

How do primary care physicians in Singapore keep healthy?

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INTRODUCTION Not much is known regarding how primary care physicians (PCPs) in Singapore keep themselves healthy and mitigate ill health. This study aims to determine the health-seeking behaviour of local PCPs and to identify the predictors of local PCPs attaining the recommended level of exercise.

METHODS This study was a cross-sectional questionnaire survey, which included questions on the demographic characteristics, practice profiles and health-seeking behaviour of PCPs. The sampling frame was the 1,400 listed members of the College of Family Physicians Singapore. The anonymised survey was executed in two phases: a postal survey, followed by a web-based survey on the College of Family Physicians Singapore website. The two data sets were collated; the categorical variables, summarised; and the differences between subgroups (based on exercise engagement), compared using Fisher's exact test. The effect of each risk factor on exercise duration was quantified using odds ratio (OR) estimate and 95% confidence interval (CI). Multivariate logistic regression analysis was performed to identify significant predictors of exercise engagement.

RESULTS A total of 631 PCPs participated in the survey – 26% were ≤ 34 years old, 58% were male, 21% were single, 34% were singleton practitioners, and 56% were private practitioners. The percentage of PCPs who exercised ≥ 2.5 hours weekly was 29%, while 28% exercised < 0.5 hours weekly. Of the PCPs surveyed, 1% currently smoke, 0.8% drink more than 14 units of alcohol weekly, 60% undertook health screening, 65% had blood investigations done, and 64% had taken preventive measures such as getting influenza vaccination.

CONCLUSION While local PCPs generally did not have undesirable habits such as smoking and alcohol abuse, they could further increase their exercise intensity and undertake more preventive measures such as getting vaccinated against various diseases.

Keywords: exercise, health, primary care physicians, vaccination

INTRODUCTION

Doctors are typically perceived to be healthier than the general population. In fact, an Australian study reported that doctors have a lower mortality rate.⁽¹⁾ Nonetheless, the prevalence of chronic diseases among doctors is similar to that of the general population.⁽²⁾ Primary care physicians (PCPs) have often assumed the role of counsellors, educating patients on the importance of adopting healthy lifestyles that include regular exercise. Regular physical activity and exercise have been shown to reduce the morbidity and mortality from many chronic diseases, and are therefore vital for the health and well-being of people of all ages. Regular physical activity has been shown to reduce the risk of developing or dying from heart disease, diabetes mellitus, colonic cancer and hypertension. On average, people who are physically active outlive those who are not. However, little is known regarding how PCPs 'walk the talk' and whether they keep themselves healthy with regular physical activity to mitigate premature development of chronic diseases.

In Singapore, PCPs in public and private primary care clinics work different hours due to Singapore's dual primary

healthcare system. Groups of doctors work in public polyclinics, which operate during office hours from Mondays to Saturdays. However, general practitioners (GPs) in private clinics (singleton or group practices) typically provide primary care service in the evenings, with some even operating round-the-clock. Locums are employed to relieve these doctors when they have other commitments. In other words, private GPs are more likely to work irregular hours than doctors who work in public polyclinics. With this variety of working conditions, access to a healthy lifestyle may differ across different groups of PCPs. Thus, this study aimed to determine the health-seeking behaviour of PCPs in Singapore and to identify the predictors of PCPs attaining the recommended level of exercise.

METHODS

As there was no validated survey instrument in Singapore to determine the health and illness behaviour of PCPs, we developed the 'Dr4Dr' questionnaire based on personal experience, literature search and feedback from fellow doctors in the community. The questionnaire covers the participants'

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Table 1. Demographic and practice profiles of the primary care physicians (PCPs), according to their reported duration of exercise.

