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Water Consumption Pattern among Pregnant Women in Mubi Lga of Adamawa State.

Nkereuwem S. Etukudoh[1], Ocheola Oki E. Joyce[2*]

1. *Department of Haematology, Federal School of Medical Laboratory Science, Jos-Nigeria*
2. *Department of Academics, Federal School of Medical Laboratory Science, Jos-Nigeria*

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ABSTRACT

Pregnancy outcomes depends on many factors especially the nutritional status of the 'to be' mother. Among all the nutrients needed, one is not often mentioned, or talked about in terms of the quantity,its intake pattern and its adequacy and that nutrient is water. a retrospective observational study cohorts study was carried out to understand the water consumption pattern among pregnant women in Mubi Adamawa state. A total of 150 pregnant women were recruited with due consent, the mean weights of the respondents were also taken. The results showed an almost equal number of the different trimesters of pregnancy among the women, with most of the women, 100(66.67) married. Majority of the women 70(50) were aged between 20-30years. Some 55(36.67) of the respondents earned between ₦10,000-₦14,000 monthly. Most of the respondents were farmers 47(31.33) or full time housewives 41(27.33), with majority of them completing secondary education 75(50.00). majority of the respondents 86(57.33), had high physical activity levels. The mean weight of the gestational period was highest for the second trimester 66.4 ± 10.62. on their water consumption pattern, most of the respondents 100(66.67) agreed to using borehole water as a major source of domestic water, some of the respondents 120(80), did not agree to drinking rain water, but some 95(63.33) of them said that they drank pure satchet water, popularly known as 'pure water' as their most common drinking water source, even as some of the respondents 55(36.66)drank between 3.5L-4.5L of water daily, with orange being the most commonly taken fruits among most of the respondents 90(60.00). about 145(96.67) of the respondents attested to indulging in drinking of carbonated drink. With a fair water consumption pattern, the pregnancy outcomes could be affected by the increased drinking of carbonated drinks, while the high physical activities can be advantageous to pregnancy outcomes. More enlightenments are needed to understand the limits of these water consumption especially among pregnant women, Nigerian nutrition society needs to work to provide a standard water consumption pattern for all age groups.

Key words: water, adequate intake, consumption pattern, pregnancy outcome.

I. BACKGROUND

The consumptionof water is very vital for temperature regulation, metabolism, transporting nutrients and wastes removal, andtissue maintenance. Water intake is also essential forpregnant women with oligohydramnios and those at riskof developing uteroplacental insufficiency (Wright et. al., 2010).

Four ways ofwater-output includes urine through urinary system, sweatthrough skin surface, breath through respiratory system,and feces through digestive system. Under normal conditions, water maintains a state of dynamic balance in body,that is, the amount of water-input is approximately equalto the amount of water-output (CNS, 2014; Ma and Zuo, 2011).

All through pregnancy extra water is required to deal with the demands of our ever-changing bodies and to maintain a fit, as well as a healthy body.

There are several reasons the body needs water, some of which are to flush out toxins, aid digestion and assist our bodies in the absorption of the essential nutrients from the food we eat. It also helps to restore and revitalize our bodies(www.emmasdiary.co.uk, accessed June 2022).

For the duration of pregnancy these essential functions are even more important as we strive to cope with a changing body and maintain a

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healthy environment for our unborn baby. Water is also a key component of breast milk so it's essential for good lactation. An adult's body weight is comprised of between 50-70% water and, without regular top-ups, our body's survival time is limited to a matter of hours or days.(www.emmasdiary.co.uk, accessed June 2022)**.**

Insufficient fluid in the body may lead to dehydration, which, even in mild cases, can lead to health problems like constipation, headaches, anxiety, fatigue and dull skin. In pregnancy severe dehydration can cause miscarriage and preterm labour.

Drinking water rehydrates our tissues and improves our complexion(www.emmasdiary.co.uk, accessed June 2022). Some pregnant women find that drinking water at regular intervals can actually relieve the symptoms of morning sickness, heartburn and indigestion.

