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# Determinants of Household Access to Safely Managed Water Services in Amassoma, Nigeria

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**Abstract**
Progress towards the attainment of the Sustainable Development Goal (SDG) 6, target 6.1 by 2030 has been significantly constrained. Accordingly, this study examined the determinants of household access to safely managed water (SMW) services in Amassoma. Data for the study were obtained from responses to a structured questionnaire, which was administered to 440 household heads, using a multistage sampling technique. The data were analyzed using percentages and mean statistics. The analyses revealed that the mean response to the eight selected factors ranged from 3.02 to 3.83 on a Likert scale, with a grand mean value of 3.55 points. While, the analyses showed that the respondents agreed that all the factors are major determinants of household access to SMW services, household head income and educational attainment were the most influential determinants, with mean values of 3.83 and 3.81, respectively. On the other hand, sex of the household head and household size were considered less influential with mean values of 3.02 and 3.26, respectively. Overall, the grand mean of 3.55 points indicated that approximately 71% of the respondents agreed that the eight factors are determinants of household's access to SMW services in Amassoma. Therefore, any strategy designed to fast-track households' access to SMW services should give due consideration to these determinants, especially improving households' income and education. Failure to do so will slow down progress towards achieving the SDG 6, target 6.1 by 2030 in the study area.

**Keywords**: Access, Determinants, Household, Safely Managed Water, SDG Target 6.1

## 1. Introduction

The ultimate aim of the SDG 6, target 6.1, is to ensure that by 2030, everyone globally has "equitable access to safe and affordable drinking water" (UNICEF & WHO, 2023). In addition, the ladder for drinking water services has at its peak, "safely managed water" (SMW), which means having "drinking water from an improved source that is accessible on premises, available when needed and free from faecal and priority chemical contamination" (UNICEF & WHO, 2023). These targets are quite challenging to achieve but the benefits of achieving these targets are very promising. For example, several studies have established that households with access to safe water, sanitation and hygiene (WASH) services are more likely to enjoy good health, prevent the spread of waterborne diseases, stunting among children, school absenteeism and other socioeconomic benefits, than households with limited or poor access (Zerbo *et al* 2021; Ohwo & Omidiji 2021; Meehana *et al*., 2020; Howard *et al.,* 2020; Ohwo, 2019). In addition, adequate WASH services are key to the attainment of some of the other SDGs, which further make the attainment of SDG 6 a top priority.

Since the year 2000, the various efforts and initiatives by the United Nations, through its Millennium Development Goals (MDGs) and SDGs have yielded considerable results in the provision of improved water supply globally. For example, from the year 2000-2022, about 2.1 billion people globally have since gained access to SMW services, which have reduced the number of people without access by 247 million. From 2015-2022, global SMW services increased by 4%, from 69% to 73% (UNICEF & WHO, 2023). This increase is however not evenly distributed globally, as the percentage coverage was more in the urban area, 80% (2015) and 81% (2022) than the rural area that had a coverage of 62% in 2022 from 56% in 2015 (UNICEF & WHO, 2023). Although the percentage coverage was more in the urban area, however, the percentage growth in service increased more in the rural area (6%) from 2015-2022, as against the urban area that grew by only 1% under the same period. This shows that the disparity that exist between the rural and urban area is gradually being abridged.

It should be noted however, that the impressive global coverage for SMW services is not replicated in every SDG region and country. In some SDG regions and countries, service levels are very low. For instance, in sub-Saharan Africa (SSA), the proportion of SMW coverage was 27% (2015) and 31% (2022) (UNICEF & WHO, 2023). Just like the global average, disparity exist between the urban and rural areas in SSA. In the urban area, the coverage was 51% (2015) and 53% (2022), while in the rural area, it was 12% (2015) and 15% (2022). Similarly, the SMW coverage in Nigeria was very low, with total coverage of 25% (2015) and 29% (2022); while the urban coverage was 34% (2015) and 36% (2022). The rural coverage of 17% (2015), and 21% (2022) in Nigeria was also lower than the urban coverage just as was recorded globally and in SSA (UNICEF & WHO, 2023). These figures show that great disparities exist in the provision of SMW services as some people are being left behind in the drive to achieve the SDG target 6.1. This assertion is substantiated by the Joint Monitoring Programme (JMP) report for 2023, which projected that by 2030, all SDG regions will fail to meet the target 6.1 based on current rates of progress. In fact, only 32 countries globally were projected to meet the set target, while 78 other countries were assessed to be progressing very slowly and another 16 countries were experiencing decreasing coverage. In all, 2.2 billion people globally still lacked SMW services and about 115 million people still used surface water as their major source of drinking water in 2022 (UNICEF & WHO, 2023). Based on the slow rate of overall progress in the provision of SMW services globally, Ohwo and Ndakara (2022a) projected that service levels in the various SDG regions must increase at least fourfold to achieve the target 6.1. The JMP report for 2023 even recommended a higher service progress of sixfold to meet the global SDG water target (UNICEF & WHO, 2023).

