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# AVAILABILITY OF SANITATION FACILITIES AND ITS CONTRIBUTION TO ACADEMIC PERFORMANCE OF CHILDREN IN PRE-PRIMARY SCHOOLS IN MATHARE SUB-COUNTY IN NAIROBI CITY COUNTY, KENYA

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**Abstract:**
The purpose of this study was to establish the contribution of the availability of sanitation facilities to the academic performance of children in pre-primary schools in Mathare Sub-County. The study was built on the theory of Bronfenbrenner's ecological systems theory. A descriptive research design was used to achieve the research objectives. The target population was 68 Early Childhood Development Education centers distributed within Mathare Sub-County. Stratified sampling was used to select 136 teachers to participate in the study. A pilot study was undertaken to establish the reliability and validity of the research instruments. Data was collected using a semi-structured questionnaire. Data were analyzed using Statistical Package for Social Sciences (SPSS) to generate both descriptive and inferential statistics. The study employed an independent sample t-test as well as a chi-square analysis. Data were presented in tables and charts and interpretations were made based on research objectives. Findings revealed that all schools under the study had functional hand-washing facilities. Most APBET schools had one hand washing facility with no soap most of the time. Very few have at least two hand washing facilities with no soap most of the time. All public schools had hand washing and anal cleansing materials. All public schools had hand washing and anal cleansing materials. However, the anal cleansing materials in public schools purposely served the teachers and staff alone. Findings revealed that the majority of schools did not have quality sanitation since an average of only 9 schools could meet the quality standards of

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sanitation in Mathare slums. Sanitation facilities in pre-primary schools were not fully utilizable as toilets were in pathetic conditions in more than 50% of the schools engaged in the study. the study concluded that there are big deficits in sanitation facilities and materials in the sampled schools of Mathare slums because all schools demonstrated that one toilet could be shared by over one hundred pupils at any given time during school hours. The study recommended that the Ministry of Education should conduct regular monitoring and evaluation of school sanitation and hygiene standards as part of its regulatory roles.

**Keywords**: availability of sanitation facilities, academic performance, pre-primary school children

## 1. Introduction

Sanitation facilities entail clean drinking water, provision of hand washing facilities and materials such as soap and disposable towels, as well as toilets and urinals (Meydanlioglu et al., 2022). The benefits of sanitation include among other things, reduced morbidity and decreased mortality rates, better nutrition among children, a cleaner environment, safe food, and increased impact of improved water suppliers. In addition, sanitation contributes to better learning and retention among school children, more dignity and privacy for everybody especially women and girls, and increased awareness of sanitation and hygiene (Azam et al., 2022). The importance of sanitation, therefore is maintaining safe schools cannot be underestimated, however, schools in many countries have been considered unsafe due to neglected sanitation operations (Sahiledengle et al., 2022). According to the world health organization (WHO, 2022), there are 780 million people worldwide who do not have access to improved water sources (Naseem et al., 2022).

In developing countries, UNICEF (2022) indicates that approximately 68 million children live in households without access to improved sanitation, posing a risk to their survival and development. Schools with good sanitation are said to attract and retain children compared to those that do not. Generally, healthy children attend school more (Godfrey et al., 2022). In the implementation of water sanitation and hygiene deliverables by rural primary schools in Zimbabwe, it was found that the identification of core factors that were considered a hindrance to the implementation of school sanitation policies (Dunne et al., 2022). The study established that schools did not have age-suitable toilets for 3-5 year children and heavily depended on donor subsidies for WASH resources. This then affected the sustainability of sanitation activities when the resources were over or non-functional in the case of boreholes. The study identified large teacher-pupil ratios, teacher attitudes, and absence of caregivers as one of the challenges faced in school sanitation. The current study is suitable for understanding the current context within which sanitation is implemented within schools.

In Uganda, schools that performed poorly had poor sanitation. Among the study parameters examined in the study and relevant to the current study was the sanitation

