Available online at **www.ijmrhs.com**

ISSN No: 2319-5886

International Journal of Medical Research & Health Sciences, 2018, 7(9): 1-14

Eating Habits among Healthcare Providers during Working Hours at National Guard Health Affairs-Riyadh, Saudi Arabia

Taghreed Mohammed Al Hazmi*, Abdullah Alghamdi and Imad Abdulmajeed

National Guard Health Affairs, King Abdulaziz Medical City, Riyadh, Saudi Arabia

**Corresponding e-mail: totazah00@hotmail.com*

ABSTRACT

Background: *Poor dietary habits can impact negatively the well-being of health care workers (HCWs). Although some studies have demonstrated the deleterious effects of unhealthy eating habits of HCWs, they are limited and their results may not be generalized to other professions.* ***Aim of the study:*** *This study aims to explore the dietary habits among different healthcare workers at King Abdulaziz Medical City (KAMC) in Riyadh, Saudi Arabia.* ***Subjects and methods:*** *A cross-sectional survey was conducted between June 2015 and August 2015. A validated questionnaire was distributed to HCWs and 388 HCWs completed it. Chi-square and Fisher exact test were used to analyze categorical variables and independent sample t-test was used for quantitative variables. The $p<0.05$ indicates statistical significance.* ***Results:*** *Saudis HCWs comprised 69.1% and 57% of the participants were females. The majority (46.7%) are residents and nurses (23%). Half of HCWs work more than 8 hours daily. The most frequently consumed foods and drinks are sweets (46.6%) and coffee (66.2%). Females eat more fruits and vegetables than males (47.1% vs. 18.6%, $p=0.000$). Saudis are less likely to eat fruits and vegetables than non-Saudis (49.7% vs. 66.1%, $p=0.001$) and they binge eat at home more than non-Saudis (61.9% vs. 22.5%).* ***Conclusion and Recommendations:*** *HCWs adopt unhealthy dietary habits due to workload, inadequate break time and unavailability of healthy food in the hospital and it has affected their work performance and well-being negatively. Therefore, healthcare organization like KAMC-RD should introduce healthier foods at a reasonable price in the hospital catering, and oversee the organization of workload in a way to ensure adequate break time for the HCWs.*

Keywords: Healthcare workers, Dietary habits, Workload, Weight

INTRODUCTION

Proper dietary habits are defined by Preedy, et al., as "the habitual decisions of individuals or group of people regarding what foods they eat" and it includes consumption of vitamins, minerals, carbohydrates, proteins and fats [1]. It is generally known that poor dietary habits in which inadequate and or imbalanced diet play a significant negative role in human health. Most of the published studies were done to assess poor dietary habits among HCWs with different working hours schedules, though they were limited in their scope, have shown that these habits are associated with serious health conditions such as metabolic syndrome, type 2 diabetes, increased risk of cardiovascular diseases and obesity [2-7]. While these studies have been conducted in the USA; developing countries like Saudi Arabia faces probably the same problems due to the increasing prevalence of sedentary lifestyle and poor dietary habits.

Generally, most of the HCWs have different working hours' schedules, and some studies have demonstrated that there was no difference between shift workers and daytime workers in terms of their total energy intake and this has also been confirmed in some nutrition's research review [7]. On the other hand, it has been shown that shift workers have more unfavorable dietary habits compared to day workers [8]. Moreover, many others reports have shown that shift workers have different dietary habits and food selection [7]. Salameh, et al., although didn't involve HCWs in particular, has found that students' dietary habits might become worse than their earlier years at the college. Furthermore, these poor dietary habits at work are likely to be a continuum of those habits acquired during childhood and early adulthood [9].

Long working hours, shift work, availability of fast food, eating in responses to stress as a maladaptive coping convenience, environmental factors and nature of food outside the working hours [3-8,10-12], may all or in part

contribute to the observed poor dietary habits among HCWs and can affect their productivity negatively [13-15]. Faugier, et al., has conducted a study to examine the barriers to healthy eating in the nursing profession and found that workload, inadequate regular break, and difficult access to healthy food can affect their dietary habits [3].

Physician's responsibility of their well-being is considered a core competency by the Royal College of Physicians and Surgeons of Canada [16]. However, their physical and mental well-being has been linked to the availability of nutritional sources at work and this places an important role for healthcare policy and decision makers in hospitals and healthcare organizations [17,18].

Healthy dietary habits influence positively the ability of the physicians to care for their patient and healthcare organizations should adopt more proactive approaches to the wellness of their healthcare workers as many physicians around the globe usually fail to adopt healthy dietary habits at work [18,19]. Poor dietary habits among (HCWs) in Saudi Arabia is generally observed among non-Saudi nurses working in the central region, but not studied enough among other HCWs [20]. The aim of this study is to explore the various dietary habits among HCWs at King Abdul-Aziz medical city (KAMC)-Riyadh during work times. It also aims to answer two questions:

- What are the drawbacks of poor dietary habit on HCWs?
- What are the barriers to adopting healthy dietary habits at work?

Study Objectives

Primary objectives

- To assess various eating habits among health care providers.
- To assess barriers to healthy eating habits at the workplace.
- To explore possible associations among participants demographics, job nature and dietary behaviors at work.
- To determine the prevalence of unhealthy dietary habits among different health care providers.

Secondary objective

Determine the prevalence of overweight and obesity among HCWs.

PATIENTS AND METHODS

This study was conducted among HCWs in King Fahd Hospital and in National Guard Comprehensive Specialized Clinic (NGCSC) at King Abdulaziz Medical City, Riyadh (KAMC-RD), Saudi Arabia, which cover different areas and population. The study was approved and funded by King Abdullah International Medical Research Center (KAIMRC).

The study subjects include both gender of physicians, nurses, pharmacists, and technicians. Exclusion criteria include HCWs who work in the nutrition department and other workers who are unable to fill out the questionnaire properly.

