REVIEW ARTICLE

An integrated behavioral model approach to the control of dengue hemorrhagic fever and the role of waste management: A systematic review

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Abstract

Waste management practices are a concern for public health and environmental protection. This research examines the relationship between waste management and the incidence of dengue fever using the Integrated Behavioral Model (IBM) approach. The study adopted a systematic review methodology, which involved scanning multiple journal databases, including PubMed, ScienceDirect, Scopus, Web of Science, and ProQuest, and following the requirements of the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) checklist. We discovered 642 papers between 2018 and 2023. Articles derived from reviews, systematic reviews, and meta-analyses were among the exclusion criteria in this study. In contrast, original studies, English-language publications, and open access were the inclusion criteria. The results indicate that the management of trash and the prevention of dengue disease are closely related. In order to accomplish integrated urban waste management for the prevention of dengue fever, local governments must understand the community's concerns, preferences, knowledge, and behaviour and involve them in the process of providing municipal trash infrastructure. *(Afr J Reprod Health 2024; 28 [10s]: 464-481)*

Keywords: Waste management, dengue hemorrhagic fever control, integrated behavioral model

Résumé

Les pratiques de gestion des déchets sont une préoccupation pour la santé publique et la protection de l'environnement. Cette recherche examine la relation entre la gestion des déchets et l'incidence de la dengue en utilisant l'approche du modèle comportemental intégré (IBM). L'étude a adopté une méthodologie de revue systématique, qui impliquait l'analyse de plusieurs bases de données de revues, dont PubMed, ScienceDirect, Scopus, Web of Science et ProQuest, et le respect des exigences de la liste de contrôle des éléments de rapport préférés pour les revues systématiques et les méta-analyses (PRISMA). Nous avons découvert 642 articles entre 2018 et 2023. Les articles dérivés de revues, de revues systématiques et de méta-analyses figuraient parmi les critères d'exclusion de cette étude. En revanche, les études originales, les publications en anglais et l'accès libre étaient les critères d'inclusion. Les résultats indiquent que la gestion des déchets et la prévention de la dengue sont étroitement liées. Afin de parvenir à une gestion intégrée des déchets urbains pour la prévention de la dengue, les gouvernements locaux doivent comprendre les préoccupations, les préférences, les connaissances et le comportement de la communauté et les impliquer dans le processus de fourniture d'infrastructures municipales de gestion des déchets. *(Afr J Reprod Health 2024; 28 [10s]: 464-481).*

Mots-clés: Gestion des déchets, lutte contre la dengue hémorragique, modèle comportemental intégré

Introduction

Unclean water, sanitation and hygiene are the fourth risk factors for disease in low income countries with a death rate of 1.6 million people (6.1 percent)[1] . Solid waste management practices are a concern for public health and environmental protection. Waste management is a major challenge in most developing countries. When compared with high-income countries, the amount of solid waste per capita generated by urban populations in developing countries is less, but the capacity of developing countries to collect, process, dispose, and re-use waste in a cost-effective manner is still limited[2] .

The UN-Habitat (2022)[3] states that poor waste management, especially if it is illegally

dumped into waterways or burned through open burning, can have various negative impacts on the environment of local communities, public health and livability. In addition, population growth, rapid development, increasing people's living standards, and urbanization have caused an increase in the volume of waste produced[3].

The World Bank (2012) reports that only 13% of the world's population lived in urban areas in 1900 and produced less than 300,000 tonnes of waste per day, whereas in 2000 this increased by 49% and produced more than 3 million tonnes of waste per day. This and is expected to increase by 55% in 2025 and produce 6 million tons of waste per day.

There are several problems related to the environment and public health that arise due to poor waste management in Indonesia. Among these are the high generation of plastic waste and flooding due to illegal waste dumping activities. The share of plastic waste as non-organic material is the largest in Indonesia (14% of total waste production) and most plastic waste is non-biodegradable (2008) which can cause soil pollution.

Garbage that is thrown away in inappropriate places often ends up in waterways, causing flooding during the rainy season, as well as polluting waterways and coastal waters[2,4]. The negative impacts of a poor waste management system in an area include air pollution due to piles of rubbish emitting an unpleasant odor, water pollution, and soil pollution due to leachate from piles of rubbish. This poor environmental condition can affect public health in general due to poor environmental sanitation [5,6].

The practice of throwing away rubbish here is closely related to the existence of *Ae. aegypti* as a vector for dengue fever. This is caused by the mosquito *Ae. aegypti* which can breed in trash. This is closely related to the way society manages waste. Research conducted by Astuti EP, (2016)[7] in West Java shows that the majority of people still process waste by burning it. Meanwhile, non-flammable trash will be left behind and become a breeding ground for *Ae . aegypti*.

