

Open Defecation Practices among Primary School Children in Almajiri Schools, Sokoto, Nigeria

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Abstract

Open defecation remains a serious health and basic education problem in northern Nigeria, particularly among children of primary school age who study in Almajiri schools and live on the premises without parental supervision. This study assessed the frequency of the practice, identified the reasons the children attribute it to, described the availability of toilets and sources of water at their schools, and examined what the pattern means for the schools themselves. A descriptive cross-sectional quantitative survey was conducted among 120 primary-school-age Almajiri children in Kware and Gwadanbawa Local Government Areas of Sokoto State, recruited on a non-probability basis with the consent of their guardians. Data were collected through interviewer-administered semi-structured questionnaires reviewed by subject experts, and were analysed using frequencies and percentages. Open defecation was practised frequently or mostly by 70.0% of respondents. Facility-related reasons accounted for 91.6% of responses, while cultural preference accounted for 8.3%. Toilets were present at the schools of 65.8% of respondents, and wells supplied 75.8% of the schools. Reported coverage exceeds usable access, so sanitation provision at elementary schools requires maintenance arrangements and a reliable water supply alongside it.

Keywords: Almajiri schools; basic education; open defecation; primary school children; school sanitation

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INTRODUCTION

Sanitation occupies a central position within the sustainable development agenda, and target 6.2 commits states to end open defecation by 2030 while giving particular attention to women, girls, and people in vulnerable situations. Open defecation refers to the disposal of human excreta in fields, bushes, gutters, water bodies, or any other open space rather than in a toilet. Global monitoring places the number of people still practising it at roughly 419 million, and the burden falls most heavily on sub-Saharan Africa and southern Asia (UNICEF & WHO, 2023). Nigeria carries one of the largest national shares of that burden, with an estimated 48 million people involved in the practice, and the associated mortality attributed to faecally transmitted disease reaches hundreds of thousands of deaths each year (Omeiza, 2025). Reducing that burden depends on understanding why the practice persists in specific settings rather than on national averages alone.

Open defecation and the chain of infection

The public health cost of open defecation follows a traceable route rather than a vague association. Excreta deposited in the open release pathogens that reach the human mouth through fluids, fingers, flies, fields, and food, the five pathways summarised in the F-diagram presented in Figure 1. Humans act as the reservoir in which agents such as *Salmonella typhi* multiply, faeces serve as the portal of exit, contaminated water, hands, utensils, and foodstuff serve as vehicles of indirect transmission, and the mouth serves as the portal of entry (Abdullahi et al., 2023). Interrupting any single link on that route reduces transmission, which is why sanitation interventions work on excreta containment, water quality, and hand hygiene at the same time (Sridhar et al., 2020; Sarkingobir, 2025).

