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Full Length Research

ASSESSMENT OF WATER SANITATION AND HYGIENE PRACTICES IN PUBLIC PRIMARY SCHOOLS IN OWERRI MUNICIPAL AREA COUNCIL IMO STATE, NIGERIA

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Infectious diseases remain an issue of concern in the public primary schools due to inadequate environmental health practices. In this work, assessment of water, sanitation and hygiene practices among public primary schools in Owerri Municipal Area Council of Imo state is being done. A descriptive study was conducted with the use of a structured questionnaire administered on sample size of 374 respondents. The sample size was determined using Nwana method. Data were collected, presented and analyzed using descriptive statistics. The source of water varied with 236 (63.10%) of water tanker, followed by water hawker 124 (33.16%), rain water 104 (27.81%) and borehole/mono pump 77 (20.69%). The ventilated improved pit dominated with 316 (84.49%), water closets 37 (9.89%) and least was ordinary pit latrine 21 (5.62%). Hand-washing points were found to be 136 (36.36%) with less hand towels 111 (29.68%) and improper hand-washing upon blowing of nose 38 (10.16%). Hand-washing with only water dominated by 187 (50.00%) and less use of toilet soap and detergent. The sanitary master was found to be improper based on sanitary regulation. Based on data analysis, water sanitation and hygiene practices were inadequate due to significant difference in available toilets and water facility, hand-washing practices and hygiene conditions. Hence, good policy making, implementation and management of these facilities provides adequate water, sanitation and hygiene eliminating contagious diseases.

Keywords: Hand-washing, open defecation, water, sanitation, hygiene.

INTRODUCTION

Promotion of environment health requires good sanitary conditions. According to Olukanni (2013), sanitation promotes hygiene and prevents contamination of diseases through adequate provision of safe water, sanitation facilities and good individual hygiene practices. Hand-washing with soap and use of disinfectants prevent human contact with faeces. Thus, protect human health by providing a clean environment that will stop the transmission of diseases such as diarrhoea, nosocomial and parasitic infections especially through the faecal-oral route and unclean water (UNICEF and WHO, 2012). For example, improper sanitation has been a leading cause of diarrhoea which is associated with malnutrition and stunted growth in children. Sanitation is a part of global development priority and sustainable development goal. It has been reported that about 2.3 billion people world over have poor

access to basic sanitation facilities which created public health issues such as dignity and safety (WHO and UNICEF, 2017). Poor availability of quality water, sanitation, and hygiene (WASH) practices tremendously increased the contagious diseases. In Nigeria, government efforts remain hiding through National School Health Policy and Guidelines (NSHPG) with aim 'to provide safe water, adequate sanitation and hygiene services to all schools in the country'. Schools are educational centres to develop useful life knowledge on health and hygiene. This implies absent of sanitation and hygiene facilities in school make it a risky place where diseases are transmitted increasing morbidity and mortality. Unsafe hygiene practices along with contaminated water and food are causes of child mortality (Katukiza et al., 2012). Also, total sanitation campaign has been identified to promote understanding and popularizing novel ideas of children (Majra and Gur, 2010). Behavioural and health impacts of provision of waterless hand sanitizer to primary schools have been reported to be unsafe conditions to pupils (Pickering et al., 2013). Provision of soap and its usefulness prevent faecal bacteria contamination and hard free germ among the primary school pupils was reported (Saboori et al., 2013; Nicholson et al., 2014). According to the report of Anunonwu et al., (2009), awareness of low level of environmental sanitation and poor waste disposal in Owerri Municipal Council Area of Imo state with inadequate Environmental Health officers. Babatope (2013) reported that there is no adequate knowledge with improper hygiene practice resulted to environmental threat. Lawani et al., (2014) also reported lack of potable water supply and functional toilets in the schools which could affect the hygiene status and handwashing by the pupils. Assessing of water sanitation and hygiene practices found to be limited in literature which can make the policy making bodies to design and implement in both existing schools in order to save the life of pupil and environment. This work is aimed at assessing the sources of water supply, the excreta disposal methods and toilet facilities, level of hand-washing and hand-washing facilities, the level of awareness of water sanitation and hygiene.

