



Health-promoting behaviours and perceived lifestyle cancer risk factors among nurses

Siaw Wei Tong^a, Ping Lei Chui^{a,*}, Mei Chan Chong^a, Li Yoong Tang^a, Caryn Mei Hsien Chan^b

^a Department of Nursing Science, Faculty of Medicine, Universiti Malaya, 50603 Kuala Lumpur, Malaysia

^b Faculty of Health Sciences, Universiti Kebangsaan Malaysia, 50300 Kuala Lumpur, Malaysia

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ABSTRACT

Background: Nurses play a pivotal role in promoting health for cancer prevention. Comparatively little is known, however, of their health-promoting behaviours and perceived lifestyle-related cancer risk factors. **Aim:** To assess nurses' health-promoting behaviours and perception of lifestyle-related cancer risk factors. **Methods:** This is a descriptive, cross-sectional design study of 357 nurses from a teaching hospital. Respondents completed the Health-Promoting Lifestyle Profile II questionnaire. Perception of cancer risk factors was measured based on 29 well-established lifestyle factors.

Findings: Almost half of all nurses were overweight or obese (mean BMI = 25.2, SD = 4.95). The highest health-promoting behaviour mean score was for the spiritual growth subscale, while the lowest mean score was in physical activity subscale. Lifestyle-related cancer risk factors such as overweight/ obesity, practising diets high in red meat or diets low in vegetables/ fruit, and insufficient physical activities were not prioritised by the nurses.

Conclusions: Nurses in this sample were found to not engage in physical activity. A high proportion of nurses in this study attributed cancer risk to environmental rather than personal factors. The findings of the study enlighten nurse administrators in developing healthy lifestyle programs for nurses.

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Summary of relevance

Problem or Issue

Little is known about the nurses' health-promoting behaviours and perception of modifiable lifestyle-related cancer risk factors.

What is already known

Nurses have been found to neglect their health and not apply their professional knowledge of healthy lifestyle choices in their lifestyle behaviours.

What this paper adds

The nurses have reported physical activity to be the least important of their health-promoting behaviour. The lifestyle-related cancer risk factors such as overweight/obesity, practising diets high in red meat or diets low in vegetables/fruit, and insufficient physical activities were not prioritised by the nurses.

1. Introduction

The increasing cases of cancer globally are believed to be driven by a rise in lifestyle-related cancer risk factors (Islami et al., 2018). Aside from non-modifiable factors such as ageing and inherited mutation, there is much that can be done to reduce cancer risk through modification of lifestyle factors such as tobacco smoking, exposure to sunlight, overweight or obesity, diet, and alcohol (American Institute for Cancer Research 2019; Brown et al., 2018). Nurses play a pivotal role in promoting health for cancer prevention. Nurses who are attentive to lifestyle cancer risk factors and practice healthy lifestyle behaviour are stronger role models, advocates, and educators in health promotion and disease prevention to their loved ones, their communities, and their patients (Perry et al., 2018).

Despite the movement to increase awareness of cancer risk factors and promote congruent health-promoting behaviours among the general public, the health behaviours of nurses require attention. Nurses have been found to neglect to practice their health-promoting role and to not apply their professional knowledge of healthy lifestyle choices in their lifestyle behaviours and health (Ross et al., 2017). Studies on health behaviours and participation in health promotion activities reported that nurses do not

* Corresponding author.

E-mail address: chuipinglei@um.edu.my (P.L. Chui).

engage in healthy lifestyle behaviours and participated in fewer healthy lifestyle activities compared to other healthcare professionals (Hidalgo et al., 2016; Kurnat-Thoma, El-Banna, Oakcrum, & Tyler, 2017; Thacker et al., 2016). Nurses are occupationally physically active due to the nature of their job, which deters them from leisure-time physical activity (Lim, Danaee, & Jaafar, 2019). The irregular work schedule and long working hours have put the nurses at risk for poor work-life balance (McElroy, Olney, Hunt, & Glennon, 2020). Shift work has contributed to circadian disruption affecting hormonal systems regulating metabolism and stress responses, like glucose, and cortisol regulation (James, Honn, Gaddameedhi, & Van Dongen, 2017). Shift workers had more often obesity and diabetes than non-shift workers. Shift workers also had a less healthy lifestyle, they were more often physically inactive, ate fruit and vegetables less often, smoked more often, and had more often poor sleep quality compared to non-shift workers (Hulsege et al., 2021).

