An analysis of the services in primary health centers in Anand, Gujarat, with specific focus on noncommunicable diseases and emergency conditions

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Abstract

Background: Skilled health workers are unable to deliver services effectively without appropriate physical capitals.

Objective: The current study is pursued with the objectives (1) to study the competence level of medical officers in providing the treatment and care of two specific noncommunicable diseases and emergency conditions. (2) To score primary health centers (PHCs) on the basis of vulnerability by using Vulnerability Index calculator. (3) To know about the availability of the medicines to treat diseases in question, important instruments, and vehicle.

Materials and Methods: The current study is a cross-sectional study involving PHC medical officers (MBBS). There are total 47 PHCs in Anand district in Gujarat. It was decided to include 50% PHCs from each block out of total 47 PHCs. The PHCs were selected by systematic random sampling with sampling interval of 2 and ni calculated for each block separate. Σni is 25.

Results: We found that the median knowledge scores for hypertension and diabetes among PHC medical officers were 4.00 and 4.50 out of 10. Mean Vulnerability Index was 7.36, which is overall coming in moderate vulnerability. A total of 40% medical officers were able to identify correctly at least 2 symptoms of hypertension. A total of 88% medical officers were able to handle cases of snake bite and bee stings. In all the PHCs, emergency lifesaving drugs were available.

Conclusions: There should be proper training of medical officers in the treatment of noncommunicable diseases. Logistics that are not available should be made available.

KEY WORDS: Anand, knowledge, universal health coverage, PHC, medical officer

Introduction

A skilled, motivated health workforce with knowledge is critical for achieving universal health coverage. Health workforce includes those that provide health services such as doctors, nurses, and so on and other supportive health services. Skilled health workers are unable to deliver services effectively without appropriate physical capitals.[1] The primary health care is managed by the rural primary health centers (PHCs), where only primary health care is provided. Apart from treatment, provision of health care is the most important event here. The first-level intervention starts from PHC. Patient from the rural setup with any type of ailments approaches the PHC and seeks advice or treatment depending on the nature and seriousness of the impaired health condition of the individual.[2] The Planning Commission of India has released a document on universal health coverage in which health service entitlements are proposed for different disease categories.[3]

The goal of universal health coverage is to ensure that all people obtain the health services they need without suffering financial hardship when paying for them.

This requires an efficient health system, a system for financing health services; access to essential medicines; and sufficient well-trained, motivated health workers.[4]

The current study was pursued with the following objectives:

1. To study the competence level of medical officers in providing the treatment and care of two specific noncommunicable diseases and emergency conditions
2. To score PHCs on the basis of vulnerability by using Vulnerability Index calculator
3. To know about the availability of the medicines to treat diseases in question, important instruments, and vehicle

Materials and Methods

The current study is a cross-sectional study involving PHC medical officers (MBBS). There are 47 PHCs in Anand district in Gujarat. It was decided to include 50% PHCs from each block making it to 24 and rounding it to 25 out of the total 47 PHCs. The PHCs were selected by systematic random sampling with sampling interval of 2 and n_i calculated for each block separately. Many PHCs were having AYUSH medical officers, were excluded from the study, and also those who delayed in sending the forms. To compensate for the number, PHCs from other blocks were studied. The study was approved by the Human Research Ethics Committee of HM Patel Center for Medical Care and Education, Karamsad, Anand. Representation from one block was not made because of the above reason. To check the knowledge of hypertension and diabetes, knowledge scores were calculated by using five-question tests for both the disease having a Likert scale from 0 to 2 with a final sum total of 10 for that disease. Reliability analysis was done and Chronbach's alpha was more than 0.70 for both the disease questions (Table 1). Performance was analyzed between the blocks by ANOVA (hypertension) and Kruskal–Wallis (diabetes) test. Vulnerability Index was calculated and analyzed between the blocks by Kruskal–Wallis test. Σn_i is 25. Total number of PHCs selected was 25 and distribution is as in Table 2.