MATERIALS AND METHODS

Owerri Municipal is a Local Government Area in Imo State, Nigeria. Its headquarters is in the City of Owerri. It has an area of 58 km² with a population of 127,213 according to the 2006 census. Owerri city sits at the intersection of roads from Port Harcourt, Onitsha, Aba and Umuahia. It comprises of twenty five (25) public primary schools. The study population consists of thirteen thousand one hundred and fifty (13,150) pupils in all the public primary schools in Owerri Municipal Area Council with total number of twenty five (25) public primary schools in Owerri Municipal Council Area. All the public primary schools in Owerri Municipal Area Council were regulated by Imo State Universal Basic Education Board (IMSUBEB) of the State ministry of Education. Structured questionnaire containing toilet facilities, water facilities, hand-washing, toilets sanitation and hygiene, sanitation and hygiene practice was used. The parameters under assessment were the sanitation facilities in these schools, water supply/main water source and hand-washing practices. A multi-stage systematic sampling technique as described by Adukwu (2001) was applied. Table 1 shows the list of the eight (8) public primary schools that were randomly selected which approximately formed 30% of twenty five public primary schools in Owerri Area council of Imo State. The 8 schools were selected by dividing the population into groups or clusters. Each group consists of three (3) schools, and one school is selected from each group or cluster. The sample population used from the eight public primary schools was 3723 pupils. The sample size of 374 pupils was determined using Nwana (1981) which is about 10% of sample population. Structured questionnaire was administered to sample size for data collection. The data was presented and analysed using descriptive statistics – percentages and frequency tables. Chi-square (X^2) was used to test the hypotheses with confidence interval level of 95 percent with Pearson's correlation (R^2). The Chi-square (X^2) was calculated using equation (1):

$$X^2_{cal} = \sum \frac{(O-E)^2}{O} \quad \text{.....(1)}$$

RESULTS AND DISCUSSION

Table 2 shows the availability of water facilities among public primary schools. Water tanker as a source of water used in the public schools was dominated, followed by water hawkers, then rain water and borehole/mono pump was obtained to be the least, while 69 (18.45%) pupils reported to obtain

Table 1. List of Schools, population of Pupils and sample size.

S/N	Name of school	Population of Pupils	Approximated Sample Size
1	Central School. 1 Owerri	407	41
2.	Township Pri / School. 11 Owerri	90	9
3.	Mann Street Pri / School. 11 Ow.	166	17
4.	Sam Njemanze Mem. pri/sch. 1	404	40
5.	Model Pri / Sch. New Owerri	1415	142
6.	WorldBank Pri/School. 11 Owerri	725	73
7.	Model Pri/Sch. Shell Camp Owerri	421	42
8.	Special Education R.S	95	10
	Total	3723	374

Table 2. Availability of water facilities among the public primary schools.

Variables	Yes (N=374)	Percentage (%)	No (N=374)	Percentage (%)
Types of water source				
Water tanker	236	63.10	138	36.90
Water hawker	124	33.16	250	66.84
Rain water	104	27.81	270	72.19
Borehole/mono pump	77	20.69	297	79.31
None of the above	69	18.45	305	81.55
Storage of water				
Clean containers	228	60.96	146	39.04
Source of drinking water				
Borehole	70	18.72	216	81.28
covered buckets	197	52.67	177	47.33
Jerry cans	71	18.98	393	81.12
None of the above	35	9.36	339	90.64

$X^2_{cal} = 414.2312$, $X^2_{tab} = 16.919$, $p - value = 0.000$

water from different source outside the option in the questionnaire. Among the respondents, majority accepted the cleaning of water storage 228 (60.96%). This may be attributed to negligence or poor monitoring of cleaning or washing of the water storage containers by the staff. Also, the source of drinking water was dominated by covered bucket after gotten water from tanker, followed by jerry cans and the borehole was found to be the least, while 35 (9.36%) respondents could not state the source of drinking water. This shows poor source of drinking water among the public primary schools. Treatment and hygienic conditions of water obtained from covered bucket and jerry cans cannot be ascertained. This may be a source of several infectious diseases. The calculated chi – square value (414.231) was found to be greater than tabulated chi-square value (16.919) with inferior p-value of 0.05 and high magnitude of R^2 (0.9085). There is significant difference in availability of water facility which contributed to poor sanitary environment and hygiene practices. Inadequate

Table 3. Toilet facilities among the public primary schools.