The calculated sample size was 350, which was calculated using an OpenEpi epidemiologic calculator based on the prevalence of junk food consumption among nurses. There is another study done by Almajwal which was published after the completion of this study [20]. About 70% of prevalence was assumed from Wong, et al., a study [15].

A non-random, convenience sampling was used to obtain the representative sample of the target population. Data was collected through a self-administered questionnaire of 26 items that were designed by the researchers based on a literature review of articles having the same objectives. This questionnaire was reviewed and validated by an experienced statistician and epidemiologist. It was pre-tested in a pilot study on 16 HCWs from different specialties then finalized. The purpose of the pilot testing was to ascertain if the questionnaire was appropriate and easily understood by the respondents. In addition, it helped us to assess the time needed to complete the questionnaire. Questionnaires of the pilot study were not included in the final sample.

The questionnaire was distributed to participants in all targeted departments after obtaining a consent form. Data collection was carried out between June 2015 and August 2015. Sampling was carried out on 3 days (by lottery) every week until the required sample size was covered. Subjects were recruited during their department morning rounds, academic activities and during their break times.

The questionnaire was divided into 5 sections. The first section includes the demographic characteristics of the study population such as age, gender, anthropometric data, current professional position, specialty, and smoking status. The participants involved in this study self-reported their weights and heights. A corrected body mass index (BMI) was calculated using the corrected weight in kilograms over height squared (in square meter). According to the international classification of adult weight to height status (i.e., underweight, overweight, and obese), BMI values were classified into 4 categories for individuals 20 years of age or older: underweight (BMI 18.5 kg/m^2), normal weight (BMI between 18.5 and 24.9 kg/m^2), overweight (BMI between 25 and 29.9 kg/m^2), and obese (30 kg/m^2) [21]. The second section contains close-ended questions about nature of the work: Working hours (either less than 8 hours or more), (day, evening, night or variable times) and if they are working overnight (on call more than 12 hours). Third section explores dietary habit in last month and the way to provide the food and its frequency (home or hospital catering), food and drink samples through food frequency categories which include (fruits and vegetables, dairy product, sweets, cereals, bread, meats, fish or eggs, spaghetti, mixed dishes, soups, sauces and condiments), total number of meals and snacks at home and at work time. The fourth section assessed workload affected HCWs and how it impacted them and their habits especially binge eating after work. A score ranging from (-2 to +2) was assigned to each question that measured HCWs attitude; more than 0 consider the positive attitude of healthy dietary habit and less than 0 consider negative attitude. The last section was to identify the barriers which make it difficult to drink or eat in a healthy way during working hours and how to improve food service at KAMC-Riyadh.

Statistical Analysis

Statistical package for the social sciences version 23 (SPSS, 23) software was used by a statistician for data analysis. Descriptive statistics were performed in the form of frequencies and percentage for categorical variables while mean and standard deviation (SD) were used for the description of continuous variables (age). Analytic statistics were done using the chi-square test (χ^2) and Fisher test to assess the difference between categorical variables. Statistically, significance was set to 0.05 or less.

Ethical Consideration

This study was approved by the King Abdullah International Medical Research Center (RC15/036/R). The consent form was obtained from the participants when the questionnaire was distributed. All data were kept confidential and used only for research purposes.

RESULTS

Characteristics of the study group

Based on the study design, 388 healthcare workers (HCWs) were selected from King Abdulaziz Medical City in Riyadh. The average age of the participants was 32.8 ± 8.3 years (range; 21-63 years). More than two-thirds of them were Saudis (69.1%) with a slight predominance of females (57%). Residents constituted nearly one half of them (46.7%) while nurses formed almost one quarter (23%), and physicians (11%) distributed as consultants (6.3%), assistant consultants (4.6%) and staff physicians (4.1%). The majority of physicians and nurses included in this sample work in emergency medicine (25.8%), family medicine (15%) and obstetrics and gynecology departments (12.3%). Only a few of the respondents (14.9%) indicated that they were current smokers Table 1.

Table 1 Characteristics of the study group (n=388)

Characteristics	No.	%
Nationality		
Saudi	268	69.10%
Non-Saudi	120	30.90%
Gender		
Male	167	43.00%
Female	221	57.00%
Current Position		
Resident	171	46.70%
Staff Physician	15	4.10%
Associate/Assistant consultant	17	4.60%

Consultant	23	6.30%
Nurses	84	23.00%
Pharmacist	22	6.00%
Technician	34	9.30%
Specialty (Physicians and Nurses)		
Family Medicine	50	15.00%
Internal Medicine	21	6.30%
General Surgery	29	8.70%
Obstetrics and Gynecology	41	12.30%
Pediatrics	28	8.40%
Emergency Medicine	86	25.80%
Others	78	23.40%
Smoking Status		
Smokers	58	14.90%
Nonsmokers	330	85.10%

Table 2 shows that more than one-half of the HCWs (54.5%) work for more than 8 hours daily, in variable timing (53.6%); and one third (34%) cover on-calls.

Table 2 Working hours and on-call

Characteristics	No.	%
Working hours		
≤ 8 hours	176	45.5%
> 8 hours	211	54.5%
Working time		
Daytime only	179	46.4%
Variable timing	207	53.6%
Covering on-calls		
Yes	131	34.0%
No	254	66.0%

Dietary Habits of the Healthcare Workers:

Table 3 shows that 38.5% of the health care workers consistently bringing food from home. However; nearly 40% buy their food consistently from the hospital catering. Moreover, approximately half of the HCWs reported that they consume one meal during working hours, whereas one third (32.3%) consume two meals while working. The most frequently consumed foods during working hours are sweets (46.6%), cereals and bread (42.8%) and meat/fish/eggs (39.9%), whereas sauces and condiments were much less frequently consumed (6.2%). Coffee is the commonest drink used during working hours (66.2%) followed by tea (35.8%), while natural juices are consumed by only 18% of the HCWs.

