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Araştırma Makalesi/ Research Article

Climate Change Awareness in Pregnant Women: A Qualitative Study

Gebelerde İklim Değişikliği Farkındalığı: Nitel Bir Araştırma

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ABSTRACT
Objective: This study was conducted to determine the awareness of climate change in pregnant women.
Methods: In this study, a qualitative research approach was adopted. A phenomenological research design was used to conduct the study. The research was carried out with pregnant women who applied to the pregnant outpatient clinic of Aydın Adnan Menderes University Hospital between 01.09.2022 and 15.09.2022. With qualitative research, a semi-structured interview form prepared by the researchers was used to determine the climate change awareness among pregnant women. A total of 12 pregnant women were interviewed by audio recording. Interviews were analyzed using the MAXQDA 2022 program. The thematic analysis of the interviews identified 6 main themes. While analyzing the data, descriptive analysis technique was used. This study was based on COREQ guidelines for reporting qualitative research.
Results: It has been seen that most of pregnant women follow the news and developments about climate change occasionally. Pregnant women, who stated that the causes related to climate change are generally caused by humans, expressed the necessity of educating people and raising their awareness in taking precautions against climate change. It was found that the knowledge of pregnant women about the impact of climate change, which negatively affects health in many ways, on maternal and child health during pregnancy was incomplete and insufficient.
Discussion: It was determined that the awareness of pregnant women about climate change was formed but was not sufficient. It is thought that the study will support the literature in raising awareness about climate change.
Keywords: Awareness, climate change, pregnant women, qualitative research

ÖZ
Amaç: Bu çalışma gebelerde iklim değişikliği farkındalığını belirlemek amacı ile yapılmıştır.
Yöntem: Bu çalışmada nitel araştırma yaklaşımı benimsenmiştir. Çalışmanın yürütülmesinde fenomenolojik araştırma deseni kullanılmıştır. Araştırma, 01.09.2022-15.09.2022 tarihleri arasında Aydın Adnan Menderes Üniversitesi Hastanesi gebe polikliniğine başvuran gebeler ile gerçekleştirilmiştir. Nitel araştırmada gebelerin iklim değişikliği farkındalığını belirlemek üzere araştırmacılar tarafından hazırlanan yarı yapılandırılmış bir görüşme formu kullanılmıştır. Görüşmelerde ses kaydı alınarak, toplam 12 gebe ile görüşülmüştür. Görüşmeler deşifre edilerek, MAXQDA 2022 programı ile analiz yapılmıştır. Görüşmelerin tematik analizini 6 ana tema belirlemiştir. Veriler analiz edilirken, betimsel analiz tekniğinden yararlanılmıştır. Bu çalışma, nitel araştırmaların raporlanmasında COREQ yönergelerine dayanmaktadır.
Bulgular: Gebelerin çoğunun iklim değişikliği ile ilgili haberleri ve gelişmeleri ara sıra takip ettiği görülmüştür. İklim değişikliği ile ilgili nedenlere genellikle insanlardan kaynaklı olan sebepleri belirten gebeler, iklim değişikliğine karşı önlem almada insanların eğitilmesi ve farkındalıklarının arttırılmasının gerekliliğini ifade etmiştir. Gebelerin, sağlığı birçok yönden olumsuz etkileyen iklim değişikliğinin gebelikte anne ve bebek sağlığına etkilerine yönelik bilgilerinin eksik ve yetersiz olduğu görülmüştür.
Sonuç: Gebelerin iklim değişikliği ile ilgili farkındalıklarının oluştuğu fakat yeterli olmadığı belirlenmiştir. Çalışmanın iklim değişikliği ile ilgili farkındalık oluşturulması konusunda literatüre destek sağlayacağı düşünülmektedir.
Anahtar Kelimeler: Farkındalık, iklim değişikliği, gebe kadınlar, nitel araştırma