The results of the study conducted by Yusron et al. in the Puri Health Centre Working Area, Mojokerto Regency in 2021[8] on the relationship between waste management and the incidence of dengue fever indicate that the waste produced by respondents in both cases and control groups included in domestic waste (household waste). which contains a lot of organic waste (easily decomposed). Non-organic waste (garbage that is not easily decomposed or cannot be decomposed) such as used bottles, used cans and used tires is not often found inside or outside the respondents' homes. This type of waste is waste has the potential to become a breeding ground for mosquitoes. When the number of breeding sites increases, the risk of transmitting dengue fever will also increase.

The main mandate of Law no. 18 of 2008[9] provides that waste management should improve public health and the quality of the environment as well as turning waste into a resource. This implies that waste management needs to be carried out in a comprehensive and integrated manner from upstream to downstream in order to provide economic and healthy benefits for society.

The Theory of Reasoned Action (TRA) And The Theory of Planned Behavior (TPB) can provide a theoretical picture for investigating the relationship between individual intentions and behavior towards an activity in various fields, for example in environmental psychology, such as water conservation, energy use, sustainable food choices, and recycling processes[7]. This research examines the nature of waste management behaviour in Indonesia and its relationship to controlling dengue fever in coastal areas using a planned behavior theory approach.

Methods

Data sources, search strategies, and search process

The main method used in this study was a systematic review of the literature, using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA), the procedure of this systematic review consists of several steps, namely 1) compiling the Background and Purpose, 2) Research Question, 3) Searching for the literature 4) Selection Criteria 5) Practical Screen 6) Quality

Table 1: Methodology for searching particular databases

Database	Search strategy	Filter	Number of Articles
PubMed	waste management AND Community Involvement OR community participation AND dengue hemorrhagic fever	2018 – 2023, Free Full Text	11
ScienceDirect	waste management AND Community Involvement OR community participation AND dengue hemorrhagic fever	2018 – 2023, Research articles, Social sciences and medicine, Open access & Open archive	55
ProQuest	waste management AND Community Involvement OR community participation AND dengue hemorrhagic fever	2018 – 2023, Scientific Journal, International Journal of Environmental Research and Public Health, English	413
Scopus	waste management AND Community Involvement OR community participation AND dengue hemorrhagic fever	Shows only Open Access journals, first quartile,	78
Web of Science	waste management AND Community Involvement OR community participation AND dengue hemorrhagic fever	Includes Open Access Only, Health Sciences & Public Health Care, English, Quarterly	85

Checklist and Procedures 6) Data Extraction Strategy, 7) Data Synthesis Strategy.

Checklist guidelines and searches from several journal databases including PubMed, ScienceDirect, Scopus, Web of Science and ProQuest. Additionally, articles were also obtained by manual search. The publication year for this research was limited to 2018 – 2023. The journal database search strategy is presented in Table 1. In the initial stage of searching for journal articles, around 642 articles were obtained from 2018 to 2023. The inclusion criteria used in this research included original articles, English language articles, and open access, while the exclusion criteria were articles in the form of reviews, meta-analyses, or systematic reviews.

Criteria for inclusion and exclusion

This study's exclusion criteria are (1) publications that take the form of reviews, systematic reviews, or meta-analyses, while its inclusion criteria were (1) original articles, (2) articles written in English, and (3) open access. PICOS was used to categorize the papers that made up this Systematic Review: participants/population, intervention and comparison, outcome, and research design.

Extraction of data

Finding similar articles (duplicates) based on the article title was the first step in the data mining process. The duplicate articles were then removed. The items were be assessed based on the titles and abstracts. The research criteria were followed, and titles and abstracts that did not fulfill the standards were eliminated. Full text reviews of papers that satisfied the inclusion and exclusion criteria will be conducted.