The population without access to SMW services suggests that many people globally are exposed to the risk of waterborne diseases, which could threaten public health and lead to premature death. For example, Simelane *et al* (2020) assert that inadequate WASH services have led to the death of millions of people globally, despite the declaration of water and sanitation as a fundamental human right (UN General Assembly, 2010). Also, Prüss-Ustün *et al* (2019) assert that inadequate water access was responsible for the 485,000 reported deaths due to diarrhea in 2016. Another report by Bain *et al* (2014) revealed, that "700,000 children below the age of five, died from diarrhea caused by drinking contaminated water". These reported cases clearly demonstrate the urgent need to improve access of the global population to SMW services.

Considering the low SMW coverage in most of the low-and middle-income countries, and the disparities that exist between and within the SDG regions and countries, there is a compelling need to investigate the underlying factors for these low levels of progress in service provision. Documenting these factors or

determinants will help to reveal areas and inequalities in service provision that need to be addressed and provide clues to the development of workable strategies to improving access to SMW services, especially in low-and middle-income countries.

In spite of the importance of adequate documentation of the determinants of households' access to SMW services to aid development of measures to address the poor coverage experienced in most low-and middle-income countries, not much studies have been undertaken in this direction, especially in Nigeria and the study area in particular. Most studies that have been conducted so far, focused more on documenting the determinants of households' water consumption or demand (Cominola *et al.*, 2023; Oyerinde & Jacob, 2022; Ogunbode & Ifabiyi, 2014; Fan *et al.*, 2013). Therefore, to fast track the achievement of target 6.1, especially in developing countries, there is the need to conduct studies to assess the major determinants of households' access to SMW services. The outcome of such studies could provide guide for the planning of new sustainable water projects, since the knowledge of the current water situation is a mirror to understanding future water needs.

Unfortunately, households' access to SMW services in Amassoma has not been documented to the best of the researchers' knowledge, despite being a major community and a host to the Niger Delta University (premier tertiary institution in Bayelsa State, Nigeria), which was established over two decades ago. In spite of, the growing population of Amassoma, due to its educational function, access to SMW services is a serious challenge to the inhabitants. Therefore, this study was carried out to assess the determinants of household access to SMW water services in Amassoma.

## 2. Methodology

### 2.1. Description of the study area

Amassoma, which hosts the Niger Delta University is located in Wilberforce Island, Southern Ijaw Local Government Area, Bayelsa State, Nigeria. It lies between "latitudes 4º 57' and 4º 58' North of the Equator and longitude 6º 9' and 6º 10' East of the Greenwich Meridian" (see Figure 1 for spatial reference). Amassoma is situated on a low-lying terrain with an average height of less than 15 m and characterized by wetlands. Its gradient is relatively flat with gentle depressions at some points, which results in ponding in flood and non-flood seasons. It has an equatorial climate, with two major seasons (wet and dry). The dry season last for a relatively short period (November to March), while the wet season last from April to October.

However, rain is usually experienced in most months of the year. The mean annual rainfall ranges between 2,500–4,000 mm; while the average daily temperature is about 27ºC, with high daily mean relative humidity of about 85% (wet season) and 60% (dry season). Amassoma is drained by Ogobiri Creek, a tributary of the Nun River. Its major vegetation type is the freshwater swamp forest.

Amassoma is rich in water resources (surface, groundwater and atmospheric water), however access to safely managed water (SMW) services by the inhabitants is still inadequate due to several factors such as the high concentration of iron in the groundwater and pollution of the surface water resources. For instance, Ohwo (2018) asserts that "in spite of the abundant surface water and large stock of groundwater resources in Amassoma, the government has failed to provide public water utilities for the people. Hence, the major sources of domestic and drinking water supply in Amassoma are boreholes, river/stream, rainwater and sachet water".