Variables	Yes (N=374)	Percentage (%)	No (N=374)	Percentage (%)
Type of toilet				
Ordinary pit latrine	21	5.62	353	94.38
Ventilated Improved Pit (VIP)	316	84.49	58	15.51
Water closets	37	9.89	337	90.11
Number of Toilets				
One	0	0.00	374	100.00
Two	0	0.00	374	100.00
Three	91	24.33	283	75.67
Four	121	32.35	253	67.65
Five & above	162	43.33	212	56.67
Number of male toilets				
One	44	11.77	330	88.23
Two	127	33.96	247	66.04
Three	59	15.78	315	84.22
Four	98	26.20	276	73.80
Five & above	47	12.57	327	87.43
Number of female toilets				
One	44	11.77	330	88.23
Two	127	33.96	247	66.04
Three	59	15.78	315	84.22
Four	98	26.20	276	73.80
Five & above	47	12.57	327	87.43
Toilets for pupils				
Availability of toilets for pupils	336	89.84	38	10.16

$X^2_{cal} = 2920.01$, $X^2_{tab} = 32.6706$, $p - value = 0.000$

quantity and quality of water posed major environmental sanitation threat due to source and storage of water (Nkwocha and Egejuru, 2010). Table 3 shows the types of toilet facilities available in public primary schools in Owerri Municipal Area Council. Ventilated improved pit 316 (84.49%) found to be highest followed by water closets 37 (9.89%) and least was ordinary pit latrine 21 (5.62%). The dominance of ventilated improved pit may be attributed to time of establishment of the public primary schools with long time renovation by the government and causes lost loss of interest in toilets use among the pupils which causes infection among people as reported by WHO and UNICEF (2014), thereby, resulted to defecation around the schools premises which is non-hygienic. The highest number of toilets in schools was found to be five and above, followed by four toilets in school, then three toilets while there is no school where one or none is present. Based on UBEC (2010) specification of number of pupils, the numbers of toilets available in public primary schools were found to be inadequate. Also, the number of toilets are not adequately paired because two pair toilets dominated, followed four, then three, and five and above while one pair in all the public primary schools. More so, the percentage of available toilets for pupils was found to be 89.84% but not enough based on the number of pupils in each school. It can be observed that there is significant difference in terms of toilet facility among public primary schools since calculated chi – square is greater than tabulated chi-square with inferior p-value of 0.05. This indicates that adequate environmental sanitation practices cannot be

Table 4. Sanitary and hygiene practices of the toilets accommodations.

Variable	Yes (N=374)	Percentage (%)	No (N=374)	Percentage (%)
Frequency of washing of toilets in a week				
Once	0	0.00	374	100.00
Twice	124	33.16	250	66.84
Thrice	141	37.70	233	62.30
Daily	94	25.13	280	74.87
None of the above	16	4.28	358	95.72
Washing toilets with disinfectants				
Use of disinfectants	136	36.36	238	63.64
Provision of disinfectants				
School	87	23.26	287	76.74
Teachers	49	13.10	325	86.90
Community	0	0.00	374	100.00
Philanthropist	0	0.00	374	100.00
Frequency of cleaning of toilet rooms				
Once	0	0.00	374	100.00
Twice	94	25.13	280	74.87
Thrice	280	74.87	94	25.13
Daily	0	0.00	374	100.00

$X^2_{cal} = 1675.303$, $X^2_{tab} = 22.362$, $p - value = 0.000$

ensured where basic amenities and poor sanitation habits with improper hygiene practices are inadequate as reported (Afon, 2006; Ademiluyi and Odugbesan, 2008). Hence pollution of primary schools in Owerri Municipal Area Council of Imo State with defecation of feace promoted by unsanitary conditions of living and breeding of communicable diseases as reported by Adimekwe (2013).

The sanitary and hygiene practices in toilet accommodations based on toilet washing, provision and use of disinfectant, and cleaning of the toilet are presented in Table 4. The washing of toilets thrice a week which is 141(37.70%) is the most common among the public primary schools, followed by twice in a week 124(33.16%), daily 94(25.13%) and 16(4.28%) was found not to employ any washing pattern of the toilets used in the schools while none of the respondents reported washing of toilets once in a week. Washing of the toilets with disinfectants is inadequate as it is found to be only 136(36.36%) uses disinfectants in washing the toilets. Disinfectants are provided by the school administration and teachers with the values 87 (23.26%) and 49 (13.10%) respectively. The use of disinfectant should be encouraged in the schools so as to protect the pupils from germs and many microbes that can cause infection. The cleaning of the toilet accommodations was observed not to be daily. It can be deduced that unavailability of water and inadequate provision of disinfectants results to unsafe hygiene practices in the schools. The data depict a significant difference in terms of sanitary and hygiene practices of toilet accommodation since calculated chi – square is greater than tabulated chi-square with inferior p-value of 0.05.

Table 5 shows the hand-washing practices in the public primary schools based on hand washing activity, hand washing with an enhancer, availability of hand washing points, availability of materials for cleaning of hands, washing of hand towels or materials for cleaning and frequency of washing

Table 5. Hand washing practices among the public primary schools.

