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Abstract

Background: Pregnancy is an important process that affects the body's daily water requirements through various mechanisms. Adequate fluid intake also plays a critical role in pregnancy. This research aimed to determine levels of water/fluid intake and influencing factors among pregnant women presenting to a university hospital in Trabzon, Türkiye.

Methods: A total of 1,082 pregnant women were included in this cross-sectional research. A questionnaire was used during the face-to-face interviews to collect data. SPSS version 23.0 software was employed during data analysis, and logistic regression was applied to identify factors that affect adequate daily fluid intake.

Results: The pregnant women in this study consumed a daily mean amount of water amounting to 1.8 ± 0.9 liters and had a mean fluid intake of 2.3 ± 0.9 liters. Results showed that daily fluid intake was inadequate in 557 (51.5%) participants. At the same time, logistic regression analysis revealed higher rates of sufficient daily fluid intake among pregnant women who were informed about water intake by their physicians and women with higher total monthly household incomes.

Conclusions: Fluid intake was lower than the recommended amount for pregnant women in approximately half of the study's participants. High levels of education, household income, and information about water intake provided by a physician were identified as important factors related to adequate daily fluid intake.

Keywords: fluid intake, pregnancy, Turkey

INTRODUCTION

Water is essential for the maintenance of life and the body's physiological functions.[1,2] Given that the body cannot produce its own water, this has to be taken in from the outside; furthermore, water lost through various mechanisms during the day must be replaced.[3] The body's water requirements are affected by several factors, including physical activity, health status, diet, and environmental conditions.[2]

Meanwhile, pregnancy is a highly important process that affects the body's daily water requirements through various mechanisms. Due to their increased weight and energy intake, pregnant women are advised to raise their daily water intake by 300–450 mL.[4] Sufficient fluid intake plays a critical role in pregnancy in terms of increasing blood volume via neuroendocrine mechanisms, which, in turn, ensures adequate uteroplacental perfusion.[5,6] In addition, proper fluid intake enables the mother to maintain sufficient reserves to tolerate fluid loss during childbirth.[5] Sufficient fluid intake is also required for the optimal absorbance of water-dissolved vitamins (e.g., ascorbic acid, nicotinic acid, riboflavin, B12 [thiamine], and B6 pyridoxine]) that are essential for maternal and fetal health. This factor also plays a role in ameliorating constipation, which is experienced by one in three women during pregnancy, and in treating urinary tract infections that can lead to complications. One case control study conducted in the framework of the National Birth Defects Prevention study in the USA reported a decrease in congenital defects, including neural type birth defects (spina bifida), orofacial clefts (cleft lip), congenital heart defects (including various cardiac anomalies such as hypoplastic left heart syndrome, right-side obstructions, and pulmonary valve stenosis), and musculoskeletal defects (gastroschisis and extremity deficiencies) as a result of increased water intake among pregnant women.[7]

Studies have also reported that inadequate fluid intake during pregnancy may cause health risks in terms of fetal development and maternal health. Plasma volume throughout pregnancy is associated with the infant's

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birth weight and low plasma volume, which increase the risk of fetal developmental delay.[8] In addition, dehydration has been associated with adverse fetal outcomes, such as preterm labor, because it leads to premature contractions, preeclampsia, and curettage.[6,9]

While the National Academy of Medicine (NAM) recommends a minimum daily fluid intake of 2.3 L, including water, the Turkish Nutrition and Health Survey published in 2019 reported an average daily water intake of 1,205 mL for pregnant women in Turkey.[10,11] This worrying value warrants further investigation and assessment of the daily water intake of pregnant women in Turkey.

