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Evaluating Sanitation Practices at Ibn Cholim Islamic Boarding School: Insights on Clean Water, Waste Management, and Latrine Provision

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ABSTRACT Inadequate basic sanitation practices in educational institutions can significantly impact student health and environmental conditions, especially in Islamic boarding schools where large populations reside in close quarters. This study aims to evaluate the management of basic sanitation practices including clean water provision, waste management, latrine facilities, and sewerage systems at Ibn Cholim Islamic Boarding School in Bangkalan Regency, Indonesia. Employing a descriptive qualitative research design, the study involved structured interviews and observational checklists based on the Planning, Organizing, Actuating, and Controlling (POAC) management model. Six dormitory administrators, equally representing male and female housing units, participated as key informants. The study applied non-probability sampling to gather detailed insight into sanitation practices. Findings revealed that clean water supply management was rated as good in male dormitories (71%) and sufficient in female dormitories (62%). Waste management scored lower, with 52% in male and 56% in female dormitories, both falling into the "sufficient" category. The provision of healthy latrines was relatively good, at 68% for males and 73% for females. However, sewerage systems were identified as a major weakness, with poor ratings of 10% and 24% in male and female dormitories, respectively. The overall sanitation management average was categorized as sufficient, with scores of 50% for male and 54% for female dormitories. The study concludes that while certain aspects of sanitation management have been implemented effectively, significant deficiencies remain, particularly in sewerage infrastructure. Continued education, increased awareness among staff, and direct oversight from public health authorities are essential to improving sanitation quality in boarding schools. Policy reinforcement and infrastructural development are recommended for sustainable sanitation management.

INDEX TERMS Sanitation management, Islamic boarding school, POAC model, hygiene infrastructure, environmental health

I. INTRODUCTION

Basic sanitation is a fundamental pillar of public health, playing a critical role in preventing the transmission of diseases such as diarrhea, dengue fever, and typhoid [1]. Despite its importance, many educational institutions, particularly Islamic boarding schools, struggle to meet basic sanitation standards due to inadequate infrastructure, limited resources, and insufficient awareness [2]. These challenges compromise the health and well-being of students, highlighting the urgent need for improved sanitation management practices. This study evaluates the sanitation practices at Ibn Cholim Islamic Boarding School in Bangkalan Regency, focusing on clean water provision, waste management, latrine facilities, and sewerage systems, with the aim of identifying gaps and proposing actionable solutions.

Problem Statement Islamic boarding schools, as long-standing educational institutions in Indonesia, face persistent sanitation-related challenges, including unreliable clean water access, poorly maintained latrines, and ineffective waste disposal systems [3]. These deficiencies contribute to unhygienic living conditions, increasing the risk of waterborne and vector-borne diseases among students [4]. For instance, inadequate wastewater management can lead to environmental contamination, while the absence of proper latrine facilities promotes open defecation, further exacerbating health risks [5]. At Ibn Cholim Islamic Boarding School, preliminary observations revealed issues such as yellowish well water, non-segregated waste, and uncovered sewerage channels, underscoring the need for a systematic evaluation of sanitation practices. Addressing these

problems is essential to safeguard student health and align with national sanitation standards [6].

Recent studies on sanitation management in boarding schools have employed qualitative and quantitative approaches to assess infrastructure, hygiene practices, and policy implementation. The Planning, Organizing, Actuating, and Controlling (POAC) framework has emerged as a robust tool for evaluating sanitation management, as it systematically addresses operational and administrative aspects [7]. For example, Supriadi et al. [8] used POAC to analyze waste management in Islamic boarding schools, revealing gaps in waste segregation and disposal practices. Similarly, Fibrianti et al. [9] applied descriptive qualitative methods to link sanitation facilities with health outcomes, emphasizing the role of regular maintenance and community engagement. These studies demonstrate the value of structured frameworks in diagnosing sanitation challenges and informing targeted interventions.

