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# The Challenges of Water Pollution on Human: A Case Study of Udei Community in Guma Local Government Area of Benue State

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**Abstract** **Original Research Article**

Water is a universal solvent which serves diverse purposes. Its availability and purity is a *sine qua non* to healthy growth and living of plants, animals and humans. A research into the challenges of water supply and pollution on humans in *Udei*, Guma local government area of Benue State was investigated. Structured questioners was administered to address pertinent issues such as age, sex, occupation , religion, educational background, waste disposal methods, source and assess to potable water, water storage facilities, incidence of health challenges associated to water pollution, awareness to the dangers of water. Reports from the respondents to the questioner's shows that what obtains at *Udei* community does not conform to WHO standard and international best practices advocated by other monitoring agencies in terms of water quality and distribution. Simple statistical tools proved significant difference in all the instruments and parameters used in the analysis. 94% confirms the absence of water board in the local government area, whereas 83% claimed not having assess to portable water in the community. Sixty eight percent (68%) of the respondents are not aware of the dangers posed by water pollution. It is often noted in most communities within and outside of Benue State that water pollution controlling factor like, waste products from agricultural; careful handling of industrial waste including particles from rice meal, effective erosion control could help to reduce the dangers of water contamination which may result into the outbreak of water borne diseases in the light of these findings. Prompt and adequate measures is therefore recommended to improve the supply and distribution of portable water to *Udei* and its neigbouring communities to avert large scale outbreak of water borne diseases. In addition adequate treatment of all wastes water generated from agricultural, domestic and industrial activities is strongly advocated while the government and monitoring agencies should enact strict laws to stern further pollution in *Udei* community.

**Keywords:** Water Pollution, Udei Community, Guma Local Government.



## INTRODUCTION

Water is life and good quality drinking water is essential for life. Gore [1] reported that human beings are made up of water, in roughly the same percentage as water on the surface of the earth. Human tissues and membrane, brain and heart, sweat and tears all reflect the same recipe for life, in which efficient use is made of those ingredients available on the surface of the earth. Water constitutes about 65 – 75 percent of the total weight of an average human being [2, 3]. Water is indispensable to human life, animals and plants [4]. Man requires water for drinking, cooking, washing and general sanitation. He can survive longer without food than without water. UNCSD [5] reported that water is of utmost importance for the development and maintenance of the dynamics of every ramification of society. Following this therefore, water symbolizes life and hence is an indispensable natural resource that would have made life meaningless without it.Generally, water is a colourless, transparent, odourless and tasteless liquid found in the seas, lakes, rivers and oceans and is vital to the existence of life on earth [6].

According to Central Intelligence Agency (CIA) (2008) report, water covers 70.9 percent of the earth's surface and it is vital for all forms of life. On earth, 96.5 percent of the planet's water is found in oceans and 1.7 percent occurs as ground water [47]. Only 2.5 percent of the earth's water is fresh water and 98.8 percent of that water is ice and groundwater. Provision of safe and reliable source of water is an important pre-requisite for sustained development [8]. Human settlement to a large extent is dependent on the availability of reliable sources of water preferably in close proximity to settled localities. Based on this

understanding, groundwater becomes generally acceptable as a source for drinking water supply and irrigation in food production and represents the largest reservoir of drinkable water known as reported by Zelkster and Everett [9] and Udoessien [10].

Pollution and contamination resulting from bacteria, viruses, heavy metals, nitrates and salts affect the quality of water supplies adversely due to inadequate treatment and disposal of waste from humans and livestock, industrial discharges and overuse of limited water resources. The impact of uncontrollable disposal systems in Nigeria can subject groundwater and surface water unfit for human, agricultural and recreational use, and then pose a threat to human life which invariably defeats the aim and the principle of sustainable development [11]. Wegelin –Schuringa, [12] opined that the provision of adequate water supply and sanitation to the rapidly growing urban population is increasingly becoming a problem for governments throughout the world. Water resources are threatened not only by this rapidly increasing demand of population but also through diminishing quality caused by population and saline intrusion.

Improvement in safe drinking water in the last decade is encouraging in every part of the world. However, the Millennium Development Goals (MDG) [13], UNO [14] and WHO [15] report indicates that one billion people still lack access to adequate sanitation. Evidently, there is a direct relationship between access to safe water and Gross Domestic Product (GDP) per capita. This is because, it is postulated that by 2030, some developing regions of the world will experience demand exceeding supply of water by 50 percent which could lead to calamity. All these go to confirm that the world is still faced with acute shortage of safe water in some areas.