A previous study reported that nurses possessed adequate knowledge about breast cancer, but they needed more information on cancer risk estimation (Andsoy & Gul 2014). Nurses' knowledge about cancer lacks adequacy and needs to be reinforced (Rao, Acharya, Bajpai, Abbas, & Khetrapal, 2019). Nurses as trained caregivers are supposed to be knowledgeable about cancer risk factors and communicate and teach others in living a healthy lifestyle, however, little is known about the nurses' awareness of modifiable lifestyle-related cancer risk factors. This indicates that there is a need for greater attention to nurses' perceptions of lifestyle-related cancer risk factors. The study aimed to assess the health-promoting behaviours and identify perceptions of lifestyle-related cancer risk factors among nurses in a tertiary referral teaching hospital.

2. Methodology

2.1. Design, sample, and setting

This is a descriptive cross-sectional design study set in a tertiary referral teaching hospital in Malaysia. The sample size calculation was based on a population size of 2,329 nurses, on a 95% confidence interval and a response rate of 50%, resulting in 330 required participants. An additional 20% was factored into account for potential incomplete responses, resulting in a final estimated sample size of 396.

The single inclusion criterion was that participants had to be registered nurses. No exclusion criteria were applied. In order to obtain a sample population that best represents the entire population being studied, the stratified random sampling method was used to divide the nurses into four strata based on their workplace areas, namely ambulatory care units, operation theatres, critical care units, and inpatient services. The required sample size of each stratum is proportionate to the population size of the stratum: 59 nurses from ambulatory care units; 58 nurses from operation theatres; 89 nurses from critical care units; and 190 nurses from inpatient services. Random sampling was used to select the names of nurses from the sampling frame of each stratum based on a random number generator.

2.2. Measurements

The questionnaire contained three main parts. Part I comprised of items that solicited the general and demographic characteristics of participants. Part II encompassed a modified and validated Health-Promoting Lifestyle Profile II (HPLP II) scale (Walker, Sechrist, & Pender, 1987). HPLP II is a 52-item instrument. It has six dimensions or subscales of health-promoting lifestyle behaviours, including 9 items on health responsibility, 8 items on

physical activity/ exercise, 9 items on nutrition, 9 items on spiritual growth, 9 items on interpersonal relations, and 8 items on stress management. The HPLP II uses a four-point Likert scale with the range of 1 (never), 2 (sometimes), 3 (often), and 4 (routinely) to measure the frequency of self-reported health-promoting behaviours. In order to increase the comparability of the test scores, the overall scoring was obtained by adding the scores of all the items and dividing it by the total number of items. For each subscale, the sum scores for all the items of each subscale were divided by the total number of items in each subscale (Walker et al., 1987). Thus, the possible average scores of the total HPLP II and each subscale ranged from 1.00 to 4.00. A higher score is indicative of a higher level of health-promoting behaviours and vice versa. The HPLP II is a well-established questionnaire with adequate psychometric properties including internal consistency, convergent validity, and sensitivity to change in performance status ratings (Walker & Hill-Polerecky, 1997). It has been translated into different languages and widely used to measure health-promoting behaviour among patients (Teng, Yen, & Fetzer, 2010); nurses (Sousa, Gaspar, Vaz, Gonzaga, & Dixe, 2015); elderly (Tanjani, Azadbakht, Garmaroudi, Sahaf, & Fekrizadeh, 2016); postmenopausal women (Rathnayake, Alwis, Lenora, & Lekamwasam, 2020), and university students (Kuan et al., 2019). Its validity and reliability have been verified.

