

The Contribution of Basic Occupational Health Services for Sustainable Tourism: a Case Study in Mangunan Forest Tourism Site, Yogyakarta

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ABSTRACT

Background: Basic Occupational Health Services (PKD) are health empowerment efforts for workers and their work environment. BOHS provides promotive, preventive, and protective services through hazard identification and risk control activities; health and safety supervision; basic occupational health education; and provision of safety equipment, which is expected to impact forest tourism's sustainability. There is still a lack of qualitative research empirically exploring the BOHS in forest tourism and its impact on sustainable tourism. This study aimed to explore the implementation of BOHS in the tourism village of Mangunan, Yogyakarta, and its impact on forest tourism sustainability.

Methods: A qualitative case study approach was used, conducted from January to February 2024; data were collected at BOHS of the Becici Peak, Pinus Pengger, Lintang Sewu, Pinus Asri, Mangunan forest tourism areas through semi-structured interviews with 9 informants: tourism employees and managers, health workers, and public health officials, selected by purposive sampling. Data analysis by thematic analysis.

Results: This study found a limited BOHS activities in Mangunan, weak organizational management, and low employee participation. Theoretically, BOHS can improve employee welfare and maintain the work environment so that healthy employees will be productive in the present and future, but empirically, the implementation of BOHS in Mangunan cannot prove its contribution to sustainable tourism.

Conclusion: BOHS managed effectively has the potential to significantly improve worker welfare and environmental conservation, thereby contributing to the long-term sustainability of tourism. The urgency for stronger BOHS development is clear, as it is needed to support responsible forest tourism management.

1. Introduction

Forests support the Sustainable Development Goals (SDGs) by promoting locally managed social forestry programs (1). Social forestry integrates forest conservation with community well-being, conserving ecosystems and biodiversity (2). Social forestry transforms forest conservation into a tourism industry that is considered a low-carbon industry. Forest tourism offers benefits to the economic and social well-being of forest communities (3–5), also benefits the physical and mental health of

tourists, helping reduce stress, and improving mood (6,7). Forest-based tourism has gained traction, for example, in Japan "forest bathing" (shinrin-yoku) (8), and the Batur Geopark in Bali-Indonesia, where forest-based health tourism has been popularized (9).

On the other hand, forests and ecotourism have potential hazards and risks to safety and health (10). The hazard of wildlife and venom is a threat to workers and tourists, falling trees or obstructing branches/twigs, slippery and terraced soil, dry leaves and woods that are easily burned, and the location of the forest is usually far from health and safety facilities so that it will be difficult when needing an emergency response. Therefore, sustainable forest tourism must anticipate the issues and damage caused by tourism activities, which are integral to managing and preserving these ecotourism areas. Previous literature suggests that health and safety practices are important for tourist satisfaction, especially in rural and nature-based tourism destinations (11).

Previous studies also have shown that BOHS can serve as a collaborative platform to promote occupational safety and health (12,13). The responsible actions by stakeholders toward sustainable tourism, combined with the positive attitudes of tourists, can further contribute to sustainable tourism development (14). Thus, BOHS has the potential to be a practical tool in fostering responsible and sustainable tourism. Despite increasing awareness of tourism safety challenges (15–17), However, minimal literature still empirically proves the relationship between BOHS and sustainable tourism in the community-based forest tourism sector. This gap provides an opportunity to examine how BOHS can maintain and improve the health and welfare of workers in the forest tourism environment. and why it impacts sustainable forest tourism. In the pine forest of Mangunan, Yogyakarta, social forestry combines environmental conservation with community economic empowerment. Although successful in developing ecotourism, forest tourism presents many environmental hazards, making occupational safety and health an important consideration (18). To address this issue, community health officers from the Puskesmas Dlingo 2 are responsible for empowering forest tourism workers through the BOHS program. The program targets tourism employees and management, emphasizing their role in maintaining a safe and healthy tourism environment.

This study aimed to explore the implementation of BOHS in the tourism village of Mangunan, Yogyakarta, and its impact on sustainability in forest tourism settings. The findings are expected to provide recommendations for strengthening participatory BOHS programs, making them mandatory for tourism workers, particularly in forest-based tourism areas.

Literature review

Social forestry

According to the Ministry of Environmental and Forestry, social forestry is defined as a sustainable forest management system in state or non-state forest areas carried out by local communities or Indigenous peoples to improve their livelihoods, alleviate poverty, improve their welfare and socio-cultural dynamics, and conserve the environment or briefly community-based forest management (2) Another definition is a model of agrarian change that supports neoliberal solutions, as evidenced by the trend towards community forest entrepreneurship, commercialization of forest products, and private sector investment (1).

