Original Article

Assessing the knowledge and skill of ASHA community health workers in blood pressure measurement and primary care of hypertension

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Abstract

Introduction: India has a high burden of hypertension, and community health workers (CHWs) can contribute to its primary care. Studies of small-scale interventions have shown that trained CHWs can be useful contributors to hypertension care. No assessments are available in India on effectiveness of CHW training when conducted on a large scale. **Methods:** A study was conducted in Chhattisgarh, where 38,000 Accredited Social Health Activist (ASHA) CHWs had been trained in blood pressure (BP) measurement and counselling skills related to hypertension. The study involved a skill test and a knowledge test with ten points each, administered to two representative samples of trained CHWs – 433 in rural areas and 422 in urban slums. **Results:** The mean skill score out of 10 was 7.79 (7.59–7.99) and 8.11 (7.93–8.29) for the rural and urban CHWs, respectively. Around 75.3% (71.0–79.1%) of the rural and 80.3% (76.2–83.9%) of urban CHWs were able to score 70% (7 out of 10) or higher in the skill test. The mean knowledge score out of 10 was 8.18 (8.04–8.33) and 8.82 (8.78–8.93) for the rural and urban CHWs, respectively. Around 83.2% (79.3–86.4%) and 95.0% (94.4–96.7%) of the rural and urban CHWs, respectively, were able to score 70% or higher in the knowledge test. **Conclusion:** The ASHAs in Chhattisgarh demonstrated the necessary competence to contribute to BP measurement and primary care of hypertension. It shows feasibility of training a large number of CHWs in such skills. Efforts to equip and support the 1 million strong cadre of ASHAs across India need to be speeded up.

Keywords: Accredited Social Health Activist, blood pressure, community health workers

Background

According to the global estimates for 2023, around 1.28 billion people aged 30–79 years have hypertension and two-third of them live in the low- and middle-income countries (LMICs).[1] Hypertension is the most common non-communicable disease (NCD).[1] The global prevalence of hypertension has doubled between 1990 and 2019, and the LMICs including India and China accounted for a big share of this increase.[1-3] The estimated prevalence of hypertension among the population aged 30–79 years was 31.1% in India, close to the global average of 33.1%.[3] In India, around 220 million individuals are estimated to have hypertension.[4]

For effective management of hypertension, it is necessary that the disease is identified in time and treatment is initiated and follow-up is ensured with regular blood pressure measurements.[5] Timely identification of hypertension requires that the entire population above the age of 30 years is screened annually for

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hypertension.[5] This is a mammoth task for a country with 1.4 billion population. The community health workers (CHWs) can play a significant role in this regard if they are equipped to measure blood pressure (BP). India launched a national initiative on comprehensive primary health care in 2018. It assigned a key role to the CHWs known as the Accredited Social Health Activists (ASHAs), including in the primary care for NCDs such as hypertension.[5,6] The NCD training modules for ASHA, designed nationally under the above initiative, included the skill of measuring BP.[6] However, the national guidelines left it to the states to decide whether to equip ASHAs in BP measurement.[5,6]

There is a small set of studies available on equipping ASHAs in BP measurement. An intervention study showed that ASHAs were able to gain substantial knowledge on community counselling for hypertension when a training was provided to them on those actions.[7] Another intervention study found that ASHAs were able to deliver advice and measure BP by conducting group meetings of known cases of hypertension.[8,9] Another intervention study equipped ASHAs in BP measurement and found that ASHAs played a positive role in identification of new cases and better BP control among the known cases of hypertension.[10] Another study showed that equipping ASHAs in BP measurement was effective in improving BP control.[11]

All the existing studies on ASHA and BP measurement have been small-scale intervention studies. None of them have focused on a situation where a large number of ASHAs had got trained through routine government mechanisms. It is not known how far the large-scale efforts to train ASHAs are successful in imparting them the knowledge and skills useful for primary care of hypertension. The current study was aimed at addressing this gap.

