

ADEQUACY OF FLUID INTAKE AMONG PREGNANT WOMEN ATTENDING FEDERAL MEDICAL CENTRE, OWO, ONDO STATE, NIGERIA

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ABSTRACT

Objective: This study was conducted to find out the adequacy of fluid intake among pregnant women attending Federal Medical Centre, Owo, Ondo State.

Subject and Methods: Eighty Pregnant women who attended ante-natal clinic of the medical centre were involved in the study. Purposive sampling method was used to select the subjects. A validated questionnaire was used to obtain information from the women at their clinic sessions. Background information on the socio-demographic data, water and fluid intake of the pregnant women were collected. Data obtained were analyzed using SPSS version 17. Descriptive statistics was used to determine frequency, percentage and mean while inferential statistic ANOVA was used to analyze the relationship between the variables.

Results: The results showed that majority (28.7%) of the pregnant women were between the ages of 26-30 years, 41% of the women drank tap water, 39% drank sachet water, and 13% had well water while about 6% took rain water. The amount of daily water intake showed that 39% of the subjects drank above 8 cups of 8 oz glasses of water daily, 29% took 6-7 cups and 9% had 2-3 cups daily. Weekly fluid intake showed that 32% took cocoa beverage, 40% tea, 49% soft drink. Mean daily water intake and total fluid intake was 1290ml and 1.9L, which was below the recommended intake of 1900ml and 2.3L, respectfully. Fluid availability and type of fluid intake was significant at $p < 0.01$ level.

Conclusion: Twelve point five percent (12.5%) and 6.2% of pregnant women depended on well and rain water, respectively, which were poor sources of water, and could pose danger to the health of both mother and fetus. The fluid intake from beverage of most pregnant women was inadequate while the total fluid intake was adequate, though the intake of sugar and caffeine containing beverages was high, which may also have irreversible negative health effects on the mother and the fetus. Pregnant women therefore should not only increase caloric intake during pregnancy, but increased intake of good source of water and nutrient enriched fluid. Adequate fluid intake can come from drinking water, beverages of all kinds, and from food moisture. On average, 1900 ml intake in each 24 hour period – of non-food fluid (beverages) and 1500ml from food fluid could guarantee average daily need.

KEY WORDS: Pregnant women, fluid intake, Fruit & vegetable, Water intake.

INTRODUCTION

During pregnancy the body is adapting to provide a favourable environment for the developing fetus. Throughout pregnancy there are a number of hormonal changes, many of which can contribute to the development of uncomfortable side effects. Research suggests that gastrointestinal problems during pregnancy are as a result of hormonal changes and not the physical effects of the gravid

uterus – the uterus containing a fetus (1, 2). Between weeks 12 and 20 of gestation, the hormone aldosterone increases colonic water absorption (3, 4). During pregnancy the cumulative effects of these hormones slow gastrointestinal transit time (5, 6). Symptoms of changing hormone concentrations include constipation, bloating, hemorrhoids and anal fissures (enlarged veins in the anal canal that may tear) (5). These changes therefore, call for increase water and fluid

consumption. These conditions can reduce the woman's quality of life individually or in combination. A fibre-rich diet that is supplemented with sufficient fluid can help to ease some of these gastrointestinal problems (7, 8). Lack of dietary fibre and water are important factors in the etiology of bowel habit problems during pregnancy (9, 10).

Apart from this, pregnant women have increased fluid requirements because their extracellular volume increases by 4-6 litres, particularly as pregnancy progresses (11). Short periods of water restriction can lead to an 8% reduction in the amniotic fluid index, a measurement that indicates how much fluid surrounds the fetus. This can reduce the thickness of the protective amniotic cushion surrounding the infant (12). Water represents 94% of the baby's weight at the end of the first trimester, water is also needed for the renewal of amniotic fluid, the baby's living environment. A low water intake, also known as hypo hydration, can result in hardened stools and constipation (13). Water is an essential element of life and constitutes 55-65% of a person's body weight, making it the most common element in the body (14). Water needs to be taken in throughout the day because the body cannot produce enough on its own (15). Intake of fluid should approximately equal output. Adults lose between 1450 to 2800 ml each day from insensible (immeasurable) and sensible (measurable) losses (15). Water needs can be calculated based on food consumption. The general requirement for fluid is 1-1.5ml of water for each calorie consumed. For instance, a person consuming a 2000 calorie diet would need 2000-3000ml of fluid each day (15). Pregnant women are advised to increase their calorie intake by about 300 calories beginning in the second trimester (15) and at least 300ml

additional fluid intake.

