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Original Article

Knowledge, attitudes and practices of medical officers in two selected teaching hospitals in the Colombo District in the application of non-communicable disease prevention activities in the ward setting

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Keywords: non-communicable diseases, NCD, prevention, hospitals, doctors

Abstract

Background
Non-communicable diseases (NCD) are a significant health problem in Sri Lanka. The national health policy recommends building the capacity of Medical Officers (MO) in the national health system to address this issue. This study aimed to assess the knowledge, attitudes and practices of MOs in two teaching hospitals in the Colombo District in applying NCD prevention activities in the ward setting.
Methods
A cross-sectional study to assess the knowledge, attitudes and practices of 465 MOs of two teaching hospitals was conducted using a self-administered questionnaire.
Results
Only 43.7% of MOs possessed a 'good' level of knowledge regarding NCD prevention. Only 41.4% were able to name three NCDs that could be screened for and only 18.4% were aware of the location of screening services. Of the MOs, 68% knew of three primary/primordial NCD prevention activities that could be applied in the ward setting. A majority (76.6%) showed favourable attitudes to applying NCD prevention in wards. Considering practices, only 43% provided lifestyle guidance to all in-patients with NCDs and only 14.3% advised family members of patients regarding their role in NCD prevention. Reported barriers to implement NCD prevention were lack of; time (85.9%) and lack of training (47%).
Conclusions and recommendations
Knowledge and practices of NCD prevention strategies that are applicable in ward settings was poor among the majority of MOs while attitudes were mostly favourable. The study recommends improving knowledge and overcoming identified barriers in order to promote MOs to take up NCD prevention in wards.

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Introduction

Non-communicable diseases (NCD) cause a high disease burden throughout the world. The World Health Organization (WHO) reports that NCDs kill more than 36 million people each year. Of this, nearly 80%, or 29 million deaths, occur in low and middle income countries. More than 9 million deaths occur before the age of 60 years with 90% in low and middle income countries[1].

In Sri Lanka, NCDs account for 75% of the 138,000 deaths reported annually. Forty percent are due to cardiovascular disease~~,~~ the leading cause of death in Sri Lanka[2].

The Global Action Plans of the WHO for the Prevention and Control of NCDs for 2008-2013 and 2013-2020, specify primary, secondary and tertiary preventive activities to address the burden of NCDs[3,4].

The National Policy and Strategic Framework for the Prevention of Chronic NCDs (2009) and the draft Sri Lanka National Health Promotion Policy (2013) identify hospitals as suitable settings to deliver all levels of NCD preventive activities and have identified the need to strengthen human resources in carrying out these activities[5,6,7]. Few studies, world over, have assess the capacities and practice of medical doctors working in hospital settings in applying NCD preventive activities.

A study among 394 internal medical physicians in 10 hospitals in Guatemala found that their knowledge on NCD and its prevention was limited[8]. Among postgraduate trainee doctors in the United Kingdom, only 11% advised patients on lifestyle change for diabetes control[9]. A study among cardiologists, neurologists and other physicians in internal medicine (N=1609) from 232 primary, secondary and tertiary care healthcare institutions in Beijing, China to assess their practices in advising on lifestyle modifications in the management of hypertension[10] found that 48.6% of cardiologists and 28.3% of other physicians prescribe lifestyle modifications to control hypertension. Another study in China among 837 physicians attached to cardiology units of 35 tertiary care hospitals to assess the influence of education and working background on knowledge of secondary prevention guidelines for coronary heart disease found that only 53.9% fulfilled the expected standard of knowledge[11].

Though there has been no direct assessment of the capacity or practices of doctors in NCD prevention in Sri Lanka, there are two related studies.

Knowledge, attitudes and practices of 385 doctors on screening for and management of alcohol misuse among patients conducted in 2008 at the National Hospital of Sri Lanka found that only half the doctors (49.1%) always inquired about alcohol misuse from patients[12]. Despite poor practices, 75.9% possessed good knowledge and 91.5% held favourable attitudes on the screening and management of alcohol misuse among patients.

