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Environmental Sanitation Information-Seeking Behaviors and Practices among Households in a Rural Nigerian Community



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ABSTRACT

Background: Man's health and his environment are intricately linked. Sanitation impacts the standards of basic environmental conditions, health, wellbeing, and quality of life of communities. This study assesses the environmental sanitation (ES) information-seeking behaviors and practices among households in rural Nigeria. **Materials and methods:** This was a cross-sectional survey of 445 rural households, selected via a multistage sampling technique. Data were obtained by interview using semi-structured questionnaires and analyzed using statistical package for social sciences software version 22. Statistical significance was done using Chi-square and Fishers tests at p -value ≤ 0.05 . **Results:** Awareness of ES was reported by 427 (98%) of respondents, with the key sources of information as radio/television, community meetings, family relatives. Information on ES was reportedly sought by 248 (56%) for reasons which include: improved ES. Only 139 (31.2%) respondents had good knowledge on ES, 161 (36.2%) collect waste weekly, 172 (38.7%) store waste using covered waste bin, 115 (26.8%) in open space, while methods of disposal of waste were: 206 (46.3%) open dumpsite, 119 (26.7%), burning. Level of knowledge on ES had associations with [(gender ($p = 0.0001$); marital status ($p = 0.0000$) and size of household ($p = 0.0495$)] respectively. **Conclusions:** This study found apparently high awareness of ES, with poor knowledge and poor practice of ES. The level of knowledge on ES was influenced by gender, marital status, and size of the household. We recommend improved multi-sectorial, localized and need-based ES strategies with full involvement of the community, government at all levels and private partners.

1. INTRODUCTION

Man's health is integral to his environment. The number of persons, where and how they live, e.g. via their use of natural resources such as water, management of wastes, pollution control, etc., all affect the quality of the environment (1). These changes in the water they drink, quality of place they live and work, the air they breathe, in turn, affect human health, wellbeing, and quality of life, through impacts such as water shortages, invasion by animal reservoirs and insect vectors of diseases, and various forms of pollution.

Environmental sanitation is a fundamental process of collecting and safely disposing of all kinds of waste where people live and work (2,3). The Nigerian Federal Ministry of Environment in 2005, defined ES as the principles and practices of effecting healthful and hygienic conditions in the environment to promote public health and welfare, improve quality of life and ensure a sustainable environment (4). The components of ES include; collection, temporary storage, and sanitary disposal of wastes; stormwater drainage; clearing of markets and other public space; food hygiene; disposal of the dead; control of rearing and straying animals; environmental sanitation agency inspection and enforcement of sanitary regulations; monitoring of the observance of environmental standards (5).

Globally, 2.4 billion people lack access to improved sanitary facilities, mostly in developing countries (6). It is estimated that inadequate sanitation is responsible for 4% of deaths and 5.7% of disease burden worldwide (7). About 13 million deaths can be prevented annually by making our environment healthier (8). Over half of the hospital beds globally are filled with people suffering from water and sanitation-related diseases (9). In Nigeria, over 50 million people lack adequate sanitation, while there is a loss of about 455 billion Naira annually, equivalent to 1.3% of gross domestic product. Several issues with morbidity, mortality, poverty, and underdevelopment in the community, have been documented in the literature as aftermaths of a lack of safe drinking water supplies as well as poor ES (10).

Environmental sanitation is a key aspect of the social, physical, and economic wellbeing of the population. Awareness and knowledge of improved sanitation practices help to improve rational decision-making towards better sanitation. This improves the standard of living (10,11). Thus, the practices individuals engage in identifying their need for information, searching for, and using or transferring the same, are of utmost public health concern (12). Households' access to information depends on their information-seeking behavior (the

complex patterns of actions and interactions in which individuals articulate their information needs, seek, evaluate, select, and use the same) (13). Successful ES depends on the effectiveness of the institutional arrangements provided by the government for its management. But rural areas are mostly inhabited by persons with little or no access to social amenities and agencies for information dissemination and regulation of ES practices (14). There is every indication that the people in the community should be guided on how to seek information on ES. Research has also supported that provision of information could motivate locals towards active involvement in creating their wellbeing (15). It is on this premise that the researchers set out to determine the environmental sanitation information-seeking behaviors and practices among these households.

