T.C.
YEDITEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF NUTRITION AND DIETETICS

DETERMINATION OF THE KNOWLEDGE LEVEL, ATTITUDES, AND FOOD AVAILABILITY OF PREGNANT WOMEN ABOUT FOOD SAFETY: ÇERKEZKÖY COUNTY SAMPLE

MASTER THESIS

BEYZA KURT

ISTANBUL, 2023

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APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated ..... and numbered .....

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DECLARATION

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree except where due acknowledgment has been made in the text.

Date 03.06.2023

Beyza Kurt

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LIST OF SYMBOLS AND ABBREVIATIONS

BMI Body Mass Index

CDC Center for Disease Control

CI Confidence Interval

CSFS Center for Studies in Food Security

FAO Food and Agricultural Organization

FDA Food and Drug Administration

FHC Family Health Centers

g Gram

HACCP Hazard Analysis at Critical Control Points

HFSSM-SF Household Food Security Survey Module – Short Form

ISO International Organization for Standardization

kg Kilogram

m Meter

m^2 Square Meters

NCHS National Center for Health Statistics

NTD Neural Tube Defect

SD Standard Deviation

USDA United States Department of Agriculture

UN The United Nations

WHO World Health Organization

WFP World Food Programme

ABSTRACT

Kurt, B. (2023). Determination of the Knowledge Level, Attitudes and Food Availability of Pregnant Women About Food Safety: Çerkezköy County Sample. Yeditepe University, Institute of Health Science, Department of Nutrition and Dietetics, Master's Thesis, Istanbul.

This study aimed to determine pregnant women's knowledge level, attitudes about food safety, and food availability. The study was conducted with 192 volunteer pregnant participants who applied to Family Health Centers in Çerkezköy district of Tekirdağ between January 12, 2022 and August 1, 2022. A data collection form about food safety and "Household Food Security Survey Module -Short Form" was used to measure food availability. The researcher measured anthropometrics. It was determined that 96.4% (n=185) of the participants did not know exactly the concept of food safety. The mean score of the participants for the "Level of Knowledge" sub-dimension was 28.04±24.20; for the "hygiene" sub-dimension, it was 41.02±32.85, while it was 33.25±28.31 for "Food Separation" sub-dimension. For the "cooking," "cooling," and "consumption" sub-dimensions, the mean scores were 38.80±35.24, 16.67±22.36, and 44.62±22.68, respectively. The total scores from all the sub-dimensions vary between 2 and 80.4; the mean score was 35.28±21.58. The Kuder Richardson-20 coefficient of the data collection form is 0.940. The mean score of the Household Food Security Survey Module -Short Form was 2.04±1.95, which indicates low food security. As a result, in the research group consisting of pregnant women in the Çerkezköy district, the knowledge levels of pregnant women about food safety are low. Their scores for performing the right application of food safety practices are low. According to food security levels, pregnant women had low food security. Larger-scale studies are needed to draw attention to the importance of the subject and to ensure that necessary precautions are taken.

Keywords: Food Safety, Food Security, Food Insecurity, HFSSM-SF, Pregnant Women.

ÖZET

Kurt, B. (2023). "Gebelerin Gıda Güvenliği İle İlgili Bilgi Düzeylerinin, Tutumlarının Ve Besine Ulaşılabilirliklerinin Saptanması: Çerkezköy İlçesi Örneği". Yeditepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Anabilim Dalı, Yüksek Lisans Tezi. İstanbul

Bu çalışmanın amacı, gebelerin gıda güvenliği konusundaki bilgi düzeylerini, tutumlarını ve besine ulaşılabilirliklerini saptamaktır. Çalışma, 12 Ocak 2022 - 1 Ağustos 2022 tarihleri arasında Tekirdağ'ın Çerkezköy ilçesindeki Aile Sağlığı Merkezlerine başvuran 192 gönüllü gebe katılımcı ile yürütülmüştür. Gıda güvenliği ile ilgili bir veri toplama formu ve gıda ulaşılabilirliğini ölçmek için "Hanehalkı Gıda Güvencesi Anket Modülü - Kısa Form" kullanılmıştır. Araştırmacı antropometrik ölçümler yapmıştır. Katılımcıların %96,4'ünün (n=185) gıda güvenliği kavramını tam olarak bilmediği tespit edilmiştir. Katılımcıların "Bilgi Düzeyi" alt boyutu için ortalama puanı 28,04±24,20; "Hijyen" alt boyutu için 41,02±32,85; "Gıda Ayırma" alt boyutu için 33,25±28,31'dir. "Pişirme", "Soğutma" ve "Tüketim" alt boyutları için ortalama puanlar sırasıyla 38,80±35,24, 16,67±22,36 ve 44,62±22,68'dir. Tüm alt boyutlardan alınan toplam puanlar 2 ile 80.4 arasında değişmektedir; ortalama puan 35.28±21.58'dir. Veri toplama formunun Kuder Richardson-20 katsayısı 0.940'tır. Hanehalkı Gıda Güvencesi Anketi Modülü -Kısa Form puan ortalaması 2,04±1,95 olup düşük gıda güvencesine işaret etmektedir. Sonuç olarak, Çerkezköy ilçesindeki gebe kadınlardan oluşan araştırma grubunda, gebe kadınların gıda güvenliği konusundaki bilgi düzeyleri düşüktür. Gıda güvenliği uygulamalarını doğru yapma puanları düşüktür. Gıda güvencesi düzeylerine göre gebelerin gıda güvencesi düşüktür. Konunun önemine dikkat çekmek ve gerekli önlemlerin alınmasını sağlamak için daha büyük ölçekli çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: Gıda Güvenliği, Gıda Güvencesi, Gıda Güvencesizliği, HFSSM-SF, Gebe Kadınlar.

1. INTRODUCTION AND PURPOSE

Nutrition is one of the basic physiological needs necessary for the survival of living organisms (1). Among the most critical food-related points are the definitions of food security and safety. The concepts of "food security" and "food safety" are of utmost importance for people to meet their nutritional requirements (2).

"Food security" refers to the assurance of the right of household members to purchase and consume safe, quality, and healthy foods, as well as having access to physically and economically sufficient food for all of them (1).

The concept of "food safety" is included in the definition of food security and defined by the Federation of Turkish Food and Beverage Industry Associations as "compliance with the necessary rules and precautions during the production, processing, storage, and distribution of foods to ensure healthy and flawless food production" (3). According to the definition made by the Food and Agriculture Organization, "the whole of the hazards that may acutely or chronically harm consumer health is expressed as food safety" (4). Food safety covers the entire food journey from the field to the table (1).

Food safety and security are under threat due to many problems experienced today (5–8). Measures to be taken with various global co-operation are necessary to ensure food safety and security (2). Otherwise, access to sufficient, healthy, and safe food may become very difficult in the near future, and various diseases may spread rapidly (9–13). When the studies carried out up to now are examined, it is seen that the concepts of food security and food safety are sometimes used interchangeably (7). Failure to define these two concepts precisely and accurately may lead to misinterpretations (2,3).

On the other hand, although the Food and Agricultural Organization (FAO) makes regional assessments according to food security criteria, it is seen that there are limited studies evaluating the results of these criteria on a regional and country basis (2,5,7,13). In addition, it is seen that in undeveloped or developing countries, access to sufficient food may take precedence over food safety (3,6). Therefore, especially in developing countries, the risk of foodborne diseases is higher than in developed countries.

Foodborne hazards are evaluated separately at the processing, transport, storage, purchasing, storage, preparation, and cooking stages, from food production to consumption. These hazards are classified as physical, chemical, and biological risks (14). Plastic, metal particles, and insects mixed into foods represent physical risks; mercury, cadmium, lead, agricultural and animal drug residues, and food additives represent chemical risks. Threats such as bacteria, fungi, viruses, and parasites are

expressed as biological risks (15). When disease-causing bacteria, viruses, or parasites contaminate food, they can trigger foodborne diseases. Foodborne diseases are generally contagious and are caused by bacteria, viruses, parasites, or chemicals that enter the body through food or water (16). According to the Centre for Disease Control and Prevention, 48 million people, or in other words, one in every 6 people, get foodborne infections yearly (17).

Foodborne diseases are a severe public health problem that adversely affects the quality of life and cause economic losses in Turkey and the world. However, since reporting such cases to the official authorities is generally low, there are not enough studies to determine the rates, especially in our country (18). The course of foodborne diseases is affected by various factors depending on the source causing poisoning, the physiological period the person is in, or the existing diseases of the person. Accordingly, it can be mild, exhibit a more severe picture, or even be fatal. Therefore, individuals can experience foodborne diseases at different levels (2,18). While tens of thousands of cases are reported every year in developed countries, it is seen that there is not a sufficient level of study that keeps statistics in this manner in Turkey (18). Especially pregnant women are at high risk for foodborne diseases (19). This is because changes in the mother's immune system during pregnancy may make it more difficult for her to cope with some dangerous foodborne microorganisms (20). Also, a fetus which has not yet developed to fight infections leads to be classified as high risk for foodborne diseases (21).

The mother's foodborne illness during pregnancy causes serious health problems for both the mother and the baby and can cause miscarriage, premature birth, and stillbirth (22). In addition, foodborne microorganisms can harm the developing fetus through the placenta, and the infected fetus may face various health problems and death. In addition, it can result in hearing loss, blindness, intellectual disability, premature birth, and even death in the baby (20).

In 2016, a study conducted in an Australian tertiary hospital with 223 participants to determine the level of knowledge of pregnant women was found to be low, and 83% did not know the foods to avoid during pregnancy (22). In another study conducted in Florida with 299 pregnant and mother participants, the level of food safety knowledge was found to be low in general, and especially the knowledge level of women with first pregnancy was lower than the others. For this reason, it was emphasized that, especially for food safety training, it is necessary to give education, especially to women who are experiencing their first pregnancy (19).

In this context, together with the insufficient data on food safety in pregnant women in our country, there is a risk of low awareness in direct proportion to variables such as education and income (1). Therefore, it is essential to determine the level of knowledge about food safety in pregnant women in a specific sample in our country to draw attention to the possibility of more extensive studies. Although food safety is essential for people of all age groups, it is an issue that should be treated very carefully and meticulously, especially for pregnant and fetuses. For this reason, it is crucial that the mother is fed with safe foods as well as adequate and balanced nutrition during pregnancy (21).

In line with this information, the primary purpose of this cross-sectional descriptive study is to determine the knowledge levels about food safety, attitudes, and food availability of pregnant women with volunteer pregnant participants who applied to voluntary Family Health Centers (FHC) in Çerkezköy district of Tekirdağ province.

2. LITERATURE REVIEW

2.1. Food Security and Food Insecurity

The United Nations (UN) Universal Declaration of Human Rights in 1948 stated that the right to food is the most fundamental right of human beings (23,24). In the 1970s, various definitions of food security were made in conferences organized with the increase in problems related to food and nutrition (2,23,24). In 2001, FAO revised the food security definition to a more comprehensive one that is still valid today. According to the FAO report, food security is defined as "the continuous physical and economic access of all people to sufficient, healthy, safe, and nutritious food to meet their nutritional needs and food priorities necessary for an active and healthy life at all times" (2,23,24).

According to the Center for Studies in Food Security (CSFS), the five fundamental principles of food security are availability, accessibility, acceptability, sufficiency, and agency (24). “Availability” refers to the availability of enough food for everyone at all times; “accessibility” implies that everyone will have affordable access to food; “adequacy” refers to access to nourishing, sustainable, and safe food (23,24). Providing food appropriate for cultural traits in a way that respects people's rights and dignity is what " acceptability " means (2,24). Lastly, “agencies” are the organizations in charge of setting policies and overseeing procedures related to food security (2). Contrary to food security, food insecurity arises when there is insufficient social, physical, or economic access to food (25–28). Food insecurity can result in long-term or short-term, depending on income, work, and disabilities. The primary factor in determining a household's food security is income (24,29,30). Food insecurity is more likely if food is scarce or there isn't enough money to purchase food. As a result, households with low incomes are more likely than those with higher incomes to experience food insecurity. Unemployment has a detrimental effect on households' level of food security. With high unemployment rates among low-income groups, it becomes harder to afford basic food demands (24).

2.1.1. Prevalence of Food Insecurity

Nearly 30% of the world's population, or about 2.3 billion people, experienced moderate to severe food insecurity in 2021; this is more than 350 million more people than in 2019, the year before the COVID-19 epidemic began (30–34). Close to 40% of those afflicted by moderate or severe food insecurity worldwide were experiencing food insecurity at extreme levels (31). The prevalence of severe food insecurity rose from 9.3%

in 2019 to 11.7% in 2021 - equivalent to 207 million additional people in two years. FAO's 2022 report shows the prevalence of food insecurity worldwide in Figure 2.1. (31).

	Prevalence of severe food insecurity (%)						Prevalence of moderate or severe food insecurity (%)					
	2014	2016	2018	2019	2020	2021	2014	2016	2018	2019	2020	2021
WORLD	**7.7**	**7.9**	**9.0**	**9.3**	**10.9**	**11.7**	**21.2**	**22.7**	**25.0**	**25.4**	**29.5**	**29.3**
AFRICA	**16.7**	**19.2**	**19.3**	**20.2**	**22.4**	**23.4**	**44.4**	**49.7**	**51.3**	**52.4**	**56.0**	**57.9**
Northern Africa	10.2	10.4	9.3	8.7	9.5	11.3	29.7	30.0	31.1	28.9	30.2	34.0
Sub-Saharan Africa	18.2	21.2	21.6	22.8	25.3	26.2	47.9	54.2	55.9	57.7	61.8	63.2
Eastern Africa	21.5	25.4	24.3	25.0	28.1	28.7	56.3	63.2	62.7	63.6	66.6	66.9
Middle Africa	n.a.	n.a.	n.a.	n.a.	35.9	37.7	n.a.	n.a.	n.a.	n.a.	70.1	75.3
Southern Africa	8.9	9.1	9.2	9.2	11.0	11.0	21.4	21.8	21.9	21.9	24.6	24.5
Western Africa	10.2	13.0	14.9	16.6	19.9	20.7	36.1	44.0	48.4	51.7	59.0	60.0
ASIA	**7.1**	**6.4**	**8.1**	**8.2**	**9.7**	**10.5**	**17.6**	**17.7**	**21.1**	**21.3**	**25.8**	**24.6**
Central Asia	1.6	2.0	2.2	2.3	4.7	4.9	8.5	10.0	13.6	13.2	17.9	20.2
Eastern Asia	0.8	1.5	1.9	1.3	2.0	1.0	6.0	6.3	9.6	7.4	7.8	6.2
South-eastern Asia	2.4	2.5	2.6	2.6	3.4	4.1	15.4	17.0	17.3	16.8	18.9	20.7
Southern Asia	14.4	11.9	15.5	16.3	18.9	21.0	27.9	27.3	31.8	34.3	43.2	40.6
Western Asia	8.0	8.5	9.0	8.6	9.1	9.6	27.5	26.2	27.4	27.8	31.8	33.7
Western Asia and Northern Africa	*9.1*	9.3	*9.1*	8.7	9.3	*10.4*	28.5	*28.0*	*29.1*	28.3	*31.0*	33.8
LATIN AMERICA AND THE CARIBBEAN	**7.5**	**8.8**	**9.4**	**9.9**	**12.8**	**14.2**	**24.6**	**31.0**	**31.4**	**31.7**	**39.5**	**40.6**
Caribbean	n.a.	n.a.	n.a.	n.a.	36.6	30.5	n.a.	n.a.	n.a.	n.a.	68.4	64.0
Latin America	5.7	7.1	7.5	8.2	11.1	13.0	21.8	28.7	29.1	29.4	37.5	38.9
Central America	6.5	6.2	6.9	7.3	7.3	8.0	30.2	27.5	27.3	28.2	34.1	34.1
South America	5.4	7.5	7.8	8.5	12.7	15.1	18.4	29.2	29.8	30.0	38.8	40.9
OCEANIA	**2.5**	**3.3**	**3.7**	**3.8**	**2.6**	**4.5**	**11.4**	**11.9**	**13.1**	**13.6**	**12.0**	**13.0**
NORTHERN AMERICA AND EUROPE	**1.4**	**1.3**	**1.0**	**0.9**	**1.2**	**1.5**	**9.3**	**8.7**	**7.6**	**7.1**	**7.8**	**8.0**
Europe	1.5	1.4	1.0	1.0	1.4	1.9	8.7	8.6	7.4	6.9	7.5	7.8
Eastern Europe	1.4	1.5	0.9	0.8	1.4	1.7	10.2	11.7	9.1	8.4	10.2	10.5
Northern Europe	1.8	1.7	1.0	0.9	1.2	1.8	6.7	6.6	5.5	5.1	4.1	4.4
Southern Europe	1.8	1.6	1.6	1.6	2.3	2.8	11.2	8.8	9.0	8.7	9.2	8.6
Western Europe	1.4	0.9	0.8	0.7	0.8	1.7	5.7	4.9	4.5	4.3	3.9	4.9
Northern America	1.0	1.0	0.8	0.8	0.7	0.8	10.5	9.0	8.0	7.6	8.3	8.3

Source: FAO, IFAD, UNICEF, WFP, WHO. *The State of Food Security and Nutrition in the World 2022*. FAO; 2022. doi:10.4060/cc0639en

Figure 2.1. Prevalence of Food Insecurity

Based on the findings of the Turkey Nutrition and Health Survey in 2019, in the context of food security, the proportion of individuals who are concerned about not having enough food due to economic difficulties within a year is 23.4%, 22.7% of those who cannot access healthy and nutritious food; 22.8% of those who experience a decrease in the variety of food they consume (24,35). The rate of individuals who have to skip meals due to economic reasons is 13.1%; the rate of those who consume less than they need is 16.5% (24,35). The rate of those who cannot eat even though they are hungry due to economic reasons is 8.4% (35).

2.1.2. Degrees of Food Security and Insecurity

The United States Department of Agriculture (USDA) identified the levels of food security and food insecurity levels in 2006 (24,36,37). Two categories of food security are defined. The first is "high food security," which refers to circumstances with neither reported access issues nor food limitations (36). The second is "marginal food insecurity," which is often described as one or two reports reflecting concerns about the availability of food and limitation at home but little or no change in diet and food intake (24,36,37). Two categories also exist for food insecurity (24,36). The first is "low food security," formerly known as "food insecurity without hunger," which is defined as circumstances with little or no indication of decreased food consumption and diminished variety, quality, and desirability of the diet (24,36). The second category is "very low food security," formerly known as "food insecurity with hunger," and it is characterized by situations when there are numerous signs of altered eating habits and decreased food consumption (24,36,37). The procedures used to determine a household's food security have not altered despite introducing new labels (38–40).

2.2. Food Safety and Foodborne Disease

Food safety refers to all potential hazards that can cause acute or chronic harm to consumer health (2,4,9,10). Food safety is also defined as complying with the necessary rules and taking precautions during food production, processing, preservation, and distribution to ensure healthy and flawless food production (2,3). "Safe food" refers to food that, when prepared as intended, is appropriate for human consumption based on its physical, chemical, and microbiological properties and has retained its nutritional value(3). However, the safety of food at any stage of the production-sale-consumption chain can be compromised and contaminated (40). The consumption of these unsafe and contaminated foods causes foodborne diseases (41).

2.2.1. Prevalence of Food Safety and Foodborne Disease

According to the World Health Organisation (WHO), foodborne disease is a type of infectious or toxigenic disease that may be caused by the consumption of food or water (18). More than 250 known foodborne diseases and many different types of foodborne hazards cause these diseases (18). According to the WHO 2022 data, nearly 1 in 10 people worldwide, or 600 million, are expected to get sick from eating contaminated food, and 420 000 people die as a result (41). This leads to a loss of 33 million. 40% of foodborne disease deaths occur in children under the age of five, which results in 125 000 deaths annually (41).

2.2.2. Foodborne Hazards

All kinds of factors that disrupt the safety of food by contaminating food are called foodborne hazards (7,18,42,43). At all stages of the food's journey from the field to the table, harmful elements imping food safety can contaminate food from different sources (18,42–44). In this sense, the factors that impair food safety and endanger human health are examined under three main headings. These elements are physical, chemical, and biological hazards (18,45).

Physical hazards encompass foreign substances that are not meant to be present in food and are unsafe for consumption(18,46). These hazards include pieces of toothpicks, broken glass, plastic or plastic wrap, stone, soil, and parts of cloth or metal. These hazards can cause suffocation, tooth breaks, mouth and throat injuries, and even death in some cases (3). These foreign substances can also carry harmful microorganisms. In this case, physical hazards also include biological hazards (45).

Chemical hazards can pose a threat to food safety. These chemical hazards include pesticides, materials utilized in food packaging, environmental pollutants, and cleaning agents like detergents and disinfectants (18,45,47). Metals such as aluminum and copper in food packaging are also significant contaminants (48). In addition, food allergens (such as dairy products, peanuts), food additives beyond acceptable limits (such as sodium nitrate), naturally occurring toxins produced by plants, animals, or microorganisms (such as toxic neurotoxins in fungi, aflatoxins in peanuts, Scombrotoxin in fish, glycoalkaloids in potatoes), heavy metals (such as mercury, lead, cadmium) and natural toxins such as mycotoxins are chemical hazards that impair food safety (18,49). Other hazards that may be present in foods are food allergens and substances that cause food intolerance (47). Turkish Food Codex Food Labelling and Consumer Information

Regulation was published in the Official Newspaper on 26 January 2017 (45). This Regulation Within the scope of the Regulation, the provision of allergen information to the end consumer has been made mandatory as of 01 January 2020 (45).

