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Original Article

Investigation of medication use patterns among pregnant women attending a tertiary referral hospital

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ABSTRACT

Background and Aims: Medication use during pregnancy presents a challenge and concern for pregnant women and healthcare providers. The aim of this study was to explore patterns and factors associated with medication use by pregnant women.
Methods: This cross-sectional study was performed in a gynecology and obstetrics outpatient clinic of a tertiary referral hospital in Turkey. Data were collected by a questionnaire between October 2019 and January 2020. The questionnaire was consisted of 35 questions about participants' attitudes towards the use of medication. The sociodemographic features, medication and herbal product use during the current pregnancy, and participants' attitudes towards the use of medication were investigated.
Results: A total of 485 pregnant women were included in the study. The prevalence of using at least one medication during the current pregnancy was 45.6%, whereas herbal product use was 3.9%. Overall, 10.5% of participants used medication to treat chronic/long-term diseases before pregnancy. The most frequently used drugs were agents for nervous system (32.8%), followed by anti-infective drugs (20.8%) and agents for the alimentary tract and metabolism (19.2%). Participants with university degree or higher education, who had chronic disease before pregnancy, who had one or more previous pregnancies, who had a planned current pregnancy, who were in the second or third trimester, and who were unemployed were likely to use at least one medication.
Conclusion: Medication use is common in pregnancy and is associated with several maternal factors. The factors affecting medication use during pregnancy should be considered in order to incorporate them into clinical pharmacy practice when treating groups that need to be followed more closely in terms of drug use.

Keywords: Medication use, Pregnancy, Prevalence, Herbal product

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INTRODUCTION

Information about medication use during pregnancy and the attitudes of pregnant women about both drugs and over-the-counter (OTC) or herbal products are important. This information leads to the adoption of counseling services and the development of strategies to support pregnant women, which helps them make informed decisions. Identifying commonly used medications in pregnancy is also critical to determine research priorities regarding drug safety.

During pregnancy, the rapidly growing fetus is vulnerable at the cellular level, affecting cell growth and division. The potential unwanted effects of anything consumed present a challenge and concern (Bánhidy, Lowry, & Czeizel, 2005). The most common concerns due to drug use by pregnant women were reported to be having a child with a birth defect, miscarriage, or their child developing an allergy (Mulder et al., 2017).

Medication use (both physician-prescribed and non-prescribed) and over the counter (OTC) drugs or herbal medication use among pregnant women vary all over the world. Women may use medication due to chronic disorders that need to be treated or due to pregnancy-related medical conditions that require pharmacological treatment (Florio, DeZorzi, Williams, Swearingen, & Magalski, 2021; McCarter-Spaulding, 2005).

Medication use during pregnancy is a concern because drug pharmacokinetics are altered, and drugs may cause harm to the fetus by passing through the placenta. In this context, proper management of medication use is crucial for public health. Therefore, pregnant women hesitate to use medication and exhibit attitudes and behaviors that can lead to different outcomes, such as termination of a desired pregnancy, unwillingness to use drugs for nausea, non-compliance with prescribed medication, preference for herbal products or OTC drugs, and other unspecified self-medication methods (Zafeiri, Mitchell, Hay, & Fowler, 2021; Baggley, Navioz, Maltepe, Koren, & Einarson, 2004; Coren, 2007; Erebara, Bozzo, Einarson, & Koren, 2008; Florio et al., 2021; Glover, Amonkar, Rybeck, & Tracy, 2003; Undela, Joy, Gurumurthy, & Sujatha, 2021; Holst, Wright, Haavik, & Nordeng, 2009).

It was reported that 81.2% of pregnant women used at least one medication, either prescribed or OTC drugs, and over 65% of pregnant women used self-medication with OTC drugs (Lupattelli et al., 2014). The use of drugs including OTC was reported in 88.8% of pregnancies in the USA, and the prevalence of prescribed medication use in pregnancy ranged from 26% to 93% in Europe, changing from country to country (Araujo et al., 2021; Lupattelli et al., 2014). The variability among countries may be due to the different designs and methodology of the studies.

