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LITERATURE REVIEW

The Role of Housewives in Managing Household Waste During and After the COVID-19 Pandemic

Fidan Safira
Senior Researcher, Jakarta Smart City
Jakarta Provincial Government, Indonesia
Email: fidansafira19@gmail.com
ORCID: 0000-0002-9107-0412

Dr Sri Setiawati Tumuyu
Lecturer, School of Environmental Science
Universitas Indonesia
Email: sri.setiawati11@ui.ac.id
ORCID: 0000-0002-8944-3750

ABSTRACT

PURPOSE: TThis research examines women's significant role in waste management, especially housewives, including influencing factors, impacts, and waste management methods from various cases in scientific publications.

DESIGN/METHODOLOGY/APPROACH: The systematic literature review method was used to obtain reliable and accurate data sources. This study focuses on scientific works released between 2019 and 2024, both during and after the COVID-19 pandemic. The Scopus database was searched methodically to find high-quality publications that could be extracted.

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FINDINGS: The results of this study show that housewives have a significant role in household waste management. However, several factors, such as knowledge, awareness, and gender stereotypes, must be addressed. Furthermore, training and mentoring in household waste management effectively provide behavioural changes towards waste management.

ORIGINALITY/VALUE: The findings of this study anticipated that more studies and initiatives would be conducted to empower women in waste management. As a result, women and housewives have a larger part in waste management than only recycling, composting, and sorting.

KEYWORDS: *Housewives; Women; Waste Management; COVID-19 Pandemic*

INTRODUCTION

In most countries, public solid waste production increased during the COVID-19 pandemic compared to the years before the pandemic (Olawade *et al.*, 2024). Domestic wastewater is one of the causes of water pollution and has a significant impact on the environment, health, and water quality (Hastika and Surtikanti, 2024; Tamba and Surtikanti, 2024). The surge in waste stemmed from the widespread use of disposable personal protective equipment (PPE) at the household level and food consumption waste. Healthcare waste is the most significant, including mask, glove, and hand sanitiser waste (Jayasinghe *et al.*, 2023). In Indonesia, health waste production has increased, although the community is not fully aware of and has not treated household infectious waste. In addition to the increased burden on the environment, improper management and treatment of biological waste pose a risk of spreading COVID-19 to the general population.

Household waste has also increased, by 43% and 53% in food waste and plastic packaging respectively (Leal Filho *et al.*, 2021). This is due to people spending more time at home, resulting in increased consumption of packaged food and food delivery (Leal Filho *et al.*, 2021; Sarkodie and Owusu, 2020). Changes in people's behaviour in shopping and cooking, food consumption, and managing supplies and food waste have occurred due to COVID-19 (Iranmanesh *et al.*, 2022). This is a context that is widely discussed in scientific publications from various countries such as India, Italy, Iran, Japan, Korea, Malaysia, Guyana, Nigeria, Canada, Brazil, Nepal, Thailand, Romania, and many more.

Concerning food shopping, housewives play an important role in household waste management (Indirawati *et al.*, 2021; Kusuma *et al.*, 2023; Tumuyu *et al.*, 2024). Compared to men, women tend to produce more food waste; this is because women are responsible for managing and shopping for food for their households (Koivupuro, 2012). Indirawati *et al.* (2021) found that most of the waste is generated from household activities. In addition, housewives are considered people who spend the

most time at home and are usually responsible for managing waste at home. Housewives are often involved in household waste management, such as waste segregation, waste banks, and composting (Indirawati *et al.*, 2021).

Several studies have focused on women as those most involved in waste management. Khairunnisa *et al.* (2023) focus on providing waste care education to housewives by socialising good waste management. The World Wildlife Fund (WWF) (2021) assesses the level of acceptance of women in their role in the plastic value chain. The research is built on women's perceptions of plastic use and consumption, as well as on practicing the principles of reduction, reuse, and recycling. Zahara *et al.* (2021) analyse the knowledge, attitudes, and practices of housewives who are members of the environmental community towards food waste generated in the household. Mukhter and Chowdhary (2024) seek to understand the problem of solid waste management in rural communities and the role of women in its management using a case-series approach.

