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Combating non-communicable diseases in rural Lucknow: Are the skills and knowledge of female health workers adequate?

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ABSTRACT

Background: India is facing the surging trend of non-communicable diseases (NCD). Forecasting the burden for NCDs, the Government of India (GOI) initiated a program in 2010 across the country, i.e., National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke. The GOI has envisaged the female health workers (FHW) for the last mile delivery of health services under the programme. Available literature shows that FHWs lack essential knowledge regarding chronic diseases. This study attempts to fill these gaps by studying knowledge and skills regarding NCDs among FHWs in rural Lucknow. Objectives were to explore the knowledge about NCDs among ASHAs and ANMs in rural Lucknow and to assess of skills related to NCD screening among ANMs in rural Lucknow.

Methods: It was a cross-sectional study conducted among FHWs of Lucknow, Uttar Pradesh from June 2019 to

Results: Among the FHWs, knowledge about NCDs was found to be higher for those with the age more than 40 years, with the education of higher secondary and above and also amongst those who had received previous training

Conclusions: Majority of the respondents were found to have poor knowledge regarding NCDs. Additionally, older age, training and higher education are found to be associated with good knowledge; there is a need of training of grass root level workers for them to correctly identify the symptoms and risk factors of various NCDs.

Keywords: Non-communicable diseases, Accredited social health activists, Auxiliary mid wives, NPCDCS, Female health workers

INTRODUCTION

India, like other developing countries, is facing the surging trend of non-communicable diseases (NCDs)1. Studies show that 38 million (68%) of all global deaths and about 5.87 million (60%) of all deaths in India are caused by NCDs and estimates predict a further increase in the figure by 2020.^{2, 3, 4} In India, the problem is further exacerbated by an early age of onset of NCDs, multiple underlying conditions, lack of knowledge, and insufficient health care access.5

With India still grappling with the problem of infectious and parasitic diseases, the rising numbers of NCD cases resulting in a double burden of disease present a heavy burden on health facilities, and pose a substantial challenge to the public health system in the country.6 It has become an inevitable need to address this problem at the primary health care level and there have been recommendations for a community-based approach for NCD care.^{2, 7} Forecasting the burden for NCDs, the Government of India (GOI) rolled out an umbrella program in 2010 across the country, i.e., National Programme for Prevention and Control of Cancer, Diabetes. Cardiovascular Diseases. and Stroke

(NPCDCS). Considering the critical shortages in healthcare workforce of the country, the GOI has envisaged the Female Health Workers (FHW), especially, Accredited Social Health Activists (ASHAs) and Auxiliary Mid Wives (ANMs), for the last mile delivery of health services under the programme.8,9 FHWs are set to become the backbone of primary health care service in the country due to the cost-effectiveness in comparison to other cadres of the health system and their success in delivery of essential maternal and child health, family planning and nutritional health services in the country. 8, 10, 11 Role of ASHAs under NPCDCS is to conduct a 'Complete Community Based Assessment' for NCD screening, to identify individuals with high risk behaviours, raising knowledge about NCDs and health promotion; additionally, **ANMs** also undertake 'Population-Based Screening' for various NCDs at the sub-centre level, follow-up of patients with NCDs, referring the individual who needs confirmation, reporting and recording of data.

ANMs backed up with ASHAs should have the skills to use the BP apparatus, glucometer, and to conduct 'Clinical Breast Examination' for the screening process. ^{12,13,14,15} The proportion of ASHAs trained to support population-based screening of NCDs is 42.5%. ¹⁶ There is little information describing the processes of training and supervision required to integrate and orient the female health workers into NCD care services. ¹⁷ Available literature shows that FHWs lack essential knowledge regarding chronic diseases. ¹⁸

Moreover, studies regarding their effectiveness in NCD prevention and intervention delivery in developing country settings are limited. ¹⁹This study attempts to fill these gaps by studying knowledge and skills regarding NCDs among FHWs in rural Lucknow.

Objectives of the study were to explore the knowledge about NCDs among ASHAs and ANMs in rural Lucknow and Assessment of skills related to NCD screening among ANMs in rural Lucknow.

METHODS

Study design

Cross-Sectional Study design was selected for the study.

