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Research Article

The Impact of COVID -19 Infection on Female Health Care Workers in Iraq, 2022

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Abstract

Health care workers are among the highest population at risk of exposure to COVID-19 infection. High financial and technological resources were put to cope with this health crisis. Women experience unique health risks and outcomes. Regular menstrual cycle is a vital sign of women's health and well-being. The menstrual irregularities are not only related to future chronic health problems, but also negatively affect life quality, work productivity in addition to the financial burden on the health systems. This study aimed to highlight the impact of COVID -19 infection on women health and their cycle regularity in Iraq. A cross sectional study was conducted in Mosul and Baghdad cities. A total of 300 female health care workers participated in the study with Mosul to Baghdad participation ratio 2:1. The sample was collected randomly including all reproductive age groups. Our results showed 65% of health care working female got the infection. High rate of irregular cycle was noticed (79.7%). Age, educational level, profession, economic status, smoking habit, physical activity had no significant effect on having COVID -19 infection ($p = 0.9$, $p = 0.1$, $p = 0.06$, $p = 0.4$, $p = 0.6$, $p = 0.3$, respectively). Marital status had a positive effect on getting COVID -19 infection ($p = 0.00$). In conclusions, High rate of COVID -19 infection was noticed among Iraqi female health care workers. Age, educational level, profession, economic status, smoking habit, and physical activity were not determinants for COVID -19 infection in this study. Marital status had a positive impact on corona infection. Female sex hormones had no impact on getting COVID -19 infection.

Keywords: COVID -19; Demographic features; Menstrual cycle

Introduction

Health care workers are among the highest population at risk of exposure to COVID-19 infection. Their occupational contact during the pandemic is among the most vital concerns that need to be addressed comprehensively and effectively. It is a fundamental matter to ensure the safety of health care workers not only to safeguard continuous patient care, but also to guarantee they do not transmit the virus [1]. This risk to HCWs was reflected by multiple published reports and studies globally about the high number of cases and mortalities among them [2-4]. In Iraq, it was reported in May 2020 that HCWs cases constituted about 5% of the total cases in Iraq [5]. Therefore, high financial and technological resources were put to cope with this health crisis [6]. Women experience unique health risks and outcomes. Regular menstrual cycle is a vital sign of women's health and well-being [7]. Menstrual cycle irregularities include the changes in the menstrual pattern in terms of duration, frequency, intensity, regularity, and intermenstrual bleeding [8].

Irregular menses make women more liable to develop infertility, premature menopause, cardiovascular disease, diabetes mellitus, even breast and ovarian cancer later in life [9]. The menstrual irregularities are not only related to future chronic health problems, but also negatively affect life quality, work productivity in addition to the financial burden on the health systems [10]. Therefore, this study aimed to highlight the impact of COVID -19 infection on women health and their cycle regularity in Iraq.

Materials and Methods

A cross sectional study was conducted in Mosul and Baghdad cities. A total of 300 female health care workers participated in the study with Mosul to Baghdad participation ratio 2:1. The sample was collected randomly including all reproductive age groups. Informed written consent was obtained from the participants. A self-administered pretested questionnaire in Arabic was used. Data were collected by face-to-face interview. The questionnaire was filled by the participants after explaining the aim of the study by the investigators and were informed of their right to withdraw from the study at any time. They were also instructed not to write their names on it and were told that their responses would be confidential. The questionnaire involved questions about regularity of female menstrual cycle three months prior to the study and history of COVID -19 infection in addition to demographic information (age, marital status, educational level, etc.). Data collection took about three months from the 1st of April till the 30th of June 2022. Ten women were excluded from data analysis because of early menopause. All statistical calculations were done using SPSS (Statistical Package for Social Sciences) version 25. Descriptive statistics were presented in form of tables and figures. Chi square and Fisher exact tests were used accordingly. P value less than 0.05 was considered statistically significant.