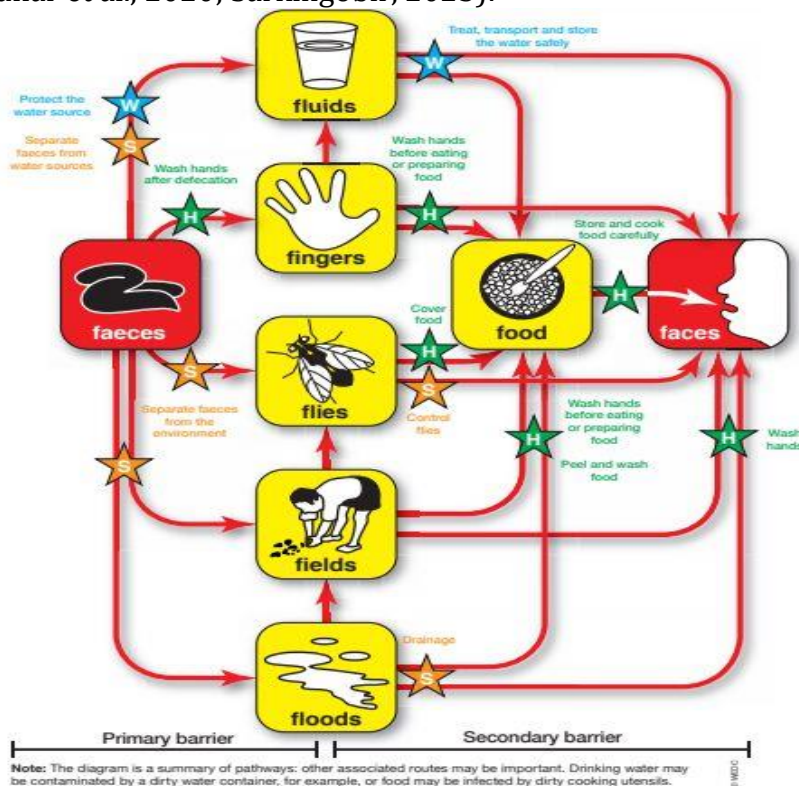


Figure 1: The typical F-diagram; Source: Reed et al. (2025)

Table 1. Attitudes and practices that interrupt faecal-oral transmission

Behavior	Knowledge	Attitude and practice
Safe use of toilets. Improper use of toilets causes diarrhoea and worm infections	Open defecation leads to the spread of diarrhoea, sickness, and worm infection	Teachers and students recognize the importance of proper use of toilets, safe disposal of faecal matter, handwashing, and use of soap after toilet use
Personal hygiene	Personal hygiene practices prevent disease	Washing hands, cutting nails, brushing teeth, regular bathing etc are health tips of high preventive potential against the spread of infectious and non-infectious diseases
Handwashing with soap at critical times	Handwashing reduces the chance of diarrhoea and other infections	Teachers and students are made to appreciate the importance of handwashing before and after toilet use and before and after food preparation or eating

Source: (Centre for Legislative Research and Advocacy, 2013; Abdullahi et al., 2023)

Diseases arising along this route include cholera, typhoid fever, dysentery, trachoma, poliomyelitis, and soil-transmitted helminth infection such as ascariasis. Children carry a disproportionate share of the resulting morbidity because repeated enteric infection during growth contributes to undernutrition and stunting, and because the school days lost to diarrhoeal episodes accumulate into measurable educational disadvantage (Bello et al., 2022). Beyond infection, defecating in the open exposes children to injury, to encounters with animals and traffic, and to loss of dignity and privacy, all of which shape whether the practice is abandoned once an alternative exists (Mensah et al., 2022).

The Almajiri system and the exposure of its pupils

Almajiri derives from the Arabic *al-muhajir*, a person who departs from home in pursuit of learning, and it names a boarding arrangement in which children leave their families to study under a teacher in another community (Sebastine & Obeta, 2015). Before the colonial period the system operated with organised funding, an accepted curriculum, and recognised routes into employment within the Sokoto Caliphate and neighbouring polities. The disruption of those funding structures during and after colonial rule left the schools without a reliable resource base (Mohammed & Danjuma, 2015). Pupils in the contemporary system are frequently seen begging for food, and analyses of their situation describe the denial of rights that the state guarantees to other children, including rights to adequate care and to basic services (Okugbeni, 2013; Taiwo, 2013). Integration of these schools into the mainstream education system has advanced slowly across the north-west geopolitical zone (Teke et al., 2020).

Health assessments conducted among Almajiri pupils document a consistent pattern of vulnerability. Studies report psychoactive substance use, elevated prevalence of psychiatric morbidity relative to pupils in public primary schools, and a high burden of intestinal parasitosis (Abdulmalik et al., 2009; Abdullateef et al., 2017; Mohammed et al., 2022). Work carried out in Sokoto metropolis records food insecurity, crowded

sleeping arrangements, and deficient personal hygiene among the same population (Sarkingobir et al., 2023; Zakir et al., 2014). An assessment of water, sanitation, and hygiene parameters in Almajiri schools in Sokoto found that many institutions operated without sanitation or water services (Miya et al., 2023), and a parallel study in Jigawa State reported limited access to school health services within the same educational system (Suleiman et al., 2025). Pupils in these settings combine high exposure to faecal pathogens with low access to the facilities that would contain them.