Thus far, current studies have largely focused on determining the amount of fluid intake among pregnant women, the content distribution of their fluid intake (water, beverages, and foods), and the effect of water intake and fluid content on maternal/fetal health.[6,7,12–17] In comparison, only a limited number of studies have addressed the factors affecting the water intake levels of pregnant women.[6,13,18] The results of these studies are also inconsistent. For example, a study of pregnant women in China reported a total fluid intake of approximately 1.4 L/day, while a study from Mexico cited 2.6 L/day. Similar variations in the content distribution of daily fluid intake have been reported.[6,12] For instance, a study of pregnant women in Indonesia reported that plain water accounted for 72% of total fluid intake, while a study from Mexico reported a figure of 33.2%.[12,18] These results indicate wide intersocietal differences in the water/liquid consumption behaviors of pregnant women. Therefore, it is important for each community to conduct its own studies to assess the distinct populations of pregnant women.

In line with the abovementioned research gap, the purpose of the present research was to determine levels of water/fluid intake among pregnant women presenting to the Department of Obstetrics and Gynecology pregnancy clinic of a university hospital located in Trabzon, Türkiye and the factors affecting such intake.

METHODS

Ethical approval

Approval for the research was granted by the Karadeniz Technical University Medical Faculty Ethical Committee (No. 24237859-342, dated 25.05.2018). During the data collection stage, we explained the study to women presenting to the pregnancy clinic, and verbal consent was obtained from those who agreed to participate.

Study design

This study was performed with a cross-sectional design. Pregnant women who agreed to participate were administered a questionnaire during the face-to-face interviews, which were conducted to collect data.

Settings

The research population consisted of pregnant women presenting to the pregnancy clinic of a public university hospital in Trabzon, Türkiye. The study was conducted in the pregnancy clinic within the hospital's Gynecology and Obstetrics Department. All pregnant women presenting to the clinic during the recruitment period, which lasted from March to August 2018, were invited to participate.

Participants

The eligibility criteria for the selection of pregnant women for inclusion in the study were as follows: age over 18 years, willingness to participate, pregnancy persisting at the time of the research, evaluation of a single presentation in case of multiple presentations, and absence of risky pregnancy. Women with any condition that might hinder verbal communication were excluded from the study.

Variables

The questionnaire developed by the researchers following a literature review consisted of three sections:

Section 1: Sociodemographic and individual characteristics. This section included closed-ended questions on the participants' educational level (illiterate, literate, elementary school graduate, middle school graduate, high school graduate, and university graduate), profession and working status (yes/no), and presence of chronic disease/drug use before pregnancy (yes/no). Questions regarding the participant's age, total monthly household income, and number of family members were open-ended. The questions on the participants' age, total monthly household income, and number of family members were categorized to be used in the analyses. Age was classified according to mean values and categorized as 30 years or under and over 30 years. Monthly household income was determined in Turkish lira and converted into dollars to ensure that it could be assessed using international values. Monthly household income was classified based on the mean value and categorized as ≤ 780 dollars ($) and >780 $. The number of individuals in the household was classified according to mean values and categorized as 3 persons or fewer and more than 3 persons.

Section 2: Pregnancy-related characteristics. This section included closed-ended questions on pregnancy-related health problems/drug use for the current pregnancy (yes/no), the institution where regular monitoring took place (university/public/private hospital), and regular monitoring by health personnel during pregnancy (yes/no). It also included open-ended questions on the most recent menstrual cycle and total number of pregnancies, as well as information of any pregnancy-

related health problem. The trimesters of pregnant women were determined based on their most recent menstrual cycle dates. In addition, the number of pregnancies was categorized based on whether the current pregnancy was the first or not, as this indicated the experience of the woman concerned.