Increased water needs in pregnancy is as a result of the weight gain (typically 10-15 kg), the higher energy intake, the increase in blood volume, the formation of amniotic fluid and increased water output which can occur as a result of morning sickness (16). Meeting water needs through diet may be more difficult in pregnant than in non pregnant women because of food aversions and/or avoidance of fluid intake when morning sickness appears. As a result, pregnant women may be more vulnerable to dehydration. The European Food Safety Authority (16) has made the following recommendations for adequate intakes of water for pregnant and breastfeeding women. An additional water intake of 300ml in addition to 2L per day adequate intake recommended for non-pregnant women. **The European food safety Authority recommends 2.3 L of daily intake of water from all sources** (16). It is calculated that of the total water consumed, 20-30% typically comes from food and 70-80% comes from beverage (all types, not just plain water). This may however, vary greatly depending on the diet an individual chooses (16, 17).

Good hydration is extremely important for a healthy pregnancy and postpartum period. Water flushes waste products from the cells and aid in liver and kidney function for both mother and the baby. During pregnancy water is also needed for the body's expansion as mother's blood volume increases significantly. Insufficient water intake can be a factor in constipation, preterm labour in the third trimester, and miscarriage, and even slight dehydration can cause or contribute to fatigue, (18). Not drinking enough water can also cause headaches, nausea (and other morning sickness symptoms). Increasing water intake will dilute

mother's urine and help prevent urinary tract infections, which are common in pregnancy, and make most mothers very uncomfortable. Drinking enough water would enable pregnant women have enough to deal with (morning sickness, weight gain, hormones and odd cravings among others (18). Proper dehydration during pregnancy is also important for adequate breast milk production and flow (21). Pregnant women typically need between 8 to 12, eight ounce glasses of water per day and higher intake if the weather is warm or during exercise. Often thirst does not set in until after dehydration (19) and some beverages cause dehydration (20). Although most studies show that caffeine intake in moderation is acceptable, however, caffeine intake may be related to miscarriage. Pregnant women should avoid caffeine during the first trimester to reduce the likelihood of a miscarriage (19). Caffeine is a diuretic, which means it helps eliminate fluids from the body. This can result in water and calcium loss. Increased intake of water, juice and milk is preferred beverages. Caffeine molecules are small enough to penetrate the placenta and slip into the baby's blood circulation. Organs and systems in fetus are not fully developed, therefore not capable metabolizing caffeine and excreting it. The energy booster tends to linger in the fetus's blood ten times longer than in adult. High levels of caffeine are bound to accumulate in the baby's body with frequent maternal consumption of caffeine. Caffeine could also cause an increased baby's pulse rate. Caffeine should be limited to 200mg per day as it is a diuretic (21).

MATERIALS AND METHODS

Study Area

The study was carried out at Federal Medical Centre, Owo, Ondo State, Nigeria. Ondo State is

located in Southwest Nigeria. The hospital serves as a referral centre for many hospitals within and outside the State. The people in the State are predominantly Yoruba ethnic group. The main inhabitants are mostly civil servants. The people were also involved in different occupations such as agro-allied, business, petty trading, farming or vocational job.

Subjects

Pregnant women attending ante-natal clinic at the Federal Medical Centre, Owo were involved in the study. Eighty pregnant women were purposively selected from one hundred and fifty four (154) pregnant women that registered with the ante-natal clinic of the hospital. The eighty (80) pregnant women whose ages were between 20-45 years and at 14 to 38 weeks of gestation were involved in the study. They must have registered with the antenatal clinic at the first trimester of pregnancy before they could be enlisted. Pregnant women whose ages were below 22 years, and gestation period below 4 weeks were excluded from the study. Informed consent was obtained from the subjects before commencement of the study and approval by the ethical committee of the Hospital was received.