Variable	No. (%)			Unadjusted OR (95% CI)	p-value
	Total (n = 631)	Exercise (hrs/wk)			
		< 2.5 (n = 451)	≥ 2.5 (n = 180)		
Age group (yrs)					
25–34	163 (25.8)	130 (28.8)	33 (18.3)	1.00	–
35–44	207 (32.8)	150 (33.3)	57 (31.7)	1.49 (0.92–2.44)	0.106
45–54	160 (25.4)	108 (23.9)	52 (28.9)	1.89 (1.14–3.14)	0.013
55–64	66 (10.5)	40 (8.9)	26 (14.4)	2.56 (1.37–4.78)	0.003
≥ 65	35 (5.5)	23 (5.1)	12 (6.7)	2.06 (0.93–4.55)	0.076
Gender					
Female	265 (42.1)	206 (45.8)	59 (32.8)	1.00	–
Male	365 (57.9)	244 (54.2)	121 (67.2)	1.73 (1.21–2.49)	0.003
Marital status					
Single	130 (20.6)	78 (17.3)	52 (28.9)	1.00	–
Married/divorced/widowed/separated	501 (79.4)	373 (82.7)	128 (71.1)	0.52 (0.34–0.77)	0.001
Ownership of practice					
Private clinic	318 (55.9)	218 (53.6)	100 (61.7)	1.00	–
Public primary care clinic/institution*	251 (44.1)	189 (46.4)	62 (38.3)	0.72 (0.49–1.04)	0.007
Operational mode of practice					
Singleton	199 (34.0)	139 (33.3)	60 (35.7)	1.00	–
Group	387 (66.0)	279 (66.7)	108 (64.3)	0.90 (0.62–1.31)	0.571
Professional profile					
PCP	590 (97.5)	418 (97.4)	172 (97.7)	1.00	–
Specialist practising as PCP	15 (2.5)	11 (2.6)	4 (2.3)	0.88 (0.28–2.81)	0.834
No. of working hours					
< 25	70 (11.2)	50 (11.2)	20 (11.2)	1.00	–
20–50	408 (65.2)	297 (66.3)	111 (62.4)	0.93 (0.53–1.64)	0.813
≥ 25	148 (23.6)	101 (22.5)	47 (26.4)	1.16 (0.62–2.17)	0.634
Locums (full/part-time)					
	144 (22.8)	106 (23.5)	38 (21.1)	0.88 (0.58–1.34)	0.562

Note: Figures for some items do not add up to total due to missing data. *Includes family medicine departments in universities or selected restructured hospitals. CI: confidence interval; OR: odds ratio

demographic characteristics, practice profiles, health and illness behaviours and their views of a proposed healthcare support system for doctors in Singapore.

Participants in the present study were PCPs working in various types of primary care practices, including public and private primary care clinics, as well as family medicine units within the academic departments of the two medical schools and hospitals in Singapore. The sampling frame was the College of Family Physicians Singapore (CFPS) membership list, which consisted of 1,400 members as at June 2011. Of the 1,400 members, 558 (40%) were female doctors while 842 (60%) were male doctors; 811 (58%) were < 45 years of age and 589 (42%) were ≥ 45 years of age.

To increase the response rate, the questionnaire was administered in two phases – Phase A and Phase B. In Phase A, printed copies of the questionnaire were mailed to the participants and some were fielded to them during a family medicine training module organised by CFPS. In the mailed survey, stamped envelopes addressed to CFPS were provided for participants to return the completed questionnaire. In Phase B, a web-based survey using the same questionnaire was carried out via the CFPS website. The SurveyMonkey software (SurveyMonkey, Palo Alto, CA, USA), which allows only a single entry from any one email address, was used. These two approaches were used to allow greater access and convenience for the PCPs to self-administer the questionnaire. To ensure truthful responses

to the questions and prevent any potential stigmatisation, the questionnaire was anonymised. All data obtained from Phases A and B was transcribed into a Microsoft Excel file (Microsoft Corp, Redmond, WA, USA). The study was approved by the Institutional Review Board of the National University of Singapore.

Categorical variables were summarised using frequencies and percentages, and differences between subgroups (categorised according to duration of exercise engagement) were compared using Fisher's exact test. The effect of each factor on exercise duration was quantified using odds ratio (OR) estimate and its associated 95% confidence interval (CI). To identify independent predictors of exercise engagement, account for putative confounders, and prevent potentially important factors from being missed out, variables with a p-value of ≤ 0.1 in the bivariate analysis were further considered for inclusion in the multivariate logistic regression model. Model selection was carried out based on the likelihood ratio test. All statistical analyses were performed using STATA software version 12.0 (StataCorp, College Station, TX, USA), assuming a two-sided test at the conventional 0.05 level of significance.

