Clinical and Experimental Health Sciences

Preconception Risk Factors and Preconception Care Practices in a Hospital Based Turkish Sample

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ABSTRACT

Objective: The aim of the study was to evaluate the preconception risk factors that may adversely affect pregnancy outcomes, and preconception care practices.

Methods: A descriptive study was completed with 359 women. The data were collected with a questionnaire that was drawn up by the researchers.

Results: Findings demonstrated that preconception risk factors were advanced age (20.6%), smoking (23.1%), existence of a chronic illness (23.6%) and being overweight (26.7%). Applied to a health institution to receive preconception care was 12.3 %. The most common preconception care practices were the use of folic acid (45.4%) and applying to the doctor for reorganization of the treatment for chronic illness (41.2%).

Conclusion: The data showed that women had preconceptional risk factors and did not receive adequate preconceptional care. Women need to be provided with awareness on preconception risk factors. Policies should be developed to increase the frequency of women receiving preconception care.

Keywords: Preconception care, preconception risk factors, health behavior, pregnancy.

1. INTRODUCTION

The care provided to couples prior to pregnancy with the aim of reducing maternal and fetal mortality and morbidity is referred to as preconception care. Preconception care (PCC) involves screening for risks and providing treatment at an early stage as well as offering couple's education and counseling to promote the health of women and their children. In recent years, it has been noted that antenatal care by itself is not sufficient in promoting mother-child health and in this context; the importance of preconception care has been emphasized (1-3).

Organizations such as World Health Organization (WHO), Centers for Disease Control and Prevention (CDC) and *American College of Obstetricians and Gynecologists* (ACOG) have reported that all couples in the preconception period must be assessed by health professionals and that women who are smokers/drinkers, women who have a chronic disease (e.g., diabetes, hypertension, hypothyroidism, epilepsy), those who have been infected with Rubella, Hepatitis-B, etc. or who have a genetic condition, folic acid or nutritional deficiency, are overweight or obese must be considered as being at risk in terms of maternal and fetal morbidity and mortality (1-3). It has been asserted that women in the risk group in particular should receive PCC as an essential requirement for the protection of maternal and fetal wellbeing (2,4). For example, the incidence of neural tube defects such as spine bifida and anencephaly declines in women who start taking folic acid at least 1 month prior to their pregnancy (1,3,4). Similarly, keeping blood sugar at normal levels in the preconception (PC) period is reported to reduce maternal morbidity, spontaneous abortion, fetal malformation, fetal macrosomia and neonatal morbidity (1-4). Other PCC practices to protect and promote maternal and fetal health include assessments as to healthy diet, physical exercise, weight control, quitting smoking and the use of alcohol, the diagnosis and treatment of chronic diseases, identifying genetic conditions, preventing exposure to occupational and environmental agents, avoiding the use of no prescribed medications, immunization, screening for and preventing infectious diseases, breast examinations, dental examinations and cervical evaluation (1,2,3,5). In a globalizing world, knowing the PCC practices specific to different cultures can be guiding and beneficial on creating countries' policies

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for PCC practices. In Turkey, in the few studies that have focused this matter, it has been observed that these have looked into the maternal and fetal outcomes of obesity, advanced age and smoking (6-8) and the assessment of the prevalence of taking folic acid (9). To the best of our knowledge, the present study is the first to evaluate PC risk factors and PCC care practices in Turkey. In consequence of the study, it is aimed to remark PCC, to determine PCC practices and to contribute to national and international literature. The results obtained from the study are thought to contribute to cross-cultural PCC practices. The aim of the study was to evaluate the PC risk factors that may adversely affect pregnancy outcomes, and PCC practices.

We searched answers to the following questions in this study:

What is the prevalence of PC risk factors for adverse pregnancy outcomes?

What is the prevalence of PCC practices?

2. METHODS

2.1. Design

This descriptive study was conducted over the period 15 May 2017 – 30 August 2017, at the Antenatal Care Polyclinic of Health Sciences University, Zeynep Kamil Women's and Children's Diseases Training and Research Hospital, located in the district of Üsküdar in the province of Istanbul.