Vulnerability Index calculator was directly taken from the universal health coverage document released by Planning

Table 1: Scoring and reliability analysis of questions

Responses for a single question for one disease	Marks	Total	Total score
No response at all	0		
Answered correctly, but partially and not to satisfaction	1		
		5 questions	0–10
Answered correctly, fully, and to satisfaction	2		
Hypertension questions—Chronbach's alpha			0.740
Diabetes mellitus questions—Chronbach's alpha			0.769

Table 2: Distribution of selected PHCs

Block	No. of PHCs	No. of PHCs to be selected	No. of PHC response
Anand	11	6	9
Anklav	3	2	1
Borsad	9	5	4
Khambat	7	3	1
Petlad	7	4	5
Sojitra	2	1	2
Tarapur	2	1	0
Umreth	6	3	3
Total	47	25	25

Table 3: Vulnerability of PHCs

Vulnerability of PHC	Scores
Zero vulnerability	0
Minimal vulnerability	1–6
Moderate vulnerability	7–20
High vulnerability	21–34
Extremely vulnerable	35–50

Commission of India (November 2011).[3] The index is having 12 indicators and scales from zero vulnerability to extremely vulnerable with different scores for each (Table 3).

Results

Age, population, and years of service have a normal distribution as per Shapiro–Wilk test. Of the participants, 19 were male and 5 were female. Overall mean age was 43.21 years with SD of 9.344. Mean serving population was 36251.24 and mean years of service was 17.06 with SD of 9.073. ANOVA was found to be nonsignificant for all the variables among different blocks. ANOVA was found to be non-significant for all the variables amongst different blocks and these were Age ($F = 0.817$, $p = 0.572$), Population ($F = 0.87$, $p = .533$) and Years of service $F = 0.416$, $p = 0.859$). Forty percent of the medical officers were able to identify correctly at least two symptoms of hypertension. Fifty-six percent medical officers were able to identify correctly two to four symptoms of diabetes and 48% medical officers were able to identify correctly at least two symptoms of cancers (Table 4).

It was found that 11 PHCs were in minimal vulnerability category and 14 were in moderate vulnerability. Diabetes scores were found to be having a nonnormal distribution, whereas hypertension scores and Vulnerability Index scores were having a normal distribution as per Shapiro–Wilk test. Median knowledge scores for hypertension and diabetes were 4 and 5, respectively. Those having high knowledge scores for hypertension were also having high scores for diabetes. Mean Vulnerability Index was 7.36, which is overall coming

Table 4: Age and sex distribution of PHC medical officers and by correctly identifying the symptoms of hypertension, diabetes, and cancers

Block	Sex		Total	Mean		
	Male	Female		Age (years) N = 24	Population N = 25	Years of service N = 24
Anand	8	0	8	45.38	37121.67	19.13
Anklav	0	1	1	45.00	28207.00	15.00
Borsad	4	0	4	45.25	36852.00	19.00
Khambat	1	0	1	50.00	36352.00	24.00
Petlad	3	2	5	35.60	34585.60	9.90
Sojitra	0	2	2	40.00	45000.00	13.50
Umreth	3	0	3	46.67	32429.60	21.67
Total	19	5	24	43.21	36251.24	17.06

Symptoms of hypertension			Symptoms of diabetes			Symptoms of cancer		
<2	2–4	>4	<2	2–4	>4	<2	2–4	>4
40	44	16	16	56	28	48	36	16

Table 5: Distribution of PHCs according to Vulnerability Index and different measures for knowledge scores of hypertension and diabetes and Vulnerability Index of PHCs

Vulnerability of PHC	Scores	No of PHCs (%)
Zero vulnerability	0	0 (0.0)
Minimal vulnerability	1–6	11 (44.0)
Moderate vulnerability	7–20	14 (56.0)
High vulnerability	21–32	0 (0.0)
Extremely vulnerable	33–50	0 (0.0)
Different measures for knowledge scores of hypertension and diabetes and Vulnerability Index of PHCs		

Measures	Total knowledge score		Vulnerability Index
	Hypertension	Diabetes	
Mean	4.36	4.44	7.36
Median	4	5	7
Range	8	8	14

in moderate vulnerability. ANOVA was not significant between different blocks for hypertension knowledge scores ($F = 0.876$, $p = 0.531$) and Vulnerability index ($F = 2.138$, $p = 0.099$). Kruskal–Wallis test was not significant between different blocks for diabetes knowledge scores (chi square, 6.6524; $p = 0.367$). Spearman's correlation between knowledge scores of diabetes and hypertension is 0.525 and $p = 0.007$. Spearman's correlation between knowledge scores of diabetes and age is 0.171 and $p = 0.423$. Pearson correlation between knowledge scores of hypertension and age is 0.387 and $p = 0.0062$ (Table 5).

In all the PHCs, sphygmomanometer and glucometer were available and also the facilities of IV drip. Eighty-eight percent of medical officers were able to handle cases of snake bite and bee stings. Equal number was able to perform cardiopulmonary resuscitation (CPR). In all the PHCs, Inj hydrocortisone, Inj adrenaline, Inj DNS, Inj ARV, antisnake venom (ASV), RL pint, and Inj diclofenac were available.