Part III consisted of items related to the awareness of lifestyle-related cancer risk factors. The responses were dichotomous, either 'Yes' or 'No', on 29 lifestyle risk factors that were identified based on a literature review (American Institute for Cancer Research 2017; Brown et al., 2018) and discussion with a panel of experts. The questionnaire was administered in English and Bahasa Malaysia. The original English version was translated forward and backward to Bahasa Malaysia to ensure cross-cultural and semantic equivalence. The panel of experts consisted of senior nurse lecturers, nursing officers, and oncologists who tested content validity. A pilot study was done before the commencement of data collection on 30 nurses to confirm that the methods and instruments used were applicable and feasible; these nurses were excluded from the main study. There was no report of ambiguity on items on the questionnaire. A minor modification was made to the format to make it clear. The Cronbach's alpha for HPLP II range between 0.75 and 0.87, indicating acceptable internal consistency.

2.3. Ethical consideration

The study was reviewed and approved by the University Malaya Medical Research Ethics Committee (MRECID.No.2017113-5779), and performed in accordance with the ethical standards that are outlined in the 2008 Declaration of Helsinki. Permission to use the HPLP II instrument in this study was sought from the original author. The participants were assured of the confidentiality of this research. Informed written consent was obtained from each respondent after they received a clear and detailed explanation of the study from the participant information sheet. The study complied with STROBE reporting guidelines.

2.4. Data collection and analysis

The study was conducted from March to April 2018. A total of 396 nurses from the four main workplace areas were invited to participate in the study based on a random number generator. An envelope containing the participant information sheet, the written informed consent form, and the self-administered questionnaire was handed over to the respective ward managers to be distributed to the nurses. A list of randomly selected participant numbers was taped on the back of the envelopes. The participants were given a time frame of 2–3 days to complete the questionnaires. Their

Table 1
Characteristics of the participants (N = 357).

Variables	N (%)
Age (Mean = 30.9, SD = 8.45) years	
21 to 29	202 (56.6)
30 to 39	95 (26.6)
≥ 40	60 (16.8)
Gender	
Male	22 (6.2)
Female	335 (93.8)
Race	
Malay	325 (91.0)
Non-Malay	32 (9.0)
Marital status	
Single	138 (38.7)
Married	219 (61.3)
Live with friends or family	
Yes	322 (90.2)
No	35 (9.8)
Monthly income (1USD = 4.06MYR)	
< RM 3000 (≈739USD)	174 (48.7)
≥ RM 3000 (≈739USD)	183 (51.3)
Highest nursing education	
Diploma	347 (97.2)
Degree	10 (2.8)
Working experience (Mean = 8.80, SD = 7.68) years	
0 to 5	151 (42.3)
6 to 10	101 (28.3)
> 10	105 (29.4)
Level of nursing position	
U29 (Low)	269 (75.2)
U32 and above (High)	88 (24.8)
Area of workplace	
Ambulatory care units	55 (15.4)
Operation theatre	58 (16.2)
Critical care units	72 (20.2)
Inpatient services	172 (48.2)
Shift work	
Yes	284 (79.6)
No	73 (20.4)
History of health problems in family	
Yes	218 (61.1)
No	139 (38.9)
Presence of health problems	
Yes	51 (14.3)
No	306 (85.7)
BMI (Mean = 25.2, SD = 4.95)	
Underweight (<18.5)	20 (5.6)
Normal (18.5–24.9)	171 (47.9)
Overweight (25.0–29.9)	110 (30.8)
Obese (≥30)	56 (15.7)

Table 2
Total HPLP II score and subscale scores (N = 357).

HPLP II and subscales	Items	Min	Max	Mean Score ±SD	Order
Spiritual growth	9	1.89	4.00	2.92 ± 0.47	1
Interpersonal relations	9	1.89	3.89	2.91 ± 0.41	2
Stress management	8	1.13	3.88	2.63 ± 0.48	3
Nutrition	9	1.44	3.56	2.53 ± 0.43	4
Health responsibility	9	1.11	3.78	2.42 ± 0.50	5
Physical activity	8	1.00	3.88	2.35 ± 0.30	6
Total HPLP II	52	1.75	3.73	2.63 ± 0.39	-

responses were confidential, and no name was required in maintaining anonymity. The accomplished questionnaires were sealed in the envelope provided and were submitted to the respective ward managers.

