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Posted Date: 7 April 2026

doi: 10.20944/preprints202604.0462.v1

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Between Survival and Sanity: Examining the Socio-Psychological Challenges of Waste Scavenging in Urban Nigeria

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Abstract

Rationale: Informal waste scavenging is a critical livelihood strategy in many Nigerian urban settings, yet it exposes workers to occupational hazards and psychosocial stress. Limited data exist on how socio-demographic factors and work duration influence perceived stress and psychosocial challenges among waste scavengers. **Objectives:** To examine the socio-demographic characteristics of waste scavengers, assess associations between duration of engagement and perceived stress, and identify primary psychosocial challenges related to scavenging in Ilorin and Oshogbo, Nigeria. **Methods:** A cross-sectional survey was conducted among 155 waste scavengers recruited from Ilorin and Oshogbo. Data on age, gender, education, marital status, duration of engagement, perceived stress levels, and primary psychosocial challenges were collected using structured questionnaires. Associations were assessed using Pearson chi-square tests, with consideration of expected cell counts. Descriptive statistics summarized socio-demographics and psychosocial profiles. **Results:** The workforce was predominantly young (18-27 years, 27.1%), male (52.3%), and had primary or secondary education (55.5%). Most scavengers had engaged in waste collection for less than three years (69.7%). Perceived stress varied with duration but was not statistically significant ($\chi^2(12) = 14.680$, $p = 0.259$), though higher proportions of extreme stress were observed among longer-duration workers. Feelings of shame or embarrassment (38.8%) and anxiety about safety (31.6%) were the most frequently reported psychosocial challenges, consistently observed across stress categories, with no statistically significant association ($\chi^2(20) = 16.666$, $p = 0.675$). **Conclusion:** Waste scavengers experience persistent psychosocial challenges regardless of duration, highlighting stigma and occupational hazards as key stressors. **Recommendation:** Implement psychosocial support programs, cooperative frameworks, and safety interventions to mitigate occupational stress and improve well-being. Thus, addressing psychosocial and occupational risks among informal waste workers is essential for reducing mental health burden and enhancing safety in urban waste management.

Keywords: waste scavenging; occupational stress; psychosocial challenges; informal labor; urban health; Nigeria; environmental hazards; mental well-being; stigma; safety

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1. Introduction

Waste scavenging, the recovery of reusable materials from discarded items, is an ancient practice, yet its contemporary manifestation has evolved into a global phenomenon driven by modern consumption patterns and systemic economic exclusion. Historically, societies have generated waste through production and consumption, discarding materials ranging from pottery and textiles to metals and food remnants (Oluwaseun et al., 2019; Lateefat et al., 2022; Adiama et al., 2022; Jacob et al., 2023; Koleayo et al., 2024; Ayibatonyo et al., 2024a, b; Omoyajowo et al., 2024; Uchenna et al., 2025). However, what was once a marginal activity has become a primary survival strategy for millions, particularly in rapidly urbanising regions of the Global South. Recent estimates indicate that urban centres worldwide generate approximately 1.3 billion tonnes of solid waste annually, a figure projected to reach 2.2 billion tonnes by 2025 and potentially 3.88 billion tonnes by 2050 if current consumption trends continue unabated (Kaza, Yao, Bhada-Tata, & Van Woerden, 2018; Rauf & Raimi, 2023; Yusuf et al., 2023; World Bank, 2024; Giri et al., 2024; Raufu et al., 2026). In response to this deluge, an estimated 15 to 20 million informal waste pickers globally perform an essential yet unrecognised service, recovering valuable materials that would otherwise burden landfills and contribute to greenhouse gas emissions (Velis, 2017; Raimi et al., 2018b; Morufu et al., 2021c; Gutberlet, 2021; Raimi et al., 2025; Christopher et al., 2025; Elemuwa et al., 2025; Abiye et al., 2026). The environmental and economic contributions of this workforce are substantial: studies have shown that waste pickers are responsible for up to 60% of recycling in some major cities, effectively subsidising municipal waste systems while remaining largely invisible in official policy (Navarrete-Hernandez & Navarrete-Hernandez, 2018; Suleiman et al., 2019; Buch et al., 2021). The existing literature has robustly documented the physical occupational hazards associated with this labour, including exposure to toxic chemicals from electronic waste, sharps injuries, respiratory illnesses from burning materials, and infectious diseases such as hepatitis B and C (Sawyerr, Yusuf, & Adeolu, 2016; Hahladakis et al., 2018; Raimi & Raimi, 2020; Raimi et al., 2020; 2021; Morufu et al., 2021a, b; Yusuf et al., 2022; Raufu, Olayinka, Olawale, & Raimi, 2022; Joshua et al., 2024). Furthermore, researchers have quantified the economic precarity, noting that waste pickers often earn well below minimum wage, lack any form of social protection, and face constant threats of displacement due to privatisation or gentrification of waste management systems (Wilson et al., 2022; Morais, Corder, Golev, Lawson, & Ali, 2022; Yusuf et al., 2023; Giri et al., 2024; Raufu et al., 2026). What remains critically underdeveloped, however, is a systematic understanding of the socio-psychological dimensions of this occupation, how the daily confrontation with filth, danger, and social contempt shapes mental health, self-concept, and the fundamental human need for dignity. The controversy, and indeed the persistent research gap, lies in the tendency of both public health and environmental economics literatures to treat waste pickers primarily as vectors of material recovery rather than as psychosocial beings navigating complex emotional landscapes. While a growing number of studies acknowledge the presence of social stigma and psychological distress, few have rigorously examined the specific mechanisms through which this stigma translates into diagnosable mental health conditions such as depression, anxiety disorders, or post-traumatic stress. Early investigations from Brazil and India noted elevated rates of minor psychiatric disorders among ragpickers, but these studies often relied on small convenience samples and lacked comparative frameworks (Silva, Rigotto, & Carvalho, 2006; Chokhandre & Kashyap, 2017). More recent work has advanced the field by documenting that waste pickers in Kathmandu Valley report significantly higher levels of perceived stress and lower psychological well-being compared to general population norms, with women and migrant workers facing particularly acute vulnerabilities (Raimi et al., 2019c, d; Raimi et al., 2022a, b; Karki et al., 2022; Luan, Benu, Yulianto, & Kiling, 2026). A comprehensive scoping review by Maneen, Botha, Amoadu, and Ansah (2025) confirms that psychosocial work factors, including low job control, lack of social support from formal systems, and experiences of public humiliation, are consistently associated with adverse mental health outcomes among waste collectors in developing countries (Adias et al., 2025a, b). Nevertheless, a critical oversight persists: most existing research isolates psychological variables without situating them within the broader structural context

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of economic coercion. As Godinić, Obrenovic, and Khudaykulov (2020) argue, economic uncertainty and social identity disturbance operate synergistically to erode psychological well-being, a dynamic that is particularly salient for waste scavengers who must choose between hazardous labour and abject poverty (Anthony et al., 2025). Furthermore, there has been a historical error in framing these individuals as passive victims rather than active agents who develop complex coping strategies. Correcting this requires moving beyond deficit-based models to understand how scavengers negotiate the daily tension between the imperative to survive and the need to preserve a coherent, valued sense of self (Mlotshwa et al., 2022; Dada, Faniran, Ojo, & Taiwo, 2022).

