them, they felt as though they did not belong. CHWs began to understand the value of being in the community and nurses accepted referrals from CHWs which was not the case earlier. Nurses stopped thinking of CHWs as a threat but as people who help them.
19	(Sundaraman, 2005)	India	Why do CHWs keep being resurrected? Why and how NGOs have shown success?	Review of work of nine NGOs in India, who incorporated the concept of CHW	Success by NGO - good referral linkages - high quality leadership - women as health care providers - failure by Govt - male health workers - patronage, corrupted the choice - no continued training - weak referral - curative than preventive care
20	(SARDI, n. d)	India	Working conditions, nature of work and targets, employment, job satisfaction, association with national and international allies	Coimbatore - 28, Chengalpet - 16, Madurai - 16; 54 VHNs; 6 MPWs	- health center located at outskirts of villages - poor transport facilities - 12 months to develop rapport with villages - lack of security - increase in the coverage area as the posts remain vacant - lack of financial incentives; difference b/w state & center - sexual harassment - over burdened with records entry - urban health posts: tasks unrelated to health department on workers - cover vacant posts - non-payment allowance - suspension on raising voice - both VHNs and MPWs face enormous amount of mental stress

Table 5. Financing Community Health Worker programmes in developed and developing countries

Sl No	Author	Country	Research questions/ Conceptual frame	Methodology	Results/issues
1	(Love et al., 1997)	San Francisco, USA	This article describes the functions and attributes of the Community Health Worker based on the findings of a systematic eight-county survey of the San Francisco Bay Area in 1996.	Mail and telephonic survey in 8 northern California counties with objectives: proportion of health care employers that employ CHWs, total no. of CHWs employed, demand for CHWs, profile of CHWs, barriers to wider employment. Out of 197 organisations in the region who responded for the survey, 71 (26%) either employ or plan to employ CHWs of which 62 were currently employing CHWs. A total of 504 CHWs are working in the 62 agencies reporting employing CHWs	65% of CHWs are full time and 35% are part time. 44% of CHWs have full time salary b/w $20,000 and $25,000 93% of Agencies – provide health benefits 88% of CHWs – government employees, 66% organisations report having a career ladder 55% salary - hard money (ongoing funding) 42% soft money (grants, 3yrs) Primary source - county/city funding 29%, federal grant 17%. 66% CHWs are women –[African American 30%], 58% received formal level of education, 95% organizations provided on job training; major conc. of workers were from HIV/AIDS/STDs (27%), MCH (16%), alcohol and drugs (11%), primary care (10%), 91% indicate budget constraints as a barrier to wider employment, 33% difficulty in supervising employers
2	(Robinson & Larsen, 1990)	Colombia	Work Performance 'General Model of Work Behavior' The research was based on a theoretical model of worker performance that focuses on job related sources of rewards and feedback	The data are drawn from a broader study of health promoters (CHWs). A survey research design was employed to obtain information from a random sample of rural health promoters (N = 179) and their auxiliary nurse supervisors about CHW performance and contributing factors	The findings indicate that feedback and rewards from the community have a greater influence on work performance. The findings do not support what appears to be a widely held assumption that the health system plays the primary role in influencing motivation and performance of CHWs
3	(Thomason & Kolehmainen-Aitken, 1991)	Papua New Guinea	Performance of rural health staff; identify the costs and the range of costs variation in health services and to assess outputs of rural health facilities	Survey was conducted among 76 rural health centers and 57 Churches	Inequitable unit cost of providing care was less than GO. Inequitable distribution on analysis with indicators for staffing need, more concentration on curative aspect. Church staff performed better than GO staff.
4	(Makan & Bachmann, 1997)	South Africa	The aim of this study was to evaluate and analyse the nature, performance and costs of a sample of peri-urban and rural based CHW programs operating in the Western Cape province.	Three community based health care programs were compared, 1517 households were interviewed in these areas, cost analysis of CHW program for the year 1994/95 fiscal year was done, compared with National Progressive Primary Health Care Network Training Centre (NPPHCN-TC)	The average cost for initial training at the NPPHCN-TC was approximately R17,000 per CHW during 1994 and R10,000 during 1995 and the average cost per visit to a CHW ranged from R11 to R35. For the three peri-urban CHW programs, the average cost per home visit was R26, R28, and R27 respectively. On average the cost of visiting an outpatient in a community health clinic is R55 and a normal clinic is R30. A patient visit to a CHW was generally less costly than a CHW home visit. CHWs average costs were less costly in the peri-urban areas than in rural areas.
5	(Khan et al., 2000)	Bangladesh	To estimate the additional time required for existing health worker to complete IMCI guidelines and also to estimate the number of new community health workers required for the same.	Data collection over a period of four months at two levels: at the CHW level a sample of 1,921 cases, and 3,584 cases at the paramedic level.	CHW took less than 20 min of time to examine 87 percent of children under IMCI guidelines. CHWs spent more time on diarrhea/ dysentery. With this an estimate of 4 to 6 hours per day was necessary for providing care. An estimate of 240 working hours per year would cost US$ 992.
6	(Ismail et al., 2003)	Kenya	Evaluation of CB- nutrition programme	Review on community food and nutrition programme	Low monetary incentive Increase dropouts 50 families to be covered ZW$ 500 (US$ 10)/ CHW