A study at a Provincial General Hospital interviewed 385 patients to assess the extent of preventive care services they received while being hospitalized. Of the patients, 66% had not received any information on exercise, 74% had not received any education on smoking cessation, and only 51.4% education on smoking cessation, and only 51.4% had received information on weight control indicating lapses in delivering advice~~s~~ on NCD prevention[13].

In this background, this study aimed to describe the knowledge, attitudes and practices of grade medical officers of two selected teaching hospitals of the Colombo District in applying NCD prevention activities in ward settings. The study also identified factors associated with knowledge, attitudes and practices and barriers faced by the grade medical officers in applying NCD prevention activities in ward settings.

Methods

A descriptive cross sectional study was conducted at the National Hospital of Sri Lanka (NHSL) and the Colombo South Teaching Hospital (CSTH). The NHSL is the apex hospital in Sri Lanka, comprising 3246 beds and with 1264 grade medical officers in service. The CSTH

is a major teaching hospital in the district of Colombo with a bed strength of 1293 and with 843 medical officers in service. The grade medical officers (an MBBS or an equivalent degree qualified medical officer who is not an intern or a specialist) who were attached to one of the selected wards/units of the hospitals were the study units.

Expecting that 50% of the study population will have a 'good' level of knowledge, the size of the sample required was estimated at 384[14]. Accounting for the multistage cluster sampling technique used and for non-response the final sample required was 465. A ward/unit was considered a cluster and cluster size was five. Allocation of clusters was proportionate to the size of the grade medical officer population in the two hospitals (NHSL- 56 and CSTH-37).

A structured, pre-tested self-administered questionnaire was used to collect data. Whenever possible, participants were requested to fill up the questionnaire in the presence of the PI to avoid cross-contamination.

Data collection was carried out during December 2013 and January 2014. Data was analyzed using SPSS version 17 statistical software. A marking scheme was formulated and a cut off mark that was based on possessing knowledge to the questions on ‘must know’ areas of the theme was used to categorize respondents as ‘good’ and others as ‘poor’ in knowledge on health promotion.

A 5-point Likert scale was used to assess attitudes to applying NCD preventive activities in ward settings. A scoring system (1.00 to 5.00) was devised with low scores representing unfavourable attitudes with 3.00 as the cut off to classify respondents.

Level of knowledge and overall attitude were cross analyzed with selected factors to assess any association. Specific practices on applying NCD prevention activities were cross analyzed with selected factors to ascertain any association. Statistical testing for associations were performed when considered appropriate using Chi square test. A probability value of less than 0.05 was considered as significant.

Ethical clearance to conduct the study was obtained from Ethics Review Committee of Sri Lanka Medical Association.

Results

The study included 419 grade medical officers with a response rate of 90% (419/465).

Basic characteristics of the study population

Equal proportions of male (50.6%, N=212) and female (49.4%, N=207) grade medical officers participated. A majority of the study population were in the age group of 25 to 34 years (50.3%, N=211). Most of the study participants were Sinhalese (83.1%, N=348) and married (78.8%, N=330).

A majority (56.3%, N=236) of the grade medical officers were attached to wards of medicine/medicine related fields. Those with a service duration of 1-10 years comprised the largest group (74.9%, N=314). Approximately one fourth (26.5%, N=111) of the study population had a postgraduate qualification or were currently enrolled in a postgraduate training programme.

A total of 93(22.2%) were diagnosed with at least one NCD. While 337(90%) reported at least one NCD among parents or siblings. The commonest type of NCD among family members was hypertension. (N=263, 62.8%).

Knowledge on NCD and its prevention

Among the study population, only 37.7% (158) were able identify four modifiable risk factors for NCDs while 47.5% (199) were able to identify two non-modifiable risk factors.

Only 41.5% (N=174) of participants knew three NCDs which could be screened for. Two hundred and twenty eight (54.4%) were aware of the recommended age for screening of NCDs. Only a minority (18.4%, N=77) knew of the screening services provided through the Medical Officer of Health (MOH) units of the country.