Table 3 Dietary habits of the participants during

Dietary habits	No.	%
Bringing Food from Home		
Always	79	20.4%
Frequently	70	18.1%
Rarely	137	35.4%
Never	101	26.1%
Buying Food from Hospital Catering		
Always	31	8.1%
Frequently	118	30.8%
Rarely	192	50.1%
Never	42	11.0%
Number of Meals during Working Hours		
Non	28	7.4%

One meal	175	46.3%
Two meals	122	32.3%
Three meals	42	11.1%
More than three meals	11	2.9%
Food Items usually Consumed during Working Hours		
Fruits and vegetables	135	34.8%
Dairy products	97	25.0%
Sweets	181	46.6%
Cereals/bread	166	42.8%
Meat/Fish/Eggs	155	39.9%
Spaghetti/Mixed dishes/soups	80	20.6%
Sauces and condiments	24	6.2%
Drinks usually Consumed during Working Hours		
Coffee	257	66.2%
Tea	139	35.8%
Energy drinks	15	3.9%
Natural juice	70	18.0%
Milk (natural/flavored)	38	9.8%
Soft drinks	69	17.8%
Others	54	13.9%

On exploring the dietary habits at home, the majority of the HCWs either take two (44.1%) or three meals (27.3%), while 21.1% take only one meal and a minority (7.5%) consume more than three meals on a daily basis. The most consumed foodstuff at home is meat/fish/eggs (80.7%), fruits and vegetables (59%) and cereals/bread (51.3%) and the least consumed are also the sauces and condiments (8.5%) (Table 4). Nearly 50% of the HCW is consistently binge eaters when they are at home.

Table 4 Dietary habits of the participants at home

Dietary habits	No.	%
Number of Meals Consumed at Home		
One meal	82	21.1%
Two meals	171	44.1%
Three meals	106	27.3%
More than three meals	29	7.5%
Food Items usually Consumed at Home		
Fruits and vegetables	229	59.0%
Dairy products	164	42.3%
Sweets	126	32.5%
Cereals/bread	199	51.3%
Meat/Fish/Eggs	313	80.7%
Spaghetti/Mixed dishes/soups	118	30.4%
Sauces and condiments	33	8.5%
Binge Eating when going Home after Work		
Always	49	12.6%
Frequently	144	37.2%
Rarely	148	38.1%
Never	47	12.1%

The majority of the healthcare workers (71.4%) who responded to the question whether eating habits at work impacts their health negatively, 34% agree and 37.4% strongly agree that eating at work has a negative impact on health, and almost two thirds (64.5%) either agree (35.1%) or strongly agree (29.4%) that eating at work affect performance and productivity. On the same line, the majority of the HCWs (84.3%) are not always able to ensure adequate nutrition during work hours (Table 5).

Table 5 Agreement of the health workers about the statements reflecting their opinion about dietary habits during working

Agreement						
Statements	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly agree**	**Statements**
Eating habits at work had a negative impact on health	145 (37.4%)	132 (34%)	73 (18.8%)	32 (8.2%)	6 (1.5%)	Eating habits at work had a negative impact on health
Eating habit at work affect work performance or productivity	114 (29.4%)	136 (35.1%)	71 (18.3%)	61 (15.7%)	6 (1.5%)	Eating habit at work affect work performance or productivity
Health care workers	152 (39.2%)	175 (45.1%)	46 (11.9%)	13 (3.4%)	2 (0.5%)	Health care workers

The most important reasons cited by HCWs for their inability to get healthy food at the work site are shown in Table 6. Apparently, 29.1% of the HCWs see that consider the quality of food offered through hospital catering is bad, and the majority (79.3%) perceive say that it is either difficult (54.9%) or very difficult (24.4%) to find healthy food at work.

Table 6 Opinion of the healthcare workers about food available at work site

Variables	**No.**	**%**
Quality of food offered at hospital catering		
Bad	111	29.1%
Neutral	191	50.1%
Good	72	18.9%
Excellent	7	1.9%
Easiness of finding healthy food at work site		
Very difficult	94	24.4%
Difficult	212	54.9%
Easy	76	19.7%
Very easy	4	1.0%
Healthy food is more expensive at work site		
Strongly agree	89	23.2%
Agree	144	37.5%
Neutral	117	30.5%
Disagree	31	8.1%
Strongly disagree	3	0.8%

Of the two thirds (60.5%) of the HCWs who responded to the question about how expensive to buy food at work, 37.5% agree and 23.2% strongly agree that healthy food is usually more expensive to obtain at work. Moreover, the barriers to eating and drinking healthy food at work are displayed in Figure 1. The workload is the commonest reported barrier 270 (69.6%) followed by problems related to the availability of healthy food 215 (55.4%), the least reported barrier was the food hygiene at work.

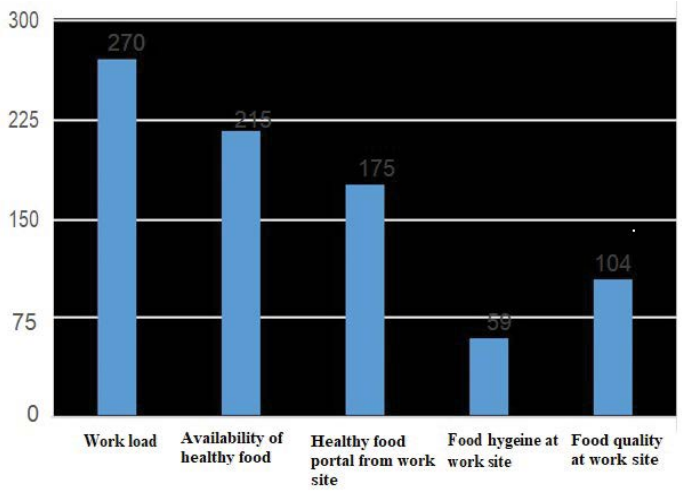

Figure 1 Barriers that make it difficult for eating and drinking in a healthy way during working hours

Health care workers have pointed out several suggestions to improve the quality of food services at work as shown in Figure 2. The majority of them, 297 (76.5%) suggested the necessity of availing more choices of healthy food and drinks, 167 (43%) suggested more food courts and 103 (26.5%) pointed out to the importance of improving food labeling such as caloric contents. Additional suggestions included assigning break time, providing different food choices according to nationality, and contracting with other food catering company.