However, the quality of these major water sources is not guaranteed and may pose serious public health challenges to the people, which may negate efforts towards the achievement of SDG target 6.1 in the community. The current state of SMW services necessitated the need for this study to examine the determinants of household access to SMW services in Amassoma.

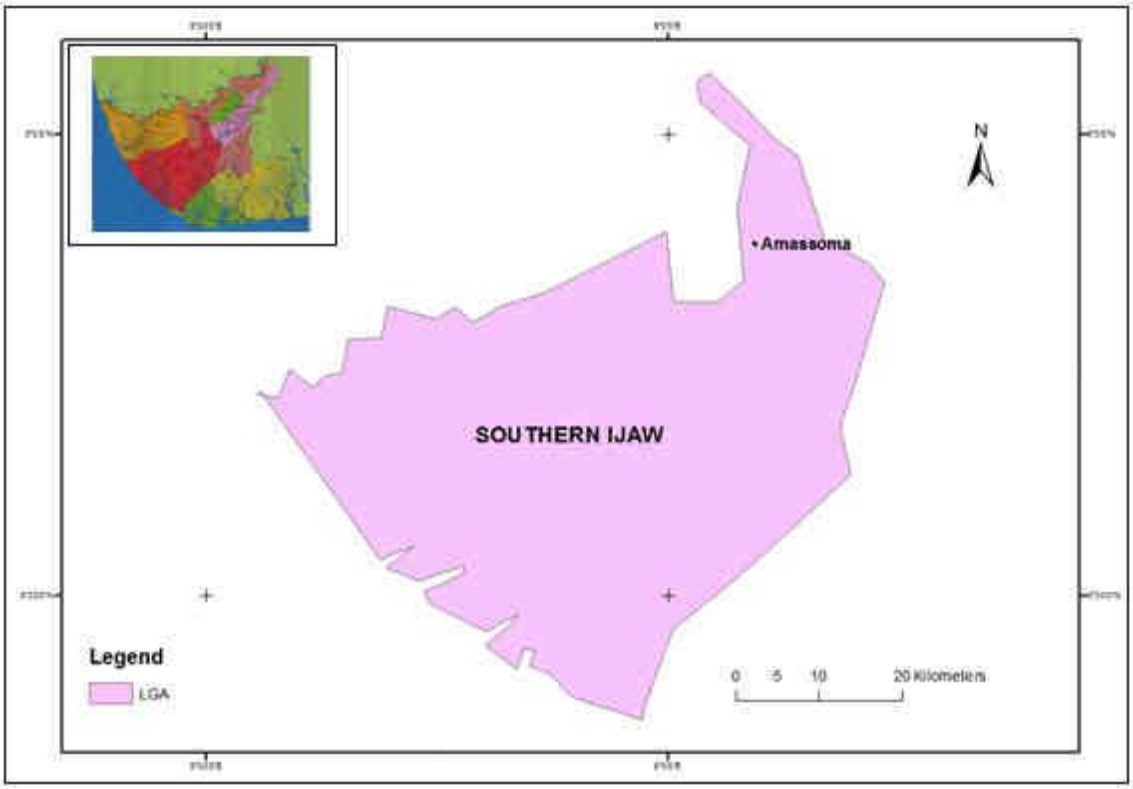


Figure 1: Amassoma in Southern Ijaw Local Government Area of Bayelsa State
Source: Ohwo (2018)

## 2.2. Data collection

This study used the cross-sectional survey research design, which involved the administration of a self-designed structure questionnaire tagged: Questionnaire on Determinants of Households' Access to Safely Managed Water Services (QDHASMWS) and physical observation of the major sources of domestic water supply in Amassoma. This design was considered appropriate because it affords the researchers the opportunity to compare several different variables at a point in time.

The questionnaire consists of three sections-A, B and C. Section A, focused on the demographic characteristics of households, with six questions; section B, was directed at households' water characteristics, with seven questions and section C, was on household's perception of the determinants of access to SMW services, with one question, comprising of eight items designed in a "Likert scale (strongly agree, agree, disagree, strongly disagree and undecided)". The data for the study were primary, which consist of the responses to the various questions on the three sections of the questionnaire.