Of the study population 325 (77.6%) correctly knew the type of fat to be consumed in lesser amounts to prevent NCDs. Over three fourths of the study population were able to identify the correct type of fat in sunflower oil 78% (N=327), fish 82.3% (N=345), butter 80.4% (N=337) and pork 85.2% (N=357). However, only 64.9% (N=272) were able to identify the correct type of fat mostly seen in coconut oil. Recommended daily amounts of salt (N= 164, 39.1%), sugar (N=51, 12.2%) and fruits and vegetables (N=60, 14.3%) per day per adult to prevent NCD was known only by a minority.

The study population was assessed for their knowledge on the recommended level of physical activity of an adult to prevent NCDs, and only 22.7%, (N=95) knew that moderate level physical activities have to be performed 30 minutes per day and for at least five days a week to prevent NCDs.

Approximately half of the study population (47.7%, N=200) incorrectly identified the statement 'consumption of a small quantity of alcohol per day is recommended to prevent ischemic heart disease', as correct. The statement indicating that 'advice to smokers should be to gradually reduce smoking and then stop smoking cessation should not be a gradual process' was identified correctly as true by 54.4% (N=228).

Among the study population 398 (95%, N=419) were able to identify the correct formula for BMI calculation**.** Using the range of values of the latest WHO classification on BMI[15], the overweight category was correctly known only by 51.3% (N=215) and obesity category was correctly known by 54.2% (N=227).

The study population was requested to identify up to three primary and primordial NCD preventive activities they can apply on inpatients in the ward setting based on a given case scenario of a hospitalized NCD patient. Sixty eight percent (N=285) of the study population were able to identify such activities.

When the study population was categorized based on their overall knowledge, 56.3% (N=236) of study population demonstrated poor overall knowledge and 43.7% (N=183) demonstrated good overall knowledge.

The responses of study population on method/methods they use to update their knowledge on NCD and NCD prevention activities revealed that the most common method used to update their knowledge was conferences/lectures (N=342, 81.6%). In addition, ward rounds with specialists (N=279, 66.6%), journals (N=320, 76.4%), and ward clinical discussions (N=216, 51.6%) were also reported as methods to update knowledge on NCD and NCD prevention activities. Only 28.9% indicated that they gained this knowledge through continuous professional development programs.

Attitudes on NCD and its prevention

Attitudes of the study population on application of NCD preventive activities were assessed using five attitudinal statements (Table 1).

Table 1: Distribution of study population by their attitudes on applying NCD prevention activities in the ward settings

Attitude	Strongly agree N(%)	Agree N(%)	Neutral N(%)	Disagree N(%)	Strongly disagree N(%)	Total N(%)
Doctors can efficiently contribute to reduce NCD burden in the country if they perform preventive action in the wards	198 (47.3)	194 (46.3)	9 (2.1)	16 (3.8)	2 (0.5)	419 (100)
Doctors in hospitals should not implement NCD prevention activities as it is not part of curative services	5 (1.2)	10 (2.4)	17 (4.1)	176 (42.0)	211 (50.4)	419 (100)
A doctor trying to advice patients regarding NCD prevention is a waste of time	2 (0.5)	2 (0.5)	9 (2.1)	181 (43.2)	225 (53.7)	419 (100)
Doctors cannot contribute towards NCD prevention because they are overburdened with other ward work	15 (3.6)	98 (23.4)	31 (7.4)	192 (45.8)	83 (19.8)	419 (100)
Providing health promotion in addition to medical care is the responsibility of a doctor	196 (46.8)	193 (46.1)	12 (2.9)	15 (3.6)	3 (0.7)	419 (100)

Of the study population, 93.6% (N=392) agreed or strongly agreed to the statement that ‘doctors can efficiently contribute to reduce NCD burden in the country if they perform preventive action in the wards’. A majority (92.7%, N=387) of the study population disagreed or strongly disagreed to the statement that 'doctors in hospitals should not implement NCD prevention activities as it is not part of curative services'.

Based on the score to assess overall attitudes using the method described, it was shown that 76.6% (N=321) possessed favourable attitudes towards application of NCD prevention activities in ward settings while the rest (N=98, 23.4%) possessed unfavourable attitudes.