This study is therefore both timely and innovative, addressing a pressing gap that has gained renewed urgency in the wake of the COVID-19 pandemic (Gift et al., 2020; Samson et al., 2020; Raimi & Raimi, 2020; Gift & Olalekan, 2020; Morufu et al., 2021a, 2021b, 2021d; Raimi et al., 2020; 2021, 2021b, 2021c; Kakwi et al., 2024a, 2024b; 2025), which disproportionately disrupted informal economies while exacerbating mental health burdens globally. The pandemic exposed the fragility of waste pickers' livelihoods as lockdowns restricted movement, waste volumes fluctuated unpredictably, and the fear of viral transmission added a new layer of psychological stress to an already precarious existence (Raimi & Ochayi, 2017; Ahmad, Mueller, & Tsamakis, 2020; Shanmugasundaram, 2024). Crucially, the crisis also highlighted the indispensable role of these workers in maintaining urban sanitation (Raimi et al., 2017; Olalekan et al., 2018; Raimi et al., 2018; Raimi et al., 2019a, 2019b; Iyoha et al., 2025; Omotoso et al., 2025) and recycling systems, yet policy responses have overwhelmingly focused on technical solutions, such as personal protective equipment or vaccination campaigns (Kakwi et al., 2024a, 2024b; Elemuwa et al., 2024; Okechukwu et al., 2024; Promise et al., 2024; 2025), without addressing the underlying socio-psychological determinants of well-being (Bezama & Agamuthu, 2019; International Labour Organisation, 2019). What makes the current investigation particularly innovative is its explicit focus on the *intersubjective* dimension of waste scavenging: the internalised shame, the anticipation of public contempt, and the psychological labour required to maintain a sense of purpose in an occupation widely viewed as degrading. Drawing on the environmental health disparities framework proposed by Gee and Payne-Sturges (2004), this study recognise that psychosocial stressors, including chronic uncertainty, social exclusion, and perceived illegitimacy, are not merely ancillary to physical hazards but constitute independent pathways to poor health. Recent empirical work from Nigeria substantiates this view, showing that waste pickers' perceptions of occupational hazards are strongly mediated by their sense of social valuation and future prospects, with those reporting higher levels of community disrespect also endorsing significantly lower scores on validated psychological well-being measures (Dada et al., 2022; Solaja, Osifo, & Amoo, 2024). Moreover, the potential for collective action and cooperative formation, as documented in Brazil, Indonesia, and Chile, suggests that psychological well-being can be enhanced through social solidarity and recognition, even in the absence of formal employment contracts (Gutberlet, Baeder, Pontuschka, Felipone, & dos Santos, 2013; Çolak et al., 2024; Navarrete-Hernandez & Navarrete-Hernandez, 2018). This insight challenges fatalistic narratives and opens avenues for intervention, but it also underscores the need for research that captures the nuanced, context-specific ways in which scavengers experience and resist social marginalisation. Accordingly, the present study is designed to address these gaps by centring the lived experiences of waste scavengers and examining the dialectical relationship between economic survival and psychological integrity. Building on a growing recognition that health is produced not only in clinics but also in the daily practices of work, home, and community (Valdez, Holden, Novak, & Veinot, 2014), this study argue that waste scavenging represents a critical case study for understanding how structural violence becomes embodied as psychological distress. The specific objectives guiding this investigation are as follows: 1) To examine the psycho-socio effects of waste scavenging on individuals engaged in this practice, including the emotional, cognitive, and relational dimensions of their daily labour; and 2) To evaluate the influence of social stigma on the mental health of waste scavengers, with particular attention to the pathways through which perceived devaluation translates into symptoms of depression, anxiety, and diminished self-worth. By pursuing these

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objectives, this study aim to move beyond the simplistic binary of victim versus hero, acknowledging that waste scavengers are neither passive sufferers of trauma nor romanticised agents of environmental salvation; rather, they are individuals who must constantly navigate the agonising space *between survival and sanity*. This study contributes to the emerging literature on occupational health equity by providing empirical evidence that can inform multi-level interventions, ranging from mental health support and anti-stigma campaigns to cooperative development and legal recognition, that address both the material and psychological dimensions of this essential yet invisible workforce. In doing so, this study responds directly to the call issued by The Lancet Commission on Pollution and Health for research that integrates social, environmental, and mental health perspectives to advance health justice for the world's most marginalised populations (Landrigan et al., 2018).

2. Methods

2.1. Study Design and Setting

This study employed a community-based, cross-sectional survey design to examine the socio-psychological challenges associated with waste scavenging. The cross-sectional design was selected to capture the prevalence and distribution of psychological distress, perceived stress, and social stigma among active waste scavengers at a single point in time (March to June, 2025). The study was conducted in two urban centres in Nigeria: Ilorin (capital of Kwara State) and Oshogbo (capital of Osun State). These locations were selected due to the presence of active, organised waste scavenger populations and the absence of formalised municipal recycling systems, conditions typical of many rapidly urbanising Nigerian cities (Afon, 2012; Dada, Faniran, Ojo, & Taiwo, 2022). Both cities have experienced significant population growth and concomitant increases in solid waste generation, yet lack structured waste management infrastructure, creating an informal recycling economy sustained largely by scavenger labour (Yusuf, Opasola, Adewoye, Raimi, & Balogun, 2023).