Forest tourism is a forest landscape (natural landscape) that is used as one of the main elements that have receptive characteristics as a tool to support tourism activities (19,20). Green spaces in cities and villages encourage physical activity and social integration among residents and visitors and thus contribute not only to physical health but also to mental health (21).

Sustainable tourism

According to the United Nations World Tourism Organization (UNWTO), sustainable tourism balances economic, social, and environmental needs, optimizing resources and community well-being. In addition to maintaining ecological processes, sustainable tourism preserves natural heritage and biodiversity, respects the cultural authenticity of local communities, and upholds traditional values. It contributes to intercultural understanding and tolerance, ensures long-term economic viability, and provides all stakeholders fair social and economic benefits, including creating stable jobs, income opportunities, and social services for host communities. In this way, sustainable tourism plays a role in poverty alleviation (22).

Responsible tourism

The Cape Town Declaration (2002) defines responsible tourism as the effort to "create better places for people to live in and better places for people to visit" (23). It requires responsibility and action from operators, the tourism industry, governments, local communities, and tourists to minimize negative impacts and maximize benefits for local communities. Responsible tourism also strives to preserve local cultures and traditions while ensuring environmental sustainability (24). The sustainability principles are integrated into every aspect of destination management and tourist behavior, linking responsible tourism closely with sustainable tourism. While sustainable tourism is the ultimate goal, responsible tourism serves as a tool to achieve it (25,26).

BOHS

BOHS is a health empowerment effort that aims to improve health and awareness of occupational health, protect employees from hazardous environments, address health risks, preserve the workplace environment, and provide essential health services [26] through planned and organized activities. It is a program that values the active involvement of workers, focusing on those in the informal sector, including tourism workers. Community health and medical workers facilitate the implementation of professional health services, and support from policymakers and cross-sector collaboration is essential for the success of the program (25,26).

2. Method

This study uses a qualitative approach and case study method. The qualitative approach of the case study method is suitable because it can explore important things that are of concern in BOHS and the informants' experiences so that it can answer how and why BOHS can play a role in sustainable tourism. In addition, forest-based tourist destinations with BOHS are only in Puskesmas Dlingo II working area, so the number of respondents is small enough to be studied quantitatively. The research area in the Pine Forest tourist area: Puncak Becici, Pinus Pengger, Lintang Sewu, and Pinus Asri, in Bantul Regency.

Data were gathered through in-depth, semi-structured interviews conducted from January 25 to February 20, 2024. The researchers conducted triangulation by interviewing multiple informants to cross-verify the information. The interview process involved 9 informants: including the BOHS program coordinator, the head of Puskesmas Dlingo II, the head of the community empowerment and health promotion section at the Bantul Regency health office, the manager of the tourism areas, and workers. Interview questions were designed to explore the informants' experiences with the implementation of BOHS, its challenges, and potential for the participants', worker's engagement, and the perceived effectiveness of these programs in addressing occupational health risks and safety, as well as forest tourism sustainability.

The data were analyzed in three key stages: data reduction, data display, and conclusion drawing/verification. This iterative process allowed for the identification of key themes related to the effectiveness of BOHS in supporting sustainable tourism. Coding was applied to categorize the data, ensuring that relevant patterns and insights emerged systematically (27).

The analysis was carried out in two phases. First, the interview transcripts were reviewed to identify recurring issues regarding worker participation, risk assessments, and health promotion activities. Second, thematic analysis was used to explore deeper insights into the barriers and opportunities related to BOHS implementation, particularly in the context of sustainable tourism.

Ethical considerations

The research protocol was approved by the Health Research Ethics Committee of Universitas Ahmad Dahlan, Indonesia (Approval Number: 012312315) and the Health Research Ethics Committee of Dr. Moewardi General Hospital (Approval Number 1.030/IV/HREC.2024). All participants provided informed consent before interviews were conducted, and the confidentiality of informants' identities was maintained throughout the research.

3. Result

Location Description and Informant Characteristics

The research was conducted in the Mangunan pine forest area located in the highlands of Gunung Cilik, Yogyakarta. Since the Governor of the Special Region of Yogyakarta established a development policy to make Yogyakarta a leading tourist destination (28), the Mangunan Forest Management Unit (UPH), in collaboration with the Noto Wono Cooperative, a local cooperative, changed the concept of the pine forest from a production forest to a tourist forest aimed at community empowerment and poverty alleviation (29). A crucial aspect of this transformation is the role of the Puskesmas Dlingo II, which is dedicated to promoting the basic occupational health of forest tourism workers at Puncak Becici, Pinus Pengger, Lintang Sewu, and Pinus Asri through the BOHS program.

