ASSESSMENT OF MACRONUTRIENT INTAKE, EATING HABITS, SLEEP QUALITY AND PHYSICAL ACTIVITY, AMONG MEDICAL DOCTORS (26-50) YEARS WORKING IN A TERTIARY CARE HOSPITAL SETTING IN MUMBAI, INDIA.

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ABSTRACT

In almost all cultures and communities today, practicing medicine is difficult and fraught with difficulties previously unheard of. Medical doctors who regularly engage in physical activity might serve as role models for their patients and encourage physical activity among them. Medical doctors disregard their own health by putting others' needs before their own because of their busy work schedules and the issues that come with the delivery of healthcare. This study aimed to assess the Macronutrient Intake, Eating Habits, Sleep Quality, and Physical Activity among Medical Doctors (26–50) Years Working in a Tertiary Care Hospital Setting in Mumbai, India. The tool used structured interviews and complete questionnaires to collect information on demographic details, eating and lifestyle habits, dietary preferences, macronutrient intake, physical activity, and sleep quality. The association between eating habits, sleep quality, and physical activity was studied. The study revealed that the mean height, weight, and BMI were significantly higher in males than in females. The mean BMI for both males and females was above the recommended range. (25.23 kg/m^2 and 23.8 kg/m^2), respectively (p 0.031). The study also found that a majority of the participants skipped breakfast. A positive association between those who did not skip breakfast and good sleep quality for men (p-value 0.024) was recorded. The findings of this study can be used to design targeted interventions to improve the health and well-being of medical doctors and prioritize their own health to promote healthy lifestyles among their patients.

Key Words: *Medical Doctors Macronutrient Intake, Eating Habits, Sleep, and Physical Activity*

1. INTRODUCTION

The nutritional state of persons is mostly influenced by food and physical exercise. Malnutrition is the outcome of consuming too little food (i.e., being overweight, obese, or undernourished). A person who has received the necessary training to evaluate, identify, and treat patients is a medical doctor. This is a physically hard job, and experience significant mental stress at work, which can have an impact on one's nutritional state and eating habits. Due to the unique nature of their working environment, health care workers face more occupational risks than the general population. Self-care may be extensively examined in order to enhance the health care system because healthcare professionals' health influences how well they function. (Nihal Buyukuslu et.al 2014)

Physical activity (PA) is described as "any bodily movement produced by skeletal muscles that results in energy expenditure." Studies have shown that regular exercisers had a reduced chance of acquiring coronary artery disease, diabetes mellitus, obesity, hypertension, and joint illnesses than non-exercisers do. Lack of physical activity is a key risk factor for non-communicable diseases (NCDs). (Darren E.R et al , 2012). Adult disorders like heart disease, stroke, diabetes mellitus, depression, obesity, etc. are all linked to a lack of regular physical activity. Additionally, bad eating habits have also boosted the prevalence of adult obesity and associated repercussions. As a result, for optimal health, The American Heart Association (AHA) advises engaging in "at least 150 minutes of moderate intensity aerobic activity or 75 minutes of strenuous activity per week." (Dr. Fayez Saud AL Reshidi. 2014).

Doctors make up a physically and mentally burdened group. Rotating work shifts, demanding tasks, together with family-related issues, make physical exercise hard to be planned and performed. Several studies have highlighted that healthcare providers do not get enough exercise, but they also indulge in unhealthy food, alcohol abuse and are at a high risk of professional burnout. As future doctors, medical students' personal adoption of healthy lifestyles is even more crucial, as they are more likely to fail to provide their patients with opportunities for health promotion. Additionally, it has been demonstrated that medical students display early risk indicators for chronic illnesses. (Chythra R Rao et al. 2012). A person’s occupation is believed to affect the prevalence of sleep disorders (Ursin R et.al, 2009). A study has shown that sleep problems are common among health care workers, although many factors such as socio-demographic and occupational characteristics also affect its prevalence. (Ertel KA, et.al, 2011). Sleep disturbance can negatively affect work quality and increase the risk of adverse events and safety-compromising behaviors. (Patterson PD et.al,2012). Sleep quality is known to have a relation with physical fitness. (Tandiono EK et al, 2021)

2. METHODOLOGY

2.1 Study Design

The study was conducted using a cross-sectional study design to assess Macronutrient Intake, Eating Habits, Sleep Quality and Physical Activity, among Medical Doctors (26-50) years working in a Tertiary Care Hospital setting in Mumbai, India.