Application of NCD prevention activities at ward settings

Table 2 describes the practices of study population in applying NCD prevention activities at ward settings in relation to in-patients.

Table 2: Distribution of study population by their practices in applying NCD prevention activities in ward settings

Practice	No N(%)	Yes, I do it for all N(%)	Yes, I do it for some N(%)	Yes, I do it occasionally N(%)	Total N(%)
Advising patients with NCDs on changing their habits /life styles so that the existing NCDs are controlled and the future complications are avoided	10 (2.4)	173 (41.3)	208 (49.6)	28 (6.7)	419 (100)
Advising the family members of patients with NCDs about measures that the family can take to control existing NCDs/ avoid the patient getting other NCDs in the future	54 (12.9)	60 (14.3)	198 (47.3)	107 (25.5)	419 (100)
Advising family members of inpatients with NCDs about measures that family should take to avoid getting NCDs in the future	73 (17.4)	61 (14.6)	199 (47.5)	86 (20.5)	419 (100)
Advising patients who admitted for other diseases but having risk factors for NCDs on changing their habits /life styles so that the risk of getting NCDs in the future minimized	67 (16.0)	110 (26.3)	189 (45.1)	53 (12.6)	419 (100)
Advising in-patients who are smokers on stopping smoking so that the risk of getting NCDs in the future is minimized	48(11.5)	186(44.4)	150(35.8)	35(8.4)	419(100)
Advising in-patients who are consumers of alcohol on stopping alcohol consumption to minimized future NCDs	34 (8.1)	144 (34.4)	191 (45.6)	50 (11.9)	419 (100)
Advising in-patients who are not diagnosed with NCD in the ward on NCD screening services	82 (19.6)	67 (16.0)	186 (44.4)	84 (20.0)	419 (100)

Of the study population 41.3% (N=173) advised all in-patients with NCDs on changing their habits/life styles so that existing NCDs are controlled and the future complications are avoided. Approximately half (47.3%, N=198) advised family members of the inpatients with NCD about measures that the family can take to control existing NCDs/ avoid the patient getting other NCDs in the futures. The practice of advising in-patients who are smokers on stopping smoking was performed by 44.4% (N=186) of the study participants for all the patients and 35.8% (N= 150) for some of the patients.

Inquiring into the practice of the study population on advising ward staff members on changing their life styles/habits to prevent the development of NCDs, it was found that only 67.3% (N=282) had ever advised staff members is regard. Approximately one third of the study population (30.3%, N=127) had taken a personal effort to ensure that health education materials were available in the ward to provide information on NCD prevention. Of the study

participants 24.3% (N=102) had ever done group health education sessions in the ward targeted at patients in the ward in relation to NCD prevention.

Perceived barriers to applying NCD prevention activities in ward setting

A majority identified 'lack of time' (85.9%, N= 360) as a barrier to implement NCD prevention activities in ward setting. In addition, 'lack of training' was also an issue identified by 47% (N=197).

Factors associated with knowledge, attitudes and practices of applying NCD prevention activities in ward settings

Possessing a postgraduate qualification or undergoing postgraduate training (p<0.001) and having favourable attitudes (p=0.003) were significantly associated with good overall knowledge on NCD and NCD prevention activities (Table 3).

Table 3: Factors associated with overall knowledge on NCD prevention activities in ward settings

Factors	Overall Knowledge		Significance
	Poor N(%)	Good N(%)	
Duration of service			
Equal or less than 10 years	170 (53.9)	145 (46.1)	χ^2=2.864 df=1 p=0.091
More than 10 years	66 (61.1)	38 (38.9)	
Postgraduate training			
Obtained/currently involved	46 (41.4)	65 (58.6)	χ^2=13.597 df=1 p<0.001
Not having postgraduate training	190 (59.8)	118 (40.2)	
Diagnosed NCD among study participants			
Yes	52 (55.9)	41 (44.1)	χ^2=0.008 df=1 p=0.928
No	184 (56.4)	142 (43.6)	
Overall attitude			
Favourable	168 (52.3)	153 (47.7)	χ^2=8.874 df=1 p=0.003
Unfavourable	68 (69.4)	30 (30.6)	

The study did not identify service duration (p=0.075), having a NCD (p=0.729) or possessing a postgraduate degree/post graduate training (p= 0.439) to be associated with favourable attitudes to applying NCD prevention activities in ward settings (Table 4).