Results

642 articles were identified in the first electronic search; these were subsequently culled down to 473 by means of screening using keywords and parameters such the article type, year of publication, language (English), and other pertinent variables. During this procedure, duplicate articles were also eliminated. 81 papers were chosen for a thorough assessment by looking over the entire text after the titles and abstracts were screened, as shown in Figure 1. Fifteen papers were deemed eligible for inclusion in this review after a comprehensive assessment of the entire text. Of these, eight articles described the role of waste management in dengue
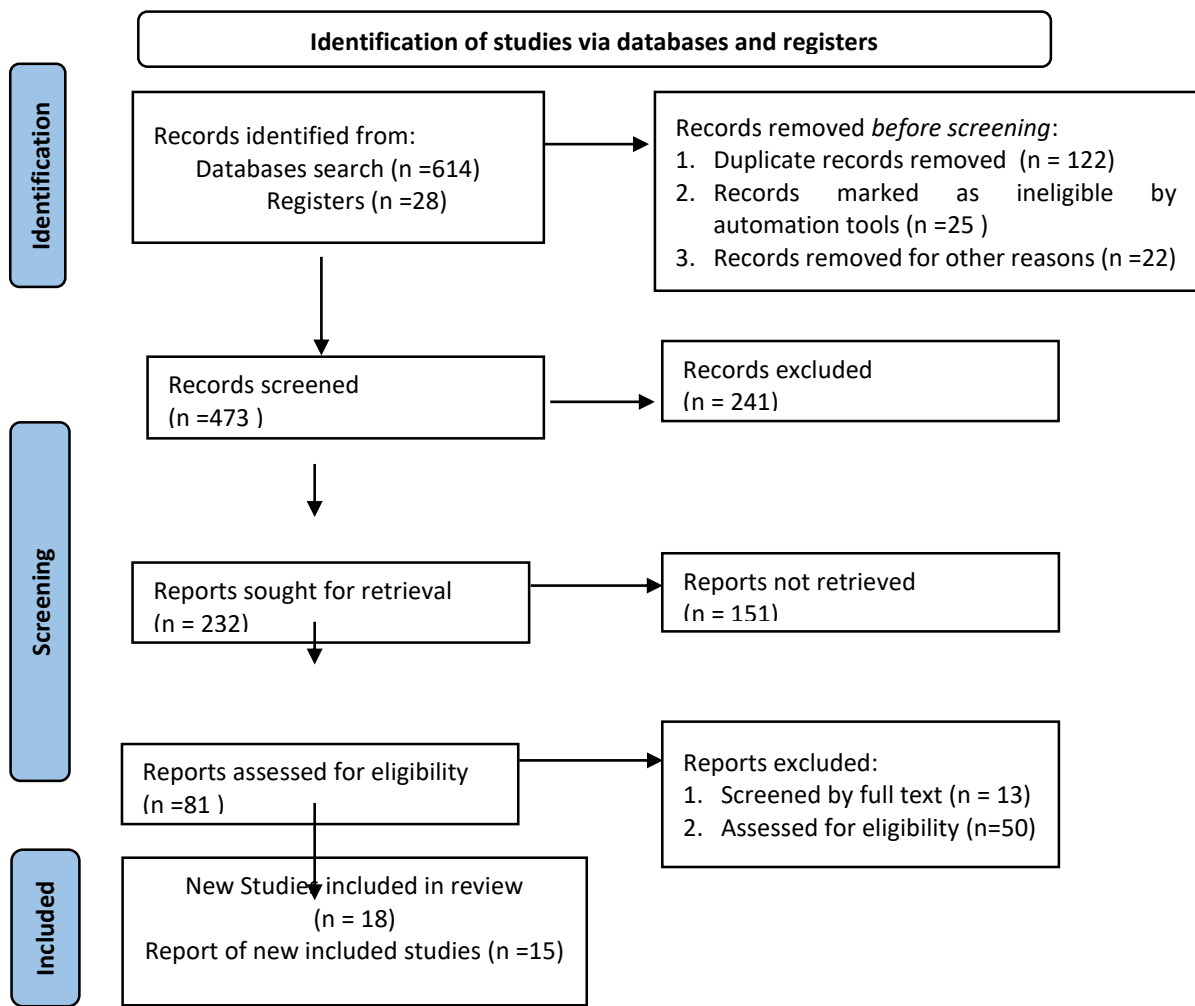
Figure 1: PRISMA flow diagram used to identify the papers that are part of a systematic review

prevention, including risk factors and dengue control, waste management and prevention of dengue, and community participation in waste management. Seven of these articles focused on highlighting the paradigm for behavioural control and dengue prevention, including how behavioural theories and waste management relate to each other and how health behaviours relate to the benefits of community participation in dengue control. The characteristics of the studies and their key findings are summarized in Table 3.

The table 3. Indicates that a number of studies have demonstrated the critical impact that appropriate waste management practices have in

reducing Dengue Hemorrhagic Fever (DHF). Mosquitoes carrying the Aedes aegypti species breed in areas with standing water, such as discarded tires, cans, plastic bottles, and loosely closed garbage cans. Consequently, it is crucial for the community to manage home garbage and the surrounding environment in order to disrupt the mosquito's life cycle.