While existing research has explored sanitation issues in Islamic boarding schools, significant gaps remain. First, many studies focus narrowly on infrastructure deficiencies without examining the managerial and behavioral dimensions of sanitation practices [10]. Second, there is limited evidence on the application of the POAC framework in evaluating sanitation systems holistically [11]. Third, few studies provide actionable recommendations tailored to the unique socio-cultural context of Islamic boarding schools, where religious practices and communal living influence hygiene behaviors [12]. This study bridges these gaps by integrating POAC-based assessments with qualitative insights from school administrators, offering a comprehensive analysis of sanitation management at Ibn Cholil Islamic Boarding School.

This study aims to evaluate the implementation of basic sanitation management at Ibn Cholil Islamic Boarding School, focusing on four key components: clean water provision, waste management, healthy latrine facilities, and sewerage systems. By employing the POAC framework, the study seeks to identify strengths, weaknesses, and opportunities for improvement, ultimately contributing to enhanced sanitation standards and student well-being. This study makes three key contributions:

1. It demonstrates the applicability of the POAC framework in assessing sanitation management in Islamic boarding schools, providing a replicable model for similar institutions [13].
2. Practical: The findings offer actionable recommendations for school administrators and policymakers to improve sanitation infrastructure and maintenance practices [14].
3. Theoretical: The study enriches the literature on sanitation management by highlighting the interplay between infrastructure, management practices, and community engagement in resource-constrained settings [15].

II. METHODS

A. STUDY DESIGN AND APPROACH

This study employed a descriptive qualitative approach to evaluate basic sanitation management at Ibn Cholil Islamic

Boarding School in Bangkalan Regency, Indonesia. The research focused on four key sanitation components:

1. Clean water provision
2. Waste management
3. Healthy latrine facilities
4. Sewerage systems

The Planning, Organizing, Actuating, and Controlling (POAC) framework was applied to assess management practices in each domain [16]. This framework was selected due to its systematic structure, which aligns with sanitation management evaluation in institutional settings [17].

B. STUDY POPULATION AND SAMPLING

The study population consisted of six key informants (three male and three female dormitory administrators) responsible for sanitation oversight at the boarding school. A non-probability purposive sampling technique was used to select participants based on their direct involvement in sanitation management [18]. This sampling method ensured that respondents had sufficient knowledge of the school's sanitation practices.

C. DATA COLLECTION METHODS

1. INTERVIEWS

Semi-structured interviews were conducted with the six administrators using a predefined questionnaire. The interview questions were designed to assess:

- a. Planning: Policies, schedules, and budget allocation for sanitation maintenance.
- b. Organizing: Roles and responsibilities of personnel in sanitation management.
- c. Actuating: Implementation of sanitation activities (e.g., waste disposal, latrine cleaning).
- d. Controlling: Monitoring and evaluation mechanisms for sanitation compliance. Each interview lasted approximately 30–45 minutes and was recorded with participant consent.

2. OBSERVATIONAL CHECKLISTS

A structured observation checklist was used to evaluate physical sanitation conditions in both male and female dormitories. The checklist assessed:

- a. Clean water quality (color, odor, turbidity)
- b. Waste segregation and disposal methods
- c. Latrine functionality and hygiene
- d. Sewerage system condition (covered/uncovered, watertight design)
- e. Observations were conducted over two weeks to ensure consistency in data collection.

D. DATA ANALYSIS

Qualitative data from interviews were transcribed and analyzed using thematic analysis to identify recurring patterns in sanitation management practices [19]. The observational data were quantified using predefined scoring criteria based on Indonesian Ministry of Health sanitation standards [20]. Scores were categorized as:

1. Good ($\geq 70\%$ compliance)
2. Sufficient (50–69% compliance)
3. Poor ($< 50\%$ compliance)

E. ETHICAL CONSIDERATIONS

The study adhered to ethical guidelines, including:

1. Informed consent from all participants.
2. Anonymity in reporting responses.
3. Approval from the boarding school administration.

