

Research Article



## INTEGRATION OF THE SEHAT-LINGKUNGAN MODEL INTO QUALITY AND ACCREDITATION SYSTEMS: A CASE STUDY OF ENVIRONMENTAL HEALTH RISK MANAGEMENT AT THE MUNA DISTRICT HEALTH CENTRE

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### ABSTRACT

**Background:** Environmental health management in health care facilities is an important determinant in ensuring service quality and patient safety. Community health centres in Muna Regency face real challenges in the form of non-standardized medical waste management, limited water quality monitoring, and inadequate basic sanitation facilities. Previous research emphasizes the importance of water, sanitation, and hygiene (WASH) in primary care accreditation, but the integration of environmental health indicators into the quality system of health centre in Indonesia has rarely been studied, especially in resource-limited areas.

**Methods:** This study used a qualitative approach with a case study design in three Health centre (Kabawo, Katobu, and Tampo) through in-depth interviews, field observations, and document reviews.

**Results:** The results show that the dominant weaknesses in each health centre are different: Kabawo faces problems in medical waste management, Katobu in the consistency of clean water monitoring, and Tampo in limited sanitation infrastructure, all of which have a direct impact on accreditation scores.

**Conclusion:** These findings confirm the relevance of integrating the Environmental health Model into the primary service quality system as an adaptive strategy that can strengthen health policies, improve human resource capacity, and encourage the achievement of accreditation quality standards in areas with limited resources.

**Keywords:** Accreditation, Environmental Health, Service Quality, Community Health Centre

## INTRODUCTION

Environmental health management in healthcare facilities still faces serious challenges, especially in developing countries with limited resources(1–4). The WHO reports that a quarter of (1,5–7) facilities worldwide do not have access to basic water, while one in five do not have adequate sanitation facilities. This situation has a direct impact on the (8–12), increases the risk of infection transmission, and reduces public trust in healthcare facilities. This situation also has implications for the achievement of the Sustainable Development Goals (SDGs), particularly SDG 3 on good health and SDG 6 on clean water and sanitation (13–17)

Health centres in Muna Regency face similar problems in various aspects of environmental health management (3,18–21). The Kabawo Health Centre experiences difficulties in managing medical waste, which is not yet standardised, the Katobu Health Centre faces limitations in the consistency of water quality monitoring, while the Tampo Health Centre is confronted with inadequate sanitation infrastructure. (5, 6, 22, 23). This phenomenon underscores the importance of integrating environmental health into quality and accreditation systems to ensure safe, efficient, and sustainable services (24–27).

A number of global studies emphasise the importance of the WASH (water, sanitation, hygiene) dimension as a determining factor in the quality of primary healthcare services (16). WHO–UNICEF reports indicate that healthcare facilities without adequate WASH services will find it difficult to achieve quality standards, as WASH plays a direct role in preventing healthcare-associated infections. The integration of WASH indicators into quality and accreditation systems is seen as an

important strategy in ensuring patient safety and service sustainability. Thus, environmental management cannot be separated from the assessment of healthcare quality (3, 28–30).

Within the framework of Primary Health Care (PHC), service quality is positioned as a core function that transcends purely clinical aspects. The WHO, in its Operational Framework for Primary Health Care report, emphasises that quality is not only related to medical practice, but is also closely linked to the management of a safe and sustainable environment. This indicates that environmental health is a key determinant of public trust in primary health care facilities (33–37).

Donabedian's model of healthcare quality provides a robust theoretical framework for understanding the relationship between structure, process, and outcome of services (5,25,38–41). Structure encompasses facilities, infrastructure, and resources; process reflects the application of standards in service practice; while outcome describes the received by patients (8–11, 42). For environmental health, structure includes the availability of sanitation facilities, water monitoring systems, and waste management facilities; processes relate to the implementation of standard management procedures; while outcomes can be seen from the achievement of quality indicators and accreditation (43,44). This theory emphasises that weaknesses in one dimension will have a direct impact on the final quality of health services (9, 25, 42, 45).

Research on environmental health risk management shows the relevance of using qualitative risk assessment (QRA) when quantitative data is limited(46,47). A case study in Kazakhstan on mercury contamination shows that is able to map risk

perceptions, social barriers, and technical limitations that are not recorded in numerical data(48). The advantage of QRA is its ability to bridge the gap between technical data and public perception, thereby enabling the development of more adaptive risk management strategies (48–50). This approach is relevant for use in community health centres, where limitations in facilities, funding, and human resources often hinder the implementation of environmental standards (51–55).