2.2. Study Population and Sampling

The target population comprised all active waste scavengers operating at designated dumpsites and along waste collection routes in Ilorin and Oshogbo. Eligible participants were required to: (1) be aged 12 years or older (with parental consent for minors), (2) have engaged in waste scavenging as a primary or secondary source of income for at least three months preceding the survey, and (3) provide verbal or written informed consent. Exclusion criteria included individuals who had scavenged for less than three months or who were unable to complete the survey due to cognitive or language barriers. A convenience sampling strategy was employed, recruiting participants through the Waste Pickers Association of Nigeria (WPAN), the recognised union representing informal recyclers in both cities. This approach was necessitated by the absence of a comprehensive sampling frame for waste scavengers, a well-documented challenge in informal sector research (Gutberlet, Baeder, Pontuschka, Felipone, & dos Santos, 2013; Velis, 2017). Union leaders were briefed on the study objectives and assisted in identifying and mobilising members at weekly collection points and dumpsites. Of 180 individuals approached, 155 completed the survey fully, yielding a response rate of 86.1%. This sample size exceeds the minimum required for chi-square analyses with 5×4 contingency tables assuming medium effect sizes (α=0.05, power=0.80), though it remains modest for subgroup analyses (Maneen, Botha, Amoadu, & Ansah, 2025).

2.3. Data Collection Instrument

A structured, interviewer-administered questionnaire was developed for this study, drawing on validated instruments from the occupational health and psychological well-being literature. The questionnaire comprised four sections. Section A captured socio-demographic characteristics: age, gender, educational attainment, marital status, location of operation (Ilorin or Oshogbo), and

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duration of scavenging activity (categorised as <1 year, 1-3 years, 4-6 years, >6 years). Section B assessed perceived stress related to scavenging using a single-item five-point Likert scale (not stressful at all, less stressful, moderately stressful, highly stressful, extremely stressful). Single-item stress measures have demonstrated acceptable convergent validity with longer instruments in marginalised occupational populations. Section C evaluated psychosocial challenges through a multiple-response item asking respondents to identify their primary source of psychological difficulty from six options: feelings of shame or embarrassment, anxiety about safety, social isolation, fear of being judged by others, trauma from past experiences, and other (specify). This categorisation was informed by qualitative work on waste picker experiences in Brazil and India. Section D, not analysed in the present paper, collected data on coping mechanisms and perceived institutional support. The questionnaire was pilot-tested on 20 waste scavengers in a neighbouring community (not included in the final sample) to assess face validity, comprehension, and administration time. Minor wording adjustments were made following pilot feedback. Interviewers, three research assistants fluent in Yoruba and English, underwent two days of training on ethical conduct, neutral questioning, and standardised data recording.

2.4. Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of the Federal University of Health Sciences Research Ethics Committee (approval number: FUHS/EH/2025/007). Permission was also secured from local authorities and the Waste Pickers Association of Nigeria in both cities. Given the potentially sensitive nature of questions regarding psychological distress and stigma, several safeguards were implemented. First, informed consent was obtained verbally for participants with limited literacy, with written consent for those able to provide it. Parental or guardian consent, accompanied by child assent, was required for participants under 18 years, recognising the presence of minors in the scavenging workforce. Second, participants were assured of complete confidentiality; no names or identifying information were recorded on questionnaires. Third, a referral pathway was established with a local non-governmental organisation providing mental health support, though no participant requested this service. Fourth, participation was entirely voluntary, and respondents were informed they could withdraw at any point without penalty. Data collection occurred in private spaces away from dumpsites to minimise coercion and social desirability bias.

2.5. Statistical Analysis

Data were entered into IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA). All questionnaires were double-entered and cross-verified for data entry errors. Descriptive statistics, frequencies and percentages, were calculated for all categorical variables, including socio-demographic characteristics, perceived stress levels, and primary psychosocial challenges. No continuous variables were collected; thus, mean and standard deviations are not reported. For inferential analysis, Pearson chi-square tests of independence were conducted to examine associations between: (1) duration of scavenging and perceived stress level (Table 2); and (2) perceived stress level and primary psychosocial challenge (Table 3). The chi-square test was selected due to the categorical nature of both independent and dependent variables. Assumptions of the chi-square test were assessed for each analysis. Specifically, this study evaluated expected cell frequencies, with a threshold that no more than 20% of cells should have expected counts below 5. Where this assumption was violated, as in Table 3, where 60% of cells had expected frequencies below 5, the asymptotic p-value is reported with a cautionary note, and the Fisher-Freeman-Halton exact test is recommended for future studies with larger samples. All tests were two-tailed, with statistical significance set at $\alpha = 0.05$. No adjustments were made for multiple comparisons, as these analyses were exploratory rather than confirmatory. Post-hoc pairwise comparisons were not conducted for non-significant omnibus tests. Missing data were minimal (three respondents missing primary psychosocial challenge, 0.6% of all data points) and were handled by pairwise deletion, as the proportion of missingness was well below the 5% threshold for introducing bias.

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3. Results

3.1. Socio-Demographic Characteristics of the Study Population

Table 1 & Figure 1 present the socio-demographic profile of the 155 waste scavengers who participated in this study. Regarding age distribution, the largest proportion of respondents were aged 18-27 years (27.1%), followed by those aged 28-37 years (20.0%) and those aged 48-57 years (19.4%). Respondents younger than 18 years constituted 18.7% of the sample, while those aged 58 years or older represented the smallest group at 3.2%. The mean age category fell within the 18-27 year band, indicating a predominantly young adult workforce. In terms of gender, more than half of the respondents identified as male (52.3%), while female respondents accounted for 41.9%. A small proportion of participants (5.8%) preferred not to disclose their gender. The sample was nearly evenly divided by location, with 49.0% of respondents recruited from Ilorin and 51.0% from Oshogbo. With respect to educational attainment, the majority of scavengers had completed either secondary education (29.0%) or primary education (26.5%). Respondents with no formal schooling comprised 20.6% of the sample, while those with higher education accounted for 20.0%. A small minority (3.9%) reported Arabic education as their highest level of schooling. Regarding the duration of engagement in waste scavenging, the most common categories were 1-3 years (36.8%) and less than one year (32.9%). A smaller proportion of respondents had been scavenging for 4-6 years (16.8%) or for more than six years (13.5%). Finally, in relation to marital status, nearly half of the respondents were married (47.7%), while single individuals constituted 40.0% of the sample. Separated and divorced respondents each accounted for 5.2%, and widowed individuals represented the smallest group at 1.9% of the total sample.

Table 1. Socio-demographic characteristics of waste scavengers in Ilorin and Oshogbo, Nigeria (N=155).

