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Original Article

Effect of Climate Change Awareness Program on Knowledge, Attitude and Preventive Practices among Pregnant Women.

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ABSTRACT

Background: The big danger of world health in the 21st century is thought to be climate change, a widespread issue with far-reaching effects especially in vulnerable population as pregnant women. **Aim of the study:** To assess effect of Climate Change Awareness Program on Knowledge, Attitude and Preventive Practices among pregnant women. **Design:** Aquasi experimental research design with one group pre and post-test was adopted in this study. **Setting:** The study was carried out at antenatal clinics of Women health hospital at Assuit University. **Sample:** A convenient sample of 100 pregnant women were involved. **Data collection tools:** Four tools were used Tool (I) Structured interviewing questionnaire, Tool (II) knowledge assessment tool, Tool (III) pregnant women's attitude toward climate change self-rating scale, Tool (IV) women's reported preventive practices toward climate changes. **Results:** There is highly statistically significant difference between pre &post-test in relation to pregnant women's knowledge, attitude and preventive practices toward climate changes**.** **Conclusion**: The climate change awareness program had a positive effect on enhancing pregnant women's knowledge, attitude and preventive practices regarding climate changes evidenced by pre-test and post-test knowledge, attitude and practice scores. **Recommendations:** Awareness initiatives are needed for pregnant women to enhance their knowledge, attitude and improve their preventive practices regarding climate change**.**

Keywords: Awareness program, Attitude, Climate change, Knowledge, Preventive Practices**.**

Introduction

The big danger of world health in the 21st century is thought to be climate change, a widespread issue with far-reaching effects on the social, political, cultural, physical, and economic consequences. The reasons of climate change are human-made and stem from behaviors, decisions, and consumption that unjustly deplete and pollute resources **(Ibrahim et al.,2023).**

Health risks factors associated with climate change include air pollution, forced migration, and shifting patterns of infectious diseases, which can compromise one's physical and mental well-being and are more likely to affect vulnerable populations. **(Aronsson et al., 2020**).

Climate change affects pregnancy through prenatal exposure to increased temperatures & air pollution impacting fetal 's respiratory health, emphasizing the vulnerability of pregnant women **(Yadav & Pacheco , 2023)**

Climate change, specifically heat stress, can disrupt hormonal balance and immune response among pregnant women, leading to adverse pregnancy outcome **(Yüzen et al., 2023).** Exposure to extreme heat during pregnancy can lead to adverse maternal health outcomes like pre-eclampsia, gestational diabetes, low birth weight, pre-term birth, and stillbirth. **(Brimicombe et al.,2023).**

The psychological effects of climate change on pregnant women are increasingly recognized as significant contributors to antenatal distress. Research indicates that climate change anxiety correlates with heightened levels of worry and depression among expectant mothers, driven by fears for their children's health and future in a changing environment **(Lykins et al.,2023)**. Additionally, exposure to extreme weather events (EWEs) exacerbates mental health issues, leading to feelings of helplessness and trauma, which are critical during the perinatal period **(Rothschild et al.,2022).**

The relationship between knowledge, attitudes, and practices regarding climate change among pregnant women is critical, as it directly impacts maternal and child health. According **Acar & Oter (2023)** in a qualitative study conducted to assess climate change awareness in pregnant women awareness about climate change exists, but it is often insufficient, leading to gaps in understanding the health implications of climate change thus the practices among pregnant women to mitigate climate change effects remain inadequate, as they often lack the necessary knowledge to implement effective strategies.

Maternity nurses play an important role in educating pregnant women regarding the recognition of climate change indicators and symptoms of heat stress. Furthermore, they emphasize the significance of maintaining proper hydration levels before, during, and after their work shifts, as well as the importance of consuming a well- balanced and nutritious diet along with an adequate intake of fluids. These nurses also stress the importance of taking breaks at appropriate intervals, monitoring hydration levels and using personal protective equipment (PPE) in conjunction with protective clothing, such as cotton garments, when working outdoors. Lastly, they emphasize the necessity of seeking medical advice when needed **(Abo Khashabah et al., 2020).**

Significant of study

According to World Health Organization., Climate change is responsible For a minimum of 150,000 deaths every Year worldwide, a number that is Expected to double by 2030 **(Ibrahim et al.,2023).**

Egypt is considered one of five highly vulnerable countries in the world to climate change due to its triple effect: the weather, low rainfall, and hot summers; the nature of the land (large desert) and densely populated cities and geography **(Anwar et al.,2022).**

