Knowledge and practices of maternity nurses related to the potential impacts of climate change on women's health.

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Abstract

Background: Climate change represents a significant global health issue that has rapidly ascended to the forefront of the global health agenda. Its impact can be profound, affecting individuals not only on a physical level but also psychologically and socially. Specifically, women are a population that may be particularly susceptible to the ramifications of climate change, and their quality of life may be threatened. It is worth noting that nurses are the frontline of any health system; therefore, it is essential to have a knowledgeable and skilled workforce to ensure the health of the community, particularly during crises such as climate change. **Aim of the study:** to assess knowledge and practices of maternity nurses related to the potential impacts of climate change on women's health. **Design**: A cross-sectional descriptive research design was implemented. **Subjects**: A convenient sample of 255 maternity nurses were enrolled from four maternity hospitals at Alexandria Governorate, Egypt. **Tools**: Data was collected using three tools namely, maternity nurses' basic data structured questionnaire, maternity nurses' knowledge related to the potential impacts of climate change on women's health structured questionnaire, and maternity nurses' practices related to the potential impacts of climate change on women's health structured questionnaire. **Results**: the mean score of the overall knowledge is 36.40±7.84 with a total percent score of 62.77% indicating fair knowledge, while the overall practices were unsatisfactory in the majority (93.3%) of nurses with a mean score of 8.76±2.65. **Conclusion:** The current study concluded that the overall score of maternity nurses' knowledge was fair while the overall mean score of their practices was unsatisfactory. Therefore, there is a gap between knowledge and practice. **Recommendations:** It is suggested that the responsible authorities should conduct educational programs and training workshops to raise maternity nurses' awareness of climate change and its impacts on women's health as well as incorporating climate change in nursing curricula in all levels of study.

Introduction

Climate change is a considerable global health peril that endangers the population worldwide. It pertains to noteworthy and enduring alterations in the global climate, encompassing "temperature, precipitations, and wind" which are predominantly human induced. The impacts of disrupting the earth's weather patterns are jeopardizing the planet's ecosystem sustainability, humankind future, and the stability of the global economy (Youmatter, 2020; Shafer, 2022).

The "National Aeronautics and Space Administration (NASA)" defined climate change as "a broad range of global phenomena created predominantly by burning fossil fuels, which add heat-trapping gases to Earth's atmosphere. These phenomena include the increased

temperature trends described by global warming, but also encompass changes such as wildfires, air pollution, and ocean heating, ocean acidification, sea-level rise and ice mass loss in Greenland, Antarctica, the Arctic and mountain glaciers worldwide that lead to flooding, shifts in flower/plant blooming; more intense storms, droughts, and other extreme weather events" (Global Climate Change [NASA], 2022).

Egypt is significantly prone to be impacted by the consequences of climate change, resulting in an anticipated escalation in heat waves, dust storms, Mediterranean coastal storms, and occurrences of extreme weather. Over the past three decades, there has been a notable increase in the intensity of warming, with average annual temperatures rising by 0.53 °C per decade. It is of paramount importance to recognize that the younger generations will be particularly affected by the country's climate-related hazards. Significantly, there is a swift increase in awareness regarding the significance of taking action on climate change in Egypt. The country finds itself at a turning point with regards to its dedication and efforts aimed at mitigating the impacts of climate change. Egypt has also pledged to incorporate climate change considerations into its national development policies and adopt a progressively eco-friendly approach across all sectors, as part of its 2030 vision and sustainable development strategy (Ismail, 2018; COP27, 2022).

At the "27th annual United Nations Climate Change Conference (COP27)" which convened on the 18th of November 2022 in Sharm el-Sheikh, Egypt, a series of side events were held that specifically addressed the intersection of gender and climate change. Speakers across several communities expounded on the fact that climate change has a disproportionate effect on women and girls, thereby exacerbating the prevailing gender disparity. The adverse effects of climate

change on the outcomes of reproductive and sexual health care coupled with the intensification of economic hardships and gender-inequitable opportunities, can further increase incidences of sexual and gender-based violence (SGBV). This phenomenon is primarily attributed to the prevalence of gender discriminatory laws and culture norms that harmfully affect women and girls' reproductive and sexual health care rights and decrease their financial and educational chances (COP27, 2022; Un Women, 2022).