The state of Chhattisgarh in India has been a pioneer in implementation of CHW programmes. It has more than 70,000 CHWs known as Mitanins, and they are part of the national ASHA programme. The state trained 38,000 of the above CHWs in measuring BP and equipped them with digital monitors. The trained Mitanins are expected to screen individuals above the age of 30 years by measuring BP and referring those with high BP to primary health facilities. In addition, they are expected to measure BP of the existing cases of hypertension each month and refer the cases having high BP. They provide advice to individuals and communities on risk factors for hypertension. They also counsel the hypertension cases on importance of taking their medication regularly.

The training of Mitanin CHWs was implemented in two phases – the CHWs in urban areas were trained in 2020 and received a refresher training in 2021. The CHWs in rural areas received training once, in 2022. The current study had the following two objectives:

1. To assess the skills gained by Mitanins in measuring BP correctly.
2. To assess the knowledge of Mitanins on their role in primary care of hypertension including providing advice for prevention, screening, and follow-up.

Methods

Sampling: The study was aimed to assess the skill of a representative sample of 38,000 Mitanin CHWs trained in BP measurement. The study covered two separate samples – Mitanins working in the rural and urban areas. For a precision of 5% and a confidence level of 95%, a minimum sample requirement of 385 Mitanins each was calculated for the rural and urban areas. An additional 20% was taken to account for the non-responses. The actual survey was able to cover 433 rural Mitanins and 421 urban Mitanins.

Data Collection: A structured tool was used for data collection. It collected information on socio-demographic characteristics of Mitanins. The skill and knowledge tests were based on the national training modules for ASHA.[6] The skill checklist consisted of ten steps, each carrying one point (Annexure 1). The knowledge score was based on ten questions carrying one point each. It included three questions on risk factors and prevention, four questions on screening and identification, and three questions on follow-up of hypertension cases.

Data Analysis: The data were analysed using the STATA 15 software. Descriptive statistics was used to assess the skill score and knowledge score. The confidence intervals (CIs) at 95% were reported for key indicators. Cross tabulations were used to compare the scores achieved by Mitanins with different levels of education. To find out the association between the scores and the background characteristics of Mitanins, multi-variate ordinary least squares (OLS) regression was carried out.

Ethics approval for the study was obtained from the Institutional Ethics Committee of State Health Resource Centre.

Results

The profile of the CHWs covered in the study is given in Table 1.

Skill score

The mean skill score of rural Mitanins was 7.79 (7.59–7.99) out of the maximum possible score of 10. The mean skill score for the urban Mitanins was slightly higher at 8.11 (7.93–8.29).

Around 75.3% (71.0–79.1%) of the rural Mitanins were able to score 70% (7 out of 10) or higher in the skill test. Among the urban Mitanins, 80.3% (76.2–83.9%) scored 70% or higher.

The accuracy of BP measurement done by each Mitanin was assessed by comparing it with the measurement done for the same person by the surveyors. According to the measurement by surveyors in rural areas, 121 out of the 429 persons had high BP (>140/90 Hg). Out of these 121 persons, 4 (3.3%) were

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incorrectly measured by Mitanins as below the 140/90 Hg cutoff. Thus, 96.7% of the measurements by Mitanins were correct in terms of identifying high BP. In urban areas, the surveyors found 76 persons above 140/90 Hg and Mitanins made an error for 2 (2.6%) of them.

Association between the skill score and education attainment of Mitanin: Table 2 presents the mean score according to the level of education of Mitanins. Among the rural Mitanins, the skill score was poorer for the less educated Mitanins. In urban areas, the skill scores were similar for Mitanins with varying levels of formal education.

Table 3 presents the proportion of Mitanins scoring 70% or higher in the skill test disaggregated by level of education. Although 57.1% of the rural Mitanins with no formal education could score 70% of higher in the skill test, the proportion was significantly higher in the case of CHWs with eighth standard or higher education.

The results of OLS regression for skill score are given in Table 4. It shows that among the rural Mitanins, those belonging to the Scheduled Castes or Other Backward Classes were likely to have a greater skill score than those from the Scheduled Tribes ($P < 0.05$).

The rural Mitanins looking after a larger population were also likely to have a greater skill score ($P < 0.05$). The rural Mitanins with eighth standard or higher education were likely to have a greater skill score than those without any formal education ($P < 0.1$). In the case of urban Mitanins, none of the variables covered were associated with their skill score.