This paper explores the significant role of women, especially housewives, in waste management, including influencing factors and impacts from various cases in scientific publications. This includes coverage of waste management methods and methods of intervening with a group regarding waste management behaviour. Gender equality issues related to the role of women in waste management are also explored. Stereotypes in circulation are expected to strengthen the role of women in this issue. The scope of this research is on scientific publications published during and after the COVID-19 pandemic, between 2019 and 2024. A systematic search was undertaken using the Scopus database to obtain quality publications for extraction.

METHODOLOGY

The research uses a systematic literature review method with a qualitative approach. This method was chosen based on the research objectives, to see women's significant role in waste management, especially housewives. A systematic literature review seeks to collect all relevant evidence that fits the predetermined eligibility criteria to answer specific research questions. This review uses explicit and systematic methods to minimise bias in the identification, selection, synthesis, and summary of research (Moher *et al.* 2015). The search strategy is shown in Table 1.

Table 1: Search Strategy

Database	*Keywords*	*Initiatives*
Scopus	housewife AND waste AND management	37

Source: Constructed by authors

The identification of the research boundaries is based on PICOC (population, intervention, comparison, outcomes, context). This limitation is necessary to find answers that follow the research objectives (Table 2).

Table 2: PICOC

Population	Housewives and Waste Management
Intervention	Housewives, Waste Management, and COVID-19
Comparison	-
Outcomes	The role of housewives in managing waste management during and after the COVID-19 pandemic
Context	The role of housewives in managing waste management during and after the COVID-19 pandemic

Source: Constructed by authors

Table 3 shows the inclusion and exclusion criteria used in this study.

Table 3: Inclusion and Exclusion Criteria

Selection Stages	*Inclusion Criteria*	*Exclusion Criteria*	*Data*
I: Initiatives Data	Keyword	Does not match keywords	37
	2019-2024	Not in between 2019-2024	24
	Article Journal	Conference Paper, In Press, Book, and Book Chapters	14
	English	Non-English	12
II: Title and Abstract	The role of housewives in waste management	Others from role of housewives in waste management	12
III: Full text	Available	Not Available	7

Source: Constructed by authors

A previously created checklist question is used to conduct quality assessments. Table 4 contains a list of the quality assessments.

Table 4: Checklist Questions for Quality Assessment

List	*Questions*
C1	Does the article have a problem statement or background?
C2	Does the article have a clear objective or research context?
C3	Does the article present relevant findings from earlier studies or the state of the art?
C4	Does the article describe the methodology used in their research?
C5	Does the article have a result/finding/discussion?
C6	Does the article show a conclusion based on their research purpose?
C7	Does the article propose future work/improvement?

Source: Constructed by authors

The stage of qualitative extraction and synthesis will contain articles that receive a checklist score of more than five. Articles that receive a checklist score of five or less are deemed unqualified. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) was used as a guideline to help the authors prepare protocols for systematic reviews; this can be seen in Figure 1.