Although various literature has discussed the importance of WASH, PHC, Donabedian Model, and QRA in environmental health management, research on the integration of environmental health models into Health centre accreditation in Indonesia is still very limited (19,21,56–58). Most studies focus on technical aspects such as waste treatment technology or the availability of sanitation facilities, without directly linking them to quality and accreditation frameworks. This gap highlights the need for a more adaptive contextual approach, particularly in resource-constrained areas such as Muna District. Therefore, this study seeks to present an integration model that is not only academically relevant but also applicable in strengthening the quality system of primary services(5, 23, 40, 59).

This study aims to explore the integration of the SEHAT-LINGKUNGAN Model into the quality and accreditation systems of Community Health Centres (Health centre) in Muna Regency (19,19,60). The analysis focuses on three main aspects, namely medical waste management, clean water quality monitoring, and the provision of basic sanitation in accordance with standards (13–15,44). By examining the dominant weaknesses in each Community Health Centre, this study aims to identify the

relationship between environmental health practices and accreditation quality indicators. Another objective is to develop a replicable model framework as a quality improvement strategy in other areas with similar conditions (42, 61–63).

The research was conducted using a qualitative approach with a case study design at three community health centres in Muna Regency, namely Kabawo, Katobu, and Tampo. Respondents were selected purposively and consisted of community health centre heads, environmental health officers, waste management staff, and laboratory staff. Data were collected through in-depth interviews, field observations, and reviews of relevant documents. Data analysis was conducted using thematic analysis to identify patterns of weaknesses, inhibiting factors, and potential improvements in environmental health management.

Furthermore, the research results are formulated in the form of the environmental health integration model as a strategic recommendation for improving the quality and accreditation of Community Health Centres. This model is expected to contribute both academically and practically to addressing the gap between quality standards and the reality of health facilities in the region. Thus, this research not only maps weaknesses but also presents adaptive and applicable solutions for improving the quality of primary health care services.

## MATERIAL AND METHODS

This study utilised a qualitative design with a case study approach. This approach was chosen because it was able to explore in depth the dynamics of implementing the environmental Health Model in quality and accreditation systems(24,48,64). The focus of the study was directed at identifying environmental health problems that arise in community

health centres and their relationship with service quality indicators. Data was collected through semi-structured interviews to obtain a comprehensive understanding from stakeholders. This design was considered appropriate because it provided space to explore the experiences and perceptions of respondents directly (27,41,65,66).

This study was conducted at three community health centres in Muna Regency, namely Kabawo, Katobu, and Tampo Community Health Centres. Research respondents were selected purposively based on their direct involvement in environmental health management. The main informants consisted of the heads of the health centres, those responsible for environmental health, waste management staff, and facility and laboratory officers. The total number of respondents was nine, with three informants at each health centre. Purposive sampling was used to ensure that the data obtained was relevant to the research objectives.

The main research instrument was a semi-structured interview guide developed based on the Environmental Health Model indicators (31,67,68). Questions focused on aspects of medical waste management, water quality monitoring, and basic sanitation conditions. Data collection procedures were carried out through face-to-face interviews that were recorded with the respondents' permission and field notes to supplement the data. The interview data were then transcribed, categorised, and analysed using thematic techniques. All procedures were carried out systematically so that the results obtained could be academically accountable.

## RESULTS

### Kabawo Community Health Centre

The results of the study indicate that medical waste management at the Kabawo Community Health Centre is still carried out in a rudimentary manner and does not meet environmental health standards. Solid medical waste is collected in plastic containers without being sorted according to

category, such as infectious, non-pharmaceutical, or sharp objects. Documentation related to the volume, type, and disposal route of medical waste is not carried out in a structured manner, making it difficult to evaluate and audit service quality. The absence of an incinerator is a major obstacle that causes waste to often accumulate longer than the permitted time. This condition has a direct implication on accreditation achievements, considering that medical waste management is one of the main indicators in the health centre quality system.

In addition, dependence on third parties for medical waste transportation increases operational costs that are not always accommodated in the budget. The lack of standard facilities and training for officers causes inconsistent waste management practices. The risk of exposure to health workers and the surrounding community increases due to the weak waste disposal system. The source emphasised that these weaknesses will be a serious concern in the accreditation process, especially due to the lack of consistent documentation. These findings show that the implementation of the SEHAT-LINGKUNGAN Model at the Kabawo Community Health Centre is still in its early stages, with many gaps that need to be addressed.