Girls and women are the most impacted group by climate change especially those with limited income, who suffer from various forms of coercion and discrimination, migrants, as well as those who have any form of disability or live in rural or disaster-prone regions. Such circumstances can endanger their safety, health, and livelihood, as well as make them highly exposed to all forms of violence (Giudice et al., 2021; World Health organization [WHO], 2021; COP27, 2022).

Climate events may destroy the infrastructures of both the health systems and transportation, consequently limiting the access to resources and services related to pregnancy, abortion, labor, and family planning. (COP27, 2022). Inadequate access to reproductive and sexual health rights can lead to a decrease in the interval between births and a rise in unplanned or unwanted pregnancies. Consequently, young girls may have to discontinue their education which increases the likelihood of early or child marriage, the most common cause SGBV and sexually transmitted diseases (STDs). Furthermore, inadequate economic opportunities can force women into occupations that heighten their chances of experiencing violence, such as engaging in transactional sex. Besides, alterations in resource accessibility can amplify the risk of sexual assault among women and girls, particularly when they must travel long distances to obtain

resources (COP27, 2022; Fan & Koski, 2022).

Water and food insecurity resulting from climate conditions, may exert a large impact on the health of women, resulting in an increased risk of malnutrition, decreased body weight and strength, lowered resistance to infection, as well as increased risk of the development of major chronic diseases, disability, poor mental health, poor quality of life, and premature mortality (Dunne, 2020). Also, air pollution is currently presenting a growing threat to the well-being of the global population. It is capable of causing harm to the essential organs such as the lungs, heart, and placenta. In particular, pregnant women are susceptible to the adverse effects of air pollution, which can result in preterm birth, low birth weight, and stillbirth. Furthermore, air pollution has been found to be associated with hypertensive disorders in expectant mothers and other vulnerable groups. Recent studies have revealed that air pollution is correlated with a diverse range of outcomes, including disrupted production of sperm and eggs, epigenetic changes, and birth defects, ultimately leading to infertility (Carré et al., 2017; Koman et al., 2018; Casey et al., 2019; Watts et al., 2019; Bekkar et al., 2020).

The interaction between climate change and environmental chemical toxicants is evident in some of their effects. Elevated temperatures lead to higher exposure to toxic chemicals, and extreme weather events contribute to concentrated releases of such chemicals. Moreover, climate change has the potential to intensify the effect of toxic chemicals on male and female fertility, as well as to predispose them to other diseases that can affect fertility, such as obesity, diabetes, and endocrine cancers (Borgå et al., 2022; Jain & Singh, 2023). Research has demonstrated that high temperatures can also have an impact on the health of both pregnant mother and her fetus. Such

conditions can lead to an elevated risk of heat-related illnesses, both at home and in the workplace. Likewise, there is a heightened risk of fetal congenital anomalies, including septal heart and conotruncal defects, as well as an increased incidence of eclampsia and placental abruption (Kuehn & McCormick, 2017; He et al., 2018; Lin et al., 2018; Zhang et al., 2019; American Academy of Pediatrics, 2021).

Maternity nurses have the capacity to assume a significant role in enhancing the health of women who may be negatively affected by the impact of climate change. As providers of a vital service, it is a responsibility upon them to promote and support the health and welfare of women. Furthermore, they must assess the potential impacts of climate change on the health of women within their immediate environment and develop comprehensive plans of care that are suitable to the deleterious effects of climate change on women's health (Martin & Vold, 2019; World Health organization [WHO], 2022). Additionally, it is crucial for nurses to educate and enlighten women about climate change and its concomitant impacts on health. They ought to employ their expertise to advocate and espouse strategies that mitigate the adverse effects of climate change, not only on patients but also on their families (Martin & Vold, 2019; World Health organization [WHO], 2022). As a care manager, it is imperative that maternity nurses conduct thorough research, engage in advocacy efforts, and execute sustainable policies and practices. Additionally, they should regularly initiate discussions regarding the effects of climate change on women's health and spot the light on the practices that increase the problem of climate change within work environment such as the unrationalized use of air conditioning, electricity, elevators, paper, and plastic products as well as the incorrect ways of waste separation, and toxic fumes and chemicals disposal. This will help to standardize the language and

collaborate with government officials, allied health professionals, and other emergency responders (Martin & Vold, 2019; World Health organization [WHO], 2022).