F. STUDY LIMITATIONS

1. Small sample size (six administrators), limiting generalizability.
2. Single-site study, requiring further validation in other Islamic boarding schools.
3. Lack of quantitative health impact data (e.g., disease incidence linked to sanitation).

G. CONCLUSION OF METHODOLOGY

This study provides a replicable framework for evaluating sanitation management in Islamic boarding schools using POAC-based qualitative and observational methods. Future research could expand the sample size and incorporate quantitative health metrics for a more comprehensive assessment.

III. RESULTS

The management of basic sanitation activities at Ibn Cholim Islamic Boarding School in Bangkalan Regency is summarized in TABLE 1. The men's dormitory achieved a sanitation management score of 50%, while the women's dormitory reached 54%. At Ibn Cholim Boarding School, various components of basic sanitation have been meticulously implemented, encompassing the provision of clean water, effective waste management, the provision of hygienic latrines, and the establishment of an efficient sewerage system. This multifaceted approach underscores the commitment of the school to ensuring the well-being and health of its students. Notably, the implementation of these management functions is categorized as sufficient, signifying a commendable effort in maintaining acceptable sanitation standards within the institution.

TABLE 1

Results of Basic Sanitation Management Management in Men's Dormitories and Women's Dormitories at Ibn Cholim Islamic Boarding School, Bangkalan Regency in 2024

No	Basic Sanitation Components	Male Dormitory Result(%)	Female Dormitory Result(%)
1.	Water supply management	71%	62%
2.	Waste management	52%	56%
3.	Management of healthy latrine provision	68%	73%
4.	Management of sewerage provision	10%	24%
	Average	50%	54%
	Category	Enough	Enough

The results indicate that while basic sanitation management is implemented to some extent, there are still areas that require improvement. By providing a detailed breakdown of the sanitation management scores, the study aims to identify specific areas for enhancement and inform targeted interventions to improve overall sanitation

conditions at Ibn Cholim Islamic Boarding School. Statistical measures of significance and confidence intervals were not calculated in this study; however, future research may benefit from incorporating these analyses to further strengthen the validity and reliability of the findings.

The calculation of the dormitory results was based on the following formula for both the male and female dormitories: Interval Distance Formula:

$$\begin{aligned} &\text{Calculation of Male Dormitory} \\ &= \frac{\text{maximum value} - \text{minimum value}}{\text{interval distance}} \\ &= \frac{201 - 0}{4} \\ &= 50,2 = 50\% \text{ (Fair Category)} \end{aligned}$$

$$\begin{aligned} &\text{Calculation of Female Dormitory} \\ &= \frac{\text{maximum value} - \text{minimum value}}{\text{interval distance}} \\ &= \frac{215 - 0}{4} \\ &= 53,75 = 54\% \text{ ((Fair Category)} \end{aligned}$$

[1]

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IV. DISCUSSION**A. INTERPRETATION OF KEY FINDINGS**

The study revealed significant variations in sanitation management quality across different domains at Ibn Cholim Islamic Boarding School. Our POAC-based assessment demonstrated that while latrine provision scored relatively well (68-73%), sewerage systems showed critical deficiencies (10-24% compliance). These findings suggest that management prioritizes visible sanitation infrastructure over less apparent but equally crucial wastewater systems. The moderate performance in clean water management (62-71%) aligns with challenges reported in similar Indonesian boarding schools [21], particularly regarding water quality monitoring and maintenance scheduling.

The gender disparity in sanitation scores (male dormitories averaging 50% vs female at 54%) warrants particular attention. This difference may reflect variations in maintenance protocols or resource allocation between gender-segregated facilities. Our observational data confirmed that female dormitories maintained more frequent cleaning schedules, corroborating findings from Miskiyah et al. [22] regarding gender-based differences in sanitation practices in communal living environments.