Biological hazards constitute the most significant part of foodborne diseases (18,47). These biological hazards include microorganisms such as bacteria, molds, viruses, yeasts, parasites, etc (47). These microorganisms can be found in soil, air, water, human skin - hair - nails, garbage, infected wounds, feces, and saliva (42,43,45,46). The proliferation of these microorganisms varies according to many factors, such as pH, humidity, temperature, preservatives, and presence/absence of oxygen (15). When biological hazards are transmitted to people through food, feces, or factors such as poor hygiene, or unsafe water, they usually exhibit symptoms such as fever, vomiting, weakness, confusion, and diarrhea (47).

Bacteria pose the most risk to food safety among biological hazards. It is also the most common cause of food poisoning. The most commonly observed bacteria in food poisoning are Salmonella, Bacillus cereus, Escherichia coli, Clostridium botulinum, Listeria monocytogenes, Clostridium perfringens, and Staphylococcus aureus (15,42,43,46). The majority of the source of these pathogenic bacteria is the human body. Because people's hands, skin, feces, intestines, nose, and throat, which are in constant contact with different surfaces, harbor bacteria (45).

The most common viruses on the biological hazards regarding food safety are hepatitis A, rotavirus, astrovirus, Norwalk and Norwalk-like virus, and poliovirus (42,43,45,46). They usually cause gastrointestinal system disorders when they infect humans. They can be transmitted from humans by fecal-oral route or from contaminated water to food.

Molds can show themselves with a cottony appearance in foods, and sometimes they can be observed by causing discoloration in the food they are found in (45). They can multiply even in low-humidity environments where many bacterial species cannot. Molds that can form toxins in foods cause mycotoxicosis in humans and animals (15).

Parasites, another biological hazard, need human and animal bodies to survive. Some parasites that cause foodborne diseases by passing to humans through food and/or water are Toxoplasma gondii, Giardia lamblia, Cryptosporidium parvum, and Trichinella spiralis (15).

Although yeasts are used in the food industry, they can also cause food spoilage by uncontrolled proliferation in cases where appropriate humidity - the temperature is

provided by using the essential components in foods as substrate. Some species of yeasts are also utilized in the industrial field for alcohol, inverted sugar, and enzyme production (45).

2.2.3. Food Safety Management Systems

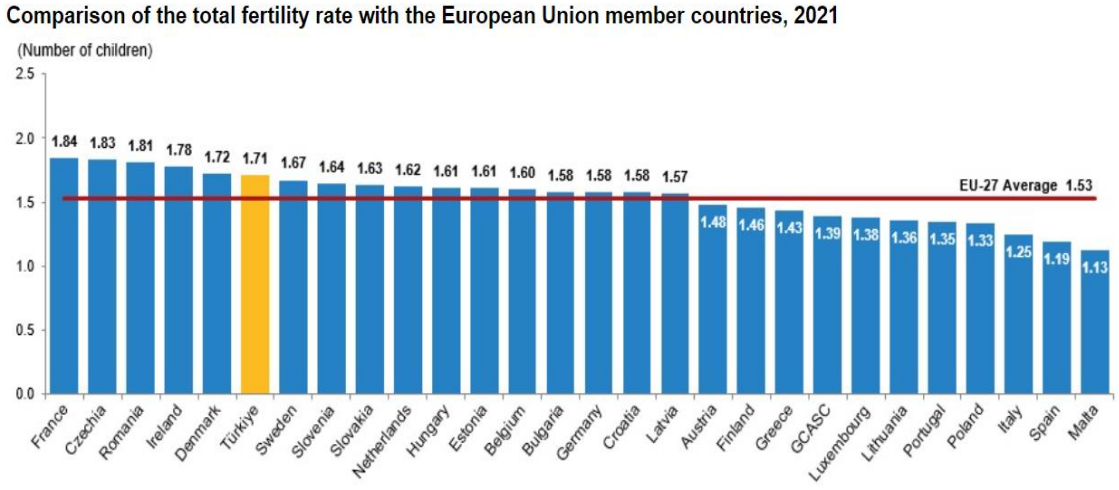
Ensuring food safety is of utmost importance. Hazard Analysis at Critical Control Points (HACCP) is a widely accepted food safety system adopted by many countries, including Turkey (47). Implementing this system has become a legal requirement for the food industry. HACCP aims to identify product-specific hazards in food enterprises, take measures to reduce or eliminate the identified risks, monitor the actions taken, and ensure the sustainability of control measures (50). The HACCP system is a tool for identifying and eliminating biological, chemical, and physical hazards (1,3,14,47,50). The most important feature of the HACCP system is the quest to protect consumer health. In addition, the continuous development of consumer expectations and the spread of the principle of safe food from the field to the plate has led to the constant renewal of existing food safety systems. In this context, "ISO 22000: 2005, Food Safety Management Systems", based on HACCP in hazard controls and compatible with HACCP principles, was standardized by the International Organization for Standardization (ISO) on 3 June 2004 (14,50). On 24 April 2006, it was accepted by the Turkish Standards Institute (TSE) and entered into force. It is crucial for public health to ensure "Good Hygiene Practices" for safe food and "Production Hygiene Criteria," including HACCP principles (47,50).

2.3. Pregnancy

Pregnancy refers to the series of events that begin with the fertilization of the male germ cell, also known as sperm, and the egg released from the woman's ovary (51). During pregnancy, a woman's body naturally creates an ideal environment that supports the growth and development of the fetus, meeting all of its necessary requirements. Pregnancy is a physiological process completed at 40 weeks, bringing about various physiological, biochemical, and anatomical changes in the body (52–55). The alterations primarily manifest in the respiratory, reproductive, hematological, and cardiovascular systems. Following childbirth, the mother's body gradually returns to its original state (51).

2.3.1. Birth Rates in Turkey and the World

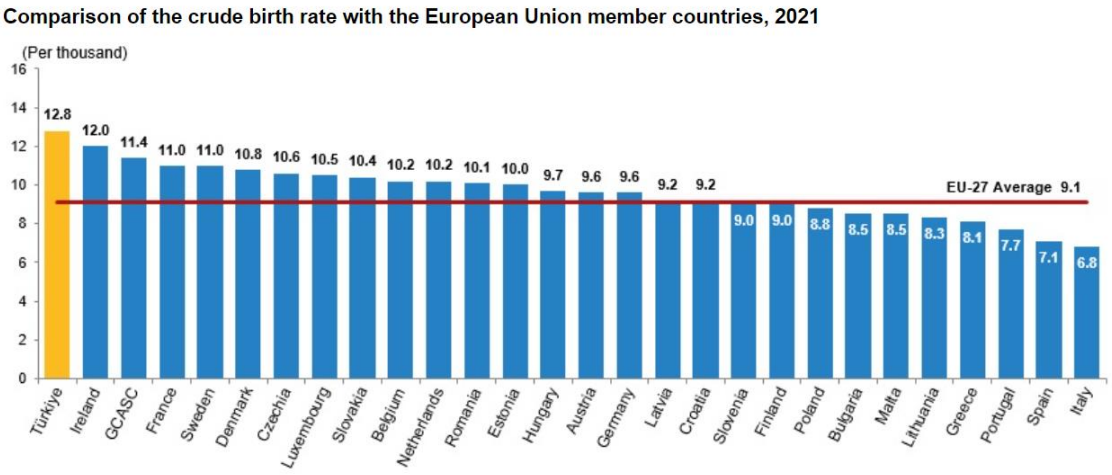
The total fertility rate pertains to the average quantity of children a woman can bear during her fertile period, which falls within the 15-49 age bracket. Based on the data provided by the Turkish Statistical Institute for 2022, the total fertility rate of 2.38 children in 2001 was 1.62 in 2022. In other words, a woman's average number of children during her fertile period was 1.62 in 2022. In the same report, the total fertility rates of 27 European Union member countries were analyzed, and it was found that France had the highest rate in 2021, with 1.84 children, while Malta had the lowest rate at 1.13 children. Turkey has a total fertility rate of 1.71 per thousand in 2021, placing it as the 6th ranked country among the European Union member states. A comparison of the total fertility rate among the European Union Member Countries is shown in Figure 2.2. (56).



Source: Turkish Statistical Institute. Birth Statistics, 2022. TUIK. Published March 15, 2023. Accessed June 11, 2023. Available at https://data.tuik.gov.tr/

Figure 2.2. Comparison of the total fertility rate with the European Union Member Countries, 2021

The crude birth rate refers to the number of live births per thousand individuals in a population. In 2001, the crude birth rate stood at 20.3 per thousand, but by 2022, it had decreased significantly to 12.2 per thousand. After analyzing the crude birth rates of 27 member countries in the European Union, it was found that Ireland had the highest crude birth rate in 2021 at 12.0 per thousand, while Italy had the lowest crude birth rate at 6.8 per thousand (56). A comparison of the crude birth rate with the European Union Member Countries is shown in Figure 2.3.



Source: Turkish Statistical Institute. Birth Statistics, 2022. TUIK. Published March 15, 2023. Accessed June 11, 2023. Available at https://data.tuik.gov.tr/

Figure 2.3. Comparison of the crude birth rate with the European Union Member Countries, 2021

2.3.2. Nutrition in Pregnancy

Nutrition during pregnancy is essential for both the mother's health and the health of the developing fetus (57–59). In this process, adequate and balanced nutrition and providing the increased needs of the pregnant woman with healthy foods can protect both the mother and the baby from the risk of many chronic diseases that may occur in the future (47,57,60). Research has demonstrated that insufficient nutrition in pregnancy can result in low birth weight, preeclampsia, and certain developmental abnormalities (47,58,59). The existing stores of the pregnant woman who cannot meet her needs through nutrition are used to meet the needs of the developing fetus (57–59,61).

The increased demand for energy during pregnancy should supply with healthy foods (milk and dairy products with high nutritional value, red meat, fish, chicken, turkey, eggs, legumes, and vegetables-fruits), not unhealthy and unsafe foods (47,57,60). A high-calorie but unhealthy diet may cause the pregnant woman to gain more weight than she needs and thus cause obesity, gestational diabetes, hypertension, macrosomia (> 4500 g), premature birth, cesarean section, and postpartum hemorrhage (60). In terms of having a low weight risk, the ideal thing is for the mother to start the pregnancy at a normal weight and with adequate nutritional status, and the weight gain should not exceed or remain below the predicted weight gain in accordance with the initial weight during the pregnancy period (53,55,59,60,62). A weight gain of 11.5-16 kg is recommended for healthy-weight pregnant women with a pre-pregnancy BMI (kg/m^2) between 18.5-25

kg/m^2. A weight gain of 7-11.5 kg is recommended for overweight pregnant women with a pre-pregnancy BMI between 25-30 kg/m^2 and 5-9 kg for pregnant women with a pre-pregnancy BMI of 30 kg/m^2 and above (60).

On average, the pre-pregnancy body mass index (BMI) of women in Turkey is 26.7 kg/m^2, indicating that a majority of pregnant women commence their pregnancy as overweight (47). Excessive weight gain and obesity during pregnancy can cause insufficient milk secretion due to the decrease in the levels of hormones responsible for milk production during lactation (57,60).

It is necessary to follow a well-balanced and nutrient-diverse diet that provides energy and nutrients at a level to meet the increased requirements. During pregnancy, the milk and dairy products group is recommended as four portions, the meat-egg-legume-nuts group as 3-4 portions, the bread and cereal group as 7-8 portions, and the vegetable and fruit group as at least five portions (1 portion of milk or yogurt 240 grams, one portion of meat and chicken 80 grams, one portion of fish 150 grams, one portion of vegetables and fruits 120 grams, one portion of bread 50 grams, one portion of cereals 120 grams) (41). The fluid requirement increases during pregnancy due to increased extracellular fluid volume, fetus requirement, and amniotic fluid. It is recommended to add 300 ml of water to the daily water requirement of 35 ml per kilogram of weight. Daily caffeine intake should be a maximum of 200 mg/day (approximately 2 cups of coffee or 4-5 cups of tea) (41).

Energy requirements during pregnancy vary according to age, pre-pregnancy body weight, physical activity, and existing diseases(47,59,60). The primary source of energy in the diet is carbohydrates. It is recommended that daily carbohydrate intake during pregnancy should be 175-210 g, or a nutrition plan should be followed so that 45-60% of energy comes from carbohydrates (47). Guidelines have drawn attention to the importance of consuming whole grains, legumes, vegetables, and fiber-rich fruits when pregnant women prefer carbohydrates (63). An adequate amount of fiber (soluble and insoluble) taken through nutrition is essential for preventing constipation that occurs with hormonal changes and decreased physical activity during pregnancy (35,63). A daily intake of 25 g of fiber is recommended for pregnant women (47).

The recommended daily allowance (RDA) for protein intake during pregnancy is approximately 70 g or 12-20% of energy, about 25 g more than in non-pregnant women. At least 50% of the dietary protein intake should be provided from proteins of animal origin (such as meat, chicken, fish, and eggs) (47,59).

The guidelines do not recommend a low-fat diet to provide increased energy needs and essential fatty acid requirements during pregnancy. 20-35% of the energy taken with daily nutrition should be provided from fats (59). Saturated fatty acid intake should be restricted (≤ 7-8%), but monounsaturated and polyunsaturated fatty acid sources should be emphasized in providing the necessary fat intake (63). Turkey Nutrition Guide for 2022 recommends an increase in fish consumption during pregnancy to improve the intake of omega-3 fatty acids. The primary sources of omega-3 fatty acids, essential in developing the brain and nervous system, are seafood (64). A total consumption of 300-400 grams of fish per week is recommended (47).

Adequate vitamin and mineral intake during pregnancy is vital for the health of both mother and baby. Deficiencies of micronutrients such as folic acid, iron, calcium, magnesium, vitamin D, and vitamin A, whose needs increase in this process but whose intake varies according to the quality of nutrition, cause significant problems (47,59).

Folate plays a crucial role in creating and maintaining DNA in the body, influencing RNA replication protein synthesis (59). The body experiences higher demands during pregnancy due to increased growth, DNA generation, and cell division. Folate insufficiency is closely linked to the possible development of neural tube defects (NTDs) (47,59). NTDs (spina bifida, anencephaly, and encephalocele) occur when the neural tube does not close completely during the fourth week of pregnancy (59,65). As a precaution, it is recommended to receive 400-600 mcg/day of folic acid (synthetic forms of folate) supplementation before pregnancy and during the first trimester of pregnancy (47,62,59).

Iron is crucial in forming hemoglobin and other components of red blood cells. The body also needs iron for the functioning of different enzymes, as well as for the immune system, the synthesis of connective tissue, and the cofactor of neurotransmitters (59). Iron is needed more than usual since the blood volume increases during pregnancy (58,61). Therefore, anemia is seen as a result of insufficient intake and is associated with premature birth, low birth weight, inadequate maternal weight gain, and maternal and infant mortality (51,57,59,60,65). In order to minimize such kind of risks, 40-60 mg/day elemental iron supplementation is applied to pregnant women in Turkey starting from the second trimester (47).

In terms of the development of the skeletal system of the developing fetus, it is essential to meet the calcium requirement in sufficient amounts by the nutrition of the pregnant. Deficiencies in calcium intake in pregnant women increase the risk of dental

caries and even osteoporosis in later life. The main source of calcium in nutrition is milk and dairy products (35). The recommended daily calcium intake is 1000 mg per day for pregnant women (47).

Iodine is one of the minerals whose deficiency in pregnant women increases the risk of mental retardation in the baby, negatively affects brain development, and increases the risk of goiter and hypothyroidism in both the mother and the baby (57,59). In order to prevent iodine deficiency in Turkey, iodization of table salt has been made mandatory (47).

Vitamin D is a crucial vitamin for the bone health of fetuses (59). Sunlight is the primary source of vitamin D. Failure to meet the increased vitamin D requirement during pregnancy is associated with adverse outcomes such as fetal skeletal defect, preeclampsia, decreased bone mass, gestational diabetes, and premature birth (59,62,65). For vitamin D deficiency, 1200 IU vitamin D support is provided free of charge by the Ministry of Health in Turkey for use as a single daily dose starting from the 3rd month of pregnancy (47).

2.4. Food Safety in Pregnancy

Pregnant women are known to be in high-risk groups for infectious diseases, particularly foodborne infections (66). In order to make room for growing fetuses, significant immunological and hormonal changes take place throughout pregnancy (20,66). A successful pregnancy requires a decrease in immune levels and an increase in hormone levels, including estradiol, estriol, and progesterone. Pregnant women's vulnerability to foodborne pathogens and the danger of experiencing more severe effects from these microorganisms are sadly increased by the immune system's down-regulation, which is done to protect the fetus from being rejected (66). Furthermore, infection during pregnancy can spread infections from the mother to the fetus (21). Usually, the placenta is essential in defending the growing fetus from potentially hazardous pathogenic organisms. Nevertheless, a few infections can enter and spread within the fetus despite the barrier activities. One of these pathogens is Listeria monocytogenes (66–68). In the United States, neonates under 31 days old accounted for 54% of all listeriosis occurrences associated with pregnancy between 2004 and 2009 (66). The majority of neonatal infections happen before birth, through transmission from the mother to the baby (66).

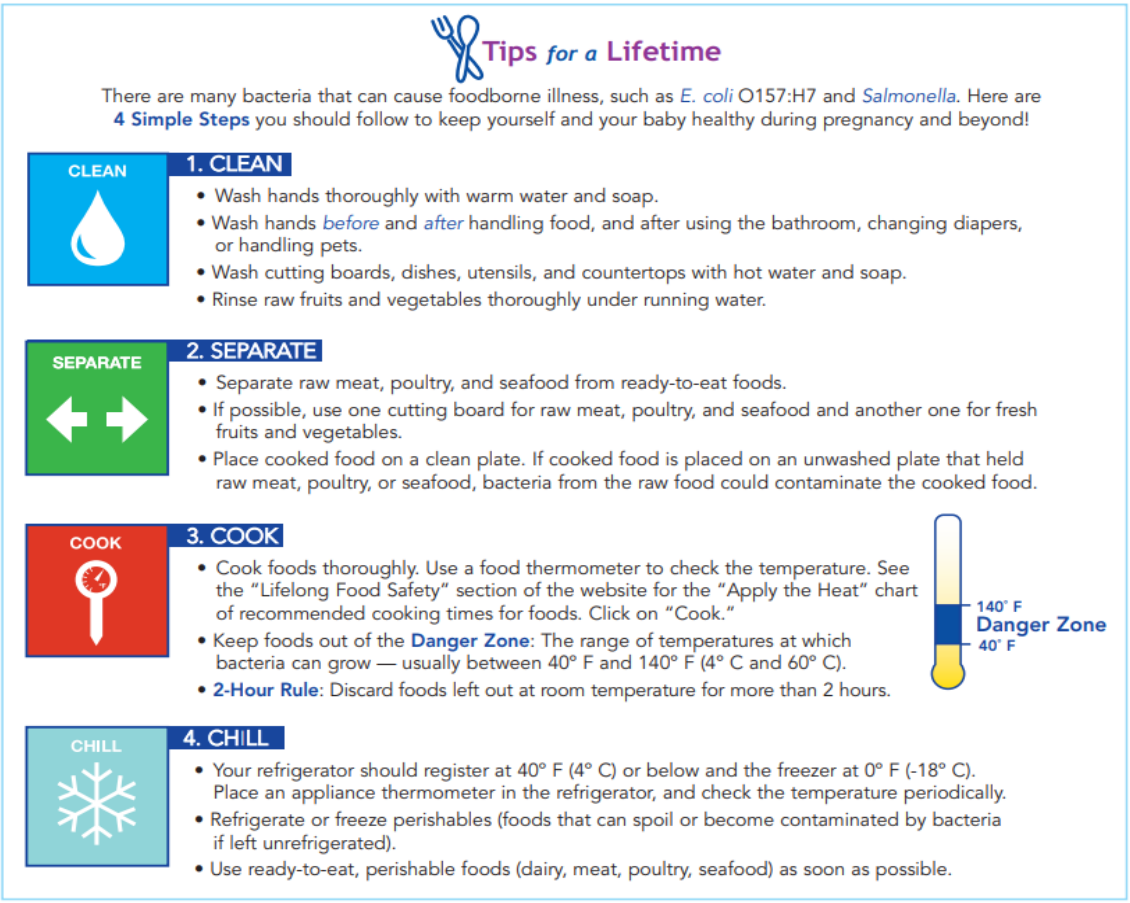
In addition to listeria monocytogenes, cryptosporidium (mostly contaminated water and soil origin), vibrio vulnificus (mostly undercooked seafood origin), the bacteria

Brucella species, Escherichia coli O157:H7, the bacteria Campylobacter jejuni, the Hepatitis A virus, and the parasite Toxoplasma gondii are frequent foodborne biological hazards that can harm pregnant (66,68).

20-40% of foodborne diseases are caused by foods prepared at home. The United States Department of Agriculture (USDA) advises specific food safety practices to help lower the risk of foodborne illnesses (21,69). These practices protect pregnant women and their fetuses from the severe consequences of foodborne diseases. Unfortunately, research indicates that pregnant women are frequently ignorant of their higher risk of contracting foodborne diseases (66). According to a multi-state study, only 74 out of 403 pregnant women (18%) knew listeriosis. In addition, it has been discovered through surveys conducted with pregnant and clinicians that food safety is frequently undiscussed. In conclusion, one of the groups that need to be most careful regarding food safety is pregnant women, who may face negative consequences such as miscarriage, stillbirth, fetal anomalies, blindness, deafness, and mental disability in case of foodborne illness (21,41,69).