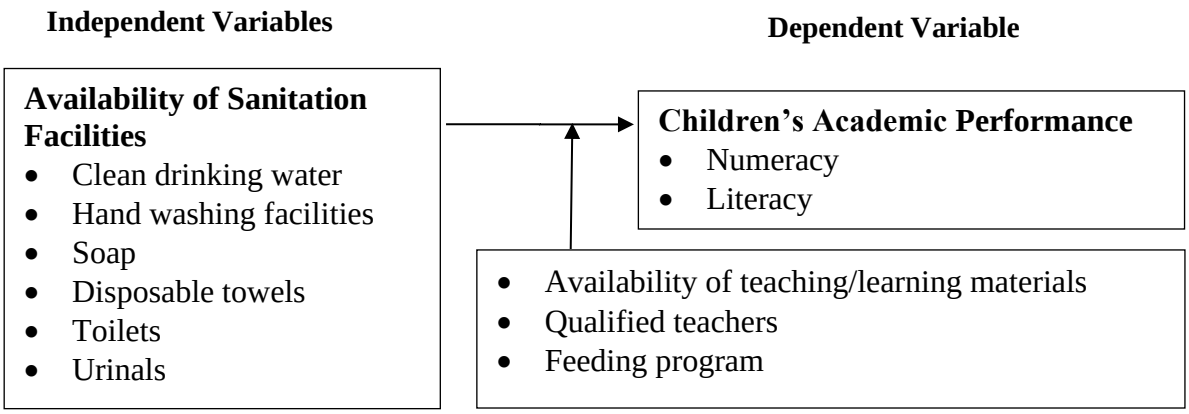
situation with findings indicating that sanitation poorly affected the school performance (Kayiwa et al., 2022). The study was however done at a higher level of learning and not early childhood education. In Kenya, there have been researched efforts addressing the sanitation situation. Gunhu (2011) indicated that children with intense worm infestations experienced a delay in development. Overall sanitation in the county is assessed through important institutions such as schools, hospitals, and homesteads. Of particular focus in this study are pre-primary schools in Mathare Sub County, which has a total of 68 pre-primary schools. As a result of the high number of Pre-primary schools, sanitation among pre-primary school children continues to be an issue of major concern, given the poor state of sanitation in the larger Nairobi City County (WSP, 2014), Mathare Sub-County being majorly a slum area is considered one of the major contributors of poor sanitation within Nairobi City County (WSP, 2014). While several studies have focussed on the implication of sanitation in a different context, little has been done to assess the relationship between adequacy & utilization of sanitation facilities and academic performance in pre-primary school children in Nairobi City County.

Mathare Sub-County has a high number of diarrhea as well as worm infestation morbidity among children below 5 years especially because of the slum situation of lack of sanitation facilities. There is also high diarrhea morbidity in the sub-county. This indicates that the prevalence rate of negative health outcomes related to lack of sanitation facilities is high in the Sub-County and this can affect the academic performance of the school-going children. It is therefore on this basis that this study sought to examine the relationship between adequacy as well as utilization of sanitation facilities and academic performance in pre-primary school children in Mathare Sub County, Nairobi City County.

### 1.1 Purpose of the Study

The purpose of this study was to examine the adequacy and utilization of sanitation facilities, and academic performance in pre-primary schools in Mathare Sub County, Nairobi City County, in the quest to establish if any relationship exists between sanitation situation and academic performance.

### 1.2 Conceptual Framework



## 2. Literature Review

This section discusses the theoretical framework and the literature related to the study topic.

### 2.1 Theoretical Framework

This study was guided by Bronfenbrenner's Ecological Systems Theory (1979). The theory states a child's development within the context of the system of relationships that form his or her environment. Relevant to this study from Bronfenbrenner's Ecological Systems Theory is the micro-system which comprises of environment closest to the child, including the physical structures in which the child has direct contact. This according to Berk (2000) encompasses the direct relationships that a child interacts with.

Structures in the micro-system comprise family, school, neighborhood, or childcare environments. At this stage, relationships affect the child away and towards him or her. At the micro-system level, bi-directional effects with greater influence on the child are strongest. Bronfenbrenner's Ecological Systems Theory (1979) is important in understanding the context of this study concerning sanitation. Sanitation is one among several aspects of a child's micro-systems that have implications for the well-being of a child. From the theory and some study observations, it is notable that the microenvironment upon which the child lives may threaten their well-being.

### 2.2 Availability of sanitation facilities and academic performance in pre-primary schools

The availability of sanitation facilities is one step towards realizing sanitation in a pre-primary setup. It has to do with the extent to which the achievement of sanitation is attained through the provision of clean drinking water, provision of hand washing facilities, and materials such as soap and disposable towels, as well as toilets and urinals. Rowley, (2009) and Oswald, (2012) investigated drinking water provision and hand washing combined. In the United Kingdom, various studies measured increased water consumption concerning the increased provision of water in schools (Rowley, 2009; Scott, 2012). There was a statistically significant increase consumption of water in cases where children were allowed free access (Kindley, 2011; Kumi, 2010). The literature shows that providing water as well as hand washing materials has the potential of reducing absenteeism and illnesses in school while increasing knowledge on sanitation.