Pregnant women are especially vulnerable to the health risks associated with climate change, including preterm birth, small for gestational age, hypertensive disorders of pregnancy, and other negative reproductive health and birth outcomes **(Fan et al.,2023).**

According a study of **Adebayo et al. (2020**) educating pregnant women about climate change health risks through narrative format enhances knowledge, risk perception, self-efficacy, and information seeking, improving maternal and child health outcomes. Also, the study of **Fan & Zlatnik (2023)** reported that educating pregnant women about climate change can help mitigate risks like preterm birth, small for gestational age, and hypertensive disorders, enhancing resilience and health outcomes.

Some studies suggest that the urgency and depth of understanding required to drive significant behavioral change that are still lacking among various demographics, including pregnant women. This highlights the need for comprehensive educational initiatives tailored to this vulnerable group **(Sambath et al.,2022).**

Therefore, effective awareness initiatives are needed to improve awareness of pregnant women about climate change to improve pregnancy outcomes for women**.**

Study aim

To assess effect of Climate Change Awareness Program on knowledge, attitude and Preventive practices among pregnant women.

Research Hypothesis

H0: Climate Change Awareness program would have no effect on pregnant women's knowledge, attitude and preventive practice toward climate change.

H1: Pregnant women will expected to have higher post-test knowledge, attitudes and preventive practices scores than pre-test scores following Climate Change Awareness program.

Operational definition

Climate change: refers to the alteration in Earth's climate patterns, predominantly caused by human-induced pollution that traps heat in the atmosphere, leading to global warming and impacting ecosystems worldwide**.**

An awareness program: refers to initiatives aims to enhance knowledge and practices on a specific topic, such as climate change, through educational sessions and interventions to improve understanding and behaviors among participants.

Methods

Research design

A quasi – experimental one group pre and post-test design was employed. A quasi-experimental research design, according to **Devin (2015),** involves manipulating independent variables to observe the effect on dependent variables but does not use randomly assigned groups. A single case was observed at two time points, one before and one after the intervention, using a one-group. Changes in a desired outcome were attributed to the intervention or treatment.

Setting of the study

This study was carried out at antenatal clinics of Women health hospital at Assiut University Hospital. The setting comprises a single floor that is divided into four distinct sections: the reception area, the antenatal section, the gynecological section, and a family planning section. The official operating hours of the antenatal clinic commence at 9 am and conclude at 12 pm on a daily basis. For routine antenatal care, two nurses and four obstetricians (consisting of a consultant, specialist assistant, specialist, and one junior doctor).

Sample

A convenient sample of 100 pregnant women was selected to be included in the study sample. The sample size was calculated using (Epi-info statistical package, version 7.2, designed by the CDC (Centre for Disease Control and Prevention) with 80 percent power, a value of 2.5 is chosen at the acceptable limit of precision (D) at 95 percent confidence level (C1), with expected prevalence 10%, worst acceptable 25%.

Tools for Data Collection

Data from pregnant women was collected using the four main tools.

Tool I- A structured interviewing questionnaire. It included two main parts:

Part 1: Personal data of pregnant women: such as age, occupation, residence, and education.

Part 2: Women's obstetric history: Such as number of gravidities, gestational age, abortion, and parity.

Tool II- knowledge assessment tool. It was created by the researcher to assess pregnant women's knowledge about climate change. It included (8) Open ended questions about the definition of "climate change", causes/reasons for it, gases that cause climate change, effect of climate change on maternal health, effect of climate change on infant health during pregnancy, effect of climate change on psychological state of pregnant women, Individual measures for eliminating climate change, ways for protecting from effects of climate change **(Afifi et al., 2024).**

Scoring system:

Each question was given score 2 for correct and complete,1 in case of correct and incomplete answer and score 0 for incorrect answer or don't know; Then all scores summed up, converted to a percent and the total knowledge score was classified as

Poor: If the percent score was <50% (8)

Fair: If percent was 50% to75% (8-12)

Good: If the percent was more than 75% (more than 12)

Tool III: Pregnant women's attitude toward climate change self-rating scale: This tool was developed by the researchers after reviewing the relevant literatures. It included 10 statements to assess pregnant women 's attitude toward climate change and its effect on health. It was rated by bipolar Likert scale that measure two opposed forces as agree versus disagree. In all statements the response to each questions was scored as 1 if agree and zero if disagree except the following statements

No.1 and No.6 with reversed answers if the response was agree take (zero) and if disagree take (1) **(Ibrahim et al., 2023).**

Total attitude score was summed up, ranged from (0- 10), converted into a percent and categorized as following:

Negative attitude: If score was less than 60% (6).