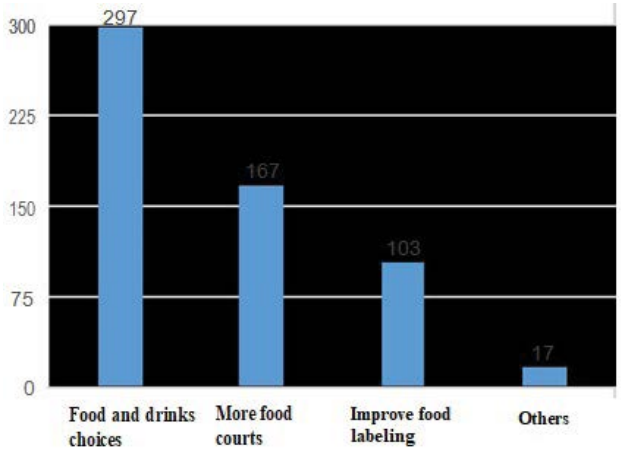

Figure 2 Suggestions of the health workers for improving food services and providing more healthy food and drink choices

Differences in dietary habits of the healthcare workers according to their demographic characteristics

differences in dietary habits according to gender: Table 7 demonstrates that a significantly higher proportion of female health workers bring food from home to work (56.1%), and they used to take more frequent meals than males; as 36.6% of females reported that used to take two meals during work hours compared to 26.5% of males, and 17.9% of females take three or more meals compared to 9.3% of males ($p<0.05$). On the other hand, more males than females buy food from the hospital catering, however, this difference is not statistically significant ($p>0.05$). Female health workers consume significantly more fruits and vegetables (47.1%) than males (18.6%), and significantly more cereals/ bread (51.6%) than males (31.1%) ($p<0.05$), and there was no significant difference between them in consuming other types of food available at work ($p>0.05$). Interestingly, while male health workers drink more tea (42.5%) than females (30.8%) and more soft drinks (22.8% vs 14%); female HCWs drink more natural juices (22.2%) than males (12.6%) ($p<0.05$).

Table 7 Dietary habits of the healthcare workers at the workplace according to gender

Pattern of eating	Gender				χ^2	p*
	Males		Females			
	No	%	No	%		
Bringing food from home to workplace						
Always/frequently	25	15.10%	124	56.10%	67.459	<0.001**
Rarely/never	141	84.90%	97	43.90%		
Buying food from hospital catering						
Always/frequently	73	44.20%	76	34.90%	3.477	0.062
Rarely/never	92	55.80%	142	65.10%		
Number of meals consumed during working hours						
No meals	21	13.00%	7	3.20%	20.777	<0.001**
One meal	83	51.20%	92	42.60%		
Two meals	43	26.50%	79	36.60%		
Three or more meals	15	9.30%	38	17.60%		
Food items usually consumed during working hours						
Fruits and vegetables	31	18.60%	104	47.10%	34.045	<0.001**
Dairy products	34	20.40%	63	28.50%	3.368	0.066
Sweets	81	48.50%	100	45.20%	0.405	0.525
Cereals/bread	52	31.10%	114	51.60%	16.244	<0.001**
Meat/Fish/Eggs	73	43.70%	82	37.10%	1.732	0.188
Spaghetti/Mixed dishes	31	18.60%	49	22.20%	0.757	0.384
Sauces and condiments	9	5.40%	15	6.80%	0.32	0.571
Drinks usually consumed during working hours						
Coffee	115	68.90%	142	64.30%	0.903	0.342
Tea	71	42.50%	68	30.80%	5.708	0.017**
Energy drinks	8	4.80%	7	3.20%	0.674	0.412
Natural juice	21	12.60%	49	22.20%	5.925	0.015**
Milk (natural/flavored)	12	7.20%	26	11.80%	2.258	0.133
Soft drinks	38	22.80%	31	14.00%	4.955	0.026**

HCWs' eating habits at home are outlined in Table 8. Male HCWs are more likely to binge eat (61.1%) than females HCWs (41.2%) when they go home after work ($p<0.05$). Although more females reported that they usually take more than three meals daily (10.5%) than do males (3.6%), this difference is not statistically significant ($p>0.05$).

Table 8 Dietary habits of the healthcare workers at home according to gender

Pattern of eating	Gender				χ^2	p*
	Males		Females			
	No	%	No	%		
Binge eating when going home after work						
Always/frequently	102	61.10%	91	41.20%	15.07	<0.001**
Rarely/never	65	38.90%	130	58.80%		
Number of meals consumed at home						
One meal	37	22.40%	45	20.50%		
Two meals.	76	46.10%	95	43.40%	6.37	0.095
Three meals.	46	27.90%	56	25.60%		
More than three meals	6	3.60%	23	10.50%		
Food items usually consumed at home						
Fruits and vegetables	83	49.70%	146	66.10%	10.43	0.001**
Dairy products	73	43.70%	91	41.20%	0.251	0.617
Sweets	55	32.90%	71	32.10%	0.028	0.866
Cereals/bread	74	44.30%	125	56.60%	5.713	0.017**
Meat/Fish/Eggs	137	82.00%	176	79.60%	0.351	0.554
Spaghetti/Mixed dishes	44	26.30%	74	33.50%	2.289	0.13
Sauces and condiments	14	8.40%	19	8.60%	0.006	0.94

Similar to eating habits at work, females HCWs eat more fruits and vegetables at home (66.1%) than males (49.7%) and more cereals/bread (56.6% vs 44.3%) ($p<0.05$). On the other side, no statistically significant difference was observed between males and females regarding consumption of other food items at home.