A total of 9 informants participated in the study. Their educational backgrounds ranged from middle school to postgraduate degrees, with roles varying from BOHS coordinators to local tourism managers. The diverse backgrounds of participants provided a comprehensive view of the implementation of BOHS in forest tourism settings

The characteristics of the study informants are detailed in Table 1.

Table 1. Informant Characteristics

Informant	Education Level	Role	Main Occupation
NN	Diploma	BOHS facilitator at the community level	Sanitarian
SK	High school	BOHS Cadre/worker	The village head, preschool teacher
SY	Middle school	BOHS Cadre/worker	Culinary worker
LS	Middle school	BOHS Cadre/worker	Catering and Culinary
SG	High school	Tourism manager	Tourism manager
DY	High school	Tourism manager	Tourism manager
KA	Undergraduate	Tourism manager	Tourism manager
SW	Undergraduate	BOHS supervisor at the community level	Head of Community Health Center
SB	Postgraduate	BOHS supervisor at the district level	Head of community empowerment and health promotion, Bantul Health Office

Implementation of BOHS

The study found that the BOHS activities in Mangunan started in 2022. The health workers began to conduct workplace assessments to reactivate BOHS, involving pine forest tourism workers and local artisans through social media groups. This inclusive approach provided counseling to introduce BOHS. During the 2021 pandemic, the program manager stated that BOHS activities visited tourist attractions for COVID-19 education, making everyone feel involved in the solution. In 2021-2022, health workers began conducting workplace assessments to reactivate the BOHS, engaging pine forest tourism workers and local artisans through social media groups. They provided counseling to introduce the BOHS:

"Initially, in 2020, I gathered them, introduced myself, and created a WhatsApp group. During the pandemic in 2021, we had no activities, only visiting tourism sites for COVID-19 education" In 2022, "We gathered artisans working with wood and bamboo... to discuss safety practices, such as wearing masks to avoid dust exposure" (NN).

By 2023, As the pandemic subsided, the program expanded to cover broader occupational health issues, such as workplace safety, food hygiene, and waste management. However, the study revealed that key components of BOHS, such as work risk assessments, routine health surveillance, and health promotion, were underdeveloped. BOHS activities integrate with other programs like health promotion, epidemiology, and environmental health, as the BOHS itself needed more allocated funding and

participant contributions. Collaborative efforts included First Aid training, food hygiene and sanitation workshops for culinary vendors, waste recycling training, mosquito breeding eradication campaigns, and larvae monitoring at tourism sites. These activities were carried out with cross-program coordination, as noted by an informant.

"Preventive and promotive activities were conducted in collaboration with other programs... I had to mobilize colleagues for joint funding" (NN).

Promotional activities include public health campaigns on smoking cessation and healthy living habits, such as installing banners in tourism areas. Preventive measures are implemented with environmental health programs, such as monitoring mosquito larvae in tourism locations, early detection of non-communicable diseases, and basic health checks (weight, waist circumference, blood sugar, and blood pressure). First Aid training and health checks are also provided as simple curative services; if the patient's condition cannot be treated at BOHS, they are referred to external health services. There are healing services for tourists who experience minor accidents by providing first aid. In more severe cases, patients are referred to health clinics, but according to local tradition, for certain conditions, they are also taken to shamans, a practice that is deeply rooted in the local culture and should be respected and acknowledged, as told by one of the cadres.

"A tourist once got stung by a scorpion, and we took them to a local healer" (LS).

Beyond these basic health services, BOHS workers have yet to conduct more comprehensive health activities, such as regular disease screenings, fitness programs, or environmental improvements, which are essential components of an active BOHS. Additionally, many workers expressed reluctance to participate in health checks, with less than 20% of male workers engaging in routine screenings due to fear of discovering underlying health conditions. BOHS coordinators also partnered with non-communicable disease programs to conduct workplace health checks, utilizing funds originally allocated for integrated non-communicable disease surveillance (Posbindu). Funding constraints limited the range of activities that could be conducted. The lack of policy and budget support from local authorities contributed to the inactivity of many BOHS sites. While preventive and promotive activities, such as First Aid training and health checks were carried out, curative services were minimal and often relied on external healthcare providers.

Another barrier was low worker awareness and engagement. Informants reported that workers often hesitated to participate in BOHS programs due to a limited understanding of occupational health risks and the fear of discovering illnesses. This reluctance was compounded by a lack of motivation from both workers and tourism managers to prioritize health services, leading to sporadic implementation of BOHS activities. The head of the Puskesmas Dlingo II also noted that workers' enthusiasm for BOHS activities has yet to be matched by their ability to self-organize due to limited health awareness.