Schools with scarce supplies for hand washing such as water provision, soap, or towels reported less hand washing (Nadrup, 2009). In the United States (2007) survey, 59% of residents' halls did not provide water while 92% did not provide soap. Thirty-one percent lacked hand washing supplies and therefore did not wash their hands. Research findings in Madeleea in Columbia showed children who had access to hand-washing materials increased the consistency of the habit by three times. Those who reported hand-washing habits were less likely to report gastrointestinal and respiratory illnesses. In the Pakistani province of Sindh, Ahmed et al. (2022) conducted a cross-sectional survey in

425 primary schools. To determine the WASH conditions at the schools, structured observations and interviews were conducted. The results showed that whereas WASH policy and/or recent WASH initiatives at the school were not connected with overall water quality, the existence of WASH interventions and/or WASH policy was considerably (P 0.001) linked to the school's achievement.

Warero (2013) revealed that a total of 228 pupil latrines and 57 teachers latrines were observed in the study with 58% of mixed schools having boys' urinals. National standards stipulate a ratio of 25 pupils to 1 latrine but the situation in the study schools differed greatly. The main sources of water differed with 30% having water piped to the school, 20% purchasing from water vendors, and 5% having boreholes. Warero (ibid) further revealed that the overall pupils' latrine ratio was 45 girls: 1 latrine with a door; for boys in schools without urinals stood at 71 boys to 1 latrine with a door. A local study by Mbula (2013) sought to determine the factors influencing the implementation of sanitation practices in public secondary schools in the central division of Machakos County. The study adopted a descriptive survey design. The target population for the study was 30 schools and 4481 students and 30 principals. Using the Kredgcie table and formulae, 28 schools, 354 students, and 28 principals were selected for use by the study. The study found that the availability of water has the greatest influence on the implementation of sanitation practices and was followed by the availability of soap while the availability of sanitary towel disposal bins does not have a strong influence. The availability was established to affect the academic performance of the students positively.

## 3. Methodology

### 3.1 Research Design and Target Population

This study adopted a descriptive survey design. A descriptive survey design is used to describe the situation the phenomenon of a research situation in its natural setting (Kothari, 2011). Kothari further adds that a descriptive design aims to evaluate existing relationships between study variables and is the most frequently used approach in social science studies. The design was most suitable for the current study since it facilitated an assessment of the current situation of sanitation among pre-primary children and how it contributed to their academic achievement. The target population of this study comprised 272 preschool teachers from a total of 68 pre-primary schools in Mathare Sub County. According to Nairobi City County Education Department database (2019), Mathare Sub-County has 68 pre-primary schools including both public and alternative provisions of basic education and training centres.

### 3.2 Sampling Technique and Sample Size

The study used a stratified random sampling technique to select the respondents to participate. The sample proportion was based on the target number of schools in the sub-county. Mugenda (2010) and Kothari (2011) recommend a sample proportion of at least 10% and a maximum of 100% in a social science study. Based on this concept, a sample

proportion of 50% of each category of the schools was picked. Out of the total of 272 preschool teachers, a proportion of 50% was selected translating to a sample size of 136 respondents. A 50% selection was within the recommended range between (10%-100%) of the sample size and also within the practical means for the researcher to carry out the study.

### 3.3 Research Instruments

The study used questionnaires and an observation checklist. This study used a combination of a semi-structured questionnaire and an observation checklist. Questionnaires were particularly suitable for this study because they are easy to administer and it enables the collection of large data within a short period. The observation schedule sought to answer research questions two and three.

### 3.4 Pilot Study

Participants of the pilot study were picked from schools in Mathare Sub-County but the same were excluded from the main survey. A total of 10 respondents were involved in the pilot study. Validity was therefore achieved in this study through the examination of the already existing literature to identify the conceptual dimensions as well as appraisals regarding the instrument with the help of the supervisor. Construct validity was ensured by expert judgment, and subject experts ensured that the items in the tools were adequate, relevant, precise, and clear. For reliability, the Test re-test method was used to measure the reliability of the instrument. The questionnaire was issued to the same respondents two times. A reliability coefficient of 0.83 was obtained and hence the instrument was considered reliable enough.

### 3.5 Data Collection Procedure

The researcher obtained a letter of introduction from Kenyatta University graduate school. She then used the letter to seek permission to conduct research from National Commission for Science, Technology, and Innovation (NACOSTI) and Nairobi City County Education. Through the school administrators, the researcher sought permission to carry out the study in the sampled institutions. Consent from the respondents was also sought through consent forms then the researcher proceeded to administer the questionnaire and undertook the assessment of the school sanitation situation to fill the observation checklist. Respondents were given the whole day to complete the questionnaire before picking it up.