This study aimed to determine medication use in pregnant women consulting in the outpatient gynecology and obstetrics clinic of a tertiary healthcare facility and to assess their attitudes according to sociodemographic and medical characteristics.

MATERIAL AND METHODS

Study design and participants

This cross-sectional study was conducted between October 2019 and March 2020. Pregnant women who visited the gynecology and obstetrics outpatient clinic of a university hospital for routine antenatal pregnancy care appointments or any symptomatic indications at any gestational week were eligible to take part in the study. Women who did not speak Turkish or were unable to complete the questionnaire were excluded.

The minimum sample size required for the study was calculated to be 461 pregnant women using Epi Info version 7.2 (Centers for Disease Control and Prevention, Atlanta, GA, USA) applying the following assumptions: estimated prevalence of women who use at least one medication (excluding vitamin/mineral supplements) during pregnancy of 60%, confidence interval of 95%, margin of error of 5%, and additional non-response rate of 25%.

Data collection

The data of this study were collected between October 2019 and January 2020 through an anonymous self-completed questionnaire, consisting of three sections with 35 items. Pretesting of the questionnaire was conducted with a smaller sample (50 subjects) to determine whether participants were interpreting questions as intended. After a few modifications to the phrasing of the items, the questionnaire was finalized with multiple choice and open-ended questions. The first section of the questionnaire included items investigating the sociodemographic (age, education level, employment status, residence, alcohol use, and smoking) and medical characteristics (presence of an illness, gravidity, gestational age [according to obstetric ultrasonography], and previous pregnancy history) of participants. The second section consisted of items concerning the use of medications with or without prescription (excluding vitamin and/or mineral supplements) and use of herbal products during the current pregnancy. Finally, the third section of the questionnaire was to explore the subjects' attitudes regarding medication use (i.e., consulting their physician regarding medication use, following the physician's advice, and informing their physician regarding chronic diseases and use of medications). Illiterate pregnant women completed the questionnaire with help from physicians.

Ethical considerations

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Clinical Trials Ethics Committee of S.B. İstanbul Medeniyet University Göztepe Research and Training Hospital (Date. 28.08.2019 / No. 2019/0329). The eligible pregnant women during the study period were informed and invited to participate in the study, and informed consent was obtained from those who agreed to participate.

Data analysis

The data analysis was carried out using IBM SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, N.Y., USA). The sociodemographic characteristics of the participants were described with frequencies, proportions, and means and stan-

dard deviation values. Medication use during pregnancy was demonstrated without vitamin and/or mineral supplements. The percentages of the drugs were classified according to the Anatomical Therapeutic Chemical (ATC) classification system of the World Health Organization (WHO, 2020). Respondents were categorized as users if they used at least one medication in their current pregnancy, whereas others were categorized as non-users. Associations between medication use during pregnancy and maternal factors as independent variables (education, gravidity, presence of a chronic/long-term disease before pregnancy, planned pregnancy, age, gestational age, and working status) were investigated performing the binary logistic regression test (Backward LR method). Adjusted odds ratios, 95.0% confidence intervals, and p values of all independent variables included in the model were presented. P-value < 0.05 was considered statistically significant for all analyses.

RESULTS

The study population

A total of 520 pregnant women between October 2019 and March 2020 were invited to participate in our study; 485 agreed to participate (response rate: 93.3%). Sociodemographic characteristics of the sample are presented in Table 1. The mean age of the participants was 29.2± 5.15 years (ranged from 19 to 45 years). The majority were primary (35.4%) or secondary (28.8%) school graduates, unemployed (80.9%), and living in urban areas (98.9%). A total of 79 participants, 16.8% of whom had a chronic/long-term disease (diabetes %35.8, hypo/hyperthyroidism 20.9% , asthma 12.3%, cardiovascular disease 11.1%, rheumatologic disease 4.9%, and others 15.0%), and 12.8% of whom were current smokers. Most of the pregnant women were multigravida (73.4%), had a planned current pregnancy (66.7%), and did not use assisted reproductive techniques (98.1%). Of the 116 women (27.8%) who had a history of pregnancies not completed, 93.9% had had a miscarriage.