Contribution of BOHS to sustainable tourism

Sustainable tourism takes into account current and future economic, social, and environmental impacts, meeting the needs of visitors, the industry, the environment, and host communities (30). Concerning the "future economic", one of the waste management training carried out did not provide sustainable solutions, because lacking follow-up support such as marketing for recycled products. Despite training, the lack of market access made it difficult to sustain recycling efforts, resulting in the eventual discard of recycled materials, as conveyed by the following informant:

"After we learned to make bags from recycled coffee packages, there was no market support, so we ended up discarding them... it was all for nothing" (KA).

Workers are human capital. Healthy workers will be economically productive. The study found that many workers are reluctant to undergo health checks for early detection because of fear of being found sick, which limits the program's effectiveness. Early health checks can increase the chances of recovery, which means increasing treatment efficiency. An informant stated:

"Less than 20% of men are willing to participate, mainly because they are afraid to find out if they are sick" (SK).

Training and outreach are needed to improve participation. The head of the Bantul Health Office's community empowerment division echoed these concerns, stating that BOHS activities do not fully align with the standards outlined in Indonesia's Ministry of Health Regulation Number 100 in 2015, leading to many inactive BOHS:

"Development programs require significant policy and budget support, but this is often lacking, leaving many BOHSs inactive" (SB)

The sustainability of the natural and cultural environment is a crucial aspect that links tourism to natural and cultural heritage. The Mangunan tourism manager has emphasized forest environmental conservation, such as preventing deforestation, managing waste, and ensuring forest security. This is a significant step, as the importance of forest conservation. It's a matter that should concern us all, and we must be aware of the impact of our actions on the environment.

"We do communal cleaning every six months. Workers are assigned to rotating duties every three months. Those in the food stalls are responsible for cleaning their area daily" (LS).

4. Discussion

The BOHS is important in addressing occupational health and sustainability. Sustainable tourism requires not only environmental conservation but also the protection of the workforce that supports these initiatives (31). The study found that BOHS in Mangunan has not been implemented effectively. According to BOHS guidelines, essential activities should include promotive and preventive measures, such as hazard identification, and risk control. This study lacks comprehensive hazard identification and risk control to ensure worker safety and well-being, only workers/cadre BOHS at Becici Peak doing the mosquito larvae monitoring, and all the BOHS did not conduct regular health checks every 3-6 months for early detection of non-communicable diseases. Also, did not conduct routine health surveillance, and lacked worker safety instruments and health education. Health education through social media, posters, banners, and direct counseling should be part of these efforts (12). These activities aim to improve the quality of life of local communities and maintain a healthy workforce to support tourism, which is critical to the long-term sustainability of forest tourism.

BOHS programs have the potential to promote responsible tourism by raising awareness of occupational hazards and encouraging healthy behaviors among workers. However, to be effective, BOHS must be fully integrated into local tourism management systems.

The study further reveals that workers' reluctance to participate in health screenings, due to fear of discovering illnesses, points to a lack of awareness about the importance of occupational health (32,33). This lack of engagement undermines the potential of BOHS to improve occupational health and safety. Similar challenges have been reported in other countries, such as India and Kenya, where workers were reluctant to participate in health screenings (34). To address this, more targeted efforts are needed to raise awareness among workers about the importance of health checks and the role of BOHS in protecting their long-term well-being. The principles of sustainable tourism emphasize the importance of participation, stakeholder engagement, local ownership, and sustainable resource use.

Systemic issues within institutional support for BOHS also affect its ability to provide comprehensive services. Individual participation in BOHS activities is greatly influenced by organizational support, which includes financial and resource commitments that allow teams to function effectively (35). According to the study, despite enthusiasm for health initiatives, workers often struggle to organize themselves due to a limited understanding of occupational health practices. Empowering workers through participatory approaches, such as involving them in the planning and evaluation of BOHS activities, could also increase their motivation to engage in health programs. Regular training sessions, peer-to-peer health promotion, and incentives for participation are recommended to encourage active involvement.