Characteristic	Category	Frequency (n)	Percentage (%)
Age (years)	<18	29	18.7
	18–27	42	27.1
	28–37	31	20.0
	38–47	18	11.6
	48–57	30	19.4
	≥58	5	3.2
Gender	Male	81	52.3
	Female	65	41.9
	Prefer not to say	9	5.8
Location	Ilorin	76	49.0
	Oshogbo	79	51.0
Educational level	No formal schooling	32	20.6
	Primary	41	26.5
	Secondary	45	29.0
	Higher education	31	20.0
	Arabic education	6	3.9
Duration scavenging	<1 year	51	32.9
	1–3 years	57	36.8
	4–6 years	26	16.8
	>6 years	21	13.5
Marital status	Single	62	40.0
	Married	74	47.7
	Separated	8	5.2
	Divorced	8	5.2
	Widowed	3	1.9

Data are n (%). Percentages may not sum to 100 due to rounding. Source: Field survey, 2024-2025 (authors' own data).

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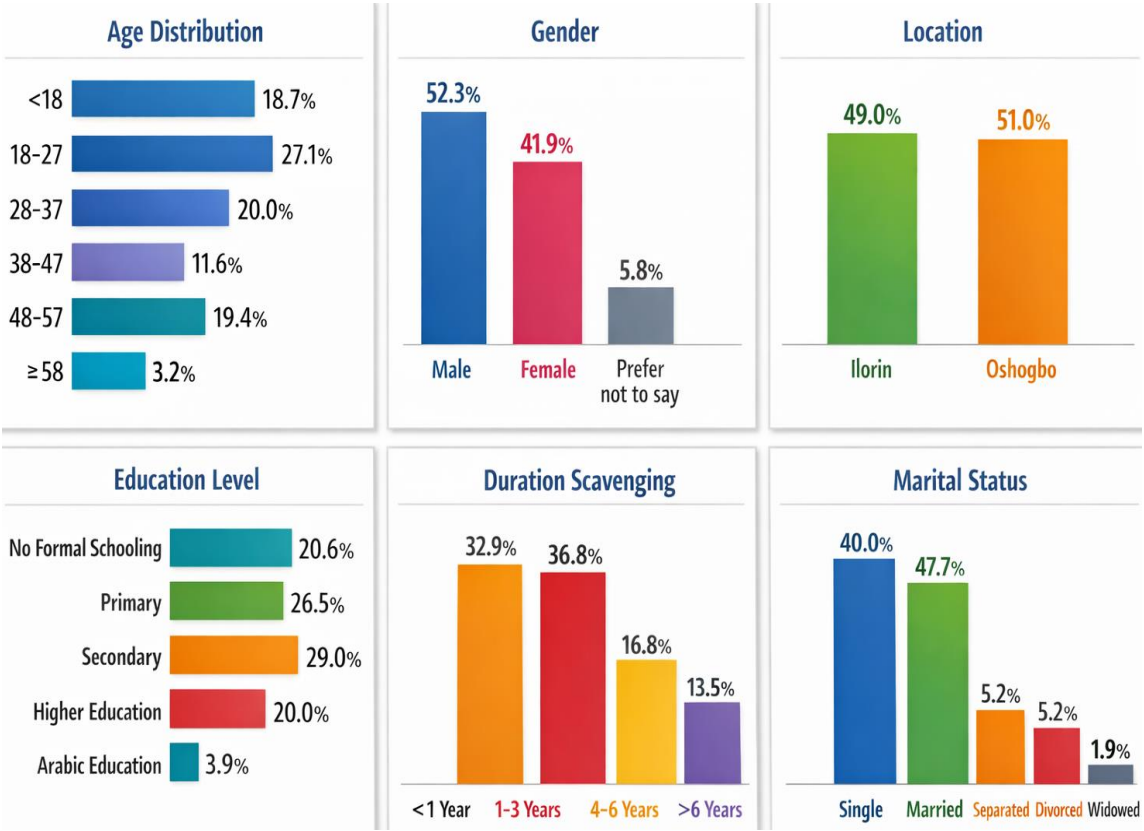

Figure 1. Socio-demographic characteristics of waste scavengers in Ilorin and Oshogbo, Nigeria.

3.2. Association Between Duration of Waste Scavenging and Perceived Stress Level

Table 2 & Figure 2 present the cross-tabulation of perceived stress levels by duration of scavenging activity, along with the results of a Pearson chi-square test of independence. Among the 155 respondents, the distribution of perceived stress varied across duration categories. For respondents engaged in scavenging for less than one year (n=51), the largest proportion reported that scavenging was "not stressful at all" (17 respondents, 33.3% of that duration group), followed by "less stressful" (14 respondents, 27.5%) and "highly stressful" (11 respondents, 21.6%). Among those engaged for 1-3 years (n=57), the most frequently reported category was also "not stressful at all" (19 respondents, 33.3%), followed by "moderately stressful" (16 respondents, 28.1%). For respondents engaged for 4-6 years (n=26), the modal category was "moderately stressful" (9 respondents, 34.6%), with "extremely stressful" reported by three respondents (11.5%). Among those engaged for more than six years (n=21), "moderately stressful" was again the most common response (9 respondents, 42.9%), while two respondents (9.5%) reported "extremely stressful." The Pearson chi-square test yielded a value of $\chi^2(12) = 14.680$, with an asymptotic significance (two-sided) of $p = 0.259$. Based on a conventional alpha threshold of 0.05, this result indicates no statistically significant association between duration of waste scavenging and the level of perceived stress among respondents in this sample. However, we note that 10 of the 20 cells (50.0%) in this 5 × 4 contingency table have expected counts of less than 5, with a minimum expected count of 1.49. This violates the assumption of the chi-square test that no more than 20% of cells have expected frequencies below 5. Consequently, the asymptotic p-value should be interpreted with caution. A Fisher-Freeman-Halton exact test (where computationally feasible) or a Monte Carlo simulation would provide a more reliable estimate of the true p-value. The observed pattern of higher proportions of "extremely stressful" responses among longer-duration groups (11.5% at 4-6 years, 9.5% at >6 years) compared to shorter-duration groups (1.8% at <1 year, 7.0% at 1-3 years) does not reach statistical significance in this sample, but the cell sparsity precludes definitive inference.

Table 2. Association between duration of waste scavenging and perceived stress level (N=155).