The questionnaire was later administered to 440 sampled household heads, which were selected using the multistage sampling techniques. The 440-sample size was considered adequate representation of the

estimated population of about 20,000 households in Amassoma, using the table for sample size determination from a given population designed by Krejcie and Morgan (1970). In order to achieve an unbiased sampling of the respondents, firstly, the community was divided into 22 neighbourhoods, based on the existing compounds (Amas) in the community (Asanebi, 2018). Secondly, in the absence of a reliable population of the respective compounds, equal numbers of the questionnaire (20) were assigned to each compound, making a total of 440 copies of the questionnaire. Thirdly, in each of the 22 compounds, 20 households were randomly selected using the systematic sampling technique at every five houses interval with the aid of two research assistants who were duly instructed. At each of the sampled households, the purpose of the study was explained to the household head (male or female) that was present at the time of visit. After obtaining a verbal consent, the questionnaire was administered directly by hand to the household head to fill and return (this was done to guide against the loss of questionnaire).

### 2.3. Data analysis

The obtained data were analyzed using frequency, percentage & mean. Responses to demographic characteristics of the respondents and households water characteristic were analyzed using frequency and percentage, while responses to the determinants of households' access to SMW services which was designed in Likert scale format was analyzed using mean. The weighted Likert scale is as follows: strongly agree (5-point), agree (4-point), disagree (3-point), strongly disagree (2-point) and undecided (1-point); which produced criteria score of (5+4+3+2+1) / 5 = 3-point. Responses to an item with a mean score of 3 points and above signifies agree, while mean scores below 3 points signify disagree.

## 3. Results

### 3.1. Demographic characteristics of household head

Three hundred and sixty-five (365) out of the 440 copies of the administered questionnaire, representing 83% were retrieved and used for the study. The responses as presented in Table 1 indicated that 64.1% and 35.9% of the respondents were male and female, respectively. The age range (25-40 years) had the highest responses of 35.9%, while above 65 years had the lowest responses (1.1%). In fact, 71% of the respondents were within the age bracket of 25-65 years. The marital status indicated that 47.9% were married, while 40%, 7.9% and 4.1% were single, separated and widowed, respectively.

The educational level showed that 87.9% had either secondary (27.9%) or tertiary (60%) education, which clearly suggest that the respondents were largely literate to respond adequately to the questionnaire. The reason for the relative high percentage of respondents with tertiary education could be connected to the fact that Amassoma is a university community with high population of staff and students. The household size showed that 35.9% had 1-3 persons, while 28.5%, 27.7% and 7.9% had 4-6, 7-9 and above 10 persons, respectively. The monthly income distribution of the respondents revealed that 56.2% earned below N50,000 (about $50), while only 4.1% earned above N350,000 (about $350). Since about 68% of the respondents earned N150,000 ($150) and below, it means that majority of the population are low-income earners.

Table 1: Demographic Characteristics of Household Head

| S/N | Variable | Classification | Response (%) |
|---|---|---|---|
| 1 | Sex of household head | Male | 234 (64.1) |
| | | Female | 131 (35.9) |
| 2 | Age | Below 25 years | 102 (27.9) |
| | | 25 – 40 years | 131 (35.9) |
| | | 41 – 65 years | 128 (35.1) |
| | | Above 65 years | 4 (1.1) |
| 3 | Marital status | Married | 175 (47.9) |
| | | Single | 146 (40) |
| | | Widowed | 15 (4.1) |
| | | Separated | 29 (7.9) |
| 4 | Education status | No formal/primary | 44 (12.1) |
| | | Secondary | 102 (27.9) |
| | | Tertiary | 219 (60) |
| 5 | Household size | 1-3 262, 520, 808, 319 | 131 (35.9) |
| | | 4-6 | 104 (28.5) |
| | | 7-9 | 101 (27.7) |
| | | Above 10 | 29 (7.9) |
| 6 | Income per month | Below N50,000 | 205 (56.2) |
| | | N51,000 – N150,000 | 44 (12.1) |
| | | N151,000 – N250,000 | 43 (11.8) |
| | | N251,000 – N350,000 | 58 (15.9) |
| | | Above N350,000 | 15 (4.1) |

Source: Author's fieldwork, 2023

***Household water characteristics***

Table 2 revealed household water characteristics. The data on household major source of domestic water supply show that majority (44.7%) of the households had access to basic water services; while only 3.8% had access to SMW services, which was lower than the 4.1% that used surface water (worst form of drinking water) in Amassoma. In addition, 47.4% either had unimproved (20%) or limited (27.4%) water services. The household water connection reflects the major sources of households' water supply, as 84.1% had no connection, while only 15.9% had connection. Due to the low level of water connection among households, 75.8% spent five minutes and above to fetch water from their major source including queuing, while only 24.1% spent less than five minutes.