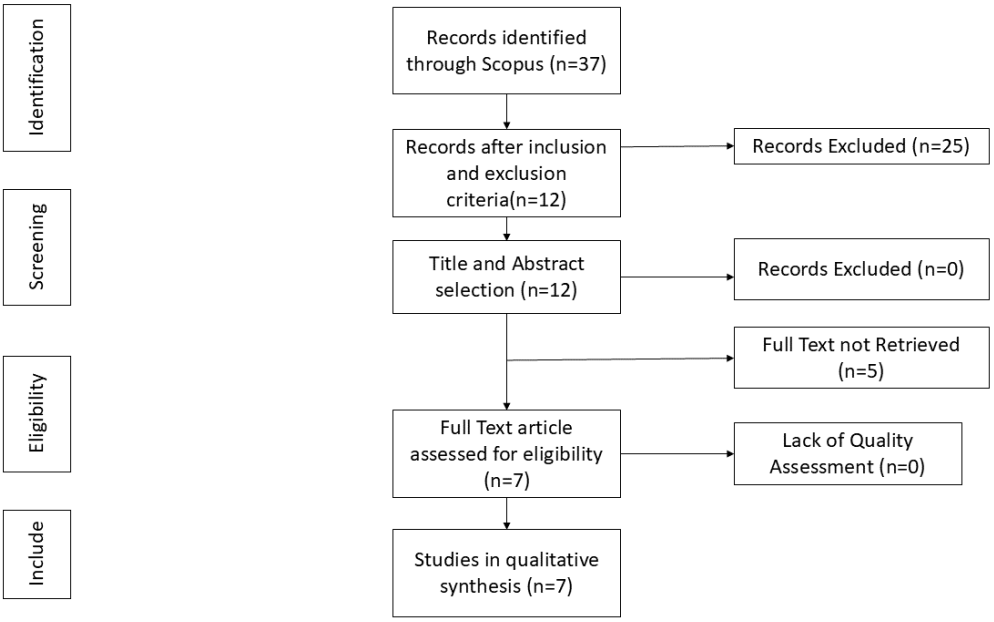

Figure 1: Protocol for Systematic Literature Review

Source: Constructed by authors

A total of seven articles were included for extraction and synthesis. This research uses qualitative data analysis from Miles *et al.* (2014) with stages including data collection, data condensation, data presentation, and conclusion drawing.

RESULTS

Based on the seven selected articles from the Scopus database, it is known that the distribution of articles by year has no significant difference. Two documents were taken from 2020, 2021 and 2024, and one document from 2023; there were no articles selected from 2022 (Table 5). Furthermore, each selected article discusses one case related to household waste management and how it relates to the role of women or housewives. The cases in the selected articles are mostly found in Indonesia, followed by other developing countries such as India, Sri Lanka, and Iran. Developing countries were found to be research locations related to the role of women in waste management.

Table 4: Articles Selected

Years	Authors	Title
2020	Sadeghi *et al.*	The effect of an educational intervention based on the Integrated Behavior Model (IBM) on the waste separation: A community based study
2020	Wijerathna *et al.*	Socioeconomic, demographic and landscape factors associated with cutaneous leishmaniasis in Kurunegala District, Sri Lanka
2021	Luthra, A.	Housewives and maids: The labour of household recycling in urban India
2021	Sofia *et al.*	Analysis of Generation, of Household Waste and Its Potential Utilization in Darul Imarah sub-district - Aceh Besar District
2023	Kusuma *et al.*	Assessment of medicines and potential pharmaceutical wastes management among households in Lamongan, Indonesia
2024	Tumuyu *et al.*	Food Waste Management Strategies suitable for households as sustainable food
2024	Natsir *et al.*	Analysis of Factors Influencing Community Behavior in Household Waste Management on Lakkang Island, Indonesia

Source: Constructed by authors

Increased waste generation during and after the COVID-19 pandemic

Municipal solid waste generated worldwide before and during the COVID-19 pandemic has increased. According to the World Bank's global waste database, the amount of waste generated depends on the economic strength of a region (The World Bank, 2022). Olawade *et al.* (2024) organised and compared data on municipal solid waste generated worldwide before and during the COVID-19 pandemic, sourced from OECD 2021 and the World Bank 2022 (Table 6).

Table 6: Municipal solid waste before and during the COVID-19 pandemic

Country	MSW generated pre-COVID (World Bank, 2022)		MSW generated in 2020 (OECD, 2021)		% change in MSW generated
	Tonnes/year	Kg/capita	Tonnes/year	Kg/capita	
Belgium	4,765,883	415	4,799,862	418	+0.71
Costa Rica	1,460,000	307	1,459,290	307	-0.05
Czech Republic	5,334,855	500	5,418,774	508	+1.55
Cyprus	769,485	642	542,840	453	-41.80
Denmark	4,910,859	844	4,926,531	847	+0.32
Estonia	489,512	369	509,497	384	+3.92
Finland	3,124,498	566	3,296,157	597	+5.21
France	36,748,820	548	36,153,605	539	-1.65
Germany	50,627,876	609	52,566,960	632	+3.69
Hungary	3,780,970	387	3,545,381	363	-6.64
Israel	5,400,000	644	5,982,347	714	+9.73
Latvia	839,714	439	908,96	475	+7.62

Country	MSW generated pre-COVID (World Bank, 2022)		MSW generated in 2020 (OECD, 2021)		% change in MSW generated
	Tonnes/year	Kg/capita	Tonnes/year	Kg/capita	
Lithuania	1,315,390	472	1,349,947	484	+2.56
Luxembourg	490,338	791	497,764	803	+1.49

Source: Olawade *et al.* (2024)

This demonstrates that the amount of waste produced and the economy are correlated. A rise in family consumption, especially as a result of spending more time at home and buying online, frequently counterbalanced the decline in waste that many countries saw at the start of the pandemic, as evidenced in certain countries with severe restrictions. The waste volumes in several nations before and during the epidemic are contrasted in Table 6. While the waste produced by some nations, such as France and Hungary, decreased, others, such as Belgium, Germany, and Israel, saw a minor increase.