Operational Definition

i. Reproductive age: 15-45 years old.

ii. Regular cycle:

a) Frequency 21-28 days.

b) Variation between the shortest to longest cycles 7-9 days.

c) Duration of flow ≤ 7 days.

d) Blood loss 5-80ml. [11, 12]

iii. Irregular cycle:

a) Variations in any of the above four parameters.

b) Intermenstrual bleeding. [11, 12]

iv. Blood loss amount:

a) Light bleeding: less than 5ml.

b) Moderate bleeding: ranges 5-80ml.

c) Heavy bleeding: more than 80ml [13].

v. Income level:

a) Low: income is less than expenditure.

b) Middle or moderate: income is equal to the expenditure.

c) High: income is more than expenditure [13].

Results

Out of total 300 participants, 195 female HCWs (65%) got COVID -19 infection. Figure1 shows distribution of COVID -19 infection among studied participants.

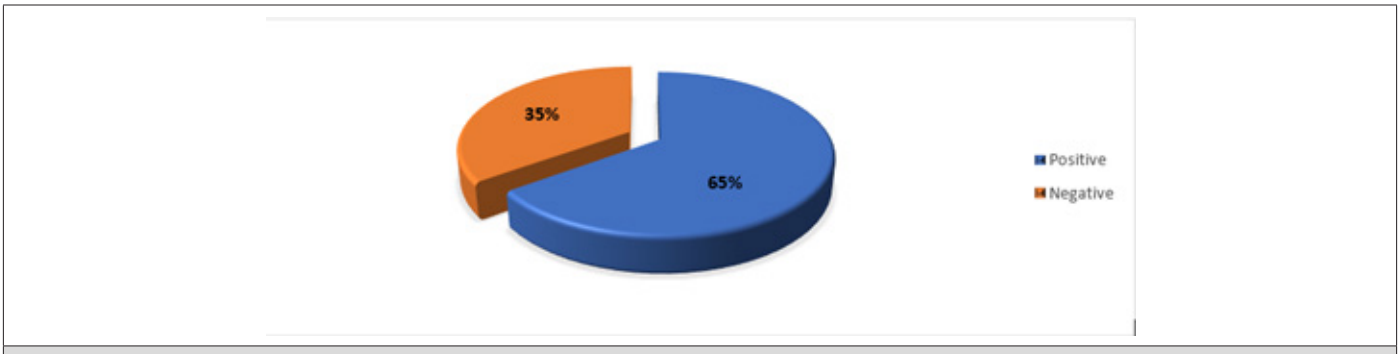

Figure 1: COVID - 19 infections among Iraqi women.

Menopause participants were 10 (3.3%) and non-menopausal ones were 290 (96.7%). This is seen in Figure2.

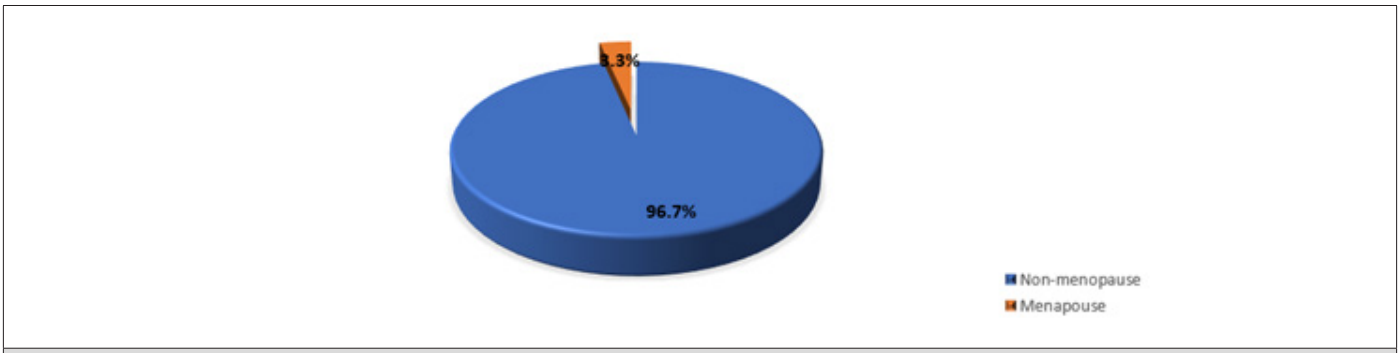

Figure 2: Menopausal and non-menopausal participants.