Differences in dietary habits according to nationality: Saudi health workers are significantly less likely to bring food from home to workplace than non-Saudis (25.1% vs. 68.3%) (Table 9), but they are more likely to buy food from the hospital catering than the non-Saudis (48.1% vs. 18.5%). Also, Saudi HCWs are less likely to take 3 or more meals during working hours than non-Saudis (10% vs. 23.1%) ($p<0.05$). While Saudi HCWs consume more sweets than non-Saudis (54.9% vs. 28.3%), the reverse was observed for consuming fruits and vegetables, cereals/bread, meat/fish/egg and spaghetti/mixed dishes where non-Saudis are consuming it more than the Saudis ($p<0.05$). There was no statistically significant difference between Saudis and non-Saudis regarding drinks consumed during working hours ($p>0.05$).

Table 9 Dietary habits of the healthcare workers at the workplace according to nationality

Pattern of eating	Nationality				χ^2	p*
	Saudi		Non-Saudi			
	No	%	No	%		
Bringing food from home to workplace						
Always/frequently	67	25.10%	82	68.30%	65.374	<0.001**
Rarely/never	200	74.90%	38	31.70%		
Buying food from hospital catering						
Always/frequently	127	48.10%	22	18.50%	30.275	<0.001**
Rarely/never	137	51.90%	97	81.50%		
Number of meals consumed during working hours						
No meals	25	9.60%	3	2.60%	27.109	<0.001**
One meal	137	52.50%	38	32.50%		
Two meals.	73	28.00%	49	41.90%		
Three or more meals	26	10.00%	27	23.10%		
Food items usually consumed during working hours						
Fruits and vegetables	57	21.30%	78	65.00%	69.868	<0.001**
Dairy products	70	26.10%	27	22.50%	0.579	0.447
Sweets	147	54.90%	34	28.30%	23.419	<0.001**
Cereals/bread	104	38.80%	62	51.70%	5.6	0.018**
Meat/Fish/Eggs	83	31.00%	72	60.00%	29.117	<0.001**
Spaghetti/Mixed dishes	48	17.90%	32	26.70%	3.883	0.049**
Sauces and condiments	15	5.60%	9	7.50%	0.517	0.472
Drinks usually consumed during working hours						
Coffee	182	67.90%	75	62.50%	1.085	0.298
Tea	96	34.80%	43	35.80%	0	0.998
Energy drinks	12	4.50%	3	2.50%	Fisher	0.569
Natural juice	44	16.40%	26	21.70%	1.544	0.214
Milk (natural/flavored)	25	9.30%	107	10.80%	0.212	0.645
Soft drinks	48	17.90%	21	17.50%	0.01	0.922

Table 10 shows that a significantly higher percentage of Saudi HCWs are frequently binge eating when going back home than non-Saudis (61.9% vs. 22.5%), and they are significantly more frequently taking one (26.8%) or two meals (46%) if compared to non-Saudis (9.2% and 41.2% respectively) ($p<0.05$). Also, Saudi HCWs are significantly less likely to eat at home fruits and vegetables, cereals/bread and meat/fish/eggs than non-Saudis ($p<0.05$).

Table 10 Dietary habits of the healthcare workers at home according to nationality

Pattern of eating	Gender				χ^2	p*
	Males		Females			
	No	%	No	%		
Binge eating when going home after work						

Always/frequently	166	61.90%	27	22.50%	51.575	<0.001**
Rarely/never	102	38.10%	93	77.50%		
Number of meals consumed at home						
One meal	71	26.80%	11	9.20%	26.157	<0.001**
Two meals	122	46.00%	49	41.20%		
Three meals	59	22.30%	43	36.10%		
More than three meals	13	4.90%	16	13.40%		
Food items usually consumed at home						
Fruits and vegetables	132	49.30%	97	80.80%	34.177	<0.001**
Dairy products	115	42.90%	49	40.80%	0.147	0.702
Sweets	88	32.80%	38	31.70%	0.052	0.82
Cereals/bread	121	45.10%	78	65.00%	12.073	<0.001**
Meat/Fish/Eggs	202	75.40%	111	92.50%	15.592	<0.001**
Spaghetti/Mixed dishes	85	31.70%	33	27.50%	0.696	0.404
Sauces and condiments	22	8.20%	11	9.20%	0.098	0.755

The attitude of the Healthcare Workers towards Healthy Diet at Work and Home according to their Characteristics

Saudi health workers have significantly more negative attitude towards healthy diet at work and home than non-Saudis (-4.9 ± 2.84 vs -3.8 ± 3.30) ($p<0.05$) (Table 11). Although males have scored more positive attitudes than females (-4.6 ± 3.11 vs -4.5 ± 2.95); the difference is not statistically significant ($p>0.05$). Based on health profession, the most negative attitude is recorded among pharmacists (-5.0 ± 3.66) whereas the most positive attitude is scored by staff physicians (-3.7 ± 4.37) and technicians, however, this difference is not statistically significant ($p>0.05$). Similar to pharmacists, health workers in the internal medicine have reported negative attitude towards healthy diet at work and home (-6.1 ± 2.14) although there was no statistically significant difference. Comparing smokers to non-smokers, their average attitude's score towards a healthy diet is not statistically significant ($p>0.05$).