The fact that the quality of drinking water is a powerful environmental determinant of health cannot be over-emphasized. Assurance of drinking quality potable water is a safe foundation for the prevention and control of water – borne diseases and this should be recognized. In the face of rapid population growth, increased water demand and greater reliance on groundwater, it is essential to monitor the ground water quality. In *Udei* community, water supply is difficult to obtain during dry season especially in these areas like Tsetor, Tseanudu, tsesaa, Tseorshio and tseihoor. The scarcity of water supply and harmful effect of water pollution on human health prompted that Benue State Government to establish enterprises such as Benue State Rural water supply and Sanitation Agency (BEWASA) and Benue State Community and Social Development Agency provide portable (wholesome) water to communities including *Udei*. One among the beneficially of that program. , to enhance living standard of the citizen on water hygiene.

The research reports on measures adopted to improve the quality of drinking water supply and to reduce the problems associated with water borne disease in *Udei* community and its environs.

## RESEARCH METHODOLOGY

### Research Design

According to Freund *et al*. [16], research design is a definite plan that is determined before data are collected.This research work aim at establishing the challenges of water pollution in *Udei* community and possible solution that can enhance improvement of water pollution in *Udei* community. The design covers the use of questionnaire, including observation and interview for collecting information. The questionnaire was divided into two parts, personal data and investigative method.

### Population of the study

The population sample covers three major parts in *Udei* community (Tse-tor; Tse-Anudu; Tse-Saar; Tse-Orshio and Tse-Ihoor). One hundred (100) respondents were consulted through random selection in the whole of Udei community and its environs.

### Sample of the study

Ten (10) villages were selected from the five communities that make up Udei and ten (10) questionnaires each were distributed to each of the village to obtain information from respondent. Each questionnaire contains twenty (20) questions.

### Sampling Technique

Sample technique is a method of selecting a portion of the population in *Udei* community for the study. Randomly selection techniques were used to avoid bias.

### Instrument used for data collection

The questionnaire was mostly closed one. It was divided into two segments. The first part contains personal bio data (sex, age, marital status, education background) of the respondent. The second segment was concerned with the water consumers, tagged “water sources”. The questionnaire and personal observation are used methods: in data collection. This methods were used because of the easy collection, interpretation and analysis of the information obtained.

### Administration of the instrument

The services of three local personnel were engaged in each community in the distribution of questionnaires and collection of data. The local personnel were used for ease of interpretation and location of the sampling points and water collection.

### Technique for data analysis

Table analyses of data with little mathematical and statistical techniques were employed in this research work such as simple percentages for easy understanding and interpretation.

The frequency tables was used to determine the number of responses from sample respondent. The questionnaire, interview, and observation among other were analysed using different methods and formula such as:

Example $\frac{x}{y} x \frac{100}{1}$

Where X = means number of respondents
Where Y = means total number of questionnaire retrieved
100 = means (%) percentage

## RESULTS

**Data Presentation and Analysis of Results**

A total 100 questionnaires were distributed to the ten (10) villages in the five communities in *Udei* of Guma Local Government Area of Benue State. The questionnaires were filled and ninety six (96%) out of 100 were retrieved for data analysis and presentation as shown in the Tables. Table 1 shows the sex distribution of the respondents. Six two (65%) were males and thirty four (35%) were females. The age distribution of the respondent is shown in Table 2. Seventeen (18%) represents between 20-29; forty (42%) represents 30-39; thirty (31%) represent 40-49; nine (9%) represent age 50 and above.

## PERSONAL DATA

**Table-1: Sex distribution of respondents**

| Sex | Respondents | Percentage % |
|---|---|---|
| Male | 62 | 65% |
| Female | 34 | 35% |
| Total | 96 | 100% |

**Table-2: Age distribution of respondents**

| Age | Respondents | Percentage % |
|---|---|---|
| 20-29 years | 17 | 18% |
| 30 – 39 | 40 | 42% |
| 40 – 49 | 30 | 31% |
| 50 and above | 9 | 9% |
| Total | 96 | 100% |

Table 3 shows the occupational distribution of respondents. Thirty five (36%) of the respondents are farmers, twenty one (22%) are students, twenty (21%) are civil servants, fifteen (16%) are applicants and five (5%) represent traders. Table 4 shows the marital status of the respondents. Fifty (52%) of the respondents are single, forty (42%) are married, four (4%) are divorcee while two (2%) are widows.