Section 3: Characteristics related to water and fluid intake in pregnancy. This section investigated characteristics, such as information about water intake provided by a physician, changes in the amounts of daily water intake compared to prepregnancy levels, amounts of daily intake of water and other fluids (mineral water, tea, coffee, fruit juice, milk and milk products, fruit juices, and soft drinks like fizzy drinks containing sugar or sweetener). In this section, the question about being informed by a physician about water intake is a closed-ended question (yes/no). Alterations in water intake during pregnancy were asked as closed-ended (decreased, unchanged, and increased) based on the participants' self-reports. Two distinct terms, "water intake" and "total fluid intake," were used in the study. Specifically, "water intake" refers to the amount consumed by an individual daily in the form of plain water (tap or bottled water) only. Meanwhile, daily "total fluid intake" represents the sum of all fluids consumed during the day and is categorized as follows: water (tap, bottled, and mineral water), hot drinks (tea and coffee), milk and milk products, soft drinks (fizzy drinks containing sugar or sweetener and fruit juices), and other drinks. A there is no recommended level of daily plain water intake for pregnant women in the literature, we thus applied the 2.3 L fluid intake value recommended by the NAM for calculating the sufficiency of daily beverages and plain water-based fluid intake.[10] Accordingly, fluid intake of 2.3 L or more was regarded as adequate that less than 2.3 L was considered inadequate.

Study size

OpenEpi software was employed for sample calculation. Accordingly, we planned to include at least 1,066 pregnant women at a 95% confidence interval (CI), a 50% frequency with unknown prevalence, and 3% deviation. A total of 1,082 pregnant women who agreed to participate were interviewed in the scope of the study. We subsequently scanned patients presenting to the Gynecology and Obstetrics Department, using ICD10 code "Z33: pregnant state" from the hospital database, to determine the total number of pregnant women presenting to the pregnancy clinic between the study dates. The total number of patients diagnosed with "pregnant state" and presenting to the departmental clinics during the study period was 2,385. This number included pregnant women presenting to the high-risk pregnancy clinic or other clinics with different symptoms. However, the study sample was a comprehensive one.

Statistical analysis

SPSS 23.0 software was used during data analysis. Descriptive statistics were expressed as number (N) and percentage (%) for categorical variables and as mean, standard deviation (SD), minimum, and maximum (min–max) for numerical variables. The number of pregnancies, including the current pregnancy, and the number of individuals in the household were presented with median (25th–75th percentile) values. For questions that were unanswered by the participants, the number of participants who answered these questions was expressed as "N" in the question row. The normal distribution of numerical variables was assessed using the Shapiro Wilk test. The Mann–Whitney U and Kruskal–Wallis tests were used to compare measurement variables between independent groups for data that were not distributed normally. Post hoc Bonferroni correction was used to determine the source of significant differences between groups. Logistic regression was applied to identify factors affecting adequate daily fluid intake. Based on NAM recommendations, water intake of 2.3 L or more a day was considered adequate, while intake less than 2.3 L a day was deemed inadequate (10). Parameters with $p < 0.20$ in previous relevant comparisons and with no mutual interaction (educational level, monthly household income, number of pregnancies, trimester, presence of pregnancy-related health problems, and information about water intake during pregnancy provided by a physician) were included in the model. The statistical alpha significance level was set at $p < 0.05$.

RESULTS

A total of 1,082 pregnant women participated in the study. Given that the data were collected face-to-face, responses were recorded reliably, and no ineligible forms were identified. The mean age of the women was 29.7 ± 5.6 (18–54) years, and the median number of pregnancies, including the current pregnancy, was 2.0 (1.0–3.0), while the mean gestational week for current pregnancies was 23.0 ± 9.8 (3.0–40.6). The median number of individuals in the household was 3 (2–4). Other sociodemographic, individual, and current pregnancy-related characteristics are shown in Table 1.

The participating women's mean water intake was 1.8 ± 0.9 (0.1–5.0) liters (L) daily, and their mean total fluid intake was 2.3 ± 0.9 (0.2–6.0) L/day (Table 2). Based on NAM values for daily fluid intake, 557 (51.5%) participants had inadequate levels of water intake, while 525 (48.5%) reported adequate intake. Plain water represented 78.8% of total fluid intake among the pregnant women in this study, 77.1%, 76.3%, and 78.5% in those in the first, second, and third trimesters, respectively. The different fluid distributions in total fluid intake are shown in Table 3.