2. MATERIALS AND METHODS:

2.1. Study Area: This study was conducted in the Ogbaku community in Mbaitoli LGA of Imo State, Nigeria. It is located at about 76km from Onitsha Anambra State, Nigeria and 14km from Owerri, the capital of Imo State, Its geographical location is approximately at latitude 5.55 North and longitude 6.96 East (16). Ogbaku has an area of 84km² and a population of 143,485 persons as at the 2006 census with a 2011 population density projected at 2004.5 persons per sq. km (17).The residents are mainly traders, farmers, civil servants, and artisans. The town hosts a few private hospitals and a comprehensive primary health center overseen by the Imo State University Teaching Hospital (18). It is made up of 18 villages that constitute the four zones of the community. Topographically, it is made up of plain land except for its southern end where it approaches the Ijakaha hills. Its residential buildings are popularly the “face me I face you” type (as popularly described in Nigeria) but some areas are partially planned consisting of flats and private-owned duplexes (18). Their major sources of water supply are borehole and well, while the commonest method of refuse disposal is open dumping (18).

2.2 Study Design: This study was a cross-sectional descriptive study.

2.3 Study Population: Households resident in Ogbaku, Imo state.

2.3.1 Inclusion Criteria: Households who have resided in Ogbaku for at least one year. Members of such households who were actively involved in ES and were within the age interval of 16-45 years.

2.3.2 Exclusion Criterion: Households or members of the household who were absent during the time of the study.

2.4. Sample Size Estimation: The minimum sample size was calculated using the Cochran formula (19). $n = \frac{z^2 pq}{d^2}$, where; n=minimum sample size, Z= standard normal deviate corresponding to 95% confidence interval = 1.96, p= proportion of the target population that had moderate to good standard of practice relating to ES, q = 1 – P, d = tolerable error of margin, set at 0.05, Based on ES practices, a case study of solid waste management, in semi-urban communities in Orlu, Imo state Nigeria (11), p = 49% = 0.49, n= 384 households. An additional 10% was added to make up for attrition, giving us a total of 422 households the sample size.

2.5. Sampling Technique: A multi-stage random sampling technique was used to select participants. In the first stage, a stratified sampling technique was used to split the rural community studied into four according to the four zones. The second stage involved the selection of the villages studied under the four selected zones by simple random sampling. Each select village was regarded as a cluster. The sample size calculated was proportionately allotted to each cluster. Thirdly, a central place in each area was located e.g. market or hall and an empty bottle was spun on the ground (the bottle made a minimum of three complete turns before stopping). When it ceased to move, the direction of the neck of the bottle was taken as the starting point. The researchers walked in a line then began again, for the inclusive households. Then systematic sampling technique was used through consecutive enrolment of households to select an eligible and consenting participant from each household within the select village in the respective zones.

2.6. Data Collection: Data were collected by interviews, using a semi-structured questionnaire. The questionnaire comprised four sections which comprised: a) socio-demographic and household characteristics, b) awareness and information-seeking behavior on ES; c) knowledge of ES and d) ES practices.

2.7. Data Management and Analysis: The data were edited and entered into the computer. Data cleaning was done. Descriptive and analytical statistics of the data were carried out using statistical package for social sciences (SPSS) Windows version 22.0 (20). Tests of statistical significance were carried out using Chi-square and Fishers tests for proportions. A p-value of ≤ 0.05 was considered significant. Descriptive data were presented as simple

frequencies and percentages. Five knowledge items were used with a total scale score of five (5) at one (1) point each, where (0-2= poor; 3= fair; 4-5=good).

3. RESULTS:

A total of 445 questionnaires were administered to select households. All the questionnaires were retrieved, giving a response rate of 100%. Table 1 shows the socio-demographic and household characteristics of the respondents. The modal age group 126 (28.3) was 31-35 years. The majority of them were males, currently married, Christians, Ibos, traders, while 39 (8.8%) of them had no formal education. The modal size of households, 4-6 occupants was 208 (44.7%). Table 2 shows the awareness of and information-seeking behaviors on ES among respondents. Four hundred and twenty-seven (98%) of them reported awareness of ES, with the information of the key sources on ES as 427 (100%), radio/television, 206 (48.2%) community meetings, 134 (31.4%) family relatives. Three hundred and forty-nine (78.4%) understand the meaning of ES, 93 (26.7%) know steps in waste management, 310 (88.8%) mentioned at least one component of ES, while the consequences of poor ES reported include: 247 (70.8%) makes the locality dirty, 207 (59.3%) nuisance to the community, 142 (40.3%) blocks canals and drains. Two hundred and forty-nine (56%) seek information on ES and the reasons for seeking information on ES include: 224(90%) improved ES, 213 (83.5%) improved quality of life, 187 (75.1%) better health. The information needs of respondents include 242 (97.2%) information on pure drinking water, 233 (95.8%) information on vector control, 224 (90%) information on sanitary measures, while the forms of information dissemination include: 248 (99.6%) town criers, 240 (86.4%) community meetings /age grade meetings.