**Table-3: Occupation of respondents**

| Occupation | Respondents | Percentage % |
|---|---|---|
| Civil servant | 20 | 27% 21 |
| Applicants | 15 | 16% |
| Students | 21 | 22% |
| Traders | 05 | 05% |
| Farmers | 35 | 37% 37 |
| Total | 96 | 100% |

**Table-4: Marital Status of Respondents**

| Marital status | Respondents | Percentage % |
|---|---|---|
| Married | 40 | 42% |
| Single | 50 | 52% |
| Widow | 02 | 02% |
| Devours | 04 | 04% |
| Total | 96 | 100% |

Table shows the religion of the respondent. Eighty five (89%) are Christians, eleven (11%) are pagans. None of the respondent belong to the Muslim religion, thus represents zero (00%). The educational qualifications (background) of the respondents is shown in Table 6. Forty four (46%) are primary school certificate holders, thirty two (33%) are holders of secondary school certificate, whereas twenty (21%) are holders of University degree. Table 7 shows the different sources of drinking water of all the respondents. Forty five (47%) obtain their water from the stream, twenty six (27%) from wells, fifteen (16%) from untreated rain water, ten (10%) are from boreholes. Sachet and bottle water were not recorded in the study.

**Table-5: Religion of Respondents**

| Religion | Respondents | Percentage % |
|---|---|---|
| Christianity | 85 | 89% |
| Muslim | 00 | 00% |
| Pagan | 11 | 11% |
| Total | 96 | 100% |

**Table-6: Educational Background**

| Qualification | Respondents | percentages % |
|---|---|---|
| Primary school | 44 | 46% |
| Secondary school | 32 | 33% |
| Tertiary | 20 | 21% |
| Total | 96 | 100% |

**Table-7: Sources of Drinking Water**

| Marital status | Respondents | Percentage % |
|---|---|---|
| Stream | 45 | 47% |
| Well | 26 | 27% |
| Untreated Rain water | 15 | 16% |
| Sachet/bottle water | 00 | 00% |
| Borehole | 10 | 10% |
| Total | 96 | 100% |

Table 8 shows that ninety (94%) respondents agree that there is no state water in the community

whereas six (06%) agreed that there is water board in the community that supply water. Table 9 show that ninety two (96%) of the respondents disagree that there is no organization to supply portable water in the community while four (04%) agree. Table 10 shows that eighty (83%) of the respondent admitted that most of the villages do not have access to portable water, while sixteen (17%) agreed that most villages in the community have portable water. Table 11 shows that sixty five (68%) of the respondent agreed that there are factors contributing to water pollution in *Udei* community, while thirty one (32%) of the respondent disagreed with the statement.

**Table-8: Is there any state water board in the community?**

| Respondents | Frequency | Percentage % |
|---|---|---|
| Yes | 90 | 94% |
| No | 06 | 06% |
| Total | 96 | 100% |

**Table-9: Is there any organization to supply portable water in the community?**

| Respondents | Frequency | Percentage % |
|---|---|---|
| Yes | 04 | 04% |
| No | 92 | 96% |
| Total | 96 | 100% |

**Table-10: Most of the villages in *Udei* do not have portable water**

| Respondents | Frequency | Percentage % |
|---|---|---|
| Yes | 80 | 83% |
| No | 16 | 17% |
| Total | 96 | 100% |

**Table-11: Is. there any contributing factor to water pollution?**

| Respondents | Frequency | Percentage % |
|---|---|---|
| Yes | 65 | 68% |
| No | 31 | 32% |
| Total | 96 | 100% |

Sixty five (68%) of the respondent indicated that the communities are exposed to education on the danger of the water pollution as shown in Table 12. Thirty one (32%) said there was no education on water pollution. Table 13 shows that 75 (78%) respondent agreed that the *Udei* community do not have the technical know-how to control water pollution, while 21 (22%) disagreed that *Udei* community have the knowledge to control water pollution.

**Table-12: Is there health education on the danger of water pollution?**

| Respondents | Frequency | Percentage % |
|---|---|---|
| Yes | 65 | 68% |
| No | 31 | 32% |
| Total | 96 | 100% |

**Table-13**: **1s there any way that *Udei* community can control water pollution?**

| Respondents | Frequency | Percentage % |
|---|---|---|
| Yes | 21 | 22% |
| No | 75 | 78% |
| Total | 96 | 100% |

Table 14 shows the different methods the inhabitants of the *Udei* community store their water. Forty (42%) of the respondents store water from their pots, twenty five (26%) store in Jerry cans, twenty (21%) store in drums, eight (8%) store in tanks while three (3%) store water in reservoirs. Table 15 shows that seventy six (79%) of the respondent in *Udei* community claimed of knowing the danger resulting from improper storage of water, whereas twenty (21%) of the respondent are not aware of the danger resulting from improper storage of water. Sixty six (69%) of the respondents do not have proper way of disposing waste water, while thirty (31%) of the respondents have proper way of disposing water as shown in Table 16.