Higher levels of daily water and fluid consumption were associated with several factors, namely, a higher

TABLE 1. Pregnant women's descriptive characteristics

Variable	N	%
Education status		
Illiterate	7	0.6
Literate	21	1.9
Elementary school graduate	220	20.3
Middle school graduate	213	19.7
High school graduate	320	29.6
University graduate	301	27.9
Own profession		
Yes	335	31.0
No	747	69.0
Working in income-generating employment		
Yes	299	27.6
No	783	72.4
Monthly household income (N = 1,010)		
≤$780	727	72.0
>$780	283	28.0
Presence of chronic disease before pregnancy		
Yes	238	22.0
No	844	78.0
Regular medicine uses before pregnancy		
Yes	167	15.4
No	915	84.6
Trimester (N = 1,075)		
First	205	19.1
Second	407	37.9
Third	463	43.0
Presence of pregnancy-related health problems		
No	858	79.3
Yes	224	20.7
Gestational diabetes	50	23.4
Thyroid disease	47	22.0
Anemia	28	13.1
Hypertension	27	12.6
Recurrent urinary tract infection	15	7.0
Vitamin/mineral deficiency	12	5.6
Kidney failure	7	3.3
Kidney stone	4	1.9
Other	40	18.7
Medicine use during pregnancy (N = 1,079)		
Yes	933	86.5
No	146	13.5
Regular monitoring by health personnel during pregnancy		
Yes	1,071	99.0
No	11	1.0
Institution where regular monitoring took place[a]		
University hospital	1,001	93.7
Public hospital	386	36.1
Private hospital	279	26.1
Receipt of information from a physician concerning water intake in pregnancy		
Yes	565	52.2
No	517	47.8
Alteration in water intake in pregnancy		
Increased	484	44.7
Unchanged	459	42.4
Decreased	139	12.9

[a]More than one option might be selected

education level, working in an income-generating occupation, greater household income, first pregnancy, advancing trimester, having a pregnancy-related disease, taking medication during pregnancy and being informed about water consumption (Table 4).

Logistic regression analysis revealed that a higher level of education, higher income levels, and being informed about water consumption increased adequate fluid intake (Table 5). In particular, the prevalence of adequate fluid intake among pregnant women educated at the high school level or above was 53.3%, significantly higher than that of women with a below high school educational level (42.1%) (OR = 1.37, 95% CI: 1.03–1.82). The prevalence of adequate fluid intake among the women with monthly total household incomes above the 780$ mark was significantly higher than among those with lower income levels (60.4% vs 45.4%, OR = 1.57, 95% CI: 1.15–2.13). Additionally, the prevalence of adequate fluid intake among women who had been informed about water consumption during pregnancy by a physician was significantly higher than that among women who did not receive such information (54.3% vs 42.2%, OR = 1.42, 95% CI: 1.09–1.84).

DISCUSSION

The mean plain water intake of the women who participated in this research was 1.8 ± 0.9 (0.1–5.0) L/day, and their total fluid intake was 2.3 ± 0.9 (0.2–6.0) L/day. As mentioned previously, a cut-off value for adequate total fluid intake of 2.3 L/day was adopted, and an incidence of inadequate fluid intake of 51.5% was determined. The 2019 TBSA reported a daily plain water intake level of approximately 1.2 L among pregnant women, but this contained no data for total fluid intake.[11] In a study from China, Zhou *et al*. reported a mean plain water intake of 1,160 mL/day among pregnant women and a mean total fluid intake of 1,385 mL/day.[6]

In an Indonesian study, Bardosono *et al*. reported a mean total fluid intake of 2311mL/day and adopted 2.3 L/day as a cut-off value for adequate total fluid intake, yielding an inadequate fluid intake rate of 42%.[18] In Martinez's study of pregnant women in Mexico, mean total fluid intake was 2.6 L/day, and a cut-off value of 2,080 mL/day for adequate fluid intake yielded an inadequate intake prevalence of 41%.[12] The prevalence of inadequate total fluid intake in previous studies is quite high. Furthermore, inadequate total fluid intake levels in the present research were higher than in those two previous studies. Total fluid intake is frequently evaluated, because it is simple to apply in large populations and provides a basic finding concerning sufficient hydration. Therefore, the inadequate fluid consumption rate determined in the current research involving an extensive sample group represents a risk for both maternal and fetal health.