### 3.6 Data Processing and Analysis

The researcher used both quantitative and qualitative techniques to analyze data. Qualitative data analysis entailed a thematic description of responses based on the open research questions. Qualitative data was analyzed using content analysis of meanings and implications emanating from respondents' information and comparing responses. The presentation of the qualitative results was done through narrative. The quantitative

data was also analyzed through frequency, percentages, and means in establishing the scores of responses provided. The presentation of the data was done using tables. Multiple correlations were also conducted on independent variables against learners' performance (scores in numeracy and literacy) at the level of 0.5% significance level (95% Confidential Interval-2-tailed).

## 4. Study Results

### 4.1. Demographic Information

In terms of demographic data, the study determined the distribution of the participants by gender, age, and professional qualifications as shown in Table 1.

**Table 1:** Demographic Information of the Participants

| Respondents | Gender | | Age in Years | | Duration of Service in Years | | | |
|---|---|---|---|---|---|---|---|---|
| | Males | Females | 18-35 | 36-59 | 1-5 | 6-10 | 11-15 | 16-20 |
| **Administrators (Frequency)** | 39 | 29 | 10 | 58 | 16 | 34 | 12 | 6 |
| % | 57.35% | 42.65% | 23.53% | 76.47% | 21.32% | 50% | 18.38% | 10.29% |
| **Teachers (Frequency)** | 26 | 42 | 43 | 25 | 27 | 16 | 15 | 8 |
| % | 38.24% | 61.76% | 63.24% | 36.76% | 40.9% | 24.2% | 22.7% | 12.1% |

From Table 4.1, it can be observed that the majority of 42(61.76%) of ECD teachers respondents were generally female while 26(38.24%) comprised male teachers. On the other hand, 39 (57.37%) of the school administrators comprised males a number higher than female category administrators. most of the teachers were aged between 18 and 35 years (63.24%). This is different from school administrators whose majority age was between 36 and 59 years (76.47%), with just a paltry age between 18 and 35 years (23.53%). majority 68(50.0%) of the school administrators had served in their current work stations for years between 6-10 years, 21.32% for a period of 1-5 years, 18.38% for 11-15 years while only 10.29% had served for the period between 16-20 years. on the other hand, a high proportion 27(40.9%)of teachers had served for a duration between 1-5 years.

### 4.2 Frequency of Use of Instructional Media by Teachers for Acquisition of Numeracy Skills

The main purpose of this study was to establish the relationship between the availability of sanitation facilities and the academic performance of children in pre-primary schools in Mathare Sub County. To achieve this, data based on the availability of sanitation facilities was cross-tabulated with the sores of academic performance in numeracy and literacy (rated based on a 5-item Likert scale of; Exceeds Expectation, Meets Expectation, Approaching Expectation, Below Expectation). The levels of performance were labeled based on the scores for the first-term performance in literacy and numeracy provided by teachers and administrators. The results are presented in Table 2.

**Table 2:** Influence of Availability of Sanitation Facilities on Academic Performance of Children

| Type of Facility | Number of facilities (No. of schools) | Level of performance in numeracy and literacy | | | |
|---|---|---|---|---|---|
| | | Exceeds expectations (over 70%) | Meets expectation (50-69%) | Approaching expectation (39-49%) | Below expectation (Below 49%) |
| Flush toilets | 1 (n=8) | 0 | 0 | 4 | 16 |
| | 2 (n=10) | 6 | 14 | 0 | 0 |
| | 3 (n=1) | 0 | 2 | 0 | 0 |
| | None (n=0) | 0 | 0 | 1 | 1 |
| Urinals | 1 (n=1) | 0 | 0 | 2 | 0 |
| | 2 (n=19) | | 6 | 24 | 8 |
| | 3 (n=0) | - | - | - | - |
| | None (n=0) | - | - | - | - |
| Hand washing facilities | 1 (n=16) | 0 | 10 | 12 | 10 |
| | 2 (n=3) | 0 | 2 | 4 | 0 |
| | 3 (n=1) | 1 | 1 | 0 | 0 |
| | None (n=0) | - | - | - | - |
| Water points | 1 (n=13) | 0 | 2 | 22 | 2 |
| | 2 (n=5) | 2 | 4 | 4 | 0 |
| | 3 (n=1) | 2 | 0 | 0 | 0 |
| | None (n=1) | 0 | 0 | 2 | 0 |

From the cross-tabulations, it can be noted that of the 20 pre-children in schools with one flush toilet, 16 had performed below expectation while 4 displayed a performance approaching the expectation. Contrary to this finding, it can be noted from the results that 14 children in schools with at least two flush toilets had a performance of above 50%. Results also showed that no child in schools with only one urinal scored above average (over 50%) in literacy and numeracy. The results further showed that preschool children in schools with three water points recorded scores above 70%. However, children in pre-schools without water points performed below average. These results were further subjected to analysis using Pearson's Correlation Coefficient to assess the existence of a relationship between the availability of sanitation facilities and the learners' performance (scores in numeracy and literacy) at the level of 0.5% significance level (95% Confidential). Table 3 presents the Correlation matrix measuring the relationship between the availability of sanitation facilities and the academic performance of preschool learners.