The menstrual characteristics of the studied participants is presented in Table1. Female with cycle length ranging 21-28 days were 179 (61.8%), less than 21 days were 89 (30.7%), and those with more than 35 days were 22 (7.5%). Females cycle duration seven days or less were 220 (75.9%), and those with more than seven days duration were 70 (24.1%). Heavy menstrual bleeding was noticed among 130 (44.8%) of the participants, 115 female health care workers had moderate bleeding (39.7%), and those with light bleeding were 45 only (15.5%). Most of the participants 230 (79.3%) had no intermenstrual bleeding. Many females had irregular cycle 231 (79.7%).

Table1: Menstrual characteristics of the study sample.

Menstrual Characteristics		Freq.	%
Cycle length	< 21 days	89	30.7
	21-35 days	179	61.8
	> 35 days	22	7.5
Cycle duration	≤ 7 days	220	75.9
	> 7 days	70	24.1
Blood loss amount	Light	45	15.5
	Moderate	115	39.7
	Heavy	130	44.8
Intermenstrual bleeding	Yes	60	20.7
	No	230	79.3
Cycle regularity	Regular	59	20.3
	Irregular	231	79.7
Total		290	100

The effect of female characteristics on getting COVID -19 infection is presented in Table2. The peak age with history of COVID - 19 infection was 31 - 44 years 105 (65.6%). Women's age had no significant effect on having COVID -19 infection (χ^2 = 0.03, p = 0.9). Out of 163 (56.2%) with bachelor's degree, 114 (69.9%) had COVID -19 infection. From 69 (23.8%) participants with high school, 42 (60.9%) got the infection, and from 58 (20%) specialists only 33 (56.9%) had the infection. Educational level had no impact on having COVID -19 infection among health care workers (χ^2 = 3.9, p = 0.1). Out of 66 (22.8%) doctors, 35 (53%) had COVID -19. From 62 (21.3%) nurses / midwives, and 162 (55.9%) others (pharmacists, dentists), only 43 (69.3%) nurses\ midwives and 111 (68.5%) with other professions got the infection. Profession had no significant effect on getting COVID -19 infection (χ^2 = 5.6, p = 0.06). Out of total married participants 203 (70%) and unmarried ones (single, widow, and divorced) 87 (30%), there were 141(69.5%) married and 46 (52.9%) unmarried had COVID -19 infection. Marital status had a significant effect on COVID-19 infection (χ^2 = 7.3, p = 0.00). Out of total female HCWs with low income 39 (13.4%), middle income 165 (56.9%), and high income 86 (29.7%), there were 29 (74.4%) with lower income, 106 (64.2%) moderate income high income, and 54 (62.8%) participants had got corona virus infection. Economic status had no significant effect on COVID -19 infection (χ^2 = 1.9, p = 0.4). Out of total smokers 5 (1.7%) and non-smokers 285 (98.3%), there were 4 (80%) smokers and 184 (64.6%) non-smokers had history of COVID 19 infection. Smoking habit had no significant effect on COVID -19 infection (p = 0.6). Out of total physically active participants 88 (30.3%) and non-active ones 202 (69.7%), there were 61 (69.3%) active and 128 (63.3%) non-active workers had COVID -19 infection. Physical activity had no significant effect on COVID -19 infection (χ^2 = 0.9, p = 0.3).

Table 2: The impact of female characteristics on COVID - 19 infection.

Variables	Total		COVID - 19		Chi Test d.f. P Value
			Positive		
	No.	%	No.	%	
Age					
≤ 30 years	130	44.8	84	64.6	χ^2 = 0.03 d.f. =1 p = 0.9
31-44 years	160	55.2	105	65.6	
Educational level					
High school	69	23.8	42	60.9	χ^2 = 3.9 d.f. =2 p = 0.1
Bachelor	163	56.2	114	69.9	
Specialists	58	20	33	56.9	
Profession					
Doctor	66	22.8	35	53	χ^2 = 5.6 d.f. =2 p = 0.06
Nurse/midwife	62	21.3	43	69.3	
Others	162	55.9	111	68.5	