TABLE 2. Levels of water and fluid intake among pregnant women

Variable	Amount of daily fluid intake (L)		Proportion of total fluid intake
	Mean ± SD	Min–Max	%
Water	1.80 ± 0.90	0.1–5.0	78.8
Water-based beverages			
Tea	0.30 ± 0.30	0.0–2.5	11.2
Coffee	0.01 ± 0.05	0.0–0.8	0.5
Milk and milk products			
Ayran	0.10 ± 0.10	0.0–1.5	4.7
Milk	0.02 ± 0.08	0.0–1.0	0.8
Nonalcoholic drinks			
Gaseous drinks	0.02 ± 0.06	0.0–0.8	0.7
Fruit juice	0.05 ± 0.10	0.0–1.5	2.3
Other	0.02 ± 0.07	0.0–1.0	1.0
Total fluid intake	2.30 ± 0.90	0.2–6.0	100

TABLE 3. The contributions of different fluid types to total fluid intake

Fluid types	First trimester (%)	Second trimester (%)	Third trimester (%)	Total (%)
Water	77.1	76.3	78.5	78.8
Hot drinks	12.8	12.8	12.4	11.7
Milk and dairy	5.2	6.3	5.6	5.5
Soft drinks	4.2	3.6	2.4	3.0
Others	0.7	1.0	1.1	1.0

TABLE 4. Amounts of daily water and fluid intake related to various parameters

Variable	Daily water intake (L)	*p*	Daily fluid intake (L)	*p*
Age (years)				
30 or under	2.0 (1.0–2.5)	0.126	2.3 (1.7–2.9)	0.368
Over 30	2.0 (1.0–2.5)		2.2 (1.6–2.8)	
Education level				
Below high school	1.5 (1.0–2.0)	<0.001*	2.1 (1.5–2.8)	0.002*
High school or above	2.0 (1.4–2.5)		2.4 (1.8–2.9)	
Working in income-generating employment				
Yes	2.0 (1.5–2.5)	<0.001*	2.4 (1.9–3.0)	<0.001*
No	1.5 (1.0–2.5)		2.2 (1.5–2.8)	
Monthly household income (N = 1,010)				
≤$780	1.5 (1.0–2.5)	<0.001*	2.2 (1.6–2.8)	<0.001*
>$780	2.0 (1.5–2.5)		2.4 (1.9–3.1)	
Number of individuals in the household				
3 or fewer	2.0 (1.2–2.5)	<0.001*	2.3 (1.7–2.9)	0.019*
More than 3	1.5 (1.0–2.0)		2.1 (1.5–2.8)	
Number of pregnancies				
First pregnancy	2.0 (1.0–2.5)	0.017*	2.3 (1.6–2.9)	0.446
≥ two pregnancies	1.7 (1.0–2.5)		2.2 (1.6–2.8)	
Trimester (N = 1,075)				
First	1.5 (1.0–2.0)	<0.001[a,b]*	2.0 (1.3–2.7)	<0.001[a,b]*
Second	1.6 (1.0–2.5)		2.2 (1.6–2.8)	
Third	2.0 (1.2–2.5)		2.4 (1.8–3.0)	
Presence of a pregnancy-related health problem				
Yes	2.0 (1.2–2.5)	0.021*	2.4 (1.8–3.0)	0.038*
No	2.0 (1.0–2.5)		2.2 (1.6–2.8)	
Medicine use during pregnancy (N = 1,079)				
Vitamins/minerals	2.0 (1.0–2.5)	0.001[c]*	2.2 (1.6–2.9)	0.003[c,d]*
Medicine other than vitamins/minerals	2.0 (1.2–2.5)		2.4 (1.7–2.9)	
None	1.5 (1.0–2.0)		2.0 (1.3–2.6)	
Information about water consumption during pregnancy provided by a physician				
Yes	2.0 (1.3–2.5)	0.001*	2.4 (1.8–3.0)	0.001*
No	1.5 (1.0–2.0)		2.1 (1.5–2.7)	

[a]First trimester vs. second trimester, [b]second trimester vs. third trimester, [c]No vs. nonvitamin/mineral medicine, [d]No vs. vitamin/minerals. $p < 0.05$.