RESULTS

A total of 631 PCPs participated in the survey, resulting in a response rate of 45.1%. The demographic and practice profiles of the participants are shown in Table 1. Junior doctors (i.e.

Table II. Details on the lifestyles of the primary care physicians, according to their reported duration of exercise.

Variable	No. (%)			Unadjusted OR (95% CI)	p-value
	Total (n = 631)	Exercise (hrs/wk)			
		< 2.5 (n = 451)	≥ 2.5 (n = 180)		
Smoking status					
Never	596 (94.5)	423 (93.8)	173 (96.1)	1.00	–
Ex-smoker	28 (4.4)	22 (4.9)	6 (3.3)	0.67 (0.27–1.67)	0.388
Current smoker	7 (1.1)	6 (1.3)	1 (0.6)	0.41 (0.05–3.41)	0.408
Weekly alcohol intake					
Never	304 (48.2)	221 (49.0)	83 (46.1)	1.00	–
< 7 units	306 (48.5)	220 (48.8)	86 (47.8)	1.04 (0.73–1.48)	0.825
7–14 units	16 (2.5)	6 (1.3)	10 (5.6)	4.44 (1.56–12.59)	0.005
> 14 units	5 (0.8)	4 (0.9)	1 (0.6)	0.67 (0.07–6.04)	0.718

CI: confidence interval; OR: odds ratio

Table III. Preventive measures undertaken by the primary care physicians in the past one year, according to their reported duration of exercise.

Variable	No. (%)			Unadjusted OR (95% CI)	p-value
	Total (n = 631)	Exercise (hrs/wk)			
		< 2.5 (n = 451)	≥ 2.5 (n = 180)		
Health screening	380 (60.2)	248 (55.0)	132 (73.3)	2.25 (1.54–3.29)	<0.001
Blood investigation*	410 (65.0)	276 (61.2)	134 (74.4)	1.85 (1.26–2.71)	0.002
Urine test	176 (27.9)	108 (23.9)	68 (37.8)	1.93 (1.33–2.79)	0.001
Electrocardiography	107 (17.0)	66 (14.6)	41 (22.8)	1.72 (1.11–2.66)	0.015
Any form of radiography†	103 (16.3)	66 (14.6)	37 (20.6)	1.51 (0.97–2.36)	0.069
Any form of imaging‡	70 (11.1)	47 (10.4)	23 (12.8)	1.26 (0.74–2.14)	0.395
Any form of ultrasonography	89 (14.1)	63 (14.0)	26 (14.4)	1.04 (0.63–1.70)	0.877
Any form of endoscopy	46 (7.3)	33 (7.3)	13 (7.2)	0.99 (0.51–1.92)	0.967
Exercise treadmill test	32 (5.1)	21 (4.7)	11 (6.1)	1.33 (0.63–2.82)	0.453
Any form of advanced cardiac imaging§	19 (3.0)	7 (1.6)	12 (6.7)	4.53 (1.75–11.70)	0.002
Self-initiation of any of the listed investigations¶	299 (67.0)	201 (65.3)	98 (71.0)	0.77 (0.50–1.19)	0.233
Vaccination against infectious diseases¶	380 (64.2)	263 (61.9)	117 (70.1)	0.69 (0.47–1.02)	0.063

*Blood investigation may be part of a screening or diagnostic test (e.g. full blood count, lipid profile and thyroid function test). †Examples include chest radiography and kidneys, ureters and bladder radiography. ‡Examples include computed tomography and magnetic resonance imaging. §Examples include myocardial perfusion imaging and two-dimensional echocardiography. ¶Data was not available for 185 participants for the category 'self initiation of the listed investigations'. 39 participants did not provide information on vaccination against infectious diseases. Calculation of the percentages, and statistical analysis, were done with the available data. CI: confidence interval; OR: odds ratio

doctors aged 25–34 years) made up 25.8% of the participants, while only 5.5% of participants were of retirement age (≥ 65 years). More than half (57.9%) of the participants were male, one-fifth (20.6%) were single, more than half were (55.9%) private GPs, and approximately one-third (34.0%) were singleton practitioners. Only a small proportion (2.5%) of specialists practised as PCPs. Among the 631 PCPs surveyed, only 28.5% of participants exercised at least 2.5 hours per week, as recommended by our local health authority; 28.4% of them exercised less than 0.5 hour per week. Only 1% of the participants were current smokers and 0.8% of them drank alcohol in excess of 14 units weekly (Table II).