Table 3 summarizes the level of knowledge of ES among respondents. Only 139 (31.2%) respondents had good knowledge of ES.

Table 4 highlights the ES practices among respondents. On the frequency of waste collection, 161 (36.2%) collect every week, 119 (26.7%) daily, 117 (26.3%) bi-weekly. The methods of storage of waste (temporary waste storage containers) include: 172 (38.7%) covered waste bin, 115 (26.8%) open space/ No storage containers, while the methods of disposal of waste were: 206 (46.3%) open dumpsite, 119 (26.7%) burning, 31 (7%) waste van, One hundred and ninety-two (43.1%), disposed of wastes weekly, 119 (26.7%) bi-weekly, while 154 (34.6%) reported visits for a house to house inspections and 62 (40.2%) of this 154, reported

that these visits by sanitary inspectors were irregular. Suggestions on improving ES include 142 (31.3%) Government enforcement/ regulation of ES practices, 98 (22%) educating people on ES, 78 (17.3%) proper site for refuse dumping, 71 (16%) community involvement in ES.

Table 5 shows the relationship between socio-demographic cum household characteristics and level of knowledge on ES among respondents. There were statistically significant associations between level of knowledge on ES and these socio-demographic cum household characteristics: [gender- males and females ($\chi^2=15.584$, $p=0.0001$); marital status- currently married and not currently married ($\chi^2=128.22$, $p=0.0000$) and size of the household – 4 to 6 occupants per household and others ($\chi^2=7.895$ $p=0.0495$)] respectively.

4. DISCUSSION:

The index cross-sectional descriptive study assessed the ES information-seeking behaviors and practices among households in Ogbaku, a rural community in Imo State, Nigeria. Among the participants, males, the currently married, Christians, Ibos, and traders were in the majority, while 8.8% of them had no formal education. The gender distribution in this study depicted a dissimilar picture with that presented in a study in Orlu, Nigeria, where the majority tilted towards the female folks (11). This variation could be attributed to differences in methodologies such as sampling and data collection procedures. The modal size of households in the current study agrees with the average size of four to six occupants reported in the reference study (11).

This study determined the awareness of ES among the households studied. From the findings, 98% of them reported awareness of ES, with the key sources of information on ES as radio/television, community meetings, and family relatives. This finding is in contrast to a study done in Katsina, Nigeria, where a higher proportion of participants agreed to the lack of awareness reported as a factor affecting ES (21). This finding is, however, in tandem with a study done in Orlu, Nigeria, where most participants, 95% reported awareness of ES and the majority of them got their information about sanitation from the mass media, community meetings, etc. (11). This high awareness of ES in the present study is corroborated by its report that 78.4% of participants understand what ES means, out of this proportion, 26.7% knows steps in waste management, 88.8% mentioned at least one component of ES. Also varying proportions of participants could report consequences of poor ES, such as makes the

locality dirty, constitutes a nuisance to the community, blocks canals and drains, spreads germs, etc. The finding of a study in Dukem, Ethiopia (22) and another in Tamale, Ghana (23), both concur with the findings of the current study on the consequences of poor ES.

The present study determined the information-seeking behaviors of ES among these households. According to our findings, slightly more than half (56%) of them reported that they seek information on ES, and the reasons adduced are improved ES, improved quality of life, better health, etc. Also, the finding of the current study on the information needs of rural households is in keeping with the findings of works done in Nigeria (24) and India (15). Also, the current study noted that the main forms of information dissemination include town criers, community meetings /age grade meetings. This agrees with the report of a study among rural women in Borno state, Nigeria, where the majority of them preferred informal sources of information via friends, relatives, spouses, and children (25). According to them, ‘‘these sources are more reliable and authentic(25)’’.