Table 4: Factors associated with overall attitudes on NCD prevention activities in ward settings

Factors	Overall Attitude		Significance
	Favourable N(%)	Unfavourable N(%)	
Duration of service			
Equal or less than 10 years	248 (78.7)	67 (21.3)	χ^2=3.81 df=1 p=0.075
More than 10 years	73 (70.1)	31 (29.9)	
Postgraduate training			
Obtained/currently involved	88 (79.3)	23 (20.7)	χ^2=0.600 df=1 p=0.439
Not having postgraduate training	233 (75.6)	75 (24.4)	
Diagnosed NCD among study participants			
Yes	70 (75.2)	23 (24.8)	χ2=0.120 df=1 p=0 .729
No	251 (76.9)	75 (23.1)	

Table 5 describes the association between the practice of giving tertiary preventive advices to inpatients diagnosed to have NCDs and giving secondary prevention advices to high risk inpatients for future NCDs.

Providing tertiary preventive advice was not significantly associated with service duration (p=0.573), whether the study unit was diagnosed with a NCD (p=0.319), possessing a postgraduate qualification or being in post graduate training (0.258), overall knowledge (p=0.838) or overall attitudes (p=0.448) of the study population. The practice of providing inpatients without NCD but having NCD risk factors with advice on secondary NCD prevention was not associated with duration of service (p=0.148), whether the study unit was diagnosed with a NCD (p=0.143), possessing a postgraduate qualification or being in post graduate training (p=0.432), overall knowledge (p=0.317) or overall attitude (p=0.121) of the study population.

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Table 5: Factors associated with applying NCD prevention activities in ward settings

Factors	Practices		Significance
	Good N(%)	Poor N(%)	
Advice on tertiary prevention of NCDs to inpatients diagnosed to have NCDs			
Duration of service			
Equal or less than 10 years	285 (90.5)	30 (9.0)	χ^2=0.318 df=1 p=0.573
More than 10 years	96 (92.3)	8 (7.7)	
Postgraduate training			
Obtained/currently involved	98 (88.3)	13 (11.7)	χ^2=1.066 df=1 p =0.258
Not having postgraduate training	283 (91.9)	25 (8.1)	
Diagnosed NCD among study population			
Yes	87 (93.5)	6 (6.5)	χ^2=0.993 df=1 p=0.319
No	294 (90.2)	32 (9.8)	
Overall knowledge			
Poor	214 (90.7)	22 (9.3)	χ^2=0.420 df=1 p =0.838
Good	167 (91.3)	16 (8.7)	
Overall attitude			
Favourable	290 (90.3)	31 (9.7)	χ^2=0.576 df=1 p =0.448
Unfavourable	91 (92.9)	7 (7.1)	
Advice on secondary prevention to high risk inpatients for future NCDs			
Duration of service			
Equal or less than 10 years	219 (69.5)	96 (30.5)	χ^2=2.095 df=1 p=0.148
More than 10 years	80 (76.9)	24 (23.1)	
Postgraduate training			
Obtained/currently involved	76(68.5)	35(31.5)	χ^2=0.618 df=1 p =0.432
Not having postgraduate training	223(72.4)	85(27.6)	
Diagnosed NCD among study population			
Yes	72 (72.4)	21 (22.6)	χ^2=2.147 df=1 p=0.143
No	227 (69.6)	99 (30.4)	
Overall knowledge			
Poor	173 (73.3)	63 (26.7)	χ^2=1.000 df=1 p =0.317
Good	126 (68.9)	57 (31.1)	
Overall attitude			
Favourable	223 (69.5)	98 (30.5)	χ^2=2.399 df=1 p =0.121
Unfavourable	76 (77.6)	22 (22.4)	

Discussion

Basic characteristics of the study population

Approximately half (50.3%) of the study population were young (25-34 years) indicating that they have served only a few years in hospitals. Most serving in medical and medical related sub specialties (56.4%) would have given them more opportunities to interact with NCD patients. Approximately one fourth (26.5%) was currently undergoing/possessed post graduate qualifications. Irrespective of the discipline of postgraduate training these study units are expected to be more knowledgeable regarding prevention of NCDs.