Marital status					
Married	203	70	141	69.5	$\chi^2 = 7.3$ d.f. =1 p = 0.00
Single, widow, divorced	87	30	46	52.9	
Economic Status					
Low	39	13.4	29	74.4	$\chi^2 = 1.7$ d.f. =2 p = 0.4
Medium	165	56.9	106	64.2	
High	86	29.7	54	62.8	
Smoking habit					
Smoker	5	1.7	4	80	p = 0.6
Nonsmoker	285	98.3	184	64.6	
Physical activity					
Yes	88	30.3	61	69.3	$\chi^2 = 0.9$ d.f. =1 p = 0.3
No	202	69.7	128	63.3	
Cycle regularity					
Regular cycle	59	20.3	38	64.4	$\chi^2 = 0.01$ d.f. =1 p = 0.9
Irregular cycle	231	79.7	151	65.4	

Discussion

The study revealed that 65% of Iraqi health care workers women got COVID -19 infection. This figure is higher than that in UK (24.4%) [14], USA (13.7%) [15], and Spain (9.3%) [16]. This high figure might reflect the eroded health system in Iraq due to wars, conflicts, chaos, and corruption. Several articles demonstrated the deterioration of Iraqi health system [17,18]. Lack of an effective preventive and control program to hinder the infection transmission (early detection of COVID cases, effective isolation of confirmed cases, and screening program) which must be carried out at regular interval to detect asymptomatic, pre-symptomatic cases that can be difficult to address by clinical symptoms alone and can impose a crucial threat to transmit the infection to other health care workers and the whole community [19].Other reasons behind this high rate are: first, COVID-19 has many atypical clinical presentations, so patients may visit different departments for treatment. As the disease may be contagious during the incubation period, many medical and paramedical staff are not adequately protected and become infected via unwitting contact with the patients. Second, it is important to note there were no sufficient protective equipment in the hospitals for a pandemic of such severity. Third, the infected medical staff may be asymptomatic but infectious that may lead to clustered infection in a department [20].

The study showed that 3.3% females within reproductive age had early menopause. It might be familiar, or due to surgery (hysterectomy, oophorectomy), drugs (chemotherapy), etc. Being old or young has no significant effect on getting corona virus (p = 0.9). This finding is inconsistent with that in China [21, 22]. It appears that age-related comorbidities have a more important weight than age itself. Educational level and profession had no significant effect on having corona virus (p = 0.1, p = 0.06 respectively). Following global preventive and control measures is the main corner stone for not being infected with COVID -19. Being in contact with patients all working time rises the possibility of getting the infection for all health care workers in general. This finding is like that in literature [23] and in contrast to that in Iran [24] and Portugal [25]. The study revealed that marital status had a significant effect on getting COVID 19 infection (p = 0.00). Married health care workers bear more responsibility than single, divorced ones. Social contact with infected individuals (especially family members) is one of the main routes of viral spread. This finding is like that in Vietnam [26] and inconsistent with that in Saudi Arabia [27].

Economic status, smoking habit and physical activity had no significant effect on getting COVID 19 infection (p = 0.4, p = 0.6, and p = 0.3 respectively). Viral spread mainly depends on social contact and respiratory droplets. Socio-economic status might affect course of the disease, but not infection rate. It's worthy to mention that some published reports had shown smokers to have more severe complications from COVID-19 and a higher mortality rate than non-smokers [28-30]. Cycle regularity had no significant effect on getting COVID -19 infection (p = 0.9). In general, Sex hormones affect both the immune and reproductive systems. Estrogens and progesterone can play a protective role against direct antiviral activity in women. Regulation of pro-inflammatory immune processes against COVID-19 associated with increased anti-inflammatory regulation, and antiviral defines [31]. The protective-immune function of Estradiol 2 (E2) is directly related to the ovarian cycle. When E2 levels are high (pregnancy), the cycle

is affected by a rise in T cells [32]. The pattern of Th1/Th2 cytokine is widely known for allergies, infection, and autoimmune diseases. High levels of interleukin-6 in menopausal women can more rapidly lead patients with coronavirus into the cytokine storm which is characterized by immune dysregulation and hyper inflammation [31].

Conclusions

High rate of COVID -19 infection was noticed among Iraqi female health care workers. Age, educational level, profession, economic status, smoking habit, and physical activity were not determinants for COVID -19 infection in this study. Marital status had a positive impact on corona infection. Female sex hormones had no impact on getting COVID -19 infection.

Conflicts of Interest

No conflicts of interest were declared by the authors.

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