On the other hand, Indonesia, as the country most found in the selected articles, also experienced a significant increase in waste generation following the COVID-19 pandemic. Based on data from the National Waste Management Information System, the comparison of waste generation data increased more in each province from 2021 to 2022, both in daily and annual waste generation (Table 7).

Table 7: Comparison of Waste Generation in Indonesia from 2021 to 2022

Province	2021		2022		Difference	
	Daily Waste (tonnes)	Annual Waste (tonnes)	Daily Waste (tonnes)	Annual Waste (tonnes)	Daily Waste (tonnes)	Annual Waste (tonnes)
Aceh	539	196,604	1,640	598,630	1,101	402,026
Sumatera Utara	5,733	2,092,364	5,650	2,062,420	-82	-29,944
Sumatera Barat	1,166	425,491	2,625	958,235	1,460	532,745
Riau	1,781	650,029	2,346	856,366	565	206,337
Jambi	787	287,374	966	352,484	178	65,110
Sumatera Selatan	2,347	856,484	3,434	1,253,537	1,088	397,053
Bengkulu	107	38,966	375	137,035	269	98,069
Lampung	1,371	500,345	1,726	629,906	355	129,561
Kepulauan Riau	389	141,983	1,607	586,455	1,218	444,472
Kepulauan Bangka Belitung	525	191,442	423	154,292	-102	-37,150
DKI Jakarta	6,450	2,354,345	8,527	3,112,381	2,077	758,036
Jawa Barat	12,359	4,510,863	14,660	5,351,017	2,302	840,154
Jawa Tengah	13,759	5,021,888	16,176	5,904,061	2,417	882,173

Province	2021		2022		Difference	
	Daily Waste (tonnes)	Annual Waste (tonnes)	Daily Waste (tonnes)	Annual Waste (tonnes)	Daily Waste (tonnes)	Annual Waste (tonnes)
D.I. Yogyakarta	1,240	452,638	1,894	691,435	654	238,798
Jawa Timur	11,148	4,068,912	15,389	5,616,863	4,241	1,547,951
Banten	2,180	795,830	7,200	2,627,866	5,019	1,832,036
Bali	2,508	915,482	2,815	1,027,434	307	111,951
Nusa Tenggara Barat	1,007	367,513	2,232	814,804	1,225	447,291
Nusa Tenggara Timur	420	153,332	447	162,985	26	9,652
Kalimantan Barat	1,199	437,814	1,573	574,099	373	136,285
Kalimantan Tengah	713	260,339	982	358,359	269	98,020
Kalimantan Selatan	2,144	782,592	2,128	776,827	-16	-5,765
Kalimantan Timur	1,825	666,303	2,169	791,829	344	125,526
Kalimantan Utara	55	20,093	121	44,338	66	24,245
Sulawesi Utara	857	312,875	1,331	485,946	474	173,071
Sulawesi Tengah	698	254,913	1,110	405,093	411	150,180
Sulawesi Selatan	3,334	1,216,987	3,609	1,317,276	275	100,289
Sulawesi Tenggara	344	125,445	724	264,182	380	138,737
Gorontalo	141	51,542	409	149,171	267	97,629
Sulawesi Barat	132	48,328	126	45,956	-6	-2,371
Maluku	255	93,074	126	45,956	-129	-47,118
Maluku Utara	46	16,835	185	67,401	139	50,567
Papua	387	141,103	466	170,118	79	29,014
Papua Barat	160	58,406	207	75,615	47	17,210
Papua Selatan	45	16,298	164	60,017	120	43,719
Papua Tengah	68	24,694	158	57,742	91	33,048
Papua Barat Daya	34	12,311	50	18,163	16	5,852

Source: Sistem Informasi Pengelolaan Sampah Nasional (SIPSN), 2021 dan 2022

The majority of the provinces saw this increase, although some, including DKI Jakarta, West Java, and East Java, saw particularly large increases. Rapid urbanisation, rising consumption, and population growth are probably the root causes of this phenomenon. The rise in waste in Indonesia and around the world indicates that waste management is becoming more difficult. Provinces such as Aceh and South Sumatra, for instance, have seen a sharp increase in waste production, necessitating extra care from the government and relevant stakeholders to guarantee the waste management system can manage the increasing volume.