2.2. Participants

The sample size was calculated to be 291 using a sample calculation formula in universe-unknown situations (a type of error 0.05, the prevalence of PCC practices 5%, d=0.01). In our study, convenience sampling method was used. A total of 385 pregnant women presenting to the antenatal polyclinic during the mentioned period and carrying the inclusion criteria stated below were taken into the study. Twenty-six pregnant women withdrew from the study because they did not wish to answer some of the questions. The study was concluded with 359 participants.

Inclusion criteria

Pregnant women who consented to participate over the age of 18 and had applied for the first antenatal care visit of their current pregnancy were accepted into the study.

2.3. Data Collection

The data were collected with a questionnaire that was drawn up by the researchers and this form was filled out in a face-to-face interview. The participants were interviewed in a room which in antenatal polyclinic. The questionnaire was completed in approximately 10 minutes.

The questionnaire

The questionnaire consists of 3 sections. The first section contained 6 structured questions designed to evaluate the sociodemographic characteristics (age, educational status, and employment status) of participants, the number of pregnancies experienced and the status of planned pregnancy. In the second section, the queries (26 structured) pertained to the woman's PC risk factors (e.g., use of cigarettes and alcohol, obesity, genetic diseases, chronic diseases, consanguineous marriage, use of drugs without a prescription and obstetric history). Pre-pregnancy body mass index (BMI) was calculated by dividing the weight reported by the woman (kg) by the square of the measured height (m). The third section of the form contained 24 structured questions on the participating woman's about PCC practices (an evaluation in terms of the use of folic acid, quitting smoking and intake of alcohol, use of multivitamins, weight control, regulating treatment of chronic disease, regular exercise frequency, checking fasting blood glucose, whole blood count, dental examination, having a Pap smear in the last 5 years, inoculations and infectious diseases, etc.).

2.4. Analysis of the data

Since the data will be presented as frequency, the analyzes were made using Microsoft Office Excel program. In the statistical analysis of the study data we used percentages and mean values.

Ethical considerations

During the planning stage of the study, the permission of the Ethics Committee of the hospital was obtained (Protocol Number:125 Date: 07.2015). After written and oral explanations, informed consent forms were collected from those wishing to participate in the study.

3. RESULTS

The mean age of the women in our study was 29.4 ± 5.7 years. The average duration of marriage was 65.2±58.6 months and the average number of pregnancies experienced was 2.16 ± 1.3. 28.4% were university graduates and 66.3% had wanted pregnancies (Table 1).

Table 1. *The characteristics of study participants (n=359)*

Characteristics	X±SD	
Age (years)	29.4 ± 5.7	
Duration of marriage (months)	65.2 ± 58.6	
Number of pregnancies	2.16 ± 1.3	
	n	**%**
Women's education		
Middle school	140	39
High school	117	32.6
University degree or above	102	28.4
Women employment status		
Working	124	34.5
Not working	235	65.5
Planned pregnancy		
Yes	238	66.3
No	121	33.7

A look at the preconception risk factors of the women in the study showed that 20.6% were 35 years of age or over, 23.1% smoked, 23.6% had a chronic disease, 16.4% were in consanguineous marriages, 13.1% were obese (Body Mass Index [BMI] ≥ 30) and 26.7% overweight (BMI ≥25-29.9). Of the multigravidae, 36.1% had experienced at least one miscarriage, 13% had had a stillbirth and 27.4% had delivered prematurely (<37th gestational week). Among the women, 4.2% and 2.5% of their spouses had some form of genetic disease (Table 2).

Table 2. *The preconception risk factors of the women*

Variables	n	%
Age Years ≥35	74	20.6
Cigarette Smoking	83	23.1
Alcohol Consumption	14	3.9
Consanguineous marriage	59	16.4
Body Mass Index (BMI) (kg/m^2)		
Low (<18.5)	21	5.8
Normal BMI (18.5-24.9)	195	54.8
Overweight ≥25-29.9)	96	26.7
Obese (≥30)	47	13.1
Presence of Hereditary Disease in Women		
Yes	15	4.2
No	307	85.5
Unknown	37	10.3
Presence of Hereditary Disease in Partner		
Yes	9	2.5
No	317	88.3
Unknown	33	9.2
Presence of any Chronic Disease	85	23.6
Hypertension	57	15.9
Hypothyroidism	10	2.8
Diabetes	5	1.4
Asthma	4	1.1
Epilepsy	3	0.8
Gastrointestinal diseases	1	0.3
Rheumatic diseases	2	0.6
Cervical Problem	17	4.7
Prescription Drug Use (disease specific)	46	12.8
Non-prescription drug use	12	3.3
Total	**359**	**100**
Bad Obstetric History	**n**	**%**
Spontaneous Abortion	75	36.1
Premature Birth (Before Gestational Age 37. Week)	57	27.4
Immature Birth (Gestational Age 20-24.Week)	15	7.2
Low Birth Weight Baby Birth (< 2500 Gr)	18	8.7
Stillbirth	27	13
Termination of Pregnancy Due to Anomaly	14	6.7
Birth of Baby with Anomaly (Sipifida, Cleft Palate, Etc.)	10	4.8
Eclampsia / Preeclampsia	24	11.5
Gestational Diabetes	6	2.9
Total*	**208**	**100**
* Answers from multigravida women.		