2.4.1. Food Safety Guidelines for Pregnant Women: Four Steps for Food Safety

Several guidelines have been published by authorities such as Food and Drug Administration (FDA), USDA, Centers for Disease Control and Prevention (CDC), and WHO to inform the public and raise awareness about food safety in risk groups (16,17,20,21,41,69,70). When these are compared, it is seen that correct practices about food safety are highlighted in 4 basic steps (17,20,69). These steps are; 1) Clean - 2) Separate - 3) Cook - 4) Chill (17,20,21,70). Good food safety practices are described in each of these steps to prevent foodborne diseases and pathogenic bacteria. In the guideline published by WHO, unlike the classification of other authorities, five key steps are mentioned instead of four steps. This additional step is the "use of safe water and raw materials" (71). This part of the study will summarize and mention the four critical steps by USDA, FDA, and CDC guidelines to present the most up-to-date, especially for pregnant women. Figure 2.4. shows a summary picture of the 4 key steps in the guideline published by the FDA (20).



Source: Food and Drug Administration. Food Safety for Moms-to-Be - Educator's Resource Guide.; 2017. www.fda.gov/pregnancyfoodsafety

Figure 2.4. The Four Steps for Food Safety

2.4.1.1. First Step for Food Safety: "Clean"

Microorganisms that can cause foodborne disease can be found on any clean-looking floor or surface, as they are too small to be seen with the naked eye (17,20,21). For this reason, the "clean" step in the guidelines is expressed as the first and most essential step in ensuring food safety (17,20,21). It is important to wash hands thoroughly for at least 20 seconds using clean water and soap before reparing food or eating (20,41). In addition, it is necessary to ensure that the equipment to be used and kitchen utensils are washed correctly before and after preparing food and that they are clean. It was emphasized that the cutting board and kitchen counter should be cleaned with odorless sanitizing liquids (17,20,21). It was underlined that all equipment used after meat-fish-poultry preparation should be washed using detergent. Fresh vegetables and fruits, even those whose skins cannot be eaten, must be thoroughly cleaned by washing them under

running water (17,20,21,69). In addition, since it is not known under which conditions canned foods are stored before use, it is emphasized that their lids should be cleaned and used afterward (17,20,21,69). In summary, in this section, it is underlined that the first step for safe food is cleaning, and every tool used in food preparation and cooking should be sanitized.

2.4.1.2. Second Step for Food Safety: “Separate”

The second step published by the guidelines is "food separation." The main scope of this step is to prevent the contact of cooked and raw food with each other. It was emphasized that food separation should start while still in the market, and it was stated that products such as meat, fish, eggs, and chicken should be placed in a separate market basket and a separate bag from other foods (17,20,21,69). When placing raw meat products in the cabinet, they should be kept in deep containers to prevent their juices from leaking and contaminating other foods, and it is recommended to place them on the lower shelves of the refrigerator (20). The aim here is to prevent cross-contamination. Cross-contamination is the exchange of bacteria between different organisms in different foods when these different foods come into contact with each other (17). For example, the most common bacterium in eggs is salmonella, but when a raw egg comes into contact with a raw vegetable, salmonella, which we do not expect to see in a raw vegetable, can transfer to the vegetable, which means cross-contamination (69). As a precaution, the guidelines emphasized that separate cutting boards should be used for raw and cooked foods. Different cutting boards for raw meat, chicken, fish, fresh vegetables, and fruit are essential (20). It is also underlined that different cutting boards should be used separately for raw products and cooked ones (17,20,21).

2.4.1.3. Third Step for Food Safety: “Cook”

The third step published by the guidelines is "cooking," this step states that the best practice for destroying harmful microorganisms found in such products as meat, fish, eggs, and chicken is the correct cooking (20). There are some critical temperature ranges here. The first is the "dangerous temperature zone" (17,21). Studies have shown that the temperature range in which most foodborne bacteria multiply rapidly is between 4 and 60 Celsius.

Therefore, when evaluated regarding foodborne disease, this temperature range is referred to as the dangerous temperature range. Foods should be kept at temperatures outside these ranges to protect against foodborne illnesses (17). For example, the

refrigerator or freezer is the best environment for preserving food. Since the temperature here is below 4 degrees, the proliferation activity of bacteria is the lowest.

The periods for keeping foods in the refrigerator or freezer are described in the "chill" subheading. Regarding the cooking of foods, different internal temperatures are recommended according to the type of food. A kitchen-type internal temperature thermometer is recommended to ensure the cooked product is at the correct internal temperature (20). The recommended internal temperatures for various kinds of foods are given in Figure 2.5. (140, 145, 160, and 165 degrees Fahrenheit are 60, 62.7, 71.1, and 73.8 degrees centigrade, respectively). However, generally, the recommended internal temperature for poultry is 74 degrees Centigrade and 71 degrees Centigrade for ground beef, lamb, veal, and pork (17).

U.S. Department of Agriculture/ U.S. Food and Drug Administration
Recommended Safe Minimum Internal Temperatures

Category	Food	Temperature (°F)	Rest Time
Ground Meat & Meat Mixtures	Beef, Pork, Veal, Lamb	160°F	None
	Turkey, Chicken	165°F	None
Fresh Beef, Veal, Lamb	Steaks, Roasts, Chops	145°F	3 minutes
Poultry	Chicken & Turkey, Whole	165°F	None
	Poultry Breasts, Roasts	165°F	None
	Poultry Thighs, Legs, Wings	165°F	None
	Duck & Goose	165°F	None
	Stuffing (Cooked Alone or in Bird)	165°F	None
Pork and Ham	Fresh Pork	145°F	3 minutes
	Fresh Ham (Raw)	145°F	3 minutes
	Precooked Ham (To Reheat)	140°F	None
Eggs & Egg Dishes	Eggs	Cook until yolk and white are firm	None
	Egg Dishes	160°F	None
Leftovers & Casseroles	Leftovers	165°F	None
	Casseroles	165°F	None
Seafood	Fin Fish (Cod, Snapper, Tilapia, Etc.)	145°F or cook until flesh is opaque and separates easily with a fork.	None
	Shrimp, Lobster, & Crabs	Cook until flesh is pearly and opaque.	None
	Clams, Oysters, & Mussels	Cook until shells open during cooking.	None
	Scallops	Cook until flesh is milky white or opaque and firm.	None

Source: U.S. Food and Drug Administration (FDA). Food Safety For Pregnant Women, Their Unborn Babies, and Children Under Five. FDA. Published January 2022. Accessed June 3, 2023. https://www.fda.gov/media/83740/download

Figure 2.5. The Recommended Internal Temperatures for Various Kinds of Foods

Another critical point underlined is that products that have been at room temperature for more than 2 hours should not be consumed. If the temperature is 32 degrees and above, this period should be reduced to 1 hour, and if it has been waiting longer, it should be discarded (20). Another significant point is related to milk.

Pasteurized milk is recommended to be consumed as safe milk by the guidelines (69). Pasteurized milk is an application in which the loss of vitamins and minerals is kept to a minimum, and the destruction of pathogenic bacteria is done by heat treatment (71,72,73). For cooking eggs, it is recommended to avoid the consumption of undercooked eggs and to consume fully cooked eggs to avoid the risk of Salmonella (69).

2.4.1.4. Fourth Step for Food Safety: "Chill"

The fourth step specified by the guidelines for safe food is "chill." This step generally describes the correct freezing, cooling, or thawing of food (20,70). The most crucial point emphasized in this sense is the need to guarantee that the refrigerator is at +4 degrees and the freezer is at -18 Celsius (20). The periods when foods can be safely stored in refrigerators or freezers are given in Figure 2.6. (0 Fahrenheit equals -18 centigrade degrees, 40 Fahrenheit equals 4 centigrade degrees)

Category	Food	Refrigerator (40°F)	Freezer (0°F)
Eggs	Fresh, in shell	3 to 5 weeks	Don't freeze
	Hard cooked	1 week	Don't freeze well
Liquid Pasteurized Eggs, Egg Substitutes	Opened	3 days	Don't freeze well
	Unopened	10 days	1 year
Deli and Vacuum-Packed Products	Egg, chicken, ham, tuna, & macaroni salads	3 to 5 days	Don't freeze well
Hot Dogs	Opened package	1 week	1 to 2 months
	Unopened package	2 weeks	1 to 2 months
Luncheon Meats	Opened package	3 to 5 days	1 to 2 months
	Unopened package	2 weeks	1 to 2 months
Bacon & Sausage	Bacon	7 days	1 month
	Sausage, raw—from chicken, turkey, pork, beef	1 to 2 days	1 to 2 months
Hamburger and Other Ground Meats	Hamburger, ground beef, turkey, veal, pork, lamb, & mixtures of them	1 to 2 days	3 to 4 months
Fresh Beef, Veal, Lamb, Pork	Steaks	3 to 5 days	6 to 12 months
	Chops	3 to 5 days	4 to 6 months
	Roasts	3 to 5 days	4 to 12 months
Fresh Poultry	Chicken or turkey, whole	1 to 2 days	1 year
	Chicken or turkey, pieces	1 to 2 days	9 months
Seafood	Lean fish (flounder, haddock, halibut, etc.)	1 to 2 days	6 to 8 months
	Fatty fish (salmon, tuna, etc.)	1 to 2 days	2 to 3 months
Leftovers	Cooked meat or poultry	3 to 4 days	2 to 6 months
	Chicken nuggets, patties	3 to 4 days	1 to 3 months
	Pizza	3 to 4 days	1 to 2 months

Source: U.S. Food and Drug Administration (FDA). Food Safety For Pregnant Women, Their Unborn Babies, and Children Under Five. FDA. Published January 2022. Accessed June 3, 2023. https://www.fda.gov/media/83740/download

Figure 2.6. The Periods When Foods Can be Safely Stored in Refrigerators or Freezers

It was also stated that when placing the food in the fridge, it should be placed in a way that does not disturb the airflow. For optimal food safety and to avoid bacterial

growth, waiting until the end of a grocery shopping trip before picking up frozen items is advised (20). After acquiring them, promptly store them in the freezer to prevent thawing at inappropriate temperatures. It was stated that when thawing frozen foods, wrong practices, such as soaking in hot water and keeping them at room temperature, should be avoided (17). According to recommendations, the most secure way to thaw food is by placing it in deep containers inside the refrigerator, where the temperature is at +4 degrees.

2.4.2. High-Risk Foods and Patogens to be Avoided During Pregnancy

Guidelines have listed all right food safety practices to ensure food safety in four basic steps. This information is also valid for all individuals. However, pathogenic bacteria and parasites found in undercooked, unwashed, or unpasteurized foods pose a greater danger to pregnant women than others (69,73). Possible food sources of some pathogenic bacteria and parasites for pregnant women and the negative consequences that they can cause in pregnant women are shown in Figure 2.7.

Key food-related pathogens to avoid during pregnancy

Food-related pathogen	Health Consequences	Foods to avoid	Precautions that can be taken
Listeria monocytogenes	Miscarriage Stillbirth Preterm labour Low birthweight Infant death	Unpasteurized milk or juice Soft cheeses such as camembert, brie, ricotta, blue-vein Cheese made from unpasteurized milk Pâte Undercooked meat or poultry Pre-prepared/pre-packaged salads Cold-cured meats such as salami, prosciutto	Listeria is destroyed by heat, so heat pre-prepared meals thoroughly
Salmonella	Miscarriage Premature labour	Raw or partially cooked eggs Mayonnaise and mousse (made with raw eggs) and soft serve ice cream Undercooked meat; especially poultry and seafood Raw sprouts	Store raw meat, seafood, and fish separately to cooked foods or foods that do not require cooking, to avoid cross-contamination
Campylobacter	Premature labour Spontaneous abortion Stillbirth	Undercooked meat or poultry	Cook and heat all meat and poultry thoroughly before eating
Toxoplasma gongii	Hearing loss Blindness Intellectual disability Brain or eye problems	Undercooked meat or poultry Cat faeces	Avoid contact with potentially affected soil and cat litter trays, or wear gloves if contact is required. Clean hands thoroughly before handling food

Source: De Seymour J V., Beck KL, Conlon C. A. Nutrition in pregnancy. *Obstet Gynaecol Reprod Med*. 2022;33(12):253-258. https://nap.nationalacademies.org/resource/12584/Report-

Figure 2.7. Key Food-Related Pathogens to Avoid During Pregnancy

Listeria monocytogenes is an excellent example of these pathogenic bacteria. It can be found mainly in undercooked veal, lamb, and any food produced from these animals because this bacterium can be found in some animals without showing any

disease symptoms (20). Therefore, all food made from the meat of such animals should be well cooked because listeria is a bacterium that can be killed by appropriate heat. Listeria can also be transferred to crops grown in contaminated soil (17,20,21). For this reason, all crops grown in soil should be washed thoroughly, and various sprouted vegetables should be cooked and used (20). In addition, animal milk is a high-risk food regarding food safety. For this reason, it is essential to prefer pasteurized milk during pregnancy. Likewise, pregnant women should not select cheeses made from unpasteurized milk (17). When infected with listeria, a disease called listeriosis occurs. Symptoms include fever, gastrointestinal system pain, confusion, diarrhea, and muscle aches (20). In addition, unlike other bacteria, this bacterium can show high reproductive activity at low temperatures such as refrigerator temperature (+4 degrees centigrade). Compared to other healthy individuals, pregnant women have a roughly 10-fold increased risk of contracting listeriosis (20). Pregnant women are thought to account for around one in six (17%) of all Listeria monocytogenes cases (20,46). In addition, one of the most frequent fetal infection-related causes of miscarriage is L. Monocytogenes (20,46). Late infections can cause a variety of health issues in fetuses, including intellectual incapacity, paralysis, convulsions, blindness, and brain, heart, or kidney defects (20,67,68).

Salmonella is a type of bacteria that causes a disease called salmonellosis. Especially eggs and poultry products are the most common foods where salmonella is most commonly found (74). Since it can be found in the intestinal flora of some animals and especially chickens, washing the eggs well before consumption and consuming them well-cooked is recommended (20). To ensure their safety, pregnant women should avoid consuming undercooked or raw chicken, veal, lamb, unpasteurized milk, and raw chicken ham (20,59,75). The main symptoms are vomiting, abdominal pain, fever, and diarrhea. Salmonella can cause miscarriage and premature birth in pregnant women.

Toxoplasma gondii is a parasite that can be present in various sources, such as raw or undercooked meat, unwashed fruits and vegetables, soil, contaminated water, and outdoor areas where cat feces may be present (20). It's essential to be cautious and aware of these potential sources to avoid infection. Toxoplasmosis is an illness that can be especially harmful to pregnant and fetuses (76). Although the symptoms include headache, muscle pain, and fever, it may not give any symptoms. Newborns whose mothers were infected with T. gondii during or just before pregnancy face a severe risk of contracting toxoplasmosis (17,21). The infection during the first trimester, which is the period when the central nervous system is developing, can lead to fatal consequences for

the fetus. T. gondii can result in hearing loss, intellectual disability, and blindness in infants. In addition, children can experience brain or eye issues several years after birth (20).

Escherichia coli is found in the intestinal flora of humans and mammals. Since it is also found in cattle and similar animal feces, it is likely to be transmitted to plant foods through the soil (3). Typically impacting the gastrointestinal system, symptoms of this condition may include diarrhea and vomiting (18). The primary food sources where it can be found are; hamburger patties, fried meat, sausages, raw milk, unchlorinated tap water, raw vegetables, and raw sprouts (20,42,43,46).

Campylobacters were initially discovered in patients suffering from hemorrhagic symptoms in 1972. However, it wasn't until the late 1970s that their role in causing diseases in humans was acknowledged. Campylobacteriosis causes a disease called Gullian Bare Syndrome in humans (18). Campylobacters jejuni, in particular, plays a leading role in diarrhoeal diseases. Symptoms are characterized by fever, abdominal pain, and diarrhea. The main reservoirs of Campylobacter are poultry, cattle, sheep, and pork (3,18,46).

Shigella dysenteriae is a bacterium that can be transmitted by the fecal-oral route. Symptoms usually include diarrhea, abdominal pain, fever, and vomiting. It can be transmitted primarily through inadequate hygiene and consuming contaminated water, shellfish, fruits, vegetables, chicken, and salads (3).

Brucella can be transmitted from the meat and feces of goats, pigs, cows, cattle, and sheep. It can also be transmitted from goat and cow milk (15). A prevalent method of brucella transmission is consuming raw or undercooked meat, raw milk, and milk-based products made from unpasteurized milk. It can show symptoms such as high fever, heart or arthritis, weakness, and weight loss (15,42,46).

Clostridium botulinum is an anaerobic spore-forming bacterium capable of producing neurotoxins (46). It is possible to encounter these bacterial toxins in canned food prepared under unsuitable conditions at home, spices, soil, and honey. It has been reported that it can cause paralysis or respiratory failure by affecting the nervous system (3).

In Summary, High-risk foods in terms of food safety include raw or undercooked meat and meat products, chicken, fish, eggs, unpasteurized dairy products, cheese varieties made from unpasteurized milk, meat products that are pre-cooked and suitable for cold consumption, unwashed vegetables, and fruits, raw sprouts, the water of

uncertain origin (20,69,75). Authorities have released guidelines to assist pregnant women in making safe food choices by categorizing foods into high-risk and lower-risk groups. This classification is shown in Figure 2.8.

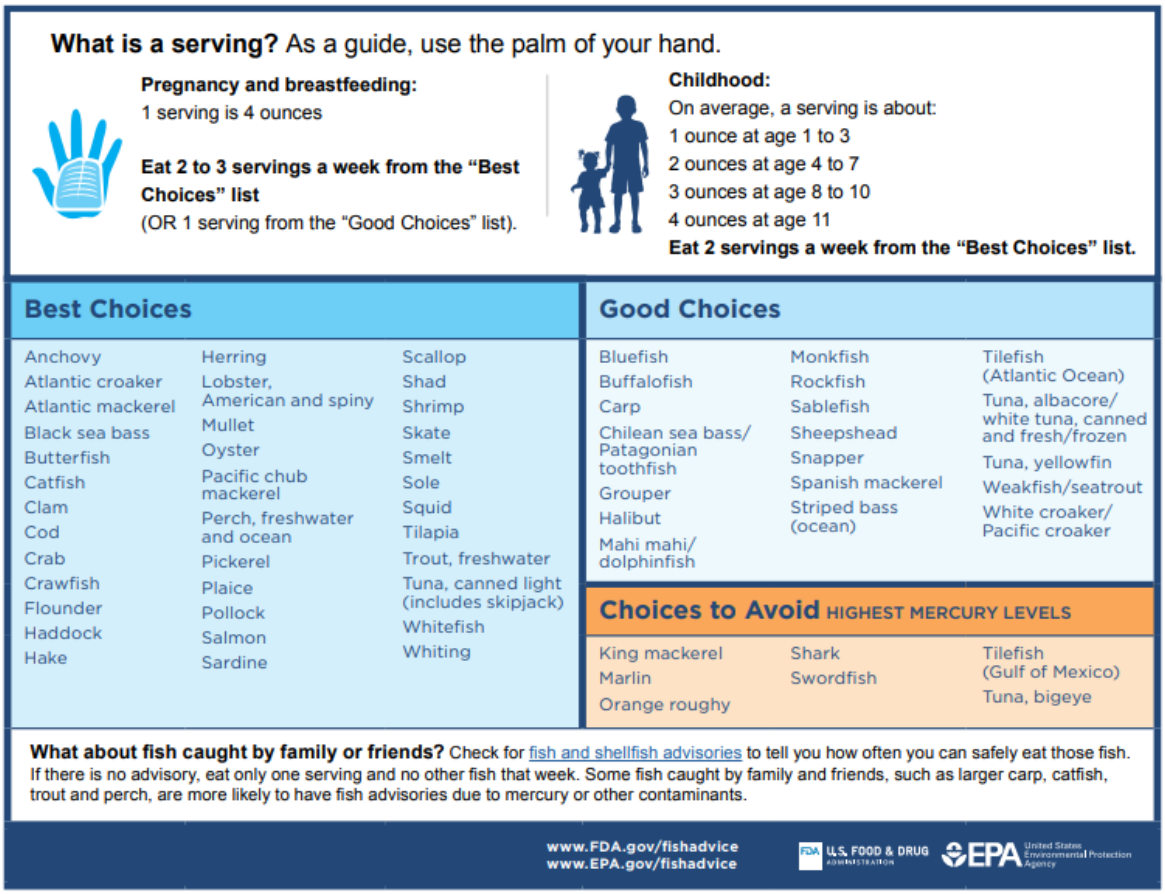
Type of Food	Higher Risk	Lower Risk
Meat and Poultry *Tip: Use a food thermometer to check the internal temperature. See the Safe Minimum Internal Temperatures chart on page 8.*	Raw or undercooked meat or poultry	Meat or poultry cooked to a safe minimum internal temperature (Food Safety for Pregnant Women)
Seafood *Tip: Use a food thermometer to check the internal temperature. See the Safe Minimum Internal Temperatures chart on page 8.*	• Any raw or undercooked fish, or shellfish, or food containing raw or undercooked seafood, e.g., sashimi, found in some sushi or ceviche • Refrigerated smoked fish • Partially cooked seafood, such as shrimp and crab	• Previously cooked seafood heated to 165°F • Canned fish and seafood • Seafood cooked to 145°F
Milk	Unpasteurized (raw) milk	Pasteurized milk
Eggs **Tip: Pre-made foods from grocery stores, such as Caesar dressing, cookie dough, or eggnog that say made with pasteurized eggs/pasteurized egg products are lower risk.*	Foods that contain raw/undercooked eggs, such as: • Homemade Caesar salad dressings* • Homemade raw cookie dough* • Homemade eggnog*	*At home:* • Recipes that call for raw or undercooked eggs are made with pasteurized eggs *When eating out:* • Ask if pasteurized eggs were used
Sprouts	Raw sprouts (alfalfa, bean, or any other sprout)	Cooked sprouts
Vegetables	Unwashed fresh vegetables, including lettuce/salads and raw sprouts	• Washed fresh vegetables, including salads • Cooked vegetables
Cheese	Soft cheeses made from unpasteurized (raw) milk, such as: • Feta • Brie • Camembert • Blue-veined • Queso fresco	• Hard cheeses • Processed cheeses • Cream cheese • Mozzarella • Soft cheeses that are clearly labeled "made from pasteurized milk"
Hot Dogs and Deli Meats *Hot Dogs and Deli Meats* *Tip: You need to reheat hot dogs, deli meats, and luncheon meats before eating them because Listeria monocytogenes bacteria grow at refrigerator temperatures (40ºF or below). These bacteria may cause severe illness, hospitalization, or even death. Reheating these foods until they are steaming hot destroys these dangerous bacteria and makes these foods safe for you to eat.*	Hot dogs, deli, and luncheon meats that have not been reheated	Hot dogs, luncheon meats, and deli meats reheated to steaming hot or 165ºF
Deli Salads	Deli salads prepared without preservatives in a deli-type store or restaurant	Deli salads freshly prepared at home
Pâtés	Unpasteurized, refrigerated pâtés or meat spreads	Canned or shelf-stable pâtés or meat spreads

Source: U.S. Food and Drug Administration (FDA). Food Safety For Pregnant Women, Their Unborn Babies, and Children Under Five. FDA. Published January 2022. Accessed June 3, 2023. https://www.fda.gov/media/83740/download

Figure 2.8. Higher Risk and Lower Risk Groups of Foods

Another food that pregnant women should avoid is fish with high mercury content. These fish are usually larger and are called deep-water fish. As the size of the fish

increases, the mercury content may also increase. Smaller surface fish (such as anchovy, horse mackerel, bonito, and mackerel) are preferred because their mercury content is lower than other fish (64,75). Fish such as turbot, mussel, and swordfish are not recommended as they contain higher mercury (64). In order to provide detailed options for pregnant women, the FDA has published a fish consumption recommendation (17,64). Accordingly, it classifies fish as those to be avoided, good options, and best options. This classification is shown in Figure 2.9.



