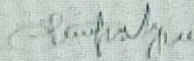January 22, 2022

To

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It is my pleasure to inform you that your article entitled "Egyptian Physicians'
Lifestyle Behaviors and Health Promotion Activities Towards Patients with Chronic
Non-Communicable Diseases" has been accepted by "Discovery Scientific Society".
The same is scheduled for publication in the Journal "MEDICAL SCIENCE".

With best regards

Seenivasagam R
Editor-in-Chief
Discovery Scientific Society

# Egyptian Physicians' Lifestyle Behaviors and Health Promotion Activities Towards Patients with Chronic Non-Communicable Diseases

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**Running title: Physicians' lifestyle & health promotion**

## ABSTRACT

**Introduction:** The primary prevention of chronic non-communicable diseases (NCDs) is based on health promotion activities aiming to protect people against unhealthy lifestyle behaviours. This study aimed to assess lifestyles, the perceived level of training on and practicing health promotion among physicians working in Benha City, Egypt.

**Materials and methods:** This cross-sectional study was conducted on physicians working at public health facilities in Benha. A designed questionnaire was used to collect data on sociodemographic characteristics, lifestyle behaviours, perceived level of training on and practices health promotion among physicians.

**Results:** The study recruited 260 physicians (response rate = 67.7%). Their ages ranged between 27 and 70 years. 10.8% of physicians have been ever smoked, and 50% slept 6-8 hours per day. About two-thirds of physicians ate <3 portions of fruit/ vegetable daily and were physically active. Three-quarters were overweight/ obese. Less than one-third were very prepared on counseling for weight control, nutrition, exercise, breast cancer, and cervical cancer. Most physicians advised their patients to eat healthy food and take medication properly. Physical exercise, avoiding smoking, and avoiding alcohol intake were advised by 55.4%, 21.5%, and 3.8%, respectively. Physical activity was associated with providing counselling about nutrition, exercise, and smoking avoidance.

**Conclusion:** Considerable proportions of physicians reported not engaging in healthy lifestyle behaviours, which might impact their health and render them less likely to encourage such behaviours in their patients.

**KEYWORDS:** *Physicians; Lifestyle behaviors; Health promotion activities; Non-Communicable Diseases; NCDs; Egypt.*

## INTRODUCTION

Chronic non-communicable diseases (NCDs) including cardiovascular diseases, cancers, respiratory diseases, and diabetes represent 71% of global deaths [1]. NCDs are predisposed by adverse lifestyle/ risk factors such as smoking, unhealthy diet, alcohol intake, stress, and sedentary life. These diseases can affect any age however, they are more common in old age people particularly, in low-and middle-income countries reaching epidemic patterns. Thus, the prevention of NCDs and reduction of premature deaths (deaths between 30 and 69 years old) due to NCDs constituted important components of sustainable development goals by the year 2030 [2;3].

The primary prevention and control of NCDs are based on health promotion activities aiming to protect people against predisposing factors such as exposure to tobacco smoke, alcohol intake, excess salt intake, unhealthy food with excess trans-fat, encouraging physical activity, and regulation of work and rest times [4].

It is important for health professionals to practice healthy lifestyle behaviours, including physical activity, healthy food (rich in fruits, vegetables, fish, nuts, and seeds), adequate sleeping (at least 8 hours per day), reduce stress, avoid smoking, and avoid alcohol intake. These behaviours will reduce the risk of NCDs and promote wellbeing in health professionals [5].

In addition, it has been shown that the engagement in sound lifestyle behaviours would enhance health professionals to provide preventive counselling to their patients and make them more self-confident and more convincing when motivating patients to avoid health-risk behaviours [6;7]. A systematic review of published literature on physical activity among physicians and counselling practices on physical activity between 2000 and 2010 found significant evidence that physicians who practice physical exercise regularly were more likely to provide counselling on physical activity to their patients [8]. This was also concluded by the prospective cohort study of

Seguimiento Universidad de Navarra (SUN), which found that doctors who were adherent to a healthy Mediterranean diet and physical activity were more likely involved in patient counselling on a healthy diet and exercise. In addition, doctors who were current or former smokers were unlikely involved in smoking cessation practices [9].

In Egypt, NCDs constitute a substantial burden on the different health, economic and social sectors. They accounted for 82% of all deaths and 67% of premature deaths. Moreover, the Egyptian community-based survey 2011-2012 revealed a progressive increase in the prevalence of adverse behaviours such as smoking, overweight/ obesity, and physical inactivity [10]. In addition, unsatisfactory physicians' lifestyle was observed where only 44.6% of healthcare providers practice physical exercise [11] and 21.5% of physicians were current smokers [12]. This might affect their abilities to actively contribute to the prevention and control of NCDs.

There is lacking research on health professionals 'lifestyle behaviours and health promotion activities in Egypt. This study is the first in Egypt to investigate the different aspects of lifestyle among physicians and their health-promoting activities provided to patients with NCDs.

*Aims and objectives*

This study aimed to reduce the risk and complications of NCDs through better health promotion practices provided to patients by health professionals in Benha City, Egypt. The specific objectives were as follows:

- To assess the lifestyle behaviours of physicians working at governmental health facilities in Benha City.
- To identify health-promoting activities conducted by physicians towards their NCDs patients.
- To evaluate the level of training of physicians on the different health-promoting activities.
- To identify the relationship between physicians' lifestyle and health promotion practices.

**MATERIALS AND METHODS**

*Study design:*

This is a questionnaire-based cross-sectional study

*Study setting:*

4

The study was conducted during November and December 2020 on physicians working at governmental health facilities in Benha City, Egypt. Benha is the Capital of Qalyubiya Governorate, 45 Km. north of Cairo. It has a population of 174,518 in 2018 and its surface area is 10.9 Km$^2$ [13]. In Benha, public health facilities comprised two general hospitals (Benha Teaching Hospital and Benha University Hospital), five specialized hospitals (Benha Children Specialist Hospital, Chest Hospital, Fever Hospital, Ophthalmic Hospital, and Dermatology and Leprosy Hospital), and four Primary Health Centres (PHCs).