Positive attitude: If score was 60% or higher (6 or more)

Tool IV: Women's reported preventive practices toward climate change. It was adapted from **Tiong et al. (2020)** and translated into Arabic language. It was used to assess preventive health-related behaviors of pregnant women regarding climate change. It consisted of 25-items has five subscales that focus on different areas of preventive maternal health- related behaviors regarding climate changes. These subscales were: General measures (6- items), Nutritional practices (4- items), Clothes and protective tools (6- items), Daily activities and sports (7- items) and Resorting to medical care (2- items).

Scoring system:

Each item was scored according to a three-point Likert scale continuum. Each item was given a score (3) if it was always practiced, a score (2) if it was practiced sometimes, and a score (1) if it was never practiced. The overall score for health-related behaviors was calculated by summing up the scores of each item. The obtained scores ranged from 25 and 75, with higher scores indicating a greater level of involvement in healthy behaviors. Total practices score was classified into two levels:

Satisfactory level: (≥ 60% -100%). Score of ≥ 45.

Unsatisfactory level: (< 60 %). Score of < 45.

Validity and reliability

Four experts in the fields of Obstetrics Nursing, Community health Nursing and psychiatric &mental health nursing assessed the content validity of the study tools. Cronbach's Alpha was used to determine the internal consistency of the tool and it was 0.84 for tool IV.

Administrative approval:

The Research Ethics Committee at Assiut University's Faculty of Nursing provided an ethical approval with a code number 1120240778. The manager of the Assuit University Hospital's antenatal Clinic gave his official approval. Women were informed of the study's purpose and nature prior to data collection. They should agree to participate in the study after learning about its purpose. They were assured that the data would be kept private and used only for research purposes. They were informed that their participation in the study is entirely voluntary and that they can opt out at any time.

Pilot study:

It was performed on ten percent of total sample (ten women) to assess the clarity and applicability of the tools. There was no modification on the tools and the pilot study was included into the total sample.

Field work:

This study was carried out from the beginning of March 2024 and completed by the end of August

2024 covering six months. The researchers collected the data two times/ week (Mondays and Wednesdays) from 9.00 a.m. to 12.00 p.m. at previously mentioned setting until the predetermined sample was completed. In order to accomplish the aim of this research, the subsequent phases were adopted; preparatory and planning phase, interviewing and assessment phase, implementation phase and evaluation phase.

(1) Preparatory and planning phase.

In this phase, based on review of related literature, the researcher design the program and the research tools to provide women with knowledge related to climate change. The number of sessions, number of women in each session, place and time of sessions were determined. Teaching methods and media were planned during this phase.

(2) Assessment phase:

During this phase, the researcher interviewed the women, introducing herself to them and explaining the nature and purpose of the study. Then, women's knowledge, attitudes, and preventive practices were assessed. The researcher filled out the tools. Care was taken to make the questions simple so that they were understandable to the women, and explanations were provided whenever questions arose. The time spent filling out the tools ranged between 35 and 45 minutes.

(**3) Implementation phase:**

During this phase, the awareness program was executed. The researchers grouped the patients into 20 sub-groups, each with 5 women. The program sessions were conducted in Arabic, as intended. The program consisted of four sessions, each having a teaching component and pre-designed training materials. The researchers gave the program to each group of women in the same way, with each session lasting 20-30 minutes. Participants were given an overview of the session objectives at the start of each session. Sessions included the distribution of pamphlets, flyers, and hands-on items. Each session concluded with feedback from the participants. Instructional methods during the program implementation included lectures, discussions, as well as the use of photos, videos, and posters for supplemental learning.

The first session was about concept of climate change, causes, gases that cause climate change and effect of climate change on psychological state.

The second session was about its effect on maternal and infant health such as (anemia, preterm birth, gestational hypertension, intrauterine growth retardation, antepartum hemorrhage, antepartum fetal distress, hyperemesis gravidarum, recurrent infections, altered nutritional composition, low birth weight, sleep deprivation and reduced quality of sleep, fatigue and exhaustion and psychological anxiety and stress).