Drinking plenty of water also dilutes the urine, reducing the risk of urinary infections, which can be common in pregnancy(www.emmasdiary.co.uk,accessed June 2022)**.**

Despite its advantages it is also important to note that, too muchor inadequate water intake disturbs the dynamic waterbalance of the body, changes the hydration state, and affects bodyhealth negatively. When water intake exceeds the regulatory capacity of kidney, it may cause acute water intoxication and hyponatremia. Insufficient water intake mayinduce a dehydrated state, which reduces cognition ability (Backes et.al., 2013;Edmond et. al., 2013; Ganio et. al.,2011.) and physical activity ability (Kenefick et.al.,2012; Peronet et.al., 2010; Sawka et. al., 2012)and increases therisk of urinary system diseases (such as kidney stones,urinary tract infections and chronic kidney disease Bjornstad et. al., 2016; Lotan et.al., 2016) and cardiovascular disease (Jaing et.al.,2016).

it's a well known fact that nutrients and energy requirements for pregnant women increases, as a result, food intake is increased.Water is the carrier of food metabolism, digestion, absorption, circulation and excretion. The water requirement is 1 mL for every 4.184 kJ of energy consumption,as much, more energy intake requires more water intakecorrespondingly (CNS 2014; Isabel et. al.,2004). Many surveys on fluid intake have shown that pregnantwomen have insufficient water intake. According to thedata of the 1977–1978 Food Consumption Survey conducted by the US Department of Agriculture National. It was found that the average total water intake among188 pregnant women was 2100 L/d, (Ershow et.al., 1991). In a study inNew Zealand in 2014, the average daily water intakeamong 504 pregnant women was 2200 mL/d (Mackenzie et.al., 2017). In a2016 survey of 20 pregnant women, the average totalwater intake was almost 2259 mL/d (Bardosono et.al., 2016). In a 2016study in Indonesia, showed that the average daily water intakeamong 300 pregnant women was 2332 mL/d, althoughin approximately 42% of participants, the water intakewas less than the recommended level (2048 mL/d) (Ma et. al., 2012).In China, only a few surveys on fluid intake among children and adults have been conducted. These studieshave shown that only one third of the participants hadadequate water intake and that almost one quarter ofparticipants were dehydrated (Zhang et. al.,2017. However, no surveys have been conducted for water intake among pregnantwomeninChina.

Water consumption and its effect on feotal development.

Few epidemiological studies have addressed the role of water intake on adverse reproductive outcomes with most of these focusing on the effect of specific contaminants such as disinfection by-products. (Savitz et.al.,1995)Savitz reported an inverse association between increased waterintake and risk of preterm delivery (PTD) (ie, < 37gestational weeks) and low birth weight infants. Compared to those reporting no daily water intake, oddsratios (ORs) were 0.5 and 0.6 for > 4 glasses/day forsmall for gestational age (SGA) and PTD, respectively.Relative to low intake (1-7 glasses/week), (Aggazzottiet.al., 2004) showed little evidence of anassociation between high intake of tap water (> 35 glasses/week) and risk of SGAor PTD(ORs=1.0and1.1,respectively). Other studies have shown a decreased risk ofspontaneous abortion (Swan et.al., 1998) and cardiac anomalies, Shaw et. al.,(1990) withincreased bottled water intake. Given that water intakeis a non-specific marker of exposure, it is not clear ifthese results are due to residual confounding or actualeffects of water ingestion.

Using a prospective cohort study, they examined birthweight and risk of SGA among term births and risk ofPTD in relation to daily bottled, cold tap, total tap andtotal water intake. The primary study hypothesis examined whether water intake is associated with measures offeotal growth and protective of adverse birth outcomes.

Considering the fact that water many be difficult to measure

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Study design
A retrospective observational cohort study, a total of 150 pregnant women of different pregnancy stages were recruited for the study.

Study area
The study area was Mubi located in Adamawa state in the north east Nigeria.

Method
In thisretrospective study the daily intake of plain drinking water was brought forward retrospectively by each respondent, and the mean was taken. The population of 150 pregnant women who consented to be part of this study were made to fill a survey questionnaire which had both open and closed ended questions.

A major inclusion criterion was that all the respondents were pregnant as at the time of the survey, and the research was carried out between October and December.
Because it was a baseline study which aimed at understanding their plain water intake pattern, only the weight of the respondents was taken, this was done thrice and the mean was recorded.

Statistical analysis
Data obtained were presented using simple statistics such as mean and standard deviation, all measurements especially weights was done in triplicate and the main was recorded for each participant, before it was further classed according to their various trimesters.