Method of data collection

Data was collected by interviewer administered questionnaire on the subjects' socio-demographic data, water intake, beverage and fluid intake of the subjects. Eighty (80) questionnaires out of 92 were filled and returned.

Sampling method

Purposive sampling was used to select the eighty pregnant women. The women were selected at two clinic sessions. At the first visit to the ante-natal clinic, 50 pregnant women were selected while the remaining 30 subjects were selected at the second

visit. The women were between 20-45 years and at 14 to 38 weeks of gestation.

Data analysis

Data were analyzed using SPSS version 17. Descriptive statistics such as frequency, mean, median and percentage were determined while inferential statistics ANOVA was used to determine correlation between the variables at $p=0.05$.

4.0 RESULTS AND DISCUSSION

Table 1 shows the social demographic data of the subjects. Twenty five percent (25%) of the pregnant women were between ages 22-25 years, 28.7% were between the ages of 26-30 years, while the least were 10% and they were above 41 years. The Table also shows the occupation of the pregnant women to be as follows: 42.5% were civil servants, 17.5% were into business women while 26% were traders. The women educational qualification shows that 8.7% had primary education, 31.3% had secondary education, while the highest 52.5% had tertiary education.

Table 1: Distribution of the pregnant women by socio-demographic data

	Characteristics	Frequency	Percentage (%)
A	Age		
	22-25 years	20	25.0
	26-30 years	23	28.7
	31-35 years	11	13.8
	36-40 years	18	22.5
	>41 years	8	10.0
	Total	80	100
B	Tribe		
	Igbo	10	12.5
	Yoruba	55	68.8
	Hausa	5	6.2
	Others, specify	10	12.5
	Total	80	100
C	Occupation		
	Civil servant	34	42.5
	Private business	14	17.5
	Trader	21	26.0
	Artisan	11	14
	Total	80	100
D	Educational Qualification		
	Primary	7	8.7
	Secondary	25	31.3
	Tertiary	42	52.5
	Non-formal education	6	7.5
	Total	80	100
E	Religion		
	Islamic	18	22.5
	Christianity	59	73.8
	Traditional	3	3.7
	Total	80	100

Table 2 shows daily water intake of pregnant women. Majority of the pregnant women (41.4%) usually drank tap water, 38.7% drank sachet water and only very few (1.2%) took bottle water. Daily water intake of a good number of pregnant women was below the recommended intake (39%). Nine percent (9%) drank 2-3 cups of water daily, 23.7% had 4-5 cups per day, and 38.7% consumed more than 8 cups daily. Only 39% of the pregnant women took 8 cups of water and above which is the recommended daily intake while the remaining 61% drank below the recommended intake(22).

Table 2: Water intake of pregnant women

	Characteristics	Frequency	Percentage (%)
A	Types of water		
	Sachet water	31	38.7
	Tap water	33	41.4
	Well water	10	12.5
	Rain water	5	6.2
	Bottled water	1	1.2
	Total	80	100
B	Daily amount of water intake		
	2-3 cups	7	8.9
	4-5 cups	19	23.7
	6-7 cups	23	28.7
	8 and above cups	31	38.7
	Total	80	100

Fluid and beverage intakes of pregnant women is shown in Table 3. The Table shows that 56% of the pregnant women drank cocoa- based beverage daily, 33% drank it weekly while 11% usually took cocoa drink occasionally. The results also reveals that 49% usually took carbonated drink weekly, 24% took it daily and 28% took it occasionally. Seventy two percent, 39% and 28% of the mothers occasionally drank sobo drink, kunu drink and Coffee respectively.

