

## Sanitary facilities in primary schools in Jos, Nigeria

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### Abstract

**Background:** Poor sanitary facilities in schools increase the risk of infections, a major cause of morbidity and mortality in developing countries.

**Methods:** A cross sectional study of 66 primary schools (20 public and 46 private) in Jos North Local Government Area of Nigeria was conducted to ascertain the availability of sanitary facilities. The following parameters were assessed: availability and type of toilet facilities, toilet: pupil ratio, availability and source of water, refuse disposal facilities and facilities for hand-washing.

**Results:** All 46 (100%) private schools and 6 (30%) public schools had toilets ( $\chi^2 = 40.87$   $p < 0.0001$ ). Toilet: pupil ratio was  $>1:30$  in 44 (85%) of the 52 schools with toilets, six public and 38 private schools ( $\chi^2 = 1.23$ ,  $p = 0.27$ ). Thirty five (76%) private and 5 (25%) public schools had pipe - borne water ( $\chi^2 = 15.23$ ,  $p < 0.001$ ). Sixty (91%) schools practiced open dumping of refuse. Soap/ detergent for hand-washing were available in 28 (61%) private and 1 (5%) public school ( $\chi^2 = 15.5$ ,  $p < 0.0001$ ).

**Conclusion:** This study revealed poor sanitary facilities especially in public primary schools in Jos North Local Government Area. Attention should be paid to the school environment as an essential component of the school health programme to promote the health of the pupils and the community.

**Keywords:** Primary Schools, School Health, Sanitary Conditions

### Introduction

Infections and infestations are a major cause of mortality and morbidity in children in developing countries.<sup>1</sup> Poor sanitary conditions, use of unsafe

water and poor health behaviour contribute to this enormous burden of disease.<sup>2</sup> Hand-washing has been recognized as one of the most important measures in infection control.<sup>3</sup>

School-age children constitute 23% of the Nigeria population.<sup>4</sup> Epidemiological surveys, and institutional records have documented a high prevalence and incidence of infections and infestations in school children.<sup>5-8</sup> These contribute to the high prevalence of anaemia, decreased cognition and absenteeism from school with its attendant consequences.<sup>7</sup>

A healthy school environment is necessary for the optimal health of the school -age child. The school provides unique opportunities to promote the health of these children who spend a considerable proportion of their day in school. The World Health Organization (WHO) has defined a health promoting school as a school that promotes and improves the health of the pupils, personnel, families and the community.<sup>9</sup>

Studies in other parts of the world have documented sub-standard sanitary facilities in schools with a potential for spread of infectious disease.<sup>10-12</sup> For example, Rajaratnam and co-workers<sup>11</sup> reported an outbreak of hepatitis A infection in a middle school in the United Kingdom where the school toilet was the source of transmission. Furthermore, children's negative perceptions of school toilets have been shown to contribute to urinary and bowel problems posing a risk to their physical and psychological health.<sup>13</sup> In Africa, studies have also depicted poor sanitary facilities in schools.<sup>7</sup> Previous studies in other parts of Nigeria have documented poor sanitary facilities and water supply.<sup>5, 6, 14-17</sup> Oduntan<sup>6</sup> reported that 70% of public primary school in Ibadan had no pipe- borne water and 20% had no refuse disposal facilities. Ochor<sup>14</sup> in Benin, southern Nigeria found that 12% of the 10 schools assessed did not have any source of water. In a survey in Zaria, northern Nigeria, Ebong<sup>15</sup> found that 64% of school toilets were dirty and 20.9% of schools had indiscriminate littering of the school compound with human faeces. Similarly, Akani<sup>16,17</sup> in a survey of 47 schools in Port Harcourt, Southern Nigeria documented that only 25% had functional sources of

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water within the school premises and only 54% had functional toilets.

The objective of this study was to assess the sanitary facilities in primary schools in Jos North Local Government Area as an important component of the School Health Programme. In addition, the study sought to compare the availability of these facilities in the public (Government – owned) and private schools.

### Patients and Methods

This cross sectional study was conducted over a period of two months in Jos North Local Area (LGA) of Plateau State in North Central Nigeria. There were a total of 132 registered primary schools [40 governments owned (public) and 92 private owned].