The third session was about health-related behaviors regarding climate change including Individual measures for eliminating climate change and measures for protecting from effects of climate change.

The fourth session (Closing): The study participants were thanked for their cooperation, The researchers held an open discussion to learn the

women's opinions about program sessions. Every woman documented her program experience and the ways it changed her outlook on the climate change.

(4) Evaluation phase:

To assess effect of the climate change awareness program on enhancing women's knowledge, attitudes, and practices, a post-test (four weeks after program implementation) was conducted with the same tools.

Statistical analysis

The SPSS version 26 statistical software application was used to evaluate, code, analyze, and tabulate data. Frequencies and percentages were used for Qualitative data. The mean and standard deviation (SD) of quantitative data were used. To analyze the association between variables, the Wilcoxon Signed Ranks test and student t-test were utilized. Also, Pearson Correlation between variables was employed. P-value $\leq$ 0.05 was established as the significant level.

Results

Table (1): Shows the personal data of the studied women, and reveals that 69 % were between 25 to < 35 yrs old ,65 % were from rural areas, 36% had secondary education and 55% were non-working.

Table (2): Shows the obstetric history of the studied women, and reveals that 45% were gravida 2 and para1 and 38% were in first trimester.

Table (3): Shows knowledge of pregnant women about climate change in pre and post-test, and reveals that there is highly statistically significant difference between pre &post- test with p-value (0.001).

Figure (1): Shows total knowledge level of studied pregnant women about climate change in pre and post-test, and clarifies that 69% of the women had poor level of knowledge in pre-test which decreased to 3% of the women in post-test.

Table (4): Shows attitude of pregnant women about climate change in pre and post-test, and clarifies that there is highly statistically significant difference between pre &post- test with p-value (0.001).

Figure (2): Shows total attitude of pregnant women about climate change in pre and post-test, and clarifies that there is highly statistical significant difference between pre &post- test with p-value (0.001), where only 17% of the studied women had positive attitude toward climate change in pre-test, compared to 77% in posttest.

Table (5): Displays Total mean scores of self-reported preventive practices regarding Climate changes in pre and posttest among the studied pregnant women**,** and reveals that there is highly statistically significant difference between pre- and post- test with p-value (0.000).

Figure (3): Displays Total self-reported preventive practices regarding Climate changes in pre and post-test among the studied pregnant women, and reveals that only 28% of the women had satisfactory level of preventive practices in pretest, which improved to 67% in post-test.

Table (6): Reveals a highly positive correlation between post-program total knowledge

level and total self-preventive practices & total attitude scores of studied pregnant women (r=.980 &r=.835) at (p≤0.001).

Table (1): Distribution of the studied women according to their personal characteristics (N=100)

Variable	No	%
Age		
18- < 25	13	13
25 - < 35	**69**	**69**
≥35	19	19
Mean ±SD	24.18 ± 1.63	
Residence		
Rural	**65**	**65**
Urban	35	35
Level of educational		
Read and write	18	18
Basic education	19	19
Secondary education	**36**	**36**
University education	27	27
Occupation		
Working	45	45
Non-working	**55**	**55**
Income		
Sufficient	17	17
Fairly sufficient	**52**	**52**
Insufficient	31	31

Table (2): Distribution of the studied women according to their obstetrical history (N=100)

Obstetric history	No.	%
Number of gravida		
Primigravida	27	27
2	45	45
3	17	17
More than 3	11	11
Number of para		
Non	27	27
1	45	45
2	28	28
Number of abortion		
None	86	86
Once	14	14
Number of children		
non	30	30
1-3	70	70
Gestational age		
First trimester	38	38
Second trimester	37	37
Third trimester	25	25

Table (3): Distribution of the studied women according to their knowledge regarding climate change pre and post awareness program (N=100)

Variable	Pre-test		Post- test		P-value
	N	%	N	%	
Definition and concept of climate changes	30	30	55	55	0.001**
Causes of climate changes	27	27	64	64	0.001**
Gases that cause climate change	15	15	73	73	0.001**
Effect of climate change on psychological state	25	25	50	50	0.002*
Effect of climate change on maternal health during pregnancy	55	55	71	71	0.037*
Effect of climate change on infant health during pregnancy	40	40	84	84	0.000**
Individual measures for eliminating climate change	15	15	81	81	0.001**
Measures for protecting from effects of climate change	40	40	80	80	0.001**