Significance of the problem:

Climate change represents a significant global health issue that has rapidly ascended to the forefront of the global health agenda. Its impact can be profound, affecting individuals not only on a physical level but also psychologically and socially. Specifically, women are a population that may be particularly susceptible to the ramifications of climate change, and their quality of life may be threatened. It is worth noting that nurses are the frontline of any health system; therefore, it is essential to have a knowledgeable and skilled workforce to ensure the health of the community, particularly during crises such as climate change (World Health organization [WHO], 2021). Furthermore, it is crucial that nurses, particularly maternity nurses, possess a thorough understanding of climate change and its impacts on health, especially women's health, to safeguard the well-being of the community at large and women in particular. Besides, maternity nurses must avoid all the climate-unfriendly practices within the work environment. As such, the purpose of this study is to evaluate the maternity nurses' knowledge and practices related to the potential effects of climate change on women's health.

Aim of the study

To assess knowledge and practices of maternity nurses related to the potential impacts of climate change on women's health.

Research question

1. What is the level of maternity nurses' knowledge related to the potential impacts of climate change on women's health?

2. What is the level of maternity nurses' practices related to the potential impacts of climate change on women's health?

Materials and method

Materials

Research design:

A cross-sectional descriptive research design was implemented in this study.

Settings:

The study was carried out in four maternity hospitals in Alexandria. These hospitals are:

- EL-Shatby Maternity University Hospital affiliated to Alexandria University.
- Salah Al Awadi maternity hospital affiliated to Health Insurance.
- Dar El-Welada hospital (Maternitee) affiliated to Health Care Organizations.
- Dar Esmaeel governorate hospital for birth affiliated to Ministry of Health.

Subjects:

A convenient sample of 255 maternity nurses working at the aforementioned settings were enrolled.

o The "Epi Info statistical program" was utilized to estimate the sample size based on the following parameters: a "population size" of 740, "an expected frequency" of 50%, an "acceptable error" of 5%, and a "confidence coefficient" of 95%. As a result, the minimal required sample size was calculated to be 253.

o The final sample size was 255.

Tools:

Three tools were used for data collection.

Tool (I): Maternity nurses' Basic data structured questionnaire:

This tool included maternity nurses' basic data such as age, marital status, current residence, qualifications, work unit and years of experience.

Tool (II): Maternity nurses' knowledge related to the potential impacts of climate change on women's health structured questionnaire:

This tool was developed and used by the researchers based on extensive revision of recent and relevant literature to measure the maternity nurses' knowledge related to the potential impacts of climate change on women's health (Kircher et al., 2022; Sambath et al., 2022; Amin et al., 2023). It comprised 31 questions covered through two parts:

- Part one: Maternity nurses' knowledge about climate change in general which comprised 15 questions.

- Part two: Maternity nurses' knowledge about the potential impacts of climate change on women's health which comprised 16 questions.

Each item in the two parts is given "(0) for incorrect answers, (1) for correct but incomplete answers, and (2) for correct and complete answers".

The overall score of knowledge ranged from 0 to 62 and was categorized as follows:

- "Poor for a total score 0-20".

- "Fair for a total score 21-41".

- "Good for a total score 42-62".

Tool (III): Maternity nurses' practices related to the potential impacts of climate changes on women's health structured questionnaire:

This tool was developed and used by researchers after extensive revision of recent & relevant literature to assess maternity nurses' practices related to the potential impacts of climate changes on women's health (Martin & Vold, 2019; Abdallah & Farag, 2022; World Health organization [WHO], 2022; Mahmoud & Mahmoud, 2023). It covered 28 items under the following categories.

- Practices with the patients (6 items)

- Practices within work environment (13 items).

- Participation in Staff development about climate change (5 items).

- Practices through hospital's web site and social media (1 item).

- Participation in Policies and regulations related to the impacts of climate change (1 item).

- Practices within the community (2 items).

Each item is scored as "(0) for no practice and (1) for the presence of practice".

The overall score of practices was categorized as follows:

- "Unsatisfactory practices for a total score of 0 - <60%".

- "Satisfactory practices for a total score of 60% or more".

Method

The study was conducted in the following steps:

1. Approvals:

- Approval from the research ethics committee, Faculty of Nursing, Alexandria University was obtained.

- Permission for data collection was obtained from the responsible authorities of the study settings after explaining the research aim.

2. Tools development:

- Tools were developed by the researcher after an extensive review of recent & relevant literature.

- Tools were tested for content validity by a jury of five professors in obstetrics and gynecologic nursing and the necessary modifications were made.