Two features of this system matter for a journal concerned with basic education. The pupils are children of primary school age, and comparative health research on the population has treated Almajiri pupils and public primary school pupils as equivalent age groups drawn from the same communities (Abdullateef et al., 2017). The institutions themselves deliver basic education, since analyses of the sector discuss Almajiri schooling under the heading of the basic education entitlement of the Nigerian child and examine its integration with the mainstream primary system (Okugbeni, 2013; Teke et al., 2020). Reading the schools in this way places them alongside other institutions of elementary Islamic education, including the *madrasah ibtidaiyah*, where pupils of the same age spend the whole school day and, in boarding arrangements, the whole day and night on the premises. Sanitation at these schools belongs to the discussion of elementary education rather than to public health alone.

School sanitation and the learning of primary-age pupils

Conditions of water and sanitation at a primary school shape attendance and learning as well as health. A study of basic level students in government schools in Nepal found that the state of school water, sanitation, and hygiene was associated with pupil absenteeism (Sharma & Adhikari, 2022a), and a companion study on the same population linked those conditions to the health status of the pupils (Sharma & Adhikari, 2022b). Work on school sanitation in a deprived area of Ghana reports that facilities deteriorate rapidly once operation and maintenance arrangements fail, after which pupils return to open defecation (Mensah et al., 2022). Nigerian analysis has drawn the consequence for schooling directly, describing how open defecation depresses attendance, concentration, and progression among pupils (Bello et al., 2022). Sanitation behaviour among schoolchildren varies with the condition and acceptability of what the school provides rather than with instruction alone (Xuan et al., 2012; Makhfudli et al., 2017).

Availability of toilets and the decision to use them

Counting facilities and observing behaviour produce different pictures of sanitation, and the distance between the two has become a central concern in recent research. A scoping review of thirty-one quantitative studies found latrine utilisation ranging from 36% to 94% among households that already owned a latrine, and identified cleanliness, functionality, the presence of a superstructure, proximity, and the availability of water for handwashing as attributes that determine whether an existing facility is used (Gaffan et al., 2025). A meta-analysis conducted across African settings reached a similar conclusion regarding the safe disposal of child faeces, showing that ownership of an improved facility does not by itself guarantee safe practice (Soboksa et al., 2024). Evidence from rural Indonesia adds the psychosocial dimension, reporting that risk perception, social norms, ability, and self-regulation predict whether available toilets are used regularly (Nastiti et al., 2025).

Studies among school-age populations reinforce the same distinction. Sanitation behaviour among schoolchildren in northern Vietnam varied with the condition and acceptability of the facilities provided rather than with their mere presence (Xuan et al.,

2012), and research on school-age children in Indonesia identified facility quality alongside knowledge and habit as determinants of the practice (Makhfudli et al., 2017). Water availability operates as an enabling condition throughout this literature, since flushing, anal cleansing, and cleaning all depend on a supply that is close and reliable (Yarima et al., 2021). Measuring coverage without measuring condition and use risks overstating the protection that a sanitation facility actually delivers.

Nigerian evidence on open defecation concentrates on households and general communities, covering causes, consequences, and intervention options at that level (Olagbemide & Oluropo, 2025; Olkiabo & Aideyan, 2022; Abdullahi et al., 2023). Boarding arrangements of the Almajiri type differ from households in ways that matter for sanitation, since the children live away from parental supervision, the schools rarely control a budget for maintenance, and the ratio of users to available facilities is high. Earlier work in Sokoto documented the deficit in facilities at these schools (Miya et al., 2023), yet the frequency of the practice and the reasons the children themselves give for it have not been reported together for the rural local government areas of the state. This study addresses that gap for pupils at the basic education stage. It determines the self-reported frequency of open defecation among Almajiri children in Kware and Gwadanbawa, identifies the reasons they attribute it to, describes the availability of toilets and the sources of water at their schools, examines the relationship between reported availability and continued practice, and draws out what that relationship means for the schools these children attend.