	Characteristics	Frequency	Percentage (%)
A	Cocoa drink		
	Daily	45	56
	Weekly	26	33
	Occasionally	9	11
	Total	80	100
B	Tea		
	Daily	29	36
	Weekly	32	40
	Occasionally	10	13
	Never	9	11
	Total	80	100
C	Soft drink		
	Daily	19	24
	Weekly	39	49
	Occasionally	22	28
	Total	80	100
D	Fruit juices		
	Daily	2	26
	Weekly	14	18
	Occasionally	30	38
	Total	80	100
E	Sobo drink		
	Daily	2	2
	Weekly	11	14
	Occasionally	57	72
	Never	10	12
	Total	80	100
F	Kunu		
	Daily		
	Weekly	15	19
	Occasionally		
	Never	21	26
	Total	80	100
G	Malted drink		
	Daily	31	39
	Weekly	12	15
	Occasionally		
	Never	80	100
	Total	80	100
H	Coffee		
	Daily	19	24
	Weekly	20	25
	Occasionally	35	43
	Never	6	8
	Total	80	100

Table 4 shows the milk consumption of the expectant mothers. Eight percent (8%) of mothers consumed milk daily, 33% weekly while 59% occasionally. The Table also shows that about 24% of the women took yoghurt daily, 28% had yoghurt weekly while 25% consumed it occasionally.

Table 4: Milk consumption of pregnant women

Characteristics	Frequency	Percentage (%)
Milk		
Daily	7	8
Weekly	26	33
occasionally	47	59
Total	80	100
Yoghurt		
Daily	19	24
Weekly	22	28
Occasionally	20	25
Never	11	24
Total	80	100
Ice-cream		
Daily	14	18
Weekly	12	15
Occasionally	22	28
Never	32	46
Total	80	100
Soymilk		
Daily	15	19
weekly	30	46
Occasionally	28	35
Never	7	8
Total	80	100

Table 5 shows reasons for fluid intake by pregnant women. Thirty eight percent (38%) of the subjects had chosen to drink specific fluids because of its availability, 26% took some fluid because they were cheap, 21% consumed them because of their nutritional content while 15% gave hygiene as their reason.

Table 5: Reason for fluid intake by pregnant women

Characteristics	Frequency	Percentage (%)
Reasons		
Availability	30	38
Cost/cheap	21	26
Nutritional value	17	21
Purity/ hygiene	12	15
Total	80	100

Table 6 shows the mean daily intake of pregnant women. The mean daily intake of water by the subject was 1290mL, mean daily beverage intake 350mL, and total daily fluid intake was 1940mL which were still below the recommended intake (2300mL) (22).

Table 6: Mean daily fluid intake of pregnant women

	Mean daily fluid intake of subjects	Percentage adequacy of daily fluid intakes of pregnant women	Recommended daily fluid intake for pregnant women
Plain water intake	1290mL	67.8%	1900mL
Fluid intake from beverages alone	350mL	26.9%	1300mL
Total fluid intake(water & beverages)	1640mL	71.3%	2300mL

Table 7 shows that there is no significant difference between mothers' education, mothers' occupation and quantity of fluid intake but fluid availability and type of fluid intake were significant at ($p < 0.01$) level.

Table 7: Relationship between variables and fluid

S/n	Variable	N	Correlation	Sig.
1.	Mothers' education and occupation	80	-0.064	0.670
2.	Mothers' occupation and quantity of fluid intake	80	0.176	0.232
3.	Mothers' education and quantity of fluid intake	80	0.000	0.367
4.	Fluid availability and type of fluid intake	80	0.087	0.000
5.	Fluid availability and quantity of fluid intake	80	0.080	0.004
6.	Mothers' age and quantity of fluid intake	80	0.066	0.668

P value, 0.001 (P= significant at 0.001 level)

DISCUSSION

The result showed that none of the pregnant women that attended FMC, Owo was below 18 years of age which is not ideal for pregnancy. The subjects were mostly civil servants, which is the major occupation in the State. The subjects had very high literacy level; fifty two percent (52.5%) of them had tertiary education which is the hallmark of Ondo State people.