*Wilcoxon Signed Ranks Test, # Only correct answers were presented, * p≤0.05, ** p≤0.001*

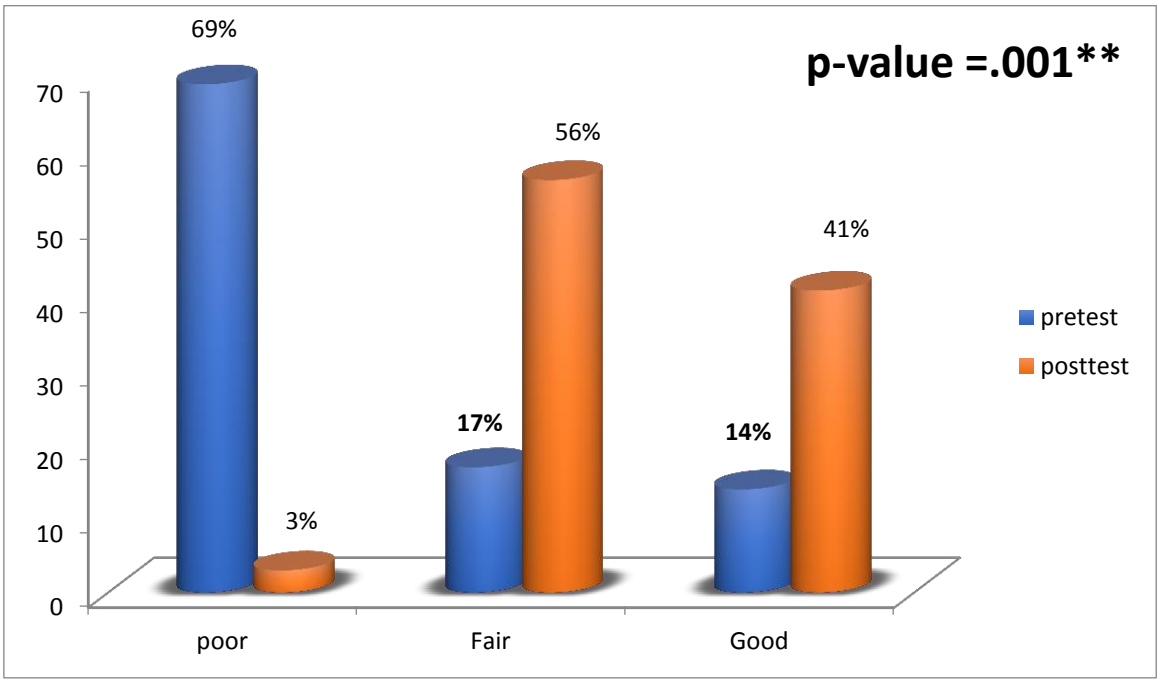

Figure (1) : Total knowledge level among the studied women at pre and post test

Table (4): Distribution of the study participants according to their attitudes about climate change pre and post awareness program

Variable	Pret-est				Post- test				p-value
	Agree		Disagree		Agree		Disagree		
	N	%	N	%	N	%	N	%	
Do you think climate change is just propaganda?	58	58	42	42	14	14	86	86	(0.001**)
Do you think that indicators of climate change are convincing?	40	40	60	60	66	66	34	34	(0.002)*
Do you think that climate change is a global phenomenon?	49	49	51	51	65	65	35	35	(0.023)*
Are you willing to participate in any activities of the climate change?	48	48	52	52	72	72	28	28	(0.005)*
Are you afraid of climate change?	57	57	43	43	70	70	30	30	(0.068)
It is already too late to do anything about climate change and its effect on health	61	61	39	39	10	10	90	90	(0.001**)
Climate change is inevitable	35	35	65	65	57	57	43	43	(0.008)*
Human activities have no significant impact on global temperatures	28	28	72	72	64	64	36	36	(0.001**)
I believe climate change is a very big problem	40	40	60	60	67	67	33	33	(0.004)*
I am preparing myself for the effects of climate change	31	31	69	69	66	66	34	34	(0.001**)