*Sample size estimation:*

The minimal sample size was calculated using the following formula:

$$\text{Sample size} = \frac{Z_{1-\alpha/2}{}^2\, P(1-P)}{d^2}$$

Where

$Z_{1-\alpha/2}=$ is the standard normal variate at 5% type 1 error (P<0.05); it is 1.96.

P= the expected proportion based on previous studies.

d= the absolute error (0.05)

The expected proportion was considered 50% since there were no previous studies in Egypt and to maximize the sample size. The calculated sample size was 384.

*Sampling method:*

One general hospital, one specialty hospital, and one PHC were randomly selected. Physicians were chosen from the selected health facilities using the systematic random sampling method from physician lists.

*Inclusion criteria:*

Physicians working at governmental health facilities in Benha City, who were caring for patients with NCDs, had work experience more than one year, and agreed to participate in the study were eligible for the study.

*Exclusion criteria:*

Physicians with work experience of less than one year, not dealing with patients with NCDs, and those who were on leave during the period of the study were excluded.

*Ethical considerations:*

This study was done in accordance of the Helsinki declaration of the ethical principles for medical research involving humans and was approved by the Research Ethics Committee of Benha Faculty of Medicine (RC 11-8-2021).

An informed consent was obtained from all participants. This included all details about the study (title, objectives, methods, expected benefits and risks, and confidentiality of data).

*Data collection tools:*

A designed questionnaire was developed based on previous relevant studies [14;15]. A telephone interview and a supplementary online link, using Google form, were used to collect data. the questionnaire collects data on the following:

- Sociodemographic characteristics: These comprised items such as age, gender, work experience, marital status, and self-reported health status.

- The participants' body mass index (BMI): Participants were inquired to report their weight and height, and their BMI was calculated by dividing weight in kilograms by height in meters squared.

- Health professionals' lifestyle behaviours: The study participants were asked about i) smoking status (ever smoker vs. never smoker), ii) hours of sleep per day, iii) number of portions of fruits/vegetables eaten per day, iv) the number of hours spent watching TV on a normal weekday, v) alcohol consumption (yes vs. no), and vi) physical activity, according to the International Physical Activity Questionnaire (IPAQ) [15;16] that inquiries on physical activity in the last seven days as regards the number of days you practiced moderate/ vigorous physical activities and the duration (in minutes) of physical activity per day. Physically inactive participants are those who do not spend at least 150 minutes per week doing moderate-to-vigorous physical activity.

- Health professionals' perceived level of training on health promoting activities: Health professionals were asked about their level of training on health-promoting activities regarding nutrition, exercise, weight control, breast cancer, and cervical cancer. They were asked to rate their preparedness for health-promoting activities as "unprepared", "somewhat prepared", or "very prepared."

- Health promoting activities: Physicians were asked whether they advise their patients with NCDs, such as obesity, dyslipidaemia, hypertension, type 2 diabetes, and cancer e.g., breast or cervical cancer, to eat healthy food, practice physical exercise, avoid smoking, avoid alcohol intake, and to take treatment properly (yes *vs*. no).

*Data management:*

The collected data were described as frequency and percentage for categorical data and mean ± Standard Deviation (SD) and range for numerical data. Comparisons between the different study groups were carried out using the Chi-square test ($X^2$) and the Fisher Exact Test (FET) as appropriate. P-values <0.05 were considered statistically significant. All statistical analyses were executed using the computerized statistical package STATA/SE version 11.2 for Windows (STATA Corporation, College Station, Texas).

**RESULTS**

The study recruited 260 physicians (response rate = 67.7%) from the different governmental health facilities (General hospitals (48.1%), specialty hospitals (42.7%), and PHCs (9.2%)) in Benha City. Their ages ranged between 27 and 70 years with an average age of 36 (±7.4) years, females accounted for 58.1%, and most participants were married (83.5%). The proportions of physicians who had master and doctorate degrees were 48.55 and 43.1%, respectively. Their work experience ranged between 3 and 45 years with an average of 12.2 (±7.7) years. 61.5% described their health status as regular/ good, 32.3% as very good/ excellent, and 6.1% as bad (Table 1).

Regarding the lifestyle behaviors of studied physicians (Table 2), 89.2% have never smoked before, their average sleep duration was 6.8 (±1.3) hours, the average number of fruits/ vegetables portions consumed per day was 2.2 (±1.5). The average time spent watching TV on normal weekends was 3.6 (±3.70 hours. Alcohol intake was not reported by any physicians.

About two-thirds of studied physicians were physically active (practiced moderate/ severe physical activities for at least 150 minutes per week). Their average BMI was 28.4 (±5.6) kg/m$^2$.

Self-perception for preparedness on health promotion activities by studied physicians is shown in Figure 1. More than half reported that they were somewhat prepared for health-promoting activities for weight control, physical exercise, and proper nutrition. While, 53.8% and 60.4% were unprepared for health promotion activities against breast and cervical cancer, respectively. Smaller proportions of physicians were very prepared on counseling for weight control (32.7%), nutrition (24.6%), exercise (22.3%), breast cancer (10.8%), and cervical cancer (10.4%).

Figure 2 demonstrates the frequency distribution of health promotion activities provided by studied physicians to their patients with NCDs (obesity, dyslipidemia, hypertension, type-2-diabetes, cervical, and breast cancers). The vast majority (95.4%) advised their patients to eat healthy food and 83.5% instructed patients to take medication properly. Physical exercise, avoiding smoking, and avoiding alcohol intake were instructed to patients by 55.4%, 21.5%, and 3.8%, respectively.

Variations in lifestyle behaviors by the sociodemographic characteristics of studied physicians are shown in Table 3. There were significant differences in the proportions of ever smokers and never smokers by physicians' age (p<0.01), gender (p<0.001), the type of health facility (p<0.01), and work experience (p<0.05). The average sleep duration per day was varied significantly by age of physicians (p<0.001), marital status (p<0.01), work experience (p<0.05), and health status (p<0.05). There were significant differences in the average number of fruits/ vegetables portions consumed daily between male and female physicians (p<0.001). The average number of hours watching TV on weekends varied significantly by age, marital status, and educational qualification at p<0.001, gender at p<0.01, and the type of health facility, work experience, and health status at p<0.05. The proportions of physically active physicians varied significantly by their age, marital status, and health status at p<0.05. There were significant differences in physical activity by the type of health facility, educational qualification, and work experience at p<0.01. There were significant differences in BMI by physicians' age, gender, marital status, the type of health facility, and work experience at p<0.001.