The role of housewives in household waste management

Sadeghi *et al.* (2020) found that housewives are considered to handle most household affairs and have a major impact on any recycling. Furthermore, Tumuyu *et al.*'s research (2024) quotes Koivupuro *et al.* (2012), who found that household food waste is influenced by the role of housewives. Women tend to produce more food waste than men because women are responsible for shopping and managing food for the family. Research by Kusuma *et al.* (2023) stated that housewives are also quite influential in managing medicines at home, with most of their respondents stating that housewives were responsible for the management of family medicines (68%). In a study by Wijerathna *et al.* (2020), housewives were 3.9 times more likely to be infected (95% CI: 0.606-12.658) with leishmaniasis: this is because they help their husbands in farming activities and interact closely with rotting waste, termite hills, unclean areas, and wet soil. These conditions made them susceptible to sandfly vector bites.

The results of the review of selected articles mostly show the role of women in technical household waste management. This is also in line with Mukhter and Chowdhary (2024), where, for many women involved in agriculture, assessing their role in agricultural and household waste management is very important. Furthermore, Patel *et al.* (2018) suggest that a woman is the main decision-maker in the household responsible for the family's waste disposal practices. Her contribution to the family is tremendous as the practices of one household will inevitably affect the wider community. Most housewives are responsible for purchasing goods and managing plastic waste at the household level and are an important part of the informal waste sector. Women bear a disproportionate burden in terms of managing plastic use and waste when compared to men (WWF, 2021).

Influencing factors of housewife involvement in household waste management

Research by Tumuyu *et al.* (2024) showed that, in general, the housewives involved in the study had poor knowledge of packaging label information, as well as poor attitudes and behaviours in handling the prevention and reduction of food waste at home. The results of Kusuma *et al.*'s research (2023) suggested that the fact that housewives are quite influential in managing medicines at home may give different results in households. This is related to individual capacity, including knowledge and awareness, to create and strengthen a culture of correct medication practices. Furthermore, the success of previously described intervention programmes also confirms that, at baseline, housewives do not have sufficient knowledge of household waste management (Sadeghi *et al.*, 2020; Sofia *et al.*, 2021; Tumuyu *et al.*, 2024). Even though housewives have joined the waste bank community, which is one of the communities engaged in environmental conservation, it has not made any changes to waste management (Tumuyu *et al.*, 2024). Consequently, to align home waste management with the required standards, it is critical to enhance understanding. Counselling

and the provision of pertinent home waste management information are two ways to increase knowledge, by bringing attention to the ways that environmental factors can affect one's health (Natsir *et al.*, 2024).

Natsir *et al.* (2024) conclude that the knowledge and social environment of respondents have a significant influence on waste management behaviour. In contrast, income level and availability of physical facilities do not have a significant influence on community behaviour in waste management on Lakkang Island, Makassar City. This is different from Wijerathna *et al.* (2020), who showed that occupation, monthly income, and the presence of potential breeding and resting places in the environment are the main risk factors for leishmaniasis transmission. This is because households with decaying waste, termite hills, unclean areas, areas with wet soil, and gardening areas in the vicinity have a higher risk of disease. This makes it difficult for the community to manage waste. Furthermore, Sadeghi *et al.* (2020) explained that, in addition to public awareness of the environment, broad public participation, and adequate infrastructure, public participation in recycling is one of the most important factors in the management of waste products.

The impact of housewives' involvement in household waste management

Housewives play an important role in home waste management, as evidenced by studies by Sadeghi *et al.* (2020), Sofia *et al.* (2021), and Tumuyu *et al.* (2024); this emphasises their influence on waste creation and disposal methods, and demonstrates how education and training influenced housewives' roles as key actors in household waste management. Studies conducted by Sadeghi *et al.* (2020) and Tumuyu *et al.* (2024) showed that training programmes and educational interventions successfully enhance waste management-related knowledge, attitudes, and behaviours, lowering waste generation and enhancing waste separation techniques. Changing community behaviour in household waste management is a crucial aspect of implementing waste management practices: it should be a priority to achieve sustainable household waste management. By promoting awareness and encouraging responsible practices, such as reducing waste generation, sorting, and recycling, communities can play an essential role in minimising environmental impact and fostering long-term sustainability in waste management (Utomo *et al.*, 2021).