Knowledge score

The mean knowledge score of rural Mitanins was 8.18 (8.04–8.33) out of the maximum possible score of 10. The mean knowledge score for the urban Mitanins was slightly higher at 8.82 (8.78–8.93).

Around 83.2% (79.3–86.4%) of the rural Mitanins were able to score 70% (7 out of 10) or higher in the knowledge test. Among the urban Mitanins, 95.0% (94.4–96.7%) scored 70% or higher.

Association between the knowledge score and education attainment of Mitanin: Table 5 presents the mean score according to the level of education of Mitanins. Among the rural Mitanins, the knowledge score was poorer for the less educated Mitanins. In urban areas, the knowledge scores were similar for Mitanins with varying levels of formal education.

Table 6 presents the proportion of Mitanins scoring 70% or higher in the knowledge test disaggregated by level of education. Although 54.5% of the rural Mitanins with no formal education could score 70% of higher in the knowledge test, the proportion was significantly higher in the case of CHWs with eighth standard education.

The results of OLS regression for knowledge score are given in Table 7.

Table 7 shows that among the rural Mitanins, those with eighth standard or higher education were likely to have a greater knowledge score than those with less or no education ($P < 0.05$). In the case of urban Mitanins, none of

Table 1: Sample profile

	Rural CHWs (%)	Urban CHWs (%)
n	433	421
Age category of CHW		
<40 years	36.03	51.07
40 to 49 years	41.8	35.15
50 years and above	22.17	13.78
Marital status of CHW		
Married	99.31	97.15
Not Married	0.69	2.85
Social group (Caste category) of CHW		
Scheduled Tribes	19.72	11.64
Scheduled Castes	17.66	16.15
Other Backward Classes	57.11	57.96
Other castes	5.5	14.25
Education attainment of CHW		
8th standard or above	72.06	77.91
1 to 7th standard	19.63	17.81
No formal education	8.31	4.28
Experience of working as CHW		
<5 years	5.5%	5.9%
5 to 9 years	9.9%	47.0%
10 to 15 years	26.1%	47.1%
>15 years	58.5%	0.0%
Population covered by CHW		
<400	45.8%	16.9%
401 to 600	32.9%	33.7%
601 to 800	13.4%	23.0%
>800	8.0%	26.4%

Table 2: Mean skill score of Mitanin CHWs in BP measurement (with 95% CI)

Education level	Rural Mitanins (*n*=433)	Urban Mitanins (*n*=421)
8th standard or higher	8.05 (7.83-8.28)	8.17 (7.97-8.37)
1st to 7th standard	7.40 (6.91-7.90)	7.95 (7.54-8.35)
No formal education	6.57 (5.83-7.32)	7.94 (7.11-8.78)
All	7.79 (7.59-7.99)	8.11 (7.93-8.29)

Table 3: Proportion of Mitanin CHWs scoring 70% or higher in BP measurement skill (with 95% CI)

Education level	Rural Mitanins (*n*=433)	Urban Mitanins (*n*=421)
8th standard or higher	78.8% (73.9%-83.0%)	81.7% (77.1%-85.5%)
1st to 7th standard	72.0% (61.2%-80.7%)	77.3% (66.4%-85.5%)
No formal education	57.1% (40.3%-72.5%)	72.2% (47.3%-88.3%)
All	75.3% (71.0%-79.1%)	80.3% (76.2%-83.9%)

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Table 4: Results of OLS regression for skill score of rural and urban CHWs