II. RESULTS

Table 4.1: details of socio-demographic details, gestational age and physical activity levels of participants.

s/n	Questions	Quantity	Percentage %
1.	**Marital status**		
	Married	100	66.67
	Single	05	03.33
	Divorced	15	10.00
	Widowed	30	20.00
	Separated	00	00.00
2	**Respondents age range**		
	10-20	10	06.67
	21-30	75	50.00
	31-40	40	26.67
	41-50	10	06.67
	51 and above	00	00.00
	No response	15	10.00
3.	**Estimated monthly income of respondents**		
	₦5000- ₦9.999	40	26.67
	₦10,000-₦14,999	55	36.67
	₦15,000-₦19.999	10	06.67
	₦20,000-₦24,999	00	00.00
	Above ₦25,000	20	13.33
	No response	25	16.67
4.	**Respondents occupation**		
	Civil servant	08	05.00
	Trader	14	09.33
	Farmer	47	31.33
	Artisan	23	15.33
	Students	17	11.33
	Others	00	00.00
	Full time housewife	41	27.33

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5.	**Educational qualification**		
	No formal education	00	00.00
	Quaranic education	30	20.00
	Primary school uncompleted	00	00.00
	Primary school completed	05	03.33
	secondary school uncompleted	20	13.33
	Secondary school completed	75	50.00
	Higher institution	10	06.67
	Postgraduate	10	06.67
6.	**Gestational week**		
	First trimester	50	33.33
	Second trimester	45	30.00
	Third trimester	55	36.67
7.	**Physical Activities**		
	Low	21	14.00
	Middle	43	28.67
	High	86	57.33
8.	**Gestational age**	Mean weight and SD	
	First trimester	51.6±5.90	
	Second trimester	66.4±10.62	
	Third trimester	59.3±5.18	

Table 4.2: Water/fluid consumption pattern of the respondents

s/n	Questions	Quantity	Percentage%
1.	**Source of household water**		
	Tap water	05	03.33
	Borehole water	100	66.67
	Public well	20	13,33
	Private well	25	16.67
	Streams or river	00	00.00
	Others	00	00.00
2.	**Drink rain water**		
	Yes	25	16.67
	No	120	80.00
	No response	05	03.33
3.	**Most common drinking water source**		
	Pure sachet water	95	63.33
	Bottled water	00	00.00
	Plain tap water	05	03.33
	Well water	00	00.00
	Stream or river	00	00.00
	Borehole water	50	33.33
4.	**Approximate quantity of water consumed per-day/equivalent in litres**		
	1-3 sachets /0L-1.5L	30	20.00

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	4-6 sachets/2L-3L	35	23.33
	7-9 sachets/3.5L-4.5L	55	36.67
	10-12 sachets/5L-6L	30	20.00
	13-15 sachets/6.5L-7.5L	00	00
	Above 15 sachets/>7.5LL	00	00
5.	**Most common fruit type consumed**		
	Orange	90	60.00
	Water melon	55	36.66
	Banana	05	03.33
6.	**Have diabetes**		
	Yes	35	23.33
	No	115	76.67
7.	**Take alcohol**		
	Yes	15	10.00
	No	135	90.00
8.	**Take carbonated drinks**		
	Yes	145	96.67
	No	05	03.33

III. DISCUSSION

The result showed that majority 100(66.6) of the respondent were married while few 05(03:33) were not married. Some of the respondents 15(10:00) were divorced, while others 30(20:00) where widowed.

Majority of the respondents 75(50:00) were aged between 21-30 years of age, very few of the respondents 10(06:67) were within the age range of 10-20 years. Showing that child marriage is gradually disappearing in this region of the country Nigeria.

Most of the respondent 55(36.67) earned between ₦10,000 - ₦14,000 monthly (approximately between $20-$28), only few 20(13:33) earned above ₦25000 (about $50 dollars). This is a reflection of the economic situation in the country, and with this, food security could be very difficult for households.

Most of the participants 47(37:33) were farmers, some 41(27:33) agreed that they were full time house wives, some of the participants, 23(15:33) were artisans, a few of those who participated 17(11:33) were students, while some 14(19:33) said they were traders. Only 08(05.00) of the respondents were civil servants, this data also reflects the level of government inclusion of women in its general activities. There is a need to increase women employment at all levels to at least 40% to help improve household food security.