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How stressful is scavenging	Duration of scavenging activity			
	<1 year (n=51)	**1-3 years** (n=57)	**4-6 years** (n=26)	**>6 years** (n=21)
	n (%)	n (%)	n (%)	n (%)
Not stressful at all	17 (33.3)	19 (33.3)	4 (15.4)	5 (23.8)
Less stressful	14 (27.5)	12 (21.1)	5 (19.2)	3 (14.3)
Moderately stressful	8 (15.7)	16 (28.1)	9 (34.6)	9 (42.9)
Highly stressful	11 (21.6)	6 (10.5)	5 (19.2)	2 (9.5)
Extremely stressful	1 (2.0)	4 (7.0)	3 (11.5)	2 (9.5)

Data are n (row percentages calculated within each duration column). Percentages may not sum to 100 due to rounding. ***Statistical note:*** *Pearson $\chi^2(12) = 14.680$, $p = 0.259$ (asymptotic). Cell counts are observed frequencies; percentages in parentheses represent the proportion of respondents within each duration category. Ten cells (50.0%) have expected frequencies below 5, with a minimum expected count of 1.49, rendering the asymptotic p-value potentially unreliable. No post-hoc pairwise comparisons were conducted due to the non-significant omnibus test and sparse cell counts. Analyses were performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA).*

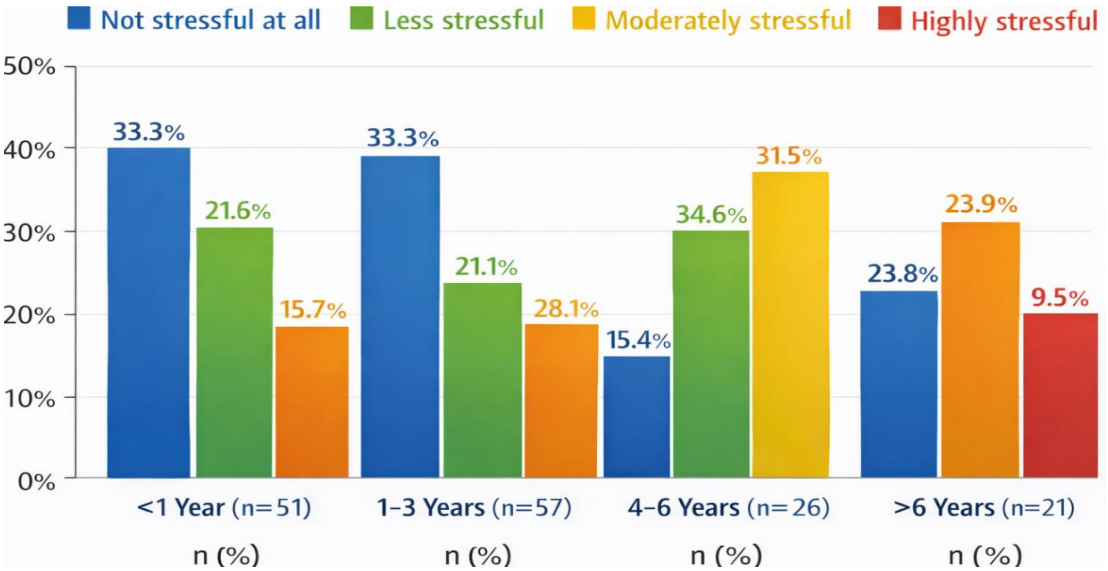

Figure 2. Stress Levels by Duration of Scavenging Activity.

3.3. Association Between Perceived Stress Level and Primary Psychosocial Challenge

Table 3 & Figure 3 present the distribution of primary psychosocial challenges reported by waste scavengers, stratified by their perceived level of work-related stress. Among the 152 respondents who identified a primary challenge, feelings of shame or embarrassment were the most frequently reported category overall (n=59, 38.8% of respondents with a reported challenge), followed by anxiety about safety (n=48, 31.6%) and social isolation (n=21, 13.8%). Fear of being judged by others was reported by 11 respondents (7.2%), trauma from past experiences by four respondents (2.6%), and other challenges by nine respondents (5.9%). When examining the distribution across stress levels, among respondents who rated scavenging as "not stressful at all" (n=45), the most common primary challenge was feelings of shame or embarrassment (17 respondents, 37.8%), followed by anxiety about safety (11 respondents, 24.4%). Among those reporting "less stressful" (n=33), shame or embarrassment again predominated (16 respondents, 48.5%). For respondents rating scavenging as "moderately stressful" (n=41), anxiety about safety was the most frequently endorsed primary challenge (17 respondents, 41.5%), followed by shame or embarrassment (13 respondents, 31.7%). Among those reporting "highly stressful" (n=23), shame or embarrassment and anxiety about safety were each reported by eight respondents (34.8%). For the small subgroup rating scavenging as "extremely stressful" (n=10), shame or embarrassment was the primary challenge for half of the

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respondents (five respondents, 50.0%). A Pearson chi-square test of independence was conducted to assess whether the distribution of primary psychosocial challenges differed significantly across stress levels. The test result was not statistically significant ($\chi^2(20) = 16.666$, $p = 0.675$). However, this finding must be interpreted with substantial caution: 60.0% of cells had expected frequencies below 5, violating a key assumption of the chi-square test and rendering the asymptotic p-value potentially unreliable.

Table 3. Primary psychosocial challenge reported by waste scavengers, stratified by perceived stress level (N=155).

How stressful is scavenging	N	Feelings of shame or embarrassment	Anxiety about safety	Social isolation	Fear of being judged by others	Trauma from past experiences	Other
		n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Not stressful at all	45	17 (37.8)	11 (24.4)	5 (11.1)	5 (11.1)	2 (4.4)	5 (11.1)
Less stressful	33	16 (48.5)	10 (30.3)	5 (15.2)	1 (3.0)	0 (0.0)	1 (3.0)
Moderately stressful	41	13 (31.7)	17 (41.5)	7 (17.1)	2 (4.9)	1 (2.4)	1 (2.4)
Highly stressful	23	8 (34.8)	8 (34.8)	3 (13.0)	3 (13.0)	0 (0.0)	1 (4.3)
Extremely stressful	10	5 (50.0)	2 (20.0)	1 (10.0)	0 (0.0)	1 (10.0)	1 (10.0)
Total	**152***	**59**	**48**	**21**	**11**	**4**	**9**