2.2 Sampling Technique

The study participants were recruited through a snowball sampling method which included a sample size of 200 participants, 116 females and 84 males. The consent of participants were taken and participants were conversant about the study and its aim and objectives. The samples were recruited on the basis of the following inclusion criteria.

2.3 The criteria used for selecting participants were as follows:

Inclusion Criteria

➢ Males and females within the age group of 26 to 50 years

➢ Medical Doctors

➢ Doctors working Minimum of 9 hours shift in same hospital (Government & Private)

➢ Doctors who gave an informed consent to participate in this study

Exclusion Criteria

➢ Males and females above the age group of 26 to 50 years

➢ Doctors with chronic diseases like TB, Cancer, Stroke

➢ Medical Doctors practicing outside of Mumbai

➢ Doctors who refused to participate in the study

2.4 Tools and Technique

Participants had a structured interview and completed questionnaires to collect information on demographic details, eating and lifestyle habits, dietary preference, macronutrient intake, physical activity and sleep quality. Anthropometric parameters were recorded. Sleep quality and Physical activity was assessed using the Pittsburgh Sleep Quality index (PSQI) and International Physical Activity Questionnaire (IPAQ-SF) respectively. Macronutrient Intake was assessed using a semi quantitative Food Frequency Questionnaire. Association between eating habits, sleep quality and physical activity was studied. Descriptive and bivariate analysis was performed.

2.5 Data Analysis

Data analysis was performed using SPSS (Statistical Package for Social Sciences) software (version 20). Data was generated in the form of tables and figures. Descriptive statistics such as mean, standard deviation, frequency and percentage were used to analyze sociodemographic variables and anthropometric measurements. Inferential statistics such as the chi-square test was performed to determine the association between two variables.

3. RESULT

The study was conducted to assess Macronutrient Intake, Eating Habits, Sleep Quality and Physical Activity, among Medical Doctors (26-50) years working in a Tertiary Care Hospital setting in Mumbai, India.

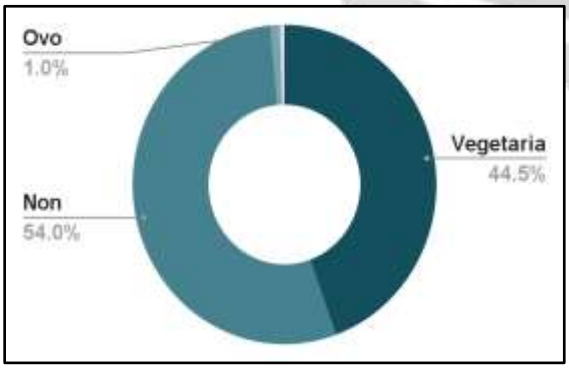
3.1 Demographic Details

The (Table 1) represents the demographic characteristics of the study participants, divided into different categories and displayed as frequencies and percentages. The study included a total of 200 participants, with 42% being male and 58% being female. The largest age group was 31-41 years, with 50%, followed by 26-31 years with 33%, and 41-50 years with 17%. In terms of marital status, 56% were single, while 44% were married. The **majority** of participants had a graduate qualification, with 44% falling into this category. Post-graduate qualifications were held by 29%, while 13.5% were doctorate, and another 13.5% were specialists. The largest occupational group was general physicians, with 38%, followed by diabetologists 33.5%, cardiologists 16%, radiologists and orthopedics 8% and 4.5% respectively. The **majority** of participants 65% reported working for more than 8 hours, 32.5% worked for 9 to 11 hours, and only 2.5% reported working for more than 11 hours. 39.5%, reported consuming their food in the cafeteria. This was followed by 33.0% who mentioned eating in a restaurant. Additionally, 27.0% got their food from home during their break hours. 44.5% of them were vegetarians, followed by 54 % Non-Vegetarians and Only 1% of the participants followed a lactose-free or gluten-free diet.