Table 11 Average score of the attitude of the healthcare workers according to their characteristics

Characteristics	Mean ± SD	p
Nationality		
Saudi	-4.9 ± 2.84	0.003[a]
Non-Saudi	-3.8 ± 3.30	
Gender		
Male	-4.6 ± 3.11	0.852[a]
Female	-4.5 ± 2.95	
Current Position		
Resident	-4.8 ± 2.69	0.267[b]
Staff Physician	-3.7 ± 4.37	
Associate/Assistant consultant	-4.8 ± 2.51	
Consultant	-4.5 ± 3.41	
Nurses	-4.1 ± 2.69	
Pharmacist	-5.0 ± 3.66	
Technician	-3.7 ± 3.43	
Specialty (Physicians and Nurses)		
Family Medicine	-4.9 ± 2.98	0.204[b]
Internal Medicine	-6.1 ± 2.14	
General Surgery	-4.3 ± 2.79	
Obstetrics and Gynecology	-4.7 ± 3.34	
Pediatrics	-4.5 ± 3.09	
Emergency Medicine	-4.1 ± 2.76	
Others	-4.2 ± 3.33	
Smoking Status		
Smokers	-4.5 ± 4.04	0.954[a]
Nonsmokers	-4.5 ± 2.82	

Prevalence of Normal Weight, Overweight, Obesity, and Underweight in HCWs

Total 386 HCWs have reported their weights and heights in this study using their best of memory. The prevalence of underweight (BMI 18.5 kg/m^2) was 4%, normal weight (BMI between 18.5 and 24.9 kg/m^2) was 45%, overweight (BMI between 25 and 29.9 kg/m^2) was 35%, and obesity (30 kg/m^2) was 16% respectively among different genders and HCWs (Table 12).

Table 12 Prevalence of underweight, normal weight, overweight and obesity among different genders and HCWs

Variables	%
Normal Weight	45%
Overweight	35%
Obese	16%
Underweight	4%

DISCUSSION

This study shows significant poor dietary habits among various HCWs at KAMC-RD. Poor dietary habits have been recognized as common modifiable risk factors associated with chronic diseases such as obesity, diabetes cardiovascular diseases and metabolic syndrome [3-6]. While exploring these modifiable risk factors is beyond the scope of this study, recognizing unhealthy habits in healthcare organizations and their physical, mental and work performance consequences provide an important insight for their health policy and decision makers to implement aggressive preventive and health maintenance measures [22,17].

Sweets are generally cheap and quick sources of energy and readily available in many places in hospitals, it is not surprising to find them the most preferred food item to HCWs in this study. Craving for sweets is recognized as an inherent preference which starts at early ages [22, 23]; and continues throughout life and some people might get addicted to it [24]. It might explain the observed paradox in which healthcare workers are aware of the adverse consequences of the overconsumption of sweets, yet sweets are their preferred food especially at work [13]. Westwater, et al., have shown that sweets elicit neurobiological responses similar to those seen in drug addiction, but unlike drug addiction, sugar has caloric value in addition to the hedonic (pleasure) value which influences its consumption [25,26]. This results in certain neurological adaptations at the molecular level to avoid withdrawal symptoms, but lead to excessive sugar intake over time [25]. Emotionally stressed individuals with longer working hours and shift patterns consume more sweet foods than did unstressed eaters [27]. The overconsumption of sweets increases the risk of obesity, type 2 diabetes mellitus, dyslipidemia and decreases bone density [28-31]. This could explain, among other unhealthy dietary habits, the high prevalence of overweight and the alarming percentage of obesity among HCWs in this study.

Coffee, the commonest drink consumed by HCWs in this study, is not only consumed as a tradition, but because it is usually sweetened, has important stimulant effects, and is generally known to enhance mental processes and work performance [22]. In fact, some studies have shown that physicians who often work for long hours consume more caffeine to enhance their performance [32].

Sugar and coffee consumption has been found in some studies to be strongly linked to binge eating [33]. Although a causal relationship is not found in our study, however, binge eating among HCWs was an important finding reported by 50% of them. It is characterized by loss of control and eating a larger amount of food that could be consumed by most people in the same period. To differentiate it from the excessive consumption of foods in occasional events such as holidays and parties, binge eating disorder (BED) is recurrent consistently once or more weekly for at least three months [34]. Based on this definition, the World Health Organization (WHO) has reported that the lifetime prevalence of BED was (median; 1.4%; 0.8-1.9%) in 2013 [35]. With the increasing complexities of healthcare delivery especially in tertiary care organizations like KAMC-RD, one can argue that the workload on HCWs for many reasons is becoming even more stressful and may explain some of the unhealthy habits like binge eating. In fact, Kessler, et al., argues that binge eating is viewed as a sign of distress, impaired social functioning and lower self-esteem [35,36]. Individuals can binge on sweets, coffee and other foods and drinks that have high caloric contents but not on fruits and vegetables. Binge eating in HCWs and its consequences on their health and performance is worthy of a separate research; however, it is beyond the scope of this study.

HCWs learn and might teach their students and patients about the various health benefits of fruits and vegetables,

however, in this study only 34.8% of them eat fruits and vegetables at work and Saudi HCWs even eat less (21.3%). This could be explained by lack of healthy food menu, short break times, cultural norms like in Saudis, and the need for high energy sources to meet the physical and mental demands of their work. Obesity and overweight are significant problems among HCWs in this study. Therefore, allowing for an increased consumption of fiber-rich fruits and vegetables often leads to a spontaneous decrease in fat intake [26], with subsequent reduction in the body mass index [27]. Probably for cultural reasons, Saudi HCWs eat fewer fruits and vegetable compared to expatriates (21.3% vs 65%) and this can be inferred from the findings of a national interview survey involving 10,735 Saudi adults by Basulaiman, et al., in 2015 where they state that "there is substantial low consumption of fruits and vegetables among Saudi adults". Although the benefits of eating fruits and vegetables are beyond doubt, they are generally more expensive than sweets and other high energy foods and drinks. Even their prices fluctuate and might be affordable for many but they are still not consumed regularly as recommended by CDC and MOH guideline [32].