**Table 3:** Influence of Availability of Facilities on Pupil's academic performance

| | | **Independent Variables (Availability of Sanitation Facilities by Type)** | | | |
|---|---|---|---|---|---|
| **Dependent Variable** | | **Flush toilets** | **Urinals** | **Hand washing facilities** | **Sources of water facilities** |
| Pupil's academic performance (r) | Pearson correlation | .045 | .123* | .173* | .143* |
| | Sig.(2-tailed) | .784 | .024 | .245 | .476 |
| | N | 68 | 68 | 68 | 68 |

*Correlation is significant at the 0.001 level (2-tailed).

From the correlation in Table 3, it can be seen that the values of Pearson Correlation Coefficient at 0.01 significance include r=0.45 for flush toilets, r=0.123 for urinals, r=173 for hand washing facilities, and r=0.143 for the availability of water points. This implies that there exists a positive relationship between the availability of sanitation facilities extended in pre-schools under study and the first-term scores in literacy and numeracy, this notwithstanding, all the factors had a significant p-value ($p<0.001$) at 95% Confidential Interval except flush toilets that was not significant at 95% CI.

### 4.3 Hypothesis Testing

**$H0_1$:** There is no significant positive relationship between the availability of sanitation facilities and the academic performance of children in pre-primary schools.

To test the hypothesis and to determine whether there was enough statistical evidence in favour of the relationship between the availability of sanitation facilities and pupils' academic performance, a Chi-square analysis was computed at a 0.01 significance level by checking the availability of sanitation facilities against pupils' academic performance as demonstrated in Table 4.

**Table 4:** Relationship between the Availability of Sanitation Facilities and Learners' Academic Performance

| | **Value** | **Df** | **Asymp.Sig. (2-sided)** |
|---|---|---|---|
| Pearson Chi-Square | 38.322 | 5 | .001 |
| Likelihood Ratio | 4.364 | 4 | .359 |
| Linear by-Linear Association | .475 | 1 | .491 |
| **N of valid cases** | **141** | | |

Table 4 shows that the chi-square value is 38.322, DF=5 with an associated p of 0.001. Since p is less than 0.05 ($p= 0.001<0.05$), the null hypothesis is rejected, and therefore availability of sanitation has a significant relationship with pupils' academic performance in pre-primary schools in Mathare slums of Nairobi City County. The results imply that accessibility to sanitation facilities results in an improvement in pupils' academic performance. This could be because the provision of clean water both for drinking and hand washing and clean toilets encourages learners to stay in school and concentrate on school activities within a friendly and safe environment. There is fair availability of

sanitation facilities, especially in the urban schools where there are informal settlements like Mathare slums in Nairobi City County as compared to the rural schools. The result coincides with those of Jasper and Bartram (2012) who revealed that providing water as well as hand washing materials has the potential of reducing absenteeism and illnesses in school while increasing knowledge on sanitation. Another study by Mbula (2013) found that the availability of water has the greatest influence on the implementation of sanitation practices and was followed by the availability of soap while the availability of sanitary towel disposal bins does not have a strong influence. The findings are also supported by Ahmed et al. (2022) who revealed that school performance was significantly linked with the presence of WASH interventions.

## 5. Conclusion

The results indicated that most schools had sanitation facilities physically, but most of them lacked basic facilities for hand washing. It can be concluded that there are big deficits in sanitation facilities and materials in the sampled schools of Mathare slums because all schools demonstrated that one toilet could be shared by over one hundred pupils at any given time during school hours.

## 6. Recommendations

1) The Ministry of Education itself should conduct regular monitoring and evaluation of school sanitation and hygiene standards as part of its regulatory roles. Schools that do not meet the standards should be closed until they upgrade to desirable and acceptable sanitation standards.
2) There was no proper use of sanitation facilities. Hence, despite the different backgrounds of the students in the schools, school administration should design sanitation and hygiene policies and programs to groom students and the general school population into practically responsible citizens.

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**Conflict of Interest Statement**

The authors declare no conflicts of interest.

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