BOHS serves as an important platform for occupational safety and health, several operational shortcomings were identified, including insufficient training, irregular health services, and limited worker engagement. The lack of proactive measures, such as promoting personal protective equipment (PPE) and improving environmental conditions, highlights the need for better integration of occupational health services into sustainable tourism management. Additionally, limited health policy support and budget allocation exacerbate these challenges. These findings are consistent with prior research that also identified the urgent need for a well-structured and adequately supported BOHS (31). Ideally, BOHS health workers should plan, implement, and report health promotion activities monthly. The curative and rehabilitative services are also needed to ensure comprehensive health support for forest tourism workers (36). Weak coordination between Puskesmas Dlingo and tourism managers, along with limited funding and resources, further impedes progress. This aligns with previous research showing that overlapping responsibilities and multiple regulations, without proper enforcement, hinder effective BOHS governance (37). Researchers emphasize the need for strategic interventions to activate and strengthen BOHS as a pillar of worker health in forest tourism.

Both workers and tourism managers generally appreciate BOHS programs for promoting safety and health, but the lack of follow-up and practical support limits their effectiveness, for example, waste recycling training was ineffective because it lacked marketing support, leading workers to discard recycled products. The success of BOHS as a tool for sustainable tourism depends on stronger policy support and adequate funding. The study emphasizes the need for more robust governmental backing to ensure the sustainability of BOHS programs. Currently, many BOHS sites, including Mangunan, struggle with limited financial resources and rely on cross-subsidization from other health programs. For BOHS to have a greater impact, local governments and tourism authorities must allocate dedicated funds to support comprehensive occupational health initiatives.

BOHS empowerment consists of four key components: human development, business development, environmental development, and institutional development (38). Human development focuses on improving the capacity of health workers and employees through training, technical assistance, and the provision of infrastructure to facilitate behavioral change. This enables workers to adopt healthy lifestyles and promote occupational safety practices (39).

Sustainable tourism focuses on climate change and improves the sustainability of tourism development and operations (22). Environmental development includes community-based health surveillance activities, such as mosquito breeding eradication, hazard identification, and risk mitigation. Active participation in these efforts helps prevent vector-borne diseases among workers and tourists. For example, community-based early warning systems for dengue fever in traditional villages in Nusa Tenggara Barat have successfully raised awareness among residents and tourists (40).

To increase awareness among tourism workers and tourists about the importance of forest conservation, safety, and health during tourism activities, community health facilitators can provide communication, information, and education through BOHS activities. Raising environmental awareness among local communities is also vital to support disaster mitigation efforts (9). An informed community is expected to support sustainable tourism management and development (41).

BOHS activities that promote healthy lifestyles and environmental awareness can increase worker productivity, enhance environmental conservation, and support the sustainability of forest tourism. Workers involved in BOHS indirectly contribute to the long-term sustainability of tourism destinations and local communities. Sustainable tourism development fundamentally requires that local

communities use natural, social, and cultural resources to support tourism for current and future generations (42). However, challenges arise when balancing visitor experiences with resource conservation. Effective forest resource management can create sustainable development opportunities in forest tourism areas (19). Involving local communities in the optimal use of forest resources is essential to ensure ecosystem sustainability. The concept of sustainability in tourism encompasses socio-ecological aspects and requires the participation of various stakeholders (43). Implementing forest management policies that involve worker responsibility is crucial for the sustainability of forest tourism through community empowerment (18). Through health and safety training, BOHS can empower workers to prevent and manage risks in the workplace while contributing to forest conservation (44). Given the alignment of BOHS objectives with responsible tourism objectives and their impact on sustainable tourism, the study suggests that BOHS could also be used as a key performance indicator in competitions for the best tourist villages. Responsible tourism involves activities that respect local communities, cultures, and the environment (45).

The limitations of this study are the method that only involved a minimal number of informants and no intervention to management and workers. Future research should focus on developing participatory models that integrate BOHS into tourism management, ensuring that occupational health is a fundamental component of sustainable tourism practices. By addressing these challenges, BOHS can serve as a practical tool in promoting responsible tourism, protecting workers and the environment, and contributing to the long-term sustainability of forest-based tourism.

5. Conclusion

In the context of Mangunan forest tourism, this study shows that the role of BOHS in supporting sustainable tourism has not yet met expectations. Greater synergy is needed between BOHS activities, such as work risk assessments, health surveillance, and routine health promotion, in Mangunan to promote sustainable tourism in forest areas like Mangunan, Yogyakarta. While BOHS has the potential to enhance worker health and safety, essential for the long-term sustainability of tourism, its current implementation is limited by inadequate training, low worker participation, and insufficient policy and financial support. Strengthening coordination between health and tourism departments is required to achieve the full benefits of BOHS in forest tourism. Policies should mandate the establishment of BOHS in every tourism village, ensuring that workers actively participate in health risk assessments, routine health surveillance, and health promotion activities. Additionally, community involvement must be prioritized to raise awareness of occupational health risks and empower workers to engage in safer, healthier behaviors.

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