Behaviors and attitudes regarding medication use

After excluding vitamin and mineral supplements, 45.6% (n=213) of the participants used at least one medication during the current pregnancy. According to the ATC classification system, the most frequent classes of medications were anti-infective drugs for systemic use (J), agents for the nervous system (N), agents for the alimentary tract and metabolism (A), and systemic hormonal preparations (excluding reproductive hormones and insulin) (H) (32.8%, 20.8%, 19.2% and 8.4% respectively). Out of 469 respondents, 10.5% (n=49) used medication for the treatment of chronic/long-term diseases before pregnancy, and 37.5% (n=176) used medication for acute/short-term diseases (Table 2). The most frequently used medications for chronic/long-term diseases were levothyroxine (n=21, 31.3%), methyldopa (n=20, 29.8%), and metformin (n=18, 29.3%).

Among the participants, 97.5% of whom indicated that they would consult a physician regarding medication use, 90.1% of the participants informed their physician regarding the presence of a chronic disease and/or use of medications, 87.4% of whom would use medication in accordance with the physician's advice, 95.6% of whom would consult a physician in case

Table 1. Characteristics of the study participants.

		n	%
Age (years)	29.20 ± 5.15 (Mean ± SD)		
Education	Illiterate	13	2.8
	Literate (no formal education)	39	8.3
	Primary	166	35.4
	Secondary	135	28.8
	High school	46	9.8
	University	61	13.0
	Postgraduate	9	1.9
Working status	Unemployed	390	80.4
	Employed	95	19.6
Employment	Public-related sector	32	36.0
	Self-employed	14	14.0
	Non-public related sector	45	47.0
	Other	3	3.0
Residence	Urban	465	98.9
	Rural	5	1.1
Smoking	Yes	61	12.8
	No	366	80.9
	Quitted during pregnancy	30	6.3
Alcohol use	Yes	0	0.0
	No	460	98.1
	Quitted during pregnancy	9	1.9
Presence of a chronic/long-term disease before pregnancy	Yes	79	16.8
	No	390	83.2
Planned pregnancy	Yes	315	66.7
	No	157	33.3
Gravida	First pregnancy	127	26.6
	>1	351	73.4
Utilization of assisted reproductive techniques	Yes	9	1.9
	No	458	98.1
Gestational age	1st trimester	36	7.8
	2nd trimester	155	33.5
	3rd trimester	271	58.7
History of pregnancies not completed	Yes	116	27.8
	No	301	72.2
Cause of pregnancies not completed	Dilatation and Curettage	7	6.1
	Miscarriage	108	93.9

Table 2. Use of medications† and herbal products.

		n	%
Any medication use	Yes	213	45.6
	No	256	54.4
Medication use for chronic/long-term diseases	Yes	49	10.5
	No	416	89.5
Medication use for acute/short-term diseases	Yes	176	37.5
	No	293	62.5
ATC class‡ of medications	A	48	19.2
	B	14	5.6
	C	20	8.0
	G	9	3.6
	H	21	8.4
	J	52	20.8
	N	82	32.8
	R	4	1.6
Use of herbal products	Yes	18	3.9
	No	445	96.1

†Vitamin/mineral supplements were not included.
‡ATC class A: Alimentary tract and metabolism - B: Blood and blood forming organs - C: Cardiovascular system - G: Genitourinary system and reproductive hormones - H: Systemic hormonal preparations (excluding reproductive hormones and insulin) - J: Anti-infective for systemic use - N: Nervous system - R: Respiratory system.