A total of 371 nurses returned the questionnaire. The data were analysed using the Statistical Package for the Social Sciences (SPSS Ver. 22; IBM Corporation, Armonk, NY). Descriptive statistics, frequencies, and percentages were used to summarise the data. Chi-

square tests were used to determine associations. A p-value of <0.05 was considered significant.

3. Results

The response rate was 93.68%. The reasons for not returning the questionnaire included being disinterested (n = 19) and refusing to answer some of the items (n = 10). A further 14 questionnaire sets were incomplete. Therefore, only 357 questionnaires were included in the analysis.

More than half of all respondents (n = 202; 56.6%) belonged to the 21–29 age bracket (mean overall age = 30.9, SD = 8.45). The majority were female (93.8%), and of Malay ethnicity (91.1%). Over half were married at some point (61.3%), while most respondents lived with family or friends (90.2%) and had an average monthly household income of at least RM 3,000 (51.3%). The majority (97.2%) had a diploma in nursing, while 29.4% had more than 10 years of nursing experience. Close to a quarter (24.6%) held senior nursing positions. Over two-thirds of this sample (79.6%) worked three shifts.

Based on self-reported height and weight, the mean BMI was 25.2 (SD = 4.95). The BMI results for the participants revealed that 47.9% were within the normal range, 5.6% were underweight, 30.8% were overweight, and 15.7% were obese. The general characteristics of the participants are detailed in [Table 1](#).

3.1. Health-promoting lifestyles among nurses

The overall health-promoting lifestyle mean score was 2.63 (SD = 0.39). By subscale, the highest mean score was 2.92 (SD = 0.47) from the spiritual growth subscale, whereas the lowest mean score was 2.35 (SD = 0.30) from physical activity subscale. The range and mean scores of the HPLP II by subscale are shown in [Table 2](#).

Table 3
Perception of lifestyle-related cancer risk factors (N = 357).

Lifestyle-related cancer risk factors	Yes N (%)
1. Inherited predisposition / 'Cancer Genes'	344 (96.4)
2. Radiation	330 (92.4)
3. Tobacco	327 (91.6)
4. Nuclear power	322 (90.2)
5. Industrial pollution	313 (87.7)
6. Pesticide residue on produce	294 (82.4)
7. Food additives	280 (78.4)
8. Asbestos	261 (73.1)
9. Alcohol†	261 (73.1)
10. Cellphones	249 (69.8)
11. Excessive exposure to sun	236 (66.1)
12. Cured meats‡	230 (64.4)
13. Genetic modified foods	225 (63.0)
14. Radon	190 (53.2)
15. Hormones in beef	170 (47.6)
16. Artificial sweeteners	172 (48.2)
17. Breast implants	172 (48.2)
18. Grilling meat	157 (44.0)
19. Overweight/obesity‡	155 (43.4)
20. Viruses and bacteria	154 (43.1)
21. Diets high in fat	151 (42.3)
22. Stress	149 (41.7)
23. Diets high in red meat‡	145 (40.6)
24. Trans-fats	134 (37.5)
25. Power lines	126 (35.3)
26. Diets low in vegetables and fruit‡	120 (33.6)
27. Insufficient physical activity‡	113 (31.7)
28. Sugar‡	81 (22.7)
29. Coffee	66 (18.5)

Note:†The established lifestyle-related cancer risk factors (American Institute for Cancer Research 2017).

Table 4
Association between nurses' characteristics and health-promoting behaviour (N = 357).