Variables	Yes (N=374)	Percentage (%)	No (N=374)	Percentage (%)
Hand washing activity				
Washing of hands after toilet	336	89.84	38	10.16
Washing of hands after blow of nose	38	10.16	336	89.84
Hand washing with an enhancer				
Hand washing with detergent soap	72	19.25	302	80.85
Ash and water	0	0.00	374	100.00
Tablet soap with water	115	30.75	259	69.25
Water only	187	50.00	187	50.00
Available place of Handwashing				
Handwashing point in the classroom	136	36.36	238	63.64
Availability of hand towel				
Pupils with hand towels	111	29.68	263	70.32
Materials used for cleaning of hand				
Hand towel	89	23.80	285	76.20
Handkerchief	76	20.32	298	79.68
With their cloths	135	36.10	239	63.90
Allow it to dry	74	19.79	300	80.21
Frequency of washing hand towels or materials for cleaning				
Once a week	14	3.74	360	96.26
Twice a week	57	15.24	317	84.76
Thrice a week	26	6.95	348	93.05
Daily	16	4.28	358	95.72
None of the above	341	91.18	33	8.82
Frequency of washing hand after toilet				
Immediately after using the toilet	263	70.32	111	29.68
30mins after using the toilet	111	29.68	263	70.32
1 hour after using the toilet	0	0.00	266	100.00
None	0	0.00	266	100.00

$X^2_{cal} = 2231.698\ X^2_{tab} = 33.924,\ p - value = 0.003$

hands after toilets. Washing of hands after toilet was dominant which accounted for 336 (89.84%) while washing hands after nose blowing was 38 (10.16%). This indicates poor hygiene practices in the schools. Microbes such as *Staphylococcus aureu*s, *E. coli* that can cause many infections can be contacted through unhygienic practices. 187 (50.00%) of the respondents wash hands with only water, followed by the use of toilet tablet soap with water 115 (30.75%) and then, hand washing with detergent 72 (19.17%). There is inadequate hand washing points in the schools as only 136(36.36%) of respondents acknowledged having hand washing points in the schools. This is an indication of non involvement of

Table 6. Awareness of sanitation and hygiene practices.

Variables	Yes (N=374)	Percentage (%)	No (N=374)	Percentage (%)
Pupils awareness on sanitation	266	71.12	108	28.88
Presence of sanitation and hygiene in curriculum	225	60.16	149	39.84
Availability or presence of sanitation master or mistress	137	36.63	237	63.37

$X^2_{cal} = 414.2312$, $X^2_{tab} = 16.919$, $p - value = 0.000$

sanitary, environmental or public health personnel(s) during the designing of the classrooms as well as toilets in the public primary schools. Availability of hand towels among the pupils was found to be 111 (29.68%). The non possession of hand towels by the pupils may be due to low level of awareness of its importance in hand hygiene practice. Also, parents may see the provision of hand towels as a waste of money as a child may misplace it or lose it, thereby encouraging poor hand hygiene practice. Majority of the pupils acknowledged using their cloths to clean their hands. The washing of the hand towels after use was observed to be poor. More so, 263 (70.32%) of the pupils agreed on washing hands immediately after use of toilet. Based on statistical data for hand-washing practices among the public primary schools in Owerri Municipal Council of Imo State, calculated chi–square was found to be greater than tabulated chi-square with inferior p-value of 0.05.

Table 6 shows the awareness of sanitation and hygiene practices in public primary schools in Owerri Municipal Council. The awareness of sanitation among pupils was 266 (71.12%) indicating high level of awareness among the pupils. Sanitation sand hygiene practices was also found to be higher in the curriculum which amounted to 225 (60.16%). The availability of sanitary and hygiene professionals in the schools was found to be 137 (36.63%). This indicates poor availability of sanitary professionals to teach the curriculum content and the implementation of sanitary and hygiene practices in the public primary schools in Owerri Municipal Area Council, Imo state. This may be due to unemployment of the professionals, especially, sanitary or environmental health officers by the government during recruitment and ignorance of the vital roles of sanitary officers. There is significant difference in awareness of sanitation and hygiene practices since calculated chi–square was found to be greater than tabulated chi-square with inferior p-value.

CONCLUSION

It can be deduced that the WASH program in all the schools are not satisfactory due to inadequate provision of potable water supply, sanitation and hygiene education with inadequate of professionals to enforce or implement in Owerri Municipal Area Council Area even though there is legislation on it. The study revealed inadequate water sources, cleanliness of water source and storage containers with dominant of ventilated improved toilets and presence of pit toilets as against specification of toilets with population coupled with poor implementation of legislation. In order to avert the consequences of water sanitary and hygiene practice, the need to employ professionals in public schools for teaching of curriculum and implementation of legislation as well as design of classroom and schools is necessary. Provision of water, toilet disinfectant, detergent and hand-washing facilities by the government and supported by parents in order safe the life and environment of pupils in public schools are unavoidable. Hence, it leads to defecation around the school premises. Poor WASH in the public primary schools surveyed can be connected to a lack of clear policy, insufficient budget allocations from government and negligence on the part of the school management system which should be improved.