Sl No	Author	Country	Research questions/ Conceptual frame	Methodology	Results/issues
7	(Harter & Leier, n. d.)	Canada	The impact of new economy on CHWs, income, work experience	Interview with N=836 Members of UFCW	- increase in stress due to job insecurity followed by "Health and Social Services Delivery Improvement Act" - serve more people in less time, morale affected -reduction in no. of trainings affected their performance -increase in incidents of injury -union views not addressed in new economy
8	(Brown et al., 2006)	Peru	Describing the profile of CHWs	Describe the profile of CHW Qualitative and quantitative, 1997-2002 CH projects (41) n = 171	More young males with high school graduation. Increase drop out rates among them, voluntary basis. Completely opposite to traditional healers
9	(Mack et al., 2006)	Northwest Lansing, USA	Evaluation of enrolment of uninsured into Ingham Health Plan	Using three community-based organizations and Greater Lansing African American Health Institute, qualitative interview with the CHWs and quantitative data of Ingham Health Plan was collected	To start only 50 percent of baseline adults had coverage, with the introduction of CHWs, the enrolment increased substantially not only in Ingham Health Plan but also in Medicaid.
10	(Whitley et al., 2006)	Denver Health Community Voices, USA	The purpose of the study was to evaluate the financial effectiveness of CHW interventions with a population using a public safety net system; using return on investment way of cost analysis	A sample of all clients who began working with a CHW between January 1, 2003 and June 30, 2004 and had patient activity within the Denver Health system prior to their initial involvement with the CHW. Pre-intervention baseline data consisted of clients' utilization and charges that occurred during the 9 months before the initial intervention of a CHW.	Pre-intervention cost $5,343,135, Post-intervention $5,043,808 Increase in total visits from 5211 to 6630, statistically significant, was found in primary care.
11	(Perez et al., 2006)	New York, USA	Evaluate the experiences of CHWs for health insurance, child immunizations, and asthma management from 2000-2005	Descriptive and qualitative methods used to demonstrate the extent and impact of the training programs on CHWs, the participating organizations, and community residents	200% increase in insurance enrollment, 32% increase in asthma management, 16% immunization
12	(Witter et al., 2007)	Ghana	Assess the impact of exemption of delivery fee scheme on health workers and TBAs	A cross sectional survey was done among the health workers, doctors, nurses, community health nurses and TBAs. The structured questionnaire was used to capture the household characteristics, income, working hours, and views about the exemption of the scheme.	The results showed that the professionals increased their working hours with relative increase in workload counterbalanced by increase in pay. The TBA suffered the most with the exemption of the scheme.