Responses to availability of major water source to household was also unsatisfactory, as 20%, 44.1% and 35.9% indicated very available, sometimes available and poorly available, respectively. In spite, of the associated benefits of using SMW services, only 47.9% respondents were very aware of the benefits, while

52.1% were either fairly aware (40%) or poorly aware (12.1%). This probably explained why a large proportion of the households use poor quality water sources. Despite the poor quality of many households' water sources, the average cost of households' water supply per day was relatively high compared to the monthly National Minimum Wage of N30,000 ($30), as over, 68% of the households spent above N200 ($0.20) daily. The relative high cost of daily water supply may have also influenced the quantity of households' water usage per day, as 43.8% households used 150 litres and below per day.

Table 2: Household water characteristics

| S/N | Variable | Classification | Response (%) |
|---|---|---|---|
| 1 | Household major source of domestic water supply | Surface water | 15 (4.1) |
| | | Unimproved | 70 (20) |
| | | Limited | 100 (27.4) |
| | | Basic | 163 (44.7) |
| | | Safely managed | 14 (3.8) |
| 2 | Household water connection | Yes | 58 (15.9) |
| | | No | 307 (84.1) |
| 3 | Approximate time spent fetching water from major source including queuing | Less than 5 minutes | 88 (24.1) |
| | | 5-30minutes | 175 (47.9) |
| | | More than 30minutes | 102 (27.9) |
| 4 | Availability of major water source to household | Very available | 73 (20) |
| | | Sometimes available | 161 (44.1) |
| | | Poorly available | 131 (35.9) |
| 5 | Awareness of the benefits of having a safely managed water source | Very aware | 175 (47.9) |
| | | Fairly aware | 146 (40) |
| | | Poorly aware | 44 (12.1) |
| 6 | Household average cost of domestic water supply per day | Below N100 | 15 (4.1) |
| | | N100-N200 | 102 (27.9) |
| | | N201-N300 | 117 (32.1) |
| | | N301-N400 | 44 (12.1) |
| | | Above N400 | 87 (23.8) |
| 7 | Household average quantity of water usage per day | Below 50 litres | 58 (15.9) |
| | | 50-150 litres | 102 (27.9) |
| | | 151-250 litres | 45 (12.3) |
| | | 251-350 litres | 117 (32.1) |
| | | Above 350 litres | 43 (11.8) |

Source: Author's fieldwork, 2023

### 3.2. Household access to SMW services

Table 3 contains responses to the eight determinants of households' access to SMW services in Amassoma. The responses were based on a weighted five-point Likert scale of strongly agree (SA), agree (A), disagree (D), strongly disagree (SD) and undecided (UD). The weighted responses to educational status of household head ranged from 10 points (SD) to 695 points (SA), with a mean value of 3.81 points on a five-point scale. The second determinant, distance/time spent fetching water from improved source revealed that the highest (728 points) and lowest (4 points) weighted-values were recorded for A and SD, respectively, with a mean value of 3.70 points. Similarly, responses to household's cost of water per day showed that the highest (724 points) and lowest (14 points) weighted-values were for A and SD, respectively, with a mean value of 3.73 points.

The determinant with the highest mean value (3.83 points) was household head monthly income, which recorded the highest and lowest weighted values of 1216 points (A) and 0 points (SD), respectively. The responses to awareness of the benefits of safe drinking water ranged from 25 points (UD) to 812 points (A), with a mean value of 3.53 points. Similar mean value (3.55 points) was also recorded for age of household head, where the responses ranged from 20 points (UD) to 732 points (A). Of the eight selected determinants of household access to SMW services, sex of household head had the lowest calculated mean value of 3.02 points. The highest (392 points) and lowest (25 points) weighted values were recorded for A and UD, respectively. Similar responses were also recorded for household size, which had a calculated mean value of 3.26 points, which is the second lowest to sex of household head. The highest (568 points) and lowest (38 points) weighted values were recorded for A and UD, respectively. In all, the grand mean for the eight determinants was 3.55 points. The respective mean values and the grand mean suggest that the eight factors substantially influenced household access to SMW services in Amassoma.