- Tools (II & III) were also tested for their reliability by using Cronbach's alpha test and the result indicating reliability of both tools where r=0.892 for tool I and 0.853 for tool II.

3. Pilot study:

A pilot study was conducted on 25 maternity nurses, constituting 10% of the total participants, who were not included in the main study sample. The objective of pilot study was to assess the comprehensibility and practicality of the used tools. Subsequently, the required modifications were made.

4. Ethical considerations:

Written informed consent was obtained from each nurse before the collection of data and after explanation of the study aim. Confidentiality of collected data was ensured and the anonymity of participating nurses was maintained throughout the study. It was explicitly communicated to each nurse that their participation in the study was voluntary,

Results

Table (1) presents the basic data of the study sample, where 38% of nurses aged from 20 to <30 years with a mean age of 36.07±11.01 years. More than half of them (56.5%) were married. Moreover, it was found that, the majority of nurses

and they had the right to withdraw at any point in time.

5. Collection of data:

- At the beginning, the researcher encountered the nurses and proceeded to introduce herself and explicate the title and purpose of the study.

- Then, the questionnaires were distributed among the nurses during their break times to assess their knowledge and practices related to the potential impacts of climate change on women's health. The duration of completion of the form varied from 20-30 minutes on average, depending on the level of understanding and responsiveness of the questionnaire.

- Collection of data covered a period of 4 months from January to the end of April 2023.

6. Statistical analysis:

Data was analyzed using the "Statistical Package for Social Sciences (SPSS)" version 25. The collected data underwent categorization, coding, computerization, tabulation, and analysis. Frequency and distribution were employed to describe and summarize categorical data. Cross tabulation, with percentages, was utilized to probe relationship between variables. Suitable tests, namely the arithmetic mean, ANOVA, and student tests at the 0.05 level of significance, were employed. Pearson's Correlation Coefficient test was utilized to measure the direction of the relationship between knowledge and practices.

(94.9%) live in urban areas, 42 % of them have a bachelor's degree, the highest percent of nurses (27.4%) are working in the antenatal department while the least percentage (11.8%) are working in family planning department. More than half

(55.3%) of them have more than 10 years of work experience with a mean of 15.35±11.80 years.

Table (2) displays that nurses' general knowledge about climate change was fair in about two thirds (67.1%) of nurses. In assessing their knowledge about the potential impacts of climate change on women's health, it was found that about half (51.3%) of nurses have good knowledge. However, the mean score of the overall knowledge is 36.40±7.84 with a total percent score of 62.77% indicating fair knowledge.

Figure (1) shows that social media is the most common source of information for 43.1% of maternity nurses followed by television which is reported by 39% of nurses. The least reported source of information was scientific conferences which constituted 3.9%.

Table (3) demonstrates that nurses' practices with the patient were unsatisfactory in the majority (93.3%) of them, however the practices within work environment were satisfactory in 80% of nurses. Moreover, all nurses (100%) have unsatisfactory practices in relation to the participation in staff development about climate change. Also, 95.7% of nurses have unsatisfactory practices regarding the participation in practices through the hospital's web site and social media. Considering the participation in the formulation of policies and regulations, the

majority of nurses (96.9%) have unsatisfactory practices. With regard to nurses' practices within the community, it was found that 82.7% of them have unsatisfactory practices. The overall practices were unsatisfactory in the majority (93.3%) of nurses with a mean score of 8.76±2.65.

Table (4) reveals a positive correlation between knowledge and practices. A statistically significant difference was found between overall knowledge score and overall practices score (r = 0.220, P = <0.001).

Table (5) From the table it is noticed that there is statistically significant relation between nurses' overall knowledge and their qualifications, work department, and years of experience where p= >0.001, >0.001, and 0.043 respectively. However, no statistically significant relation was detected between nurses' overall score of knowledge and their age, marital status, and residence where p=0.977, 0.264, &0.779 respectively.