A total of 217 women (60.4%) study said that they had previously heard of PCC. Out of these women, 34.5% said they heard about PCC from healthcare providers, 30.1% from social media channels and 9.7% from their friends.

When the women's PCC practices were reviewed, it was found that only 12.3% had applied to a health institution to receive PCC.

Among the participants, the use of folic acid was 45.4%, applying to the doctor to regulate a chronic disease was carried out by 41.2% of the women while 44.6% had a complete blood count assessment, 22.8% were tested for fasting blood glucose, 89.4% had had a Pap smear test in the last 5 years, 54.2% had quit smoking, 78.5% had quit drinking, 36.8% increased their intake of nuts, 24.2% preferred to eat organic foods, a diet to have normal weight %14 and 14.2% exercised (Table 3).

Table 3. *Women's preconception care practices*

Variables	n	%
Applied to a Health Institution to Receive Preconception Care	44	12.3
Folic Acid supplementation	163	45.4
Consumption of at Least Five Servings of Vegetables / Fruits Per Day	39	10.9
Increase in the Consumption of Nuts	132	36.8
Multivitamin supplementation	51	14.2
Consuming at Least Three Servings of Milk and Milk Products Per Day	72	22.1
Regular Exercise (150 Minute Per Week)	51	14.2
Avoid Exposure to Radiation and Chemical Agents	126	35.1
Avoid contact with animals	46	12.8
Avoid contact with sick people	57	15.9
Consumed Organic Food	87	24.2
Not to Eat or Drink Raw Animal Products	65	18.1
Avoid Non-Prescription Drug Use	12	3.3
Fasting Blood Glucose Assesment	82	22.8
Complete Blood Count Assesment	160	44.6
Dental checkups (yearly)	44	12.3
Pap smear test in the last 5 years	321	89.4
Hepatitis B Vaccination	10	2.7
Tetanus Vaccination	30	8.3
Rubella (IgG) Vaccination	3	0.8
Total	**359**	**100**
Applied a modified diet to achieve normal weight standard *Only among low, overweight, and obese pregnants (n=164)*	23	14
Applied to reorganization of the treatment of chronic disease *Only among pregnants who have chronic diseases (n=85)*	35	41.2
Avoid Cigarette Smoking *Only among smoking pregnants (n=83)*	45	54.2
Avoid Alcohol Consumption *Only among pregnants using alcohol (n=14)*	11	78.5

In the PC period, 24.2% – 31.5% of the participants had been tested for Hepatitis-B, Chlamydia, Human Papilloma Virus (HPV), Gonorrhea, Syphilis, Herpes Simplex Virus (HSV) and Toxoplasmosis (Figure 1).

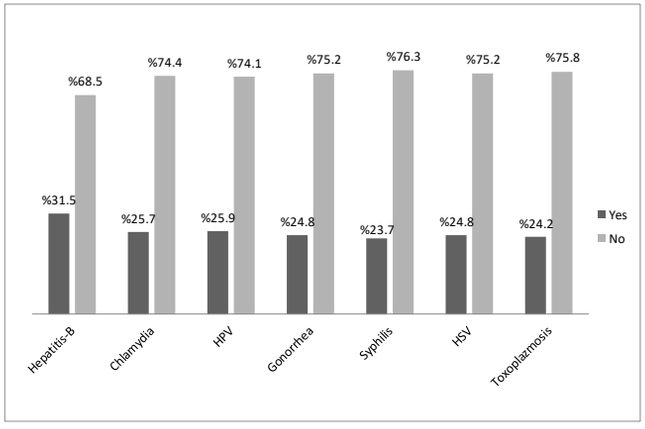

Figure 1. *Test status of participants for infectious diseases*

4. DISCUSSION

The findings have indicated that women carry preconception risks such as advanced age, being overweight or obese, being smokers, having a chronic disease, having an adverse obstetric history and that preconception care is not receiving adequate.