### Katobu Community Health Centre

At the Katobu Community Health Centre, water quality monitoring is relatively better than in Kabawo, although it does not yet fully meet standards. Water quality monitoring is carried out on borehole wells and storage tanks, but only two to three times a year. This monitoring frequency is far from the ideal requirement of monthly or quarterly checks. Limited human resources, particularly environmental health personnel,

of which there is only one, is the main factor preventing regular monitoring. This shows that limited technical capacity remains a serious obstacle to the implementation of an environmental health-based quality system.

In addition to manpower issues, other obstacles include the availability of testing equipment and materials, as well as the cost of transporting samples to district laboratories. The available monitoring data is not yet consistent enough to serve as a basis for long-term risk assessment. The source stated that accreditation requires data consistency, so weaknesses in documentation could potentially lower the quality assessment score. Although there have been positive efforts in monitoring, capacity constraints have prevented the optimal implementation of the SEHAT-LINGKUNGAN Model. Therefore, the Katobu Community Health Centre needs to strengthen its human resource capacity and facility support so that the water quality monitoring system can run more consistently.

### **Tampo Community Health Centre**

Tampo Community Health Centre faces a different challenge, namely limited basic sanitation facilities. The number of toilets available is insufficient for the needs of patients and health workers, often resulting in queues and reduced comfort. This situation is exacerbated by a simple sewage system that does not meet technical standards. Wastewater is often discharged directly into drains without prior treatment, increasing the risk of environmental pollution. The visible impact in the field is the accumulation of dirty water, which causes unpleasant odours around the health facility.

In addition to reducing service comfort, these sanitation limitations also

have implications for public health risks due to the potential spread of environmentally-based diseases. Poor drainage causes toilets to frequently break down and be difficult to clean, thereby lowering the hygiene standards of the facilities. The use of the same toilets by patients, health workers, and visitors also increases the risk of cross-infection. The source emphasised that substandard basic sanitation conditions are a serious concern in accreditation assessments. These findings show that the implementation of the Environmental Health Model at the Tampo Community Health Centre requires urgent infrastructure intervention in order to support quality improvement and accreditation.

An in-depth analysis shows that the three health centres in Muna Regency have varying levels of environmental health risk management, depending on the main focus. The Kabawo Health Centre faces serious problems in medical waste management, particularly the lack of an incinerator and documentation system. The Katobu Health Centre is relatively better at monitoring clean water quality, but these activities are not carried out consistently due to limited environmental health personnel. Conversely, the Tampo Community Health Centre faces fundamental obstacles in providing basic sanitation, with an inadequate number of toilets and liquid waste disposal channels that do not meet technical standards. These differences in the focus of the problems confirm that each Community Health Centre requires a different intervention strategy in order for the integration of the Environmental Health Model to run optimally.

The research results presented in Table 1 show the mapping of key issues and their implications for quality systems and accreditation. This visual element shows that



the Kabawo Community Health Centre has the highest risk score in terms of medical waste, Katobu in terms of water monitoring consistency, and Tampo in terms of basic sanitation infrastructure. A unique finding in this study is the variation in problem priorities in each Health centre despite being in the same district, reflecting differences in

resource capacity and local management. This can be explained by budget constraints, differences in leadership, and uneven distribution of health workers. Thus, the intervention model must be designed adaptively according to the context of the dominant weaknesses in each health facility.

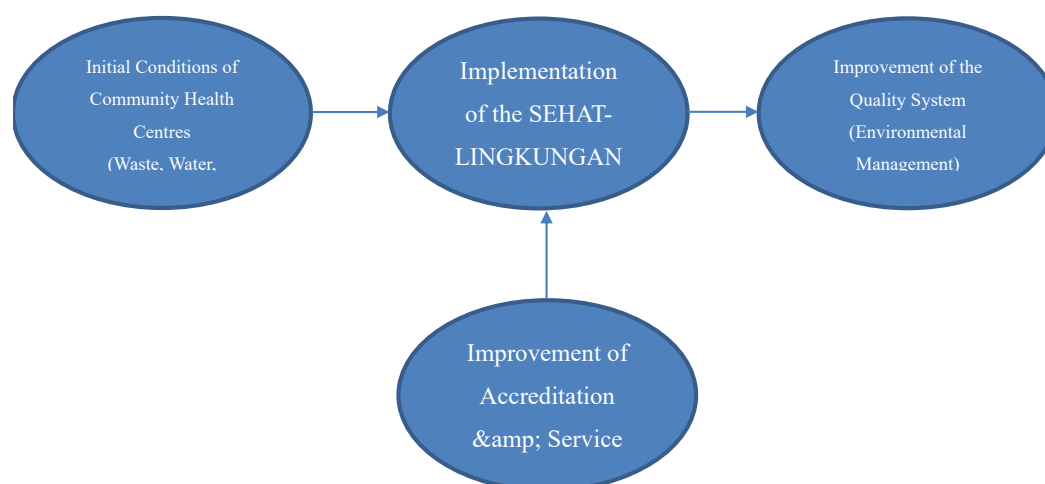
Table 1. Mapping of Key Issues and Implications for Quality and Accreditation