In furtherance to the assessment of participants’, their level of knowledge on ES showed that only 31.2% had good knowledge of ES. This finding agrees with the finding of another study in a rural community in Abuja Nigeria, where only one quarter (29.9%) had an overall good level of knowledge of ES(26). A study in a community health center, Venkatachalam, Nellore India, showed that 60% had inadequate (poor) knowledge, while 16% had adequate (good) knowledge (27). This showed an obvious discrepancy in the level of knowledge of participants in the index and reference studies this could be interpreted in the light of differences in the study methodologies; study settings- community versus facility-based, sample sizes-445 households versus 100 women; sampling techniques- multistage versus convenience, data collection- semi-structured versus structured questionnaires cum observation checklist.

Furthermore, the ES practices among participants were studied vis a vis the frequencies and methods of waste collection, storage, disposal, and pattern of the house to house visits by sanitary inspectors. From the findings of the index study, the modal frequency of waste collection was by 36.2%, who collected every week. This finding tallies with those of works in rural Canada (28) and Barkin-Ladi, Plateau state, Nigeria(29). On the methods of storage of waste, 73.2% had temporary waste storage containers and the commonest method reported was covered waste bin by 38.7% of participants, while 26.8% of them lacked storage containers and reported use of open space. This report is in tandem with reports in Dukem,

Ethiopia, where 67.7% of total households had temporary storage containers for solid waste and 32% of them had no storage containers(22). It is consistent with reports in Orlu, Nigeria (11), and Abuja, Nigeria(26), where the majority of the participants collected waste via a covered waste bin.

The findings of the current study showed that the modal frequency of disposal of waste reported, was weekly. In the same vein, the greatest percentage 46.3%, disposed of their waste at the open dumpsite, then 26.7% by burning, 11% by the roadside, This was probably due to lack of designated accessible spot for waste disposal and inefficient system for home collection of waste. However, our study findings are consistent with findings elsewhere (11,22,26).⁷ In Dunkem, Ethiopia, 46.8% of households use unsafe solid waste disposal method (open field disposal), over a quarter (28.1%) engage in burning of waste within their premises, while (13.6%) use disposal outside premises anywhere (22).⁷ In Abuja, Nigeria, more than 40% of households dispose of their wastes indiscriminately out of these, 30% engage in burning wastes within their residence (24). Also, in Orlu, Nigeria, the commonest form of waste disposal reported in the community is open dumping reported by 49.8% of households (11). This scenario had persisted despite a glaring myriad of health hazards associated with these non- recommended practices. Nonetheless, only 7% of households use waste van (home to home collection of waste and engage the services of waste disposal agencies) and this is a common practice in rural areas of Canada (28) and Osogbo, Nigeria (30).

From the index study, only 34.6% reported house to house visits by sanitary inspectors and 40.2% of these households reported that these visits were irregular. This could be one of the factors influencing the enforcement/ regulation of ES practices in the community. It thus, emphasizes the stated need by households for educating the people on the benefits of keeping their environment clean and safe, while ensuring effective ES via full involvement of the community, government, and private partners.

Finally, the present study examined and found statistically significant associations between participants' level of knowledge on ES and their gender; marital status, and size of household respectively. These findings drew enormous support from previous researchers, who documented some relationship between some socio-demographic and household variables such as gender (28,31) social class and their awareness, level of knowledge, and practice of

ES (31). Studies in rural communities of Abuja (26), and Katsina (21), Nigeria, further supports that some socio-cultural factors would play a role in the level of knowledge of ES.

Limitation and strength of the study: Reporting and recall biases could result from this study. These would have been minimized by the anonymity entrenched in data collection and assuring participants of strict confidentiality. A major strength of this study is the 100% response rate.

CONCLUSIONS:

This study found high awareness of ES, with the key sources of information on ES as radio/television, community meetings, and family relatives. About half of them seek information on ES, with the main forms of dissemination as town criers, while there was poor knowledge and poor practice of ES. Their level of knowledge on ES was influenced by gender, marital status, and size of the household. Based on the above, we recommend improved multi-sectoral, localized, and need-based ES programs and strategies with full involvement of the community, government, and private partners. All tiers of government should muster the strong political will and rational decision making in developing synergy with stakeholders towards re-enforcing public awareness about ES through efficient and viable channels to increase their level of knowledge on standard ES practices; ensuring the provision of and access to improved sanitary facilities, providing an institutional arrangement for their management; regular inspection as well as enforcing sanitary regulations and monitoring of the observance of environmental standards.