REFERENCES

Ademiluyi IA and Odugbesan JA (2008). Sustainability and Impact of Community Water

Supply and Sanitation Programmes in Nigeria: An overview. African Journal of Agriculture Research, 3 (12): 811–817.
Adimekwe SA (2013). The Impact of Environmental Pollution in Imo State: A Case Study of Okigwe Local Government Area. Journal of Educational and Social Research, 3(5): 79-85.
Adukwu EA (2001). Writing methodology of research. The Nigerian Academic Forum, 1 (3): 1 – 6.
Afon AO (2006). The Use of Residents' Satisfaction Index in Selective Rehabilitation of Urban Core Residential Areas in Developing Countries. International Review for Environmental Strategies, 6 (1): 137–152.
Anunonwu COA, Amadi AN, Nwankwo BO, Nnadozie JNB, Oguejiofor NC, Nwoga KS and Odom UC (2009). Evaluation of environmental sanitation in Owerri Municipal Area Council of Imo State. Research Journal of Medical Sciences, 3 (4): 137 – 140.
Babatope B (2013). Water, sanitation and hygiene practices among primary-school children in Lagos: a case study of the Makoko slum community. Water International, 38 (7): 921-929.
Katukiza AY, Ronteltap M, Niwagaba CB, Foppen JWA, Kansiime F and Lens PNL (2012). Sustainable sanitation technology options for urban slums. Biotechnology Advances, 30 (5): 964 – 978.
Lawani FO, Ukpanukpong RU, Utu-Baku BA, Fana NY, Uyabeme RN, Ajakaye OF, Oresegun OA, Eze FN and Edoamodu CE (2014). Potable water supply and sanitation practices in selected public primary school pupils in Owerri north local government area, Imo state, Nigeria. Asian Journal of Plant Science and Research, 4(3), 40-45**.**
Majra JP and Gur A (2010). School environment and sanitation in rural India. Journal of Global Infectious Diseases, 2(2): 109-111.
Nicholson JA, Naeeni M, Hoptroff M, Matheson JR, Roberts AJ, Taylor D and Wright RL (2014). An investigation of the effects of a hand washing intervention on health outcomes and school absence using a randomised trial in Indian urban communities. Tropical Medicine and International Health, 19 (3): 284 - 292.
Nkwocha EE and Egejuru RO (2010). The European Union micro-projects programme on water and sanitation and reduction in the incidence of some disease prevalent in the rural communities of Imo State. Reviews in Infection, 1 (4): 211-217.
Nwana OC (1981). Introduction to Educational Research. Heineman Educational Book Nigeria Limited, Ibadan, Nigeria.
Olukanni DO (2013). Assessment of WASH Program in Public Secondary Schools in South-Western Nigeria. ARPN Journal of Engineering and Applied Sciences 8 (3): 12-24.
Pickering AJ, Davis J, Blum AG, Scalmanini J, Oyier B, Okoth G and Ram PK (2013). Access to waterless hand sanitizer improves student hand hygiene behaviour in primary schools in Nairobi, Kenya. The American Journal of Tropical Medicine and Hygiene 89 (3): 411 - 418.
Saboori S, Greene LE, Moe CL, Freeman MC, Caruso BA, Akoko D and Rheingans RD (2013). Impact of regular soap provision to primary schools on hand washing and E. coli hand contamination among pupils in Nyanza Province, Kenya: a cluster-randomized trial. American Journal of Tropical Medicine and Hygiene, 89(4): 698 - 708.
UBEC (Universal Basic Education Commission) (2010). Minimum standard for basic education in Nigeria, 1 – 47.
UNICEF and WHO (2012). Progress on Drinking Water and Sanitation. Joint Monitoring Programme for Water Supply and Sanitation. ISBN: 978-92-806 - 4632-0.
WHO and UNICEF (2014). Progress on Drinking Water and Sanitation: 2014 Update. WHO/UNICEF Joint Water Supply and Sanitation Monitoring Programme.p-45. (http://www.who.int/water_sanitation_health/publications/9789241507240/en/, accessed 25 March 2018).
WHO and UNICEF (2017). Progress on Drinking Water, Sanitation and Hygiene: 2017 Update and SDG Baselines. Geneva, 8-10.