Source segregation of waste is identified as a critical step towards sustainable waste management. Studies by Sadeghi *et al.* (2020) and Olawade *et al.* (2024) emphasise the importance of source segregation for resource recovery, environmental protection, and economic benefits. Socio-economic conditions, environmental awareness, and clean-living behaviours significantly influence household waste management practices. Also, the COVID-19 pandemic highlighted the need for improved waste management practices, particularly in the healthcare sector. Jayasinghe *et al.* (2023) emphasised the need for a more integrated and decentralised waste management system, focusing on healthcare waste and incorporating a circular economy approach.

For these interventions, three methods were identified in the selected articles for waste management. Sadeghi *et al.* (2020) revealed that the most cost-effective way to recycle solid waste is to invest in waste separation at source, while Olawade *et al.* (2024) mentioned that to realise sustainable waste management practices, source segregation emerges as an important step that holds the key to unlocking a myriad of environmental and economic benefits. By sorting waste at source, a movement will open a chain of opportunities for resource recovery and reduce environmental impact.

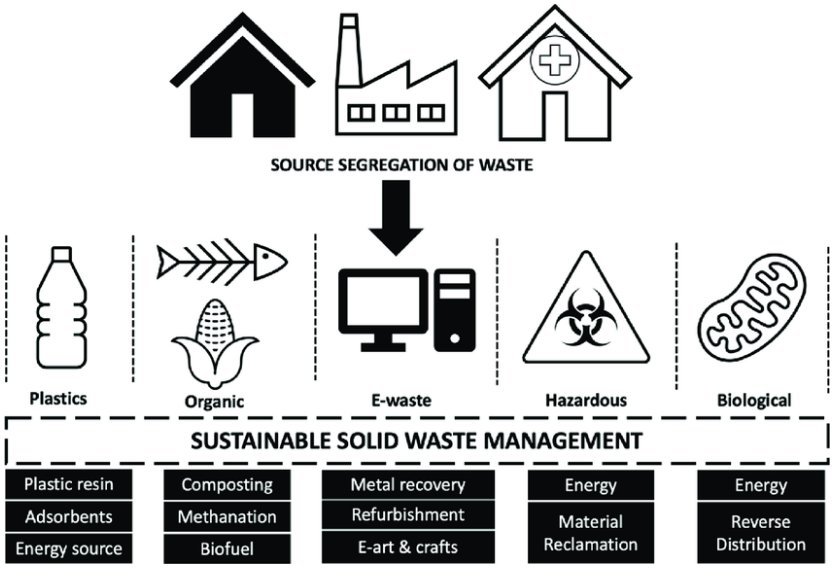

Figure 2: Sustainable Waste Management Practices

Source: Olawade *et al.* (2024)

The Sustainable Solid Waste Management (SSWM) model shown in Figure 2 prioritises source segregation of waste at its origin (households, industries, healthcare). Waste is categorised into five streams:

1. **Plastics:** Recycled into resin, used as adsorbents, or converted into an energy source.
2. **Organic:** Composted or processed through methanation for biofuel production.
3. **E-waste:** Recovered for metal, refurbished, or repurposed for creative uses (e-art, crafts).
4. **Hazardous:** Utilised for energy generation or material reclamation.
5. **Biological:** Repurposed for energy generation or distributed for agricultural or other beneficial uses.

This model emphasises the value recovery potential of waste streams, minimising environmental impact and promoting circular economy principles. Research by Tumuyu *et al.* (2024) indicates that

the effectiveness of traditional waste bank models may be limited, particularly within established, long-standing groups. Alternative approaches, such as composting, may be more effective in promoting circular economy principles for food waste. In addition, implementing successful SSWM requires behavioural change among waste generators. The Integrated Behaviour Model (IBM) can be a valuable framework for designing interventions to improve source segregation practices. While some studies suggest that coercive measures such as fines can encourage waste segregation, it is crucial to balance enforcement with education and incentivisation to ensure long-term behavioural change and community buy-in.