It has been emphasized, especially in developed countries, that regulating prenatal and neonatal health, preventing adolescent and unwanted pregnancies, averting miscarriages and abortions are among the benefits of PCC and that attention could be focused on this service (3,4,10). Although the number of women who had heard of the concept of PCC was higher than what has been reported in studies conducted in other countries (11), the percentage of women applying to health institutions to receive PCC was either lower than in some other studies (12,13), or similar (14). This suggests that the sociocultural characteristics of women in other countries, their more adequate knowledge of this matter and the health policies of the countries in question may have been the reasons behind the variation in results (15).

It is important that determine the presence of risk factors that may cause adverse obstetric outcomes (4,5). We found the rates of spontaneous abortion, premature childbirth, abnormal birth and stillbirth in our study to be higher than both the average in Turkey (16) and what has been reported by Agricola et al. (2014) (17). In Turkey, where the fertility rate is 2.26 % and 25.9 % of births are the result of unwanted pregnancies, 14% of pregnancies end in spontaneous abortion, 4.7% in voluntary abortion and 0.9% in stillbirth (16). The higher rate we found in our study compared to the country in general may perhaps be explained by the fact that the hospital in which the research was conducted is a tertiary medical institution that particularly responds to the monitoring and treatment of referred pregnancy cases at high risk. Our findings are important in terms of pointing to women's need for PCC.

In this study a significant percentage of the participants were in consanguineous marriages. Couples who are in consanguineous marriages should be evaluated in terms of genetic diseases in the PC period (1). Most of the women in the study reported that they did not know whether either their husbands or they had any genetic disorder.

The percentage of women of advanced ages in our study was lower than in other studies (12). Advanced age (≥35) also brings with it an increased risk of experiencing chronic health conditions. Anemia, hypertension, diabetes, hypothyroidism issues and other chronic conditions increase maternal and fetal mortality and morbidity risks (8,18).

In particular, iron deficiency anemia, which is a condition commonly found in developing countries due to poor dietary habits, may result in maternal mortality and cause physical and cognitive developmental disorders in the child (3). It was reported in a study conducted in Turkey that the incidence of gestational hypertension increased in women with hemoglobin levels of ≤9 g/dL in the first trimester (19). Women diagnosed with anemia n the PC period should be prescribed iron supplements. Our study indicated that close to half of our participants had blood tests during PC and we found that this rate was consistent with the results of other studies (20).

Related to diabetes, the risk of congenital malformations, spontaneous abortion and premature childbirth risks can increase (5). It is important during PC that women have their fasting glucose levels checked and if high, regulating glucose levels will reduce the risks. It was determined that only one-fourth of the participants had their fasting blood glucose levels checked during PC. The reason the rate of women having complete blood tests and fasting glucose tests was higher in our study than the rate of women applying for preconception care may be related to the fact that the family health centers in Turkey are vigilant in conducting complete blood, fasting blood glucose and similar tests in the monitoring processes.

The percentage of women with chronic conditions in our study was higher than in other studies (12,17) and the most common chronic disease noted was hypertension. On the other hand, since it was seen that only close to half of the women were under the treatment of a doctor during PC, it can be surmised that women are not adequately awareness about their condition.

Women should routinely undergo dental checkups (yearly) and Pap smear tests (every 5 years) during PC (21). It is known that dental maladies and reproductive system infections can cause miscarriage (22). The percentage of our participants having dental checkups was lower than that reported in another study (23) while the percentage of those having a Pap smear test was similar to the findings of Agricola et al. (2014) (17) but higher than reported in the study by Ignaszak-Kaus et al. (2018) (20). The reason the rate of having a Pap

smear test was high in our study can be associated with the fact that the Pap smear test is a routine part of screening programs in Turkey.