Table III lists the preventive measures (e.g. laboratory investigations and vaccinations) that the PCPs undertook in the past year. Of the PCPs surveyed, 60.2% of them had undergone some form of health screening, 65.0% had undergone some form of blood investigation, and 67.0% had initiated the undertaking of these investigations (any listed in Table III)

themselves. The percentage of PCPs that had taken preventive measures against infectious diseases (e.g. getting vaccinated against influenza) was 64.2%.

Table IV shows the results of the multivariate logistic regression analysis used to determine the predictors of PCPs attaining ≥ 2.5 hours of exercise per week. We found that PCPs who were older (especially between 45–64 years of age), married, consumed 7–14 units of alcohol (i.e. moderate intake) and had some form of advanced cardiac imaging, were more likely to attain the recommended level of exercise.

DISCUSSION

The present study is the first study to provide insight into the health-seeking behaviour of PCPs in Singapore. A healthy healthcare workforce, which includes PCPs, is fundamental in the health management of the general population.

In the present study, we found that approximately three out of ten PCPs (29%) had adequate exercise of at least 150 mins per

Table IV. Results of the multivariate logistic regression used to identify predictors of engagement in ≥ 2.5 hours of exercise per week.

Variable	Adjusted OR	95% CI	p-value
Age group (yrs)			
25–34	1.00	–	–
35–44	2.18	1.23–3.87	0.008
45–54	2.80	1.53–5.10	0.001
55–64	3.45	1.66–7.17	0.001
≥ 65	3.20	1.31–7.84	0.011
Marital status			
Single	1.00	–	–
Married/divorced/ widowed/separated	3.76	2.28–6.21	< 0.001
Weekly alcohol intake			
Never	1.00	–	–
< 7 units	1.13	0.78–1.65	0.515
7–14 units	5.66	1.91–16.78	0.002
> 14 units	0.71	0.07–6.86	0.765
Health screening			
No	1.00	–	–
Yes	2.15	1.42–3.26	< 0.001
Any form of advanced cardiac imaging			
No	1.00	–	–
Yes	3.67	1.37–9.85	0.010

CI: confidence interval; OR: odds ratio

week. According to the Health Promotion Board of Singapore, this is the minimal amount of exercise that will result in significant benefits to health, including a 20%–50% risk reduction of cardiovascular diseases (e.g. hypertension and stroke), type 2 diabetes mellitus, breast and colonic cancers, and dementia.⁽³⁾ The proportion of PCPs who had adequate exercise in the present study was noticeably lower than that reported in a British survey by Allibone et al.⁽⁴⁾ In that British survey, the authors found that 52% of the male GPs and 34% of the female GPs exercised vigorously.⁽⁴⁾

We found that 28% of the PCPs in the present study had little exercise, while the percentage of the general population (aged 18–69 years) with little exercise was 54% according to the Singapore National Health Survey (NHS);⁽⁵⁾ however, the classification of the amount of exercise differed slightly between the two studies. In the NHS, commonly cited reasons for physical inactivity were inadequate time due to work and family commitments (58%), laziness (13%), and lack of exercise (8%). In the present study, however, low levels of exercise was not related to the working hours of the PCPs. Further studies are thus needed to examine the barriers PCPs encounter in attaining regular exercise.

The PCPs in our study who achieved the recommended level of weekly exercise were married and more advanced in age. Both of these factors are inter-related as the propensity to get married increases with age. The prevalence of chronic diseases also increases with age, and this may explain the tendency of older PCPs to exercise regularly and undertake health screenings, in an effort to mitigate the risk of developing chronic diseases. We postulate that PCPs with known cardiovascular risks are more likely to evaluate their cardiac

health with investigations such as cardiac imaging; they would likely also be more proactive in attempts to reduce their risks by exercising regularly. The subset of PCPs who achieved the recommended level of weekly exercise was also found to practise other healthy pursuits, such as moderate consumption of alcohol such as red wine, which is widely perceived to avert cardiovascular risks.