Community Health Centre	Key Issues	Impact on Accreditation	Quality and Risk Level*
Kabawo	Medical waste management is not standardised, no incinerator, weak documentation	Decrease in accreditation score for waste management, exposure risk for staff and the community	High
Katobu	Inconsistent water quality monitoring, limited environmental health personnel	Inadequate monitoring data for long-term risk assessment, decline in accreditation score	Moderate
Tampo	Limited basic sanitation, insufficient toilets, drainage systems not up to standard	Environmental pollution, risk of cross-infection, low score on infrastructure assessment	High

Table 1 shows the dominant problems at three health centres in Muna District that directly affect quality and accreditation. Kabawo Health Centre faces a high risk in medical waste management due to the absence of an incinerator and weak documentation, while Katobu Health Centre faces a moderate risk due to inconsistencies in monitoring clean water quality. Meanwhile, Tampo CHC has a high level of risk related to basic sanitation limitations, particularly in the provision of toilets and liquid waste disposal systems. These differences show that quality improvement efforts cannot be carried out using a uniform approach, but rather require adaptive strategies tailored to the local conditions of each facility.

Based on these findings, this study developed a conceptual model of SEHAT-

LINGKUNGAN integration designed to link aspects of waste management, water quality monitoring, and basic sanitation provision with quality indicators and Health centre accreditation standards. This model emphasises the importance of systematic documentation, strengthening human resource capacity, and providing adequate infrastructure as three main pillars. With this framework, SEHAT-LINGKUNGAN integration can serve as a strategic instrument to bridge the gap between local practices and global standards, while supporting the achievement of more comprehensive accreditation. Conceptual model of SEHAT-LINGKUNGAN integration in the quality system and accreditation of community health centres.



**Figure 1.** Conceptual model of SEHAT-LINGKUNGAN integration in the quality system and accreditation of community health centres.

The figure above shows the conceptual model of Environmental Health integration in the health centre quality and accreditation system.

1. Input: initial conditions of the health centre, including issues of waste management, water quality, and sanitation.
2. Process: implementation of the Environmental Health Model, which focuses on strengthening environmental health risk management.
3. Output: improvement of the quality system, particularly in terms of more standardized environmental management.
4. Outcome: improvement in the accreditation and overall quality of Health centre services.

This model emphasizes that accreditation success is not only determined by administrative aspects, but also by technical and managerial readiness in managing environmental health.

## DISCUSSION

The results of research conducted at three community health centres in Muna Regency revealed variations in key weaknesses in environmental health risk management, ranging from medical waste management and water quality monitoring to the provision of basic sanitation (21,46,47,56,57). These findings confirm that environmental health management standards have not been consistently implemented, which has direct implications for service quality and accreditation achievements (11,12,40,42,61). Within the framework of environmental quality and governance theory, the differences in weaknesses between health centres indicate the need for a contextual adaptive approach. This section discusses how the research results can address previously identified research gaps, while strengthening theoretical understanding and practical implications in the integration of the Environmental Health Model.

Findings at the Kabawo Community Health Centre reinforce the inconsistent implementation of medical waste management standards. The unavailability of incinerators and weak documentation indicate weaknesses in the structure and process dimensions of Donabedian's quality model, which ultimately impact outcomes in the form of reduced service quality (14,23,40,69). Safe Management of Wastes from Health-Care Activities emphasises that medical waste documentation is an integral part of the quality system because it serves as evidence of compliance with standards and a basis for risk assessment. Thus, the integration of the Environmental Health Model can be seen as a strategic solution to strengthen the structure and process of waste management so that quality outcomes and accreditation are more assured (28,28,70). These findings also show that global standards can be translated locally through simple interventions such as staff training and integrated documentation systems (70,71).