Table 4 shows variations in health promotion activities by the sociodemographic characteristics of studied physicians. There were significant differences in the proportion of physicians who

reported providing counseling about a healthy diet (p<0.05) by marital status and educational qualification. The proportions of physicians who advised their patients to practice physical exercise varied significantly by their marital status, educational qualification, and work experience at p<0.01 and health status at p<0.05. Counseling about avoiding smoking varied significantly by physicians' age and work experience (p<0.05), and educational qualification (p<0.01). There were significant differences in the proportions of physicians who provide advice to take medications properly by work experience (p<0.05) and to avoid alcohol by educational qualification (p<0.01).

Differences in health promotion activities in studied physicians by their lifestyle behaviors are shown in Table 5. Counseling about a healthy diet was associated with time watching TV and BMI at p<0.01 and physical activity at p<0.05. Counseling about physical exercise was associated with the physical activity of physicians (p<0.01) and the number of fruit/ vegetable portions consumed per day (p<0.05). Physical activity of physicians was associated with providing advice to avoid smoking (p<0.001). Sleep duration, the number of fruit/ vegetable portions consumed daily, and time watching TV were associated with counseling about avoiding alcohol intake at p<0.01. Counseling to take medications properly was associated with daily sleep duration (p<0.01) and the number of fruit/ vegetable portions consumed daily (p<0.05).

**DISCUSSION:**

This cross-sectional study was conducted on 260 physicians working at public health facilities (primary health care units, general hospitals, and specialty hospitals) in Benha City, Egypt, to portrait their lifestyle behaviours and their impacts on health-promoting activities provided to NCDs patients.

*Lifestyle behaviours*

In this study, 10.8% of physicians have been ever smokers. A higher prevalence of smoking was noticed among male physicians, ≥ 35 years old, those working at specialty hospitals, and with longer work experience. The prevalence of smoking in the present study was lower than previously recorded rates in Egypt [12;17;18], which might be due to the greater proportion of female participants (58.1%), meanwhile the proportion of ever smokers among male participants was 23.8% (26 out of 109). Generally, smoking is uncommon among females in Egypt as an

Arabic and Eastern country [18]. The prevalence of smoking in Egypt ranged between 19.7% [19] to 30% [20]. The prevalence of smoking was recorded among Egyptian physicians, where 12.5% of male physicians were current smokers and 5% were ex-smokers, while <1% of female physicians have ever been smokers [17]. Moreover, 21.5% out of 521 physicians were current smokers and 8.3% quitted smoking. Smoking was more prevalent among men, who were above 30 years old, and those who had postgraduate qualifications (p<0.001) [12]. Meanwhile, a lower prevalence (8.4%, n= 27) was reported among primary healthcare professionals in Riyadh, with more smokers among physicians compared to nurses. This low level was explained by the smoking prohibition and local policy in the selected centres [21]. Moreover, in Brazil, the prevalence of smoking among healthcare workers was recorded among community health workers (7.4 %), physicians (5.6%), and nurses (4.9 %). In addition, 12% of physicians and community health workers were former smokers [14]. Only 6% of physicians in the United States reported tobacco smoking in the past week [22].

The results of our study revealed that about half of the studied physicians slept 6-8 hours per day. The majority of physicians under 35 years old (83.3%) slept <6 hours per day. This might be due to junior physicians are more likely to work for longer duration and many work shifts particularly during the residency training [23]. The inadequate sleeping hours might be associated with bad health status compared to those who reported an average sleeping duration ≥6 hours per day. In Brazil, a nationwide survey of primary health care workers revealed that about 50% of physicians slept 3-6 hours during night [14]. In the United States, 33.7% of 763 physicians in California had only ≤6 hours of sleep daily [22].

The recommended daily intake of fruits/vegetables is five or more portions [24]. In this study, only 11.5% of physicians consumed ≥ 5 portions per day and most physicians ate <3 portions daily. However, higher proportions of healthcare workers in Brazil consumed ≥5 portions of fruit/ vegetable daily (36%, 28.8%, and 26% of physicians, nurses, and community health workers, respectively) [14]. In Saudi Arabia, three-fourths of health professionals at primary health care centres in Riyadh had >50% on the healthy diet score with no significant difference between physicians and nurses [21].

In the present study, 47.7% of physicians spent <3 hours watching TV on normal weekends, and those working at ‹(which was more likely physicians who were <35 years old (62.9%

educational tasks  the specialty hospitals (49.2%). This might be due to work overload and the most of It was also reported that .required from junior physiciansprimary healthcare workers in Brazil reported that they watch TV for ≤3 hours on weekends with doctors were less likely watching TV than nurses and community health workers [14].

Our results revealed that about two-thirds of studied physicians were physically active, according to the IPAQ. This was more likely among young, highly qualified doctors with work experience ≥ 5 years. Physical activity was associated with good health status among physicians. Similarly, a cross-sectional survey of physicians working in California, reported that 64.6% practiced moderate to vigorous exercise [22]. In Saudi Arabia, more than half of Saudi physicians reported physical exercise [25]. Similar results were recorded among primary healthcare works in Brazil [14]. However, a lower proportion was recorded in primary healthcare professionals in Riyadh (21.1%, n=68), which can be due to different tools used to assess physical activity [21]. Meanwhile, in Estonia, >90% of electronically surveyed family doctors were physically active [26]. The higher prevalence of physical activity among Europeans can be due to different cultures.

Despite the knowledge gained by physicians and healthcare workers about the health hazards of obesity, they are not immune against obesity. Our study revealed about three quarters of physicians were overweight /obese. Obesity was more likely among male physicians who were ≥35 years old. This might be due to females are more caring of their body shape, particularly the young. Correspondingly, only one third of health professionals in Riyadh were normal weight [21], 60.2% of male physicians in Poland were over-weight or obese [27], and 38% of primary health care physicians in the United States (n.=498) were overweight and 15% were obese [28]. Meanwhile, 63% of physicians in Estonia were normal weight [26].