Table 1: Demographic Characteristics of the Study Participants

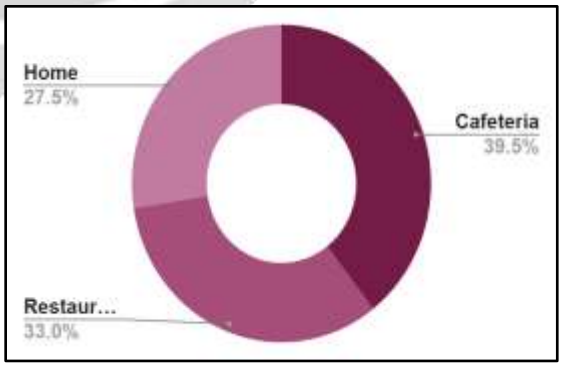
Characteristics	Male (n =84) (%)	Female (n = 116) (%)	Total (n = 200) (%)
Age (years)			
26 - 31	25 (29.8)	41 (35.3)	66 (33)
31 - 41	43 (51.2)	57 (49.1)	100 (50)
41 - 50	16 (19.0)	18 (15.5)	34 (17)

Table 1: Demographic Characteristics of the Study Participants			
Marital Status			
Single	50 (59.5)	62 (53.4)	112 (56)
Married	34 (40.5)	54 (46.6)	88 (44)
Highest Qualification			
Graduate	39 (46.4)	49 (42.2)	88 (44)
Post-graduate	27 (32.1)	31 (26.7)	58 (29)
Doctorate	10 (11.9)	17 (14.7)	27 (13.5)
Specialist	8 (9.5)	19 (16.4)	27 (13.5)
Occupation			
General physician	38 (45.2)	38 (32.8)	76 (38)
Diabetologist	27 (32.1)	40 (34.5)	67(33.5)
Cardiologist	12 (14.3)	20 (14.3)	32 (16)
Radiologist	6 (7.1)	10 (8.6)	16 (8.0)
Orthopedic	1 (1.2)	8 (6.9)	9 (4.5)
Shifts/working hours			
> 8 hours	53 (52.6)	77 (60.2)	130 (65)
9 hours to 11 hours	29 (43.8)	36 (35.5)	65 (32.5)
More than 11 hours	2 (3.6)	3 (4.3)	5 (2.5)



1.TYPE OF DIET OF THE PARTICIPANTS

Figure 1 : Type of diet of the Participants



2. CONSUMPTION OF FOOD DURING BREAK

Figure 2: Consumption of food during break hours

3.2 Anthropometric Measurements

Table 2 : Anthropometric Measurements of the Study Participants

Anthropometric Measurements	Male (n =84) (Mean ± SD)	Female (n = 116) (Mean ± SD)	t-test value	p value
Height (cm)	164.9 ± 8.18	162.7 ± 8.23	1.903	**0.058***
Weight (kg)	68.61 ± 13.80	63.0 ± 12.34	2.970	**0.003***
Waist Circumference (inches)	34.71 ± 6.99	34.30 ± 6.649	0.384	0.701
BMI (kg/m2)	25.23 ± 4.860	23.8 ± 4.276	2.171	**0.031***

Mean ± Standard Deviation *p < 0.05

Table 2 represents the overall mean weight of all the study participants. The average mean weight of males being 68.61 kg and females being 63 kg. The mean height of all the study participants was 163.6 cm. The difference between the mean values of height and weight between the groups was statistically significant (p=0.058) for height & p=0.003 for weight). Body mass index is a value derived from the mass and height of an individual. According to WHO-Asian cut-offs, a BMI of <18.5 (kg/m2) is considered as underweight, 18.6 to 22.9 (kg/m2) is normal, 23 to 24.9 (kg/m2) is overweight and >25 (kg/m2) is considered as obese. The mean BMI of the overall sample in this study was 25.85 (kg/m2), reflecting that the study population was obese on average. Energy, carbohydrate, and fat consumption were high in both groups (100 % RDA), which contributed to the high BMI. Mean BMI of participants was found to be 25.23 (kg/m2) and 23.8 (kg/m2) in males and females respectively However, the difference between the mean values of BMI between the groups was statistically significant (p=0.031).

Table 3 : Classification of Sleep Quality Gender Wise

Characteristics (n =200)	Male (n =84)	Female (n =116)	Total (n = 200) (%)	$\chi 2$ test	p-value
Overall sleep quality					
Good quality (<5)	58 (69.0%)	84 (73.0%)	142 (71.4%)	0.379	0.538
Poor quality (≥5)	26 (31.0%)	31 (27.0%)	57 (28.6%)		

Data are represented as n (%)