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Introduction

Major global environmental threats that impact life include climate change, ozone depletion, biodiversity loss, soil degradation, and food production problems. Climate change is a public health problem that is one of the greatest global health threats of the 21st century, affecting the health of all living things (Liao et al., 2019; WHO, 2021). Greenhouse gases such as methane, carbon dioxide, and nitrous oxide are reported to be emitted into the air in large quantities when fossil fuels are burned. In addition, emissions of these gases are expected to increase over time due to the pace of civil and industrial growth. Due to current and expected levels of greenhouse gases (if energy sources do not change), consequences include weather changes, serious health problems, sea level rise, and changes to the ecosystem (Olabi, 2022). Recent studies predict that many living species and the current stage of things will be thrown out of balance if global warming exceeds 1.5 ºC between 2030 and 2052 (IPCC, 2018). However, even a global warming of 1.5 ºC is not considered safe, and every tenth of a degree of warming is expected to cause serious damage to human life and health (WHO, 2021). Pregnant women may be exposed to high temperatures or heat waves from conception to delivery. Pregnant women are more susceptible to heat stress than non-pregnant women because of their poor thermoregulatory and homeostatic abilities. Exposure to high temperatures in the first trimester, the period of organogenesis, or in the first six months of pregnancy can have many negative consequences, such as low birth weight, congenital heart defects, preterm birth, and stillbirth, caused by damaging fetal development and growth (Lin et al., 2018; Wang et al., 2019; Zhang et al., 2019; Chersich et al., 2020; Ha, 2022).

Pregnancy, one of the most sensitive periods of a woman's life, is a period when important changes occur in the female body. Women are more vulnerable to the health effects of climate change due to numerous physiological, psychological, and social changes caused by pregnancy (Arslan et al., 2019; Roos et al., 2021; Samuels et al., 2022; Ha, 2022). Studies show that climate change negatively affects maternal and fetal health. Climate change affects maternal and child health during pregnancy directly through environmental disasters (wildfires, extreme heat, air pollution, floods, droughts, etc.) and indirectly through changes in the natural and social environment (Rylander et al., 2013; Lakshmanan et al., 2015; Lin et al., 2018; Wang et al., 2019; Zhang et al., 2019; Cavallin et al., 2020; Chersich et al., 2020; Shashar et al., 2020; Xiong et al., 2020; Haghighi et al., 2021; Pace et al., 2021; Ha, 2022). Climate change is associated with low birth weight, (Lakshmanan et al., 2015; Chersich et al., 2020; Ha, 2022) intrauterine growth retardation, (Ha, 2022) preterm birth, (Chersich et al., 2020; Ha, 2022), congenital anomalies, (Haghighi et al., 2021) spontaneous abortion or stillbirth (Rylander et al., 2013; Lin et al., 2018; Wang et al., 2019; Zhang et al., 2019; Cavallin et al., 2020; Chersich et al., 2020). In addition, climate change may cause respiratory problems, (Rylander et al., 2013) gestational diabetes, (Pace et al., 2021) gestational hypertension and preeclampsia (Shashar et al., 2020; Xiong et al., 2020).

Reviewing the relevant literature, no national or international scientific study on climate change awareness during pregnancy was found. It is well known that climate change causes many health problems during pregnancy, and it is extremely important that women are aware of this problem. This present study, through which we aim to contribute to raising awareness about climate change in pregnancy, will go a long way towards determining the level of knowledge of pregnant women about this issue and planning experimental studies with training programs to inform them based on the results of the study. This study was planned out of the need to identify gaps and raise awareness, which is one of the most important steps to combat climate change, which negatively affects the lives of all living beings in many ways.

Method

For the purposes of the study, we used a qualitative research approach. The study used a phenomenological design, one of the qualitative research designs. Phenomenology focuses on events that we perceive but do not understand in full detail. The main data collection tool in phenomenological studies is the interview method. Interview is one of the most effective methods of data collection to obtain information about people's experiences, attitudes, opinions, complaints, feelings, and beliefs (Yıldırım and Şimşek, 2018).

Place and Time of Research

The research was carried out with pregnant women who applied to the pregnant outpatient clinic of Aydın Adnan Menderes University Hospital between 01.09.2022-15.09.2022. The reason for conducting the study in this center is to ensure that women with different socio-cultural characteristics

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are included in the study due to the fact that the region receives immigration from outside the province and from different places.

Sampling and Participants

According to the studies, it is difficult to determine the sample size in qualitative research. The researcher collects data until the concepts that may be the answer to the research question begin to be repeated (reaching the saturation point) and can decide on the appropriateness of the sample size when the repetition of the concepts begins (Onwuegbuzie and Collins, 2007). For purposes of this study, data collection based on this information continued until no new information or concepts emerged, and the study was concluded with 12 participants who met the study criteria (18 years of age or older, min. primary school degree, no high-risk pregnancy diagnosed, and proficient in Turkish). Foreign national women and women with communication disabilities (hearing, etc.) were not included in the study.