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Competing interests

The authors declare that they have no competing interests.

Ethics approval and consent to participate

Approval was obtained from the appropriate authorities in the institution of study. Permission to conduct the study was obtained from the State Ministry of Health and the selected Local Government PHC Departments. After advocacy to relevant authorities in Ogbaku, Written consent was obtained from households involved in the study for the conduct and publication of this research freely and without coercion. Assurance of confidentiality was given. Study participants were free to refuse or withdraw from the study at any time without any penalty. The purpose and objectives of the study were explained to the participants before the interview. All authors hereby declare that the study has been performed by the ethical standards laid down in the 1964 Declaration of Helsinki.

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Table 1: Socio- demographic and household characteristics of respondents

Characteristics	Frequency (N=445)	Percentage (%)
Age(years)		
16-20	16	3.6
21-25	91	20.5
26-30	104	23.4
31-35	126	28.3
36-40	70	15.7
41-45	38	8.5
Gender		
Male	256	57.5
Female	189	42.5
Marital status		
Never married	155	34.8
Currently married	234	52.6
Divorced/ Separated	32	7.1
Co-habiting	24	5.4
Religion		
Christianity	385	86.5
Islam	41	9.2
African Traditional Religion	19	4.3
Ethnicity		
Ibo	367	82.5
Hausa.	32	7.2
Yoruba.	36	8.1
Others*	10	2.2
Highest level of education attained		
No formal	39	8.8
Primary	176	39.6
Secondary	187	42
Tertiary	41	9.2
Occupation of respondents		
Civil service	136	30.6

Trading	190	42.7
Farming	70	15.7
Artisanship	49	11
Position of respondents in households		
Head	194	43.6
Others**	251	56.4
Household size		
1-3	84	18.9
4-6	208	46.7
≥7	153	34.4
Occupation of head of household:		
Civil service	148	33.2
Trading	187	42
Farming	55	12.4
Artisanship	55	12.4

* Others- Esan, Ikwerre, Igala, Efik; Others**- Siblings, servants, maids, relatives

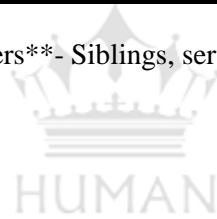


Table 2: Awareness of and information seeking behavior on environmental sanitation among respondents.

Variables	Frequency (N=445)	Percentage (%)
Have heard of environmental sanitation		
Yes	427	96
No	18	4
Source of information on environmental sanitation (n=427)*		
Radio/Television	427	100
Community meetings	206	48.2
Family relatives (Parents/ Siblings)	134	31.4
School/Place of work	120	28.1
Social media	96	22.5
Friends/peers	85	19.9
Print media	51	11.9
Understand what environmental sanitation means		
Yes	349	78.4
No	96	21.6
Know steps in waste management (n=349)		
Yes	93	26.7
No	256	73.3
Components of environmental sanitation (n=349)		
Respondents that mentioned at least three	141	40.4
Respondents that mentioned One or two	169	48.4
Respondents that mentioned none	39	11.2
Consequences of poor environmental sanitation (n=349)*		
Makes the locality dirty	247	70.8
Nuisance to the community	207	59.3
Blocks canals and drains	142	40.7
Spreads germs	100	28.7
Contaminates water sources	53	15.2
Pollution	30	8.6
Seek information on environmental sanitation		

Yes	249	56
No	196	44
Reason for seeking information on environmental sanitation (n=249)*		
Improved environmental sanitation	224	90
Improved quality of life	213	85.5
Better health	187	75.1
Information needs of respondents (n=249)*		
Information on pure drinking water	242	97.2
Information on vector control	233	93.6
Information on sanitary measures	224	90
Information on prevention of common diseases	167	67
Forms of information dissemination (n=249)*		
Town criers	248	99.6
Community meetings / Age grade meetings	240	96.4
In community markets	187	75.1
By sanitary inspectors	149	50.8

* Multiple response

Table 3: The level of knowledge on environmental sanitation among respondents

Overall	Frequency (N=445)	Percentage (%)
Knowledge		
Grade		
Poor	213	47.9
Fair	93	20.9
Good	139	31.2
Total	445	100

Table 4: Environmental sanitation practices among respondents.