Table (6) From the table it is noticed that there is statistically significant relation between nurses' overall score of practices and their work department and years of experience where p= >0.001 in both. On the other hand, there is no relation between the overall score of practices and nurses' age, marital status, residence, and qualifications where p=0.098, 0.106, 0.193, &0.074 respectively.
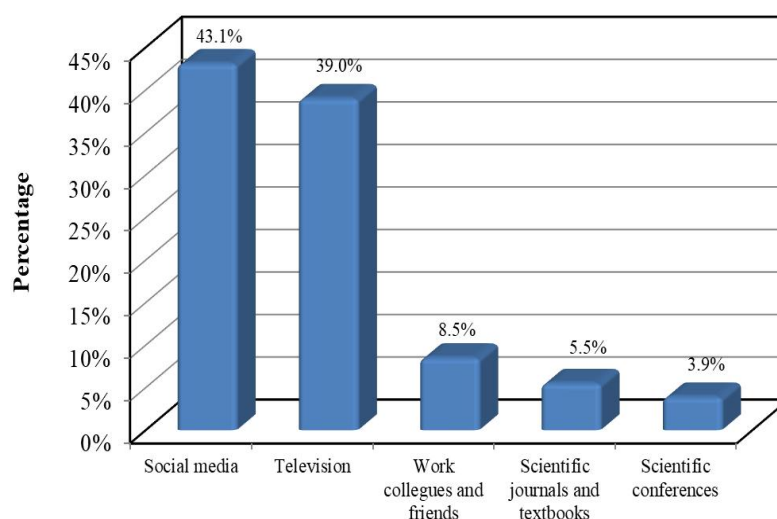
Table (1): Distribution of the study participants according to their basic data. (N = 255)

	No.	%
Age		
20-<30	97	38.0
30-<40	64	25.1
≥40	94	36.9
Mean ± SD	36.07±11.01	
Marital status		
Single	81	31.8
Married	144	56.5
Divorced	9	3.5
Widowed	21	8.2
Residence		
Urban	242	94.9
Rural	13	5.1
Qualification		
Diploma of secondary nursing school	57	22.4
Diploma of technical Institute of nursing	91	35.7
Bachelor's degree of nursing	107	42.0
Work department		
Antenatal department	70	27.4
Labor department	51	20.0
Postpartum department	54	21.2
Gynecology department	50	19.6
Family planning department	30	11.8
Years of experience		
<5 years	65	25.5
5-10 years	49	19.2
>10 years	141	55.3
Mean ± SD	15.35±11.80	

Table (2):   Maternity nurses' knowledge related to the potential impacts of climate change on women's health.

Items	Total (n= 255)		Mean scores		Mean percent score
	No	%	Min-Max	Mean±SD	
Nurses' knowledge about climate change in general.					
• Poor	2	0.8			
• Fair	171	67.1	6.00-22.00	17.64±2.68	63.00%
• Good	82	32.1			
Nurses' knowledge about the potential impacts of climate change on women's health					
• Poor	16	6.3			
• Fair	108	42.4	0.00-28.00	18.76±6.58	62.55%
• Good	131	51.3			
The overall Knowledge of Maternity nurses related to climate change and its potential impacts on women's health.					
• Poor	5	2.0			
• Fair	113	44.3	12.00-50.00	36.40±7.84	62.77%
• Good	137	53.7			

Figure (1): Sources of information about climate change and its potential impacts on women's health (n = 255).

Table (3): **Maternity nurses' practices related to the potential impacts of climate change on women's health (n = 255).**

Items	Total (n= 255)		Mean scores		Mean percentage score
	No	**%**	**Min-Max**	**Mean±SD**	
Practices with the patients					
• Unsatisfactory	238	93.3			
• Satisfactory	17	6.7	0.00-5.00	0.75±1.01	12.48%
Practices within the work environment					
• Unsatisfactory	51	20.0			
• Satisfactory	204	80.0	4.00-11.00	7.58±1.51	58.28%
Participation in Staff development about climate change					
• Unsatisfactory	255	100.0			
• Satisfactory	0	0.0	0.00-2.00	0.07±0.29	1.49%
Practices through hospital's web site and social media					
• Unsatisfactory	244	95.7			
• Satisfactory	11	4.3	0.00-1.00	0.04±0.20	4.31%
Participation in Policies and regulations related to the impacts of climate change					
• Unsatisfactory	247	96.9			
• Satisfactory	8	3.1	0.00-1.00	0.03±0.17	3.14%
Practices within the community					
• Unsatisfactory	211	82.7			
• Satisfactory	44	17.3	0.00-2.00	0.29±0.66	14.31%
The overall practices of maternity nurses related to the potential impacts of climate change on women's health					
• Unsatisfactory	238	93.3	4.00-18.00	8.76±2.65	31.29%
• Satisfactory	17	6.7			

Table (4): **Correlation between knowledge and practices of maternity nurses related to the potential impacts of climate change on women's health (n = 255).**