Discussion

Overall mean age was 43.21 years. Mean serving population was 36251.24, and mean years of service was 17.06. Out of the total 25 PHC Medical officers whom we interviewed, 10 were able to identify correctly at least 2 symptoms of hypertension, 14 were able to identify correctly 2–4 symptoms of diabetes, and 12 were able to identify correctly at least 2 symptoms of cancer. Knowledge scores (mean/median) for hypertension and diabetes were 4.36 (mean) and 5 (median), respectively. Mean knowledge scores were below 5 for both the diseases. Mean Vulnerability Index was 7.36, which is overall coming in moderate vulnerability. Differences between different blocks for knowledge scores and Vulnerability Index were not significant (diabetes scores: Kruskal–Wallis test and Hypertension and Vulnerability Index scores—ANOVA). So, overall, all the blocks were same in these respects. In all the PHCs, sphygmomanometer and glucometer were available.

Table 6: Distribution of availability of essential medicines (antihypertensive medicines, antidiabetic medicines, emergency medicines), instruments at PHCs, availability of a vehicle and other MO performance variable

Total PHC	BP inst	Glucometer	Urine sugar	Amlo 2.5	Amlo 5	Aten 50	Aten 25	Enal 5	Losartan H	Hypotension IV drip	Inj Mephentin
	Availability of antihypertensive medicines and instruments at PHCs										
25 (No.)	25	25	24	4	4	24	14	1	0	25	0
100 (%)	100	100	96	16	16	96	56	4	0	100	0

Total PHC	Metformin	Glipizide	Gibenclamide	Foot ulcer dressing	Perform CPR	Snake bite	Scorpion bite	Bee stings	Anaphylaxis	Availability of vehicle
	Availability of antidiabetic medicines, ability of medical officers to perform CPR, handle emergencies, and availability of a vehicle									
25 (No)	17	16	8	22	22	22	17	22	22	18
100 (%)	68	64	32	88	88	88	68	88	88	72

Total PHC	Inj Avil	Inj Hydrocort	Inj Adrenaline	DNS	D 50	ASV	RL	Inj Diclo	ARV	Inj Ligno	SL Nifedipine	Tab Aspirin	Inj insulin
	Availability of emergency medicines												
25 (No.)	24	25	25	25	15	25	25	25	25	19	8	10	3
100 (%)	96	100	100	100	60	100	100	100	100	76	32	40	12

IV drip facility was also available in all the PHCs. Atenolol 50 was available in 96% PHCs. In 68% PHCs, metformin was available. And 72% PHCs were having a vehicle. A total of 88% medical officers were able to handle cases of snake bite, bee stings, anaphylaxis, and were able to perform CPR.

We were not able to find any study in which the knowledge of medical officers was checked for disease knowledge with respect to treatment, causes, and symptoms.

Guidelines are provided for prevention and control of non-communicable diseases for primary health care in low resource settings in a WHO manual and the medical officers should be trained accordingly to improve the knowledge.[5] Bhaskaran mentioned in his article "Drugs for primary health care in India" about the important antihypertensive and hypoglycemic agents and also stressed on the fact that important emergency drugs can be a part of the essential drug list concept and can cover the commonly seen ailments and manage the emergencies.[2]

Our study finding related to the availability of essential medicines in PHC matched with that of Dixit et al. In their study regarding the availability of essential medicines in one of the PHCs in Khammam in Andhra Pradesh, they found that all the drugs included in the PHC essential medicine list were available at the time of their visit, that is, 100% availability.[6]

Essential drugs to handle the cases of hypertension and diabetes and also emergencies are mentioned as Annexure IV (Essential drugs for PHC) of Indian Public Health Standards (IPHS) for PHCs.[7]

The study tried to find the actual situation in PHCs related to the management of noncommunicable conditions (hyper-tension and diabetes), but the study has limitations as all the PHCs are not included.

Conclusion

We conclude from the study that 70%–100% essential med-icines and instruments were available in almost 60% PHCs and mean (median) knowledge scores for hypertension and diabe-tes were just on the border line of 50%, that is, 5. Almost all the medical officers were able to handle cases of snake bite, bee stings, and anaphylaxis. We recommend that the PHC medical officers should be trained periodically for noncommunicable dis-eases as they are first-level physicians and the diseases can be identified, treated at a very earlier stage, and further progression of the diseases can be stopped by early diagnosis or appropri-ate and timely referral. Logistics to tackle cases of emergencies that are not available should be made available at all the PHCs.

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