Table 3: Determinants of household access to SMW services

| S/N | Determinants | SA (5) | A (4) | D (3) | SD (2) | UD (1) | Mean | STD | R |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Educational status of household head | 695 | 564 | 60 | 10 | 60 | 3.81 | 1.63 | Agree |
| 2 | Distance/time spent fetching water from improved source | 395 | 728 | 183 | 4 | 41 | 3.70 | 1.58 | Agree |
| 3 | Household's cost of water per day | 405 | 724 | 183 | 14 | 35 | 3.73 | 1.59 | Agree |
| 4 | Household head monthly income | 100 | 1216 | 63 | 0 | 20 | 3.83 | 1.64 | Agree |
| 5 | Awareness of the benefits of safe drinking water | 309 | 812 | 69 | 72 | 25 | 3.53 | 1.51 | Agree |
| 6 | Age of household head | 300 | 732 | 123 | 122 | 20 | 3.55 | 1.52 | Agree |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7 | Sex of household head | 200 | 392 | 240 | 244 | 25 | 3.02 | 1.41 | Agree |
| 8 | Household size | 220 | 568 | 243 | 120 | 38 | 3.26 | 1.44 | Agree |
| 9 | Mean | 328 | 717 | 146 | 73 | 33 | 3.55 | 1.52 | Agree |

Source: Author's fieldwork, 2023

Note: SA = Strongly agree; S = Agree; D = Disagree; SD = Strongly disagree; UD = Undecided; STD = Standard deviation; R = Remark

## 4. Discussion

The aspiration of the SDG target 6.1 is to ensure that everyone globally have unrestricted access to safe drinking water. In order to monitor and measure the progress towards attaining this lofty target, five service levels have been defined, which include "surface water (river, dam, lake, pond, stream, canal or irrigation channel), unimproved (unprotected dug wells, unprotected springs, carts with small tank/drum), limited (improved source, for which collection time exceeds 30 minutes for a round trip, including queuing), basic (improved source, provided collection time is not more than 30 minutes for a round trip, including queuing) and safely managed (improved source that is accessible on premises, available when needed and free from faecal and priority chemical contamination)" (UNICEF & WHO, 2023).

Drinking water from "surface sources" is considered as "no service" and the worst form of drinking water services, hence at the bottom rung of the service ladder; while "safely managed", is considered as the best source and occupies the highest rung of the water service ladder. However, attaining the highest rung of the water service level has been a great challenge to so many SDG sub regions, especially in sub-Sahara Africa (Ohwo & Ndakara, 2022a). This assertion is substantiated by the data on household major source of drinking water as presented in Table 2. From the data, 44.7% of the households used basic water sources, which agreed with the findings by (Ohwo & Ndakara, 2022a) that "47% of the countries in Africa had less than 50% of their respective population using at least basic drinking water services in 2020". Despite the target of achieving SMW services for all by 2030, only 3.8% households in Amassoma have access to SMW sources, which is far less than the national average of 21%; while 4.1% still used surface water, which is a veritable source of waterborne diseases (Ohwo, 2019). However, the 4.1% is far less than the national average of 9% in 2022 (UNICEF & WHO, 2023).

Responses to household water connection as shown in Table 2, revealed that 84.1% had no water connection and only 15.9% had connection, which was less than the 22.3% reported for Yenagoa (Ohwo & Ndakara, 2022b). This is not surprising as only 48.5% of households had access to at least basic water services. Hence, 75.8% of households spent five minutes and above to fetch water from their major source including queuing. Of this proportion, 27.9% spent over 30 minutes. On the average a household in Amassoma spent about 21.6 minutes to fetch water for a return journey, which is higher than the 14 minutes and less than the 38 minutes reported for Madagascar and Uganda, respectively (Cassivi *et al.,* 2018). This implies that a reasonable number of the households had to traverse some distance to their respective major water sources, which could impact on the adequacy of the quantity and quality of water supply to households. This situation may increase the burden of fetching water on women and girls, who are perhaps mainly responsible for water collection in many communities in Nigeria and compromise household's health, as water may get contaminated in the course of transportation due to poor handling.

In spite of, the burden experienced by some households in fetching water from distant sources, the availability of some of these sources is not guaranteed. This situation could force some households to use other water sources that are of poorer quality. This is very likely as the level of households' awareness of the benefits of having safely managed water services is less than 50%. This indeed, is a serious threat to household health and wellbeing as some households may ignorantly use water of poor quality, which may lead to dire health consequences.