Table 3. Results of logistic regression models estimating the associations between maternal factors and medication use† during pregnancy.

Variables		AOR*	95.0% CI	p Value
Age (years)		0.971	0.926 – 1.018	0.217
Education	High school or less		Reference	
	University or more	2.360	1.313 – 4.243	0.004
Gravida	First pregnancy		Reference	
	>1	1.778	1.073 – 2.945	0.025
Presence of a chronic/long-term disease before pregnancy	Yes	7.543	3.835 – 14.838	<0.001
	No		Reference	
Planned pregnancy	Yes	1.790	1.058 – 2.737	0.015
	No		Reference	
Gestational age	1st trimester		Reference	
	2nd trimester	7.283	2.427 – 21.855	<0.001
	3rd trimester	7.349	2.523 – 21.411	<0.001
Working status	Unemployed	2.162	1.164 – 4.016	0.015
	Employed		Reference	

†Vitamin/mineral supplements were not included.
*Binary logistic regression test (Backward LR method) was performed (Log likelihood = -207.14, χ^2 = 76.82 (8 df), p<0.001).
AOR= Adjusted Odds Ratio, CI=Confidence interval.

of drug-related side effects, and 81.3% of whom attended prenatal doctor visits regularly.

Table 3 shows the results of multiple logistic regression analysis investigating the associations between characteristics of the participants and medication use during the current pregnancy. The model was statistically significant (Log likelihood = -258.06, χ^2 = 84.38 (10 df), p<0.001) and explained 23.9% of variance in medication use (Nagelkerke R^2= 0.220). The probability of using at least one medication was statistically higher in women who had a chronic disease before pregnancy, had one or more previous pregnancies, had a high level of education (university or more), had a planned current pregnancy, were in the second or third trimester, and were unemployed.

DISCUSSION

This study included a relatively large population of pregnant women with a high response rate to determine the prevalence of medication use and factors affecting their attitude regarding medication use in Turkey. However, to our knowledge, there is sparse information about the maternal characteristics associated with medication use in the Turkish pregnant population.

We found that 45.6% of the participants used at least one medication during the current pregnancy, excluding vitamin and mineral supplements. This ratio is low when compared to the prevalence of medication use in other studies. The rate of medication use during pregnancy differs among the countries. While 88.8% of all pregnancies use medications in the USA (Mitchell et al., 2011), in Europe, prevalence estimates of prescribed medication use vary, ranging from 26% (Serbia) to 93% (France) (Araujo et al., 2021; Lacroix et al., 2009; Odalovic, Vezmar Kovacevic, Ilic, Sabo, & Tasic, 2012). A study conducted in an astern Ethiopia tertiary hospital found a somewhat similar pattern of non-supplemental drug utilization and found the prevalence ratio to be 15.12% (Bedewi, Sisay, & Edessa, 2018).

Avoiding drug use during pregnancy may be dangerous and the medications used during pregnancy can prevent adverse outcomes not only for the mother but also for the fetus. Pregnant women underestimate the benefit of medicine use in some circumstances such as influenza, acute respiratory system or urogenital system infections, and hyperemesis gravidarum. During the pregnancy period, approximately 8% of pregnant

women need to use drugs due to chronic diseases and the most common chronic diseases accompanying pregnancy are epilepsy, diabetes mellitus, asthma, hypertension, thyroid diseases, migraine, and depression (Czeizel, 1999). In our study, the most commonly used medications for chronic/long-term diseases were related with their chronic health problems, such as disorder of the thyroid gland, hypertension, and diabetes mellitus, similar to the study conducted in India (Undela et al. 2021). It is pleasing that the majority of the patients use medication after consulting a physician. Our study also showed that anti-infective drugs and agents for the nervous system (such as paracetamol) and agents for the alimentary tract and metabolism (such as antacids) were the leading drugs used for acute/short-term diseases, as also shown by previous research. Analgesics, antacids, nasal decongestants/anti-allergic medications, and systemic antibiotics were reported to be the dominant medications (Czeizel et al., 2014; Navaro et al., 2018; Nordeng, Ystrøm, & Einarson, 2010; Palmsten et al., 2015; Thorpe et al., 2013).