In addition to the differences in the consumption of fruits and vegetables by nationality, a significant gender-related difference was observed in our study, where females eat fruits and vegetables more frequently than males both at work and at home. This finding is similar to that of another study carried out in Finland and Baltic countries in which females have been found to eat healthier diets than males including fruits and vegetables than men [36].

Eating habits at work might not be influenced only by preferences of the HCWs but also by the availability of food items in terms of quality, accessibility, and affordability. The majority of our HCWs rated the food available at the hospital catering as bad, and the accessibility to healthy food is difficult and expensive. In this respect, Winston, et al., grouped barriers of healthy eating in the hospital environment into three, namely: canteen related factors including price, open time and food choices, personal factors including knowledge, motivation and work stress and work-related factors including shift pattern and length and lack of break [37]. Therefore, it is not surprising to find that workload with inadequate break time are the commonest reported barrier to healthy eating at work in our study. In fact, a similar study was carried out in the UK to identify barriers in the work environment that prevent nurses from adopting health eating reported that the pattern of shift work and inadequate break time were the main barriers [3]. Accessibility and or unavailability of healthy food are other critical barriers to healthy eating at work and this may explain why most of our HCWs consistently bring food from home, similar to the reasons as for why some Canadian physicians would prefer to bring food from home to their work [18].

HCWs have proposed several key solutions to these barriers. These solutions included allowing for adequate break times, providing more items of healthy food and drinks, improving food labeling such as caloric contents. The proposed solutions by our HCWS are identical to what has been reported in similar researches carried out in different countries [3,17,18,38,39].

LIMITATIONS

The study has some important limitations that should be mentioned. First, the results are limited to HCWs working in NGHA-RD, Saudi Arabia and may not be generalizable to healthcare workers in other environments. Second, the cross-sectional nature of the study does not yield strong associations due to the unexamined temporal relationship between variables. Third, the self-reporting nature of study tool on a variable, like weight in this study may lead to over or under-estimation of the magnitude of that variable. Finally, food categories did not cover all traditional food in Saudi Arabia.

CONCLUSION

This study clearly demonstrates that a significant percentage of HCWs in different professions and practice settings adopt several unhealthy dietary habits at work and beyond ranging from excessive sweets and coffee intake to binge eating. These habits are reported to have affected their well-being and their performance. Workload, inadequate break time and unavailability of healthy food in the hospital are identified as the most important reasons and barriers for not adopting healthy habits at work.

RECOMMENDATIONS

Senior leaders and executive of healthcare organizations including those of KAMC-RD have very critical roles to address this important health issue. They should introduce healthy foods with reasonable prices in the hospital catering and in different location at KAMC-RD, invite healthy diet companies to open branches in the catering at KAMC-RD,

review the current work processes and policies in order to organize workload in ways that allow for enough break times for HCWs, implement financial and non-financial incentives for those HCWs who adopt and follow healthy practices at work, introduce mandatory regular checkups for HCWs in each practice setting to monitor their health and adopt hospital-wide electronic applications that help HCWs to plan for and monitor their diet plans.

A nation-wide study involving different practice settings and health professions is recommended to explore HCWs' poor dietary habits and their negative impacts on their physical and mental well-being as well as their work performance.

DECLARATIONS

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

[1] Preedy, Victor R., and Ronald Ronald Ross Watson. "Handbook of disease burdens and quality of life measures." *Handbook of Disease Burdens and Quality of Life Measures,* 2010.

[2] Perez, Amanda Philyaw, et al. "Peer reviewed: promoting dietary change among state health employees in Arkansas through a worksite wellness program: The Healthy Employee Lifestyle Program (HELP)." *Preventing Chronic Disease,* Vol. 6, No. 4, 2009.

[3] Faugier, Jean, et al. "Barriers to healthy eating in the nursing profession: Part 1." *Nursing Standard,* Vol. 15, No. 36, 2001, p. 33.

[4] Pietroiusti, Antonio, et al. "Incidence of metabolic syndrome among night-shift healthcare workers." *Occupational and Environmental Medicine,* 2009.

[5] El Ansari, Walid, and Gabriele Berg-Beckhoff. "Nutritional correlates of perceived stress among University Students in Egypt." *International Journal of Environmental Research and Public Health,* Vol. 12, No. 11, 2015, pp. 14164-76.

[6] Antunes, L. C., et al. "Obesity and shift work: chronobiological aspects." *Nutrition Research Reviews,* Vol. 23, No. 1, 2010, pp. 155-68.

[7] Scheer, Frank AJL, et al. "Adverse metabolic and cardiovascular consequences of circadian misalignment." *Proceedings of the National Academy of Sciences,* Vol. 106, No. 11, 2009, pp. 4453-58.

[8] Hemiö, Katri, et al. "Food and nutrient intake among workers with different shift systems." *Occupational and Environmental Medicine,* Vol. 72, No. 7, 2015, pp. 513-20.

[9] Salameh, Pascale, et al. "Assessment of dietary intake patterns and their correlates among university students in Lebanon." *Frontiers in Public Health,* Vol. 2, 2014, p. 185.

[10] Esquirol, Yolande, et al. "Shift work and metabolic syndrome: respective impacts of job strain, physical activity, and dietary rhythms." *Chronobiology International,* Vol. 26, No. 3, 2009, pp. 544-59.

[11] De Bacquer, Dirk, et al. "Rotating shift work and the metabolic syndrome: a prospective study." *International Journal of Epidemiology,* Vol. 38, No. 3, 2009, pp. 848-54.

[12] Morikawa, Yuko, et al. "Effect of shift work on body mass index and metabolic parameters." *Scandinavian Journal of Work, Environment and Health,* 2007, pp. 45-50.