TABLE 5. Factors affecting adequate daily fluid intake among pregnant women

Variable	Inadequate fluid intake		Adequate fluid intake		Odds Ratio (95% CI)
	N	%	N	%	
Education level					
Below high school[ref]	267	57.9	194	42.1	
High school and above	290	46.7	331	53.3	1.37 (1.03–1.82)*
Monthly total household income (N = 1,010)					
≤780$[ref]	397	54.6	330	45.4	
>780$	112	39.6	171	60.4	1.57 (1.15–2.13)*
Number of pregnancies					
First pregnancy	160	49.1	166	50.9	1.06 (0.81–1.39)
≥2[ref]	397	52.5	359	47.5	
Trimester (N = 1,075)					
First[ref]	121	59.0	84	41.0	
Second	218	53.6	189	46.4	1.05 (0.73–1.51)
Third	215	46.4	248	53.6	1.34 (0.94–1.93)
Presence of a pregnancy- related health problem					
No[ref]	459	52.9	409	47.1	
Yes	98	45.8	116	54.2	1.34 (0.98–1.85)
Information about water consumption during pregnancy provided by a physician					
No[ref]	299	57.8	218	42.2	
Yes	258	45.7	307	54.3	1.42 (1.09–1.84)*

The distribution of beverage types that contribute to total fluid intake also has an effect on health. Research among pregnant women shows that three groups, namely, hot beverages, plain water, and drinks containing sugar or sweeteners, represent the largest proportion of daily fluid intake.[9,11] Studies have also revealed a link between high levels of beverages containing sugar or sweeteners in diet during pregnancy and adverse health impacts.[13–17] However, no recommendations have been made concerning the distribution of the fluid types constituting total fluid intake. The proportions of plain water to total fluid intake in pregnant women were reported at 72% in an Indonesian study by Bardosono *et al*., at 33.2% in Mexico by Martinez, and approximately twice that of other fluids in Malisova *et al*.'s study from Greece.[12,18,19] Thus, we regard the fact that plain water comprised the largest component of total fluid intake in pregnant women (78.8%) in the present study as a positive finding.

High levels of education and income have a positive impact on water consumption.[20–22] In their study of pregnant women, Zhou *et al*. determined no association between education level and total water, plain water, or beverage-based water intake.[6] In the present study, a participant's higher level of education was associated with greater daily fluid and water intake, along with a higher rate of adequate fluid intake. This finding therefore indicates that education plays a role in pregnant women's health-related decision-making processes. Brooks *et al*.'s study of adults reported a 20% greater risk of inadequate hydration in those with low income compared to high-income individuals.[21] In Zang *et al*.'s study conducted in urban China, total fluid consumption was reported to be lower in areas characterized by lower socioeconomic status.[22] In the present study, pregnant women coming from households with high total income levels consumed significantly more fluid and water and exhibited higher rates of adequate fluid intake. This relationship between economic status and water and fluid consumption thus requires further investigation to eliminate inequalities in the hydration status of pregnant women.

Since the numbers of pregnancies can alter pregnant women's health-related information acquisition behaviors, they can also play a role in water and fluid intake. In a study of women in the final trimester, Aydin reported higher rates of positive nutritional behaviors during pregnancy among primiparous women compared with multiparous individuals. However, no correlation was found between parity and levels of water intake.[23] In the current research, significantly higher levels of plain water and total fluid intake were observed in women in their first pregnancy compared with their multiparous peers. However, logistic regression analysis revealed that the number of pregnancies had no effect on adequate fluid intake. This finding suggested that although women in their first pregnancies consumed high quantities of water and fluid, due to the effect of other variables, these remained at threshold levels in terms of adequacy.