Source: U.S. Food and Drug Administration. Advice about Eating Fish for Those Who Might Become or Are Pregnant or Breastfeeding and Children Ages 1 - 11 Years. FDA. Published September 28, 2022. Accessed June 11, 2023.

Figure 2.9. Fish Advice for Pregnant Women

3. MATERIALS AND METHODS

3.1. The Place and the Time of the Study

The study was conducted with 192 voluntary pregnant participants who applied to Family Health Centers (FHC) in the Çerkezköy district of Tekirdağ between January 12, 2022 - August 1, 2022, to determine the knowledge level, attitudes, and food availability of pregnant women about food safety.

3.2. Permissions and Ethical Approval of the Study

Ethical approval (Appendix – 1) was obtained from Yeditepe University Non-Interventional Clinical Research Ethics Committee on December 3, 2021. Research permission (Appendix – 2) was obtained from Tekirdağ Governorship Provincial Health Directorate in primary care services on January 12, 2022. The permission to use the "Household Food Security Survey Module - Short Form" was obtained (Appendix – 3).

3.3. The Universe and the Sample of the Research

The study was carried out in the Çerkezköy district of Tekirdağ province. There are 14 Family Health Centers (FHC) in Çerkezköy/Tekirdağ. All FHCs were informed in detail about the study. The study was conducted with ten FHCs, as four did not want to volunteer to work due to the lack of suitable rooms for the research and their workload.

FHCs that volunteered for the study: Çerkezköy İstasyon FHC, Fatih FHC, Fevzipaşa FHC, Gazi Mustafa Kemal Paşa FHC, Çınar FHC, Kızılpınar FHC, Velikoy FHC, Hayat FHC, Gültepe FHC, Sevgi FHC.

FHCs that do not want to participate in the study: Bağlık FHC, Gaziosmanpaşa FHC, Tepe Emlak FHC, Yıldırım Beyazıt FHC.

Pregnant participants who applied to voluntary FHC were informed in detail about the study. As a result, 192 pregnant women signed the "Informed Consent Form" (Appendix - 4) and volunteered to participate in the study.

3.3.1. Inclusion Criteria for the Research

- To be a volunteer
- To be pregnant
- To be 18 years old and over
- To speak Turkish

3.3.2. Exclusion Criteria for the Research

- Not being a volunteer
- Being under the age of 18
- Not being pregnant
- Not knowing Turkish

3.4. General Plan of the Study

The necessary information was collected through two questionnaires in this study. The first of these questionnaires (called the data collecting form) (Appendix - 5) was prepared by the researcher using literature research, guidelines from current and reliable authorities, and similar studies to determine pregnant women's knowledge level and attitudes about food safety (17,19–22,77).

The second questionnaire form (Appendix - 6) used in the study; is the Turkish version of the Household Food Security Survey Module - Short Form (HFSSM-SF), which was used to get information about the pregnant participants' food security and food availability. Emiral, Onsuz, and Metinal validated the Turkish version of HFSSM-SF in 2017 (78). However, since the researcher created one of the questionnaires, a pilot study group consisting of 25 participants was formed.

The pilot study aims to determine the validity and reliability of the questionnaire form created by the researcher. For this purpose, the questionnaire form was applied to the selected pilot group with an interval of 2 weeks using the test-retest method. The first phase of the pilot study was carried out on 13 January 2022. The second phase of the pilot study was carried out two weeks later, on 27 January 2022. After completing the pilot study, the data collection phase started in the FHC in the Çerkezköy district of Tekirdağ province.

The researcher used the questionnaires and the acquisition of demographic information (age, education level, occupation) by face-to-face interview, taking into account the social distance rules and pandemic conditions. In addition, anthropometric measurements of height in centimeters (cm) and weight in kilograms (kg) were measured, and the researcher also calculated BMI in kg/m^2.

3.4.1. Data Collection Form

The researcher prepared the data collection form by reviewing the literature and transforming the reliable information in the current guides prepared by reliable sources

and authorities such as Food and Drug Administration and World Health Organization into questions (17,20,21). The guidelines examine food safety under four subheadings. It is classified as "clean, separate, cook, and chill" (17,21). For this reason, the researcher included these four sub-headings in the data collection form as "hygiene, separation, cooking, cooling." When the literature is examined, although there are not many similar studies, these four main topics have been emphasized in similar studies (19,77). In addition to these four sub-headings, the "consumption" and "knowledge level" sections, which cover all of the sub-headings, were added to the form, and six sub-headings were created. The sub-headings in the data collection form of this study are in parallel with the evaluation form on food safety published by WHO (79). In this way, it was aimed to determine the "level of knowledge" and "attitude" about food safety in pregnant women with the data collection form created by the researcher to be used in the study.

The "level of knowledge" sub-heading contains 13 items that can be answered as "agree," "disagree," and "undecided." "Hygiene," "food separation," "cooking," and "cooling" subheadings; It consists of items that can be answered as "never," "rarely," "sometimes," "often," "always." The "Hygiene" subheading consists of 8 items, the "Food Separation" subheading consists of 6 items, the "Cooking" subheading consists of 4 items, and the "Cooling" subheading consists of 5 items. The "Consumption" subheading questions the frequency of consuming 15 different foods (I have never consumed, I avoid, I consume less, No Changes, I consume more) before pregnancy was planned and during pregnancy. In addition, it is also questioned whether the participants know the concept of food safety and where they obtained information about food safety.

Age, gestational week, height, current weight, and initial weight of pregnancy were questioned in the first part of the data collection form. The educational status and occupation of the participants were also questioned.

Since the questions were given in various categories in the data collection form, validity, and reliability were examined by the test-retest, the reliability of the titles with Kuder Richardson 20, and the item analysis of the answers given to the questions.

Answers given to 51 questions in 6 categories were evaluated as "5" as the highest score and "1" as the lowest. However, since it is more understandable to obtain a score according to the correct answers given to each question and to convert it to a hundred scale and evaluate it over 100 points, the total score of each case was evaluated by converting it to a hundred scale.

3.4.2. Household Food Security Survey Module- Short Form (HFSSM-SF)

HFSSM-SF was created by researchers from the National Center for Health Statistics created (80). Gülsüm Öztürk Emiral, Muhammed Fatih Onsuz, and Selma Metintaş obtained the validity and reliability studies for the HFSSM-SF (78). The HFSSM-SF consists of six items that evaluate the adequacy of food intake, access to balanced meals, and skipping meals due to economic difficulties in the last 12 months. Participants are expected to mark one of the options as “Doesn't Know,” “Never True,” “Sometimes True,” and “Often True” for the 1st, 2nd, and 4th items. For the 3rd, 5th, and 6th items, they are expected to mark one of the options as "Yes,” No,” or “I don't know.” Participants are given 1 point if they mark “Often True” for the 1st, 2nd, and 4th items and “Yes” for the 3rd, 5th, and 6th items, and “0” if they mark the other options. The score to be obtained from the scale varies between 0 and 6. A score of “0” means “high food security.” “1” point is “marginal food security (there was a risk that food would not be accessible)”; if the score is “2-4”, it is “low food security (no access to food, but there wasn't any hunger present in this circumstance)”; a score of “5-6” is interpreted as “very low food security (food cannot be reached and this is accompanied by moderate hunger).”

3.4.3. Evaluation of Anthropometric Measurements

The researcher weighed the volunteer pregnant participants' current body weights on a classic scale on a flat, hard surface, without extra weight-bearing items such as shoes and coats. The researcher obtained the initial weight of the pregnancy information by the face-to-face questioning method. The researcher measured height in cm while the subjects were looking straight ahead in an upright position, with the head in the Frankfort horizontal plane, the heels, hips, and back against the wall, and the feet attached to the wall from the heel to the wall. BMI was calculated by dividing the starting weight of pregnancy by the square of the height in meters. In calculating the body mass index, the initial weight of the pregnancy was taken as the basis, not the current weight of the pregnant woman. Results obtained: 18.5-24.9 kg/m^2 normal weight; 25-29.9 kg/m^2 overweight; $\geq$ 30 kg/m^2 is classified as obese (47). During the data collection process in the study, masks and visors were used due to the COVID-19 pandemic. The room where the measurements were made was ventilated, the social distance rules were followed while the survey questions were asked to the participant, and the pandemic conditions were observed in general.

3.5. Statistical Analysis

NCSS (Number Cruncher Statistical System) 2020 Statistical Software (NCSS LLC, Kaysville, Utah, USA) was used for statistical analyses while evaluating the findings obtained in the study. While evaluating the study data, quantitative variables were shown with mean, standard deviation, median, min, and max values, and qualitative variables were shown with descriptive statistical methods such as frequency and percentage. Shapiro Wilks test and Box Plot graphs were used to evaluate the conformity of the data to normal distribution.

Oneway ANOVA test was used for comparisons of normally distributed variables in three groups and above, and the Bonferroni test was used to determine the group causing the difference. Kruskal Wallis test was used in the comparisons of variables that did not the show normal distribution in three groups or more and the Dunn test was used to determine the group causing the difference. Spearman's correlation analysis was used to evaluate the relationships between variables. The results were evaluated at 95% confidence interval and significance was evaluated at $p<0.05$ level.

In the validity and reliability analysis of the pilot study and the actual study results of the data collection form created by the researcher regarding the determination of pregnant women's knowledge levels, and attitudes about food safety, Kuder Richardson-20 was examined. In the item analysis, the significance of each item was tested according to 25% and 75% percentiles.

The evaluation of the "r" Spearman correlation test, Cronbach alpha coefficient, and Kuder Richardson-20 coefficient values are shown in Table 3.1, Table 3.2, and Table 3.3, respectively (81).

Table 3.1. The Evaluation of the “r”: Spearman Correlation Test

“r” Spearman Correlation Test	**The Evaluation of the Spearman Correlation Test**
0.00-0.19	Very Weak
0.20-0.39	Weak
0.40-0.59	Moderate
0.60-0.79	Strong
0.80-1.00	Extremely Strong

Source: Karagöz, T. (2014), SPSS 21.1 Uygulama, Biyoistatistik. Nobel Akademik Yayıncılık; 1.basım, sf:698

Table 3.2. The Evaluation of Cronbach's Alpha Coefficient

α	**The evaluation of Cronbach's Alpha coefficient**
$0,0 \leq \alpha < 0,40$	The scale is not reliable
$0,40 \leq \alpha < 0,60$	The scale is low reliable
$0,60 \leq \alpha < 0,80$	The scale is quite reliable
$0,80 \leq \alpha < 1,00$	The scale is highly reliable

Source: Karagöz, T. (2014), SPSS 21.1 Uygulama, Biyoistatistik. Nobel Akademik Yayıncılık; 1.basım, sf:698

Table 3.3. The Evaluation of Kuder Richardson-20 Coefficient

Kuder Richardson -20 Coefficient	**The Evaluation of Kuder Richardson-20**
0.81 or more	Near Complete Agreement
0.61-0.80	Strong
0.41-0.60	Moderate
0.21-0.40	Fair
0.00-0.20	Poor Agreement

Source: Karagöz, T. (2014), SPSS 21.1 Uygulama, Biyoistatistik. Nobel Akademik Yayıncılık; 1.basım, sf:698

4. RESULTS

4.1. Pilot Study Results

The study was conducted with 25 female participants in the Family Health Centers of the Çerkezköy district of Tekirdağ province between January 13, 2022 - January 27, 2022. The data collection form was applied at 2-week intervals. The Partipicant ranged from 21 to 55; the mean age was 36.08±10.53.

Table 4.1. Distributions of Descriptive Characteristics of the Pilot Study

Variables	Mean±SD	Median (Min-Max)
Age (year)	36.08±10.53	37 (21-55)
Height (cm)	164.64±6.05	165 (150-175)
Current Body Weight (kg)	69.56±17.85	64 (48-119)
The initial weight of pregnancy	69.56±17.85	64 (48-119)
Pre Pregnancy BMI (kg/m^2)	25.59±6.31	24.8 (15.7-41.7)
Gestational Week	10.00±0.00	10 (10-10)

		Overall n=25	%
BMI classification	**< 24.9 (Normal weight)**	13	52.0
	25-29.9 (Overweight)	6	24.0
	>30 (Obese)	6	24.0
Occupation	**Housewife**	8	32.0
	Private sector	8	32.0
	Public institution	5	20.0
	Employee	0	0.0
	Government official	2	8.0
	Other	2	8.0
Educational Status	**Primary school**	3	12.0
	Secondary school	3	12.0
	High school	7	28.0
	University	12	48.0

When the educational status of the cases is examined, 12% (n=3) primary school, 12% (n=3) secondary school, 28% (n=7) high school, and 48% (n=12) university graduates.

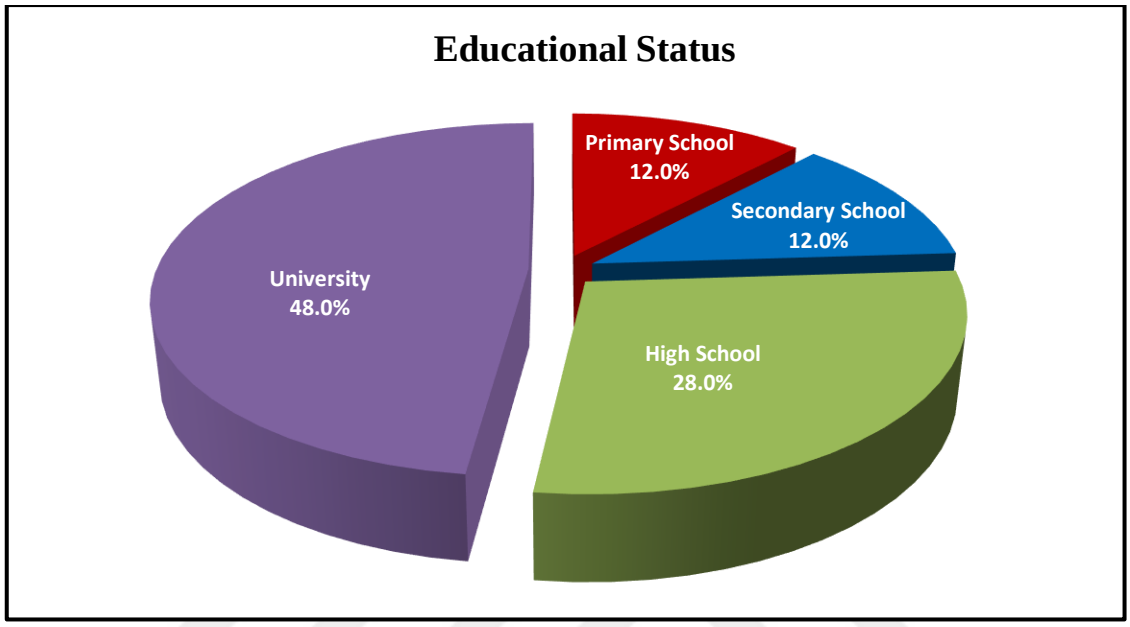


Figure 4.1. Distribution of Educational Status of the Pilot Study Group (n: 25)

The heights of the participants ranged from 150 cm to 175 cm, with a mean height of 164.64±6.05; the current weight of the participants ranged from 48 kg to 119 kg, and the mean current weight was 69.56±17.85; the initial weight of the participants ranged from 48 kg to 119 kg, and the mean initial weight was 69.56±17.85; BMI values of the participants ranged between 15.7 kg/ m^2 and 41.7 kg/ m^2, and the mean BMI values were found to be 25.59±6.31 kg/ m^2.

It was observed that 52% (n=13) of the cases were normal weight, 24% (n=6) were overweight, and 24% (n=6) were obese.

When the occupations of the subjects participating in the study are examined, 32% (n=8) are housewives, 32% (n=8) are private sector, 20% (n=5) are public institutions, 8% (n=2) are Government officials and 8%' It is seen that 2 of them (n=2) are from other professions.

The mean gestational week of the cases was determined as 10.00±0.00.