Knowledge on NCDs and its prevention

Possessing knowledge on modifiable risk factors is the key to apply primary NCD preventive strategies. The fact that only 37.7% of the study participants were able to name four common modifiable risk factors indicates a gap in the knowledge.

Screening for NCDs is a secondary preventive strategy that is highly advocated in the country at present. The Ministry of Health has taken many measures in the recent past to improve screening services for NCDs in the country. In the present study only 41.4% could accurately name three NCDs that could be identified by screening and only about half (54.4%) were aware of the recommended age for screening of NCDs. Poor referral systems and lack of integration of services between curative and preventive sector could be a reason for the poor knowledge on NCD screening services among the study population who are from the curative sector.

Though there were indications that the study population was knowledgeable (77.6%) on the type of fat that should be consumed in lesser amounts to prevent NCDs, identification of the main type of fat contained in food items was poor. The responses in relation to coconut oil 35.1 % and butter 19.6% were incorrect. This demonstrated the lack of capability of translating technical knowledge when giving practical information relevant to the patients.

Accurate identification of serving sizes per day per adult for the food items of sugar, salt, fruits and vegetables was done only by 12.2%, 39.1% and 14.3% respectively. This indicates very poor knowledge on food based dietary guidelines.

Regarding physical activity only 22.7% knew the WHO recommended level of physical exercise–to prevent NCDs. There was also evidence that knowledge on recommendations regarding alcohol and smoking was also lacking. Only 40.6% knew the recommendation on alcohol to prevent ischemic heart disease accurately and only 54.4% knew that smoking cessation counselling to smokers should be to stop smoking instantly.

Though many knew the formula to estimate BMI, the range of values of the BMI for different nutritional status was known only to 69.7%. In spite of the poor technical knowledge as shown above, a high proportion (68%) was able to identify three primary and primordial NCD preventive activities that can be applied on inpatients in the ward settings. This highlights that the knowledge gap at present is mainly the technical information to be used in primary and primordial preventive activities.

As expected, overall knowledge categorization showed that a majority (56.3%) of grade medical officers had poor knowledge on NCD and NCD preventive activities that can be applied at ward settings.

Few other research which had studied knowledge of medical officers on NCD prevention in the world also have found that the knowledge among medical officers on this aspect to be

poor. The in Guatemala in year 2011 had found that knowledge on disease screening recommendations was poor among the internal medical physicians[8]. The study in China to assess the influence of education and working background on knowledge on the secondary prevention guidelines for coronary heart disease found that 53.9% of the study participants from 837 total physicians possessed the required knowledge[11].

Exploring the methods utilised to update only 28.9% had indicated continuous professional development programme, in the present study. The fact that Ministry of Health or any other organization is not offering a structured continuous medical education programme to grade medical officers would have contributed to this pattern of response. This is in spite of having human resource development in NCD prevention high on the policy agenda to prevent NCDs in the country.

In the present study it was revealed that three quarters (76.6%, N=321) of the study population possessed favourable attitudes towards implementation of NCD prevention activities in ward settings which provides a basis for good practice. It was encouraging to see that 92.4% of study population opposed the statement that, doctors in hospitals should not implement NCD prevention activities as it is not part of curative services. At the same time, the fact that approximately one fourth (27%) of study population felt that doctors cannot contribute towards NCD prevention because they are overburdened with ward work, was of concern. It highlights the need to improve efficient utilization of limited resources in managing the wards to promote the application of NCD prevention strategies in wards.

The literature on medical officers' attitudes on NCD prevention activities in ward settings was sparse.
In a study conducted in China among general practitioners 99.3% of the study population believed that changing life styles may help to prevent NCDs and 100% intended to practice NCD prevention activities in their clinic work[15]. A study conducted in Saudi Arabia on the attitude of physicians in a major teaching hospital towards atherosclerotic risk reduction therapy in patients with peripheral arterial disease revealed that attitude towards routine patient counselling with regards to risk factor control was suboptimal[16].