Skill score	Rural CHWs (*n*=433)			Urban CHWs (*n*=421)		
	Coef.	*P>t*	95% CI	Coef.	*P>t*	95% CI
Age category						
<40 years	Ref			Ref		
40-49 years	-0.062	0.807	-0.563 to 0.439	-0.237	0.240	-0.634 to 0.159
50 years	0.356	0.267	-0.274 to 0.987	-0.194	0.493	-0.751 to 0.362
Social group						
Scheduled Tribes	Ref			Ref		
Scheduled Castes	0.996	0.005	0.299 to 1.692	0.067	0.848	-0.623 to 0.757
Other Backward Classes	0.753	0.013	0.157 to 1.349	0.211	0.472	-0.367 to 0.790
Others	0.547	0.289	-0.466 to 1.559	0.296	0.413	-0.413 to 1.004
Education						
No formal education	Ref			Ref		
1-7th standard	-0.460	0.090	-0.993 to 0.072	-0.203	0.403	-0.681 to 0.274
8th standard and above	-0.738	0.085	-1.578 to 0.103	-0.305	0.506	-1.207 to 0.596
Experience	-0.007	0.755	-0.052 to 0.038	-0.022	0.604	-0.106 to 0.062
Population	0.001	0.017	0.000 to 0.002	0.000	0.185	-0.001 to 0.000

Table 5: Mean knowledge score of Mitanin CHWs in BP measurement (with 95% CI)

Education level	Rural Mitanins (*n*=433)	Urban Mitanins (*n*=421)
8th standard or higher	8.40 (8.25-8.56)	8.81 (8.68-8.94)
1st to 7th standard	7.95 (7.63-8.27)	8.80 (8.54-9.06)
No formal education	6.82 (6.23-7.41)	9.06 (8.65-9.49)
All	8.18 (8.04-8.33)	8.82 (8.78-8.93)

Table 6: Proportion of Mitanin CHWs scoring 70% or higher in BP measurement knowledge (with 95% CI)

Education level	Rural Mitanins (*n*=433)	Urban Mitanins (*n*=421)
8th standard or higher	86.7% (82.4%-90.1%)	94.5% (91.4%-96.5%)
1st to 7th standard	83.1% (73.4%-89.8%)	96.0% (88.2%-98.7%)
No formal education	54.5% (37.4%-70.7%)	100.0% (100.0%-100.0%)
All	83.2% (79.3%-86.4%)	95.0% (94.4%-96.7%)

the variables covered were associated with their knowledge score.

Discussion

The current study presents the first assessment in India of the skill and knowledge of CHWs in measuring BP and primary care of hypertension when the training was implemented on a large scale. It found that the rural Mitanin (ASHA) CHWs in Chhattisgarh had gained a significant amount of skill as well as knowledge with a mean score of around 8 out of 10. Also, around 80% of the rural Mitanins were able to achieve a score of more than 7 out of 10. The results were further better for the urban Mitanins. Intervention studies in many parts of the world had shown that CHWs can make a positive impact on the primary care of NCDs including hypertension.[12-16] Earlier Indian studies involved micro interventions in training ASHA CHWs and had found that they can gain the requisite skills and contribute significantly to improving the primary care of hypertension.[7-11] The current study shows that it is feasible to train a large number of ASHA CHWs to do so. There is a significant amount of evidence that ASHAs including Mitanins in Chhattisgarh have been effective in improving the care for maternal and child health.[17-21] Studies have shown that Mitanins have contributed significantly to improving coverage and equity in the primary care for communicable diseases.[22,23] The current study shows that ASHA CHWs can extend their success to NCDs as well.

Though many among the less educated CHWs were able to gain the requisite skill, the proportion was greater among the eighth standard pass CHWs. Though around 75% of the rural Mitanins could score well, the study shows the need to further support the CHWs belonging to vulnerable social groups to gain the necessary level of competence. The urban CHWs showed higher skill and knowledge scores than their rural counterparts. It could be due to two rounds of training received by urban CHWs as compared to only one round for the rural CHWs. It indicates the importance of reinforcing the training of CHWs through periodic refreshers. Adequate supportive supervision has also been emphasised in the literature on building skills of CHWs.[24] In Chhattisgarh, the success could be due to strong systems of training and providing hand-holding support to the Mitanins through their supervisory cadres.[21]

Studies have shown that India is yet to achieve a satisfactory coverage in ensuring primary care of hypertension.[25,26] A 2019 review had estimated that 58.3% of women and 68.3% of men with hypertension in India were unaware that they have the condition.[2] One of the key reasons underlying the poor coverage in India is the paucity of medical workers and facilities deployed to undertake this task.[26] India has a large population that needs to be screened for hypertension. The age group above 30 years constitutes around 38% of the population.[5] Around 31% of the screened adults (>30 years age) are expected to be hypertensive, and after diagnosis, they require a monthly measurement of BP.[3]