*Preparedness on health promotion practices*

Healthcare personnel caring for patients with NCDs are recommended to be well-prepared to talk with their patients on health promoting behaviours such as healthy diet, exercise, weight control, as well as to guide cancer patients to follow sound lifestyle behaviours for better prognosis. The results of the present study showed that <25% of physicians were prepared to provide counselling about healthy nutrition and physical exercise, 32.7% were prepared to give advice about weight control, and more than half were unprepared to provide counselling about breast

and cervical cancers. Correspondingly, unsatisfactory awareness of 206 primary healthcare professionals working for five polyclinics in the Riyadh Province about hospitals' health promotion programs was recorded and training programs to improve health promoting practices within hospitals were recommended [29]. In line with our results, 36% of health professionals (n.=460) dealing with cancer patients had no idea about lifestyle guidelines for cancer survivors [30] ،However .Hidalgo et al. of very prepared doctors on nutrition higher proportions recorded breast cancer (69.2%), and cervical cancer ،(%74.2) weight control ،(%72.5) excercise ،(%57.1) [14] related health promoting activities (%70.3).

*Health promoting activities*

In our study, healthy diet intake was the most frequent (95.4%) advice given to patients with NCDs followed by taking medication properly (83.5%). Physical exercise was advised by more than half of physicians, while about one fifth advised their patients to avoid smoking. Alcohol avoidance was advised by minority of physicians because Egypt Saudi Arabia is an Islamic country and alcohol is prohibited in it. Data collected from 890 doctors who participated in the SUN cohort study revealed that 43%, 15% and 13% of them counselled all their patients about smoking cessation, exercise, and weight control and nutrition, respectively. Meanwhile, the proportions of doctors who advised 60-100 of their patients about smoking cessation, exercise, weight control, healthy nutrition, and alcohol avoidance/ reduction were 73%, 58%, 54%, 51%, and 44%, respectively [9]. In Brazil, >95% of physicians advised their patients with high BMI, dyslipidaemia, hypertension and type-2 diabetes to eat healthy diet, practice physical activity, avoid smoking, and control alcohol intake. While smoking avoidance, control alcohol intake, and taking medications properly were the most frequent advise given to patients with breast and cervical cancers (73.1%, 68.7%, and 54.1%, respectively) [14]. The differences in proportions can be due to different levels of training of physicians on health promotion, in addition to different culture and lifestyle behaviours in the different countries.

Sound lifestyle behaviours among health professionals would benefit both health professionals who enjoy better health and their patients who receive counselling to promote these behaviours in their lives. A consistent association was noticed between doctors who were physically active, adhered to a proper healthy diet, pay attention to health promotion, and spend more time providing counselling and explaining to their patients the best ways to exercise and eat healthy

food [8]. In agreement, in this study, physically active doctors were more likely to advise their patients about healthy diet, exercise and smoking avoidance. In addition, an association between adhering to healthy diet and giving counselling on diet and weight was reported in female US physicians [31].about  advise Similarly, normal weight physicians were more likely to give patients obese and more confident to provide diet and excersice counselling to weight control [28] than overweight and obese physicians.  ‹editerranean foodm yeating health ‹Moreover practicing physical activity, and avoidance of smoking in doctors were associated with longer [9] time spent in health promotion of their patients. In addition, non-smoker physicians were thought more competent to convince patients about smoking cessation than smokers [12].

lifestyle, as  yof health soriented about the benifit-t is evident that health professions are wellI regards diet, excersice, smoking, and sleep. However, they demonstrated unsatisfactory lifestyle. food catering and lacking  yThis can be predisposed by poor work environment such as unhealth k overload, working for long hours, and night facilities of within work physical activities, wor only one third  where ‹healthcare workers Unhealthy lifestyle can impact the health of .[21] shifts very good/ excellent and three quarters were  participants rated their health status as of the study .obese / overweight

This study has stregnths and drawbacks. Regarding the latter, it is aquestionnaire-based cross-sectional study, which reflects only the current situation and is not sufficient to prove a relationship between physicians' lifestyle and their health promoting activities. Moreover, subjective information is endangered by recall bias. Further large-scale objective follow-up studies are recommended to better identify the risk of unhealthy lifestyle on health promotion practices among physicians. In addition, the low response rate (67.7%) in this study might affect the external validity of the results. This low response rate was inevitable due to the circumstance of COVID-19 epidemic that overwhelmed all the health sectors and reduced doctors' ability to participate in the study. However, this study was the first to address lifestyle and health promoting activities among physicians in Egypt. The results of this study would through light on factors affecting health promotion practices by physicians, which is an essential component in the prevention and control of NCDs.

**CONCLUSION**

Finally, a considerable proportion of physicians reported not engaging in healthy lifestyle behaviours such as physical activity, healthy diet, adequate sleep, and normal body weight. This might impact their health and render them less likely to encourage such behaviours in their patients. The results of this study are expected to raise awareness and will help to develop comprehensive programs to improve health professionals' own lifestyle behaviours and health promoting practices.