Study area

The present study was conducted at Lucknow, Uttar Pradesh, India.

Study period

The study was conducted from June 2018 to August 2018. One month of the study period was utilized for review of literature, development of interview schedule

and pilot testing, two months for data collection, and one month for data compilation and analysis.

Study universe

The study universe consists of female health workers (FHWs) of Lucknow.

Study population

FHWs (ASHAs and ANMs) enrolled under the Public Health System of Lucknow.

Study unit

Individual ASHA and ANM enrolled under Community Health Centre (CHC), Sarojini Nagar, Lucknow.

Study setting

CHC selected in the study district of Lucknow.

Inclusion criteria

ASHAs and ANMs who gave consent for the study.

Exclusion criteria

ASHAs and ANMs did not respond/come to the CHC when called for three consecutive times.

Sample size and sampling procedure

The field practice area of the Department of Community Medicine, KGMU, under CHC Sarojini Nagar was selected. A total of 199 ASHAs and 67 ANMs were enrolled under the concerned CHC during the study period. All the ASHAs and ANMs were prior informed to come to the CHC. The CHC was visited on different days for data collection. ASHAs and ANMs who did not respond when called for three consecutive times were excluded from the study. Informed consent was obtained from the participants. They were briefed about the problem statement and its various aspects. Data was collected using a pre-designed, pre-tested, semi-structured questionnaire. A total of 152 ASHAs and 34 ANMs fulfilling the inclusion and exclusion criteria were personally interviewed.

Table 1: Female health workers who participated in the study.

FHW	Total number FHW enrolled under CHC Sarojini Nagar	Total number of FHW selected for the study	%
ASHA	199	152	76
ANM	67	34	51

Tools for data collection

A pre-tested, semi-structured, questionnaire containing information on the biosocial characteristics of the participants; questions pertaining to risk factors, symptoms, non-pharmacological ways of management, screening methods for NCDs (cervical cancer, breast cancer, diabetes mellitus, cardiovascular diseases, stroke); a checklist was used to assess the steps taken by ANMs to measure blood pressure, blood sugar, and perform breast examination. This checklist was developed according to their training module.

Digital blood pressure monitor (Citizen: REF CH-432) was used to assess the steps taken for blood pressure measurement.

Glucometer (ACCU-CHEK Performa, NC): was used to assess the steps taken for blood sugar measurement.

Data processing and analysis

Data was processed and analysed using SPSS 24.0. Descriptive statistics were presented as the frequency with percentages (for categorical data). Findings were also presented through graphs. Association between categorical variables was tested using the Chi-Square test. Binary logistic regression analysis was used to identify the factors for the outcome variables.

Scoring

Knowledge about NCDs

The questionnaire comprised of 25 questions to assess the knowledge regarding the aforementioned NCDs. Each response was assigned a score of '1' to correct response/s, '0' to incorrect or don't know. Scores were added to get a total score, the maximum for which was 45. The median score was calculated, which was 13; respondents were graded as per their scores.

RESULTS

A total of 152 ASHAs and 34 ANMs were enrolled for the study. Among ASHAs, majority of them were in the age group of 31-40 years (49.3%) and had education up to matriculation (67.8%). Whereas among ANMs, the majority of them were in the age group of >40 years (67.6%) and had the education of higher secondary and above (88.2%). (Table 1)

While all the ANMs knew the meaning of NCDs and were able to name Diabetes and Hypertension as NCDs, only about half of them named Cardiovascular Diseases (CVD) (47.1%) and Stroke (44.1%) as NCDs. Among ASHAs majority of them (83.6%) could explain the meaning of NCDs. About three-fourth of them could

name Diabetes (78.9%), and Hypertension (72.4%) as NCDs. Only a few of them (6.6%) and a lesser number (3.9%) could name CVD and Stroke as NCDs respectively; less than one-fifth (14.5%) of them couldn't name any NCD. (Table 2)

Table 2: Distribution of participants according to their social profile.