Table 4.2. The Compatibility of the Answers to the First and 2 Weeks After

n = 25	**ICC**	**95% Cl**	***p***
1. I do not use cracked and/or broken eggs.	1.000	1.000-1.000	***0.001****
2. I consume raw sausage, salami, and spicy fermented product made from raw ground beef called "sucuk."	1.000	1.000-1.000	***0.001****
3. I consume yogurt or cheese made from milk sold as unpasteurized.	1.000	1.000-1.000	***0.001****
4. I don't use sprouted potatoes and onions.	1.000	1.000-1.000	***0.001****
5. I consume products such as ketchup and mayonnaise that have been kept at room temperature for a long time.	1.000	1.000-1.000	***0.001****
6. The process of "freezing " kills microorganisms.	1.000	1.000-1.000	***0.001****
7. The purpose of pasteurizing milk is to kill all microorganisms in milk with the applied heat treatment.	1.000	1.000-1.000	***0.001****
8. I do not buy unpasteurized milk purchased from outside.	1.000	1.000-1.000	***0.001****
9. Frozen foods should be thawed at room temperature.	1.000	1.000-1.000	***0.001****
10. I do not consume food that has been left at room temperature for more than 2 hours.	1.000	1.000-1.000	***0.001****
11. I make and consume home-canned foods with low acidity, such as green beans and peas.	1.000	1.000-1.000	***0.001****
12. I separate the moldy part of a moldy food item and consume the non-moldy part.	1.000	1.000-1.000	***0.001****
13. I do not store opened milk in the refrigerator for more than 3 days.	1.000	1.000-1.000	***0.001****
14. Before preparing food, I always wash my hands, wrists, nails, and between fingers with hot soapy water by rubbing for at least 20 seconds.	0.957	0.906-0.981	***0.001****
15. After washing my hands, I dry them with a clean cloth towel or clean paper towel.	1.000	1.000-1.000	***0.001****
16. I wash cutting boards, dishes, and kitchen counters with hot soapy water that comes in contact with products such as raw meat, fish, and chicken.	0.914	0.816-0.961	***0.001****
17. I consume fresh fruits and vegetables by rinsing them thoroughly under running water before eating them.	1.000	1.000-1.000	***0.001****
18. I thoroughly wash fruits with hard outer skins, such as watermelons and melons, before cutting them.	1.000	1.000-1.000	***0.001****
19. I clean the sink and kitchen counter after each use.	0.970	0.934-0.987	***0.001****
20. I use eggs after washing and drying them before cooking.	1.000	1.000-1.000	***0.001****
21. Before using canned products, I clean their lids.	1.000	1.000-1.000	***0.001****
22. I keep raw red meat, poultry, fish, and eggs separate from other foods in the shopping cart and refrigerator.	1.000	1.000-1.000	***0.001****
23. I take care that the plates, cutting boards, and knives that come into contact with raw food do not come into contact with cooked food.	1.000	1.000-1.000	***0.001****
24. I separate the cutting board I use for meat, chicken, and fish and the cutting board I use for fruit and vegetables.	1.000	1.000-1.000	***0.001****
25. After coming into contact with raw meat while preparing food, I wash my hands with hot water and soap before preparing any other food.	1.000	1.000-1.000	***0.001****

*ICC; Interclass Coefficient Correlation, **p < 0.01*

Table 4.2. The Compatibility of the Answers to the First and 2 Weeks After (continue)

	ICC	95% Cl	*p*
26. When placing foods such as meat, chicken, and fish in the refrigerator, I pay attention to putting them on the lower shelves of the cabinet or in deep containers so that their water does not leak out.	1.000	1.000-1.000	***0.001*****
27. I pay attention to keeping the food in separate bags or containers in the refrigerator.	1.000	1.000-1.000	***0.001*****
28. When consuming the egg, I take care that it is well cooked.	1.000	1.000-1.000	***0.001*****
29. I pay attention to the meat, chicken, and fish are well cooked, and the internal temperature is 71 degrees.	1.000	1.000-1.000	***0.001*****
30. I eat soft-boiled eggs.	1.000	1.000-1.000	***0.001*****
31. When preparing foods containing eggs or meat, I taste them even if they are not yet cooked.	1.000	1.000-1.000	***0.001*****
32. I pay attention to the refrigerator at least 4 ° C and the freezer at least -18 ° C.	1.000	1.000-1.000	***0.001*****
33. I pack the food in the freezer in quantities to be used at one time.	1.000	1.000-1.000	***0.001*****
34. After thawing frozen food once, I do not freeze it again.	1.000	1.000-1.000	***0.001*****
35. I immediately consume cooked food or store it in the refrigerator after it has cooled down if it is to be consumed later.	1.000	1.000-1.000	***0.001*****
36. I buy frozen food at the end of the shopping trip and pay attention to putting it in the freezer as soon as possible.	1.000	1.000-1.000	***0.001*****
37. Foods you don't know how to prepare, such as salads containing raw vegetables	1.000	1.000-1.000	***0.001*****
38. Unwashed vegetables or fruit	1.000	1.000-1.000	***0.001*****
39. Raw or undercooked eggs	1.000	1.000-1.000	***0.001*****
40. Unpasteurized milk purchased from outside	1.000	1.000-1.000	***0.001*****
41. Moldy cheeses	1.000	1.000-1.000	***0.001*****
42. Unpackaged buttermilk	1.000	1.000-1.000	***0.001*****
43. Processed raw meat such as “sucuk,” salami, sausage	1.000	1.000-1.000	***0.001*****
44. Raw and/or undercooked meat, poultry, or fish	1.000	1.000-1.000	***0.001*****
45. “Çiğ köfte” (food made from raw minced meat and finely ground bulgur)	1.000	1.000-1.000	***0.001*****
46. Raw fish (sushi)	1.000	1.000-1.000	***0.001*****
47. Mussels, “kokoreç” (food made by cooking lamb intestines on the embers)	1.000	1.000-1.000	***0.001*****
48. Canned tuna fish	1.000	1.000-1.000	***0.001*****
49. Tap water or water from an unknown source	1.000	1.000-1.000	***0.001*****
50. Coffee	1.000	1.000-1.000	***0.001*****
51. Tea	1.000	1.000-1.000	***0.001*****

*ICC; Interclass Coefficient Correlation, **p < 0.01*

A perfect agreement was found between the participant's first and last answers (two weeks later) to the question " I do not use cracked and/or broken eggs" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I consume raw sausage, salami, and spicy fermented product made from raw ground beef called “sucuk” (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I consume yogurt or cheese made from milk sold as unpasteurized" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, “I don't use sprouted potatoes and onions” (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question,

“I consume products such as ketchup and mayonnaise that have been kept at room temperature for a long time" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question " The process of "freezing " kills microorganisms" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " The purpose of pasteurization of milk is to kill all microorganisms in milk with the applied heat treatment" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, “I do not buy unpasteurized milk purchased from outside" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Frozen foods should be thawed at room temperature" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I do not consume food that has been left at room temperature for more than 2 hours" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I make and consume home canned foods with low acidities such as green beans and peas" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I separate the moldy part of a moldy food item and consume the non-moldy part” (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I do not store opened milk in the refrigerator for more than 3 days” (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Before I start preparing food, I always wash my hands, wrists, nails, and between fingers with hot soapy water by rubbing for at least 20 seconds” (ICC:0,957; p=0.001; p<0,01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " After washing my hands, I dry them with a clean cloth towel or clean paper towel” (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I wash cutting boards, dishes, and kitchen counters with hot soapy water that come in contact with products such as raw meat, fish, and chicken” (ICC:0,914; p=0.001; p<0,01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I consume fresh fruits and vegetables by rinsing them thoroughly under running water before eating them” (ICC:1,000; p=0.001; p<0.01). A perfect agreement

was found between the participant's first and last answers (two weeks later) to the question, " I thoroughly wash fruits with hard outer skins, such as watermelons and melons, before cutting them" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question " I clean the sink and kitchen counter after each use" (ICC:0,970; p=0.001; p<0,01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I use egg after washing and drying before cooking" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Before using canned products, I clean their lids" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I keep raw red meat, poultry, fish, and eggs separate from other foods in the shopping cart and refrigerator" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I take care that the plates, cutting boards, and knives that come into contact with raw food do not come into contact with cooked food" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I separate the cutting board I use for meat, chicken, and fish and the cutting board I use for fruit and vegetables" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " After coming into contact with raw meat while preparing food, I wash my hands with hot water and soap before preparing any other food" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " When placing foods such as meat, chicken, and fish in the refrigerator, I pay attention to placing them on the lower shelves of the cabinet or in deep containers so that their water does not leak out" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I pay attention to keeping the food in separate bags or containers in the refrigerator" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " When consuming the egg, I take care that it is well cooked" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I pay attention to the meat, chicken, and fish are well cooked and the internal temperature is 71 degrees" (ICC:1,000; p=0.001; p<0.01). A perfect agreement

was found between the participant's first and last answers (two weeks later) to the question, " I eat soft-boiled eggs" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " When preparing foods containing eggs or meat, I taste them even if they are not yet cooked" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I pay attention to the refrigerator is at least 4 ° C, and the freezer is at least -18 ° C" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I pack the food in the freezer in quantities to be used at one time" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " After thawing frozen food once, I do not freeze it again" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I consume cooked food immediately or store it in the refrigerator after it has cooled down quickly if it is to be consumed later" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " I buy frozen food at the end of the shopping trip and pay attention to put it in the freezer as soon as possible" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Foods you don't know how to prepare, such as salads containing raw vegetables" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Unwashed vegetables or fruit" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Raw or undercooked eggs" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Unpasteurized milk purchased from outside" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Moldy cheeses" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Unpackaged buttermilk" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Processed raw meat such as "sucuk," salami, sausage" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks

later) to the question, " Raw and/or undercooked meat, poultry or fish" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " "Çiğ köfte" (food made from raw minced meat and finely ground bulgur)" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Raw fish (sushi)" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Mussels, "kokoreç" (food made by cooking lamb intestines on the embers)" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, " Canned tuna fish" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, "Tap water or water from an unknown source" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, "Coffee" (ICC:1,000; p=0.001; p<0.01). A perfect agreement was found between the participant's first and last answers (two weeks later) to the question, "Tea" (ICC:1,000; p=0.001; p<0.01).

4.2. Study Results

The study was conducted between January 28, 2022, and August 1, 2022, with 192 voluntary pregnant participants, all women, who applied to voluntary family health centers in the Çerkezköy district of Tekirdağ province. The ages of the participants ranged between 18 and 45 years, and the mean age was 27.00±5.00 years.

Table 4.3. Distribution of Descriptive Characteristics of the Study

Variables	**Mean±SD**	**Median (Min-Max)**
Age (year)	27.00±5.00	26 (18-45)
Height (cm)	161.94±5.91	162 (146-175)
Current Body Weight (kg)	71.62±12.79	69.9 (46-112)
The initial weight of pregnancy	66.60±12.90	65 (40-106)
Pre Pregnancy BMI (kg/m^2)	25.38±4.46	24.6 (17.8-41.21)
Gestational Week	21.64±9.55	20 (5-38)

		Overall n=192	**%**
BMI Classification	**< 24.9 (Normal weight)**	109	56.8
	25-29.9 (Overweight)	55	28.6
	>30 (Obese)	28	14.6
Occupation	**Housewife**	174	90.6
	Private sector	12	6.3
	Public institution	1	0.5
	Employee	1	0.5
	Government official	1	0.5
	Other	3	1.6
Educational Status	**Primary school**	55	28.6
	Secondary school	68	35.4
	High school	43	22.4
	University	26	13.5

When the educational status of the participants is analyzed, it is seen that 28.6% (n=55) are primary school graduates, 35.4% (n=68) are secondary school graduates, 22.4% (n=43) are high school graduates, and 13.5% (n=26) are university graduates.

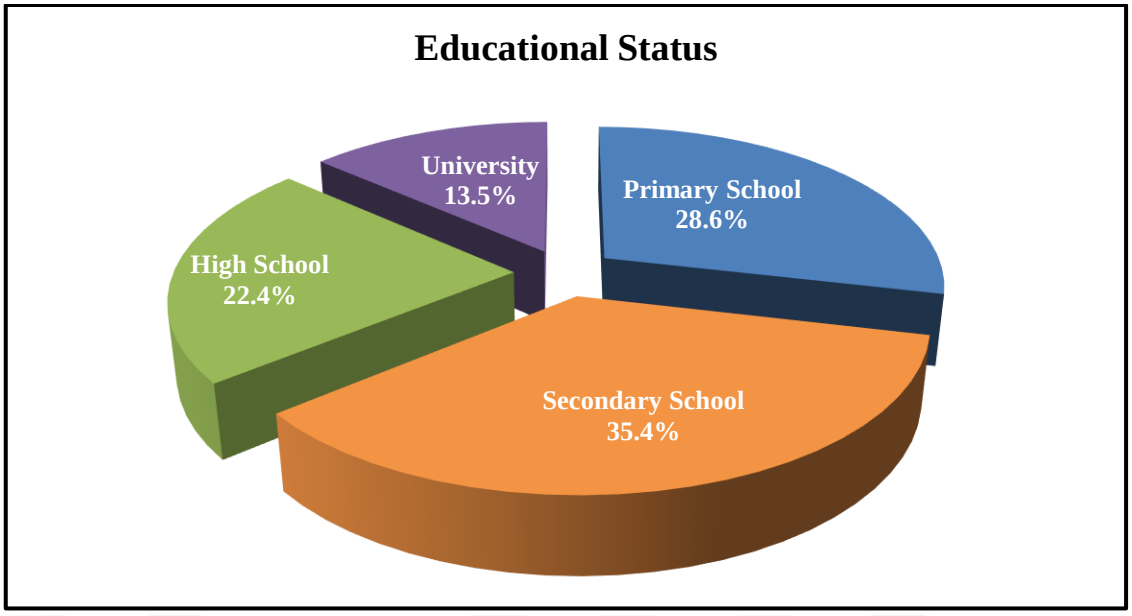


Figure 4.2. Distribution of Educational Status

The height of the participants ranged between 146 cm and 175 cm, with a mean height of 161.94±5.91; the current weight of the participants ranged between 46 kg and 112 kg, with a mean current weight of 71.62±12.79; the initial weight of the pregnancy ranged between 40 kg and 106 kg, with a mean the initial weight of 66.60±12.90; the BMI values of the participants ranged between 17.8 kg/m^2 and 41.21 kg/m^2 with a mean BMI value of 25.38±4.46 kg/m^2.

The BMI values were calculated according to the participants' initial weight of pregnancy 56.8% (n=109) were normal weight, 28.6% (n=55) were overweight, and 14.6% (n=28) were obese.

When the occupations of the participants were analyzed. 90.6% (n=174) were housewives, 6.3% (n=12) were from the private sector, 0.5% (n=1) were from public institutions, 0.5% (n=1) were employees, 0.5% (n=1) were government official and 1.6% (n=3) were from other occupations.

The participants' gestational weeks ranged between 5 and 38 weeks, and the mean gestational week was 21.64±9.55.

Table 4.4. Distribution of Responses to Questions Related to Food Safety

		n=192	%
Do you know what exactly the concept of food safety means?	**No**	185	96.4
	Yes	7	3.6
Where do you get information about nutrition and food safety?			
Circle of family or friends	**No**	126	65.6
	Yes	66	34.4
Doctor-Dietician-Nurse (Health worker)	**No**	174	90.6
	Yes	18	9.4
In School Education	**No**	187	97.4
	Yes	5	2.6
Internet, television, newspapers, etc.	**No**	121	63.0
	Yes	71	37.0
I have never been informed about this until now.	**No**	54	28.1
	Yes	138	71.9

3.6% (n=7) of the participants know exactly what the concept of food safety means. 96.4% of the participants did not know what food safety means.

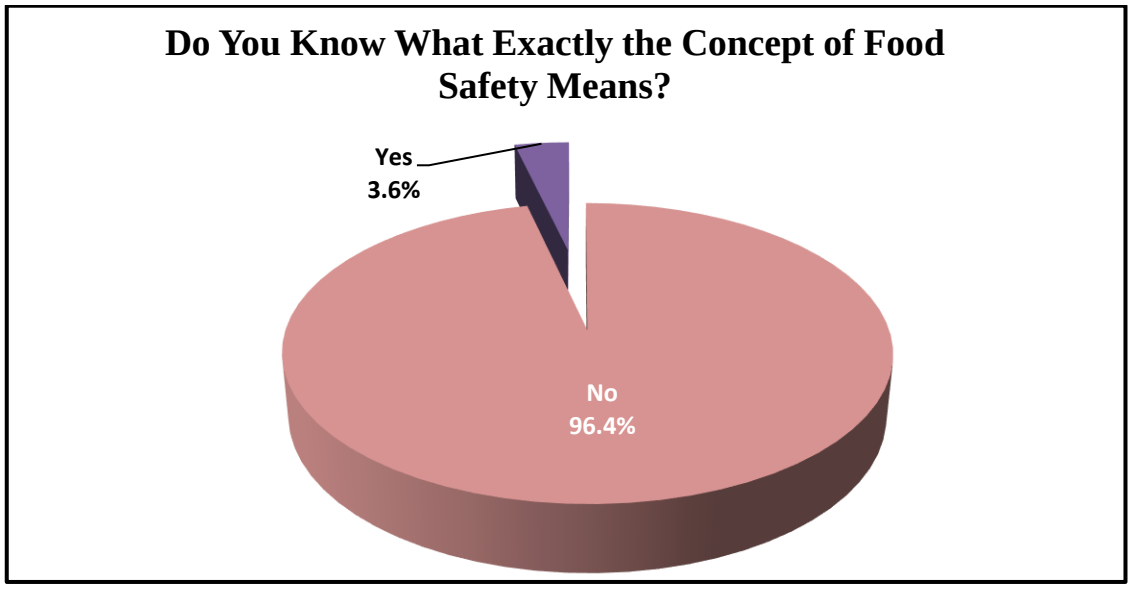


Figure 4.3. Distribution of Knowing What Exactly the Concept of Food Safety Means

Participants obtained information about nutrition and food safety from 37% (n=71) internet, television, newspapers, etc., 34.4% (n=66) family or friends, 9.4% (n=18) doctors-dietitians-nurses (health workers), 2.6% (n=5) school education. It is seen that 71.9% (n=138) of the participants have never been informed about this issue.

Table 4.5. Distribution of the Answers Given to the Questions Under the "Knowledge Level" Sub-Heading of the Data Collection Form (n=192)

	Agree		**Undecided**		**Disagree**	
	n	**%**	**n**	**%**	**n**	**%**
I do not use cracked and/or broken eggs.	**84**	**43.8**	0	0.0	108	56.3
I consume raw sausage, salami, and spicy fermented product made from raw ground beef called "sucuk."	128	66.7	0	0.0	**64**	**33.3**
I consume yogurt or cheese made from milk sold as unpasteurized.	167	87.0	0	0.0	**25**	**13.0**
I don't use sprouted potatoes and onions.	**50**	**26.0**	0	0.0	142	74.0
I consume products such as ketchup and mayonnaise that have been kept at room temperature for a long time.	114	59.4	1	0.5	**77**	**40.1**
The process of "freezing " kills microorganisms.	88	45.8	39	20.3	**65**	**33.9**
The purpose of pasteurizing milk is to kill all microorganisms in milk with the applied heat treatment.	50	26.0	80	41.7	**62**	**32.3**
I do not buy unpasteurized milk purchased from outside.	**31**	**16.1**	0	0.0	161	83.9
Frozen foods should be thawed at room temperature.	177	92.2	0	0.0	**15**	**7.8**
I do not consume food that has been left at room temperature for more than 2 hours.	**28**	**14.6**	0	0.0	164	85.4
I make and consume home-canned foods with low acidity, such as green beans and peas.	115	59.9	0	0.0	**77**	**40.1**
I separate the moldy part of a moldy food item and consume the non-moldy part.	145	75.5	0	0.0	**47**	**24.5**
I do not store opened milk in the refrigerator for more than 3 days.	**75**	**39.1**	0	0.0	117	60.9

Correct answers are written in bold.

The distribution of the participant's responses to the questions related to the knowledge level sub-heading in the data collection form is shown in Table 4.5.

Table 4.6. Distribution of Responses to "Hygiene" Sub-Heading of the Data Collection Form (n=192)

	Never		Rarely		Sometimes		Often		Always	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Before preparing food, I always wash my hands, wrists, nails, and between fingers with hot soapy water by rubbing for at least 20 seconds.	1	0.5	8	4.2	25	13.0	56	29.2	**102**	**53.1**
After washing my hands, I dry them with a clean cloth towel or clean paper towel.	11	5.7	39	20.3	43	22.4	20	10.4	**79**	**41.1**
I wash cutting boards, dishes, and kitchen counters with hot soapy water that comes in contact with products such as raw meat, fish, and chicken.	0	0.0	9	4.7	1	0.5	52	27.1	**130**	**67.7**
I consume fresh fruits and vegetables by rinsing them thoroughly under running water before eating them.	0	0.0	0	0.0	1	0.5	88	45.8	**103**	**53.6**
I thoroughly wash fruits with hard outer skins, such as watermelons and melons, before cutting them.	107	55.7	10	5.2	14	7.3	1	0.5	**60**	**31.3**
I clean the sink and kitchen counter after each use.	0	0.0	26	13.5	84	43.8	22	11.5	**60**	**31.3**
I use eggs after washing and drying them before cooking.	105	54.7	16	8.3	14	7.3	3	1.6	**54**	**28.1**
Before using canned products, I clean their lids.	106	55.2	21	10.9	21	10.9	2	1.0	**42**	**21.9**

Correct answers are written in bold.

The distribution of the participant's responses to the questions in the "Hygiene" sub-heading is as in Table 4.6.

Table 4.7. Distribution of Responses to "Food Separation" Sub-Heading of the Data Collection Form (n=192)

	Never		Rarely		Sometimes		Often		Always	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
I keep raw red meat, poultry, fish, and eggs separate from other foods in the shopping cart and refrigerator.	162	84.4	9	4.7	1	0.5	8	4.2	**12**	**6.3**
I take care that the plates, cutting boards, and knives that come into contact with raw food do not come into contact with cooked food.	5	2.6	12	6.3	2	1.0	63	32.8	**110**	**57.3**
I separate the cutting board I use for meat, chicken, fish and, the cutting board I use for fruit and vegetables.	142	74.0	0	0.0	0	0.0	0	0.0	**50**	**26.0**
After coming into contact with raw meat while preparing food, I wash my hands with hot water and soap before preparing any other food.	5	2.6	12	6.3	1	0.5	55	28.6	**119**	**62.0**
When placing foods such as meat, chicken, and fish in the refrigerator, I pay attention to putting them on the lower shelves of the cabinet or in deep containers so that their water does not leak out.	73	38.0	59	30.7	9	4.7	30	15.6	**21**	**10.9**
I pay attention to keeping the food in separate bags or containers in the refrigerator.	7	3.6	1	0.5	17	8.9	96	50.0	**71**	**37.0**

Correct answers are written in bold.

The distribution of participants' responses to the "Food Separation" sub-heading questions is in Table 4.7.

Table 4.8. Distribution of Responses to "Cooking" Sub-Heading Questions of the Data Collection Form (n=192)

	Never		Rarely		Sometimes		Often		Always	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
When consuming the egg, I take care that it is well cooked.	6	3.1	62	32.3	34	17.7	31	16.1	**59**	**30.7**
I pay attention to the meat, chicken, and fish are well cooked, and the internal temperature is 71 degrees.	1	0.5	0	0.0	11	5.7	49	25.5	**131**	**68.2**
I eat soft-boiled eggs.	**57**	**29.7**	9	4.7	45	23.4	69	35.9	12	6.3
When preparing foods containing eggs or meat, I taste them even if they are not yet cooked.	**51**	**26.6**	9	4.7	29	15.1	46	24.0	57	29.7

Correct answers are written in bold.

The distribution of the participant's responses to the "Cooking" sub-heading questions is as in Table 4.8.

