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Factors predicted metabolic syndrome among health care workers exposed to coronavirus disease 2022 in Erbil, Iraq

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Abstract

Background and objective: There have been a recent concern about life style and stress exposure among health care workers during corona virus infection pandemic. This study aimed to investigate the lifestyle of the staff working in public hospitals in Erbil city during the years of 2021-2022.

Methods: This is a survey involving data of the available hospital staff from 1st of January 2021 to 1st of April 2022. The hospital staff were including the reception staff, logistic staff, doctors and medical assistances working at the hospitals during the COVID-19 pandemic. In this study, 313 hospital staff are taken conveniently from the working hospitals. Demographic data and laboratory investigations were taken from all the participants.

Results: During COVID19 metabolic syndrome was high among staffs. Females shown to have higher prevalence of metabolic syndrome (28.9%) than males (12%). Have a car (19.9%), living in rural area (21.7%) primary education (33.3%) have highest prevalence of metabolic syndrome. Furthermore, regarding the occupation of staffs, operation assistants have highest prevalence of metabolic syndrome (37.2%) followed by reception staff (28.6%) and pharmacists (25%). Association with male sex (p value<0.001), marriage (p value=0.01) with metabolic syndrome was statistically significant.

Conclusions: During COVID19 pandemic metabolic syndrome was common among staffs. Aging, sex, education, occupation, smoking, fatty diet, marriage, family history of diabetes and cardiac disease are the main risk factors for metabolic syndrome. People with these risk factors should be assessed for metabolic syndrome and educated about the risks and possible consequences in the future.

Key words; COVID19, Health care workers, Life style, Metabolic syndrome.

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Introduction

Over the last two years, coronaviruses have caused two major pandemics severe acute respiratory syndrome (SARS) in 2002–2003 and Middle East Respiratory Syndrome (MERS) in 2012.1,2 Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was firstly recorded in Wuhan/China at December, 2019 declared as a pandemic coronavirus disease 2019 (COVID-19) disease by World Health Organization (WHO) affecting hundreds of millions and more than four million deaths globally.3 Since March 2020, we are facing a new global SARS-CoV-2 pandemic2, which is having a major impact on society as well as on health care systems around the world. Many hospitals have been compelled to adjust to the increasing patient flow due to this particular hygienic condition. The first confirmed COVID-19 patient in Kurdistan region/Iraq was reported at February 2020 followed by outbreak causing many co-morbidities and mortalities in the region.3 During the SARS epidemic in 2003, Wu et al showed, that 10% of Health Care Workers (HCW) had some sort of stress and that associated risk increased threefold among HCWs working in close contact with SARS-positive patients.3 Recent research has demonstrated that being exposed to a new infectious risk may cause anxiety, depression, or have a detrimental effect on quality of life.4 Metabolic syndrome (MetS) considered to be present if any participant had waist circumference more than (male 102 CM, female 94 CM) plus two of the following criteria; raised blood pressure more than 130/85 mmHg or on treatment, raised blood sugar fasting more than 100mg/dl or on treatment, triglyceride more than (male 164 mg/dl, female 132mg/dl), high density lipoprotein less than (male 50 mg/dl, female 40mg/dl).5 Reorganization of work in the context of a crisis always be a source of stress among employees.[6,7] Moreover, life style changes can be aggravated by psychological consequences for HCW facing a pandemic. Including changing of dietary and sleeping patterns as well as possible increases in alcohol or tobacco consumption with psychological stress.[5] Females medical staffs and nurses, are more liable for life style changes during COVID19 pandemic. Direct exposure to COVID-19 patients and working in the Intensive Care unit (ICU) are another factor, which have been found to be associated with changing sleep and rest pattern.[8,9,] In this context, we aimed to explore if the COVID-19 pandemic was associated with changing life style among HCWs.