Data are n (row percentages within each stress level). Percentages may not sum to 100 due to rounding. **Note:** Total N = 152 due to three respondents who did not report a primary psychosocial challenge. "Other" category includes: financial worry (n=3), family disapproval (n=2), physical pain (n=2), and future uncertainty (n=2). ***Statistical note:*** *A Pearson chi-square test of independence was performed to examine the association between perceived stress level (5 categories) and primary psychosocial challenge (6 categories). The test yielded $\chi^2(20) = 16.666$, $p = 0.675$ (asymptotic). However, 18 of 30 cells (60.0%) have expected frequencies below 5, with a minimum expected count of 0.26, substantially violating chi-square assumptions. Consequently, the asymptotic p-value is unreliable. A Fisher-Freeman-Halton exact test is recommended for valid inference, though sparse data may limit its power. Analyses were performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA).*

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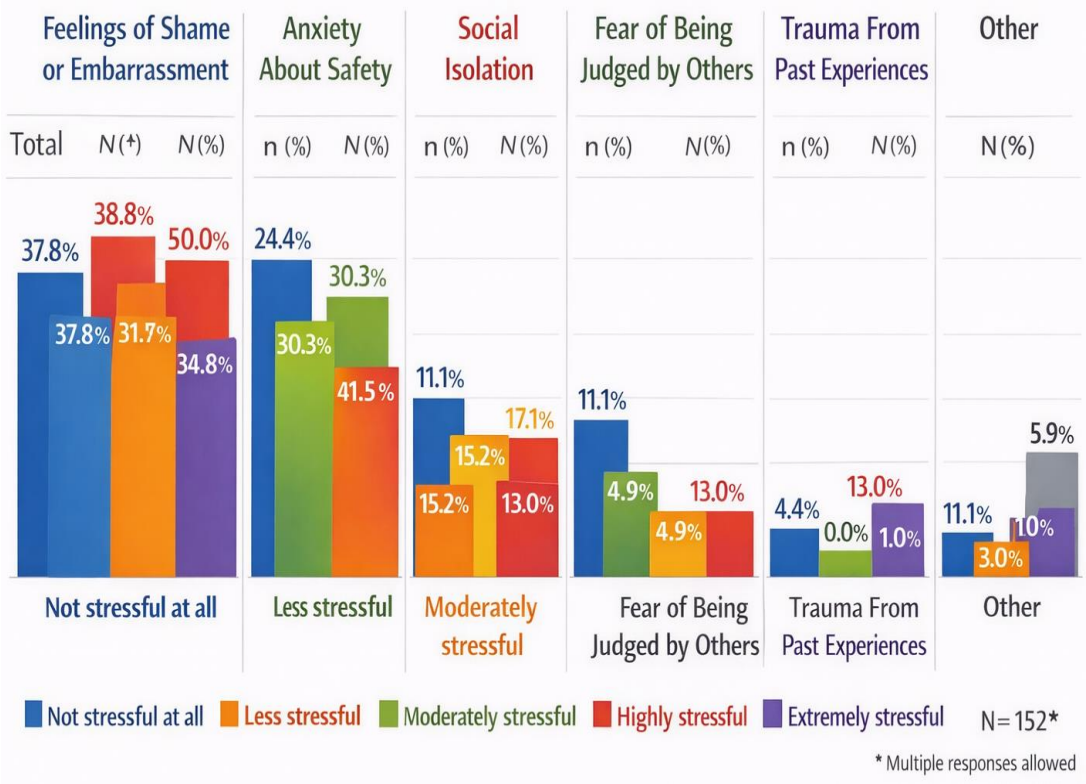

Figure 3. Factors Contributing to Stress in Scavenging.

4. Discussion

4.1. Socio-Demographic Profile and Occupational Context

The socio-demographic profile of the scavenger population in this study, characterized by a predominantly young adult workforce aged 18-27 years, aligns with prior observations that informal waste work largely attracts younger age groups due to physical demands and economic necessity (Karki et al., 2022; Kashyap & Chokhandre, 2017; Lissah et al., 2020; Wu & Zhang, 2019). This demographic trend has been reported in multiple developing contexts, including Kathmandu, Mumbai, and Ho Municipality, reflecting systemic reliance on youth for labor-intensive informal sectors (Mlotshwa et al., 2022; Luan et al., 2026; Muhammed et al., 2023). The near-equal gender distribution with a slightly higher male representation is consistent with studies showing male dominance in physically demanding waste collection roles, although female participation remains substantial due to economic imperatives (Velis, 2017; Wilson et al., 2022; Gutberlet, 2021). Furthermore, the dual-location sampling across Ilorin and Oshogbo echoes findings from comparative urban assessments where waste scavenging transcends localities, highlighting its ubiquity as a livelihood (Simatele & Etambakonga, 2015; Morufu et al., 2021a; Kasinja & Tilley, 2018). Educational attainment patterns indicate a predominance of secondary and primary education, mirroring global reports of low educational backgrounds among informal waste workers and reflecting barriers to formal employment, which reinforce dependence on the informal waste economy (MacRae, 2012; Afon, 2012; Godinić & Obrenovic, 2020). These findings support the notion that socio-demographic characteristics influence both occupational risk exposure and psychosocial outcomes, aligning with broader literature on environmental health vulnerabilities in marginalized workforces (Landrigan et al., 2018; Mishra & Farooqi, 2024; Navarro-Hernandez & Navarro-Hernandez, 2018). In addition, the predominance of respondents engaged in waste scavenging for 1-3 years and less than one year resonates with patterns observed in informal labor markets, where turnover is high and longer-term participation is limited by occupational hazards and social

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marginalization (Peña, Montoya-Torres, & Amodeo, 2025; Raufu et al., 2022; Thirarattanasunthon et al., 2012). Marital status distributions, showing a majority of married individuals, align with evidence that family responsibilities motivate engagement in low-barrier income-generating activities (Sachi & Mensah, 2020; Solaja et al., 2024; Sabah et al., 2024). These socio-familial factors are critical in understanding occupational decision-making and risk perception in waste work (Raimi et al., 2021b; Yadav & Sivastava, 2025; Labib et al., 2023). Moreover, the low proportion of Arabic education reflects structural inequalities and limited educational accessibility, which correlates with reduced awareness of occupational health risks (Muhammed Kodiya et al., 2023; Omotoso et al., 2025). These findings converge with literature emphasizing that informal waste workers' socio-demographic vulnerabilities intersect with heightened exposure to psychosocial stressors, physical hazards, and systemic marginalization (Karki et al., 2022; Luan et al., 2026; Mishra & Farooqi, 2024; Landrigan et al., 2018), while also highlighting unique regional patterns in Nigeria that may differ from those reported in South Asia and Latin America (Velis, 2017; Morais et al., 2022). Collectively, this study reinforces the importance of integrating socio-demographic context into occupational health interventions, policy design, and cooperative support mechanisms for informal waste workers.