Variables	r	p
Overall knowledge- Overall practices	0.220^*	$<0.001^*$

r: Pearson coefficient   *: Statistically significant at $p \leq 0.05$

Table (5): **Relationship between maternity nurses' overall knowledge and their basic data.**

Items	Mean scores of knowledge Mean± SD	Test of significance
Age		
20-<30	36.46±7.48	
30-<40	36.22 ±9.71	F=0.024
40+	36.47±6.79	p=0.977
Marital status		
Single	35.65±7.86	
Married	36.93±8.26	F=1.333
Divorced	39.33±6.36	p=0.264
Widowed	34.43±4.04	
Residence		
Urban	36.37±7.95	t=0.281
Rural	37.00±5.39	p=0.779
Qualification		
Diploma of secondary nursing school	32.84±5.62	
Diploma of technical Institute of nursing	36.92±9.07	$F=8.393^*$
Bachelor's degree of nursing	37.86±7.17	$p<0.001^*$
Work department		
Antenatal department	36.68±7.54	
Labor department	38.56±6.87	
Postpartum department	29.92±9.46	$F=8.659^*$
Gynecology department	33.92±9.19	$p<0.001^*$
Family planning department	31.08±4.01	
Years of experience		
<5 years	36.17±7.56	$F=3.196^*$
5-10 years	34.08±9.56	$p=0.043^*$
10+	37.32±7.16	

 F: One way ANOVA test   t: Student t-test
 *: Statistically significant at $p \leq 0.05$

Table (6):   Relationship between maternity nurses' mean score of practices and their basic data.

Items	Mean scores of practices Mean±SD	Test of significance
Age		
20-<30	9.15±3.42	
30-<40	8.80±2.63	F= 2.350
40+	8.33±1.42	P = 0.098
Marital status		
Single	9.36±3.70	
Married	8.47±2.03	F=2.057
Divorced	8.67±0.50	p=0.106
Widowed	8.52±1.66	
Residence		
Urban	8.71±2.61	t=1.304
Rural	9.69±3.33	p=0.193
Qualification		
Diploma of secondary nursing school	8.19±1.55	
Diploma of technical Institute of nursing	8.65±2.43	F=2.636
Bachelor's degree of nursing	9.16±3.19	p=0.074
Work department		
Antenatal department	9.54±3.29	
Labor department	8.25±1.72	
Postpartum department	8.62±2.87	F=5.192*
Gynecology department	8.54±0.78	p<0.001*
Family planning department	6.38±1.12	
Years of experience		
<5 years	8.54±3.17	F=14.197*
5-10 years	10.47±3.28	p<0.001*
10+	8.27±1.77	

F: One way ANOVA test   t: Student t-test

*: Statistically significant at $p \leq 0.05$

Discussion

Climate change represents the most significant threat to global health, with health professionals worldwide already taking action to address the detrimental impacts posed by this crisis. The effects of climate change extend to the social and environmental determinants of health, including access to clean air, safe drinking water, adequate food, and secure shelter. Predictions indicate that between 2030 and 2050, climate change will result in roughly 250,000 additional deaths annually due to malnutrition, malaria, diarrhea, and heat-related illnesses. Regions with limited health infrastructure, particularly in developing countries, will face the greatest challenges in preparing and responding without external support (World Health organization [WHO], 2021; Acuña et al., 2023).

Climate change is eroding several of the key social determinants that support good health, including access to healthcare, social support structures, and livelihoods that promote equality. It is worth noting that the risks associated with climate-sensitive health outcomes disproportionately affect the most vulnerable and marginalized members of society, including women (World Health organization [WHO], 2021).

Nurses in general and maternity nurses in specific hold a pivotal

responsibility in understanding the effects of climate change on public and women's health. Being at the forefront of healthcare, they have the responsibility and should possess the capacity to recognize and address the implications of climate change on the health of women and their families. Thus, the aim of this study was to assess the knowledge and practices of maternity nurses related to the potential impacts of climate change on women's health.

The results of the current study showed that the level of maternity nurses' knowledge related to the potential impacts of climate change was fair. This result matches with that of Xiao et al. (2016) who concluded that most nurses have knowledge on climate change in their study about "Nurses' knowledge and attitudes regarding potential impacts of climate change on public health in central of China". Also, the current finding is relatively in accordance with that of Amin et al. (2023) who found that that the level of knowledge about climate change was satisfactory. However, this finding is not consistent with the results of Mohammed et al. (2022) and Abdallah and Farag (2022) who found that total level of knowledge was poor.