A good number of pregnant women still depended on rain (6.2%) and well water (12.5%), even though is not safe for consumption. The reason for this was because the women consumed only what was available to them. Very few of the women, however consumed bottled water, due to the fact that majority of them could not afford to buy it. Majority of the women consumed tap water. Apart from maintaining fluid needs, most municipal water (tap water) contains fluoride, which can aid the development of teeth and bones in the growing fetus, and therefore, should be recommended for pregnant women (18).

The study reveals that many of the subjects drank below the daily recommended intake of water (less than 8 glass cup water daily) as a result of ignorance, as most of them did not know the daily water requirement and the ways to meet this requirement. The current recommendation for water intake is 8-10 glasses of water each day, though pregnant women typically need between 8 to 12, eight ounce glasses of water per day, even higher if the weather is warm or in exercise (19). Good hydration is extremely important for a healthy pregnancy and postpartum period. Water flushes waste products from the cells and aid in liver and kidney function for both mother and the baby. During pregnancy water is also needed for the body's expansion as mother's blood volume increases significantly. Insufficient water intake can be a factor in constipation, preterm labour in the third trimester, and miscarriage, and even slight dehydration can cause or contribute to fatigue (18). Increased blood flow, increased toxins that need to be removed from the body and overall blood volume, require increase intake of water (18). Lack of dietary fiber and insufficient water are important factors that contribute to bowel problems and morning sickness during pregnancy (9, 10 & 16). The high daily intake of cocoa beverage (56%) and high weekly intake of tea (40%) and soft drink (49%) could be linked to availability and nutritional benefits of these

beverages. This could also be due to ignorance of the subjects on the potential health risk of excessive intake of beverages. However, the low daily and weekly intake of nutrient enriched local drink that have nutritional benefit was very low because many of the women did not know the health benefits of such beverages. Therefore, apart from the fact that high intake of sugar containing beverages could lead to excessive weight gain of mother and fetus, it could also cause an increased baby's pulse rate, increases risk of miscarriage and it could also hinder the quality of sleep a woman gets during pregnancy (18, 19, and 21). In addition, coffee, soda (even diet sodas), tea and juice are not good substitutes for water during pregnancy (5, 6), and can lead to dehydration (20). A fibre-rich diet that is supplemented with sufficient fluid can help to ease some of the gastrointestinal problems experienced by pregnant women (7, 8). It was also observed that daily intake of milk and milk-based product was very poor while very few mothers consumed coffee weekly. This could be due to the fact that most mothers could not afford to buy milk on daily basis and were as well ignorant of health danger of coffee consumption in pregnancy. Reduction in the consumption of caffeinated beverages, such as cola, tea, coffee and hot chocolate, prevents diuresis, dehydration and constipation (18, 23). Caffeine is a diuretic, which helps eliminate fluids from the body. This can result in water and calcium loss. It is important that pregnant woman increase their intake of water, juice and milk rather than caffeinated beverages. (14). It could be seen in the study that the mean total daily fluid intake of pregnant women was 1900ml, which was below the recommended intake of 2300ml, recommended by FNB, (2004) or 3000ml which was recommended by EFSA, (2010), and this can be met between 8 to 12, eight ounce glasses of water per day (20, 23). Often individuals do not get thirsty until after they are dehydrated (19). Mothers' education and occupation with quantity of fluid intake were not significant at $p < 0.01$ while fluid availability and type of fluid intake was significant at that level ($p < 0.01$). This shows that the type of fluid intake was influenced by what is available to the women, which supports the studies of Grandjean et al. (24) that availability is one of the important factors that affect fluid intake of humans.

CONCLUSION

Water and fluid intake by some pregnant women at Federal Medical Centre, Owo was inadequate and below recommendation

RECOMMENDATION

Pregnant women should aim to consume at least 2300ml of fluid a day throughout pregnancy. This can be obtained from drinks and moisture rich food, such as milk, yoghurt, soups, stews, fruit and vegetables. Drinks should include water, squash, fruit juices and milk. Caffeinated beverages, such as tea, coffee, cola and chocolate, should be kept to a minimum as these can result in diuresis and dehydration.

Therefore, pregnant women should not only increase calorie intakes during pregnancy, but increased fluid intake.

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