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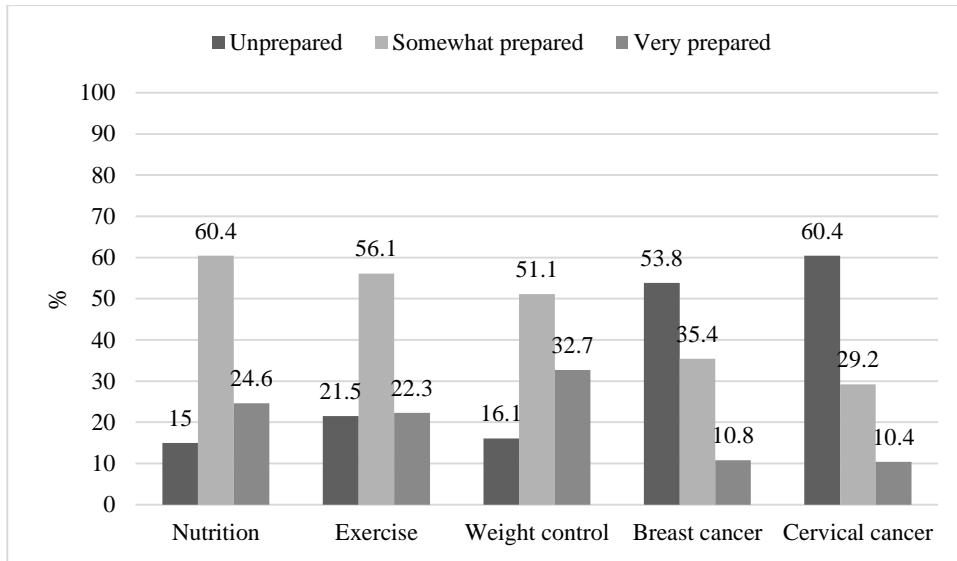
**Figure 1: Self-perception of preparedness on health promotion activities among studied physicians**
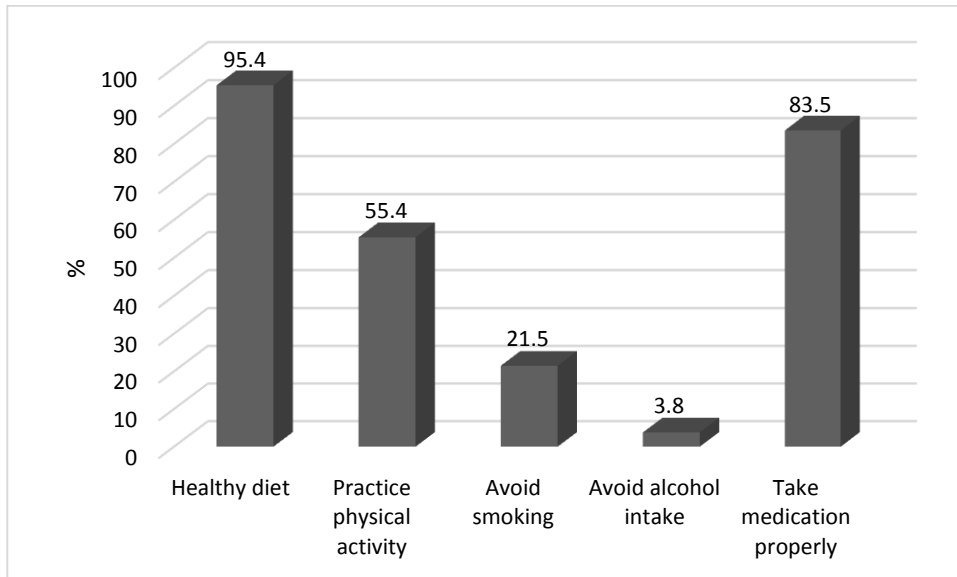


**Figure 2: Health promotion activities provided by studied physicians to patients with chronic non-communicable diseases (obesity, dyslipidaemia, hypertension, type-2 diabetes, cervical and breast cancers)**

**Table 1: Sociodemographic characteristics of the studied physicians**

| Characteristics | | Total number of physicians =260 | |
|---|---|---|---|
| | | No. | % |
| **Age (years)** | Mean ±SD; (range) | 36.0±7.4; (27-70) | |
| | <35 | 135 | 51.9 |
| | ≥35 | 125 | 48.1 |
| **Gender** | Female | 151 | 58.1 |
| | Male | 109 | 41.9 |
| **Marital status** | Divorced/ widowed | 23 | 8.8 |
| | Married | 217 | 83.5 |
| | Single | 20 | 7.7 |
| **Type of health facility** | General hospital | 125 | 48.1 |
| | Primary health centre | 24 | 9.2 |
| | Specialized hospital | 111 | 42.7 |
| **Educational qualification** | Doctorate | 112 | 43.1 |
| | Master | 126 | 48.5 |
| | Bachelor | 22 | 8.5 |
| **Work experience (years)** | Mean ±SD; (range) | 12.2±7.7; (3-45) | |
| | <5 | 14 | 5.4 |
| | 5-15 | 161 | 61.9 |
| | ≥15 | 85 | 32.7 |
| **Describe your health status** | Bad | 16 | 6.1 |
| | Regular/ good | 160 | 61.5 |
| | Very good/ excellent | 84 | 32.3 |

**Table 2: Lifestyle behaviours among studied physicians**

| Lifestyle behaviours | | Total number of physicians =260 | |
|---|---|---|---|
| | | **%** | **No.** |
| **Smoking status** | Ever smoker | 28 | 10.8 |
| | Never smoker | 232 | 89.2 |
| **Average sleep duration per day in hours** | Mean ±SD; (range) | 6.8±1.3; (2-10) | |
| | <6 | 36 | 13.8 |
| | 6-8 | 131 | 50.4 |
| | ≥8 | 93 | 35.8 |
| **Average number of fruits/vegetables portions consumed per day** | Mean ±SD; (range) | 2.2±1.5; (0-8) | |
| | <3 | 180 | 69.2 |
| | 3- | 50 | 19.2 |
| | ≥5 | 30 | 11.5 |
| **Time watching TV on a normal weekend in hours** | Mean ±SD; (range) | 3.6±3.7; (0-18) | |
| | <3 | 124 | 47.7 |
| | 3-5 | 77 | 29.6 |
| | ≥5 | 59 | 22.7 |
| **Alcohol consumption** | No | 260 | 100.0 |
| | Yes | 0 | 0.0 |
| **Physical activity [a]** | Active | 174 | 66.9 |
| | Inactivity | 86 | 33.1 |
| **BMI (kg/m$^2$)** | Mean ±SD; (range) | 28.4±5.6; (19.0-54.1) | |
| | Normal weight (18.5-24.9) | 68 | 26.1 |
| | Overweight (25.0-29.9) | 106 | 40.8 |
| | Obese (≥30.0) | 86 | 33.1 |

a: Physical activity= practice moderate/severe physical activities for at least 150 minutes per week; Physical inactivity= do not spend at least 150 minutes per week doing moderate/severe physical activity