**Determination of sample size:** A sampling ratio of 50% of all identified schools was used which gives the largest size for the chosen error margin of 0.0518. There were 40 public and 92 private schools. Thus the sampling frame was 132 primary schools and a sampling ratio of 50% gave a sample size of 66 schools.

**Sampling Technique:** A stratified random sampling technique was used in which the primary schools were stratified into public and private. The sampling ratio of 50% was applied to each group to select 20 and 46 public schools respectively, giving a total of 66 schools for the study. A table of random numbers was used to select the schools studied from the sampling frame.

**Ethical Considerations:** Ethical clearance was obtained from the Ethical Committee of the Jos University Teaching Hospital. Written permission was obtained from the Education Authority of Jos North LGA from where a list of all the registered primary schools was collected. Subsequently, verbal permission was sought from the head teachers of the selected schools.

**Data Collection:** A school health evaluation questionnaire<sup>19</sup> was completed for each school by direct interview and inspection by the researchers. The general administration data was obtained by interviewing the head teacher and inspecting the school records. The section on school environment was completed by inspection of the school environment including- toilets, source of water, refuse disposal location and general inspection of the school compound. Presence of wash-hand basins with water, waste paper baskets, toilet paper and soap/ detergent was also noted.

Prior to commencement of the study, the questionnaire was pre-tested in a selected primary school outside the sampled schools to identify possible difficulties in administering the questionnaire. No modification was required and the results of the pretest were not included in the analysis of the results.

**Data Analysis:** The statistical programme EPI info 2000 1.1.2a was used to analyze the data. Frequency distribution table were drawn. Categorical data was reported as proportions and continuous data as means + SD. The student-test was used to compare group means, while Chi square test was used for comparison of frequencies in contingency tables. In all statistical tests of significance, only p-values of less 0.05 were regarded as significant.

### Results

**Demographic Characteristics:** Sixty-six (20 public and 46 private) primary schools in Jos North LGA were studied. The total pupil population of the schools assessed was 39, 839. The minimum school population was 46 pupils, while the maximum was 4,010 pupils. Out of the 39,839 pupils 24,636 (61.6%) were from public schools, while 15,303 (38.4%) were from private schools. The total number of boys was 19,616 (49.2%), and the total number of girls was 20,223 (50.8%) giving a male: female ratio of approximately 1:1.

**Availability and source of water:** Fifty-one (77.3%) schools had water available within the school premises, [9(45%) public and 42(91.3%) private schools,  $\chi^2 = 17.0$ ,  $p = 0.0001$ ]. Out of the 51 schools with water sources within the schools, 35 (83.3%) private and five (55.6%) public had pipe- borne water ( $\chi^2 = 15.23$ ,  $p < 0.001$ ). The remaining 11 schools had wells.

**Refuse disposal:** Sixty (91%) schools practiced uncontrolled open dumping of refuse. The other methods of refuse disposal included composting, controlled tipping and incineration (Table 1). The methods of refuse disposal in public schools were not significantly different from those in private schools. Dustbins/waste baskets were available in 34(51.5%) schools (i.e. two public vs 32 private schools,  $\chi^2 = 19.8$ ,  $p < 0.0001$ ).

**Toilet Facilities:** The presence and type of toilet facilities are shown in Figure 1. Thirty-four (51.5%) schools had water closet toilet facilities. All the 34 schools were private schools. Fourteen (70%) of the public schools did not have any form of toilet facilities. In these schools, urine and faeces were passed indiscriminately and it was commonplace to see parts of the school compound littered with faeces. Differences in the provision and types of toilet facilities between public and private schools were statistically significant ( $p < 0.001$ ) as shown in Figure 1.

The toilet: pupil ratio for schools with toilet facilities ( $n=52$ ) is shown in Figure 2. Only 8(15.4%) schools, all private and no public school, had a ratio of 1 < 30 ( $\chi^2 = 1.23$ ,  $p = 0.27$ ). Public schools had higher toilet: Pupil ratios than private schools. Toilet paper was available in 35 (53.0%) schools, one public and 34 private ( $\chi^2 = 26.58$ ,  $p < 0.0001$ ).