B. COMPARATIVE ANALYSIS WITH EXISTING LITERATURE

When compared to similar studies, our results both confirm and contradict existing research. The adequate performance in latrine provision (73% in female dormitories) exceeds the 50% compliance rate found in Ainul Yaqin Islamic Boarding School by Supriadi et al. [23], suggesting some boarding schools are making progress in this area. However, our documented sewerage system failures mirror the "open channel drainage" problems identified in 82% of Pesantren surveyed by Rasyid et al. [24].

The waste management scores (52-56%) reveal a persistent institutional challenge. While better than the 100% non-compliance reported by Fibrianti et al. [25] in Nganjuk schools, they still fall short of national standards. This comparison highlights a systemic issue across Indonesian Islamic boarding schools regarding waste segregation and processing infrastructure.

Notably, our POAC framework application yielded more granular management insights than previous sanitation assessments using simpler checklists [26]. The actuating and controlling dimensions particularly exposed gaps in monitoring and evaluation that conventional studies often overlook.

C. LIMITATIONS AND RESEARCH IMPLICATIONS

Several limitations temper our findings. The single-site design limits generalizability, though provides depth for this institutional context. Our six-month observation period may not capture seasonal variations in sanitation management. Additionally, the reliance on administrator reports potentially introduces social desirability bias regarding actual practices. Despite these limitations, the study carries important implications:

1. Policy Level: Findings underscore the need for revised Ministry of Health guidelines specifically addressing boarding school sanitation [27]
2. Institutional Practice: Demonstrates the value of POAC frameworks for ongoing sanitation audits
3. Research Methodology: Establishes a replicable assessment protocol for similar studies.

The documented sewerage system failures demand immediate intervention, as they pose direct public health risks. Future research should incorporate:

1. Longitudinal designs tracking sanitation improvements
2. Expanded samples across multiple institutions
3. Quantitative health outcome measures
4. Cost-benefit analyses of infrastructure upgrades.

V. CONCLUSION

This study aimed to evaluate the implementation of basic sanitation management at Ibn Cholim Islamic Boarding School, focusing on clean water provision, waste management, healthy latrine facilities, and sewerage systems using the POAC (Planning, Organizing, Actuating, and Controlling) framework. The findings revealed disparities in sanitation performance across different components: clean water management scored 71% (male dormitory) and 62% (female dormitory), waste management achieved 52% (male) and 56% (female), healthy latrine provision

performed relatively well at 68% (male) and 73% (female), while sewerage conditions were critically deficient at 10% (male) and 24% (female). These results indicate that while some aspects of sanitation management meet acceptable standards, significant gaps persist, particularly in wastewater disposal, which poses a direct risk to student health and environmental safety. The study underscores the need for targeted interventions, including enhanced monitoring, infrastructure upgrades, and institutional policy reforms to align with national sanitation guidelines. Future research should expand to multiple boarding schools with larger sample sizes, incorporate longitudinal health impact assessments, and explore cost-effective wastewater treatment solutions to improve sanitation sustainability. Additionally, integrating community engagement and behavioral education programs could further strengthen sanitation compliance and long-term maintenance practices. By addressing these gaps, Islamic boarding schools can achieve higher sanitation standards, ensuring a healthier living environment for students while serving as a model for similar institutions in resource-constrained settings.

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DATA AVAILABILITY

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

AUTHOR CONTRIBUTIONS

Fauzul Adhim led the conceptualization, design of the study, and data collection process. Lailatul Kodriyah was responsible for data analysis and interpretation. Muhammad Fadli contributed to the development of the research methodology and literature review. Laily Nur Ramadhani coordinated the fieldwork and community engagement activities. Sitti Sutinah supervised the research project and provided critical revisions to the manuscript. All authors participated in writing, reviewed the final draft, and approved the submitted version of the paper.

DECLARATIONS**ETHICAL APPROVAL**

This study was approved by the Health Research Ethics Committee of the Health Polytechnic of the Ministry of Health Surabaya. All procedures involving human participants complied with relevant ethical standards.

CONSENT FOR PUBLICATION PARTICIPANTS.

All participants or their guardians provided written consent for the anonymized data to be published for academic and research purposes.

COMPETING INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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