In terms of their educational background, some of those that participated were majorly 75(50:00) secondary school certificate holders, some of the participants 30(20:00) have had quaranic education. Only few 10(6:67) of those that participated have had education above secondary levels (higher education) as well as post graduate level respectively as seen in table 4.1. to some extent, most of the participants can at least read and write

A probe into the gestational period showed that 50(33:33) of the participants where in their first trimester, 45(30:00) where in their second trimester of their gestational period, while 55(36.67) were in their third trimester of their gestational period. This shows an almost equal distribution of all the three trimesters as seen in table 4.1

Enquiry into their physical activity probe showed that majority 86(57:33) of the participants had a high physical activity type, 43(28:67) were of the middle or moderate physical activity while 21(14:00) of the participants were of the low physical activity class. This shows that most of the participants may have good pregnancy outcomes as high physical activity is associated with reduced risks of opposing pregnancy outcomes.

Majority of the participants 100(66:67) as seen in table 4.2, used borehole water as their major source of household water, 25(16:67) had

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private wells as their source of household water, 20 (13:33) said they used public wells, while only 05(03:33) used tap water, but those were not treated tap water but well water pumped out for use, none of the respondents used stream or river as their main source of household water.

On investigation, 120(80:00) of the respondents disagreed to drinking rain water, 25(16:67) agreed to drinking rain water while, 05(03:33) did not respond to this enquiry as seen also in table 4.2. Research has shown also that increased drinking of underground water such as well water or borehole water may increase urinary salinity in pregnant women as compared to those who drink rain water.

When asked about their most common drinking water source, 95(63:33) agreed to the use of pure sachet water as their most common drinking water source, 50(33:33) said they drink borehole water, while 05(03:33) claimed they drink plain tap water none of the respondent agreed to drinking bottled water, well water, or water from stream or river. The affordability of the pure sachet water, could be the reason for its high patronage, government as well as regulatory organizations should ensure that its production of this water is hygienic for consumption.

On the approximate quantity of water, the respondents consumed per-day, 30(20:00) consumed 0L-1.5L of water per-day, 35(23:33) of the respondents agreed to drinking 2L-3L of water per-day, these categories of participants tend to align with the Adequate Intake (AI) of water per-day, as recommended by the Chinese Nutrition Society (CNS) (MIO, 2004). 55(36:67) of the respondents claimed they drink in approximation, 3.5L-4.5L of water per day. About 30(20.00) agreed to drinking between 5L-6L, this fluid level exceeds that which is recommended by most literatures and could be as a result of increase in energy intake from macronutrients or an increase in salt intake by the respondents. Despite the fact that there are documentations to the fact that maternal body water accretion is positively correlated with birthweight and amniotic fluid which makes a good prediction on the health status of the fetus, any dehydration during pregnancy may lead to such adverse situations like abortion, preterm, preeclampsia (Mulyani et.al., 2017; McKenzie et. al., 2017; Hofmeyer and Gulmezoglu,2002; McKenzie et.al.,2017; Wright et. al., 2010). None of the respondents agreed to drinking between 6.5L-7.5L of water daily.

Orange was the most common fruit consumed by most, 90(60:00) of the respondents this could be because it is more affordable, when compared to water melon and banana, water melon was consumed by 55(36:66) of those that responded while 05(03:33) of the respondents said banana was the most common fruit they consumed. Although majority of the respondents eat more fruits that have a high-water content which means there are specific fluid addition apart from plain water, even though their quantities were not measured

On whether they have known disease conditions,115(76:67) disagreed to having diabetes, while 35(23.33) said they are known diabetics this could predispose the respondents to increased water intake as well due to increase thirst.

Some of those that participated 15(10:00) agreed to drinking alcohol, while 135 (90:00) said they don't drink alcohol. Majority of the respondents 145(96:67) said yes to drinking carbonated drink, most of these carbonated drinks contain caffeine this can cause dehydration and predispose pregnant women to severe risks and poor pregnancy outcomes, while 05(03:33) said they don't indulge in the drinking of carbonated drinks.

IV. CONCLUSION

The result of this studies shows that a large proportion of women are not taking the required recommended quantity of water per day in the region investigated, apart from this, quite a number of these pregnant women also take beverages that can predispose them to dehydration without them even knowing. This has the tendencies of producing poor pregnancy outcomes as well as adverse conditions which could be fetal to the growing fetus.

V. RECOMMENDATIONS.

1. There is a need to replicate this study in all other regions of the country.
2. The nutrition society in Nigeria should work on having their Adequate Intake levels for water like China Nutrition Society, for all age groups.
3. Another research should be carried out on water consumption pattern among pregnant women, with consideration for food types as well as beverages in all the geo-ecological zones in Nigeria since they also contribute to water intake levels.
4. Water is one nutrient that is most times neglected, enlightenment is needed to boost correct consumption pattern for water in Nigeria and the entire globe.

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