**Table 3: Variations in physicians' lifestyle behaviours by sociodemographic characteristics**

| Characteristics | Smoking status | | Average sleep duration per day in hours | | | Average number of fruits/vegetables portions consumed per day | | | Time watching TV on a normal weekend in hours | | | Physical activity [a] | | BMI (kg/m²) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ever smoker (n.=28) | Never smoker (n.=232) | <6 (n.=36) | 6-8 (n.=131) | ≥8 (n.=93) | <3 (n.=180) | 3-5 (n.=50) | ≥5 (n.=30) | <3 (n.=124) | 3-5 (n.=77) | ≥5 (n.=59) | Inactive (n.=86) | Active (n.=174) | Normal weight (18.5-24.9) (n.=68) | Overweight (25.0-29.9) (n.=106) | Obese (≥30.0) (n.=86) |
| **Age (years)** | ** | | *** | | | | | | *** | | | * | | *** | | |
| <35 | 8(28.6) | 127(54.7) | 30(83.3) | 56(42.7) | 49(52.7) | 96(53.3) | 27(54.0) | 12(40.0) | 78(62.9) | 26(33.8) | 31(52.5) | 35(40.7) | 100(57.5) | 48(70.6) | 55(51.9) | 32(37.2) |
| ≥35 | 20(71.4) | 105(45.3) | 6(16.7) | 75(57.2) | 44(47.3) | 84(46.7) | 23(46.0) | 18(60.0) | 46(37.1) | 51(66.2) | 28(47.5) | 51(59.3) | 74(42.5) | 20(29.4) | 51(48.1) | 54(62.8) |
| **Gender** | *** | | | | | *** | | | ** | | | | | *** | | |
| Female | 2(7.1) | 149(64.2) | 22(61.1) | 74(56.5) | 55(59.1) | 110(61.1) | 35(70.0) | 6(20.0) | 76(61.3) | 32(41.6) | 43(72.9) | 43(50.0) | 108(62.1) | 58(85.3) | 59(55.7) | 34(39.5) |
| Male | 26(92.9) | 83(35.8) | 14(38.9) | 57(43.5) | 38(40.9) | 70(38.9) | 15(30.0) | 24(80.0) | 48(38.7) | 45(58.4) | 16(27.1) | 43(50.0) | 66(37.9) | 10(14.7) | 47(44.3) | 52(60.5) |
| **Marital status** | | | ** | | | | | | *** | | | * | | *** | | |
| Divorced/ widowed | 2(7.1) | 21(9.0) | 8(22.2) | 6(4.6) | 9(9.7) | 16(8.9) | 5(10.0) | 2(6.7) | 6(4.8) | 6(7.8) | 11(18.6) | 13(15.1) | 10(5.7) | 0(0.0) | 17(16.0) | 6(7.0) |
| Married | 26(92.9) | 191(82.3) | 22(61.1) | 115(87.8) | 80(86.0) | 148(82.2) | 45(90.0) | 24(80.0) | 108(87.1) | 71(92.2) | 38(64.4) | 69(80.2) | 148(85.1) | 56(82.3) | 89(84.0) | 72(83.7) |
| Single | 0(0.0) | 20(8.6) | 6(16.7) | 10(7.6) | 4(4.3) | 16(8.9) | 0(0.0) | 4(13.3) | 10(8.1) | 0(0.0) | 10(16.9) | 4(4.6) | 16(9.2) | 12(17.6) | 0(0.0) | 8(9.3) |
| **Type of health facility** | ** | | | | | | | | * | | | ** | | *** | | |
| General hospital | 8(28.6) | 117(50.4) | 10(27.8) | 65(49.6) | 50(53.8) | 89(49.4) | 22(44.0) | 14(46.7) | 49(39.5) | 48(62.3) | 28(47.5) | 37(43.0) | 88(50.6) | 52(76.5) | 49(46.2) | 24(27.9) |
| Primary health centre | 0(0.0) | 24(10.3) | 6(16.7) | 12(9.2) | 6(6.4) | 22(12.2) | 2(4.0) | 0(0.0) | 14(11.3) | 2(2.6) | 8(13.6) | 2(2.3) | 22(12.6) | 4(5.9) | 14(13.2) | 6(7.0) |
| Specialized hospital | 20(71.4) | 91(39.2) | 20(55.6) | 54(41.2) | 37(39.8) | 69(38.3) | 26(52.0) | 16(53.3) | 61(49.2) | 27(35.1) | 23(39.0) | 47(54.6) | 64(36.8) | 12(17.6) | 43(40.6) | 56(65.1) |
| **Educational qualification** | | | | | | | | | *** | | | ** | | | | |
| Doctorate | 14(50.0) | 98(42.2) | 12(33.3) | 63(48.1) | 37(39.8) | 76(42.2) | 18(36.0) | 18(60.0) | 36(29.0) | 51(66.2) | 25(42.4) | 48(55.8) | 64(36.8) | 22(32.3) | 52(49.1) | 38(44.2) |
| Master | 14(50.0) | 112(48.3) | 22(61.1) | 60(45.8) | 44(47.3) | 86(47.8) | 30(60.0) | 10(33.3) | 78(62.9) | 20(26.0) | 28(47.46) | 28(32.6) | 98(56.3) | 38(55.9) | 48(45.3) | 40(46.5) |
| Bachelor | 0(0.0) | 22(9.5) | 2(5.6) | 8(6.1) | 12(12.9) | 18(10.0) | 2(4.0) | 2(6.7) | 10(8.1) | 6(7.8) | 6(10.2) | 10(11.6) | 12(6.9) | 8(11.8) | 6(5.7) | 8(9.3) |
| **Work experience (years)** | * | | * | | | | | | * | | | ** | | *** | | |
| <5 | 0(0.0) | 14(6.0) | 6(16.7) | 4(3.0) | 4(4.3) | 10(5.6) | 2(4.0) | 2(6.7) | 8(6.4) | 2(2.6) | 4(6.8) | 4(4.6) | 10(5.7) | 4(5.9) | 2(1.9) | 8(9.3) |
| 5-15 | 12(42.9) | 149(64.2) | 24(66.7) | 78(59.5) | 59(63.4) | 114(63.3) | 33(66.0) | 14(46.7) | 86(69.3) | 38(49.3) | 37(62.7) | 41(47.7) | 120(69.0) | 50(73.5) | 73(68.9) | 38(44.2) |
| ≥15 | 16(57.1) | 69(29.7) | 6(16.7) | 49(37.4) | 30(32.3) | 56(31.1) | 15(30.0) | 14(46.7) | 30(24.2) | 37(48.0) | 18(30.5) | 41(47.7) | 44(25.3) | 14(20.6) | 31(29.2) | 40(46.5) |
| **Describe your health status** | | | * | | | | | | * | | | * | | | | |
| Bad | 0(0.0) | 14(6.03) | 6(16.7) | 4(3.0) | 4(4.3) | 10(5.6) | 2(4.0) | 2(6.7) | 8(6.4) | 2(2.6) | 4(6.8) | 10(11.6) | 6(3.45) | 6(8.8) | 4(3.8) | 6(7.0) |
| Regular/ good | 14(50.0) | 147(63.4) | 24(66.7) | 78(59.5) | 59(63.4) | 114(63.3) | 33(66.0) | 14(46.7) | 86(69.3) | 38(49.3) | 37(62.7) | 52(60.5) | 108(62.1) | 42(61.8) | 60(56.6) | 58(67.4) |
| Very good/ excellent | 14(50.0) | 71(30.6) | 6(16.7) | 49(37.4) | 30(32.3) | 56(31.1) | 15(30.0) | 14(46.7) | 30(24.2) | 37(48.0) | 18(30.5) | 24(27.9) | 60(34.5) | 20(29.4) | 42(39.6) | 22(25.6) |