The findings of the current study showed that social media and television were the most common sources of information about climate change among study participants. It was interesting to find that people still get their information from television. This may be attributed to the fact that most of the study participants are in their late thirties who have less tendency than younger peers to use social media. This finding is somewhat in harmony with the study done by Sambath et al. (2022) who found that about one-quarter of the study participants reported television and social media as their sources of information about climate change. Another relatively consistent study conducted by Mohammed et al. (2022) found that only 18% of the study participants reported that

TV and radio were the most common sources of information about climate change.

Moreover, the current study findings revealed that overall nurses' practices related to the impact of climate change on women's health were unsatisfactory. This result indicating the presence of a gap between knowledge and practice which may be due the increased workload, lack of continuous supervision, and lack of awareness about the needed practices within work environment to decrease the effects of climate change on women's health as much as possible, as most of these practices do not include direct procedures with the patients instead, they include health education, behaviors, and practices within work environment itself.

This finding is consistent with the result reported by Kircher et al. (2022) who revealed unsatisfactory practices related to climate change among the study participants in the study titled "understanding the knowledge, attitudes, and practices of healthcare professionals toward climate change and health in Minnesota" and they attributed this to some barriers such as lack of time and interest. Likewise, a matching result was reported by Mohammed et al. (2022) and Abdallah and Farag (2022) who found that the total level of practice was inadequate among their study participants. However, the current finding is not consistent with that of Rahman et al. (2021) who reported that the majority of study participants had correct practices in their study about "Knowledge, attitudes, and practices on climate change and dengue in Lao People's Democratic Republic and Thailand".

The current study also revealed a statistically significant relation between the overall knowledge score and overall practices score among the studied nurses. This finding is in harmony with the result of Mahmoud and Mahmoud (2023) who found that a statistically significant relation

(P = 0.005) was found between total knowledge and total practice of the studied nurses. However, this result is not consistent with the result of Abdallah and Farag (2022) who found that no statistically significant relation (r = 0.065, P = 0.504) between the overall knowledge score and overall practice score among the studied nurses.

Furthermore, the current study found that there was a statistically significant relation between the overall score of knowledge and nurses' qualification, working department and years of experience. This means that level of knowledge increases as qualification and years of experience increases. This supports the need to encourage continuing education and the importance of holding training workshops to enhance the nurses' knowledge regarding climate change and its impact on women's health. This finding agrees with the finding of Abdallah and Farag (2022) who reported the presence of statistically significant relation between total mean score of knowledge and nurses' qualification. However, this finding doesn't fit with the results of Mahmoud and Mahmoud (2023) and Mohammed et al. (2022) who reported no statistically significant relation between total mean score of knowledge and nurses' basic data.

The present study also showed that there was a statistically significant relation between total mean score of nurses' practice and their work department and years of experience. This finding highlights the importance to provide workplace training and continuous supervision of nurses' practice regarding climate change and its impacts on women health. This finding matches to a certain extent with the result of Mahmoud and Mahmoud (2023) who found a statistically significant relation between total mean score of practice and nurses' demographic characteristics as years of experience. Another relatively supporting study done by Abdallah and Farag (2022) revealed a

statistically significant relation between total mean score of practice and nurses' demographic characteristics. However, this finding is not in accordance with the study done by Mohammed et al. (2022) who didn't find any statistically significant relation between total mean score of practice and nurses demographic characteristics.

The findings of the current study may help in breaking the gap between nurses' knowledge and practices, hence improving nurses' practice will positively contribute to achieving the optimal health of women.

Conclusion

The current study concluded that the overall score of maternity nurses' knowledge was fair while the overall mean score of their practices was unsatisfactory. Therefore, there is a gap between knowledge and practice.

Recommendations

Based on the findings of the present study, the following recommendations are suggested:

- The responsible authorities in maternity health settings should conduct educational programs and training workshops to raise nurse's awareness of climate change and its impacts on women's health.
- Using social media platforms to enhance the nurses' knowledge and foster their practices concerning climate change.
- Utilizing digital health education to disseminate evidence-based information about climate change.
- Climate change should be incorporated in nursing curricula in all levels of study.
- Further research is needed to assess the knowledge and practices of other health personnel related to climate change on a wider scale. As well as a study to test

the effect of an educational program

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