Characteristics	Female health workers			
of the	ASHAs	ANMs	Total	
participant	(n=152)	(n=34)	(n=186)	
Age (in completed years)				
≤30	56 (36.8)	07 (20.6)	63 (33.9)	
31-40	75 (49.3)	04 (11.8)	79 (42.6)	
>40	21 (13.9)	23 (67.6)	44 (23.7)	
Education				
Up to Matriculation	103 (67.8)	04 (11.8)	107 (57.5)	
Higher Secondary and above	49 (32.2)	30 (88.2)	79 (42.5)	

A meagre number (1.3%) of ASHAs and very few (11.8%) ANMs knew about the existence of government measures for NCDs, viz. NCD clinics (Table 2).

The only risk factor mentioned for Diabetes was obesity; very few ASHAs (3.3%) and ANMs (5.9%) were able to allude so. Increased frequency of urine was most frequently mentioned symptom by ASHA (30.9%) and ANMs (44.1%); however, about two-third of ASHAs (63.2%) and less than half of ANMs (38.2%) could not name any sugar intake was most frequently mentioned non-pharmacological for the measure disease management by ASHAs (82.2%) and ANMs (91.2%). About half of the ANMs (52.9%) and very few ASHAs (4.6%) could correctly tell the level of random blood sugar above which a patient is referred to the PHC (Table 2).

Regarding CVD, Hypertension was the most frequently named risk factor by ASHAs (61.8%) and ANMs (79.4%); likewise, anxiety was the most frequently named symptom by ASHAs (45.4%) and ANMs (79.4%). Reduced salt consumption was most frequently mentioned non-pharmacological measure by ASHAs (64.5%) and ANMs (88.2%). All the ANMs and nearly half of the ASHAs (42.8%) could correctly tell the level blood pressure above which a patient is referred to the PHC (Table 2).

For Cervical cancer, poor genital hygiene was the most frequently named risk factor by ASHAs (15.1%) and ANMs (52.9%); similarly, post-coital bleeding was frequently named symptom by ASHAs (31.6%) and ANMs (41.2%). Only about one third (34.9%) of the ASHAs and about two-third (67.6%) of the ANMs knew

Table 3: Knowledge about non-communicable diseases (NCDs).

Variables	ASHAs	ANMs	Total
	(n=152)	(n=34)	(n=186)
Knew the meaning of NCD	127 (83.6)	34 (100)	161 (86.6)
Diseases mentioned			-
Diabetes	120 (78.9)	34 (100)	154 (82.8)
Hypertension	110 (72.4)	34 (100)	144 (77.4)
Cancer	65 (42.8)	29 (85.3)	94 (50.5)
Cardio vascular diseases (CVD)*	10 (6.6)	19 (55.9)	29 (15.6)
Stroke	06 (3.9)	15 (44.1)	21 (11.3)
Not able to name any NCD	22 (14.5)	00 (0.0)	22 (11.8)
Knowledge about the existence of NCD clinics as Government	02 (1.3)	04 (11.8)	06 (3.2)
measures for the management of NCDs	02 (1.3)	01(11.0)	00 (3.2)
Knowledge about Diabetes			
Risk factors mentioned			
Obesity (only risk factor mentioned)	05 (3.3)	02 (5.9)	07 (3.8)
Symptoms mentioned			
Increased frequency of urine	47 (30.9)	19 (44.1)	66 (35.5)
Delayed wound healing	07 (4.6)	06 (17.6)	13 (7.0)
Weight loss	06 (3.9)	06 (17.6)	12 (6.5)
Polyphagia	07 (4.6)	02 (5.9)	09 (4.8)
Polydipsia	04 (2.6)	03 (8.8)	07 (3.8)
Generalized weakness	03 (2.0)	00 (0.0)	03 (1.6)
Visual disturbance	01 (0.7)	02 (5.9)	03 (1.6)
Tingling sensation (palms/feet)	01 (0.7)	00 (0.0)	01 (0.5)
None	96 (63.2)	13 (38.2)	109 (58.6)
Non-pharmacological measures for management mentioned			
Reduce sugar intake	125 (82.2)	31 (91.2)	156 (83.9)
Reduce carbohydrate rich food	48 (31.6)	17 (50.0)	65 (34.9)
Multiple frequent meals	01 (0.7)	09 (26.5)	10 (5.4)
Regular physical exercise	06 (3.9)	02 (5.9)	08 (4.3)
None	27 (17.1)	3 (8.8)	29 (15.6)
RBS* level at which a patient should be referred to PHC* for	07 (4.6.)	19 (52 0)	25 (12.4)
further diagnosis and management. (>140 mg/dl) ¹⁵	07 (4.6)	18 (52.9)	25 (13.4)
Knowledge about cardio vascular diseases (CVD)			
Risk factors mentioned			
Hypertension	94 (61.8)	27 (79.4)	121 (65.1)
Obesity	08 (5.3)	12 (35.3)	20 (10.8)
None	54 (35.5)	4 (11.8)	58 (31.2)
Symptoms mentioned			
Anxiety	69 (45.4)	27 (79.4)	96 (51.6)
Syncope	34 (22.4)	10 (29.4)	44 (23.7)
Breathlessness	16 (10.5)	07 (20.6)	23 (12.4)
Sweating	04 (2.6)	09 (26.5)	13 (7.0)
Headache	08 (5.3)	4 (11.8)	12 (6.5)
Vomiting	05 (3.3)	00 (0.0)	5 (2.7)
Edema	04 (2.6)	00.(0.0)	04 (2.2)
Chest pain	02 (1.3)	02 (5.9)	04 (2.2)
None	68 (44.7)	5 (14.7)	73 (34.9)
Non-pharmacological measures for management mentioned	,		,
Reduce salt consumption	98 (64.5)	30 (88.2)	128 (68.8)
Dietary modification	20 (13.2)	8 (23.5)	28 (15.1)
Reduce weight	05 (3.3)	07 (20.6)	12 (6.5)
Regular physical activity	01 (0.7)	09 (26.5)	10 (5.4)
None	54 (35.5)	4 (11.8)	58 (31.2)
4	- ()	()	()