Demographic variables	Health promoting behaviour			Chi-square	df	p-value
	Low (n = 135) n (%)	Moderate (n = 169)	High (n = 53)			
Age (years)				12.3	4	0.015*
21 to 29	85(42.1)	92(45.5)	25(12.4)			
30 to 39	37(39.0)	46(48.4)	12(12.6)			
≥40	13(21.7)	31(51.7)	16(26.6)			
Gender				1.13	2	0.56
Male	10(45.4)	8(36.4)	4(18.2)			
Female	125(37.3)	161(48.1)	49(14.6)			
Marital status				2.39	2	0.30
Single	49(35.5)	72(52.2)	17(12.3)			
Married	86(39.3)	97(44.3)	36(16.4)			
Live with friends or family				0.36	2	0.83
No	14(40.0)	17(48.6)	4(11.4)			
Yes	121(37.6)	152(47.2)	49(15.2)			
Monthly income				4.67	2	0.09
< RM3000(≈739USD)	72(41.4)	83(47.7)	19(10.9)			
≥ RM3000 (≈739USD)	63(34.4)	86(47.0)	34(18.6)			
Highest nursing education				1.39	2	0.49
Diploma	133(38.3)	163(47.0)	51(14.7)			
Degree	2(20.0)	6(60.0)	2(20.0)			
Working experience (years)				16.64	4	0.06
0 to 5	57(37.8)	76(50.3)	18(11.9)			
6 to 10	50(49.5)	41(40.6)	10(9.9)			
>10	28(35.0)	52(47.5)	25(17.5)			
Nursing position				9.88	2	0.07
Junior nurses	111(41.3)	126(46.8)	32(11.9)			
Senior nurses	24(27.3)	43(48.9)	21(23.9)			
Area of workplace				9.78	6	0.04*
Ambulatory care units	15(27.3)	26(47.2)	14(25.5)			
Operation theatre	21(36.2)	27(46.6)	10(17.2)			
Critical care units	29(40.3)	34(47.2)	9(12.5)			
Inpatient services	70(40.7)	82(47.7)	20(11.6)			
Rotational shift work				10.37	2	0.006*
Yes	117(41.2)	132(46.5)	35(12.3)			
No	18(24.7)	37(50.6)	18(24.7)			
History of health problems in family				1.21	2	0.54
Yes	87(39.9)	101(46.3)	30(13.8)			
No	48(34.5)	68(48.9)	23(16.6)			
Present of health problems				1.07	2	0.58
Yes	16(31.4)	27(52.9)	8(15.7)			
No	119(38.9)	142(46.4)	45(14.7)			
BMI (kg/m ²)				9.79	6	0.13
Underweight (<18.5)	6(30.0)	14(70.0)	0 (0)			
Normal (18.5–24.9)	62(36.3)	84(49.1)	25(14.6)			
Overweight (25.0–29.9)	42(38.2)	46(41.8)	22(20.0)			
Obese (≥30)	25(44.6)	25(44.6)	6(10.7)			

Note: *p < 0.05.

3.2. Perception of lifestyle-related cancer risk factors

Participants were asked to endorse which of the listed 29 factors had a significant effect on whether or not the average person developing cancer. Of the 29 listed factors, the five most endorsed lifestyle-related cancer risk factors were inherited predisposition/cancer genes (96.4%), followed by radiation (92.4%), tobacco (91.6%), nuclear power (90.2%), and industrial pollution (87.7%). Alcohol was rated as a cancer risk factor by the highest number of participants (73.1%), followed by cured meats (64.4%), overweight or obesity (43.4%), and diets high in red meat (40.6%). Only 33.6% and 31% of the participants' perceived diets low in vegetables and fruit, as well as insufficient physical activity were risk factors for cancer, respectively (Table 3).

3.3. Association between nurses' characteristics and health-promoting behaviour

A total of 14.8% (n = 53) of nurses reported a high level of health-promoting behaviours, while 47.4% (n = 169) and 37.7%

(n = 135) of participants reported moderate and low levels of health-promoting behaviours, respectively. Chi-square tests were performed. There were significant associations between nurses' overall health-promoting behaviour with age ($X^2[4] = 12.3$, $p < 0.05$), area of workplace ($X^2[6] = 9.78$, $p < 0.05$) and shift work ($X^2[2] = 10.37$, $p < 0.05$; Table 4).