Table 4.9. Distribution of Responses to "Cooling" Sub-Heading Questions of the Data Collection Form (n=192)

	Never		**Rarely**		**Sometimes**		**Often**		**Always**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
I pay attention to the refrigerator at least 4 ° C and the freezer at least -18 ° C.	97	50.5	33	17.2	25	13.0	16	8.3	**21**	**10.9**
I pack the food in the freezer in quantities to be used at one time.	6	3.1	6	3.1	24	12.5	88	45.8	**68**	**35.4**
After thawing frozen food once, I do not freeze it again.	35	18.2	35	18.2	62	32.3	24	12.5	**36**	**18.8**
I immediately consume cooked food or store it in the refrigerator after it has cooled down if it is to be consumed later.	38	19.8	78	40.6	33	17.2	28	14.6	**15**	**7.8**
I buy frozen food at the end of the shopping trip and pay attention to putting it in the freezer as soon as possible.	62	32.3	54	28.1	18	9.4	38	19.8	**20**	**10.4**

Correct answers are written in bold.

The distribution of the participant's responses to the questions under the "Cooling" sub-heading is as in Table 4.9.

Table 4.10. Distribution of the Responses to the Questions "Consumption" Sub-heading of the Data Collection Form (n=192)

	I have never consumed		**I avoid**		**I consume less**		**No Changes**		**I consume more**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Foods you don't know how to prepare, such as salads containing raw vegetables	**16**	**8.3**	21	10.9	56	29.2	98	51.0	1	0.5
Unwashed vegetables or fruit	**83**	**43.2**	26	13.5	64	33.3	18	9.4	1	0.5
Raw or undercooked eggs	**51**	**26.6**	12	6.3	6	3.1	112	58.3	11	5.7
Unpasteurized milk purchased from outside	**19**	**9.9**	2	1.0	0	0.0	44	22.9	127	66.1
Moldy cheeses	**126**	**65.6**	4	2.1	1	0.5	27	14.1	34	17.7
Unpackaged buttermilk (“ Unpackaged Ayran”)	**55**	**28.6**	7	3.6	6	3.1	87	45.3	37	19.3
Processed raw meat such as “sucuk,” salami, sausage	**33**	**17.2**	10	5.2	30	15.6	117	60.9	2	1.0
Raw and/or undercooked meat, poultry, or fish	**136**	**70.8**	6	3.1	7	3.6	43	22.4	0	0.0
“Çiğ köfte” (food made from raw minced meat and finely ground bulgur)	**19**	**9.9**	2	1.0	26	13.5	125	65.1	20	10.4
Raw fish (sushi)	**187**	**97.4**	3	1.6	1	0.5	1	0.5	0	0.0
Mussels, “kokoreç” (food made by cooking lamb intestines on the embers)	**105**	**54.7**	4	2.1	37	19.3	43	22.4	3	1.6
Canned tuna fish	**96**	**50.0**	**4**	**2.1**	**11**	**5.7**	49	25.5	32	16.7
Tap water or water from an unknown source	**135**	**70.3**	3	1.6	1	0.5	46	24.0	7	3.6
Coffee	**33**	**17.2**	**4**	**2.1**	**90**	**46.9**	57	29.7	8	4.2
Tea	**9**	**4.7**	**1**	**0.5**	**72**	**37.5**	62	32.3	48	25.0

Correct answers are written in bold.

The distribution of participant’s responses to the "Consumption" sub-heading questions is as in Table 4.10.

Since the questions on " Determination of the Knowledge Level, Attitudes and Food Availability of Pregnant Women About Food Safety: Çerkezköy Country Sample" were given in various categories, it was found appropriate to look at the validity and reliability through test-retest, Kuder Richardson 20 reliability of the headings and item analysis of the answers to the questions.

Table 4.11. Distribution of Internal Consistencies

	Number of Questions	Mean±SD	Median (Min-Max)	Kuder Richardson 20
Knowledge Level	13	28.04±24.20	23.1 (0-92.3)	***0.814***
Hygiene	8	41.02±32.85	43.8 (0-100)	***0.850***
Food Separation	6	33.25±28.31	33.3 (0-100)	***0.756***
Cooking	4	38.80±35.24	25 (0-100)	***0.771***
Cooling	5	16.67±22.36	0 (0-100)	***0.603***
Consumption	15	44.62±22.68	46.67 (6.67-100.0)	***0.823***
Total Score	51	35.28±21.58	37.2 (2-80.4)	***0.940***

**Scores are converted to percentile.*

The study evaluated the answers to 51 questions in 6 categories, with the highest score as 5 and the lowest as 1. However, since it is more understandable to obtain a score according to the correct answers given to each question and to convert it to a hundred-point scale and make the evaluations over 100 points, each participant's total score was evaluated by converting it to a hundred-point scale. The scores obtained accordingly;

Participant’s scores on the "Knowledge Level" sub-heading ranged from 0 to 92.3, with an average score of 28.04±24.20; scores on the "Hygiene" sub-heading ranged from 0 to 100, with an average score of 41.02±32.85; scores on the "Food Separation" sub-heading ranged from 0 to 100, with an average score of 33.25±28.31; "Cooking" sub-heading ranged between 0 and 100, with a mean score of 38.80±35.24; "Cooling" sub-heading ranged between 0 and 100, with an average score of 16.67±22.36; "Consumption" sub-heading ranged between 6.67 and 100, with an average score of

44.62±22.68. The total scores of the participants from all sub-headings ranged between 2 and 80.4, and the average score was 35.28±21.58.

When the internal consistencies of " Determination of the Knowledge Level, Attitudes and Food Availability of Pregnant Women About Food Safety: Çerkezköy Country Sample"; KR=0.814 for the "Knowledge Level" sub-heading, KR=0.850 for the "Hygiene" sub-heading, KR=0.756 for the "Food Separation" sub-heading, KR=0.771 for the "Cooking" sub-heading, α=0.603 for the "Cooling" sub-heading, α=0.823 for the "Consumption" sub-heading, and the Kuder Richardson-20 coefficient of the data collection form of the study is 0.940, accordingly, it is seen that the scale is highly reliable.

Table 4.12. Item Analysis of Data Collection Form

		Upper 27%	Lower 27%	[a]p
		Mean±SD	Mean±SD	
Knowledge Level	I do not use cracked and/or broken eggs .	2.94±0.35	1.27±0.69	***0.001****
	I consume raw sausage, salami, and spicy fermented product made from raw ground beef called "sucuk."	1.03±0.25	2.62±0.8	***0.001****
	I consume yogurt or cheese made from milk sold as unpasteurized.	1.00±0	1.77±0.98	***0.001****
	I don't use sprouted potatoes and onions.	3.00±0	1.77±0.98	***0.001****
	I consume products such as ketchup and mayonnaise that have been kept at room temperature for a long time.	1.11±0.43	2.42±0.91	***0.001****
	The process of "freezing " kills microorganisms.	1.33±0.56	2.46±0.87	***0.001****
	The purpose of pasteurizing milk is to kill all microorganisms in milk with the applied heat treatment.	1.98±0.57	2.12±0.94	***0.001****
	I do not buy unpasteurized milk purchased from outside.	3.00±0	2.08±1.01	***0.001****
	Frozen foods should be thawed at room temperature.	1.00±0	1.46±0.85	***0.001****
	I do not consume food that has been left at room temperature for more than 2 hours.	2.97±0.25	2.23±0.98	***0.001****
	I make and consume home-canned foods with low acidity, such as green beans and peas.	1.12±0.48	2.54±0.85	***0.001****
	I separate the moldy part of a moldy food item and consume the non-moldy part.	1±0	2.12±1.00	***0.001****
	I do not store opened milk in the refrigerator for more than 3 days.	2.94±0.35	1.46±0.85	***0.001****
Hygiene	Before preparing food, I always wash my hands, wrists, nails, and between fingers with hot soapy water by rubbing for at least 20 seconds.	3.62±0.85	4.97±0.24	***0.001****
	After washing my hands, I dry them with a clean cloth towel or clean paper towel.	2.68±0.89	4.81±0.74	***0.001****
	I wash cutting boards, dishes, and kitchen counters with hot soapy water that comes in contact with products such as raw meat, fish, and chicken.	3.91±0.86	5.00±0	***0.001****
	I consume fresh fruits and vegetables by rinsing them thoroughly under running water before eating them.	4.00±0.17	4.97±0.17	***0.001****
	I thoroughly wash fruits with hard outer skins, such as watermelons and melons, before cutting them.	1.21±0.66	3.5±1.77	***0.001****
	I clean the sink and kitchen counter after each use.	2.78±0.54	4.71±0.73	***0.001****
	I use eggs after washing and drying them before cooking.	1.25±0.78	3.43±1.79	***0.001****
	Before using canned products, I clean their lids.	1.28±0.81	3.53±1.63	***0.001****

*[a]Student-Test, **p<0,01*

Table 4.12. Item Analysis of Data Collection Form (continue)

		Upper 27%	Lower 27%	[a]p
		Mean±SD	**Mean±SD**	
Food Separation	I keep raw red meat, poultry, fish, and eggs separate from other foods in the shopping cart and refrigerator.	1.04±0.19	2.07±1.63	***0.001****
	I take care that the plates, cutting boards, and knives that come into contact with raw food do not come into contact with cooked food.	3.63±1.16	4.88±0.38	***0.001****
	I separate the cutting board I use for meat, chicken, and fish and the cutting board I use for fruit and vegetables.	1,00±0	3,29±2,00	***0,001****
	After coming into contact with raw meat while preparing food, I wash my hands with hot water and soap before preparing any other food.	3,63±1,19	4,96±0,19	***0,001****
	When placing foods such as meat, chicken, and fish in the refrigerator, I pay attention to putting them on the lower shelves of the cabinet or in deep containers so that their water does not leak out.	1.75±0.89	2.80±1.74	***0.001****
	I pay attention to keeping the food in separate bags or containers in the refrigerator.	3.47±1.05	4.75±0.44	***0.001****
Cooking	When consuming the egg, I take care that it is well cooked.	2.6±0.8	4.36±1.18	***0.001****
	I pay attention to the meat, chicken, and fish are well cooked, and the internal temperature is 71 degrees.	3.91±0.66	4.95±0.3	***0.001****
	I eat soft-boiled eggs.	3.68±0.6	1.75±1.24	***0.001****
	When preparing foods containing eggs or meat, I taste them even if they are not yet cooked.	4.46±0.57	2.16±1.46	***0.001****
Cooling	I pay attention to the refrigerator at least 4 ° C and the freezer at least -18 ° C.	1.25±0.58	3.16±1.51	***0.001****
	I pack the food in the freezer in quantities to be used at one time.	3.44±1.00	4.52±0.79	***0.001****
	After thawing frozen food once, I do not freeze it again.	2.40±0.80	3.52±1.61	***0.001****
	I immediately consume cooked food or store it in the refrigerator after it has cooled down if it is to be consumed later.	1.60±0.70	3.29±1.23	***0.001****
	I buy frozen food at the end of the shopping trip and pay attention to putting it in the freezer as soon as possible.	2.6±0.80	4.36±1.18	***0.001****

[a]*Student-Test*

***p<0,01*

Table 4.12. Item Analysis of Data Collection Form (continue)

		Upper 27%	Lower 27%	[a]p
		Mean±SD	Mean±SD	
Consumption	Foods you don't know how to prepare, such as salads containing raw vegetables	3.45±0.59	3.23±1.22	***0.001****
	Unwashed vegetables or fruit	3.11±0.69	1.16±0.44	***0.001****
	Raw or undercooked eggs	3.95±0.53	1.89±1.37	***0.001****
	Unpasteurized milk purchased from outside	4.7±0.79	3.99±1.56	***0.001****
	Moldy cheeses	3.73±1.69	1.1±0.51	***0.001****
	Unpackaged buttermilk (“ Unpackaged Ayran”)	4.48±0.63	1.99±1.39	***0.001****
	Processed raw meat such as “sucuk,” salami, sausage	3.91±0.36	2.29±1.32	***0.001****
	Raw and/or undercooked meat, poultry, or fish	3.23±1.24	1.00±0	***0.001****
	“Çiğ köfte” (food made from raw minced meat and finely ground bulgur)	3.95±0.65	3.34±1.25	***0.001****
	Raw fish (sushi)	1.02±0.15	1.00±0	***0.001****
	Mussels, “kokoreç” (food made by cooking lamb intestines on the embers)	3.25±1.16	1.19±0.69	***0.001****
	Canned tuna fish	4.27±0.97	1.24±0.81	***0.001****
	Tap water or water from an unknown source	3.32±1.38	1.40±1.07	***0.001****
	Coffee	3.80±0.46	2.37±1.24	***0.001****
	Tea	4.32±0.52	3.36±1,1	***0.001****

[a]*Student-Test*
***p<0,01*

The scores of the participants in the upper 27% group on all questions in the questionnaire were statistically significantly higher than those in the lower 27% group (p=0.001; p<0.01). The fact that the lower and upper limits of the questions are different from each other shows the consistency of the answers given.

Table 4.13. Distribution of Responses to the " Household Food Security Survey Module- Short Form (HFSSM-SF)" Questions

		n	%
1. The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more.	**Doesn't Know**	0	0.0
	Never True	54	28.1
	Sometimes True	78	40.6
	Often True	60	31.3
2. I cannot reach balanced meals (Balanced meals consist of: milk group: milk yogurt, cheese, cottage cheese; meat and egg group: meat, chicken, fish, eggs, legumes, fresh vegetables and fruits, cereals: Bread, rice, bulgur, flour, pasta, daily oil, sugar group: solid oil, honey, jam, molasses)	**Doesn't Know**	0	0.0
	Never True	37	19.3
	Sometimes True	46	24.0
	Often True	109	56.8
3. In the last 12 months, did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?	**Doesn't Know**	0	0.0
	No	120	62.5
	Yes	72	37.5
4. How often the situation in question 3 happens? *(this question was only answered by those who answered yes to question 3)*	**Doesn't Know**	0	0.0
	Only one or two months	11	5.7
	Some months but not every months	36	18.8
	Almost every month	25	13.0
5. Did you ever eat less than you felt you should because there wasn't enough money for food?	**Doesn't Know**	0	0.0
	No	92	47.9
	Yes	100	52.1
6. Have you ever been so hungry that you couldn't eat because you had little money?	**Doesn't Know**	0	0.0
	No	166	86.5
	Yes	26	13.5

The distribution of the participant's responses to the " Household Food Security Survey Module- Short Form (HFSSM-SF)" questions is shown in Table 4.13.

Table 4.14. Score Distribution of " Household Food Security Survey Module- Short Form (HFSSM-SF)"

	Number of Questions	Mean±SD	Median (Min-Max)	Cronbach's Alpha
Household Food Security Survey Module- Short Form (HFSSM-SF) Total Score	6	2.04±1.95	2 (0-6)	***0.829***

Participants were given 1 point if they marked "Often True" for items 1, 2, 4 and "Yes" for items 3, 5 and 6, and 0 point if they marked the other options.

The scores of the participants from the " Household Food Security Survey Module- Short Form (HFSSM-SF)" vary between 0 and 6; the average score is 2.04±1.95. Accordingly, we can say that food security is low.

The Cronbach's Alpha coefficient of the total " Household Food Security Survey Module- Short Form (HFSSM-SF)" is 0.829. Accordingly, it is seen that the scale is highly reliable.

Table 4.15. Comparison of Educational Status and the Sub-heading of the Data Collection Form (n=192)

Scores	Mean±SD Median (Min-Max)				p
	Educational Status				
	Primary School (n=55)	Secondary School (n=68)	High School (n=43)	University (n=26)	
Knowledge Level	23.07±21.80 15.4 (0-76.9)	26.92±21.89 23.1 (0-84.6)	28.97±21.22 30.8 (0-84.6)	39.93±34.67 38.5 (0-92.3)	***[a]0.031****
Hygiene	37.95±33.93 37.5 (0-100)	38.97±31.85 37.5 (0-100)	43.31±36.02 50 (0-100)	49.04±27.37 62.5 (0-87.5)	***[a]0.478***
Food Separation	29.10±26.88 33.3 (0-100)	29.17±25.50 33.3 (0-83.4)	35.67±28.08 33.3 (0-83.4)	48.73±33.98 50 (0-100)	***[a]0.013****
Cooking	42.27±38.15 25 (0-100)	34.93±34.32 25 (0-100)	40.12±33.25 25 (0-100)	39.42±35.48 25 (0-100)	***[a]0.703***
Cooling	17.82±19.88 20 (0-60)	10.29±15.64 0 (0-80)	21.40±27.04 20 (0-100)	23.08±29.77 20 (0-100)	***[b]0.058***
Consumption	44.36±25.44 46.7 (6.7-100)	41.57±21.83 40 (6.7-86.7)	49.46±22.55 53.3 (6.7-86.7)	45.13±18.31 40 (13.3-80)	***[a]0.363***
Total	33.36±22.80 29.4 (2-76.4)	32.37±19.95 32.3 (3.9-70.6)	38.15±21.89 39.2 (3.9-68.6)	42.22±21.60 45.1 (7.8-80.4)	***[a]0.163***

[a]One Way Anova Test & Bonferroni Test,
[b]Kruskal Wallis Test
**p<0,05*

A statistically significant difference was found between the "knowledge level scores" of the participants according to their education level (p=0.031; p<0.05). As a result of the pairwise comparisons made in order to determine the source of the difference, The knowledge level scores of primary school graduates were significantly lower than university graduates (p=0.020; p<0.05).

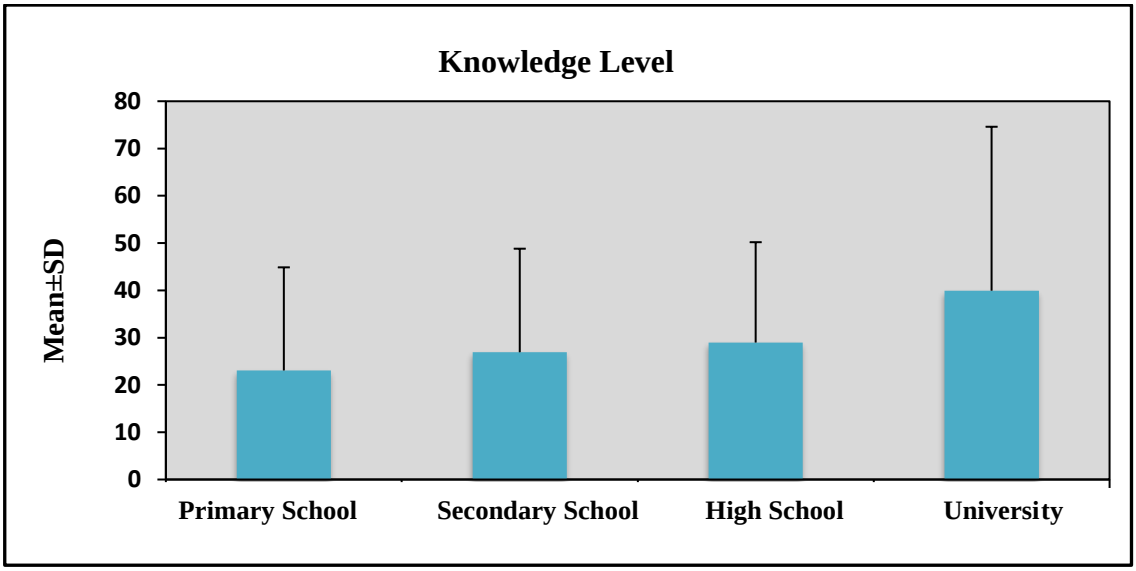


Figure 4.4. Distribution of Knowledge Level Score According to Educational Status

There was no statistically significant difference in the hygiene scores of the participants according to educational status ($p>0.05$).

There was a statistically significant difference between the food separation scores of the participants according to educational status ($p=0.013$; $p<0.05$). As a result of pairwise comparisons made to determine the source of the difference, the food separation score of primary and secondary school graduates was significantly lower than that of university graduates ($p=0.020$; $p=0.015$; $p<0.05$).

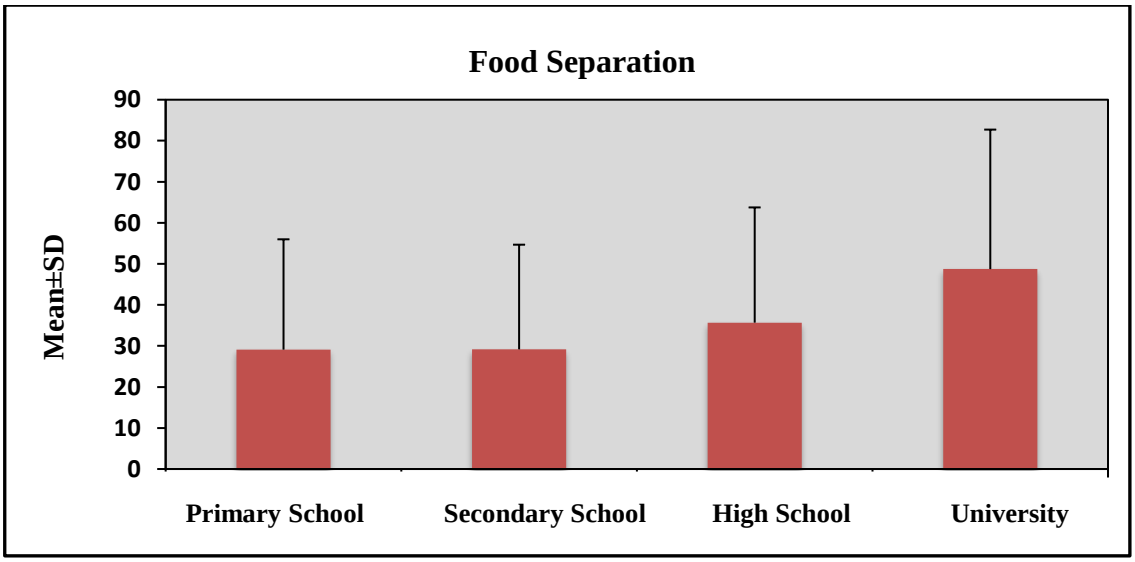


Figure 4.5. Distribution of Food Separation Score by Educational Status

The participants' cooking, cooling, consumption and total scores do not show statistically significant differences according to educational status (p>0.05).

