Original article

Factors associated with low performance of Accredited Social Health Activist (ASHA) regarding maternal care in Howrah district, West Bengal, 2015–'16: An unmatched case control study

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ABSTRACT

Introduction: To improve access to basic health services, Government of India, in 2005, inducted Accredited Social Health Activist (ASHAs) as community health workers. Evaluation of ASHA program in Howrah district of West Bengal indicated low performance of ASHAs in providing maternal care. We conducted an unmatched case-control study to identify factors associated with low performance of ASHA in Howrah district.

Methods: We categorized 993 ASHAs as low (cases) and 994 as adequate (controls) performing, based on average incentive received by each ASHA, and randomly selected 261 cases and 261 controls. We interviewed ASHAs to collect information about factors influencing their performance including socio-economic details, workload, training and support and supervision. We calculated crude and adjusted odds ratios with 95% confidence intervals using simple and multiple logistic regression respectively.

Result: Compared to adequate performing ASHAs, low performing ASHAs were more likely to serve larger population than the recommended norm of 1200 [OR: 1.8; 95%CI: 1.2–2.5] or got less supervisory visits by Auxiliary Nurse and Midwife (ANM) in field [OR: 1.75; 95%CI: 1.03–2.98], did not have any stocks of Iron Folate tablets (IFA) [OR: 4.85; 95%CI: 1.37–17.1] and belonged to religious minority [OR: 2; 95%CI: 1.26–3.35].

Conclusion: Low performance of ASHAs was associated with population overburden, not having IFA in stock, less field visit by ANM and religious minority in Howrah district. For improving performance of ASHAs, we recommended recruiting new ASHA, ensuring uninterrupted IFA supply and strengthening supporting supervision. These measures need to focus on ASHAs belonging to Muslim religion.

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1. Introduction

WHO defines Community Health Workers (CHW) as the members of the communities where they work, selected by the communities, answerable to the communities for their activities, supported by the health system but not necessarily a part of its organization and have shorter training than professional workers.¹ Several countries, especially the low-income countries, have effectively used CHWs to address the shortage of health workers.^{2–5} There have been innumerable experiences of using CHWs in health care delivery throughout the world with programs ranging from large-scale national programs to small-scale community-based initiatives. The evidence from these experiences

indicate that CHWs can make a valuable contribution to community development and, more specifically, can improve access to and coverage of communities with basic health services. CHWs can undertake actions that lead to improved health outcomes.^{4–8} CHWs have been used in maternal and child health care including reproductive health and family planning; malaria control; TB care; HIV/AIDS care and treatment of acute respiratory tract infections (ARI).^{4,6,9,10}

India has a long history of small and large scale CHW programs. The first national CHW scheme launched in 1978 was aimed to provide adequate health care to rural people and to educate them in matters of preventive and promotive health care. This scheme however did not yield expected results.¹¹ In 2005, the Government of India, as a part of the National Rural Health Mission (NRHM), launched another CHW program aimed at providing every village in the country with a trained female community health activist called as Accredited Social Health Activist (ASHA). Panchayat Raj

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Institution (PRI) members select ASHAs among the married or widowed or divorced women aged between 25–45 years with a minimum educational qualification of eighth standard. ASHAs are trained Social Health Activist who work as an interface between the community and the public health system. The key tasks of ASHAs include to generate awareness on existing health services to the community, to counsel women on care during and after pregnancy, to escort pregnant women & children requiring treatment/admission to the nearest pre-identified health facility, to provide primary medical care for minor ailments, to act as a Directly Observed Treatment (DOT) provider under Revised National Tuberculosis Control Program (RNTCP), to act as a depot holder for Oral Rehydration Therapy (ORS), Iron Folic Acid Tablet (IFA), Oral Pills & Condoms, etc. and to promote other ongoing health programs.