Table 7: Results of OLS regression for knowledge score of rural and urban CHWs

Knowledge Score	Rural CHWs (*n*=433)			Urban CHWs (*n*=421)		
	Coef.	*P>t*	95% CI	Coef.	*P>t*	95% CI
Age category						
<40 years	Ref			Ref		
40-49 years	0.162	0.361	-0.186 to 0.510	0.117	0.363	-0.135 to 0.369
Above 50 years	0.393	0.075	-0.039 to 0.825	0.161	0.372	-0.193 to 0.514
Social group						
Scheduled Tribes	Ref			Ref		
Scheduled Castes	0.297	0.224	-0.183 to 0.776	-0.044	0.845	-0.482 to 0.395
Other Backward Classes	0.778	0.000	0.366 to 1.190	-0.034	0.854	-0.402 to 0.333
Others	0.401	0.257	-0.294 to 1.096	0.050	0.827	-0.400 to 0.500
Education						
No formal education	Ref			Ref		
1-7th standard	-0.432	0.021	-0.797 to -0.067	-0.023	0.880	-0.327 to 0.280
8th standard and above	-1.324	0.000	-1.911 to -0.737	0.242	0.406	-0.330 to 0.815
Experience	-0.018	0.248	-0.050 to 0.013	-0.037	0.168	-0.091 to 0.016
Population	-0.001	0.000	-0.001 to 0.000	0.000	0.342	0.000 to 0.001

In a population of 5000, it translates into around 1800 persons to be screened per year or 150 per month. If the entire population gets screened, around 500 hypertension cases are likely to be found who would require a monthly BP measurement. Thus, a population of 5000 would require around 650 BP measurements in a month. While the rich population is increasingly buying digital BP monitors to monitor BP at home, economic and literacy constraints are likely to limit this trend in India's rural areas and urban slums. A large part of Indian population will continue to require government services for their BP measurement.

Recently, Health and Wellness Centres have been created by the government at 5000 population by adding a Community Health Officer (CHO) to the existing sub-health centres.[6] It will be very difficult for one CHO to carry out 650 BP measurements in a month considering that they have many other conditions and tasks to perform in addition to hypertension-related work. But the ASHAs act as the extended team of a Health and Wellness Centre and there are at least five ASHAs available per 5000 population. The Health and Wellness Centre can move closer to meeting the workload if ASHAs gain the capacity to measure BP along with providing the necessary advice to communities and known cases of hypertension. The policy to equip ASHAs to measure BP so far does not seem to be implemented pro-actively. No monitoring data are available to find out the number of ASHAs in different states who have been provided BP monitors along with the training. The current study suggests the need to encourage all states to do so in a time-bound manner.

Learning new skills can be useful for the ASHA CHWs too. The motivation levels of CHWs including ASHAs improve when they get opportunities to learn new skills. Studies have shown that skills help CHWs in gaining greater recognition and respect in the communities and health systems.[27] The National Health Mission has introduced a small cash incentive for ASHAs for facilitating identification and regular follow-up of NCDs including hypertension. If ASHAs are equipped to measure BP, it will add value to the quality and effectiveness of their existing efforts with respect to primary care of hypertension.

Further research is recommended to assess the effectiveness of large-scale CHW-based interventions in achieving greater coverage and control of hypertension and other NCDs.

Limitations: It was a descriptive study. It was able to assess competence of ASHAs but did not assess aspects such as the population coverage and effectiveness in terms of better outcomes.

Conclusions

The ASHA CHWs in Chhattisgarh demonstrated the necessary knowledge and skills to contribute to BP measurement and the primary care of hypertension. It shows feasibility of training a large number of CHWs to perform such tasks. Efforts to equip, train, and support the 1 million strong cadre of ASHA CHWs across India need to be speeded up to meet the workload on primary care of hypertension.

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Conflicts of interest

There are no conflicts of interest.

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