4. Discussion

Findings from this study indicate that more than three-quarters of nurses live with moderate and low levels of health-promoting behaviours. A previous study by Thacker et al. (2016) on health-promoting lifestyle practices found that nurses fail to take adequate care of themselves. Likewise, Polat, Özen, Kahraman, and Bostanoğlu (2016) reported that student nurses' healthy lifestyle behaviours were generally found to be moderate level. The overall findings showed that the participants scored spiritual growth the highest, while physical activity the lowest. These findings are consistent with previous studies conducted among student nurses in Malaysia (Geok et al., 2015). A possible explanation could be

that participants in this study were mostly of Muslim faith, a religion that places a strong emphasis on spiritual growth. Conversely, Thacker et al. (2016) reported that more than half of registered nurses have significantly lower subscale scores for spiritual growth due to too many competing priorities.

The nurses in this study reported low physical activity. This indicates that nurses are not exercising enough despite knowing inadequate exercise to be a primary cause of most chronic diseases. It was found that 58.7% of nurses did not do any scheduled exercise. A possible reason could be the nurses are tired after busy daily work which causes physical exhaustion (Govasli & Solvoll 2020). This finding differs from Lim et al. (2019) findings which showed 97.9% of the nurses in this hospital were found sufficiently physically active. This inconsistency may be due to a substantial proportion of them reported physical activity attributable to occupational physical activity. However, it is important to bear in mind that occupational physical activity may not confer the same health benefits as leisure-time physical activity (Prince et al., 2021). Common barriers to engaging in physical exercise for nurses may be the lack of time, tiredness, and lack of motivation. Among these, time is a universal concern as nurses face job-specific demands such as shift work, long and irregular working hours, and work conflicts which may hinder them from engaging in insufficient physical activity (Power, Kiezebrink, Allan, & Campbell, 2017). Further research focusing on exercise programs for nurses is warranted.

Health responsibility and nutrition were not endorsed by nurses in our study as a priority for health-promoting behaviours. Nurses in this sample reported being less likely to select and consume foods that provide well-balanced nutritional values for their overall health and well-being. These unhealthy eating habits could be a possible factor contributing to overweight and obesity. Obesity, overweight, and poor eating habits are associated with shift and rotational night shift work (Sun et al., 2018). In addition, long working hours, busy schedules, and failure to take breaks were among the identified main barriers to healthy eating by nurses (Monaghan, Dinour, Liou, & Shefchik, 2018). This finding indicates that workplace health promotion on healthy eating among nurses is required (Nicholls et al., 2017).

We found a significant association between age and health-promoting behaviours. This is consistent with findings that reported statistically significant differences between older nurses and younger nurses in terms of health responsibility, nutrition, and stress management (Thacker et al., 2016). This suggests that those aged 50 years and above may be more concerned about their health. However, a study has reported that nurses who were 40 years old and older experienced slightly lower health-promoting behaviours in comparison to their younger colleagues (Kurnat-Thoma et al., 2017).

There was a significant association between area workplaces and health-promoting behaviours. The tenuous nature and demands of certain workplaces may require long working hours, heavier workloads, and shift work; this can be stressful and hamper nurses' efforts to live a healthy lifestyle (Ross et al., 2017). A study by Ross et al. (2019) on health-promoting self-care reported that nurses who work in a non-direct patient care setting might have a higher risk for sedentariness and obesity.

In our study, shift work was significantly associated with health-promoting behaviours. This is congruent with a study that reported that nurses working on night shifts were less probably to perform regular physical exercises (Chin, Nam, & Lee, 2016). The alterations in sleep-wake cycles influence the food selections and meal patterns of shift-working nurses (Gifkins, Johnston, & Loudoun, 2018). Shift work could be the reason for the development of obesity among nurses (Zhang et al., 2020).