RESEARCH METHOD

Study design and setting

The study applied a descriptive cross-sectional quantitative survey. That design suits the objectives because the aim was to establish the distribution of a behaviour and of the conditions surrounding it at one point in time, rather than to test an intervention or to establish causal order. The work was carried out in Kware and Gwadanbawa Local Government Areas of Sokoto State in north-western Nigeria. Both areas lie outside the state capital, both host a substantial number of Almajiri schools, and both rely largely on groundwater sources for domestic supply, which makes them representative of the rural settings in which the majority of the state's Almajiri pupils live.

Population, sample, and sampling procedure

The study population comprised Almajiri children of primary school age enrolled in schools within the two local government areas, meaning pupils at the basic education stage of Qur'anic instruction rather than older students of advanced texts. A total of 120 children took part. No register or sampling frame exists for this population, since enrolment is informal and pupils move between schools and communities, so probability sampling was not feasible. Recruitment proceeded on a non-probability basis, approaching schools within the two areas and inviting children whose guardians granted permission. Participation required that a child was enrolled at an Almajiri school in the study areas, that the guardian consented, and that the child was able to respond to interview questions without assistance. Children who declined or whose guardians withheld consent were not approached further.

Instrument and data collection

Data were gathered with a semi-structured toolkit developed for the objectives of this study and reviewed by subject experts for relevance and clarity before use. The instrument covered four domains that correspond to the results reported below: the

frequency with which the respondent defecates in the open, the reason the respondent attributes the practice to, the presence of a toilet at the school attended, and the source of water supply at that school. Response options were fixed and mutually exclusive within each domain. The toolkit was interviewer-administered face to face, which suited a population whose literacy in written Hausa or English could not be assumed, and each respondent completed a single session. Completed forms were checked for missing entries on the day of collection.

Ethical considerations

Consent was obtained from the guardian of every child before any question was asked, and the children were told that participation was voluntary and that they could stop at any point. No name or other identifier was recorded on the instrument, and results are reported only in aggregate form. The subject matter carries potential embarrassment, so interviews were conducted individually and away from the hearing of teachers and peers in order to reduce the pressure to give an approved answer.

Data analysis

Responses were analysed with descriptive statistics, and frequencies together with percentages were computed for each domain. Every percentage reported in the results was calculated on the full sample of 120 respondents, and the frequencies within each table were summed and checked against that total before interpretation. The analysis remains descriptive throughout, and no test of association or inference to a wider population is attempted, a restriction that follows from the non-probability character of the sample and that is discussed among the limitations of the study.

RESULTS AND DISCUSSION

Frequency of open defecation

Table 2. Practice of open defecation among Almajiri children in Sokoto (n = 120)

Frequency of practice	Frequency	Percentage
Rarely	23	19.2
Sometimes	13	10.8
Frequently	41	34.2
Mostly	43	35.8
Total	120	100.0

Table 2 shows that open defecation is a routine rather than an occasional behaviour in this sample. Children reporting that they practise it mostly account for 35.8% and those reporting that they practise it frequently account for 34.2%, so 70.0% of the sample sits in the two highest categories combined. The remaining 30.0% is divided between rare and occasional practice, and no respondent reported abstaining from the practice altogether. A distribution of this shape indicates that the behaviour is normalised within the setting, and it is consistent with earlier findings that Almajiri schools in Sokoto operate with limited sanitation and water services (Miya et al., 2023). National reviews of open defecation in Nigeria describe the same persistence at community level (Olagbemide & Oluropo, 2025; Omeiza, 2025).