Data Collection

Datas was collected with pregnant women who applied to the pregnant outpatient clinic of Aydın Adnan Menderes University Hospital between 01.09.2022-15.09.2022. A "semi-structured interview form" developed by the researchers was used for data collection, which included questions about pregnant women's awareness of climate change. The open-ended questions included in this form are listed below:

Research Questions

- From what source did you first hear about the term climate change and what concept first comes to mind when you think of climate change?
- How often do you follow news and developments related to climate change?
- Do you have concerns about climate change? Why are you concerned about the future?
- What do you think is causing climate change?
- What is the impact of climate change on maternal health during pregnancy?
- What is the impact of climate change on infant health during pregnancy?
- What are you doing about climate change?
- What actions can be taken to prevent climate change?

Data were collected by the first researcher with qualitative research experience. Interviews were conducted in a quiet room in the outpatient clinic where participants could express themselves comfortably. The interviews were audio-recorded after obtaining consent from the participants. Data collection took an average of 20-25 minutes. This study was based on COREQ (consolidated criteria for reporting qualitative research) which is known to establish explicit guidelines in reporting qualitative research. COREQ is a 32-item checklist that guides researchers in reporting qualitative research (Tong et al., 2007).

Data Analysis

Participants' voice recordings were transcribed and read by the researchers, and codes were established. The data were coded by two researchers and then comparatively analyzed. The codes were reread and analyzed, and themes were formed from the codes collected under a similar umbrella using the inductive qualitative analysis method. Thematic data were analyzed using the MAXQDA 2022 program. The descriptive analysis technique was used to analyze the data. With descriptive analysis, the results of the analysis are supported by quotes from the participants' statements. In this way, readers are given access to qualitative data that is more understandable and clearer (Besnili Memiş, 2019).

Results

The age range of the pregnant women who participated in the study was 27-35 years. The number of pregnancies among the women was 1-5, the number of births was 0-3, and the number of births/abortions was 0-3. Most of the pregnant women (8) had a high school degree, and the rest had a university degree (2) or an elementary school degree (2). Half of the pregnant women who participated in the study reported that they were engaged in income-generating activities, and the other half reported that they were not (Table 1). The thematic analysis of the interviews identified 6 main themes: general information about climate change, concerns about climate change, effects of climate change on maternal health during pregnancy, effects of climate change on infant health during pregnancy, actions taken to prevent climate change, and measures that can be taken to prevent climate change.

General information and concerns about climate change

Most of the pregnant women who participated in the study (7) stated that they first heard about the concept of climate change in primary school/books, while the others (5) stated that they heard about it on television/watching the news.

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Table 1. Demographic characteristics of participants (n=12)

Characteristic	Value
Age, range	27-35
Number of pregnancies, range	1-5
Number of births, range	0-3
Number of miscarriages/abortions, range	0-3
Level of education, (n)	
Middle school	8
High school	2
University	2
Working status, (n)	
Working	6
Not working	6

All of the women in the study stated that they followed news and developments related to climate change while most of the pregnant women (7) stated that they followed them occasionally, while the others stated that they followed them frequently. All of the women in the study (12) stated that they were not a member of any non-governmental organization related to climate change and that they did not participate in any activities to prevent climate change. When the participants, interviewed to determine their perception of climate change, were asked what is the first concept that comes to mind when they think of climate change, most of the women answered "the changing of the seasons". Other answers given by women were; increasing drought, environmental pollution, deterioration of weather conditions, global warming and forest fires.

The women who participated in the study gave more than one answer about the causes of climate change. Most of the women stated that environmental pollution causes climate change. In addition, the women gave the following responses about the causes of climate change: air pollution, worsening weather conditions, increase in factories/geothermal energy, increase in the number of cars, global warming, deforestation, unconscious consumption of electricity and water, and increase in factories/geothermal energy (Figure 1).