Good waste management practices demonstrate social responsibility and understanding of the environment's health. The prevention of DHF can be greatly aided by communities that understand how important it is to keep the environment clean. This benefits not just the health of the individual but

Table 2: Results of journal collection and analysis

Author (Year)	Title	Objective	Method	Results	Conclusion
Sahoo *et al*., (2022) [11]	Dynamics of Household Waste Sorting Behavior in an Urban Community in Ujjain, India: A Framework Analysis	The aim of this research is to document household members' understanding of how residents think about and reflect on their waste management system in everyday life. Additionally, this study also aims to design and advocate behavior change communication interventions for household waste segregation in other cities of India and similar contexts.	This research uses a qualitative approach by conducting a documentation study of household members' understanding of how residents think about and reflect on their waste management system in everyday life. The methods used in this research are FGD (Focus Group Discussion) and IDI (In-Depth Interview). The collected data was analyzed using framework techniques and using the MOAB theory (Motivation, Opportunity, Ability) to carry out deductive framework analysis.	The results of this research are a framework for analyzing waste sorting behavior in households in urban communities in Ujjain, India. This research provides insight into the factors that influence waste sorting behavior in households and highlights the challenges that households face in managing waste.	This study contributes to developing knowledge of waste sorting behavior and repertoire to facilitate evidence-based management and policy making.
Okori, (2022) [12]	Involvement of Community Members in Waste Management and Environmental Protection in Rivers State: Implications for Sustainable Cities	This research aims to determine the extent of community participation in waste management and how environmental protection can help create a sustainable city	Regarding the methodology used in this research, this article does not provide detailed information regarding the research design, data collection methods, or data	This research found that involvement of community members in solid waste management and environmental protection can result in positive attitudes towards the environment and more	a further strategy is needed through environmental education that can be adapted to changes in attitudes towards positive management among the community because this

Author (Year)	Title	Objective	Method	Results	Conclusion
			analysis techniques used in the research. However, it is stated that the research is an original article published in the International Journal of Research - GRANTHAALAYAH	sustainable practices. This study also suggests that environmental education should be given to individuals from a young age to increase positive attitudes towards the environment. The study also recommends that institutions responsible for waste management should do better , beyond simply packing rubbish in trucks and sweeping the streets, to educate the public on how to foster a positive attitude towards the environment. Overall, this study highlights the importance of community involvement in achieving sustainable cities and promoting environmental protection.	attitude reflects their behavior in disposing of waste.
Rachman *et al.*, (2020)[13]	Participation of Figures and the Community in Waste Management in Indonesia to Reduce the Burden of Landfill Waste	This research aims to compare the waste management model recommended by the government with community-based waste management, especially in residential areas in Indonesia.	The research method used is a quantitative descriptive method, which aims to describe, explain and validate the social phenomena that are the subject of the research.	This research shows that waste management in Indonesia still faces several problems, such as a lack of community participation in waste management and a lack of support from the government. However, there are several efforts made by the government and society to manage waste, especially by implementing the	Based on the research results, it was found that one form of participation of figures and the community in efforts to improve the environment is by participating in waste management, attending 3R workshops and providing labor contributions in the form of community service.

Author (Year)	Title	Objective	Method	Results	Conclusion
				3R (Reduce, Reuse, Recycle) concept in waste management. 2. Community Based Waste Management Model . This research shows that a community-based waste management model can be one effective alternative to reduce the burden of waste entering the landfill. This model involves active community participation in waste management, for example by establishing a waste bank and managing organic waste through composting. 3. Challenges in Implementing Community-Based Waste Management	
Abdelsalam, (2019) [14]	Does the Theory of Planned Behavior Predict Healthcare Waste Management Practices?	The main aim of this research is to test the factors which relates to the behavior of health service waste management practices based on the theory of planned behavior in Libya.	The research method used in this research is Partial Least Squares Structural Equation Modeling (PLS-SEM).	Correlation test analysis shows that centralization and formalization have a very strong relationship with health services for waste collection and disposal. On the other hand, these two dimensions (centralization and formalization) were found to have no relationship with medical waste sorting	The theory basically assumes that attitudes, subjective norms, perceived behavioral control, moral obligations, self-identity, intentions, and action planning can predict behavior in health care waste management practices in public hospitals in Libya.