Each ASHA is a voluntary worker, who besides a fixed honorarium Rupees 1500/–, also receives performance-based incentives mainly for promoting Reproductive & Child Health (RCH) Program. They motivate pregnant women to register for antenatal check-up (ANC) within 12 weeks of gestation and help them complete all ANC visits in due time, escort pregnant women for institutional delivery and visit post-natal mother up to 42 days. They motivate eligible children in completing vaccination as a part of Universal Immunization Program (UIP), act as DOT provider in RNTCP and promote other healthcare programs. ASHA submits performance report to Auxiliary Nurse and Midwife (ANM) on 20th of every month. ANM checks the monthly incentive reports and Health Supervisor verifies it and sends to the block health authority. Then Block Medical Officer of Health (BMOH) disburses the monthly incentive to ASHA which is directly deposited into her bank account.

In 2011, the Ministry of Health and FW evaluated the ASHA program in eight Indian states namely Andhra Pradesh, Assam, Bihar, Jharkhand, Kerala, Orissa, Rajasthan and West Bengal. The findings of this evaluation indicated that ASHA contributed in delivering Maternal and Child Health (MCH) care – ASHAs visited 57–97% of pregnant women during antenatal period, counselled about 68–92% of them on all aspect of pregnancy, accompanied 72–91% of pregnant women during delivery and visited 80% of newborn. The overall performance of ASHA in the state of West Bengal was low with only 7% ASHAs escorted women to the facility at the time of delivery, and only 14% ASHAs visited newborn on the first day and 24% visited on second day of birth. About 60–80% of complicated pregnancies were accompanied by ASHA.¹²

During the evaluation of ASHA program in Domjur and Panchla blocks of the Howrah district of West Bengal in 2015, the

performance of ASHA in delivering MCH care was found to be low.¹³ It was observed that ASHA visited only 42% of the 79 pregnant women surveyed within 12 weeks of gestation, escorted 56% of previously counselled women to institutional delivery and none of them assisted Skilled Birth Attendant (SBA) at the time of delivery at home. Of 106 post-natal mothers surveyed, only 19% adopted practice of postnatal care taught by ASHA.

With this background, we conducted an unmatched case control study in Howrah district, West Bengal with the objective of identify the factors associated with low performance of ASHA with respect to maternal care.

2. Methods

2.1. Study setting

We conducted the study in Howrah district, which is situated adjacent to Kolkata, the capital of West Bengal. The district has a population of about 4.85 million (Census 2011). As per data obtained from Howrah district health authority, total of 1987 ASHA were working in the district as on 1st October 2015.

2.2. Study design

We conducted an unmatched case-control study. We categorized ASHAs working in Howrah district into low and adequate performing, based on their relative performance in providing maternal care. We compared the low and adequate performing ASHAs to identify the factors influencing the performance of ASHA with respect to maternal care.

2.3. Low (cases) and adequate (controls) performing ASHAs

As per the Comprehensive incentive package guidelines of NRHM, ASHAs receive performance-based incentives for the services rendered. For the maternal care provided in her service area, ASHAs receive monthly incentive for the 12 services (Table 1). We reviewed records of all the sub-centres having ASHA in Howrah district and extracted information about receipt of incentives for each of the 12 indicators of maternal care received during April to September 2015. We then calculated the total incentive received by each ASHA during this period. This was the numerator for calculation of average incentive received by ASHA.

For denominator to calculate the average incentive received by ASHA, we considered the total pregnant women registered by ANM in the service area of ASHA during June 2014–September 2015. The

Table 1
Amount of incentives received by ASHAs for providing Maternal Care as per NRHM guideline.