Overweight and obesity increase the risk of birth defects, neural tube defects, miscarriage, preeclampsia, gestational diabetes and macrosomia (3,4,7,24,25). The percentage of women in our study who were overweight (BMI) or obese was similar to rates reported in some studies (15, 23), but lower than in others (12,17). The difference in these rates may have resulted from the difference in the dietary habits and lifestyles of the women in the studies conducted in various countries.

Women in the PC period should be encouraged to follow diets followed up under the supervision of a dietician and to perform regular exercise in order to attain their normal weight (3). It has been reported that losing 10% of one's weight during PC and regularly exercising decreases the risk of miscarriage (5,7). In our study, however, it was seen that very few overweight or obese women followed a diet for weight control or exercised regularly. Our finding suggests that women do not know about the adverse effects of overweight and obesity on maternal and fetal health. The low rate of exercising in PC period in the study is consistent with the finding in another study (24,26).

Smoking during pregnancy can lead to low birth weight and the use of alcohol can result in birth defects and fetal alcohol syndrome (27). In Turkey, 13.1% of women are smokers (28). The rate of smokers among the women in preconception in our study is similar to those reported in other research (6,17). PC alcohol intake rates however are considerably low. While our study indicated that the quitting rate of women smokers in the PC period was similar to other studies (6,13,14,17), we found that this rate, was lower than that reported by Anderson et al. (2006) (23), was still not at the desired rate of 100%, The difference in smoking cessation rates during PC may be related to the degree of adequate or inadequate knowledge about this matter among the women in the countries where the studies were conducted. Research shows that education provided during PC significantly reduces the smoking rate (17,20).

The rate of taking folic acid in our study is consistent with the rates reported by Stephenson et al. (2014) (13), Ignaszak-Kaus et al. (2018) (20), Anderson et al. (2006) (23); On the other hand, this rate was higher than the rates reported by Baykan et al. (2011) (9), Mastroiacovo et al. (2014) (12) and Luton et al. (2014) (14), but still not at the desired level (100%). Although only a few of the women in our study applied to a health institution to receive PCC, it was observed that close to half had started taking folic acid, possibly as a continuation of their habit from previous pregnancies. It was seen that women were more likely to take folic acid after receiving prenatal education (17, 20, 29).

Folic acid can also be obtained through diet. Eating fruits, vegetables and dried nuts and fruits can reduce foliate deficiency. The participants in our study were eating at least five portions of fruit and vegetables during PC, which is lower than reported in other studies (23). At the same time, it was interesting to observe that the women increased their consumption of dried nuts and fruits. This finding can be related to the belief prevalent in the Turkish population that eating dried nuts and fruits will increase the chance of becoming pregnant. This superstitious habit may however be considered a positive PCC practice because of the vitamins, minerals and foliate intake that it provides.

The women in PC in our study were considerably lacking in the habit of taking multivitamins and consuming milk and milk products. The rate of multivitamin use was lower than in other studies (15,23), which may be a result of the fact that social security in Turkey does not cover multivitamins.

Exposure to teratogenic factors in PC may lead to fetal anomalies and miscarriage (5). Some of the women in the study avoided exposure to radiation and chemical agents in the PC period, tried not to be in contact with animals and sick people, consumed organic food, were careful not to eat or drink raw animal products and only a few took no prescribed medications. Although these results were not at the desired level, the data still indicates an awareness of these matters on the part of the women. The fact that the women were making positive changes in their dietary style during PC and preparing themselves for pregnancy may have something to do with the widespread broadcasts now available in the country's media on nutritional tips to follow during pregnancy.

The inadequacy in the rate of inoculations against Hepatitis-B and Tetanus reveals a lack of awareness about these diseases (17).

Screening for infections, treatment if any infection is detected, or immunization is imperative during the period of PC (1, 2, 5, 27, 30). Of the participants in our study, 65.8%-75.8% had not been evaluated for infections such as Hepatitis-B, Chlamydia, HPV, Gonorrhea, HSV, Toxoplasmosis or Rubella; this can be explained by the fact that these women had not applied to a doctor to received PCC. It was observed that a study by Ignaszak-Kaus et al. (2018) (20) revealed a similar rate of women failing to be tested for Toxoplasmosis and Rubella among those that were not receiving PCC.

Limitations

Our findings are only valid for the study sample and cannot be generalized to the country. Since no validity and reliability studies have been made of any measuring instrument that assesses PCC, data on the PCC practices in our study were obtained with a questionnaire that was drawn up by the researchers. This is one of the limitations of our study. It would be recommended that a standard questionnaire be devised in future for use in assessing PCC practices.