4.2. Duration of Waste Scavenging and Perceived Stress

The observed variation in perceived stress levels across different durations of waste scavenging aligns with prior studies highlighting the complex relationship between occupational exposure and psychosocial well-being among informal waste workers. Shorter-duration workers (<1 year and 1-3 years) reporting lower stress levels correspond with the notion that newcomers often perceive scavenging as a manageable livelihood activity before cumulative physical, social, and economic stressors manifest (Afon, 2012; Dada et al., 2022; Beniwal & Sunda, 2022; Gutberlet, 2021; Ahmad et al., 2020; Alradhawi et al., 2020; Dururu et al., 2015; Çolak et al., 2024). Furthermore, similar findings were reported in Lagos and other Nigerian cities where novice scavengers initially exhibited adaptive coping mechanisms that attenuated perceived stress (Yusuf et al., 2023; Raufu et al., 2026). This pattern resonates with global observations in informal waste economies where early engagement often coincides with heightened optimism or underestimation of long-term risks (Buch et al., 2021; Colombijn & Morbidini, 2017; Derqui et al., 2018; Degefu & Getachew, 2025). Conversely, longer-duration scavengers (>4 years) demonstrating higher proportions of moderate-to-extreme stress are consistent with cumulative exposure theories and the psychosocial strain inherent in precarious work (Dada et al., 2020; Ahmad et al., 2020; Beniwal & Sunda, 2022; Gutberlet et al., 2013; Dururu et al., 2015; Çolak et al., 2024; Ahmad et al., 2020; Alradhawi et al., 2020). Although the chi-square analysis in this study did not reach statistical significance, the trends observed suggest experiential accumulation of occupational stress, reflecting the broader evidence that prolonged engagement in informal waste work exacerbates vulnerability to psychosocial distress (Yusuf et al., 2023; Afon, 2012; Durodié, 2020; Ahmad et al., 2020; Gutberlet, 2021; Beniwal & Sunda, 2022; Raufu et al., 2026; Dururu et al., 2015). Hence, these findings underscore the need for cautious interpretation, acknowledging both methodological limitations and the established correlation between duration of informal work and occupational stress exposure. Moreover, the lack of a statistically significant association between scavenging duration and perceived stress is concordant with other literature emphasizing the role of individual, social, and environmental mediators in stress perception. Studies in diverse urban contexts indicate that stress among waste workers is influenced not only by tenure but also by access to social support, cooperative structures, and mitigation of occupational hazards (Dada et al., 2022; Beniwal & Sunda, 2022; Çolak et al., 2024; Gutberlet, 2021; Buch et al., 2021; Dururu et al., 2015; Ahmad et al., 2020; Alradhawi et al., 2020). For example, cooperative membership and participation in organized waste collection systems have been associated with reduced perceived stress despite long-term exposure, highlighting the protective effect of structured support (Colombijn & Morbidini, 2017; Buch et al., 2021; Gutberlet et al., 2013; Degefu & Getachew, 2025; Durodié, 2020; Ahmad et al., 2020; Dururu et al., 2015; Yusuf et al., 2023). Similarly, psychological adaptation and learned coping strategies may buffer stress accumulation in long-term workers, as documented in Indian and

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Nigerian informal labor studies (Afon, 2012; Dada et al., 2020; Ahmad et al., 2020; Beniwal & Sunda, 2022; Çolak et al., 2024; Gutberlet, 2021; Alradhawi et al., 2020; Dururu et al., 2015). These findings collectively suggest that perceived stress is a multifactorial outcome, where duration alone may not be a robust predictor unless contextualized within broader occupational, psychosocial, and environmental determinants. Therefore, interventions targeting waste worker mental health should incorporate structural supports, cooperative engagement, and risk mitigation strategies, rather than focusing solely on tenure-based risk stratification (Raufu et al., 2026; Yusuf et al., 2023; Ahmad et al., 2020; Beniwal & Sunda, 2022; Gutberlet, 2021; Durodié, 2020; Dururu et al., 2015; Çolak et al., 2024).

4.3. Perceived Stress and Primary Psychosocial Challenges

The predominance of feelings of shame or embarrassment among waste scavengers as their primary psychosocial challenge aligns with evidence that informal waste work is heavily stigmatized, reinforcing psychosocial vulnerability (Yusuf et al., 2023; Raufu et al., 2026; Afon, 2012; Morufu et al., 2021a; Gutberlet, 2021; Lissah et al., 2020; Karki et al., 2022; Kashyap & Chokhandre, 2017). Anxiety about safety, the second most reported challenge, reflects the hazardous work environment of informal scavenging, consistent with prior occupational risk assessments in Nigerian and international contexts (Muhammed et al., 2023; MacRae, 2012; Buch et al., 2021; Luan et al., 2026; Alradhawi et al., 2020; Ahmad et al., 2020; Adias et al., 2025a; Elemuwa et al., 2025). The distribution of these challenges across perceived stress levels indicates that both newcomers and long-term workers experience persistent psychosocial stressors, suggesting that stigma and environmental hazards contribute to stress independently of self-reported stress intensity (Raimi et al., 2025; Giri et al., 2024; Anthony et al., 2025; Raufu & Raimi, 2023; Morufu et al., 2021b; Yusuf et al., 2023; Adias et al., 2025b; Iyoha et al., 2025). This observation mirrors global findings where occupational stress among informal workers is shaped by structural and social determinants rather than exposure duration alone (Luan et al., 2026; Karki et al., 2022; Buch et al., 2021; MacRae, 2012; Kashyap & Chokhandre, 2017; Gutberlet, 2021; Lissah et al., 2020; Muhammed Kodiya et al., 2023). Moreover, the lack of statistical significance between stress levels and specific psychosocial challenges reflects methodological constraints such as sparse cell counts but also supports literature indicating that psychosocial outcomes are multifactorial and context-dependent (Yusuf et al., 2023; Raufu et al., 2026; Abiye et al., 2026; Morufu et al., 2021b; Adias et al., 2025b; Anthony et al., 2025; Gift et al., 2020; Elemuwa et al., 2025). Studies in Nigeria and other developing countries highlight that cooperative structures, social support, and protective equipment mitigate perceived stress, independent of work duration (Raimi et al., 2025; Giri et al., 2024; Raufu & Raimi, 2023; MacRae, 2012; Buch et al., 2021; Gutberlet, 2021; Luan et al., 2026; Karki et al., 2022). The prominence of shame and anxiety across all stress categories underscores the need for interventions that address both societal stigma and occupational hazards concurrently, rather than focusing solely on the intensity or duration of work (Yusuf et al., 2023; Raufu et al., 2026; Morufu et al., 2021a; Abiye et al., 2026; Adias et al., 2025a; Anthony et al., 2025; Gift et al., 2020; Iyoha et al., 2025). Consequently, policy and programmatic approaches should integrate psychosocial support, safety training, and cooperative frameworks to holistically reduce stress and enhance mental health among informal waste workers.