Reasons attributed by the children

Table 3. Reasons given for practising open defecation (n = 120)

Reason	Frequency	Percentage
No toilet available	51	42.5
Toilet is inefficient	31	25.8

Toilet is dirty	28	23.3
Cultural preference	10	8.3
Total	120	99.9

The reasons in Table 3 divide into an infrastructural group and a behavioural group, and the balance between them carries the main analytic weight of this study. Absence of a toilet accounts for 42.5%, inefficiency for 25.8%, and dirtiness for 23.3%, so 91.6% of the sample attributes the practice to the facility rather than to preference. Cultural preference accounts for the remaining 8.3%. Two of the three infrastructural reasons, covering 49.1% of respondents, describe a toilet that exists but fails on quality, which separates the question of coverage from the question of usable access. Reviews of latrine utilisation identify cleanliness and functionality among the strongest correlates of whether an available facility is used (Gaffan et al., 2025), and studies of school-age children report the same dependence on facility condition (Xuan et al., 2012; Makhfudli et al., 2017).

Availability of toilets and sources of water

Table 4. Presence of a toilet at the school attended (n = 120)

Toilet present at school	Frequency	Percentage
Yes	79	65.8
No	41	34.2
Total	120	100.0

Table 5. Source of water supply at the school attended (n = 120)

Source of water supply	Frequency	Percentage
Well	91	75.8
Pipe-borne water	29	24.2
Total	120	100.0

Tables 4 and 5 describe the physical conditions under which the reported behaviour occurs. Toilets are present at the schools attended by 65.8% of respondents and absent for 34.2%. Water reaches three quarters of the schools through wells and reaches the remaining quarter through a piped supply. Well water in this setting is drawn and carried rather than delivered under pressure, which constrains the volume available for flushing, anal cleansing, and the cleaning of the facility itself. Availability of water close to a sanitation facility appears repeatedly among the determinants of its use (Gaffan et al., 2025; Yarima et al., 2021), and evidence from schools in deprived areas of Ghana indicates that the operation and maintenance of school sanitation collapses once the water supply becomes unreliable (Mensah et al., 2022).

The gap between availability and use

Reading the four tables together produces the central finding of this study. Toilets are reported as present for roughly two thirds of the sample, yet seven respondents in ten practise open defecation frequently or mostly. The two figures are reconcilable rather than contradictory once the reasons in Table 3 are taken into account. The 34.2% who report no toilet at school correspond closely to the 42.5% who name absence of a toilet as their reason, and the residual gap is absorbed by children who have a toilet at school but describe it as dirty or inefficient. Coverage measured as presence overstates the protection actually delivered, and the effective figure for usable sanitation in this sample lies far below 65.8%.

That interpretation aligns with a body of evidence built on exactly this distinction. A scoping review of household latrine utilisation reported use ranging from 36% to 94% among owners of a latrine, and attributed the variation to cleanliness,

functionality, superstructure, proximity, and access to water (Gaffan et al., 2025). A meta-analysis across African settings found that ownership of an improved facility does not secure safe disposal of child faeces (Soboksa et al., 2024). Work in rural Indonesia showed that regular use depends on risk perception, norms, ability, and self-regulation over and above the presence of the facility (Nastiti et al., 2025). The Almajiri setting adds a structural pressure that household studies do not capture, since a single school toilet may serve a large and shifting number of resident pupils, and no household budget stands behind its cleaning and repair (Miya et al., 2023; Sarkingobir et al., 2023).

The small share attributing the practice to cultural preference, 8.3%, carries its own implication for programme design. Interventions that concentrate on awareness raising address the reason given by fewer than one respondent in ten, while the reason given by more than nine in ten points toward construction, cleaning, and repair. Sanitation campaigns built on behaviour change alone would be expected to underperform in this setting, a pattern already observed where communities returned to open defecation after facilities deteriorated (Gaffan et al., 2025; Olagbemide & Oluropo, 2025). Sequencing matters here, because behavioural messaging becomes effective once a functioning alternative is available for the behaviour to shift toward (Nastiti et al., 2025).

Public health implications

The findings place these children at the entry point of the transmission route described in Figure 1. Faeces deposited in open spaces around schools that draw water from shallow wells create a short and direct path between the portal of exit and the portal of entry, particularly where children eat with their hands and where handwashing facilities are absent (Abdullahi et al., 2023; Sridhar et al., 2020). The parasitic burden already documented among Almajiri pupils in the region is consistent with such a route (Mohammed et al., 2022). Beyond infection, the loss of school time attributable to repeated diarrhoeal illness compounds an educational disadvantage that the system imposes on these children by other means (Bello et al., 2022).