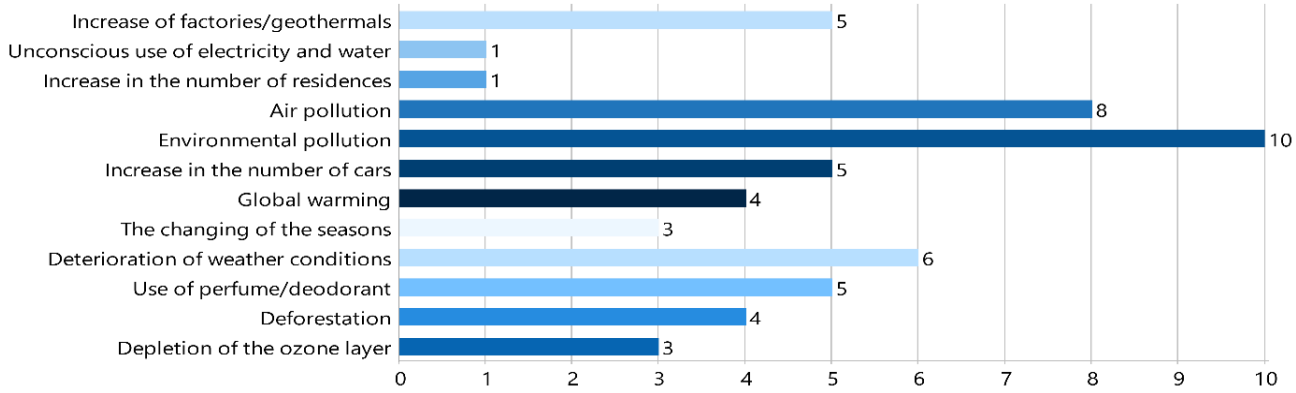

Figure 1. The causes of climate change

Most women (11) indicated that they were concerned about the future because of climate change, and the most common reason for these concerns was their children or the lives of the next generation. Pregnant women also indicated that they were concerned about the future because of depletion of natural resources and health problems. Some of the statements of the participants who had future concerns about climate change were as follows:

Yes, I worry about my children and the new generation. Because nothing is the same as before. The variety of natural products is decreasing, so everything is getting more expensive. More and more animals are becoming extinct. We are bringing the end of the world with our own hands. The biggest enemy of nature is man. With modern technology our lives become easier, but we pay the price by destroying the balance of nature. Cars in every household, an ever-increasing number of houses. We are in constant consumption. Natural methods have diminished, we resort to chemical methods (Pregnant 5).

Yes, I'm very worried about the future. Air pollution, especially the lack of water, is affecting our health. As factory exhaust, car exhaust, and forest fires pollute the air, we will have many problems, especially with the respiratory system. We immediately transition from winter to summer, we

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cannot experience spring and autumn. These situations increase my concern for the children and the lives of the next generation (Pregnant 7).

Impact of climate change on maternal and infant health during pregnancy

Most women (8) reported that climate change caused their mothers to have respiratory problems during pregnancy. Women cited psychological problems, abortion, fatigue, immune problems, nutritional problems, preterm birth, diabetes, and hypertension as reasons (Figure 2).

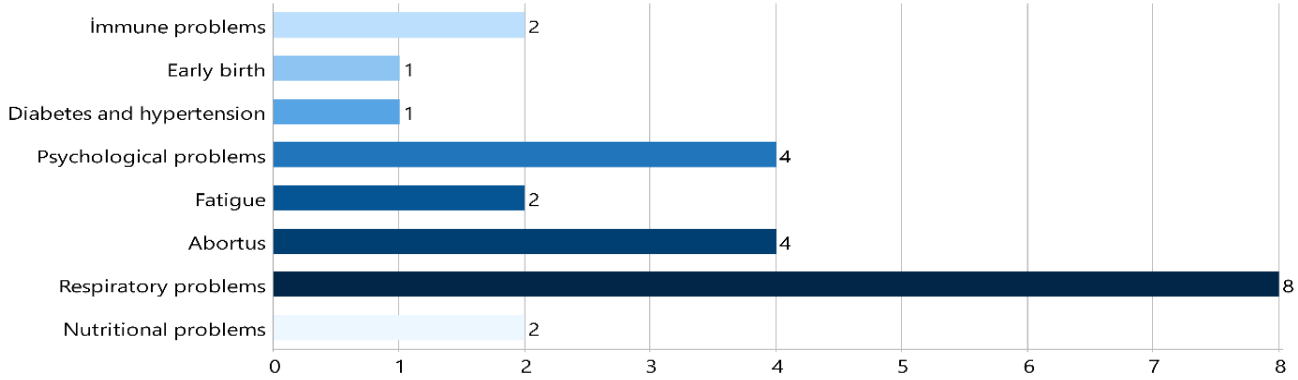

Figure 2. The effect on maternal and infant health during pregnancy

Some of the participants' statements about the impact of climate change on maternal health during pregnancy were as follows.

The food we eat is packed with hormones, what we eat affects us negatively. We are negatively affected psychologically. Factories and geothermal energy have increased, we breathe bad air, which can cause respiratory problems (Pregnant 7).