The mean BMI of the nurses in this study was 25.20 (SD = 4.95). This is higher than a study examining the association between physical activity and work schedule among nurses in Malaysia (M = 24.81, SD = 4.83) (Lim et al., 2019). This is slightly lower than the average BMI for a female Malaysian adult (M = 26.40; SD = 6.1) (Lee & Wan Muda, 2019). A total of 46.5% of nurses in this study were overweight or obese. This was higher than a study done in China (18.0%) (Fan et al., 2020). However, this is far lower than prevalence rates elsewhere, 86.1% in England (Kyle et al., 2017), 49.0% in America (Chin et al., 2016), and 61% in Australia (Perry et al., 2018), respectively.

The top three lifestyle-related cancer risk factors that nurses in this study were aware of were inherited predisposition/cancer genes, radiation, and tobacco. This is correct and congruent with previous studies which examined lifestyle-related cancer risk factors awareness (American Institute for Cancer Research, 2019; American Institute for Cancer Research 2017). Almost all (96%) nurses understood cancer to be hereditary through inherited genetic mutation. The high awareness of tobacco as a lifestyle-related cancer risk factor in our sample could be related to the role of nurses in promoting and supporting smoking cessation in the country. High awareness and knowledge of radiation exposure as a lifestyle-related cancer risk factor is documented elsewhere (Hirvonen et al., 2019) and could be related to fundamental nursing training related to radiation protection and safety.

In relation to the established lifestyle-related cancer risk factors (overweight/ obesity, alcohol, insufficient physical activity, diets high in red meat, diets low in vegetables and fruit, and cured meats) (American Institute for Cancer Research 2019), the awareness of alcohol and cured meats as lifestyle-related cancer risk factors was greater in our sample than that for the other risk factors. Of concern is the fact that awareness of obesity, diets high in red meat, diets low in vegetables and fruit, and insufficient physical activity as lifestyle-related cancer risk factors was alarmingly low in this study. Despite the universal campaign on living a healthy lifestyle that emphasises healthy eating and physical activity for a healthy weight, nurses in our sample seemed to endorse lifestyle factors less compared to genetic and environmental cancer-related risk factors. Future studies are needed to corroborate the results.

The present study has a limitation that should be considered when interpreting the results. The single-centre nature of the study makes it difficult to generalise the findings. Despite this limitation, the current study is the first to examine the health-promoting behaviours and awareness of lifestyle-related cancer risk factors among staff nurses in Malaysia. A broader scale study that includes nurses from the different hospitals is needed to provide more precise significant findings. A further study that focuses on strategies for changing nurses' health risk behaviour is therefore suggested.

5. Conclusion

Nurses in this sample were found to not engage in physical activity. Almost half were overweight or obese. It is also worth noting that the nurses reported the physical activity to be the least important of their health-promoting behaviour against cancer. The lifestyle-related cancer risk factors such as overweight/ obesity, practicing diets high in red meat or diets low in vegetables/fruit, and insufficient physical activities were not prioritised by the nurses. A high proportion of nurses in this study attributed cancer risk to environmental rather than personal factors. The findings may provide insight into the current health behaviours and perceptions of nurses on lifestyle-related cancer risk factors. This may serve well as an important indicator for nurse administrators as to where education and supportive services should target their focus.

Authorship contribution statement

Siaw Wei Tong: Conceptualisation, Methodology, Formal analysis, Writing – original draft. **Ping Lei Chui:** Conceptualisation, Methodology, Formal analysis, Writing – original draft. **Mei Chan Chong:** Conceptualisation, Methodology, Writing – review & editing. **Li Yoong Tang:** Methodology, Formal analysis, Writing – review & editing. Caryn Mei Hsien Chan: Formal analysis, Writing – original draft, Writing – review & editing.

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Ethical statement

This submitted manuscript involved human research. Ethical approval was granted for the study as a scientific research study. The submitted manuscript is based on a research study that was subjected to a full review by University Malaya Medical Centre Medical Research Ethics Committee, approval number 2017113-5779, dated 10 January 2018.

Conflict of interest

None.

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