Table 3 represents that the overall sleep quality was measured using PSQI which is a widely used tool to assess sleep quality, with scores ranging from 0 to 21, where a score of less than 5 indicating good quality sleep, and a score of 5 or higher indicating poor quality sleep. Of the total sample, (n=200), 71.4% reported good quality sleep, males being 69.0% and females n= 73.0%, while 28.6%, of which 31.0% men and 27.0% women reported having poor-quality sleep. The difference in sleep quality between genders was not statistically significant, as indicated by the p-value of 0.538. The proportion of individuals who reported poor quality sleep was slightly greater among females 27.0% than males 31.0% This was due to majority of female doctors working more than 8 hours (60.2%) than male (52.6) (Table 1)

Table 4 : Classification of Sleep Quality Components Gender Wise

PSQI Component	Male (n=84) (Mean ± SD)	Female (n=116) (Mean ± SD)	t-test value	p value
Global PSQI (±SD)	3.89 ± 2.8	3.59 ± 2.77	0.745	0.457
Subjective sleep quality	1.40 ±1.21	1.36 ±1.20	0.279	0.781
Sleep latency	0.80 ±1.07	0.73 ±1.07	0.435	0.664
Sleep duration	0.77 ±0.97	0.85 ±1.10	-0.520	0.604
Sleep efficiency	0.85 ±1.03	1.04 ±1.15	-1.252	0.212
Sleep disturbance	0.63 ±0.87	0.64 ±0.94	-0.095	0.924
Use of sleep medication	0.17 ±0.43	0.12 ±0.42	0.733	0.465
Daytime dysfunction	0.51 ±0.89	0.50 ±0.84	0.131	0.896

Data represented in mean (SD), p value <0.05 considered statistically significant.

Table 4 results indicate that, on an average, both males and females had relatively good sleep quality, with a global mean PSQI score of 3.89 for males and 3.59 for females, The individual components of the PSQI, there were no significant differences in subjective sleep quality, sleep latency, sleep duration, sleep disturbance, and daytime dysfunction between males and females.

Table 5: Classification of Physical Activity Gender Wise

Physical activity	Male (n= 84) (%)	Female (n=116) (%)	Total (n= 200) (%)	$\chi 2$ test	p value
Walking	40 (47.6%)	47 (40.9%)	87 (43.7%)	**4.822**	**0.185**
Moderate Physical Activity	23 (27.4%)	31 (27.0%)	54 (27.1)		

Vigorous Physical Activity	2 (2.4%)	0 (0.0%)	2 (1.0%)		
Physically Inactive	19 (22.6%)	37 (32.2%)	56 (28.1%)		

Data represented in n(%) & Chi Square , $p<0.05$.

Table 5 represents correlation between gender and physical activity overall ($p = 0.185$). Slightly higher percentage of males engaged in walking (47.6%) compared to females (40.9%). No females were engaged in vigorous physical activity, while a small percentage of males (2.4%) did. However a higher percentage of females were physically inactive (32.2%) compared to males (22.6%).

Table 6 : Macronutrient Intake of the Study Participants

Macronutrients	**Male (Mean ± SD)**	**RDA %**	**Female (Mean ± SD)**	**RDA %**	**t-test value**	**p value**
Energy (kcal)	2329±507	110 %	2322± 622	139.8%	0.089	**0.929**
Carbohydrate (g)	438.8± 416.2	337%	401.7± 202.8	301%	0.654	**0.514**
Protein (g)	59.2± 16.94	109.63%	49.5±54.3	108.3%	0.832	**0.406**
Fats (g)	35.3± 19.5	141.2 %	39.4±18.6	197%	-1.463	**0.145**

Data represented in mean (SD), p value <0.05 considered statistically significant.

Table 6 presents the macronutrient intake of the study participants. Energy intake of the male participants consumed an average of 2329±507 kcal, which corresponds to 110% of the recommended dietary allowance. On the other hand, the female participants consumed an average of 2322±622 kcal, exceeding the RDA at 139.8%.
In terms of carbohydrate intake, the male participants consumed an average of 438.8±416.2 g, which corresponds to 337% of the recommended dietary allowance. The female participants consumed an average of 401.7±202.8 g, reaching 301% of the RDA. The t-test analysis revealed a t-value of 0.654, indicating no statistically significant difference between the two groups ($p=0.514$).

Regarding protein intake, the male participants consumed an average of 59.2±16.94 g, which corresponds to 109.63% of the recommended dietary allowance. On the other hand, the female participants consumed an average of 49.5±54.3 g, corresponding to 108.3% of the RDA. The t-test analysis yielded a t-value of 0.832, indicating no statistically significant difference between the two groups ($p=0.406$).