Table 4.16. Comparison of BMI Value and Subheadings of the Data Collection Form

Scores	**Mean±SD** **Median (Min-Max)**			**p**
	BMI Classification			
	Normal Weight (n=109)	**Overweight (n=55)**	**Obese (n=28)**	
Knowledge Level	29.14±24.23 23.1 (0-92.3)	25.03±24.15 23.1 (0-92.3)	29.66±24.56 30.8 (0-84.6)	***[a]0.551***
Hygiene	39.22±33.87 37.5 (0-100)	42.50±30.10 50 (0-100)	45.09±34.58 43.8 (0-100)	***[a]0.650***
Food Separation	35.33±29.38 33.3 (0-100)	30.01±26.34 33.3 (0-83.4)	31.55±28.09 33.3 (0-83.4)	***[a]0.497***
Cooking	38.07±36.10 25 (0-100)	40.45±36.16 25 (0-100)	38.39±30.79 37.5 (0-100)	***[a]0.919***
Cooling	15.41±20.48 0 (0-100)	18.18±24.12 0 (0-100)	18.57±26.06 0 (0-100)	***[b]0.907***
Consumption	43.85±22.72 40 (6.7-100)	44.85±23.29 46.7 (6.7-80)	47.14±21.92 53.3 (6.7-86.7)	***[a]0.790***
Total	35.12±21.94 37.2 (3.9-78.4)	34.71±21.24 37.2 (2-80.4)	37.03±21.49 36.3 (2-68.6)	***[a]0.893***

[a]One Way Anova Test
[b]Kruskal Wallis Test
**p<0,05*

According to BMI, participant's knowledge level, hygiene, food separation, cooking, cooling, consumption and total scores do not show statistically significant difference (p>0.05).

Table 4.17. The Relationship between "HFSSM-SF" and Data Collection Form"

Scores		**Household Food Security Survey Module- Short Form (HFSSM-SF) Total**
Knowledge Level	$\mathbf{r_s}$	-0.189
	p	***0.009*****
Hygiene	$\mathbf{r_s}$	-0.147
	p	***0.042****
Food Separation	$\mathbf{r_s}$	-0.105
	p	***0.147***
Cooking	$\mathbf{r_s}$	-0.163
	p	***0.024****
Cooling	$\mathbf{r_s}$	-0.030
	p	***0.680***
Consumption	$\mathbf{r_s}$	-0.155
	p	***0.032****
Food Safety Total	$\mathbf{r_s}$	-0.176
	p	***0.015****

r_s: Spearman Correlation Test
**p<0,05*
***p<0,01*

There was a very weak statistically significant negative correlation between the total score of the "HFSSM-SF" and the score of Pregnant Women's Food Safety "Knowledge Levels" (as the total score of the HFSSM-SF increases, the score of Pregnant Women's Food Safety "Knowledge Levels" decreases) (r=-0.189; p=0.009; p<0.01).

There was a very weak statistically significant negative correlation between the total score of the HFSSM-SF and the Food Safety "Hygiene" sub-dimension score of pregnant women (as the total score of the HFSSM-SF increases, the Food Safety "Hygiene" sub-dimension score of pregnant women decreases) (r=-0.147; p=0.042; p<0.05).

The total score of the participant's HFSSM-SF and the sub-dimension score of "Food Separation" do not show a statistically significant relationship (p>0.05).

There was a very weak statistically significant negative correlation between the total score of the HFSSM-SF and the Food Safety "Cooking" sub-dimension score of pregnant women (as the total score of the HFSSM-SF increases, the Food Safety

"Cooking" sub-dimension score of pregnant women decreases) (r=-0.163; p=0.024; p<0.05).

The total score of the participant's HFSSM-SF and the sub-dimension score of Food Safety "Cooling" of Pregnant Women do not show a statistically significant relationship (p>0.05).

There was a statistically very weakly significant negative correlation between the total score of the HFSSM-SF and the Food Security "Consumption" sub-dimension score of pregnant women (as the total score of the HFSSM-SF increases, the Food Security "Consumption" sub-dimension score of pregnant women decreases) (r=-0.155; p=0.032; p<0.05).

There was a very weak statistically significant negative correlation between the total score of the HFSSM-SF and the total score of Food Security of Pregnant Women (as the total score of the HFSSM-SF increases, the total score of Food Security of Pregnant Women decreases) (r=-0.176; p=0.015; p<0.05).

5. DISCUSSION AND CONCLUSION

There is a risk of low awareness regarding food safety in pregnant women in our country due to insufficient data (1). Assessing food safety knowledge among pregnant women in a specific sample in our country is crucial to draw attention to more extensive research. While food safety is vital for all people, it must be approached with great care and attention to detail, particularly for pregnant women(17,69). For this reason, the mother must be fed adequate and balanced nutrition as well as safe foods during pregnancy (21).

This study was conducted with 192 voluntary pregnant participants to determine pregnant women's knowledge levels about food safety, attitudes, and food availability. In this study, the knowledge levels of pregnant women about food safety are low. Their scores for performing the right application of food safety practices are low. According to food security levels, pregnant women had low food security.

When the studies conducted to measure the level of knowledge about food safety are examined, it is seen that when the researcher creates the data collection form as in this study, the subheadings "knowledge level, hygiene, food separation, cooking, cooling" are included in the data collection form, or even if there are no subheadings, it is seen that the questions covering these subheadings are included in the data collection form. In this context, this study is similar to other studies conducted to determine the level of knowledge about food safety in terms of the questions mentioned (66,82–89).

In a study conducted in Slovenia with 291 pregnant participants to determine the level of knowledge about food safety, a pilot study with 30 participants was conducted because the researcher created the data collection form. In this context, the reliability and validity of the data collection form were tested by conducting a pilot study with a similar number of participants as in this study (84).

In many studies, researchers generally create data collection forms to determine the level of knowledge about food safety. In this case, it can be said that there is a need for reliable and validated scales specially prepared to evaluate food safety in various risk groups.

The ages of the pregnant women who participated in this study ranged between 18 and 45 years, and the mean age was 27.00±5.00 years. When similar studies are analyzed, it is generally seen that the age range of the majority of the participants is 26-30 years, as in this study (66,83,84).

In this study, the distribution of the educational status of the participants was as follows: 28.6% (n=55) were primary school graduates, 35.4% (n=68) were secondary school graduates, 22.4% (n=43) were high school graduates and 13.5% (n=26) were university graduates. When the findings are compared with similar studies, it is seen that, unlike this study, high school graduates are more common (19,83).

The Turkish Nutrition Guide 2022 stated that most pregnant women in Turkey were “overweight” according to the pre-pregnancy BMI classification (47). In this study, the pre-pregnancy BMI of the participants was determined as 25.38±4.46 kg/m^2. That is, the findings in this study support this information.

In this study, it is seen that 96.4% of the participants do not know exactly what the concept of food safety means. Such a high rate may be due to the fact that the majority of the participant’s education level is secondary school graduates. This is because when the studies in the literature are analyzed, it is generally seen that the level of knowledge increases as the level of education increases in terms of the level of knowledge.

The study determined that 71.9% (n=138) of the participants had never been informed about food safety before. In addition, most of the answers to the question "Where do you get information about food safety?" were "internet and television." In this case, it may indicate that television and the internet can be used to provide accurate information to individuals by disseminating internet platforms and television programs containing safe information in educating a group with low education level, but the majority of which is composed of young people. However, the fact that the majority stated that they received information via the Internet and television and, at the same time, their knowledge level was found to be low may indicate that inaccurate information is also widespread on the Internet. This situation may also suggest that the authorities should take various measures to limit the inaccurate information shared over the Internet.

In the study, the second most common source for obtaining information on food safety is the response "family and friends." This finding is in line with the findings of a study conducted in Sweden with 606 participants (82). However, in this study, it has been shown that participants who take food safety from their family and friends have lower food safety knowledge (82). However, it was observed that the participants who stated that they received information about food safety in school education had a higher level of food safety knowledge. This situation shows the advantage of receiving food safety education earlier. Although it is necessary to provide food safety education to a risky

group such as pregnant women, it can be said that it would be even more advantageous to instruct this subject at an earlier age, even within school education.

As a remarkable finding in the study, only 9.4% (n=18) of the participants stated that they received information on food safety from a doctor-dietician-nurse. This meager percentage may indicate that health professionals, who may be the most knowledgeable about this issue, are not sufficiently accessible to provide individuals with the correct information. In this sense, the necessity of free and easily accessible training where health professionals can transfer knowledge on food safety should not be forgotten.

In this study, six subheadings in the data collection form were created to evaluate the level of knowledge and attitudes about food safety. Among these subheadings, the " knowledge level" subheading mainly measures the level of knowledge, while the other subheadings evaluate attitudes as well as knowledge level. The answers given by the participants were converted into a 100-point system to make the evaluation more comfortable. The average score they received from the "Knowledge Level" sub-heading was 28.04±24.20; the "Hygiene" subheading was 41.02±32.85; the "Food Separation" sub-heading was 33.25±28.31; "Cooking" subheading was 38.80±35.24; "Cooling" sub-heading was 16.67±22.36; and "Consumption" subheading was 44.62±22.68. The mean total score they received from all subdimensions was 35,28±21,58. According to these findings, it is seen that the participants have a low level of food safety knowledge and a high rate of wrong food safety practices. These findings provide answers to the research questions in the study and also support the hypothesis that was initially established in the study. In addition, the findings are in line with some studies on pregnant women (19,22,83).

In 2016, a study was conducted in an Australian tertiary hospital with 223 participants to determine the level of knowledge of pregnant women, the level of knowledge was found to be low, and 83% did not know the foods to be avoided during pregnancy (22). In another study conducted in Florida with 299 pregnant and mother participants, the level of food safety knowledge was found to be low in general, and especially the knowledge level of women with first pregnancy was lower than the others. For this reason, it was emphasized that, especially for food safety training, it is necessary to give education (19).

According to the HFSSM-SF scale used to measure the food availability of pregnant women in the study, the mean score of food security of pregnant women was 2.04±1.95. Accordingly, it was determined that pregnant women participating in the study

had low food security. When this finding in this study is compared with the findings of a pilot study conducted in Australia with 303 pregnant women to determine food security in pregnant women, it is seen that the results are different from each other. Only 5.9% of pregnant women in the Australian study had low food security (90). There may be many reasons for this difference, but the main reason is the different levels of welfare in the countries where the studies were conducted. While Turkey is a developing country, Australia is a developed country.

According to the findings in this study, the subheading with the lowest score was "cooling." In this category, the most wrong-marked food safety practices are: "I consume cooked food immediately, or if it is to be consumed later, I keep it in the refrigerator after it cools quickly." Only 7.8% of the participants answered "always" to this statement. Compared to the findings of a similar study conducted in Florida, one-third of the participants gave a similar response (19). In other words, in general, although this item is one of the most incorrectly performed applications in many studies, it is seen that the rate of incorrectness of the participants in our study is much higher. This situation may again be related to the level of education.

In the study, the item with the highest rate of food safety misapplication under the knowledge level sub-heading was "thawing frozen foods at room temperature." 92.2% of the participants stated that they thaw frozen foods at room temperature. This finding is similar to a study on food safety and practices conducted in Slovenia with 291 pregnant and 200 non-pregnant women participants (84). In this study, thawing frozen foods was one of the most common practices pregnant women were wrong about (84).

As a remarkable finding, 83.9 % of the respondents disagreed with the statement, "I do not buy unpasteurized milk." Although it is one of the most critical issues to be considered during pregnancy, it is seen that the majority of the participants have wrong information on this issue. This may be due to the fact that animal husbandry is widespread in the region where the study was conducted, and the level of education is low.

In this study, the item "I separate the moldy part of a moldy food item and consume the unmolded part" was agreed upon by 75.5% of the participants. The rate of participants who disagreed with the option "I do not use cracked and broken eggs" was 56.3%. In addition, 74% of the respondents indicated "disagree" with the item "I do not use sprouted potatoes." An important issue that should be noted here is the following; It should be noted that the pregnant women in this study had low food security. In light of this information and the findings just mentioned, access to food may become more

important than food security for economic reasons. In other words, although they know that a cracked egg or moldy cheese should not be consumed, when it comes to the implementation stage, wrong food safety practices may be carried out due to economic inadequacies (5,26,28,31,91,92).

There was a very weak statistically significant negative correlation between the total score of the HFSSM-SF Scale and the total score of the data collection form (as the total score of the HFSSM-SF Scale increases, the total score of Food Safety of Pregnant Women decreases). This finding may indicate that as food security decreases, good practices regarding food safety also decrease. For example, they cannot throw away the broken egg for economic reasons or use a moldy tomato paste by separating the moldy part.

In this study, a statistically significant difference was found between the food safety knowledge levels of the participants according to their education level. Primary school graduates' knowledge level scores were significantly lower than university graduates. This may indicate that food safety knowledge can be affected by education level. However, the hygiene scores of the participants do not show a statistically significant difference according to their education level. This may mean participants with the right food safety knowledge can still engage in wrong practices. For this reason, besides increasing the knowledge level by organizing various training on food safety, another important aim should be to improve the right food safety practices.

There are three limitations in this study. The first one is that the questionnaire questions were asked to the participants by the researcher. In this case, participants may have given inaccurate answers because they hesitated to answer some questions. For example, some individuals may have provided an inaccurate answer to the question "Have you ever been unable to eat for economic reasons even though you are hungry?" in the household food security survey module. Although some individuals may be experiencing this situation, they may have given an inaccurate answer due to economic inadequacies. The second limitation is that food safety practices are self-reported, but actual practices have not been observed.

For this reason, participants may have given different answers than they actually practice because they do not want to accept the bad practice, even if they know the right thing. However, they still perform the wrong practice as an attitude in real life. The third limitation is that the study was conducted only in family health centers; private hospitals and clinics were not included. Since family health centers are institutions that provide

free services, many of the participants who apply here may be people who do not have the financial ability to go to private hospitals or clinics. This situation may include pregnant women with low income compared to the general population.

In conclusion, this study's results show that pregnant women's knowledge levels about food safety are low. Their scores for performing the right application of food safety practices are low. According to food security levels calculated according to the HFSSM-SF scale, pregnant women had low food security. In addition, the high rate of participants who do not know exactly what food safety means and the high rate of participants who stated that they had never been informed about this issue before is another indicator of a lack of knowledge about food safety. Nevertheless, in light of the limitations mentioned above, it is necessary to conduct large-scale studies to interpret the study results in general. In terms of the participant profile (in terms of economic status and educational level), studies should be conducted in which private and public institutions with more diverse participants (to accommodate participants from different economic classes together), and the number of samples should be larger so that it would be more appropriate to generalize the obtained results. To increase the level of knowledge about food safety, dietitians can be assigned to not only community health centers but also family health centers so that it may be easier to ensure that adequate and necessary information about food safety is provided.

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7. APPENDICES

7.1. Appendix-1 Ethical Approval

T.C. YEDİTEPE ÜNİVERSİTESİ
GİRİŞİMSEL OLMAYAN KLİNİK ARAŞTIRMALAR
ETİK KURULU

Versiyon No 1.0
Sayfa 1 / 2

KARAR FORMU

3.12.2021

ETİK KURUL BİLGİLERİ	Etik Kurulun Adı	Yeditepe Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu
	Açık Adres	Yeditepe Üniversitesi Diş Hekimliği Fakültesi, Bağdat Cad. No. 238 Göztepe 34728 Kadıköy, İstanbul
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DEĞERLENDİRİLEN BELGELER	Islak imzalı başvuru dosyası, CD'si ve elektronik başvuru	☒
	Araştırma başlığı ve araştırmacıların isimleri	☒
	Başvuru dilekçesi	☒
	Araştırmanın;	☒
	• Niteliği	☒
	• Önemi ve özgün değeri	☒
	• Amaç ve hedefleri	☒
	• Yöntemi	☒
	• Yönetimi	☒
	• Yaygın etkisi	☒
	• Araştırma bütçesi (Mevcutsa)	☒
	• Süresi ve uygunluğu (Zaman cetveli)	☒
	• Kaynakları	☒
	Araştırma izin belgesi / belgeleri	☒
	Bilgilendirilmiş Gönüllü Olur Formu (yapılan araştırmaya özel olarak hazırlanmış)	☒
	Taahhütname-1 Dünya Tıp Birliği Helsinki Bildirgesinin son versiyonunun ve Sağlık Bakanlığı'nın ilgili tüm kılavuzlarının okunmasına dair taahhüt	☒
	Taahhütname-2 Daha önce yapılmış etik kurul başvuruları mevcut olup olmadığına dair taahhüt	☒
	Taahhütname-3 Araştırma sırasında araştırma bütçesinde yer almayan ve gönüllünün kendisine veya Sosyal Güvenlik Kurumuna ek yük getirecek hiçbir işlem uygulanmayacağına dair taahhüt	☒
	Taahhütname-4 COVID-19 hastalarında tedavi yaklaşımları ve bilimsel araştırmalar genelgesi okunmasına dair taahhüt	☒
	Araştırmacıların her birisine ait özgeçmiş formu	☒
	Ek belgeler (Varsa kullanılan ölçek izinleri vb.)	☒

KARAR BİLGİLERİ	Başvuru Numarası	202110102
	Toplantı Tarihi	19.11.2021
	Toplantı Yeri	Çevirim içi (Google Meet)
	Karar No	19

Araştırmanın Başlığı	Gebelerin gıda güvenliği ile ilgili bilgi düzeylerinin, tutumlarının ve besine ulaşılabilirliklerinin saptanması: Çerkezköy ilçesi örneği
Araştırmacılar	Dyt. Beyza Kurt, Dr. Öğr. Üyesi İrem Kaya Cebioğlu

BAŞVURU NUMARASI: 202110102

KARAR 3.12.2021

☒ **KABUL**	☐ **RET** ☐ *KAPSAM DIŞI (GİRİŞİMSEL)* ☐ *BİLİMSEL VE/VEYA ETİK KURALLARA AYKIRI* ☐ *BİR SORUMLU ARAŞTIRMACININ (TEZ İSE TEZ DANIŞMANI), BİR TOPLANTIYA **İKİ (2) ADETTEN FAZLA ÇALIŞMA BAŞVURUSUNDA** BULUNMASI* ☐ *KURUM İÇİ BAŞVURULARINDA **YEDİTEPE UZANTILI E-POSTA HESABI** İLE GİRİŞ YAPILMAMIŞ OLMASI* ☐ *ŞARTLI KABULDE BELİRTİLEN REVİZYONLARIN ZAMANINDA VE/VEYA İSTENİLDİĞİ ŞEKİLDE YAPILMAMIŞ OLMASI*

	Katılım		İlişki	
Prof. Dr. Didem ÖZDEMİR ÖZENEN **Başkan**	☐Var	☐Yok	☐Var	☐Yok
Doç. Dr. Gökhan ERTAŞ **Başkan Yardımcısı**	☐Var	☐Yok	☐Var	☐Yok
Doç. Dr. Elif SUNGURTEKİN EKÇİ **Raportör**	☐Var	☐Yok	☐Var	☐Yok
Prof. Dr. Feryal SUBAŞI **Üye**	☐Var	☐Yok	☐Var	☐Yok
Doç. Dr. Mehmet Engin CELEP **Üye**	☐Var	☐Yok	☐Var	☐Yok
Dr. Öğr. Üyesi E. Çiğdem KELEŞ **Üye**	☐Var	☐Yok	☐Var	☐Yok
Dr. Öğr. Üyesi Binnur OKAN BAKIR **Üye**	☐Var	☐Yok	☐Var	☐Yok
Dr. Öğr. Üyesi E. Nur ÖZDAMAR **Üye**	☐Var	☐Yok	☐Var	☐Yok
Dr. Öğr. Üyesi SEVİM ŞEN **Üye**	☐Var	☐Yok	☐Var	☐Yok

Araştırmanın Başlığı	Gebelerin gıda güvenliği ile ilgili bilgi düzeylerinin, tutumlarının ve besine ulaşılabilirliklerinin saptanması: Çerkezköy ilçesi örneği
Araştırmacılar	Dyt. Beyza Kurt, Dr. Öğr. Üyesi İrem Kaya Cebioğlu

7.2. Appendix-2 Research Permission

T.C.
TEKİRDAĞ VALİLİĞİ
İl Sağlık Müdürlüğü

Sayı : E-12641312-044
Konu : Araştırma İzin Talebi/Beyza KURT

DAĞITIM YERLERİNE

İlgi : Beyza KURT' un 22/12/2021 tarihli dilekçesi.

İlgide kayıtlı dilekçe ile Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü Beslenme ve Diyetetik Bölümü Yüksek Lisans öğrencisi Beyza KURT tarafından gebelerin gıda güvenliği ile ilgili bilgi düzeylerinin, tutumlarının ve besine ulaşılabilirliklerinin saptanması amacıyla **"Gebelerin Gıda Güvenliği İle İlgili Bilgi Düzeylerinin, Tutumlarının Ve Besine Ulaşılabilirliklerinin Saptanması: Çerkezköy İlçesi Örneği"** konulu çalışmasını 3.01.2022-01.08.2022 tarihleri arasında Çerkezköy İlçesine bağlı olan Aile Sağlığı Merkezlerine başvuran çalışmaya katılmaya gönüllü gebe kadınları değerlendirebilmek için gerekli izin talebinde bulunulmuştur.