Table 6. The SWOT analysis of Community Health Worker programmes

Strength	✓ CHWs are highly respected and valued in the communities by involving themselves in the community activities (Brown et al., 2006; Swider, 2002) ✓ Community based antenatal care approach has positive results (Homer et al., 2000) ✓ LHWs are effective in providing modern contraceptives in rural areas (Douthwaite & Ward, 2005) ✓ Empowerment of low income women (Kovach et al., 2004) ✓ CHWs can be trained to perform wide range of PHC activities (Campos et al., 2004) ✓ Promote equitable access to care (Berman based, 2003) ✓ Cost effective way of reaching underserved and inaccessible population (Walker & Jan, 2005; Andrews et al., 2004; Berman et al., 1987) ✓ CHWs are part of the community, experience the same problems and can promote community organizations to confront the basic cause of ill health (Cruse, 1997) ✓ Provide culturally appropriate health education and information by teaching concepts of health promotion and disease prevention (NRHA, 2000) ✓ Highly accessible and highly trusted as CHW resides in the same village (Werner, 1977) ✓ Low or no charges for service (Werner, 1977) ✓ More effective than professionals in treating primary care (Werner, 1977)
Weakness	✓ More concentration on curative treatment (Thomason & Kolehmainen-Aitken, 1991) ✓ CHW selection, not known to community, lack of logistic support, lack of incentives to maintain records, no incentive for working (Stekelenburg et al., 2003) ✓ Complexity of guidelines for management of sick children (Kelly et al., 2001) ✓ Non-standardization / certification of CHW education (Doherty & Coetzee, 2005) ✓ Not recognized as legitimate providers (National Human Services Assembly, 2006) ✓ Absenteeism, poor quality of work, low morale, weak organizational and managerial issues; have resulted in lower performance of CHW (Berman, 1984; Berman et al., 1987; McElmurry et al., 2002) ✓ Low community participation, villagers not involved in identification of problems and lesser duration of training lowered the performance (Sauerborn et al., 1989) ✓ Lack of definite work schedule (Sringernyuang et al., 1995) ✓ Programs must be adequately funded (Cruse, 1997) ✓ Lack of logistic support (Zuvekas et al., 1998)

Opportunities	✓ CHWs are becoming increasingly effective members of the health care delivery team because they are able to provide outreach services to communities that have been missed through larger mainstream organization (Leinberger-Jabari, 2005) ✓ Rewards from community have a direct effect on performance (Robinson & Larsen, 1990) ✓ Educating and motivating women to receive antenatal care showed increased utilization of health facility (Sibley & Sipe, 2004) ✓ Integrating TBAs and LHWs with health care system would reduce perinatal mortality and maternal deaths (Jokhio et al., 2005) ✓ CHWs gained valuable work experience (Roman et al., 1999) ✓ Increased under-five immunization coverage (Chopra & Wilkinson, 1997) ✓ Increased utilization of health facility and enrollment into health insurance (National Human Services Assembly, 2006) ✓ Act as a two way referral mechanism between community and the professionals at the health system (Ro et al., 2003)
Threats	✓ Inadequate training, service bias and poor motivation would lead to lower levels of confidence among CHWs (Bentley, 1989) ✓ Politicization of conflict issues between different providers would hamper the role of CHWs to meet objectives (Twumasi & Freund, 1985; Zuvekas et al., 1998) ✓ Lower levels of trust in CHWs and lack of intersectoral collaboration will lead to bypassing CHWs for referrals (Sauerborn et al., 1989; Cruse, 1997) ✓ If the felt needs of the community are not addressed by the programs (Wayland, 2002) ✓ Non-financial incentives not accounted for as motivating factors for performance by CHWs (Dieleman et al., 2003) ✓ Lack of government policies, poor interpersonal relations with the government health staff, community and professionals, lack of supervision and continued support, will add to poor performance (Campos et al., 2004; Gilson et al., 1989) ✓ Lack of defined roles and responsibilities of health workers in relation to CHWs (National Human Services Assembly, 2006; Zuvekas et al., 1998) ✓ If CHW observed as a part of publicly funded health system, they lose the instinct to serve the community (Low & Ithindi, 2003) ✓ No existing functional health infrastructure hampers referrals (Bentley, 1989; Zuvekas et al., 1998) ✓ To work continuously as CHW without expecting any change in designation (Sringernyuang et al., 1995) ✓ Willingness of the community to retain CHW scheme (Sringernyuang et al., 1995) ✓ Considering monitory incentive as “salary” would increase drop out rates (Ismail et al., 2003) ✓ When CHWs are seen as cheap substitutes for the regular health staff this leads to death of the program (Cruse, 1997) ✓ Low patient demand and competing interest result in attrition (Gray & Ciroma, 1988)

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