Continued.

Variables	ASHAs (n=152)	ANMs (n=34)	Total (n=186)
BP* at which a patient should be referred to PHC for further diagnosis and management. (>140/90 mmHg) ¹⁵	65 (42.8)	34 (100)	99 (53.2)
Knowledge about cervical cancer			
Risk factors mentioned			
Poor genital hygiene	23 (15.1)	18 (52.9)	41 (22.0)
Genital warts	22 (14.5)	8 (23.5)	30 (16.1)
Multiple sexual partners	04 (2.6)	12 (35.3)	16 (8.6)
Early marriage	02 (1.3)	10 (29.4)	12 (6.5)
None	117 (77)	12 (35.3)	129 (69.4)
Symptoms mentioned	66 (43.4)	19 (55.9)	85 (45.7)
Post coital bleeding	48 (31.6)	14 (41.2)	62 (33.3)
Lower abdomen pain	45 (29.6)	10 (29.4)	55 (29.6)
Dyspareunia	04 (2.6)	19 (55.9)	23 (12.4)
None	86 (56.6)	15 (44.1)	101 (54.3)
Knew screening method (visual Inspection)	53 (34.9)	23 (67.6)	76 (40.9)
Knew about vaccine to protect against cervical cancer	06 (3.9)	08 (23.5)	14 (7.5)
Knowledge about breast cancer			
Risk factors mentioned			
Avoiding breast feeding	15 (9.9)	14 (41.2)	29 (15.6)
Late marriage	07 (4.6)	09 (26.5)	16 (8.6)
None	136 (86.8)	13 (38.2)	149 (78)
Symptoms mentioned			
Lump in the breast (only symptom mentioned)	47 (30.9)	23 (67.6)	70 (37.6)
Knew screening method (CBE)*	43 (28.3)	17 (50.0)	60 (32.3)
Knowledge about stroke			
Risk factors mentioned			
Hypertension (only symptom mentioned)	93 (61.2)	08 (23.5)	101 (54.3)
Symptoms mentioned			
Paralysis (only symptom mentioned)	35 (23.0)	16 (47.0)	51 (27.4)
Preventive measure mentioned			
Regular physical activity (only symptom mentioned)	05 (3.3)	03 (8.8)	08 (4.3)

*CVD: Cardio Vascular Diseases; RBS: Random Blood Sugar; PHC: Primary Health Centre; BP: Blood Pressure; CBE: Clinical Breast Examination

about the screening method for cervical cancer. The existence of a vaccine to protect against cervical cancer was known to very few (3.9%) of the ASHAs and less than one fourth (23.5%) of the ANMs (Table 2).