Subjects and methods:

This is a survey involving healthcare workers working in the hospital from 1st of January 2021 to 1st of April 2022. The hospital staff were including the admin staff, logistic staff, doctors and medical assistances working at the hospitals during the COVID-19 pandemic. The Hospitals in which the data taken were: Rzgary Teaching Hospital, Maternity Teaching Hospital, Mala Fandi Hospital, Erbil Teaching Hospital, Rozh-halat Emergency Hospital. In this study, 313 hospital staff were included conveniently from the working hospitals. The hospital staff were offered a comprehensive medical assessment with detailed history and physical examination. A modified interviewer-administered questionnaire was used for the purpose of this study. Data on all clinical characteristics, including clinical history, lifestyle factors, and body measurements, were collected in a structured electronic data collection system by direct interview. The questionnaire included 56 questions (single choice, multiple choice, and numeric) on baseline data (age, gender, blood group,

marital status, family size, residence, education, current work hours per day, presence of family and self-chronic diseases, smoking habits, weekly hours of physical activity, weight, and height) and changes during the pandemic (weight gain, sleep quality "less than 6hours regarded as poor pressure more than 130/85 mmHg or on treatment, raised blood sugar fasting more than 100mg/dl or on treatment, triglyceride more than (male 164 mg/dl, female 132mg/dl), high density lipoprotein less than (male 50 mg/dl, female 40mg/dl),[5] all these laboratory blood investigations done for all patients. The study was approved by ethical committee from Kurdistan Higher Council of Medical Specialties with a No of (991) at (16-5-2022). Participants were fully informed about the methods and objectives of the study, and verbal consent has been taken from all participants.

Data on demography and clinical features of the medical staff was expressed as means ± SD and/ or frequencies and percentage. In the study, the *t* tests and Chi square test of association to compare variables are used. When the expected count more than 20% of the cells of the table was less than 5, Fisher exact test was used. Multinomial logistic regressions to identify the determinants of change in the main components of lifestyle (sleep pattern, physical activity, consumption of fizzy drinks, self-reported symptoms and smoking status) during lockdown. A p value of ≤0.05 was considered as the level of significance for all analyses. The Statistical Package for the Social Sciences (SPSS) software, version 26 was used for data analysis.

sleep", tiredness, physical activity, cigarette consumption). Metabolic syndrome (MetS) considered to be present if any participant had waist circumference more than (male 102 CM, female 94 CM) plus two of the following criteria; raised blood

Results

This study including 313 HCW; the prevalence of MetS was increasing with increasing age groups being in the age group of ≥40 years has the highest prevalence (27.3%). Females shown to have higher prevalence of MetS (28.9%) than males (12.0%). Also, married HCWs 22.3%, have own car (19.9%), living in rural area (21.7%) who have a primary education level (33.3%) are recorded to have the highest prevalence of MetS. Furthermore, regarding the occupation of HCWs, operation assistants recorded the highest prevalence of MetS (37.2%) followed by reception staff (28.6%) and pharmacists (25%). (The association between female sex (p-value<0.001), married HCWs (p-value=0.010) and type of occupation of HCWs (p-value= 0.035) with MetS was statistically significant. The details of the sociodemographic characteristics of the HCWs were illustrated in Table (1).

Table (1): Sociodemographic characteristics of the hospital staff by MetS

Characteristics		No MetS (n=255)		MetS (n=58)		p value[a]
		No.	%	No.	%	
Age groups	19-20	16	94.1%	1	5.9%	0.092