Sl.	Indicators of maternal care	Incentives
1.	Attendance in the Village Health and Nutrition Day and Mobilizing Beneficiaries	Rupees 200 per month
2.	Attending sub-center on all Wednesdays and preparation/updating the list of ANC beneficiaries	Rupees 100 per month
3.	Attending sub-center on all Wednesdays and preparing/updating list of eligible couples	Rupees 100 per month
4.	Number of pregnant women who registered within 12 weeks with ANM, among those who completed 4 antenatal check-ups	Rupees 100 per pregnant woman
5.	Number of pregnant women received complete ANC among those who registered within 12 weeks	Rupees 200 per pregnant woman
6.	Number of pregnant women escorted by ASHA and admitted to health facilities for institutional delivery	Rupees 300 for escorting each institutional delivery
7.	Number of home delivery cases where timely visit of newborns (14 days old) and post-natal mother conducted on 1st, 3rd, 7th & 14th days respectively	Rupees 175 for each timely visit of newborns (14 days old) and post-natal mother
8.	Number of Institutional delivery cases where timely visit of newborns (14 days old) and post-natal mother conducted on 1st, 3rd, 7th & 14th days respectively	Rupees 175 for each timely visit of newborns (14 days old) and post-natal mother
9.	Number of cases where timely visit of newborns (42 days old) and post-natal mother conducted on 21st, 28th, and 42nd days respectively	Rupees 75 for each timely visit of newborns (42 days old) and post-natal mother
10.	Number of cases where the client has been escorted to the health facility for Post-partum IUCD insertion	Rupees 150 for escorting Post-partum IUCD insertion to the health facility
11.	Minimum 2 Village level meeting with beneficiaries organized in a month	Rupees 100
12.	Attended 3rd weekly meeting with ANM at sub-center and submission of monthly report	Rupees 100

rationale for using this reference period was that, maternal care includes a range of services starting from ANC registration to postnatal visit, the maximum time span of which could be 10 months. We extracted information about total pregnant women registered by ANM using the Maternal and Child Tracking System (MCTS) register available at the sub-centre.

We then calculated the average incentive received by ASHA per 10 pregnant women registered using the following formula:

Average incentive received by ASHA per 10 pregnant women

$$= \frac{\text{Incentive received by one ASHA for providing maternal care from April to September 2015}}{\text{Total number of pregnant women registered for ANC by the ANM from June 2014 to September 2015}} \times 10$$

We line-listed ASHAs by the average incentive received by them, arranged them in descending order and calculated the median incentive per 10 pregnant women. For our case control study, cases were low performing ASHAs who earned incentive below the median value of average incentive per 10 pregnant women and controls were adequate performing ASHAs who earned incentive equal to or more than median value of average incentive per 10 pregnant women.

2.4. Sampling procedure

We collected line list of 1987 ASHAs from the district health authority along with information about population served by them (as per the data from the office of Chief Medical Officer, Howrah district). We also collected information about incentives received by ASHA with respect to maternal care during April to September 2015 from the district health authority. We categorized them into low performing (cases, n=993) and adequate performing (controls, n=994) according to the average incentive received per 10

pregnant women, as described above. We randomly selected the required number of low and adequate performing ASHAs using random number table.

2.5. Sample size

For the calculation of sample size, we considered population served by each ASHA (NRHM norm: <1200 population per ASHA)

as an exposure variable. Among the 994 ASHAs with adequate performance (controls), 33.4% served a population of 1200 or more as per the data obtained from district health authority. Assuming 95% power with 95% confidence interval, we required 237 cases and 237 controls. We inflated the sample size by 10% to account for the non-response. Our final sample size was 261 cases and 261 controls. We used open epi software version 3.02 for calculating sample size (Fig. 1).

2.5.1. Data collection

Principal investigator interviewed ASHAs using pre-tested semi-structured questionnaire to collect information about various factors influencing her performance as summarized in Fig. 2. We collected information about the population currently served by ASHAs during the reference period of April to September 2015 through interview and found half of the ASHAs in control group was overburdened with more than 1200 population. But we found one third of ASHAs in control group was overburdened as per available district data. Information about the supervisory visits of

Fig. 1. Sampling procedure for selecting low (cases) and adequate (controls) performing ASHAs in Howrah district, West Bengal.

Fig. 2. Factors influencing Performance of ASHAs in Howrah district, West Bengal in 2016.

Block Medical Officer of Health (BMOH), Auxiliary Nurse and Midwife (ANM) and GP health supervisor was collected from the sub-centre visit book and from ASHA dairy. Information about the support received from AWW in updating Eligible Couple Register (ECR), list of pregnant mother with IUGR, making arrangement for mothers meeting and nutritional counselling for mother was collected from ASHA diary. Information about Induction training and on-the-job field training was collected from ASHA, the later was verified this information from office record of district health authority.

2.5.2. Data analysis

We entered the data in MS-Excel and analysed using Epi Info software (version 7.1.4). We tested the proportion using Chi square test and calculated the crude odds ratios with 95% confidence intervals (CI) for univariate analysis for each exposure variable. P-value < 0.05 was considered statistically significant.