Avoiding breastfeeding was identified as the most frequently named risk factor for Breast Cancer, ASHAs (9.9%) and ANMs (41.2%). The only symptom known was the development of a lump in the breast, by ASHAs (30.9%) and ANMs (67.6%). About half of the ANMs (47.1%) and about one fourth (23%) of the ASHAs knew about clinical breast examination as a screening method of the disease (Table 2).

Only risk factor known for the development of stroke was hypertension, by ASHAs (61.2%) and ANMs (23.5%); similarly, paralysis was the only symptom named by ASHAs (23%) and ANMs (47%). Regular physical activity was mentioned as a non-pharmacological

measure for prevention of stroke, by ASHAs (3.3%) and ANMs (8.8%) (Table 2).

About half (41.2%) of the ANMs and a lesser proportion (15.1%) of the ASHAs had received training for NCDs within the last one year of the study (Table 3).

Though the majority of the ANMs (79.4%) were able to correctly demonstrate all steps of measurement of blood pressure, only about half of them (47.1%) were able to demonstrate correct steps to measure blood sugar; less than one-fourth of ANMs (17.6%) were correctly able to demonstrate all the steps of Clinical Breast Examination (Table 4).

Among the FHWs, knowledge about NCDs was found to be higher for those with the age more than 40 years (77.3%), with the education of higher secondary and above (69.9%) and also amongst those who had received previous training for NCDs (91.9%). Association of the

score with all these factors was statistically significant (Table 5).

Binary logistic regression analysis was used to compute predictors of knowledge about NCDs (based on score) using various study variables. For the total score, the model predicts that respondents who had previous training for NCDs were 2.99 times more likely to get higher score [OR=20.072 (5.339–74.624), p<0.001]; also, respondents who had an education of senior secondary and above were 1.4 times more likely to obtain higher score [OR=4.070 (1.491–11.113), p=0.006]; similarly, respondents who were in the age group of more than 40 years were 1.6 times more likely to get higher score [OR=5.094 (2.452–10.583), p<0.001].

Table 4: Distribution of participants as per their training status for NCDs.

Training	ASHA (n=152%)	ANM (n=34%)	Total (n=186%)
Training for NCDs	23 (15.1)	14 (41.2)	37 (19.9)

Table 5: Distribution of ANMs as per their skills regarding NCDs.

Skills regarding NCDs among ANMs	Frequency	Percentage (%)
Correctly demonstrate all the steps of Breast Examination	6	(17.6)
Correctly demonstrate all the steps to measure blood sugar	16	(47.1)
Correctly demonstrate all the steps to measure blood pressure	27	(79.4)

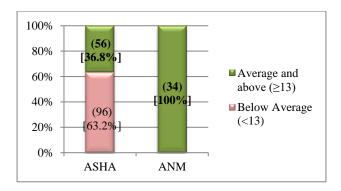


Figure 1: Distribution of female health workers as per their score for knowledge about NCDs.

About one-third (36.8%) of the ASHAs and all the ANMs received average and above score for knowledge regarding NCDs.

Table 6: Factors associated with knowledge on NCDs among PHWs (n=186).

Factors		Grading for knowledge about NCDs			
ractors		Below average	Average and above	P value	
Age (in years)	≤30	38 (60.3)	25 (39.7)		
	31 to 40	48 (60.8)	31 (39.2)	<0.00 1	
	≥40	10 (22.7)	34 (77.3)		
Educ- ation	Up to Matriculat ion	72 (67.3)	35 (32.7)	< 0.00	
	Higher Secondary and above	24 (30.4)	55 (69.6)	1	
Train- ing	Received	03 (8.1)	34 (91.9)	< 0.00	
	Not received	93 (62.4)	56 (37.6)	1	

DISCUSSION

The primary objective of this study was to assess the knowledge regarding non-communicable diseases among female health workers (FHW) of rural Lucknow.