Training of medical officers emphasizes the need for them to provide information to patients with regards to NCD control. In the management of NCDs this aspect is important because of its chronic nature. The involvement of family members is a major factor in disease control and prevention of complications. This offers the medical officers opportunities to apply primary, secondary and tertiary preventive activities in the ward settings. The present study identified that less than half (41.3 %) of study population take the opportunity to advice all the patients with NCDs on life style modifications to improve control and to avoid future complications. Life style modification advice should be universally provided to all NCD patients and this highlights an important gap in practices related to NCD prevention. Only 14.3% of medical officers advised all family members of inpatients about their role in patient management, again highlighting an important loss of a valuable opportunity to access family members. The interactions with the family members could be limited due to hospital regulation of visiting times and not having any special arrangements to have family meetings.

Only 14.6% doctors utilized the valuable opportunities given to them to apply primary or primordial NCD preventive strategies on family members who visit the ward. This again highlights the limited interactions of medical officers with family members. In addition, only one quarter (26.3%) of grade medical officers applied primordial or primary prevention strategies on patients admitted due to diseases other than NCDs and only 16% advised on NCD screening. Less than half of medical officer's utilized the opportunity of advising all

inpatients on stopping smoking (44.4%) and stopping alcohol (34.4%). These indicate lost opportunities to provide information to patients when they are more likely to be receptive to health information.

In this study 85.9%, reported that lack of time was the main barrier. In addition to that 47% stated lack of training and 32% lack of knowledge as the main barriers for implementation of NCD prevention activities in the ward settings. A study among hospital doctors in Guatemala also identified that lack of time, inadequate resources, as well as out of pocket expenditure for patients as barriers in the application of NCD preventive services in the clinical setup[8]. In the study in China Xuhui district poor patient compliance (77.6%), lack of medical consultation time (49%), lack of related educational knowledge (25.9%) and lack of technique of behavioral medicine (18.4%) were identified as the main barriers to implementation of NCD preventive services by general practitioners[15]. A study conducted in Chile to assess training needs among primary care physicians found out that a majority requested for continued further training in nutrition for prevention of NCDs[17].

Factors associated with knowledge, attitudes and practices of grade medical officers in application of NCD prevention activities in ward settings

The present study found that medical officers with post graduate qualifications or those who were being trained for post graduate qualifications showed better overall knowledge compared to those who did not have any training ($p<0.001$). This can be taken as evidence of success of continuing education as a strategy to improve knowledge among medical officers.

As expected those with favourable overall attitudes showed better knowledge ($p=0.003$). Surprisingly, suffering from a NCD was not associated with improved level of knowledge on NCD preventive strategies in ward settings.
The practices of advising the patients with already diagnosed NCD or advising patients with risk factors for development of NCDs did not differ significantly based on the service duration, having or undergoing a post graduate training, suffering from an NCD, overall knowledge level or the overall attitudes. This highlights the need to modify post graduate training to inculcate this practice and also highlights that mere improvement of knowledge or attitudes is inadequate to improve practices among grade medical officers related to applying NCD prevention in ward settings.

This study was conducted in two leading teaching hospitals of the country with better resources which would have provided the grade medical officers with higher educational opportunities. Therefore, generalizability of the study to other teaching hospitals should be done cautiously.

Conclusions and recommendations

A majority of grade medical officers had poor overall knowledge on NCD and NCD prevention and strategies that can be applied in ward settings. Attitudes on applying NCD preventive strategies in ward settings were mostly favourable. Application of primary, secondary and tertiary NCD preventive strategies in the ward settings by the grade medical officers was found to be suboptimal.

The study recommends improving accessibility to post graduate education to improve knowledge of medical officers on NCD prevention. There were indications of lack of opportunities to participate in continuous medical education. Improving such opportunities is also recommended. Considering the fact that some medical officers considered lack of time as a reason engage in NCD prevention, the study recommends to take steps to improve

management in the wards to ease the burden and to promote medical officers to take up NCD preventive activities in wards.

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