Based on exposure variables with p value of ≤ 0.2 in univariate analysis, we identified covariates to build a separate conceptual model (Directed Acyclic Graphs) for each of the predictors of low performance of ASHAs. To identify confounders and effect

modifiers we examined the difference of -2 Log Likelihoods within the conceptual model after including the potential confounders. We calculated adjusted odds ratios using unconditional logistic regression after taking care of any effect of confounders or effect modifiers.

2.6. Quality assurance

We placed our study protocol for peer-review. We translated the questionnaire into Bengali and back-translated it to English to check for conformity. We pilot-tested the questionnaire on five ASHAs from the neighbouring district.

2.7. Human subject protection

The institutional ethics committee of National Institute of Epidemiology (ICMR), Chennai approved to conduct this study. We took permission from State and District level health authority. Prior to the interview, we obtained written informed consent from the ASHA. We explained her about objective of survey, method, risk, benefit and confidentiality of this study. To maintain

confidentiality, we used identification code (ID code) for each ASHA and assured them that we would not mention their name and place of posting anywhere in our study.

3. Result

We interviewed 256 low performing (cases) and 255 adequate performing ASHAs (controls).

3.1. General characteristics of low performing ASHAs

Of the 256 low performing ASHAs, 40% were aged less than 38 years, 22% were Muslim, 20% belonged to SC/ST, 48% and 50% were educated up to 10th and 12th grade respectively and 97% were married. The low and adequate performing ASHAs did not differ with respect to age ($\chi^2=0.02$, p value=0.88), caste ($\chi^2=0.59$, p value=0.43), educational ($\chi^2=2.69$, p value=0.26) or marital status ($\chi^2=3.81$, p value=0.06). These two groups were however significantly different with respect to religion with higher proportion of low performing ASHAs belonging to Muslim religion ($\chi^2=8.86$, p value=0.003) (Table 2).

3.2. Univariate analysis

3.2.1. Socio-demographic factors

Compared to adequate performing ASHAs, low performing ASHAs were more likely to belong to religious minority [OR: 2; 95% CI: 1.2–3.3]. Other socio-demographic factors like age, caste, marital status, having nuclear family, having children under five years of age, residence within service area, representing caste-majority in her area, educational status, family income and having source of income other than ASHA job were not significantly associated with the performance of ASHA (Table 3a).

3.2.2. Workload on ASHAs

Low performing ASHAs were more likely to cater to a population of 1200 or more (overburdened population) [OR: 1.8; 95%CI: 1.2–2.5] compared to adequate performing ASHAs. The time required to walk from her home to the last house in her service area was not significantly associated with the performance of ASHA (Table 3b).

3.2.3. Support and Supervision on ASHAs

Compared to adequate performing ASHAs, low performing ASHAs were more likely to get less visit by ANM in field [OR:

1.7;95%CI: 1.03–2.98] or more likely to not having IFA in ASHA stock [OR: 4.8;95%CI: 1.3–17.1]. Other factors like BMOH visit, AWW support, having thermometer and weighing scale in stock were not significantly associated with the performance of ASHA (Table 3b).

3.2.4. Training and Selection process of ASHAs

Factors like duration of induction training, on-the-job training and gram sabha interview (interview for selection of ASHA) were not significantly associated with the performance of ASHA (Table 3b).

3.3. Multivariate analysis

Eight variables with P-value less than 0.2 in the univariate analysis were considered for multivariate analysis.

3.4. Stratified analysis

From these eight variables, we identified covariates to build a separate conceptual model for each of the predictors of low performance of ASHAs. Factors such as religious minority, overburdened population, less number of supervisory visits by ANM and not having IFA in stock were independent risk factors for low performance of ASHA (Table 4). As per the Directed Acyclic Graphs (Fig. 3) religion was a potential confounder for the association between (a) educational qualification up to 10th standard and 12th standard and low performance of ASHA and (b) not getting support from AWW and low performance of ASHA (Table 4). When adjusted for religion, education status [AOR: 2.03; 95%CI: 0.68–6.09] and not getting support from AWW [AOR: 1.25; 95%CI: 0.88–1.79] were not significantly associated with the performance of ASHA (Table 4).