Although all the ANMs had above average score for knowledge regarding NCDs, only about one-third of the ASHAs had above average; similarly, in a study conducted in Andhra Pradesh, medical officers also perceived that ASHAs do not have the requisite knowledge to provide NCD services.²⁰

Obesity was the only risk factor identified by the FHW for the development of diabetes. Increased frequency of urine was most frequently named symptom, which was named by only one-third of the health workers. More than half of the FHW could not name any symptom. Only a meagre proportion of FHW could name delayed wound healing, polydipsia, polyphagia as a symptom, which spots the gap in knowledge among them. Similarly, in a study conducted in Karnataka, baseline knowledge regarding diabetes was found to be inadequate and training was found to impart a positive effect on knowledge.²¹

Although, two-third of the ASHA and ANMs were aware of hypertension as a risk factor of CVD, only about half of them knew the range of normal blood pressure and a staggering lesser proportion of ANM i.e. 17.2% could correctly demonstrate all the steps to measure blood pressure. These findings are complementary to the findings of a study conducted in Himachal Pradesh, where the majority of the health workers could not measure blood pressure.²²

More than two-third of the FHW could not name any risk factor for cervical cancer; a dismal number of them were able to identify multiple sexual partners and early marriage as a risk factor. One-third of the ASHAs and two-third of ANMs knew about the method for early detection of cervical cancer, and very few ASHAs knew about the availability of the vaccine for protection against cervical cancer. Findings similar to ours were observed in a study conducted in Lucknow, where about two-third of the ASHAs scored below average.²³

We found that about one-fourth of the ASHAs and half of the ANMs knew about Clinical Breast Examination as a screening method; however, less than one-fourth of the ANM could correctly demonstrate all the steps of breast examination. Similar findings were observed in a study conducted in Himachal Pradesh, where the majority of the health workers could not able to perform breast examination.²²

Knowledge regarding stroke was found to be further diminished among FHW. Only risk factor named was hypertension. A few of them identified that regular physical exercise could prevent the development of stroke; these findings are similar to a study conducted in Karnataka, where ASHA workers were found to have scanty knowledge about stroke.²⁴

In this study, only 19.9% of the FHWs (41.2% of ANMs and 15.1% of ASHAs) had received training for NCDs; which is dismally less as compared to the findings of NHM survey, where they showed that the proportion of ASHAs trained to support population-based screening of NCDs is 42.5%. Complementary findings were revealed in a study conducted in Karnataka, where 69.44% of ANMs had received training on NPCDCS.

In the present study, knowledge score for NCDs was found to be higher among those who had received previous training for NCDs; similar results were found in various studies conducted in India and abroad. ^{20,22,23}

Skills for measuring blood pressure, blood sugar and breast examination were found to be low among the ANMs. Similar findings were observed in a study conducted in Himachal Pradesh, where a contracted proportion i.e. 2% of the health care workers were able to measure blood sugar and do a breast examination for cancer screening.²⁶

CONCLUSION

In the present study, the majority of the respondents were found to have poor knowledge regarding NCDs. Additionally, older age, training and higher education are found to be associated with good knowledge. In India, the educational criteria for recruitment of ASHAs are that she should be a literate woman with due preference in selection to those who are qualified up to 10 Standard. The proportion of ASHAs trained in NCDs is less than fifty percent as per the survey of Government of India.

Hitherto, as education of recruited ASHAs could not be addressed; it is important that there is a need for training of grass root level workers for them to correctly identify the symptoms of various NCDs. without them knowing the risk factors, symptoms, and preventive measures; it is not expected of them to educate the community members regarding NCDs. With proper training they can educate women, men and adolescents regarding the determinants of NCDs and various associated risk factors like unhealthy diet, physical inactivity, intake of tobacco, alcohol, and stress, etc.

Finally, the overall prevalence of poor knowledge in the present study was much higher and since a meagre number of studies were conducted on the topic in the Indian subcontinent in the past, it is suggested that further studies will have to be undertaken on the subject.

Strengths and limitations

Each participant underwent an informative session wherein they were briefed about the problem statement and how they can make a recuperative contribution by answering honestly to the questions.

Maintenance of heterogeneity was tried by selecting different groups of FHWs, i.e., ASHAs and ANMs.

The results were shown for both cumulative and individual groups. However, there are a few limitations to the study.

A convenient sampling technique was used for feasibility. It may not be right to generalize the results to all parts of India due to the diversity in education, quality of training, and other factors.

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Institutional Ethics Committee

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