	20-40	199	82.6%	42	17.4%	
	≥41	40	72.7%	15	27.3%	
Sex	Male	169	88.0%	23	12.0%	<0.001
	Female	86	71.1%	35	28.9%	
Marital state	Married	167	77.7%	48	22.3%	0.010
	Not married	88	89.8%	10	10.2%	
Own car	Yes	145	80.1%	36	19.9%	0.469
	No	110	83.3%	22	16.7%	
Residence	Urban	237	81.7%	53	18.3%	0.780
	Rural	18	78.3%	5	21.7%	
Education	Illiterate	29	69.0%	13	31.0%	0.083
	Primary	10	66.7%	5	33.3%	
	Secondary	56	84.8%	10	15.2%	
	Institute	63	86.3%	10	13.7%	
	University	97	82.9%	20	17.1%	
Occupation	Doctor	43	78.2%	12	21.8%	0.035
	Nurse	114	87.0%	17	13.0%	
	Clerk	15	93.8%	1	6.3%	
	Operation assistant	27	62.8%	16	37.2%	
	Driver	9	81.8%	2	18.2%	
	Lab. staff	26	81.3%	6	18.8%	
	Reception	5	71.4%	2	28.6%	
	Admin staff	13	92.9%	1	7.1%	
	Pharmacist	3	75.0%	1	25.0%	

*Chi-square test.

Table (2) shows the Self-recorded sleep pattern of HCWs by MetS. Those who have poor sleep quality recorded to have the highest prevalence of MetS (26.1%) versus good quality (5.3%), whereas those who have naps, tired as a result of increased duty that recorded to have headache and memory disturbances recorded to have the highest prevalence of MetS as seen in the Table. There were significant differences of sleep quality (p-value= 0.014), having headache (P-value= 0.038) and memory disturbances (P-value= 0.026) between HCWs with MetS and HCWs with no MetS.

Table (2): Self-recorded sleep pattern of HCWs by MetS

Sleep pattern & symptoms of tiredness		No MetS (n=255)		MetS (n=58)		p value[a]
		No.	%	No.	%	
Sleep quality	Poor	17	73.9%	6	26.1%	0.014
	Medium	184	79.0%	49	21.0%	
	Good	54	94.7%	3	5.3%	
Have naps?	Yes	221	81.0%	52	19.0%	0.538
	No	34	85.0%	6	15.0%	
Tired as a result of increased duty?	Yes	42	75.0%	14	25.0%	0.169
	No	213	82.9%	44	17.1%	
Have headache?	Yes	55	73.3%	20	26.7%	0.038
	No	200	84.0%	38	16.0%	
Memory disturbance	Yes	29	69.0%	13	31.0%	0.026
	No	226	83.4%	45	16.6%	

[a]Chi-square test

Although the prevalence of MetS was increasing with increase number of hours on call/ week, but the difference between those with MetS and those with no MetS was not statistically significant, Table (3).

Table (3): Working hours of hospital staff by MetS

No. of hours on call/ week	No MetS (n=255)		MetS (n=58)		p value
	No.	%	No.	%	
2-10	5	100.0%	0	0.0%	0.927[b]
11-24	129	81.1%	30	18.9%	
25-35	62	81.6%	14	18.4%	
36-54	59	80.8%	14	19.2%	

[b]Fisher's Exact test

Those HCW who self-reported to have regular (79.3%) vigorous (5%) physical activity have the lower prevalence of MetS compared to moderate (19.5%) and irregular PA (10.4%). The difference between type of exercise and regular PA between those HCWs who have MetS and those who have not MetS was statistically not significant, Table (4).

Table (4): Self-reported PA of hospital staff by MetS

Exercises		No MetS (n=255)		MetS (n=58)		p value
		No.	%	No.	%	
Exercise Types	Moderate physical activity	236	80.5%	57	19.5%	0.140[b]
	Vigorous physical activity	19	95.0%	1	5.0%	
Regular PA	Yes	195	79.3%	51	20.7%	0.055[a]
	No	60	89.6%	7	10.4%	

[a]Chi-square test [b]Fishers' Exact test PA: Physical Activity.

Accordingly, the prevalence of MetS is slightly higher in HCWs who use carbonated beverages, smoke cigarettes, and drink alcohol (19.4% vs 17.4%), (18.7% vs 17.2%), and (16.7% vs 18.6%), respectively, than it is in HCWs who do not. Only the difference between smoking cigarettes versus not smoking cigarettes was related to MetS (P-value = 0.035), according to Table (5).