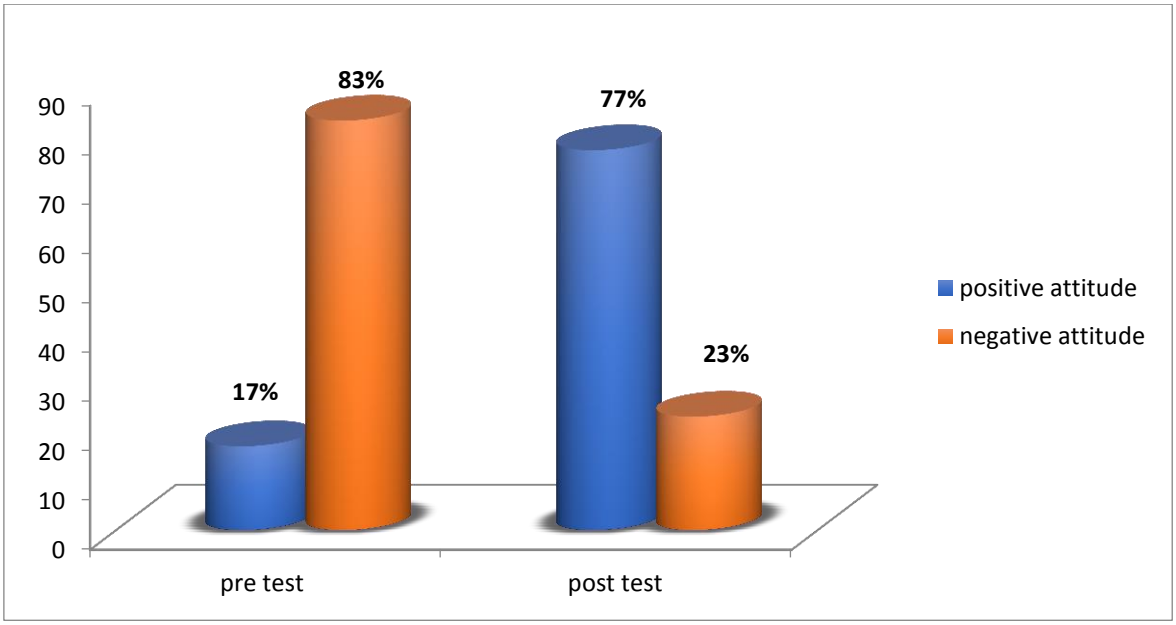

Figure (2): Total attitude level among the studied women in pre and post-test

Table (5): Total mean scores of self-reported preventive practices regarding Climate changes in pre and posttest among the studied pregnant women (N=100).

	Pre test	*Post test*	*p-value*
	Mean ± SD	*Mean ± SD*	
General measures	11.64±3.13	15.3±1.70	0.000**
Nutritional practices	8.61±1.48	10.56±1.31	0.000**
Clothes and protective tools	11.59±2.98	15.91±1.48	0.000**
Daily activities and sports	11.66±1.75	18.91±2.53	0.000**
Resorting to medical care	3.20±0.87	4.54±0.79	0.000**
Total score	46.72±5.69	65.27±4.18	0.000**