Araştırma başvurusu komisyon tarafından incelenmiş ve uygulamanın hizmeti aksatmayacak şekilde yürütülmesi, katılımın gönüllülük esasına göre yapılması, çalışma sonucunun Müdürlüğümüz bilgisi dışında ilan edilmemesi, tamamlanan araştırma raporunun 2 nüsha olarak ve ayrıca CD formatında araştırmacı tarafından Müdürlüğümüz Eğitim Birimine teslim edilmesi şartıyla çalışmanın yapılmasının uygun olduğuna karar verilmiştir.

Gereğini ve bilgilerinizi rica ederim.

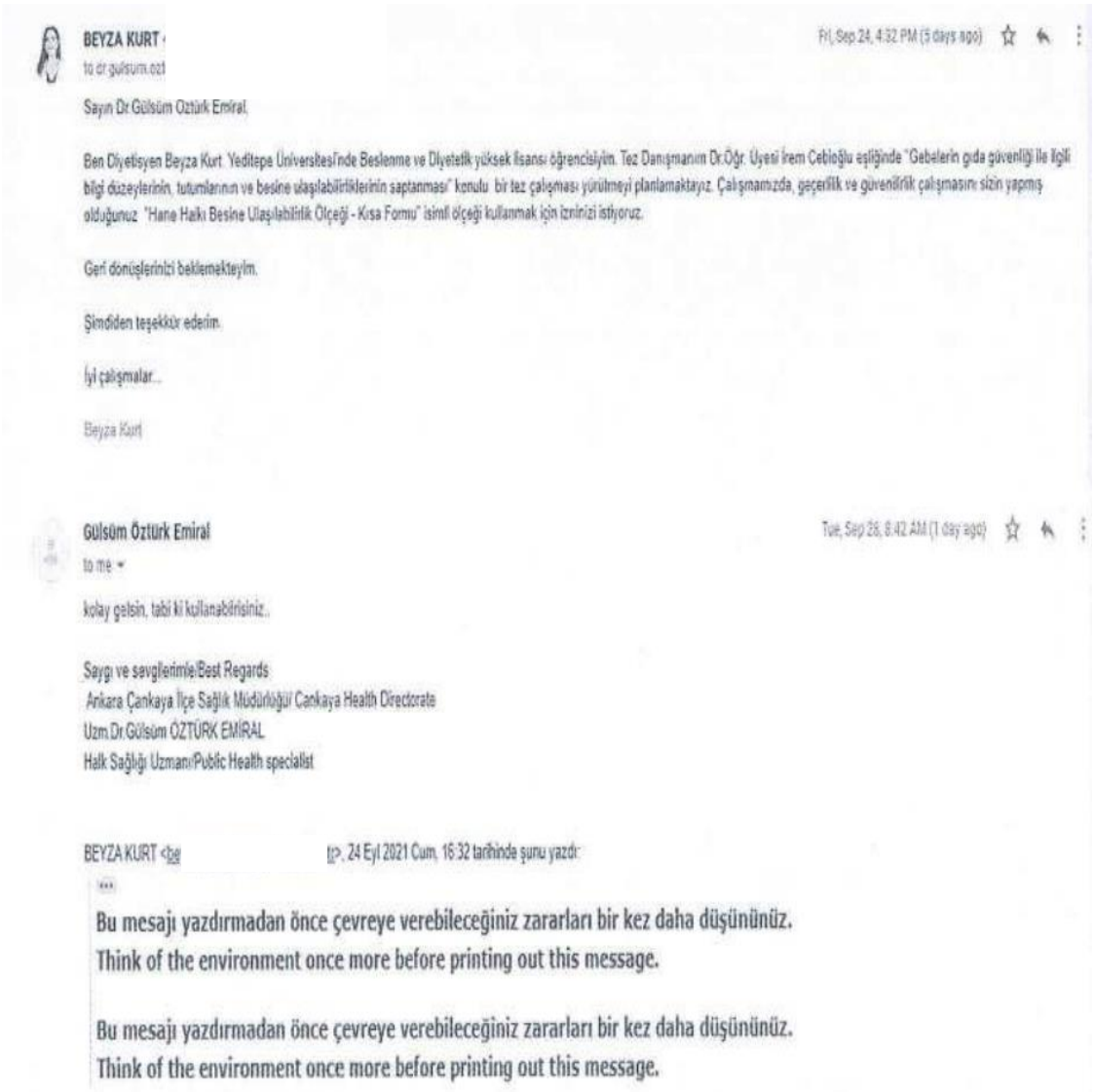
Zafer SOYKIRLI
Müdür a.
Başkan

Ek:
1. Soru Formu (5 Sayfa)
2. Protokol (2 Sayfa)

Dağıtım:
Çerkezköy İlçe Sağlık Müdürlüğü
Beyza KURT e-posta: beyza.kurt1@std.yeditepe.edu.tr

Bilgi için: EDA ÖZEL
PSİKOLOG
Telefon: Faks No:
e-Posta: eda.karacay2@saglik.gov.tr İnternet Adresi:
Telefon No: (0 282) 258 22 58

7.3. Appendix-3 Permission to Use the HFSSM-SF Scale in the Study



BEYZA KURT Fri, Sep 24, 4:32 PM (5 days ago)
to dr.gulsum.ozt

Sayın Dr.Gülsüm Öztürk Emiral,

Ben Diyetisyen Beyza Kurt. Yeditepe Üniversitesi'nde Beslenme ve Diyetetik yüksek lisansı öğrencisiyim. Tez Danışmanım Dr.Öğr. Üyesi İrem Cebioğlu eşliğinde "Gebelerin gıda güvenliği ile ilgili bilgi düzeylerinin, tutumlarının ve besine ulaşılabilirliklerinin saptanması" konulu bir tez çalışması yürütmeyi planlamaktayız. Çalışmamızda, geçerlilik ve güvenilirlik çalışmasını sizin yapmış olduğunuz "Hane Halkı Besine Ulaşılabilirlik Ölçeği - Kısa Formu" isimli ölçeği kullanmak için izninizi istiyoruz.

Geri dönüşlerinizi beklemekteyim.

Şimdiden teşekkür ederim.

İyi çalışmalar...

Beyza Kurt

Gülsüm Öztürk Emiral Tue, Sep 28, 8:42 AM (1 day ago)
to me

kolay gelsin, tabi ki kullanabilirsiniz..

Saygı ve sevgilerimle/Best Regards
Ankara Çankaya İlçe Sağlık Müdürlüğü/ Cankaya Health Directorate
Uzm.Dr.Gülsüm ÖZTÜRK EMİRAL
Halk Sağlığı Uzmanı/Public Health speclalist

BEYZA KURT <be [illegible]> , 24 Eyl 2021 Cum, 16:32 tarihinde şunu yazdı:

Bu mesajı yazdırmadan önce çevreye verebileceğiniz zararları bir kez daha düşününüz.
Think of the environment once more before printing out this message.

Bu mesajı yazdırmadan önce çevreye verebileceğiniz zararları bir kez daha düşününüz.
Think of the environment once more before printing out this message.

7.4. Appendix-4 Informed Consent Form

...../...../.....

Bilgilendirilmiş Gönüllü Olur Formu

Araştırmanın Adı: "Gebelerin Gıda Güvenliği ile İlgili Bilgi Düzeylerinin, Tutumlarının ve Besine Ulaşılabilirliklerinin Saptanması: Çerkezköy İlçesi Örneği"

Sayın Katılımcı,

"Gebelerin Gıda Güvenliği ile İlgili Bilgi Düzeylerinin, Tutumlarının ve Besine Ulaşılabilirliklerinin Saptanması: Çerkezköy İlçesi Örneği" adlı bu çalışma Dr. Öğr. Üyesi İrem Kaya Cebioğlu danışmanlığında, İstanbul Yeditepe Üniversitesi Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik bölümü yüksek lisans öğrencisi Dyt. Beyza Kurt tarafından yürütülen bir araştırmadır. Bu araştırma: Tekirdağ ili, Çerkezköy ilçesinde yaşayan 18 yaş ve üzeri gebe kadınlarda, gebelerin gıda güvenliği ile ilgili bilgi düzeylerinin, tutumlarının ve besine ulaşılabilirliklerinin saptanması amacıyla yürütülecektir. Elde edilen verilerle gebelik döneminde gıda kaynaklı oluşabilecek sağlık riskleriyle ilgili gebenin bilgi durum düzeyi ve uygulamaları hakkında detaylı bilgi elde edilerek, gebelerin farkındalığı saptanacaktır. Araştırma için etik kurul ve Tekirdağ İl Sağlık Müdürlüğü'nden gerekli yasal izinler alınmıştır. Bu araştırma, Tekirdağ İli Çerkezköy ilçesinde yer alan on Aile Sağlığı Merkezi'nden gönüllü olan Aile Sağlığı Merkezleri'ne başvuran 18 yaş ve üzeri gönüllü olarak katılmak isteyen gebe kadınlar ile yapılacaktır. Bu araştırmaya tahmini olarak 171 gönüllü katılacaktır. Araştırmaya katılmak için gönüllü olduğunuz takdirde, araştırmacı tarafından boy ve kilo ölçümünüzün yapılmasının ardından, sizden bu çalışmada verilen anket formunu doldurmanız istenmektedir. Soruları cevaplamanız yaklaşık olarak 15 dakika sürecektir. Bunun size ve yakınlarınıza hiçbir zararı olmayacaktır. Genel olarak hamilelik döneminde gıda güvenliğine ilişkin bilgi düzeyiniz ve uygulama davranışınız incelenecektir. Araştırmada alınacak tüm bilgiler araştırma kapsamı dışında hiçbir kişiyle kesinlikle paylaşılmayacaktır. Elde edilecek olan bilgiler, Etik Kurul, kurum ve diğer sağlık otoritelerinin orijinal tıbbi kayıtlarına doğrudan erişimleri olacaktır. Fakat bu gönüllü onam formunun imzalanmasıyla bu bilgiler gizli tutulacaktır. Bu çalışmaya katılmak tamamen gönüllülük esasına dayanmaktadır. Bu çalışmada yer almanız nedeniyle size hiçbir ödeme yapılmayacaktır, sizden veya bağlı bulunduğunuz sosyal güvenlik kuruluşundan hiçbir ücret istenmeyecektir. Gerek duyduğunuz tüm bilgileri istemeye ve doğru, açık, anlaşılır bilgi almaya hakkınız vardır. Gerekli gördüğü takdirde araştırmanın herhangi bir kısmında katılımcı araştırmadan çıkabilir, araştırmacı çalışmayı sonlandırabilir. Araştırmanın tüm aşamalarında kimlik bilgileriniz gizli tutulacaktır. Araştırma sonuçlarının yayımlanması halinde dahi gönüllünün kimliği gizli kalacaktır. Araştırma kapsamında elde edilen bilgiler bilimsel amaçlarla, gizlilik kurallarına uymak kaydıyla, kullanılabilir, sunulabilir ve yayınlanabilir. Araştırma ile ilgili daha fazla bilgiye ihtiyaç duyarsanız araştırmacıya diyetisyenbeyzakurt@gmail.com e-posta adresi üzerinden veya 05302869386 numaralı telefondan ulaşabilirsiniz.

"Bilgilendirilmiş Gönüllü Olur Formundaki tüm açıklamaları okudum. Bana, yukarıda konusu ve amacı belirtilen araştırma ile ilgili açıklamalar, yukarıda adı belirtilen sorumlu araştırmacı tarafından yapıldı. Araştırmaya gönüllü olarak katıldığımı, istediğim zaman gerekçeli veya gerekçesiz olarak araştırmadan ayrılabileceğimi biliyorum. **Bu çalışma sonuçlarının kullanılmasını kısıtlamamayı, yayın, rapor ve benzeri bilimsel dökümanlarda kullanılmasını kabul ediyorum. Söz konusu araştırmaya, hiçbir baskı ve zorlama olmaksızın kendi rızamla katılmayı onaylıyorum."**

Gönüllünün;	**Araştırmacının;**	**Varsa Tanıklık Eden Kişinin;**
Adı-Soyadı:	**Adı-Soyadı:**	**Adı-Soyadı:**
İmzası:	**İmzası:**	**İmzası:**
Tarih:	**Tarih:**	**Tarih:**
Adres:	**Adres:**	**Adres:**
Telefon Numarası:	**Telefon Numarası:**	**Telefon Numarası:**

7.5. Appendix-5 Data Collection Form

EK 2. VERİ TOPLAMA FORMU

"Gebelerin Gıda Güvenliği ile İlgili Bilgi Düzeylerinin, Tutumlarının ve Besine Ulaşılabilirliklerinin Saptanması: Çerkezköy İlçesi Örneği"

Yaşınız:.....

Beden Kütle İndeksi (BKI – kg/m2):.....

1. **Eğitim durumunuz**

○ İlkokul	○ Ortakokul	○ Lise	○ Üniversite	○ Yüksek Öğrenim (……)

2. **Mesleğiniz**

○ Ev hanımı	○ Memur	○ İşçi	○ Esnaf	○ Diğer (……)
○ Özel Sektör	○ Kendi işi	○ Kamu Kurumu		

3. **Gebelik haftanız .....**

4. **Gıda Güvenliği kavramının tam olarak neyi ifade ettiğini biliyor musunuz?**

○ Evet	○ Hayır

5. **Beslenme ve gıda güvenliği ile ilgili bilgileri nereden edinirsiniz?**

(Birden fazla işaretleme yapabilirsiniz)

- ☐ Aile veya arkadaş çevresi
- ☐ Doktor-Diyetisyen-Hemşire (Sağlık çalışanı)
- ☐ Okul Eğitimi içinde
- ☐ İnternet, televizyon gazete vb.
- ☐ Konferans, panel, seminer vb.
- ☐ Şimdiye kadar bu konuyla ilgili hiç bilgilendirilmedim.
- ☐ Diğer……

1/4

6. BİLGİ DÜZEYİ	Katılıyorum	Katılmıyorum	Kararsızım
Çatlak ve kırık yumurtayı kullanmam.			
Çiğ sucuk, sosis, salam tüketirim.			
Açık olarak satılan sütlerden yapılmış yoğurt ya da peynir tüketirim.			
Yeşillenmiş patates ve soğan kullanmam.			
Uzun süre oda sıcaklığında beklemiş ketçap, mayonez gibi ürünler tüketirim.			
Besinleri dondurma işlemi mikroorganizmaları öldürür.			
Süte pastörizasyon işlemi yapılmasının amacı sütün içindeki tüm mikroorganizmaları uygulanan ısıl işlemle öldürmektir.			
Açıkta satılan sokak sütü satın almam.			
Dondurulmuş gıdalar oda sıcaklığında çözündürülmelidir.			
Oda sıcaklığında 2 saatten fazla beklemiş yemekleri tüketmem.			
Taze fasulye, bezelye gibi düşük asitli gıdaların evde konservelerini yapıp tüketirim.			
Küflenmiş bir gıda maddesinin küflü kısmını ayırarak, küflenmemiş kısmını tüketirim.			
Paketi açılmış süt 3 günden fazla dolapta muhafaza etmem.			

7. HİJYEN	Hiçbir zaman	Nadiren	Ara Sıra	Sıklıkla	Her Zaman
Yiyecekleri hazırlamaya başlamadan önce mutlaka elleri, bilekleri, tırnakları ve parmak aralarını en az 20 saniye ovalayarak sıcak sabunlu su ile yıkarım.					
Ellerimi yıkadıktan sonra temiz bir bez havluyla veya temiz kâğıt havluyla kurularım.					
Çiğ et, balık ve tavuk vb. gibi ürünlerle temas eden kesme tahtalarını, tabakları ve mutfak tezgâhını sıcak sabunlu suyla yıkarım.					
Taze meyveler ve taze sebzeleri yemeden önce akan su altında iyice durulayarak tüketirim.					
Karpuz ve kavun gibi sert dış kabuklu meyveleri kesmeden önce iyice yıkarım.					
Evye ve mutfak tezgâhınızı her kullanımımdan sonra temizlerim.					
Yumurta pişirmeden önce yıkayıp kurulayarak kullanırım.					
Konserve ürünleri kullanmadan önce kapaklarını temizlerim.					

8. GIDA AYIRMA	Hiçbir zaman	Nadiren	Ara Sıra	Sıklıkla	Her Zaman
Alışveriş sepeti ve buzdolabında çiğ kırmızı et, tavuk vb. gibi kümes hayvanları, balık ve yumurtaları diğer yiyeceklerden ayrı tutarım.					
Çiğ yiyeceklere temas eden tabakları, kesme tahtasını ve bıçakları pişmiş yiyeceklere temas etmemesine dikkat ederim.					
Et, tavuk ve balık için kullandığım kesme tahtası ile meyve sebze için kullandığım kesme tahtasını ayırırım.					
Yemek hazırlarken çiğ et ile temas ettikten sonra başka besin hazırlamadan önce ellerimi sıcak su ve sabunla yıkarım.					
Et, tavuk, balık gibi gıdaları buzdolabına yerleştirirken, dolabın alt raflarına ya da sularının dışarıya sızmayacağı şekilde derin kaplar içine yerleştirmeye dikkat ederim.					
Buzdolabında yiyeceklerin ayrı şekilde poşet veya kaplarda saklanmasına dikkat ederim.					

9. PİŞİRME	Hiçbir zaman	Nadiren	Ara Sıra	Sıklıkla	Her Zaman
Yumurtayı tüketirken iyi pişmiş olmasına dikkat ederim.					
Et tavuk ve balık iyi pişmiş olmasına ve iç sıcaklığının 71 derece olmasına dikkat ederim.					
Rafadan yumurta tüketirim.					
Yumurta ya da et içeren gıdaları hazırlarken henüz pişmemiş olsa da tadına bakarım.					

10. SOĞUTMA	Hiçbir zaman	Nadiren	Ara Sıra	Sıklıkla	Her Zaman
Buzdolabının en az 4° C dondurucunun ise en az -18° C olmasına dikkat ederim.					
Buzluğa yiyecekleri tek seferde kullanılacak şekilde paketleyerek kaldırım.					
Dondurulmuş gıdaları bir defa çözdürdükten sonra, tekrar dondurmam.					
Pişirilmiş gıdalar hemen tüketirim ya da daha sonra tüketilecek ise hızlıca soğumasını takiben buzdolabında saklarım.					
Dondurulmuş gıdalar alışverişin en sonunda alırım ve en kısa surede derin dondurucuya koymaya özen gösteririm.					

Hamilelik planlamadan önce ve hamilelik sırasında aşağıdaki besinleri tüketme sıklığınız nasıl değişti, lütfen belirtiniz.

11. TÜKETİM	Daha fazla	Değişme olmadı	Daha az	Kaçınıyorum	Hiç tüketmedim
Nasıl hazırlandığını bilmediğiniz çiğ sebze içeren salata vb. gıdalar					
Yıkanmamış sebze veya meyve					
Çiğ ya da az pişmiş yumurta					
Dışarıdan satın alınan pastörize edilmemiş süt					
Küflü peynirler					
Açık ayran					
Salam, sosis, sucuk, pastırma vb. İşlenmiş çiğ etler					
Çiğ ve az pişmiş et tavuk veya balık					
Çiğ köfte					
Çiğ balık (sushi)					
Midye, kokoreç					
Ton balığı					
Açık (musluktan veya nereden doldurulduğunu bilmediğiniz kaynaktan) su					
Kahve					
Çay					

7.6. Appendix-6 Household Food Security Survey Module - Short Form (HFSSM-SF)

HANE HALKI BESİNE ULAŞILABİLİRLİK ÖLÇEĞİ- KISA FORMU

1. "Son 12 ay içerisinde aldığım gıda yetmiyordu ve daha fazla alacak param yoktu."

[ ] Sıklıkla Doğru [ ] Bazen Doğru [ ] Doğru Değil [ ] Bilmiyor

2. "Dengeli öğünlere ulaşamıyorum" (dengeli öğün şu öğelerden oluşur; Süt grubu: süt, yoğurt, peynir, çökelek, Et yumurta grubu: et, tavuk, balık, yumurta, kuru baklagil, taze sebze-meyve grubu, Tahıl grubu: ekmek, pirinç, bulgur, un, makarna, Günlük yağ şeker grubu: katı sıvı yağ, bal, reçel, pekmez)

[ ] Sıklıkla Doğru [ ] Bazen Doğru [ ] Doğru Değil [ ] Bilmiyor

3. Son 12 ay içerisinde (siz ya da ev halkındaki diğer erişkinler) paranız olmadığı için hiç öğün miktarını azalttığınız ya da öğün atladığınız oldu mu? (**Bu soruya cevap Evetse 4. Soruyu yanıtlayın, Hayır ise 5. Soruya geçin.**)"

[ ] Evet [ ] Hayır [ ] Bilmiyor

4. 3. Sorudaki durum ne sıklıkta olur?

[ ] Her ay [ ] Bazı aylar [ ] 1 veya 2 ay [ ] Bilmiyor

5. Yiyecek için yeterli paranız olmadığı için istediğinizden daha az yediğiniz oldu mu?

[ ] Evet [ ] Hayır [ ] Bilmiyor

6. Paranız az olduğu için çok aç olduğunuz halde yiyemediğiniz oldu mu?

[ ] Evet [ ] Hayır [ ] Bilmiyor