Table (5): Taking carbonated drinks and smoking or alcohol of hospital staff by MetS

Drinks consumption & Cigarette smoking		No MetS (n=255)		MetS (n=58)		p value
		No.	%	No.	%	
Taking carbonated drinks	Yes	141	80.6%	34	19.4%	0.645[a]
	No	114	82.6%	24	17.4%	
Cigarette smoking	231	231	81.3%	53	18.7%	0.035[a]
	24	24	82.8%	5	17.2%	
Narghile smoking	6	6	100.0%	0	0.0%	0.289[b]
	249	249	81.1%	58	18.9%	
Alcohol drinking	Yes	5	83.3%	1	16.7%	1.00[b]
	No	250	81.4%	57	18.6%	

[a]Chi-square test [b]Fishers' Exact test

Those HCWs who are tired as a result of increased duty, have headache, psychologically fatigue and have memory disturbances have higher prevalence of MetS than who have no such symptoms, (25%), (26.7%), (24.2%) and (31%), respectively. The differences of those who have headache and memory disturbances between those who have and have no MetS was statistically significant, (p-value= 0.038) and (-value= 0.026), respectively.

Table (6): Self-reported symptoms of hospital staff by MetS

Symptoms		No MetS (n=255)		MetS (n=58)		p value [a]
		No.	%	No.	%	
Tired as a result of increased duty	Yes	42	75.0%	14	25.0%	0.169
	No	213	82.9%	44	17.1%	
Headache	Yes	55	73.3%	20	26.7%	0.038
	No	200	84.0%	38	16.0%	
Psychologically fatigue	Yes	47	75.8%	15	24.2%	0.200

	No	208	82.9%	43	17.1%	
Memory disturbance	Yes	29	69.0%	13	31.0%	0.026
	No	226	83.4%	45	16.6%	

The results of the logistic regression to identify variables possibly associated with MetS are shown in Table 7. The hospital male staff was significantly 3.614 times have an increased likelihood of MetS (odds ratio 3.164 [95% CI 1.791, 7.292], p value<0.001). Furthermore, married hospital staff are significantly less likelihood to have MetS (OR 0.419 [95% CI 0.189, 0.929], p value= 0.032). Finally, being doctors was significantly associated with a reduction in the likelihood of MetS (OR 0.371 [95% CI 0.152, 0.909], p value= 0.030).

Table (7): Logistic regression analysis of variables by MetS

Variables	B	S.E.	df	p-value	OR	95% C.I.for EXP(B)	
						Lower	Upper
						1.791	7.292
Marital state (Married)	-0.870	0.406	1	0.032	0.419	0.189	0.929
Occupation (Doctors)	-0.991	0.457	1	0.030	0.371	0.152	0.909
Occupation (Nurses)	-1.761	1.148	1	0.125	0.172	0.018	1.631
Occupation (Clerk)	0.154	0.536	1	0.774	1.166	0.408	3.336
Occupation (Operation assistant)	0.141	0.890	1	0.874	1.151	0.201	6.591
Occupation (Driver)	-0.253	0.596	1	0.672	0.777	0.241	2.498
Occupation (Lab. staff)	0.659	0.948	1	0.487	1.932	0.301	12.395

Occupation (Reception)	-1.391	1.136	1	0.221	0.249	0.027	2.306
Occupation (Admin. staff)	-0.446	1.293	1	0.730	0.640	0.051	8.067
Sleep (Poor)	0.691	0.609	1	0.257	1.996	0.605	6.591
Sleep (Medium)	-0.848	0.841	1	0.314	0.428	0.082	2.228
Headache (Yes)	-0.096	0.422	1	0.821	0.909	0.398	2.078
Memory disturbance (Yes)	-0.434	0.526	1	0.409	0.648	0.231	1.816