4. Discussion

In 2011, the Ministry of Health and FW evaluated the ASHA program in eight Indian states namely Andhra Pradesh, Assam, Bihar, Jharkhand, Kerala, Orissa, Rajasthan and West Bengal. The findings of this evaluation indicated that ASHA contributed in delivering Maternal and Child Health (MCH) care – ASHAs visited 57–97% of pregnant women during antenatal period, counselled about 68–92% of them on all aspect of pregnancy, accompanied 72–91% of pregnant women during delivery and visited 58–80% of newborn. The performance of ASHA in the state of West Bengal was low with only 7% ASHAs escorted women to the facility at the time

Table 2
Proportion of exposures among low and adequate performing ASHAs in Howrah district, West Bengal, India, 2016.

Exposures		Cases (N = 256)		Controls (N = 255)		Chi ²	df	P value
		n	%	n	%			
Sociodemographic factors								
Age	<38 years	102	39.84	100	39.22	0.02	1	0.88
	>=38 years	154	60.16	155	60.78			
Religion	Muslim	55	21.48	30	11.76	8.68	1	0.003
	Hindu	201	78.52	225	88.24			
Caste	SC/ST	52	20.31	59	23.14	0.59	1	0.43
	Other caste	204	79.69	196	76.86			
Educational Status	Passed 8th standard	5	1.95	11	4.31	2.69	2	0.26
	Passed 10th standard	124	48.44	127	49.8			
	Passed 12th standard or higher	127	49.61	117	45.88			
Marital status	Married	247	96.48	236	92.55	3.81	1	0.05
	Divorced/Widowed	9	3.52	19	7.45			

Bold values are statistically significant.

Table 3a

Univariate analysis of exposures among low and adequate performing ASHAs in Howrah district, West Bengal, 2016.

Exposures		Cases (N = 256)		Controls (N = 255)		OR	95%	CI	P value
		n	%	n	%				
Sociodemographic factors									
Age	<38 years	102	39.84	100	39.22	1.02	0.72	1.46	0.88
	>=38 years	154	60.16	155	60.78				
Religion	Muslim	55	21.48	30	11.76	2.05	1.26	3.35	0.003
	Hindu	201	78.52	225	88.24				
Caste	SC/ST	52	20.31	59	23.14	0.84	0.55	1.29	0.43
	Other caste	204	79.69	196	76.86				
Educational Status	Passed 8th standard	5	1.95	11	4.31	1			
	Passed 10th standard	124	48.44	127	49.8	2.14	0.72	6.36	0.167
	Passed 12th std. or higher	127	49.61	117	45.88	2.38	0.8	7.07	0.116
Marital status	Married	247	96.48	236	92.55	2.2	0.98	5.21	0.05
	Divorced/Widowed	9	3.52	19	7.45				
Type of Family	Nuclear family	118	46.09	114	44.71	1.05	0.74	1.49	0.75
	Joint family	138	53.91	141	55.29				
Having under five children	Yes	30	11.72	18	7.06	1.74	0.95	3.28	0.07
	No	226	88.28	237	92.94				
Residence within service area	Yes	232	90.63	230	90.2	1.05	0.57	1.9	0.86
	No	24	9.38	25	9.8				
Representative of Caste-majority	Yes	207	80.86	209	81.96	0.92	0.59	1.45	0.74
	No	49	19.14	46	18.04				
Average family income	< Rupees 6500	120	46.88	124	48.63	0.93	0.65	1.32	0.69
	>=Rupees 6500	136	53.13	131	51.37				
Income other than ASHA job	Yes	17	6.64	21	8.24	0.79	0.4	1.54	0.49
	No	239	93.36	234	91.76				

Table 3b

Univariate analysis of exposures among low and adequate performing ASHAs in Howrah district, West Bengal, 2016.