In terms of fat intake, the male participants consumed an average of 35.3±19.5 g, reaching 141.2% of the recommended dietary allowance. The female participants consumed an average of 39.4±18.6 g, which corresponds to 197% of the RDA. The t-test analysis yielded a t-value of -1.463, indicating no statistically significant difference between the two groups ($p=0.145$).

In summary, the study participants, both male and female, had macronutrient intake levels that exceeded the recommended dietary allowances for energy, carbohydrates, protein, and fats. However, no statistically significant differences were found between males and females in terms of their macronutrient intake.

Table 7 : Association between Skipping Breakfast, Sleep Quality and Physical activity among the participants

Categories	**Sleep Quality**	**Gender**	**Physical Activity**				**Total**	**χ2 test**	**P-value**
			Inactivity n (%)	**Walking n (%)**	**MA n (%)**	**HA n (%)**	**n (%)**		
Skip Breakfast									
Never/ <1/ month	**Good Sleep (<5)**	**M**	**2(13.3%)**	9(39.1%)	6(33.3%)	0(0.0%)	**17(29.3%)**	27.693	**0.024**
		F	5(20.0%)	10(27.8%)	10(45.5%)	0(0.0%)	**25(30.1%)**	9.357	0.499
	Poor Sleep (>5)	**M**	1(25.0%)	8(47.1%)	1(20.0%)	0(0.0%)	10(38.5%)	7.734	0.655
		F	2(16.7%)	3(30.0%)	1(11.1%)	0(0.0%)	1(19.4%)	8.486	0.581
2-3 times a month	**Good Sleep (<5)**	**M**	**9(60.0%)**	7(30.4%)	6(33.3%)	0(0.0%)	22(37.9%)	27.693	0.024
		F	12(48.0%)	19(52.8%)	6(27.3%)	0(0.0%)	37(44.6%)	9.357	0.499
	Poor Sleep (>5)	**M**	2(50.0%)	4(23.5%)	3(60.0%)	0(0.0%)	9(34.6%)	7.734	0.655
		F	7(58.3%)	5(50.0%)	5(55.6%)	0(0.0%)	17(54.8%)	8.486	0.581
1/week	**Good Sleep (<5)**	**M**	0(0.0%)	4(17.4%)	2(11.1%)	0(0.0%)	6(10.3%)	27.693	0.024
		F	3(12.0%)	2(5.6%)	3(13.6%)	0(0.0%)	8(9.6%)	9.357	0.499
	Poor Sleep	**M**	0(0.0%)	1(5.9%)	1(20.0%)	0(0.0%)	2(7.7%)	7.734	0.655

	(>5)	**F**	1(8.3%)	1(10.0%)	1(22.2%)	0(0.0%)	4(12.9%)	8.486	0.581

Data represented in chi square, p value <0.05 considered statistically significant.
MA: Moderate Activity, HA: High Activity

Table 7 presents data on the association between frequency of skipping breakfast and sleep quality in terms of physical activity level and gender. The first row represents the results for individuals who skip breakfast less than once a month and have good sleep quality (<5). Among men in this group, 13.3% were inactive, 39.1% reported walking as their primary physical activity level, 33.3% reported moderate activity, and none reported high activity. Among women in this group, 20% were inactive, 27.8% reported walking, 45.5% reported moderate activity, and none reported high activity. The chi-square test value for this group was 27.693 and the p-value was 0.024, which indicates a statistically significant association between skipping breakfast and good sleep quality for men.

4. DISCUSSION

The study was conducted to assess the Macronutrient Intake, Eating Habits, Sleep Quality and Physical Activity, among Medical Doctors. The mean BMI of the overall sample in this study was 25.85 (kg/m2), reflecting that the study population was obese on average. Energy, carbohydrate, and fat consumption were high in both groups (100 % RDA), though their intake levels are good, the quality of intake has to be observed where most participants in all categories reported consuming processed foods like chips, maggi, pasta, etc., as a replacement for regular meals which contributed to the high BMI. Mean BMI of participants was found to be 25.23 (kg/m2) and 23.8 (kg/m2) in males and females respectively However, the difference between the mean values of BMI between the groups was statistically significant (p=0.031).