**Table-14: How do you store your water?**

| Response | Frequency | Percentage % |
|---|---|---|
| Pot | 40 | 42% |
| Reservoir | 03 | 03% |
| Drum | 20 | 21% |
| Jerry can | 25 | 26% |
| Tank | 08 | 08% |
| Total | 96 | 100% |

**Table-15: Are you aware of the danger resulting from the improper storage of water?**

| Response | Frequency | Percentage % |
|---|---|---|
| Yes | 76 | 79% |
| No | 20 | 21% |
| Total | 96 | 100% |

**Table-16: Do you have proper way of disposing**

| Respondents | Frequency | Percentage % |
|---|---|---|
| Yes | 30 | 31% |
| No | 66 | 69% |
| Total | 96 | 100% |

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Table 17 shows that seventy seven (80%) of the respondents are aware of the water borne related disease, while nineteen (20%) respondents are not aware of water borne related diseases. The result in Table 18 shows that forty five (47%) of the respondents had experienced amoebic dysentery, thirty one (32%) experience dysentery, twenty (21%) had contracted typhoid fever. Cholera and guinea warm were not detected from the study.

**Table-17: Are you aware of water borne related disease?**

| Respondents | Frequency | Percentage % |
|---|---|---|
| Yes | 77 | 80% |
| No | 19 | 20% |
| Total | 96 | 100% |

**Table-18**: **What are the diseases you have experienced due to water pollution?**

| Response | Frequency | Percentage % |
|---|---|---|
| Typhoid | 20 | 21% |

| | | |
|---|---|---|
| Cholera | 00 | 00% |
| Dysentery | 31 | 32% |
| Guinea warm | 00 | 00% |
| Amoebic dysentery | 45 | 47% |
| Total | 96 | 100% |

The study on the influence of religion in the control of water pollution shows that eight four (87%) of the respondents agreed that their religion does not affect the control of water pollution, whereas twelve (13%) of the respondent disagreed on this statement (Table 19). Eighty two (85%) of the respondents stated that their cultural affiliations do not influence the control of water pollution. Fourteen (15%) of the respondents are of the opinion that their cultures influence the control of water pollution (Table 20).

**Table-19: Does your religion affect the control of water pollution?**

| Respondents | Frequency | Percentage % |
|---|---|---|
| Yes | 12 | 13% |
| No | 84 | 87% |
| Total | 96 | 100% |

**Table-20: Does your culture affect the control of water pollution?**

| Respondents | Frequency | Percentage % |
|---|---|---|
| Yes | 14 | 15% |
| No | 82 | 85% |
| Total | 96 | 100% |

## DISCUSSION

The study revealed that majority of people in *Udei* community have no knowledge about the danger of water pollution. Water polluted with domestic, agricultural and industrial wastes (effluents) had been reported to cause water borne diseases especially in rural communities where potable water is not assessable [17]. In addition, improper waste disposal has been the root cause of water contamination and water borne and related diseases [18]. Portable water is used for various activities in the homes, industries, recreation and even in irrigation. The frequent disturbance of waterways by way of anthropogenic activities, disposal of domestic and industrial effluents has exposed streams and other water bodies to microbial, parasitic and inorganic pollution [19]. Lack of knowledge on the danger of water pollution, coupled with some religious and cultural belief on the treatment of water has a serious setback on the menace caused by water pollution and its attendant health implications [20, 21].

The study also revealed that most villages in *Udei* community do not have portable water, thus exposing them to depend solely on waters from streams and other sources with little or no standard hygiene. Water has been reported as a vehicle for the dissemination and transmission of water borne diseases [21, 17]. Surface run offs from top soils during erosion and heavy rainfall could also add to the microbial load of water in the streams and river [22]. Rivers and streams usually visited for recreational activities as well as bathing, laundry and defecation could be contaminated by gastrointestinal tract (GIT) and urinary tract (UT) borne microorganisms [23, 17, 21]. In addition, the indiscriminate dumping of wastes, including domestic, agriculture and industrial waste is not monitored or checked by law enforcement agencies in the *Udei* community, thus, exposing the inhabitants to the risk of contracted diseases. Lack of modern health facilities and health centers in the communities studied has also contributed to prolonged debilitating health status. This was equally compounded by the high level of illiteracy, ignorance and poor health education. Safe water for drinking, recreation and irrigation should be subjected to analysis in conformity to recommended standard [23, 24].

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