Exposures		Cases (N = 256)		Controls (N = 255)		OR	95%	CI	P value
		n	%	n	%				
Workload on ASHAs									
Population catered	>= 1200 (Overburdened)	152	59.38	121	47.45	1.8	1.27	2.56	<0.001
	<1200	104	40.63	134	52.55				
Walking time from home to last house of her area	>=25 min	147	57.42	147	57.65	0.99	0.70	1.40	0.95
	<25 min	109	42.58	108	42.35				
Support and Supervision on ASHAs									
Visit of BMOH	Not visited	247	96.48	241	94.51	1.59	0.67	3.9	0.28
	Visited	9	3.52	14	5.49				
Field visit by ANM	Once in two months/less	41	16.02	25	9.80	1.75	1.03	2.98	0.038
	Once in a month/more	215	83.98	230	90.20				
IFA in stock	Not having IFA in stock	14	5.47	3	1.18	4.85	1.37	17.1	0.013
	Having IFA	242	94.53	252	98.82				
Support from AWW	Did not get support	130	50.78	110	43.14	1.36	0.95	1.92	0.083
	Got support	126	49.22	145	56.86				
Thermometer in Stock	Not having thermometer	55	21.48	48	18.82	1.17	0.76	1.82	0.45
	Having thermometer	201	78.52	207	81.18				
Weighing Scale in Stock	Not having weighing scale	4	1.56	1	0.39	4.02	0.5	100	0.18
	Having weighing scale	252	98.44	254	99.61				
Training and Selection process of ASHAs									
Duration of Induction training	Trained for >=12 days	241	94.14	228	89.41	1.9	0.98	3.66	0.054
	Trained for <12 days	15	5.86	27	10.59				
On-the-job training	Received	123	48.05	117	45.88	1.09	0.77	1.54	0.62
	Did not received	133	51.95	138	54.12				
Gram Sabha interview before selection	Not Conducted	4	1.56	2	0.78	2	0.35	15.7	0.41
	Conducted	252	98.44	253	99.22				

Table 4

Multivariate analysis among low and adequate performing ASHAs in Howrah district, West Bengal, 2016.

Exposures		Cases (N = 256)		Controls (N = 255)		Crude Odds Ratios			Adjusted Odds Ratios		
		n	%	n	%	Point	95% CI	P value	Point	95% CI	P value
Marital status	Married	247	96.48	236	92.55	2.2	0.98–5.21	0.05			
	Divorced/Widowed	9	3.52	19	7.45						
Religion	Muslim	55	21.48	30	11.76	2.05	1.26–3.35	0.003			
	Hindu	201	78.52	225	88.24						
Having under 5 children	YES	30	11.72	18	7.06	1.74	0.94–3.22	0.073			
	NO	226	88.28	237	92.94						
Educational Status	Passed 8th standard	5	1.95	11	4.31	1					
	Passed 10th standard	124	48.44	127	49.8	2.14	0.72–6.36	0.167	2.03 [@]	0.68–6.09	0.2
	Passed 12th stdnd/higher	127	49.61	117	45.88	2.38	0.8–7.07	0.116	2.42 [@]	0.81–7.24	0.11
Population catered	>=1200	152	59.38	121	47.45	1.80	1.27–2.56	<0.001			
	<1200	104	40.63	134	52.55						
Field visit by ANM	Once in two month/less	41	16.02	25	9.80	1.75	1.03–2.98	0.038			
	Once in a month/more	215	83.98	230	90.20						
IFA in stock	Not had IFA in stock	14	5.47	3	1.18	4.85	1.37–17.1	0.013			
	Had IFA	242	94.53	252	98.82						
Support from AWW	Did not get support	130	50.78	110	43.14	1.36	0.95–1.92	0.083	1.25 [@]	0.88–1.79	0.2
	Got support	126	49.22	145	56.86						

[@] Adjusted for Religion. **Fig. 3.** Conceptual model (Directed Acyclic Graphs; DAG) for the association between various factors and Low performance of ASHAs in Howrah district.

of delivery, and only 14% ASHAs visited newborn on the first day and 24% visited on second day of birth. About 60%–80% of complicated pregnancies were accompanied by ASHA. So, in comparison with national level, performance of ASHAs in West Bengal and more particularly in Howrah district was low. We conducted this study to find out factors associated with low performance of ASHAs in Howrah district and found religious minority, other caste, population overburden, less field visit by ANM and not having IFA in ASHAs' stock as significant risk factors. If we could take care of population overburdening on ASHAs, increase visit by ANM in the field and if we could supply IFA uninterruptedly to ASHAs, they could perform adequately in maternal care perspective of ASHA program in Howrah district.