The smoking rate among PCPs varies from country to country. The proportion of PCPs in the present study who currently smoke (1%) is far lower than the prevalence of current smokers in the general population (14%). This smoking rate is comparable to a trend observed in developed countries such as the United States, Australia and New Zealand, where a steady decline in the smoking rate among physicians has been observed over the past 30 years.⁽⁶⁾ However, another study reported that almost a third (29%) of GPs in France were current smokers.⁽⁷⁾ In the present study, the proportions of PCPs who were regular consumers of alcohol (3%) and nonalcoholic drinks (48%) are comparable to those of the general population (3% regular alcoholic drinkers and 54% nonalcoholic drinkers).⁽⁵⁾

We found that 64% of PCPs were vaccinated against infectious diseases such as influenza. This percentage is comparable to that of another survey, in which 69% of participating physicians were found to be vaccinated; the latter survey, however, was carried out in two tertiary care teaching hospitals in the United States.⁽⁸⁾ Healthcare workers are important reservoirs of transmission in hospitals, contributing to the morbidities and mortalities of patients, especially vulnerable groups of patients such as children and elderly patients. Thus, it is critical for PCPs to be vaccinated to reduce such transmissions. This is especially pertinent as upper respiratory tract infection remains one of the top five reasons for consultations in private and public primary care clinics in Singapore.⁽⁹⁾ The Centres for Disease Control and Prevention in the United States recommends that all healthcare workers receive annual influenza vaccination.⁽¹⁰⁾ Many studies have been conducted to determine the barriers encountered by healthcare workers in getting vaccinated.^(8,11) Lack of time, perceived uncertainty over vaccine efficacy and fear of side effects were often quoted as primary reasons for declining vaccination.⁽¹²⁾ A greater knowledge about vaccines is associated with a higher vaccination rate.

In the present study, the proportions of PCPs that had some form of health screening and blood investigations carried out in the past one year were 60% and 65%, respectively. This is comparable to the proportions in the general population, where in the past three years 64% had undergone diabetic screening; and in the past one year 71% had undergone hypertensive screening, 61% had undergone cholesterol screening, 28% had undergone urine test and 16% had undergone some form of radiographic imaging.⁽⁵⁾ Allibone et al reported that among British GPs, 30% of male GPs and 32% of female GPs had their blood pressure checked in the past three years, 36% of male GPs and 49% of female GPs had undergone urine tests in the

past three years, and 54% of male GPs and 76% of female GPs had chest radiography performed in the past three years.⁽⁴⁾

The present study was not without limitations. We recognise the inherent limitations of a cross-sectional survey. The survey was based on self-reported information regarding the PCPs' personal health, which may have been a sensitive topic. In addition, we were unable to verify the data obtained, which could have been subject to recall bias. Previous studies on local PCPs regarding other topics relied on postal survey, resulting in suboptimal response rates.⁽¹³⁾ Such a survey design could potentially select respondents with a strong positive or negative opinion about their health-seeking behaviour and skew the data in favour of extremes. We thus sought to optimise the participation rate by carrying out the survey in two phases, one of which was a web-based survey. Since most Singaporeans have Internet access and are savvy in its use, the web-based survey allowed PCPs to participate in the survey at any hour convenient to them. Anonymity of the participants was also maintained to increase the response rate. The present study's survey yielded the largest number of responses from PCPs, and as there is no reason to suggest that the PCPs who did not participate are intrinsically different, we believe that the findings of the present study (which had a response rate of 45%) is representative of the local PCPs in general. The overall percentage of random missing data was 14%. This was another shortcoming of the use of an anonymised survey – we were unable to address any incomplete administration of the questionnaires.

In conclusion, few PCPs in Singapore have undesirable habits such as smoking and alcohol abuse. However, PCPs can be more proactive in enhancing and maintaining their good health by obtaining immunisation against common infectious diseases and exercising regularly.

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