5. CONCLUSION

The results of our study led us to conclude that many women are at risk during the PC period but that only very few apply to a health institution for PCC and PCC practices are inadequate. Consequently, it can be said that PCC is an important need in Turkey. Although there have been major developments in prenatal care in Turkey, standard PCC guidelines have yet to be put into force. The Ministry of Health needs to devise strategies that will ensure that women apply to health institutions to receive preconception care. Healthcare professionals should be trained in raising women's awareness about this matter and a PCC protocol should be drawn up. Public awareness should also be promoted about the significance of proper planning and preparation for pregnancy (31). Increasing the frequency of PCC may contribute to our country's reaching its sustainable development goals (3). Besides, the results we acquired are important in terms of revealing that one-third of women obtain information about PCC from their social media accounts. This situation presents the necessity of using social media accounts about PCC practices that are prepared by healthcare professionals in order to inform women who do not want to apply to the health institutions.

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REFERENCES

[1] American College of Obstetrians and Gynecologists. The importance of preconception care in the continuum of women's health care. ACOG Committee Opinion No. 313. Obstet Gynecol. 2005;106:665-666.

[2] Johnson K, Posner SF, Biermann J, Cordero J F, Atrash HK, Parker CS, Boulet S, Curtis MG. CDC/ATSDR Preconception Care Work Group; Select Panel on Preconception Care. Recommendations to improve preconception health and healthcare-United States. A Report of the CDC/ATSDR preconception care network group and the select panel on preconception care, MMWR. 2006; 21 (55) (RR-6): 1-23. Available from: https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5506a1.Update June 4.

[3] World Health Organization. Meeting to develop a global consensus on preconception care to reduce maternal and childhood mortality and morbidity: World Health Organization Headquarters, Geneva, 6–7 February 2012: meeting report; 2013. Available from: https://apps.who.int/iris/bitstream/handle/10665/78067/9789241505000_eng.pdf?sequence=1&isAllowed=y .

[4] Atrash H, Jack B. Preconception Care to Improve Pregnancy Outcomes: The Science. J Hum Growth Dev 2020; 30 (3): 334-341.

[5] Dorney E, Black KI. Preconception care. AJGP 2018; 47 (7): 424-428.

[6] Durualp E, Bektaş G, Ergin D, Karaca E, Topçu E. A Study on the relationship between cigarette smoking of the mothers and the newborn's weight, height, and head circumference measurements. Ankara University Journal Database 2011; 64 (3): 119-126.

[7] Ekin A, Gezer C, Taner CE, Solmaz U, Özeren M. Effect of body mass index before pregnancy on perinatal outcomes. Medical Journal of Bakırköy 2017; 13 (1): 20-25.

[8] Topçuoğlu S, Erçin S, Arman D, Gürsoy T, Karatekin G, Ovalı F. Is Adolescentor Advanced Maternal Age Risky for Newborn? Retrospective Results of a Single Center. Medical Bulletin of Zeynep Kamil 2014; 45:131-35.

[9] Baykan Z, Öztürk A, Poyrazoğlu S, Gün I. Awareness, knowledge, and use of folic acid among women: a study from Turkey. Arch Gynecol Obstet 2011; 283 (6):1249-53.

[10] Hemsing N, Greaves L, Poole N. Preconception health care interventions: A scoping review. Sexual & Reproductive Healthcare 2017; 14: 24–32.

[11] Ayalew Y, Mulat A, Dile M, Simegn A. Women's knowledge and associated factors in preconception care in adet, west gojjam, northwest Ethiopia: a community based cross sectional study. Reproductive Health 2017; 14:15.

[12] Mastroiacovo P, Nilsen RM, Leoncini E, Gastaldi P, Allegri V, Boiani A, Faravelli F, Ferrazzoli F, Guala A, Madrigali V, Scarano G. Prevalence of maternal preconception risk factors: an Italian multicenter survey. Ital J Pediatr 2014; 40 (91): 1-8.

[13] Stephenson J, Patel D, Barrett G, Howden B, Copas a, Ojukwu O, Pandya P, Shawe J. How Do Women Prepare for Pregnancy? Preconception Experiences of Women Attending Antenatal Services and Views of Health Professionals. PLoS ONE 2014; 9 (7): e103085.