Data were presented as n (%); The Chi-square test and Fisher exact test were used for comparisons as appropriate; * $p<0.05$; ** $p<0.01$; *** $p<0.001$; a: Physical activity= practice moderate/severe physical activities for at least 150 minutes per week; Physical inactivity= do not spend at least 150 minutes per week doing moderate/severe physical activity

**Table 4: Variations in health promotion activities provided by studied physicians by sociodemographic characteristics**

| Characteristics | Health promotion activities | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Healthy diet | | Practice physical exercise | | Avoid smoking | | Avoid alcohol | | Take medications properly | |
| | No (n.=12) | Yes (n.=248) | No (n.=116) | Yes (n.=144) | No (n.=204) | Yes (n.=56) | No (n.=250) | Yes (n.=10) | No (n.=43) | Yes (n.=217) |
| **Age (years)** | | | | | * | | | | | |
| <35 | 6(50.0) | 129(52.0) | 57(49.1) | 78(54.2) | 99(48.5) | 36(64.3) | 129(51.6) | 6(60.0) | 27(62.8) | 108(49.8) |
| ≥35 | 6(50.0) | 119(48.0) | 59(50.9) | 66(45.8) | 105(51.5) | 20(35.7) | 121(48.4) | 4(40.0) | 16(37.2) | 109(50.2) |
| **Gender** | | | | | | | | | | |
| Female | 8(66.7) | 143(57.7) | 71(61.2) | 80(55.6) | 119(58.3) | 32(57.1) | 143(57.2) | 8(80.0) | 23(53.5) | 128(59.0) |
| Male | 4(33.3) | 105(42.3) | 45(38.8) | 64(44.4) | 85(41.7) | 24(42.9) | 107(42.8) | 2(20.0) | 20(46.5) | 89(41.0) |
| **Marital status** | * | | ** | | | | | | | |
| Divorced/ widowed | 0(0.0) | 23(9.3) | 17(14.7) | 6(4.2) | 21(10.3) | 2(3.6) | 23(9.2) | 0(0.0) | 3(7.0) | 20(9.2) |
| Married | 8(66.7) | 209(84.3) | 95(81.9) | 122(84.7) | 167(81.9) | 50(89.3) | 209(83.6) | 8(80.0) | 36(83.7) | 181(83.4) |
| Single | 4(33.3) | 16(6.4) | 4(3.4) | 16(11.1) | 16(7.8) | 4(7.1) | 18(7.2) | 2(20.0) | 4(9.3) | 16(7.4) |
| **Type of health facility** | | | | | | | | | | |
| General hospital | 8(66.7) | 117(47.2) | 51(44.0) | 74(51.4) | 95(46.6) | 30(53.6) | 123(49.2) | 2(20.0) | 18(41.9) | 107(49.3) |
| Primary health centre | 2(16.7) | 22(8.9) | 14(12.1) | 10(6.9) | 18(8.8) | 6(10.7) | 24(9.6) | 0(0.0) | 4(9.3) | 20(9.2) |
| Specialized hospital | 2(16.7) | 109(43.9) | 51(44.0) | 60(41.7) | 91(44.6) | 20(35.7) | 103(41.2) | 8(80.0) | 21(48.8) | 90(41.5) |
| **Educational qualification** | * | | ** | | ** | | ** | | | |
| Doctorate | 2(16.7) | 110(44.3) | 50(43.1) | 62(43.1) | 96(47.1) | 16(28.6) | 112(44.8) | 0(0.0) | 19(44.2) | 93(42.9) |
| Master | 6(50.0) | 120(48.4) | 64(55.2) | 62(43.1) | 96(47.1) | 30(53.6) | 116(46.4) | 10(100.0) | 18(41.9) | 108(49.8) |
| Bachelor | 4(33.3) | 18(7.3) | 2(1.7) | 20(13.9) | 12(5.9) | 10(17.9) | 22(8.8) | 0(0.0) | 6(13.9) | 16(7.4) |
| **Work experience (years)** | | | ** | | * | | | | * | |
| 0-5 | 0(0.0) | 14(5.6) | 0(0.0) | 14(9.7) | 12(5.9) | 2(3.6) | 12(4.8) | 2(20.0) | 6(13.9) | 8(3.7) |
| 5-15 | 8(66.7) | 153(61.7) | 77(66.4) | 84(58.3) | 117(57.3) | 44(78.6) | 155(62.0) | 6(60.0) | 27(62.8) | 134(61.7) |
| ≥15 | 4(33.3) | 81(32.7) | 39(33.6) | 46(31.9) | 75(36.8) | 10(17.9) | 83(33.2) | 2(20.0) | 10(23.3) | 75(34.6) |
| **Describe your health status** | | | * | | | | | | | |
| Bad | 0(0.0) | 16(6.4) | 12(10.3) | 4(2.8) | 14(6.9) | 2(3.6) | 16(6.4) | 0(0.0) | 2(4.6) | 14(6.4) |
| Regular/ good | 10(83.3) | 150(60.5) | 66(56.9) | 94(65.3) | 118(57.8) | 42(75.0) | 154(61.6) | 6(60.0) | 27(62.8) | 133(61.3) |
| Very good/ excellent | 2(16.7) | 82(33.1) | 38(32.8) | 46(31.9) | 72(35.3) | 12(21.4) | 80(32.0) | 4(40.0) | 14(32.6) | 70(32.3) |