[13] Mota, Maria Carliana, et al. "Dietary patterns, metabolic markers and subjective sleep measures in resident physicians." *Chronobiology International,* Vol. 30, No. 8, 2013, pp. 1032-41.

[14] Lowden, Arne, et al. "Eating and shift work-effects on habits, metabolism, and performance." *Scandinavian Journal of Work, Environment and Health,* 2010, pp. 150-62.

[15] Wong, Hidy, et al. "The association between shift duty and abnormal eating behavior among nurses working in a major hospital: a cross-sectional study." *International Journal of Nursing Studies,* Vol. 47, No. 8, 2010, pp. 1021-27.

[16] Frank, Jason R., and Deborah Danoff. "The CanMEDS initiative: implementing an outcomes-based framework of physician competencies." *Medical Teacher,* Vol. 29, No. 7, 2007, pp. 642-47.

[17] Lemaire, Jane B., et al. "Physician nutrition and cognition during work hours: effect of a nutrition based intervention." *BMC Health Services Research,* Vol. 10, No. 1, 2010, p. 241.

[18] Lemaire, Jane B., et al. "Food for thought: an exploratory study of how physicians experience poor workplace nutrition." *Nutrition Journal,* Vol. 10, No. 1, 2011, p. 18.

[19] Wiskar, Katie. "Physician health: A review of lifestyle behaviors and preventive health care among physicians." *BC-Medical Journal,* Vol. 54, No. 8, 2012, pp. 419-23.

[20] Almajwal, Ali M. "Stress, shift duty, and eating behavior among nurses in Central Saudi Arabia." *Saudi Medical Journal,* Vol. 37, No. 2, 2016, p. 191.

[21] World Health Organization. *Obesity: preventing and managing the global epidemic*. No. 894. World Health Organization, 2000.

[22] Wansink, Brian, Ganaël Bascoul, and Gary T. Chen. "The sweet tooth hypothesis: how fruit consumption relates to snack consumption." *Appetite,* Vol. 47, No. 1, 2006, pp. 107-10.

[23] Ogden, Jane. *The psychology of eating: From healthy to disordered behavior*. John Wiley and Sons, 2011.

[24] Rogers, Peter J., and Hendrik J. Smit. "Food craving and food "addiction": a critical review of the evidence from a biopsychosocial perspective." *Pharmacology Biochemistry and Behavior,* Vol. 66, No. 1, 2000, pp. 3-14.

[25] Westwater, Margaret L., Paul C. Fletcher, and Hisham Ziauddeen. "Sugar addiction: the state of the science." *European Journal of Nutrition,* Vol. 55, No. 2, 2016, pp. 55-69.

[26] Tellez, Luis A., et al. "Separate circuitries encode the hedonic and nutritional values of sugar." *Nature Neuroscience,* Vol. 19, No. 3, 2016, p. 465.

[27] Mennella, Julie A., M. Yanina Pepino, and Danielle R. Reed. "Genetic and environmental determinants of bitter perception and sweet preferences." *Pediatrics,* Vol. 115, No. 2, 2005, pp. e216-e222.

[28] Malik, Vasanti S., et al. "Sugar-sweetened beverages, obesity, type 2 diabetes mellitus, and cardiovascular disease risk." *Circulation,* Vol. 121, No. 11, 2010, pp. 1356-64.

[29] Montonen, Jukka, et al. "Consumption of sweetened beverages and intakes of fructose and glucose predict type 2 diabetes occurrence." *The Journal of Nutrition,* Vol. 137, No. 6, 2007, pp. 1447-54.

[30] Welsh, Jean A., et al. "Caloric sweetener consumption and dyslipidemia among US adults." *JAMA,* Vol. 303, No. 15, 2010, pp. 1490-97.

[31] Tsanzi, Embedzayi, Cindy W. Fitch, and Janet C. Tou. "Effect of consuming different caloric sweeteners on bone health and possible mechanisms." *Nutrition Reviews,* Vol. 66, No. 6, 2008, pp. 301-09.

[32] Basulaiman, Mohammed, et al. "Fruit and vegetable consumption among adults in Saudi Arabia, 2013." *Nutrition and Dietary Supplements*, Vol. 7, 2015, pp. 41-49.

[33] Hu, Frank B., and Vasanti S. Malik. "Sugar-sweetened beverages and risk of obesity and type 2 diabetes: epidemiologic evidence." *Physiology and Behavior,* Vol. 100, No. 1, 2010, pp. 47-54.

[34] Brownley, KA, et al. Binge-Eating Disorder in Adults: A Systematic Review and Meta-analysis Binge-Eating Disorder: Treatment Effectiveness. *Annals of Internal Medicine,* Vol. 165, No. 6, 2016, pp. 409-20.

[35] Kessler, Ronald C., et al. "The prevalence and correlates of binge eating disorder in the World Health Organization World Mental Health Surveys." *Biological Psychiatry,* Vol. 73, No. 9, 2013, pp. 904-14.

[36] Prättälä, Ritva, et al. "Gender differences in the consumption of meat, fruit and vegetables are similar in Finland and the Baltic countries." *European Journal of Public Health,* Vol. 17, No. 5, 2006, pp. 520-25.

[37] Winston, James, Carol Johnson, and Sue Wilson. "Barriers to healthy eating by National Health Service (NHS) hospital doctors in the hospital setting: results of a cross-sectional survey." *BMC Research Notes,* Vol. 1, No. 1, 2008, p. 69.

[38] Panza, Francesco, et al. "Coffee, tea, and caffeine consumption and prevention of late-life cognitive decline and dementia: a systematic review." *The Journal of Nutrition, Health and Aging,* Vol. 19, No. 3, 2015, pp. 313-28.

[39] de Grood, Jill, et al. "Food for Thought: Nutrition is Important for Physician Performance." *Knowledge Translation in Alberta: Health Research with Impact*, 2017.