[14] Luton D, Forestier A, Courau S, Ceccaldi PF. Preconception care in France. Int J Gynaecol Obstet 2014; 125: 144–145.

[15] Harelick L, Viola D, Tahara D. Preconception Health of Low Socioeconomic Status Women: Assessing Knowledge and Behaviors. Women's Health Issues 2011; 21 (4): 272–276.

[16] Hacettepe University Institute of Population Studies (HUIPS). "Turkey Demographic and Health Survey – 2013". Hacettepe University Institute of Population Studies, RT. Ministry of Development and TÜBİTAK; 2014. Available from: http://www.hips.hacettepe.edu.tr/tnsa2013/rapor/TNSA_2013_ana_rapor.pdf.

[17] Agricola E, Pandolfi E, Gonfiantini M V, Gesualdo F, Romano M, Carloni E, Mastroiacovo P, Tozzi AE. A cohort study of a tailored web intervention for preconception care. BMC Med Inform Decis Mak 2014; 14 (33):1-10.

[18] Karabulut A, Özkan S, Bozkurt AL, Karahan T, Kayan S. Perinatal outcomes and risk factors in adolescent and advanced age pregnancies: Comparison with normal reproductive age women. J Obstet Gynaecol 2013; 33 (4): 346-350.

[19] Çakmak BD, Türker ÜA, Öztaş S, Arık M, Üstünyurt E. The effect of first trimester hemoglobin levels on pregnancy outcomes. Turk J Obstet Gynecol 2018; 15:165-70.

[20] Ignaszak-Kaus N, Ozegowska K, Piekarski P, Pawelczyk L, Jedrzejczak P. Planning and preparation for pregnancy among

women with and without a history of infertility. Ginekologia Polska 2018; 89 (2): 74–79.

[21] Centers for Disease Control and Prevention. (2018). Planning for pregnancy. Available from: https://www.cdc.gov/preconception/planning.html .

[22] Boggess KA, Edelstein BL. Oral Health in Women during Preconception and Pregnancy: Implications for Birth Outcomes and Infant Oral Health. Matern Child Health J 2006; 10: S169–S174.

[23] Anderson J E, Ebrahim S, Floyd L, Atrash H. Prevalence of Risk Factors for Adverse Pregnancy Outcomes during Pregnancy and the Preconception Period—United States, 2002–2004. Matern Child Health J 2006; 10: S101–S106.

[24] Endocrinology and Metabolism Association of Turkey. Obesity diagnosis and treatment guide. Miki Pres, Ankara; 2018. Available from: http://www.temd.org.tr/admin/uploads/tbl_gruplar/20180525144116-2018-05-25tbl_gruplar144108.pdf

[25] Ramoniene G, Maleckiene L, Nadisauskiene RJ, Bartuseviciene E, Railaite DR, Maciuleviciene R. Maternal obesity and obstetric outcomes in a tertiary referral center. Medicina (Kaunas) 2017; 53 (2):109-113.

[26] Nkrumah I, North M, Kothe GE, Lin CT, Stephanie P, Siew L, Briony H. The Relationship Between Pregnancy Intentions and Diet or Physical Activity Behaviors in the Preconception and Antenatal Periods: A Systematic Review and Meta-Analysis. J Midwifery Womens Health 2020; 65 (5): 660-680.

[27] Arluck J C. Mayhew AC. Preconception Care for the General Ob/Gyn. Clin Obstet Gynecol 2018; 61 (1): 62–71.

[28] [28] Turkish Statistical Insititute. Global Adult Tobacco Survey. NO:13142; 2012. Available from: https://www.who.int/tobacco/surveillance/survey/gats/report_tur_2012.pdf?ua=1

[29] De-Regil LM, Fernandez-Gaxiola AC, Dowswell T, Peña-Rosas JP. Effects and safety of periconceptional folate supplementation for preventing birth defects. Cochrane Database Syst Rev 2010; (10): CD007950.

[30] Centers for Disease Control and Prevention. Sexually Transmitted Diseases Treatment Guidelines; 2015. Available from: https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6403a1.htm

[31] Beckmann MM, Widmer T, Bolton E. Does preconception care work? Aust N Z J Obstet Gynaecol 2014; 54: 510–514.

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