Data were presented as n (%); The Chi-square test and Fisher exact test were used for comparisons as appropriate; * p<0.05; ** p<0.01; *** p<0.001

**Table 5: Variations in health promotion activities provided by studied physicians by their lifestyle behaviours**

| Lifestyle behaviours | Health promotion activities | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Healthy diet | | Practice physical exercise | | Avoid smoking | | Avoid alcohol | | Take medications properly | |
| | No (n.=12) | Yes (n.=248) | No (n.=116) | Yes (n.=144) | No (n.=204) | Yes (n.=56) | No (n.=250) | Yes (n.=10) | No (n.=43) | Yes (n.=217) |
| **Smoking status** | | | | | | | | | | |
| Ever smoker | 0(0.0) | 28(11.3) | 14(12.1) | 14(9.7) | 20(9.8) | 8(14.3) | 28(11.2) | 0(0.0) | 6(13.9) | 22(10.1) |
| Never smoker | 12(100.0) | 220(88.7) | 102(87.9) | 130(90.3) | 184(90.2) | 48(85.7) | 222(88.8) | 10(100.0) | 37(86.0) | 195(89.9) |
| **Average sleep duration per day in hours** | | | | | | | ** | | ** | |
| <6 | 0(0.0) | 36(14.5) | 18(15.5) | 18(12.5) | 26(12.7) | 10(17.9) | 36(14.4) | 0(0.0) | 8(18.6) | 28(12.9) |
| 6-8 | 10(83.3) | 121(48.8) | 59(50.9) | 72(50.0) | 105(51.5) | 26(46.5) | 121(48.4) | 10(100.0) | 12(27.9) | 119(54.8) |
| ≥8 | 2(16.7) | 91(36.7) | 39(33.6) | 54(37.5) | 73(35.8) | 20(35.7) | 93(37.2) | 0(0.0) | 23(53.5) | 70(32.3) |
| **Average number of fruits/ vegetables portions consumed per day** | | | * | | | | ** | | * | |
| <3 | 10(83.3) | 170(68.5) | 72(62.1) | 108(75.0) | 142(69.6) | 38(67.9) | 176(70.4) | 4(40.0) | 22(51.2) | 158(72.8) |
| 3-5 | 2(16.7) | 48(19.3) | 24(20.7) | 26(18.1) | 40(19.6) | 10(17.9) | 44(17.6) | 6(60.0) | 13(30.2) | 37(17.0) |
| ≥5 | 0(0.0) | 30(12.1) | 20(17.2) | 10(6.9) | 22(10.8) | 8(14.3) | 30(12.0) | 0(0.0) | 8(18.6) | 22(10.1) |
| **Time watching TV on a normal weekend in hours** | ** | | | | | | ** | | | |
| <3 | 12(100.0) | 112(45.2) | 52(44.8) | 72(50.0) | 94(46.1) | 30(53.6) | 114(45.6) | 10(100.0) | 20(46.5) | 104(47.9) |
| 3-5 | 0(0.0) | 77(31.0) | 35(30.2) | 42(29.2) | 63(30.9) | 14(25.0) | 77(30.8) | 0(0.0) | 8(18.6) | 69(31.8) |
| ≥5 | 0(0.0) | 59(23.8) | 29(25.0) | 30(20.8) | 47(23.0) | 12(21.4) | 59(23.6) | 0(0.0) | 15(34.9) | 44(20.3) |
| **Physical activity*** | * | | ** | | *** | | | | | |
| Inactive | 0(0.0) | 86(34.7) | 50(43.1) | 36(25.0) | 80(39.2) | 6(10.7) | 84(33.6) | 2(20.0) | 17(39.5) | 69(31.8) |
| Active | 12(100.0) | 162(65.3) | 66(56.9) | 108(75.0) | 124(60.8) | 50(89.3) | 166(66.4) | 8(80.0) | 26(60.5) | 148(68.2) |
| **BMI (kg/m2)** | ** | | | | | | | | | |
| Normal weight (18.5-24.9) | 8(66.7) | 60(24.2) | 24(20.7) | 44(30.6) | 54(26.5) | 14(25.0) | 66(26.4) | 2(20.0) | 10(23.3) | 58(26.7) |
| Overweight (25.0-29.9) | 2(16.7) | 104(41.9) | 56(48.3) | 50(34.7) | 78(38.2) | 28(50.0) | 102(40.8) | 4(40.0) | 17(39.5) | 89(41.0) |
| Obese (≥30.0) | 2(16.7) | 84(33.9) | 36(31.0) | 50(34.7) | 72(35.3) | 14(25.0) | 82(32.8) | 4(40.0) | 16(37.2) | 70(32.3) |

Data were presented as n (%); The Chi-square test and Fisher exact test were used for comparisons as appropriate; * p<0.05; ** p<0.01; *** p<0.001; a: Physical activity= practice moderate/severe physical activities for at least 150 minutes per week; Physical inactivity= do not spend at least 150 minutes per week doing moderate/severe physical activity