The quality of the food we eat has deteriorated; we have nutritional problems. The number of miscarriages has increased. Environmental factors are already affecting pregnancy. There are respiratory and immune system problems. Climate change is increasing. Pregnant women are constantly worried about having a miscarriage, their child being born with diseases, and this can have a psychological impact. (Pregnant 12).

Most women (6) reported that climate change caused the baby to get diseases/infections during pregnancy. Among the reasons cited were fetal mortality, respiratory problems, and low birth weight babies (Figure 3).

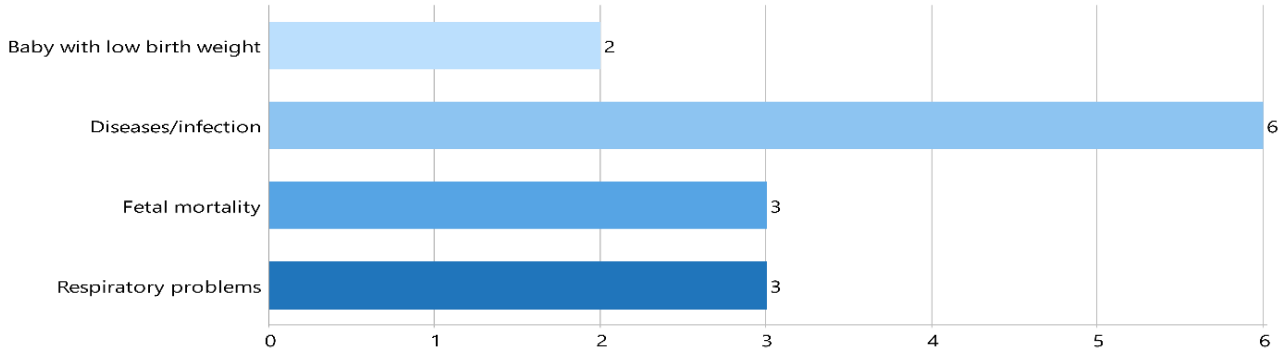

Figure 3. Impact on fetal health during pregnancy

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Behaviors and measures to prevent climate change

Most of the women (10) said that they kept the environment clean to counteract climate change. Other actions of women against climate change included educating children, not using perfume/deodorant, using electricity and water carefully, and planting trees. Some of the participants' statements about actions to prevent climate change were as follows.

I educate my children about how to use electricity and water. We make sure we don't overuse them. We keep our trash in our hands or in a bag until we find a trash can outside. When we find a trash can, we throw it away. We are careful to keep the environment clean. It starts from individual household extending to the society as a whole. Just like a butterfly effect. (Pregnant 6)

I separate my waste. I make my child aware of these issues. I pay attention to the cleanliness of green areas. I keep the environment clean (Pregnant 8).

Most of the pregnant women who participated in the study (7) mentioned awareness raising and training as measures that can be taken against climate change. The women gave answers such as auditing the relevant institutions and organizations, increasing green areas, and keeping nature clean. Some of the participants' statements about the measures that can be taken to prevent climate change were as follows:

Car traffic should be reduced, public transportation should be preferred. Filters should be used in factories and waste should be controlled. In addition, the use of products such as perfume/deodorant should be reduced. Training should be organized on the factors affecting climate change and people's awareness should be raised. (Pregnant 2).

People should be educated and made aware of climate change. Environmental, forestry and agricultural institutions should take measures. More trees should be planted, garbage should be separated, oceans should be kept clean. In short, awareness should be raised about keeping nature clean (Pregnant 7).

Discussion

This study was conducted with 12 pregnant women who agreed to participate in the study to determine pregnant women's awareness of climate change. According to the results of the study, general information about climate change, behaviors and concerns about climate change, the effects of climate change on maternal and fetal health during pregnancy, and actions that can be taken to prevent climate change were discussed.