Overburdened population was risk factors for low performance of ASHAs. While calculating sample size we found one third of ASHAs in control group were overburdened with population as per district data of 2012. But after interviewing ASHAs we found half of them in control group were overburdened. This may be because of the growth in population. Census data 2011 showing 12.5% increase in population in Howrah district. So, the coverage population for ASHAs had grown to be over the recommended population. The increase in population is largely represented by babies born within

the last five years which significantly increases the burden of work on ASHAs.¹⁴ However, program evaluation of ASHA in Uttar Pradesh revealed that 82.7% of ASHAs were overburdened. This huge gap should be filled by recruiting more ASHAs as per requirements.¹⁵

Success of CHW programmes depends on regular and reliable support and supervision. It is equally acknowledged, however, that supervision is often among the weakest links in CHW programs. Small-scale projects are often successful because they manage to establish effective support and supervisory mechanisms for CHWs.^{7,16} Periodic visit of ANM in the field has more implication on performance of ASHA, because ANMs can supervise and interacted more closely with ASHA. Less field visit by ANM was a risk factor associated with Low performing ASHAs. If the ANMs role is highlighted as a mentor of ASHAs, and if a formal organization/reporting structure for ASHAs were in place, the productivity and efficiency of these community health workers may be improved.¹⁴

Not having IFA in Subcentre stock was risk factor for Low performing ASHAs. A qualitative study from Burkina Faso showed that drug stock-outs is key barrier to performance of CHWs. Because frequent drug stock-outs undermine their credibility and cause discontent in community.¹⁷

4.1. Limitations and bias

Our study had certain limitations. Performance of ASHAs dependent on not only health system intervention factors but also on extraneous factors such as safety and security, human resource policies, legislations, political commitments etc., which we did not consider in our study as risk factors. Religion was a potential confounder for the association between (a) educational qualification up to 10th standard and 12th standard and low performance of ASHA and (b) not getting support from AWW and low performance of ASHA (Table 4). But when adjusted for religion using unconditional logistic regression we found education status of ASHAs and not getting support from AWW were not significantly associated with the performance of ASHA. So all the risk factors identified in this study were actually independently associated with low performance of ASHAs and not confounded by each other.

Since we conducted our study from November 2015 to March 2016 and we asked question about events that had happened to ASHAs during April to September 2015, there was chance of recall bias. For validating the information provided by ASHAs, we reviewed Attendance register in Subcentre, Subcentre visit book, ASHA diary, ASHA drug stock register and meeting resolution register at local gram panchayat office for recruitment process.

For minimizing interviewer bias principal investigator conducted all interviews. While administering the questionnaire, we did not allow anybody of the supervisory tiers. To minimize selection bias, we followed simple random sampling technique. To enhance external validity of our study we set our study power as 95% and interpreted results accordingly.

5. Conclusion

With the finding of our study we conclude that low performance of ASHAs was associated with religious minority, other caste, population overburden, not having IFA in ASHA stock and less field visit by ANM in Howrah district.

5.1. Recommendations

Based on our conclusion, to improve performance of ASHAs and thereby to provide enhanced maternal care in Howrah district we propose number of recommendations. We recommend to implement following suggestions specially in those areas where Muslim ASHAs predominates. We suggest local panchayat to recruit new ASHA to overcome the population overburdening on existing ASHAs. We recommend uninterrupted IFA supply to ASHAs throughout the year. We also suggest ANMs to visit field at least once in a month for each ASHA area.

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Conflicting interest

Nil.

Authors contributions

Nilanjan Mondal: Concepts, Literature search, Clinical studies, Data acquisition, Data analysis, Statistical analysis, Manuscript preparation, Manuscript editing, Manuscript review, Guarantor.

Manoj V. Murhekar: Concepts, Design, Definition of intellectual content, Literature search, Data analysis, Statistical analysis, Manuscript preparation, Manuscript editing, Manuscript review.

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