Environmental sanitation practices	Frequency	Percentage (%)
N= 445		
Frequency of waste collection		
Daily	119	26.7
Weekly	161	36.2
Bi-weekly	117	26.3
Monthly	43	9.7
Irregular	5	1.1
Had storage containers		
Yes	330	73.2
No	115	26.8
Methods of temporary storage of waste		
Covered waste bin	172	38.7
Bucket	85	19.1
Bags and sacks.	65	14.6
Bamboo basket	8	1.8
Open space/ No storage containers	115	26.8
Methods of disposal of waste		
Open dump site	206	46.3
Burning	119	26.7
Road side	49	11
Gutters	40	9
Waste van	31	7
Frequency of disposal of waste		
Daily	99	22.2
Weekly	192	43.1
Bi-weekly	119	26.7
Monthly	25	5.6
Irregular	10	2.2
Ever visited by sanitary (house to house) inspectors		
Yes	154	34.6
No.	291	65.4
Frequency of visits by sanitary inspectors (154)		
Monthly	10	6.5
Quarterly	25	16.2
Semi-annually	29	18.8
Yearly	28	18.2
Irregularly	62	40.3
Suggestions on improving environmental sanitation (445) *		
Government enforcement/ regulations	142	31.9
Educating people on safe environment	98	22
Proper site for refuse dumping	78	17.5
Public awareness campaign	75	16.9
Community involvement	71	16
Regular house to house inspection	69	15.5
Public private partnerships	56	12.6
Providing refuse bins at different points	56	12.6

* Multiple response

Table 5: The relationship between socio- demographic and household characteristics and level of knowledge of environmental sanitation among respondents

Variables	Frequency (n) /percentage (%)				Test	
statistic					p value	
	Overall Knowledge Grade				χ^2	
	Poor (%)	Fair (%)	Good (%)	Total (%)		
Gender						
Male	112 (25.2)	51(11.5)	93 (20.9)	256(57.5)	15.584	0.0001*
Female	101 (22.7)	42 (9.4)	46 (10.3)	189 (42.5)	df=1	
Total	213 (47.9)	93 (20.9)	139 (31.2)	445 (100)		
Marital status						
Never married	106 (23.8)	44 (9.9)	5 (1.1)	155 (34.8)		
Currently married	77 (17.3)	29 (6.5)	128 (28.8)	234 (52.6)	f=128.22	0.0000*
Divorced/ Separated	12 (2.7)	17 (3.8)	3 (0.7)	32 (7.1)	df=1	
Co-habiting	18 (4.1)	3 (0.7)	3 (0.7)	24 (5.4)		
Total	213 (47.9)	93 (20.9)	139 (31.2)	445 (100)		
Religion						
Christianity	197 (44.3)	82 (18.4)	106 (23.8)	385 (86.5)		
Islam	9 (2.1)	5 (1.1)	27 (6.1)	41 (9.2)	f=2.953	0.0867
African Traditional Religion	7 (1.6)	6 (1.4)	6 (1.4)	19 (4.3)	df= 1	
Total	213 (47.9)	93 (20.9)	139 (31.2)	445 (100)		
Highest level of education attained						
No formal	12 (2.7)	10 (2.5)	17 (3.8)	39(8.8)		
Primary	90(22.9)	32 (7.2)	56 (12.6)	178 (39.6)	0.0304	0.0817
Secondary	97 (21.8)	39 (8.8)	51 (11.5)	187 (42)	df= 1	
Tertiary	14 (3.2)	12 (2.7)	15 (3.4)	41 (9.2)		
Total	213 (47.9)	93 (20.9)	139 (31.2)	445 (100)		
Household size						
1-3	35 (7.9)	12 (2.7)	37 (8.3)	84 (18.9)		
4-6	99 (22.3)	45 (10.1)	64 (14.4)	208 (46.7)	7.895	0.0495*
≥ 7	79 (17.8)	36 (8.1)	38 (8.5)	153 (34.4)	df= 1	
Total	213 (47.9)	93 (20.9)	139 (31.2)	445 (100)		

* Statistically significant association = $p \leq 0.05$