DISCUSSION

The role of housewives in managing household waste is important, and various literature shows that women are responsible for shopping, and managing food and waste in the family (Koivupuro *et al.*, 2012; Patel *et al.*, 2018; Sadeghi *et al.*, 2020). This is certainly not true across the board, but the majority of practices and secondary documents suggests it to be the case. This may also be related to the gender stereotype that women are responsible for their family's domestic affairs, while men work outside the home. Women can bring their perspectives, skills, and talents to environmental management that help improve environmental sustainability and conservation. For long-lasting effects, women should also be involved in environmental decision-making processes. The advancement of ecological action and gender equality depends on women's involvement in environmental decision-making. Women's leadership can have a greater influence on the larger community when local women are acknowledged and involved as sustainability agents. As the results of this study show, managing household waste for housewives is certainly not an easy matter without being equipped with sufficient knowledge.

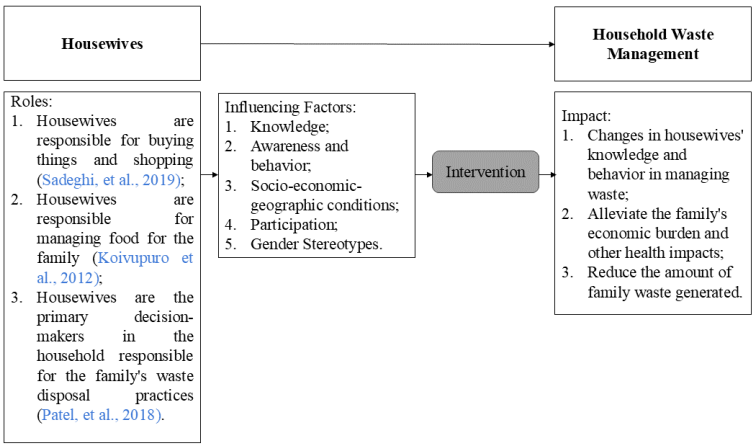

Figure 3: Interpretation of Housewives' Role in Household Waste Management

Source: Constructed by authors

In addition, environmental awareness and clean-living behaviour are also identified as factors that can influence how housewives manage household waste. This includes the socio-economic conditions in which the family lives, interacts, and participates in waste management programmes run by the local community or government. The extraction of the selected articles in this study showed a significant impact in waste management by housewives. This form of impact is quite significant in the well-being of the family; however, it can be achieved through researchers' interventions. Correspondingly, various waste management methods were identified in the intervention research found in the selected articles. Not all waste management methods are relevant to a particular family or group. This is again influenced by several factors, as listed in Figure 3.

CONCLUSIONS

The role of housewives in household waste management has a major impact on recycling and food waste management programmes. Education and training-based interventions have been proven effective in improving housewives' knowledge, attitudes, and behaviours in waste management. However, there are several influencing factors faced by housewives, such as lack of knowledge and awareness, social and economic conditions, gender stereotypes, and exploitation of female labour in waste management. Despite these factors, women's active participation in waste management is essential to achieving sustainable and environmentally friendly practices. Women's involvement in decision-making processes related to environmental issues is crucial for long-term success in waste management and environmental conservation.

Although this study focuses on publications during and after the COVID-19 pandemic, 2019-2024, it does not specifically discuss the implications of COVID-19 for the role of housewives in household waste management. This is due to the absence of selected articles that specifically discuss this matter. Although there may be more scientific publications related to waste management carried out by housewives in the future, it is expected that the subject of waste management is not always focused on women alone. Further research is expected to capture the role of women's communities and effective empowerment programmes through waste management.

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BIOGRAPHY

Fidan Safira is a research analyst in the field of social science, public policy, and information science. She works as a senior researcher at Jakarta Smart City, Jakarta Provincial Government, Indonesia. Fidan has a Masters' degree from Urban Development Studies, School of Global and Stragegic Studies, Universitats Indonesia. She is also a research assistant in Urban Development Studies, School of Global and Strategic Studies, Universitas Indonesia.

Dr Sri Setiawati Tumuyu is a lecturer in the School of Environmental Science, Universitas Indonesia. She has a PhD from the Institute Pertanian Bogor, Indonesia, and a Masters' degree from the University of Adelaide, Australia. Her research interests lie in Natural Resource Management (Energy, Food and Water), Food Loss and Waste, Green Innovation, Circular Economy, and Sustainable Development Goals.