Author (Year)	Title	Objective	Method	Results	Conclusion
Rakhmawati *et al.*, (2023) [15]	Expanded TPB Waste Sorting Objective Model: Case Study in Indonesia.	This research aims to determine the factors that influence the intention to sort waste. Specifically, this research aims to develop a model of intention to sort waste by expanding the Theory of Planned Behavior (TPB) model and testing the model to ensure the suitability, validity and reliability of the model.	The method used in this research is a survey method using a questionnaire as a data collection instrument. The research sample consisted of 460 respondents selected by purposive sampling from the areas of Jakarta, Banten, West Java, Central Java, Yogyakarta and outside Java.	The results and findings of this research are as follows: 1. Attitudes, subjective norms, perceived behavioral control (PBC), moral obligations, and facility support have a direct influence on the intention to sort waste. 2. Concern for the environment, knowledge of waste sorting, and time availability indirectly influence the intention to sort waste through attitudes, subjective norms, and PBC. 3. The variables moral obligation and facility support have a significant influence on the intention to sort waste. 4. The variables environmental concern and knowledge of sorting waste have a significant indirect influence on intention to sort waste. 5. The extended TPB model has good goodness-of-fit and high validity and reliability. 6. The results of this research can contribute to the government and society in improving waste sorting behavior in Indonesia.	The factors that influence the intention to sort waste in waste management are very important for the government and society. This study investigates the antecedents of intention to sort waste. This model was developed by expanding the TPB model.
Halder and Singh, (2018) [16]	Predictors of Recycling Intentions Among Youth:	The research objective in this article is to use the theory of	The method used in this research is quantitative	The results and findings of this research are as follows: 1.	In conclusion, it states that the TPB model is able to

Author (Year)	Title	Objective	Method	Results	Conclusion
	A Developing Country Perspective	planned behavior (TPB) model to predict the intention of school students in Delhi, India, to recycle and evaluate the factors that influence their intention.	using a questionnaire to collect data. Sample data from 272 students in grades 9 and 10 at a school in Delhi, India.	Almost all students know the concept of recycling, but many of them do not know that materials such as plastic, metal, glass, wood, electronics and textiles can be recycled.	explain school students' intention to recycle in the Indian context.
Murillo *et al.*, (2019) [17]	The Role of Vertical Transmission in Controlling Dengue Fever.	The aim of this research is to determine the implications of vertical transmission for controlling dengue fever outbreaks and to identify optimal control strategies for a two-type dengue fever model with vertical transmission in mosquito populations.	The study used a two-strain dengue fever model with vertical transmission in mosquito populations.	These findings contribute to a better understanding of the role of vertical transmission in dengue outbreaks and provide valuable insights for the development of effective control strategies and in public health policy- making processes.	Control is especially important in areas where control policies are likely to be effective, and where endemic strains do not exhibit vertical transmission
Islam *et al.*, (2023) [18]	Correlation of Dengue Fever and Meteorological Factors in Bangladesh: A Public Health Issue	The research objective in this article is to determine the relationship between meteorological factors and the spread of Dengue Fever in Bangladesh. This research aims to understand how weather variables such as temperature, humidity and rainfall can influence the spread of Dengue Hemorrhagic Fever, as well as provide insights that can be used in developing public health intervention strategies for the prevention of Dengue Hemorrhagic Fever.	The method used in this article includes time series data analysis for Dengue Hemorrhagic Fever cases and meteorological factors.	shows that meteorological factors such as temperature, humidity and rainfall have a positive correlation with Dengue Hemorrhagic Fever cases in Bangladesh during the study period. Time series analysis shows that the SARIMA model provides the best results in predicting future Dengue cases. In addition, this research also shows that a combination of waste-based and serology-based surveillance in hospitals can help detect hotspots and predict the number of patients. The implication of	Based on the research results, climate parameters, temperature and relative humidity show a positive correlation with dengue cases using data for 23 years.

Author (Year)	Title	Objective	Method	Results	Conclusion
				this research is that an effective public health intervention strategy must consider meteorological factors in efforts to prevent and control Dengue disease in Bangladesh.	
Murillo *et al.*, (2019) [19]	Behavior and Knowledge in Seeking Treatment, Attitudes and Practices in Adult Patients Suspected of Dengue Hemorrhagic Fever at a Tropical Disease Hospital, Bangkok, Thailand	The aim of this article is to determine treatment seeking behavior and knowledge, attitudes and practices (KAP) of adult patients suspected of suffering from dengue fever at the Tropical Disease Hospital in Bangkok, Thailand.	This research was conducted using a questionnaire-based cross-sectional study approach. The number of samples used in this study was 167 adult patients suspected of suffering from dengue fever	The results of this study provide valuable insight into patterns of treatment-seeking behavior and the knowledge, attitudes and practices of adult patients suspected of having dengue fever, as well as the implications for patient management and care.	These findings reflect the increasing impact of dengue fever on urban populations
Liu *et al.*, (2019) [20]	Risk Factors Associated with Dengue Virus Infection in Guangdong Province: A Community-Based Case-Control Study	The purpose of this research is to identify the specific risk factors for dengue virus infection in Guangdong Province and to offer a foundational understanding of science for future prevention and management.	Using a case-control study which included 237 cases and 237 controls in this research as a sample .	According to this study, the risk of developing diffuse fluorescent fever (DF) in Guangdong Province was shown to be considerably higher in those who engaged in outdoor sports and those who were exposed to low-quality indoor sunshine by 1.80 and 2.27 times, respectively. Additionally, our findings demonstrate that using air conditioning, having two people in a room, and having three people in a room can all lessen the likelihood of contracting dengue virus	The advice given is helpful in preventing the dengue virus from spreading. Additionally, it offers proof and a foundation for the creation of DF management and prevention strategies.