The educational consequence deserves separate statement, because it is the reason a sanitation finding belongs in a discussion of elementary schooling. Pupils who leave the premises to relieve themselves lose instructional time on every occasion, and pupils who fall ill lose whole days. Evidence gathered from basic level students in Nepal links the state of school water and sanitation to absenteeism and to health status (Sharma & Adhikari, 2022a; Sharma & Adhikari, 2022b), while evidence from Ghana shows how quickly the gains from a new school facility disappear once maintenance lapses (Mensah et al., 2022). A child at this stage is also forming the habits that will govern adult practice, so a school offering no usable toilet teaches open defecation as the normal way to relieve oneself (Makhfudli et al., 2017; Xuan et al., 2012). Sanitation provision at Almajiri schools operates as an educational measure as much as a health measure, and the same reasoning applies to any elementary institution where children of this age spend the school day, including the madrasah ibtidaiyah and the public primary school (Teke et al., 2020).

Limitations of the study

Five limitations bound these conclusions. The data are self-reported, and no independent observation verified either the presence of toilets or their condition, so the figures in Tables 4 and 5 describe what children reported rather than what an inspection would record. The sample of 120 was drawn without a probability procedure, which reflects the absence of a sampling frame for this population but prevents generalisation beyond the children who took part. The cross-sectional design

captures a single point in time and supports no statement about change or causal order. Age and sex of respondents were not recorded individually, so the description of respondents as children of primary school age rests on the stage of schooling at which they were enrolled rather than on measured ages, and that absence prevents examination of whether the practice varies with age or sex. Reporting a stigmatised behaviour to an adult interviewer invites social desirability bias, and the direction of that bias would understate rather than overstate the prevalence recorded here.

Subsequent work would strengthen the evidence in three ways. Pairing the interview with an observational checklist covering the number of toilets, their functionality, cleanliness, presence of a superstructure, and distance from sleeping quarters would convert reported coverage into measured service level. Enlarging the sample across more local government areas and recording age, duration of enrolment, and school size would permit analysis of association. Adding stool examination or a record of diarrhoeal episodes would connect the behaviour to health outcomes directly rather than through inference from the literature (Mohammed et al., 2022; Sarkingobir et al., 2023).

CONCLUSION AND SUGGESTIONS

This study assessed open defecation among 120 Almajiri children in Kware and Gwadanbawa, Sokoto State, through a descriptive cross-sectional survey. The findings indicate that open defecation remains a routine practice among the children, with 70.0% reporting that they practise it frequently or mostly. The reasons reported by the children were predominantly related to sanitation facilities rather than cultural preference. The absence of toilets, inefficient toilets, and dirty toilets accounted for 91.6% of the reported reasons, while cultural preference accounted for only 8.3%. Although toilets were reported to be available in 65.8% of the schools, the high frequency of open defecation indicates that the presence of a facility does not necessarily represent usable sanitation access. The findings also show that water supply is an important condition for sanitation use and maintenance, as 75.8% of the schools relied on wells. These conditions place primary-school-age children at continued risk of exposure to faecal contamination and may affect their health, attendance, and learning experiences.

The findings suggest that sanitation programmes for Almajiri schools should prioritise the provision of functional toilets together with regular cleaning, maintenance, and reliable water supplies. Construction of toilet facilities alone is unlikely to be sufficient when existing facilities are dirty or inefficient. Responsibility for cleaning and maintenance should be clearly assigned and supported by an adequate operational budget. Hygiene education should continue to be provided, particularly regarding handwashing with soap and the safe handling of food and water, but it should complement rather than replace improvements in sanitation infrastructure. Future research should combine questionnaire-based data with direct observation of toilet availability, functionality, cleanliness, and accessibility, while larger samples across additional local government areas could provide stronger evidence regarding sanitation conditions among Almajiri children.

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