5. Implications for Policy and Interventions

The findings underscore the urgent need for policy frameworks that address both the occupational and psychosocial dimensions of informal waste work. Interventions should prioritize safety measures, including provision of protective equipment, proper waste handling training, and enforcement of workplace hygiene standards. Additionally, psychosocial support structures are critical to reduce stigma, social isolation, and anxiety among scavengers. Community-based programs and cooperative models could strengthen social cohesion, foster peer support, and enhance collective bargaining power. By integrating these approaches, policies can not only improve the health and well-being of waste scavengers but also promote safer, more sustainable urban waste management practices. Furthermore, targeted initiatives for younger and newly engaged workers

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could provide early education on risk awareness, while long-term support strategies can mitigate cumulative stress among veteran scavengers.

6. Summary of the Findings

This study revealed a predominantly young adult, male workforce engaged in informal waste collection, with most having primary or secondary education and less than three years of experience. Perceived stress levels varied across duration categories but did not demonstrate a statistically significant association, although longer-term workers exhibited higher extreme stress proportions. Feelings of shame or embarrassment and anxiety about safety emerged as the most common psychosocial challenges, consistently affecting workers regardless of self-reported stress intensity. The patterns indicate that psychosocial burden in this workforce is persistent, driven more by social stigma and hazardous working conditions than by duration of engagement alone. Collectively, these results highlight the interplay between occupational exposure and social marginalization as central determinants of mental health and well-being among waste scavengers.

7. Study Limitations

Several limitations should be considered when interpreting these findings. The cross-sectional design restricts causal inferences, and the reliance on self-reported data may introduce bias in stress and psychosocial challenge assessments. Sparse data in certain response categories affected statistical robustness, limiting the power to detect significant associations. Additionally, the study was conducted in only two urban centers, which may reduce generalizability to other regions with differing socio-economic and environmental conditions. Despite these constraints, the study provides valuable insights into the occupational and psychosocial dynamics of waste scavengers, offering a foundation for future longitudinal and intervention-based research.

8. Conclusion

The study demonstrates that informal waste scavengers face persistent psychosocial challenges, with shame, embarrassment, and anxiety about safety dominating across all levels of perceived stress. While the duration of engagement did not show a statistically significant association with stress, longer-term workers experienced higher proportions of extreme stress, suggesting cumulative exposure to occupational hazards. The socio-demographic profile highlights a predominantly young and moderately educated workforce, emphasizing their vulnerability due to limited coping resources and societal marginalization. Overall, the findings indicate that psychosocial and occupational stressors are intertwined and pervasive, underscoring the need for holistic interventions that address both the physical and mental health dimensions of informal waste work.

9. Health Significance

Addressing the occupational and psychosocial risks of waste scavenging has substantial implications for public health and urban well-being. Reducing exposure to hazardous materials, mitigating stigma, and providing structured psychosocial support can prevent mental health deterioration, improve daily functioning, and enhance overall quality of life for this workforce. Furthermore, by promoting safer waste management practices and social inclusion, these interventions have the potential to reduce community-level environmental health risks. Strengthening both policy and practice in this sector is therefore essential for safeguarding the health of scavengers while contributing to sustainable urban waste management and broader public health outcomes. Thus, graphically it is represented as Figure 4.

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Figure 4. Integrated Framework for Addressing the Occupational & Psychosocial Risks of Waste Scavenging.

10. Recommendations

10.1. Short-Term Recommendations

i. Provide personal protective equipment (PPE) and hygiene kits to all waste scavengers to reduce immediate occupational hazards.
ii. Conduct awareness campaigns targeting stigma, safety practices, and psychosocial support among scavengers and local communities.
iii. Implement brief psychosocial support sessions, including counseling and stress management workshops, for high-risk workers.
iv. Establish reporting and monitoring mechanisms for occupational injuries and safety incidents at scavenging sites.

10.2. Mid-Term Recommendations

i. Develop community-based waste scavenger cooperatives to strengthen peer support, improve social inclusion, and enhance collective bargaining power.
ii. Introduce training programs on safe waste handling, occupational risk mitigation, and basic mental health literacy.
iii. Partner with local authorities to integrate scavengers into municipal waste management plans, ensuring access to safer work environments.
iv. Conduct periodic mental health screenings and follow-up interventions to identify and support workers experiencing elevated psychosocial stress.

10.3. Long-Term Recommendations

i. Institutionalize occupational health policies for informal waste workers, including comprehensive mental health and safety regulations.
ii. Facilitate sustainable livelihood programs, such as microcredit access and skill development, to reduce dependence on high-risk scavenging activities.
iii. Advocate for urban planning and waste management reforms that reduce environmental exposure and integrate waste pickers into formal recycling systems.
iv. Establish longitudinal research programs to monitor the impact of interventions on psychosocial well-being and occupational safety of waste scavengers.

 doi:10.20944/preprints202604.0462.v1

Author Contributions: All authors contributed equally to this work and take full responsibility for its content. All authors read and approved the final version for submission.

Funding: The authors affirm that no funding, whether financial or non-financial, was received for the execution of this study. This research was conducted independently of any external financial or material support. We uphold transparency in disclosing the absence of funding, underscoring the authors' commitment to conducting unbiased research driven solely by scientific inquiry.

Acknowledgments: The authors would like to acknowledge Federal University of Health Sciences, Ila-Orangun, Osun State and the Niger Delta Institute for Emerging and Re-emerging Infectious Diseases, Federal University Otuoke, Bayelsa State, Nigeria.

Competing interests: The authors affirm that they have no competing interests to declare. There are no conflicts of interest that could influence the objectivity or impartiality of the research findings presented in this study.

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