A study carried out to assess the nutritional status of 60 doctors and nurses of Selected Hospitals in Bengaluru reported that except for a few nutrients, the nutritional consumption of doctors and nurses was insufficient and below the RDA, and the majority of micronutrients appeared to be lacking in the diet. Fat intake was more than the RDA. Obesity was prevalent as indicated by the BMI and WHR. (Aparna Nagendra., et al. 2020)

The results of the present study reported that individuals who skip breakfast less than once a month, have good sleep quality (<5). Among men in this group, 13.3% were inactive, 39.1% reported walking as their primary physical activity level, 33.3% reported moderate activity, and none reported high activity. Among women in this group, 20% were inactive, 27.8% reported walking, 45.5% reported moderate activity, and none reported high activity.

The study results were in accordance with a similar study reported in Saudi Arabia about skipping breakfast, the study also found that the prevalence of skipping breakfast was higher among female healthcare professionals compared to males due to busy and demanding work schedule of healthcare professionals, which may lead to them sacrificing breakfast in order to save time or cope with their workload (AlQuaiz AM, et al.2017). Another study published in the Journal of the Academy of Nutrition and Dietetics in 2014 found that 31% of healthcare professionals (including physicians, nurses, and dietitians) reported skipping breakfast on weekdays owing to work long hours and irregular schedules, which made it difficult to prioritize breakfast (Smith KN, et al.2014)

The present study reported a slightly higher percentage of males engaged in walking (47.6%) compared to females (40.9%). No females were engaged in vigorous physical activity, while a small percentage of males (2.4%) did. However a higher percentage of females were physically inactive (32.2%) compared to males (22.6%). The study results were in accordance with a study which also found that 41.2% of medical doctors were physically inactive, and only 22.2% of doctors met the recommended level of physical activity because of high-stress environment of their profession, which led to fatigue and burnout, making it harder for them to prioritize physical activity on daily basis (Krishnan, G., Anand, A., & Babu, G. R. (2018)

A study by Léger et al. (2015) found that approximately 40% of French doctors reported poor quality sleep, with factors such as work overload, night shifts, and emotional stress being significant predictors. Similarly, another study by (Ahmadi et al., 2018) reported that medical residents had significantly poorer sleep quality compared to non-medical residents, which was attributed to higher levels of work-related stress and longer working hours.

Studies have also shown that the sedentary nature of the medical profession, including prolonged periods of sitting during patient consultations and administrative tasks, can contribute to low levels of physical activity among doctors (Chau et al., 2017; Oliveira et al., 2017)
According to a study, 68.4% of individuals engaged in little physical exercise (600 MET min/week). Male physicians (4.3% versus 1.3% respectively) reported higher levels of physical exercise than female physicians. Males were more likely to report having inadequate home exercise facilities (71.7%), unfavorable weather (69%) and not prioritizing exercise (67.2%) as their top barriers to engaging in physical activity. (Dr. Fayez Saud AL Reshidi. 2014).

The present study results indicate that, on average, both males and females had relatively good sleep quality, with a global mean PSQI score of 3.89 for males and 3.59 for females, The individual components of the PSQI, there were no significant differences in subjective sleep quality, sleep latency, sleep duration, sleep disturbance, and daytime dysfunction between males and females, ($p > 0.005$ for all). These findings are consistent with previous studies that have reported no significant differences in sleep quality between male and female medical doctors (Li et al., 2021; Zhang et al., 2018). However, some studies have reported that female medical doctors have poorer sleep quality compared to their male counterparts (Ahmadi et al., 2018; Zhang et al., 2019).
Additionally, both males and females reported very low use of sleep medication, with means of 0.17 and 0.12, respectively. Overall, these results suggest that males and females had similar sleep quality and patterns, with only a slight trend towards lower sleep efficiency among females. Additionally, women tend to have higher rates of insomnia compared to men, which could be another factor contributing to poorer sleep quality among female doctors (Zhang et al., 2018). Research has shown that dietary habits can have an impact on sleep quality. A study by St-Onge et al. (2016) found that a higher intake of sugar and saturated fat was associated with worse sleep quality, while a higher intake of fiber was associated with better sleep quality.

5. CONCLUSION

The current study assessed the macronutrient intake, eating habits, sleep quality, physical activity among medical doctors working more that 8 hours in a hospital setting. This study reported skipping breakfast, lack of physical activity and poor sleep quality among medical doctors. Future research should aim to emphasize on eating healthy food and being active, particularly in light of a hectic work schedule and escalating health crisis among medical professionals and to raise knowledge of health-related nutritional status and lifestyle determinants.

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