On the average, a household in Amassoma spent N273 ($0.27) per day, which amounts to N8,190 ($8.19) per month. This amount is relatively high compared to the N30,000 ($30) per month national minimum wage and a population where 56.2% of the sampled households earned below N50,000 ($50) per month (see Table 1). The cost of water may have influenced household average quantity of water usage per day. For example, 56.1% of households used 250 litres and below per day, while 43.9% used above 250 litres. In all, an average household use 200 litres per day, which translates to 40 litres per capita per day (l/c/d) since an average household size in Amassoma is 5 persons (see Table 1). The 40 l/c/d was less than the recommended 50 l/c/d by Gleick (1996). This shortfall may impact negatively on the quantity of water usage in the household, including for sanitation and hygiene, which could be inimical to healthy practices and exposure to waterborne diseases (Howard *et al.,* 2020).

Table 3 shows the responses to determinants of household access to SMW services in Amassoma. From the data in the table, the calculated mean responses to each of the eight factors range from 3.02 – 3.83 points. These values were higher than the criteria score of 3.0, which signifies that the respondents agreed that they are major determinants of household access to SMW services. The lowest mean value was recorded for "sex of household head", which was followed by "household size" with a mean value of 3.26. Sex of household head has also been found to be a significant determinant of "access to drinking water in residential areas of Pakistan" (Quraishi *et al.,* 2022); while Oskam *et al* (2021) assert that household size was one of the major determinants of household access to safe water in Africa.

On the other hand, the highest mean value was recorded for "household head monthly income", which was followed closely by the "educational status of household head", with a mean value of 3.81 points. The mean values suggest that households with high income and educational status stand higher chances of access to SMW services than households that earn lower income and have lower level of education. This shows that income and education of household head are major determinants of access to SMW services in Amassoma, which agrees with the submission by Adila *et al* (2021) that the level of household head education and wealth status are major determinants of household access to safe drinking water. This is so because those with higher levels of education are more aware of the danger posed by obtaining poor quality water and therefore strive to obtain better water quality to safeguard the health of their households.

Similarly, households with higher income can afford houses that have better facilities such as safe water connection. Since the cost of water constitutes a small fraction of the family's income, such households can easily afford SMW services compared to households that spend higher percentage of their income on water. This situation clearly explains why the calculated mean value for "household's cost of water per day" was 3.73 points. This is so because 68.3% of households earned below N50,000 - N150,000 ($50 - $150) per month and spend an average of N8,190 ($8.19) per month for water (see Tables 1 & 2), which is 27.3% of the national minimum wage (N30,000). The average household monthly expenditure on water in Amassoma was significantly higher than the N4,950 that was reported for Yenagoa (Ohwo & Ndakara, 2022b). The reason for this significant difference is attributable to the recent removal of subsidies on

electricity tariffs and premium motor spirit (PMS). The subsidy removal led to spike in the price of energy, which is used to power the various water pumping machines, thereby forcing households to increase their monthly expenditure on water at the expense of other important household needs.

Another major determinant of household access to SMW services is "distance/time spent fetching water from improved source", which had a mean value of 3.70 points. This is a major factor because 84.1% of the households do not have water connection. In addition, 75.8% of households spent five minutes and above for a return trip, including queuing to fetch water from their major source (see Table 2). This may affect water available in the household as distance influences household quantity of water collection (Ohwo & Ndakara, 2022b). The grand mean for the responses to all the determinants was 3.55 points, which suggest that together they account for 71% of agreement that they influence household access to SMW services in Amassoma. Therefore, any strategy designed to improved access to SMW services in Amassoma should target these determinants to succeed.

## 5. Conclusion

The study has revealed that the respondents perceived the eight selected factors as major determinants of household's access to SMW services in Amassoma, as the calculated mean responses revealed an agreement range of 3.02 - 3.83 points. However, the determinants that were considered most influential were levels of household head monthly income and education; while sex of household head and household size had less influence on household's access to SMW services. The calculated grand mean (3.55 points) of the eight factors suggest that they account for 71% of the level of agreement by respondents that they determine household access to SMW services. Therefore, any strategy designed to fast-track access of households to SMW services should give due consideration to these determinants, especially improving household's income and education. Failure to do so will slow down the drive towards achieving SDG 6, target 6.1 by 2030 in the community.

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