The situation at the Katobu Community Health Centre, which is only able to monitor water quality two to three times a year, represents the second gap, namely the WASH service gap in health facilities. According to the WHO–UNICEF report, the lack of consistent clean water and sanitation services contributes significantly to an increased risk of infection and a decline in service quality, especially in lower-middle-income countries (59,59,72). Within the accreditation framework, inconsistent water monitoring has implications for weak patient safety indicators. The results of this study show that limitations in human resources and facilities are the root causes that must be addressed through a capacity-based approach and regional policy support (52–55). The integration of Environmental

Health offers an adaptive monitoring mechanism that can maintain data sustainability, even under limited resource conditions (30,54,73–75).

Highlights that the integration of environmental indicators into the primary service quality system is not yet established, even though the Primary Health Care (PHC) framework emphasises the importance of quality as a core function (7,9,9,25–27,76). Findings from the Tampo Community Health Centre, particularly the limitations of basic sanitation and waste disposal channels, confirm that environmental dimensions are often overlooked in quality assessments. The WHO in its Operational Framework for Primary Health Care states that the success of PHC depends not only on clinical aspects, but also on the readiness of basic environmental facilities such as toilets, drainage, and liquid waste management. Thus, the results of this study reinforce the argument that sustainable accreditation can only be achieved if environmental aspects are integrated into quality standards. These findings challenge the old understanding that tends to place environmental health as an additional factor, when in fact it is a core determinant of primary service quality (10,59,77,78).

The results of the study also address the limitations of using quantitative data alone in risk management (49,50). Through a qualitative approach, this study reveals that the main obstacles to quality implementation are not only technical in nature, but also include social, economic, and managerial factors. As shown in the Kazakhstan case study, qualitative risk assessment (QRA) is able to map stakeholder perceptions and identify blind spots that are often overlooked by numerical data. At the Community Health Centre in Muna District, interviews with the head of the Community Health Centre, staff,



and environmental health officers revealed variations in understanding and commitment that greatly affected the quality of implementation. Therefore, QRA is not only relevant but also crucial as a complementary approach that can improve the validity of risk analysis at the primary care level.

The research results clearly show variations in the dominant weaknesses among facilities in Muna District. The Kabawo Community Health Centre experienced serious problems with medical waste, Katobu with water monitoring consistency, and Tampo with basic sanitation. These variations emphasise the importance of a contextual approach in the design of quality interventions, as uniform policies will not be effective in addressing different problems. In line with the theory of context-specific health systems strengthening, quality improvement strategies must be adaptive to local capacity, infrastructure conditions, and resource availability (39, 61, 63, 79). The Environmental Health model developed in this study provides a theoretical contribution by offering a flexible integration framework, as well as a practical contribution by providing policy recommendations that can be applied according to local needs. These findings open up opportunities for replicating the model in other regions facing similar challenges.

## CONCLUSION

The integration of the Environmental Health model into the quality and accreditation system of community health centres in Muna Regency has revealed different weaknesses in each facility. The Kabawo community health centre shows serious limitations in medical waste management, Katobu in the consistency of water quality monitoring, and Tampo in the

provision of basic sanitation. These differences emphasise the need for an adaptive, contextual approach so that policies and interventions are not uniform but tailored to local needs. The Environmental Health model has proven to be a relevant integration framework that links environmental indicators with accreditation quality standards. Thus, this study broadens the understanding that the quality of primary care is determined not only by clinical aspects but also by the readiness of environmental health risk management. These findings have theoretical benefits by enriching the literature on integrating environmental indicators into the primary service quality framework and strengthening the relevance of the qualitative risk assessment (QRA) approach as a complement to quantitative analysis. From a practical perspective, the results of this study provide strategic directions for health centre managers and health policy makers in improving human resource capacity, particularly environmental health workers, through training, documentation, and the provision of supporting facilities. Thus, this study not only provides solutions to the problems faced but also promotes a better understanding of the relationship between service quality, accreditation, and environmental health. However, this study has limitations in terms of its limited coverage of three centre and its qualitative methods, which cannot be generalised widely. Therefore, future research is recommended to expand the geographical scope, combine quantitative and qualitative approaches, and explore policy-based interventions that can strengthen the implementation of the Environmental Health Model at the national level.

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