The study provided here will guide healthcare professionals regarding medication use during pregnancy. The determination of predictors for medication use in pregnancy could be useful in strategy development and to identify vulnerable groups of women who have a higher chance of being exposed to medications. Drug safety studies will also focus on the most prominent drug groups used during pregnancy. In our study we found medication use for health problems present before pregnancy to be the most important causative factor for medication use in pregnancy, similar to the study by Odalovic et. al. (Odalovic et al., 2012) performed in Serbia.

The factors related to socio-demographic variables, such as level of education, history of previous miscarriage, and medical problems, are potential risks of using medication. Previous studies also reported that potential socio-economic and lifestyle predictors of unsafe medication use in pregnancy were place of residence, being single, being a smoker, being unemployed, or being nulliparous (Lee et al., 2006; Odalovic et al., 2013). Contrary to a previous study indicating an association between lower maternal education and more prevalent use of medication during pregnancy, in our study higher education was associated with a higher use of medication (Czeizel et al., 2014).

Interestingly, most women in this study were reluctant to use herbal products during pregnancy and this was reflected in the low percentage of herbal product users (3.9%). This shows a more conservative attitude than studies that reported the use of herbs during pregnancy in British, Italian, and Norwegian women as 57.8%, 50%, and 36%, respectively (Holst et al., 2009; Lapi et al., 2010; Nordeng & Havnen, 2004). This ratio is similar to results reported in Saudi Arabia (4.6%) (Zaki & Albarraq, 2014). In a recent study conducted in a city in the Central Black Sea region of Turkey, it was reported that almost half of women use at least one herbal product during pregnancy (Kıssal, Çevik Güner, & Batkın Ertürk, 2017). The possible adverse effects of herbal products and the large disparity between different studies on the risk factors in pregnancy could result from a restrictive attitude, as reported before (Holst et al., 2009; Kebede, Gedif, & Getachew, 2009; Tiran, 2005). Baggley et al. reported that more than half of the pregnant women who experience nausea and vomiting prefer to use herbs instead of medication (Baggley et al., 2004). Healthcare providers can improve the quality of life of pregnant woman by providing comprehensive information to those who have any disease.

Limitations

The limitations to this study were as follows: First, the information was collected by self-reporting, and patients' responses may have been subject to reporting bias. Response bias is also possible, as in all surveys, because respondents may answer questions as they are expected to rather than describing how they actually behave. However, as the data is collected through an anonymous survey, there is a low probability of this occurring. Second, the generalizability of our findings to other populations in other geographic areas may need to be established. We conducted a survey among participants living in a city. Their knowledge and attitudes about use of medications may be different from other pregnant women living in other parts of the country. However, our findings were in accordance with other findings reported.

The strengths of this study were that this is the first data regarding knowledge and attitudes about medication use among pregnant women in Turkey. Moreover, the high response rate and the inclusion of a representative sample of the population provide important insights into knowledge, attitudes, and practices regarding medication use.

CONCLUSION

In conclusion, several maternal characteristics were found to be associated with medication use during pregnancy. The pregnant women in our study seemed to prefer to consult their physician regarding medication use and adhere to treatment regimens. It is important to communicate with pregnant women about possible harms related to herbal products as well as medications.

Peer-review: Externally peer-reviewed.

Informed Consent: Written consent was obtained from the participants.

Ethics Committee Approval: This study was approved by the Clinical Trials Ethics Committee of S.B. İstanbul Medeniyet University Göztepe Research and Training Hospital (Date: 28.08.2019 No: 2019/0329).

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