We found that all women in the study followed news and developments related to climate change, but they were not members of nongovernmental organizations concerned with climate change and did not participate in activities to prevent climate change. These situations may have been influenced by factors such as the environment in which the pregnant women live, the society in which they live, and their work life. In defining climate change, the meaning we attach to the term in our own internal world is very important. When asked about climate change, most women gave ethe answer "the change of seasons." In terms of the change of seasons, women indicated that they no longer experienced the transition from winter to summer, spring, and fall as they used to. In particular, the long summer months and high temperatures can have a negative impact on health. A review of the literature shows that when pregnant women are exposed to excessive heat, many conditions occur that can harm the mother or fetus, including prenatal complications such as preeclampsia and eclampsia, decreased placental blood flow, dehydration, and an inflammatory response that can trigger preterm birth (Cavallin et al., 2020; Chersich et al., 2020; Ha, 2022). Most of the pregnant women who participated in the study stated that pollution caused climate change and that they kept the environment clean to counteract climate change. This shows that pregnant women are aware of the need to keep the environment clean. The fact that the importance of environmental cleanliness in the development and protection of sustainable environmental health is a rather controversial issue and is constantly updated may have led pregnant women to become aware of this issue. Most women in the study indicated that they were concerned about the future of climate change. Studies found that most women were concerned about the future of climate change (Clayton and Karazsia, 2020; Dündar et al., 2020). Most women in the study cited children/the next generation as the reason for the greatest anxiety about the future. The fact that pregnant women were concerned about their children and the lives of the next generation indicates that they expect climate change to continue for many years and that its impacts could increase. The fact that the negative impacts on our natural environment such as air,

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water, soil, etc. are increasing day by day is a cause for concern for pregnant women.

Most of the women who participated in the study stated that climate change can cause the mother to experience respiratory problems during pregnancy and the baby to get diseases/infections during pregnancy. It was noted that pregnant women were unaware of many issues related to the effects of climate change on maternal and infant health. The literature reports that climate change and related conditions can cause many problems, such as spontaneous abortions, neonatal deaths, preterm births, gestational diabetes, vector-borne diseases, and dehydration (Rylander et al., 2013; Lakshmanan et al., 2015; Lin et al., 2018; Wang et al., 2019; Zhang et al., 2019; Cavallin et al., 2020; Chersich et al., 2020; Ha, 2022).

Most of the pregnant women who participated in the study cited educating and raising awareness of people as actions that can be taken to address climate change. This finding underscores the importance of our study. These statements from the pregnant women are a valuable finding that highlights the importance of the human factor in solving the problems caused by climate change.

Conclusions

The study found that women had awareness of climate change but to an insufficient extent. The study found that participants' knowledge of the effects of climate change on maternal and infant health during pregnancy was incomplete and insufficient. The fact that most of the pregnant women in the study were concerned about the future of climate change, especially for their children and the lives of the next generation, shows the extent of the existing problem. More emphasis should be placed on climate change, which negatively affects maternal and child health during pregnancy. Conducting similar studies will raise people's awareness by making climate change a hot topic and generate more discussions. The fact that most pregnant women who participated in the study were in favor of raising awareness and educating people to take action on climate change shows the need for individual, social, and policy studies. Academic studies that demonstrate the aforementioned awareness research in both local and national contexts will increase scientific knowledge. Incorporating climate change-related topics into curricula, beginning with elementary school, and disseminating information to raise awareness of climate-change through communication tools such as television and the Internet are effective measures for raising awareness. Trainings should be given by health professionals in order to increase the awareness of pregnant women about climate change and to ensure that they have knowledge about the subject. In addition, it is thought that it will be effective to prepare brochures describing the effects of climate change on maternal and infant health and giving them to pregnant women.

Limitations

This study is limited to the opinions of pregnant women who applied to the pregnant outpatient clinic of a university hospital.

Ethics Committee Approval: Ethical approval was obtained from the Ethics Board for Non- interventional Research in the Aydın Adnan Menderes University (date: 25.07.2022; approval number: 2022/304) and written permission was received from the hospital where the study was performed (date and number: 11.08.2022; E-97594401-804.99-219052). In addition, the women were informed about the aim of the study and assured that the data obtained would be kept con-fidential. Verbal and written consent was obtained from the pregnant women included in the study. The research was conducted in accordance with the principles of the Declaration of Helsinki.
Peer-review: External referee evaluation.
Author Contributions: Concept: BTA, EGÖ; Design: BTA, EGÖ; Consulting/Supervision: BTA, EGÖ; Data collection and/or processing: BTA; Data analysis and/or interpretation: BTA, EGÖ; Literature search: BTA, EGÖ; Article writing: BTA, EGÖ; Critical review: BTA, EGÖ.
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What did the study add to the literature?

- This study found that most pregnant women had concerns about climate change and knew little about the effects of climate change on maternal and fetal health during pregnancy.
- The study also found that pregnant women's awareness of climate change was not at the desired levels.
- These data provide the basis for extensive research on climate change awareness, public awareness, mitigation of the impact from climate change, and adapting to climate change.

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