***A Highly Statistical significant p ≤ 0.001*

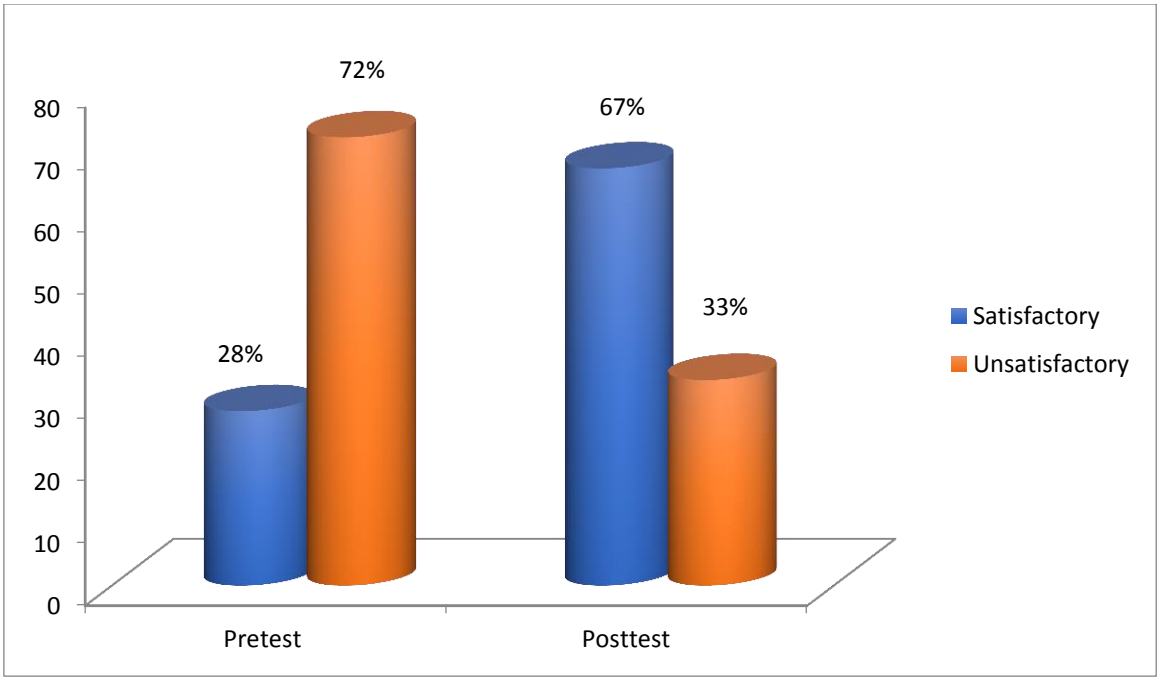

Figure (3): The total preventive practices regarding climate changes in the studied women in pre and posttest (N =100).

Table (6): Correlation coefficient between total knowledge scores and health-related behaviors of studied women in both study and control groups before and after intervention (N =100).

Variables	Total knowledge		Total knowledge	
	Pre-test		Post-test	
	R	p-value	R	p-value
Total attitude	0.551	**0.000****	. 980	**0.00****
Total practice	.097-	**569**	.835	**0.00****

***A Highly Statistical significant p ≤ 0.001*

Discussion

Pregnant women and their growing fetuses are among the most vulnerable groups to the health concerns posed by climate change. Exposure to these dangers can have both immediate and long-term consequences for the mother and offspring,

such as prenatal problems, low birth weight, restricted fetal growth, preterm birth, miscarriages, and neonatal mortality. **(Baines, 2023).** So ,This study aimed to assess effect of Climate Change Awareness Program on Knowledge, Attitude and Preventive Practices among pregnant women.

The research findings significantly achieved aim and supported the research hypotheses of the study, which prove significance of utilizing the climate change awareness program to enhance pregnant women's knowledge, attitude and preventive practices toward climate changes

Regarding the knowledge of studied pregnant women toward climate change in pre and post-test, the current study clarifies that there is highly statistical significance difference between pre & post-test, where only few number had good level of knowledge before implementation of program and improved to nearly two fifth after implementation of program indicating that climate change awareness programs significantly enhance pregnant women's knowledge regarding climate change .This finding agree with **Abd-Elhamed et al.,(2023)** who studied Impact of Narrative Versus Didactic Information on Pregnant Women's Knowledge, Attitude and Perception Regarding Climate Change in Egypt and reported that pre intervention, More than half of the studied sample had unsatisfactory knowledge level about climate change and a clear improvement appeared in the women's level of knowledge in the post intervention test. Also, In the same line with a study by **Acar & OTER (2023)** that highlighted that targeted educational interventions can lead to improved understanding of climate-related health risks, particularly for vulnerable populations such as pregnant women; in a study entitled as Climate Change Awareness in Pregnant Women. Furthermore, the finding of present research was consistent with the study done by **Adebayo et al. (2020)** who reported that the educational intervention could potentially possess significance on improving pregnant women's knowledge and reducing climate change-related risks during pregnancy; in a study conducted to assess The Effectiveness of Narrative Versus Didactic Information Formats on Pregnant Women's Knowledge, Risk Perception, Self-efficacy, and Information Seeking behavior.

From researchers' point of view, this result highlighted a positive effect of Climate change awareness programs on improving the knowledge of pregnant women by educating them about climate change , the potential risks and challenges that climate change poses to maternal and fetal health.

However, this result contradicted with **Ngwenya et al. (2018)** who reported that the majority of the studied sample had satisfactory knowledge level about climate changes meanwhile the minority had unsatisfactory knowledge level; in a study conducted to assess Emerging heat-related climate change influences; a public health challenge to health care practitioners and policy makers: insight from Bulawayo, Zimbabw. This contradiction might be as a result of conditions, place and culture differences between two studies where in Zimbabw there is more awareness about climate change since it is most susceptible to climate changes, droughts and floods.