The amount of water and fluid consumed is generally expected to increase as the trimesters advance.[4] However, previous studies found no statistically significant difference between the trimesters in terms of daily water and fluid intake.[6,13,18] In the present study, levels of water and fluid consumption increased in parallel with the trimesters, while intake of water and fluid was significantly higher in the third trimester. However, logistic regression analysis revealed no significant relationship between trimester and adequate fluid intake. Thus, we

interpreted the trimester-related increase in fluid intake in this study as a positive finding in terms of meeting increased fluid requirements from the second trimester onward, as recommended by the EFSA. Meanwhile, experiencing health problems during pregnancy can increase health awareness and play a decisive role in pregnant women's water and fluid intake. In the present research, daily plain and total water intake were significantly higher among women experiencing health problems during pregnancy and those taking medications. However, no relationship was found between the presence of a health problem during pregnancy and adequate fluid intake.

More studies have addressed nutritional behaviors among pregnant women and the role of healthcare providers than those examining the role of physicians in adequate water/liquid consumption in such women.[24–26] As mentioned earlier, water and fluid intake is also a component of nutrition during pregnancy. For example, in a qualitative study of pregnant women conducted by Bookari *et al*., physicians and obstetricians were identified as the most reliable sources of nutrition advice for pregnant women. Bookari *et al*. also reported that the advice given by the healthcare provider had a positive effect on nutrition.[24] In the current study, being informed about water intake during pregnancy by a physician was linked to an increase in fluid intake and adequate daily fluid consumption. Considering the positive effects of water on the maternal and fetal health, along with the complications that may arise in case of deficiency, the instructional role of physicians can be considered a prime example of preventive medicine initiatives in the field of public health. In this regard, he positive effect of the informative role of physicians on water and fluid consumption in pregnant women requires greater emphasis in light of the prevalence of inadequate fluid consumption.

There are several limitations to this study. First, daily fluid intake was based on participants' self-report and recall, which might have generated recall bias. Furthermore, the study involved pregnant women admitted to a university hospital, which led to a lack of random selection. Therefore, the results cannot be generalized to the entire population. Finally, compared to other studies, the amount of water ingested from food was not calculated in this research. This may have caused some limitations in the discussion of the data.

Despite these limitations, this study also particular strengths. First, while there are some studies in the local literature that investigated water/fluid consumption during pregnancy, to our knowledge, this is the first study from Türkiye to investigate the factors affecting water and fluid intake among pregnant women. Therefore, the data from this study are particularly important. Furthermore, the study was conducted with a relatively large sample size of 1,082 participants. As the data were collected face-to-face, their quality is high, and the incidence of missing data quite low. Finally, the questionnaire employed to determine the parameters affecting water and fluid consumption was a comprehensive one that was produced from an extensive review of the previous literature.

This research also has some important key points. Considering the impact of water on maternal and fetal health, the 51.5% prevalence of inadequate fluid consumption in this study is quite alarming. As such, this research can serve as a useful guide for future studies in terms of conducting in-depth investigations of the variables hereby identified as risk factors for inadequate fluid consumption and in revealing relevant risk profiles. Finally, demonstrating the positive effect of the informative role of physicians on water/liquid intake on pregnant women reveals important opportunities for successful interventions.

CONCLUSIONS

In conclusion, the fact that the daily water intake in this research exceeded the mean daily level of water consumption among pregnant women in Türkiye represents a positive finding. However, daily total fluid intake was lower than that recommended by the NAM in approximately half of our participants. Furthermore, higher levels of education and household income and being informed about water intake during pregnancy by a physician were found to be linked to adequate daily fluid consumption among pregnant women. In addition, our finding that physicians play a determining role in daily water/fluid intake and adequate fluid intake in pregnant women is an important one. Based on this finding, we recommend that physicians evaluate women's daily water and fluid intake at check-ups before, during, and after pregnancy, and that a counseling service concerning daily water intake be made available as a part of the dietary consultancy provided.

CONFLICT OF INTEREST

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