Author (Year)	Title	Objective	Method	Results	Conclusion
				infection by 0.46, 0.45, and 0.43 times, respectively.	
Sadeghi *et al.*, (2020) [21]	Effect of an educational intervention based on the Integrated Behavioral Model (IBM) on waste segregation: A community-based study	The aim of this study was to evaluate the impact of an educational intervention based on Integrated Behavior Model (IBM) on changes in the behavior of housewives in Sanandaj City, western Iran, towards waste separation at the source.	This research is a quasi-experimental research and community footprint study. The population of this study is households lives in Sanandaj.	In the intervention group at baseline, mean ± standard deviation of attitudes, subjective norms, perceived behavioral control, and self-efficacy scores were 34.03 ± 5.12, 15.91 ± 4.58, 18.93 ± 4.01 and 31.54 ± 6.79 respectively. At the end of learning, the component score increased to 36 ± 4.28, 18.9 ± 4.56, 21.76 ± 2.65 and 34.72 ± 4.66 respectively. The increase in these components occurred statistically significant ($p < 0.05$).	This IBM-based intervention can be an effective method to improve dry and wet waste separation behavior.
Akmal and Jamil, (2021) [22]	Testing the Role of Waste Management and Environmental Quality on Health Indicators Using Structural Equation Modeling in Pakistan	The study's objective is to examine the health status and practical aspects of household waste management while controlling for socioeconomic factors and omitting behavioral and environmental influences on disposal.	Utilizing a structural equation modeling approach, this study examines four constructs: waste disposal, environmental knowledge, protective attitude, and environmental quality.	The findings give important context and make it possible for households to take an active role in waste management. According to the findings, by knowing how an individual's intentions influence the health status of their household, policy makers and institutions can better support effective community programs related to sustainable solid waste management by facilitating the	It is found that understanding the environment has a significant role in the sorting and disposal of waste. It is advised that in order to handle solid waste management, government organizations and other associations give comprehensive information on various scenarios for trash disposal and sorting, as well as forecasts for

Author (Year)	Title	Objective	Method	Results	Conclusion
				encouragement of desired behavior.	household recycling at the local and national levels.
Hanif and Martini, (2019) [23]	The Relationship between Fly Density and Livestock Waste Management and the Occurrence of Diarrhea in the Dairy Cattle Farming Community in Pudak Kulon Village, Ponorogo, Indonesia	This research aims to determine the relationship between fly density and livestock waste management with the incidence of diarrhea in dairy farming communities	research uses a descriptive analytical method with a cross-sectional study design. The sample used in the research was 177 dairy farming families using a cluster random sampling method.	Based on the research results, the following conclusions can be obtained: (1) The level of fly density around the dairy cow pen which has a very high density is 9.6% (17 respondents), high density is 19.8% (35 respondents). respondents), medium density 22% (39 respondents) and low density 86 respondents (48.6%). (2) Farmers who managed waste well amounted to 70 respondents (39.5%). (3) As many as 38.4% or 68 farming families have experienced diarrhea. (4) There is a significant relationship between the incidence of diarrhea and very high fly density (P value = 0.00), so that the higher the fly density, the more significant the relationship with the incidence of diarrhea. (5) There is a significant relationship between the incidence of diarrhea and waste management (P Value=0.00).	The risk factor associated with the incidence of diarrhea is environmental conditions .