**Hand-washing facilities:** Wash-hand basins were available in 27 (41%) schools, all private and no public schools ( $\chi^2 = 19.87$ ,  $p < 0.0001$ ). Soap/detergent was available in 29 (44%) schools, 28 private and one public ( $\chi^2 = 17.66$ ,  $p < 0.0001$ ).

Table 1: Refuse disposal facilities in public and private primary schools in Jos North LGA

Method	Public schools	Private Schools	Total	P
	No(%)	No(%)		
Open dumping	19(95)	41(89)	60 (90.9)	0.66
Composting	1(5)	3 (7)	4(6.1)	
Controlled tipping	0(0)	1(2)	1(1.5)	
Incineration	0(0)	1(2)	1(1.5)	
Total	20(100.0)	46(100.0)	66(100.0)	

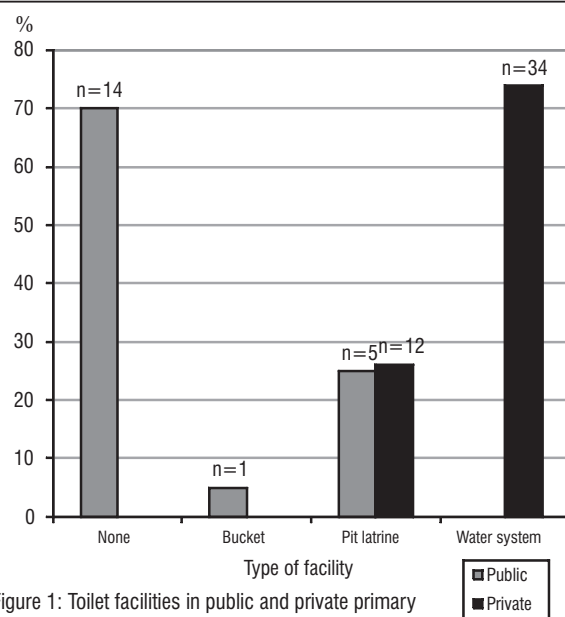


Figure 1: Toilet facilities in public and private primary schools in Jos North LGA

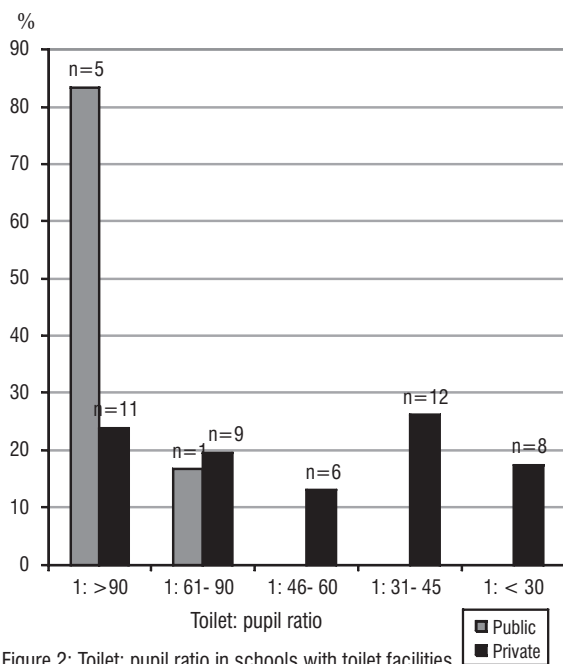


Figure 2: Toilet:pupil ratio in schools with toilet facilities

## Discussion

The findings of our study showed that sanitary and hand-washing facilities were inadequate in primary schools in Jos, especially in public schools. Twenty – three percent of the schools in our study had no source of water within the school premises, particularly the public schools. This figure is however much lower than those reported by some other authors from other parts of Nigeria.<sup>8,14-17</sup> This may be a reflection of better accessibility to water supply in Jos North LGA which hosts the capital of the state unlike some of the studies that were conducted in rural areas. Other authors similarly found poorer statistics in rural and public schools.<sup>8,12</sup> The unavailability of water or usage of poor quality water can result in diseases such as diarrhoeal disease, cholera, typhoid fever, parasitic infestation e.t.c.<sup>12</sup> On the contrary, improvement in water supply has been demonstrated to reduce morbidity from diarrhea and parasitic infestation and school absenteeism.<sup>20</sup> In addition, the need to look for water outside the school is a source of distraction for the pupils, and further exposes them to hazards including road traffic accidents a high prevalence of which has been reported among school children.<sup>9</sup>