Regarding attitude of studied Pregnant women regarding climate change in pre and post-test , the current study revealed a highly statistical significant difference between pre and post- test, where nearly one fifth of the women had positive attitude before implementation of the program and improved to more than three quarters of them after implementation of program indicating that climate change awareness programs significantly influence attitude regarding climate change. This finding is in the same line with **Menon (2023)** who concluded that targeted educational interventions can improve attitudes towards climate-related health risks, thereby encouraging pregnant women to adopt healthier lifestyle choices that mitigate climate impacts; in a study entitled as "Urgency of Breastfeeding Promotion in Climate Crisis". Also supported with **Acar & OTER. (2023)** who concluded that Climate change awareness programs can positively impact pregnant women's attitudes by educating them on the risks and the importance of taking precautions for maternal and child health during pregnancy. Also congruent with **Roos et al. (2021)** who reported that Climate change awareness programs can positively impact pregnant women's attitudes by educating them on risks, promoting adaptation strategies, and enhancing resilience to mitigate health risks for both mothers and newborns.

From researchers' point of view, Climate change awareness programs can positively impact the attitudes of pregnant women by increasing their understanding of the potential risks that climate change poses to maternal and fetal health. By educating expectant mothers about the link between environmental factors and pregnancy outcomes, these programs can empower women to make informed choices that protect themselves and their babies. Ultimately, by fostering a sense of responsibility towards the environment and future generations, climate change awareness programs can help pregnant women develop a more proactive and protective attitude towards their own well-being and that of their unborn child.

Regarding self-reported preventive practices regarding Climate changes in pre and posttest among the studied pregnant women , the current study revealed a highly statistical significant difference between pre and post- test, where only one fourth of the women had satisfactory level of practices before implementation of the program and improved to two thirds of the women after implementation of program indicating that climate change awareness programs significantly influence pregnant women's practices regarding climate change. This result agrees with **Elsayed et al. (2024)** who studied Effect of Nursing Instructional Module on Pregnant Women' Knowledge and Practice Regarding Climate Changes and reported that only few number of the women had satisfactory level of practices before implementation of Nursing Instructional Module and improved to two thirds of the women after implementation of Nursing Instructional Module .Also ,This result supported by study of **Lykins et al. (2023)** who demonstrated that structured awareness programs not only increase knowledge but also empower women to make informed decisions about their health and environmental practices during pregnancy ; in a

study conducted to assess climate change anxiety and antenatal distress in expectant female parents.

However, **Fan & Zlatnik (2023)** pointed out that while knowledge gains are evident, the long-term impact on behavior change remains less clear, suggesting a need for ongoing support and resources beyond initial awareness efforts.

From researcher' point of view, Climate change awareness programs can have a positive impact on improving preventive practices among pregnant women by increasing knowledge and promoting a better understanding of the potential maternal and fetal health risks associated with climate change, this program can empower pregnant women to take proactive steps to protect themselves and their unborn fetuses. Heightened awareness may lead to changes in lifestyle habits, such as reducing exposure to pollutants or adopting sustainable practices, which can contribute to healthier pregnancies and better birth outcomes.

Regarding correlation between total knowledge level and total self-reported practices & total attitude, the current study revealed a highly positive correlation between post-program total knowledge level and total self-reported practices & total attitude scores of studied pregnant women. This result is congruent with **Afifi et al. (2024)** who reported a highly positive statistical correlation between total knowledge and total health-related behaviors of the studied women; in a study carried out to assess Knowledge and Health-related behaviors toward climate changes and heat stress among pregnant women working outdoors: Tailored educational program.

Limitations

Occasionally, the antenatal clinic's waiting room may be overcrowded and loud. Consequently, the researchers may endure substantial periods of times until the room becomes quiet and empty. Thereby commencing the educational sessions and facilitating an environment of ease for the pregnant women. Furthermore, a number of women failed to consistently attend educational sessions required calling them to remind them of appointments.

Conclusion

It was concluded that research hypotheses were supported and The climate change awareness program had a positive effect on enhancement pregnant women's knowledge , attitude and preventive practices regarding climate changes evidenced by pre-test and post-test knowledge , attitude and practice scores.

Recommendations:

- Awareness initiatives are needed for pregnant women to enhance their awareness and improve their preventive practices regarding climate change.
- Nurses should provide counseling for pregnant women about climate changes and its effect on pregnancy outcomes.
- Future studies should be done to explore the long term health effects of climate change on pregnant women and their fetuses.

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