Author (Year)	Title	Objective	Method	Results	Conclusion
Khan *et al*., (2022) [24]	A cross-sectional study to assess the epidemiological situation and risk factors associated with dengue fever; knowledge, attitudes, and practices regarding dengue fever prevention in Khyber Pakhtunkhwa Province, Pakistan	This study aims to determine the molecular, epidemiological and potential elements that contribute to increasing dengue fever transmission patterns, as well as knowledge, attitudes and practices (KAP) towards dengue fever in KP province.	This community-based cross-sectional study was conducted (June-December 2021) in two stages. Phase I involved epidemiological (n = 5,242) and molecular analysis of DENV in 500 2021 dengue outbreak blood samples randomly collected in KP. Phase II focused on assessing the KAP level of dengue fever in healthy communities (n = 14,745, age >18 years),	Peshawar district has the highest dengue cases (60.0%) associated with co-circulation of dominant serotypes DENV-2 (45.8%) and DENV-3 (50.4%). An increase in cases was reported in October (41.8%) followed by September (27.9%) and August (14.4%; $p < 0.001$). Males (63.7%, $p < 0.001$) and individuals aged 16-30 years (37.0%, $p < 0.001$) had very high	Various poor socio-economic elements influence the transmission of dengue fever in the province. Higher KAP levels may explain the lower frequency of dengue fever in non-hotspot districts
Rajapaksha *et al*., (2023) [25]	Treatment seeking behavior, dengue prevention behavior and community capacity for sustainable dengue prevention in highly dengue endemic areas, Sri Lanka	The aim of this study was to evaluate the relationship between sociodemographic characteristics and Health Seeking Behavior (HSB), Dengue Prevention Behavior (DPB), and Community Capacity (CC) in households for sustainable dengue prevention in Sri Lanka, a country with endemicity. high dengue fever.	This research used a cross-sectional analytical study conducted in districts with the highest endemicity of dengue fever from January to April 2019. From all households, 532 people were randomly selected. Pretested, validated, and interviewer-administered questionnaires were used to assess HSB and DPB .	In this study, the results showed that health seeking behavior (HSB) , dengue fever prevention behavior (DPB) and community capacity (CC) need to be improved to change sustainable dengue prevention behavior and community capacity building programs need to be carried out in Kurunegala district, Sri Lanka.	The conclusion shows that HSB, DPB and CC need to be improved to change sustainable dengue prevention behavior and community capacity building programs need to be carried out in Kurunegala district, Sri Lanka.

Table 3: Summary of selected document

Author	Year	The application of behavioural models to dengue hemorrhagic fever control and the significance of waste management	The paradigm for behavioural control and prevention of dengue fever	Role of waste management in dengue prevention
Sahoo *et al.*	2022	Dynamics of Household Waste Sorting Behavior in an Urban Community in Ujjain, India: A Framework Analysis	-	√
Okori	2022	Involvement of Community Members in Waste Management and Environmental Protection in Rivers State: Implications for Sustainable Cities	-	√
Rachman *et al.*	2020	Participation of Figures and the Community in Waste Management in Indonesia to Reduce the Burden of Landfill Waste	-	√
Abdelsalam	2019	Does the Theory of Planned Behavior Predict Healthcare Waste Management Practices?	√	-
Rakhmawati *et al.*	2023	Expanded TPB Waste Sorting Objective Model: Case Study in Indonesia.	√	-
Halder and Singh.	2018	Predictors of Recycling Intentions Among Youth: A Developing Country Perspective	√	-
Murillo *et al.*	2019	The Role of Vertical Transmission in Controlling Dengue Fever.	-	√
Islam *et al.*	2023	Correlation of Dengue Fever and Meteorological Factors in Bangladesh: A Public Health	-	√
Murillo *et al.*	2019	Behavior and Knowledge in Seeking Treatment, Attitudes and Practices in Adult Patients Suspected of Dengue Hemorrhagic Fever at a Tropical Disease Hospital, Bangkok, Thailand	√	-
Liu *et al.*	2019	Risk Factors Associated with Dengue Virus Infection in Guangdong Province: A Community-Based Case-Control Study	-	√
Sadeghi *et al.*	2020	Effect of an educational intervention based on the Integrated Behavioral Model (IBM) on waste segregation: A community-based study	√	-
Akmal and Jamil	2021	Testing the Role of Waste Management and Environmental Quality on Health Indicators Using Structural Equation Modeling in Pakistan	-	√
Hanif and Martini	2019	The Relationship between Fly Density and Livestock Waste Management and the Occurrence of Diarrhea in the Dairy Cattle Farming Community in Pudak Kulon Village, Ponorogo, Indonesia	-	√

Khan *et al.*	2022	A cross-sectional study to assess the epidemiological situation and risk factors associated with dengue fever; knowledge, attitudes, and practices regarding dengue fever prevention in Khyber Pakhtunkhwa Province, Pakistan	√	-
Rajapaksha *et al.*	2023	Treatment seeking behavior, dengue prevention behavior and community capacity for sustainable dengue prevention in highly dengue endemic areas, Sri Lanka	√	-

also the health of the community at large. In order to stop the spread of dengue fever and establish a healthy environment free from mosquitoes carrying the virus, education and awareness about effective waste management must thus continue to be enhanced. Effective waste management, strong waste management campaigns, and high community participation in waste management practices are only a few of the approach's many noteworthy strengths for reducing dengue fever through healthy behaviour in trash management.

Discussion

Garbage disposal is an important concern which requires priority attention to prevent dengue fever. Garbage dumps can be breeding sites for *the Aedes aegypti mosquito* . Whether or not there is waste management will greatly influence the incidence of dengue fever because waste that is not separated between organic and inorganic and then thrown directly into the yard will create stagnant water that can be used by mosquitoes to lay their eggs.