Discussion

Aim of the study to study the lifestyle changes of the staff working in public hospitals in Erbil city during the year of 2021.Specific objectives of the study: To determine the lifestyle changes in terms of sleep pattern, physical activity, fizzy drinks and weight gain. To recognize the self-reported symptoms during COVID-19 such as tiredness, headache, continue fatigue and memory fluctuations. To highlight the self-reported smoking habits like: cigarette and narghile smoking. To identify the determinants of life style changes. The prevalence of MetS, DM and CVD are increasing in our country as we notice from our daily clinical practice. This change is due to urbanization, economic growth, westernization of our diet, non-physical activity, irregular meal time and increased stress, which have been blamed as risk factors for MetS Misra A. et al.5 Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was firstly recorded in Wuhan/China at December, 2019 with unknown etiology and declared as a pandemic coronavirus disease 2019 (COVID-19) disease by World Health Organization (WHO) affecting hundreds of millions and more than four million deaths globally. The first confirmed COVID-19 patient in Kurdistan region/Iraq was reported at February 2020 followed by outbreak causing many co-morbidities and mortalities in the region. medical staff they were the first line exposed to COVID19, and their duties had been increased during COVID19 pandemic, so continuous stress increase the risk of excessive calorie consumption and more risk for obesity. Obesity is a terrible factor in our country. In our study, the prevalence of MetS was increasing with increasing age groups (being highest 27.3% in the age group of ≥40 years). In addition, female participants had higher prevalence of MetS than male (28.9% and

12.0%respectively). These findings were similar to that reported in a study conducted by Tsai HJ and Tsou MT 10 in which doctor/nurse staff with night seniority >10 years had a higher OR of MetS; but those with seniority of 2–4 years had a decreased OR of MetS, also female participants had a higher OR of MetS Bergmann et al11, Chandola et al12, and Garbarino et al .13 observed that work stress, long hours of work, and burnout are associated with MetS.[11-13] There is an argue surrounding the etiology and pathogenesis of MetS, a single uniform mechanism needed to be discovered Ferrannini E. et al.[14] however, multiple factors e.g. hormonal, genetic and environmental (nutrition, body composition and stress hormones) factors play a key role in this contest Campion et al.[15] . This study also identified a number of factors that were linked to worse mental health outcomes during the COVID19 crisis, including anxiety about infecting with the virus, delay sleeping, follow up for loved ones at intensive care unit, emotional stress, limitations on family members' ability to visit patients, and having to observe hasty end-of-life decision-making all these factors described by Azoulay et al.[16]

Marital state showed significant association with MetS, 31.3% (p value 0.01 for married people, which was similar to Thomas GN, et al[17] and this may be due to more social stress. Sleep quality (p value< 0.001), headache (p value 0.0038) and memory disturbance (p value< 0.001) as a self-reported symptoms had significant association with MetS which is similar to Lee J.[18] Demographic data e.g. sex (p value 0.001) education (p value 0.001) and occupation (p value 0.001) were significantly related to prevalence of MetS Park SH. et al [19] have reported these factors as risk factors for MetS long hours of work, and burnout are associated with MetS.[11-13] There is an argue surrounding the etiology and pathogenesis of MetS, a single uniform mechanism needed to be discovered Ferrannini E. et al.[14] however, multiple factors e.g. hormonal, genetic and environmental (nutrition, body composition and stress hormones) factors play a key anxiety about infecting with the virus, delay sleeping, follow up for loved ones at intensive care unit, emotional stress, limitations on family members' ability to visit patients, and having to observe hasty end-of-life decision-making all these factors described by Azoulay et al.[16]

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Conclusions

During COVID19 pandemic MetS is highly prevalent in both health care workers and the rest of population. Health care workers should be more educated about the consequences of MetS in order to have a positive impact on the society. Aging, sex, education, occupation, smoking, fatty diet, marriage, family history of DM and CVD are the main risk factors for MetS. People with these risk factors should be assessed for MetS and educated about the risks and possible consequences in the future.

Conflicts of interest

There were no conflicts of interest.

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