The problem of unsatisfactory methods of refuse disposal requires attention. Ninety-one percent of the schools in the present study practiced uncontrolled open dumping. The situation was similar in Zaria where Ebong found that the main method of refuse disposal for both school and homes was open dumping with a prevalence of up to 89.9% in homes.<sup>15</sup> These figures may be a reflection of the increasing problem of refuse disposal in our communities. This brings to the fore the need for alternative methods of refuse disposal and also for recycling of waste, as well as education on pollution. The school is definitely a place to start and should serve as a model to the rest of the society.

Integrated within the provision of basic sanitation is the proper disposal of human waste. Fourteen (21%) of the overall schools did not have functional toilet facilities. The percentage of schools with no toilet facilities in study was lower than that of 54% reported by Akani in Southern Nigeria.<sup>33</sup> The difference between the Akani study and the present study may be due to the inclusion of private schools in our study. That up to 70% of public schools in the current study did not have functional toilets is disturbing. One (1.5%) school in our study still used the bucket latrine system. The unavailability of toilet facilities encourages indiscriminate defecation and urination in and around the school premises as was the case in some of the schools in the present study, increasing the risk of faeco-orally transmitted diseases. In the current study, even where toilet facilities were available these facilities were overcrowded, with only 12% having a ratio at 1:≤30. The toilet:pupil ratios in most of the schools in our study were below the recommended standard of one

toilet to 20-30 persons.<sup>10,21</sup> Studies from other parts of the world similarly demonstrated inadequate, overcrowded and/or poorly maintained toilet facilities.<sup>10,12</sup> Where toilet facilities are overburdened, inadequate or poorly maintained, they break down easily and create an environment conducive for transmission of infectious diseases. The findings of the present study therefore raise serious questions about the environmental health of our schools and undermine the attempts to teach the children basic hygiene.

Despite the poor sanitary conditions in the current study, hand-washing facilities were also found to be inadequate. Hand-washing has been recognized as one of the most important measures in infection control.<sup>3</sup> Furthermore, hand-washing has been shown to have a greater influence on the incidence of diarrhoea than improving faeces disposal and water quality.<sup>22</sup> Provision of hand-washing facilities in our study was however inadequate. Wash-hand basins with water were available in only 41% of schools while soap/detergent was available in 44% of schools. In addition, toilet paper was not available in 47% of schools in the present study. The availability of wash-hand basins with water in 41% of schools in the current study is comparable to that of 47% in Akani's study.<sup>17</sup> However, contrary to our study, 96% of the schools in the Akani study did not have toilet paper. This may be because Akani's study was conducted in a rural area where people tend to use water for anal washing a practice which has been associated with increased incidence of parasitic infestation.<sup>20</sup> It may also be due to low income.<sup>20</sup> These facilities for hand-washing which are not capital intensive should be provided regularly to enhance adequate and regular hand-washing.

Spreading the message of the importance of hand-washing is not enough. It must also be an easy and convenient thing to do as students will not normally go out of their way to wash their hands even where these facilities are available.<sup>23</sup> Provision of facilities for hand-washing will however need to be reinforced with health education.

The findings of the present study have revealed the poor state of environmental sanitation in the primary schools in Jos, particularly in the public schools. This poses a risk to the health of the school children in particular, and that of the community at large. Urgent steps should therefore be made to provide sanitary and hand-washing facilities, and to maintain existing ones. This should be reinforced with hygienic education. In addition, legislation with regards to standards in schools should be enacted and enforced.

The findings in the current study raises important questions about other aspects of the school health programme such as overcrowding of the classrooms, health instruction by the teachers, school health services; which the authors also intend to address in future studies. The uninvolvement of parents and pupils in our study may have limited the

interpretation of the impact of the findings on them.

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