The dengue fever prevention and waste management behavioural control paradigm

An essential first step in stopping the spread of Dengue Fever (DHF), a mosquito-borne illness, is effective waste management. This mosquito breeds in standing water, which is frequently created by improperly disposed of debris, including discarded tires, plastic containers, and rainwater-filled cans. Thus, effective waste management contributes to both preserving the purity of the environment and lowering major health hazards like DHF. The Theory of Planned Behaviour is one of several health behaviour theories that have been demonstrated to

be crucial in the development of public health interventions (TPB)[14,15,16].

The main predictor of behaviour, according to the Theory of Planned Behaviour (TPB), is a person's intention to carry out an activity. Subjective norms, perceived behavioural control, and attitudes towards the behaviour all have an impact on this purpose. Using behavioural theory in waste management offers a solid basis for creating dengue preventive strategies that are more successful. Public health policies and initiatives can be more targeted, promote greater community involvement in waste management, and ultimately lower the risk of dengue transmission by recognising the factors that influence human intentions and behaviour. To successfully create a safer and healthier environment from the threat of disease, ongoing education, facility improvements, and community support are essential.

A comprehensive strategy is needed to prevent dengue, and community capacity and individual health behaviours are key components of this strategy. We can build a safer and healthier environment by raising community knowledge and understanding of the role that healthy behaviours play in avoiding dengue and by enhancing community ability to plan and carry out preventative measures. In order to effectively address public health issues like dengue, people, communities, and other stakeholders must collaborate effectively.

Waste management's part in avoiding dengue fever

Dengue fever control and risk factors are two sides of the same coin, with effective prevention efforts centred around risk factor identification and management. The spread of dengue fever can be

more successfully stopped by combining competent environmental management, community education, vector control, and supportive government policy. To establish a healthy environment and lessen the prevalence of dengue fever in the community, cooperation between all parties from the individual to the national level is crucial[17,18,20,24].

An essential part of preventing dengue fever is waste management[26]. Communities may greatly lower the incidence of dengue fever by implementing easy yet effective measures including waste sorting, emptying water containers, and routine environmental cleaning. Effective waste management can be a powerful barrier against dengue fever in communities if the government provides the necessary support and the community takes an active role in its protection[13].

A key element of preventing dengue is community involvement in waste management. Communities can successfully lower the risk of dengue fever in their surroundings by working with the government, acting collectively, and educating one another[11,22]. Notwithstanding the difficulties in changing cultural or behavioural norms, scarce resources, and a lack of awareness or understanding on the significance of waste management all pose obstacles to raising involvement. Communities may, however, contribute significantly to preserving environmental health and safeguarding themselves against the threat of dengue fever if they are given the proper guidance and assistance[12,27].

IBM-based interventions can be effective in improving behaviors leading to the separation of dry and wet wastes[26,27]. Tang B, *et al* (2016) developed a mathematical model to mimic the integrated program of impulsive vector control and patient care and continuous isolation which was implemented in Guangdong Province, China during the 2014 dengue fever outbreak[25]. This shows that integrated interventions are effective in controlling dengue fever outbreaks. Other findings suggest that rapid and continuous impulsive implementation of vector control can effectively reduce the reproductive number of the Aedes aegypti mosquito and lead to a significant reduction in new infections.

Based on the IBM theory[29], it can be concluded that certain behavior can occur if: (1) a person has strong intentions accompanied by knowledge and behavioral skills; (2) there are no obstacles from the environment that prevent the behavior from being carried out; (3) the behavior stands out; and (4) one is accustomed to the behaviour.

Waste management and the prevention of dengue disease are closely related. Inadequate separation of organic and inorganic trash runs the risk of turning your home into an Aedes aegypti mosquito breeding colony. Involving community participation by understanding their concerns, preferences, knowledge and behavior is very important for local governments, in line with efforts to provide municipal waste infrastructure, to achieve integrated urban waste management. Therefore, household cooperation in sorting waste plays an important role in the success of recycling activities[26]. IBM is an important approach in controlling dengue fever because IBM components, for example skills, knowledge or environmental barriers can influence behavioral performance.

Conclusion

Waste management and the prevention of dengue disease are closely related. An essential component of the success of trash management initiatives is community participation. IBM's method of behavior prediction works well because it has a comprehensive understanding of the relationships between its components.

Author contributions

Ahmad Ruhardi : conceptualization, writing-review and editing
Mahmudah: designing the methodology
R. Azizah: validation, investigation, supervision
Ashriady: wrote the introduction and conducted database searches.

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