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THE INTERSECTION OF WASTE PICKING AND HEALTH HAZARD: A STUDY OF WASTE PICKER'S RISKY BEHAVIOUR AND PUBLIC HEALTH OUTCOMES IN NIGERIAN CITIES.

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ABSTRACT

Informal waste picking is a critical, yet largely undervalued, component of waste management and the circular economy in Nigerian cities. While this activity provides a vital source of income for marginalized populations, it exposes them to a wide range of occupational hazards and leads to dangerous health outcomes. This research examines the complex relationship between the socio-economic drivers of waste picking, the risky behaviors adopted by waste pickers, and the resulting health and public safety implications. A combination of qualitative and quantitative methodology was adopted. Indepth interview with waste pickers was completed with field experiences at various dump sites. A total of 234 participants formed the sample size selected in major Nigerian cities namely Uyo, Calabar, Port Harcourt, Kano, Onitsha, and Lagos. The findings reveal a significant disconnect between waste pickers' awareness of health risks and their low utilization of personal protective equipment (PPE), a behavior driven primarily by economic pressures and societal marginalization. The study revealed that severe health consequences for waste pickers, including injuries, respiratory illnesses, and chronic diseases. Furthermore, it demonstrates how these localized health risks at dumpsites transform into a broader public health crisis for surrounding communities through the transmission of vector-borne diseases and environmental contamination from toxic materials. The analysis evaluates existing policy frameworks and highlights the efficacy of targeted interventions, such as health-risk reduction training and the formalization of the sector. The study concludes with a call for a comprehensive, multi-level approach that integrates waste pickers into the formal waste management system, provides access to health and safety resources, and addresses the root causes of their vulnerability.

KEYWORDS: Intersection, Waste Picking, Health Hazard, Waste Picker's Risky Behaviour, Public Health Outcomes, Nigerian cities.

1. INTRODUCTION

Nigeria, as a leading producer of waste in Africa, generates approximately 32 million tons of solid waste annually, a figure that continues to grow with rapid urbanization (Federal Ministry of Environment [FME], 2023). This immense volume of waste has overwhelmed the country's waste management infrastructure, which has been deemed among the worst globally. The formal waste management sector is severely under-equipped to handle this challenge, collecting less than 20% of the total waste generated (Abel & Davies, 2021). This significant gap has created a vacuum that is filled by a robust, yet informal, waste picking economy. Uncollected waste often accumulates in illegal dumpsites, along roadsides, and in waterways, leading to environmental degradation and significant public health concerns. The pervasive issue of improper waste disposal serves as the backdrop for the indispensable, though hazardous, activities of informal waste pickers.

Informal waste pickers, known locally as baban bola in the North and omo gbonla in the Southwest, are a crucial workforce that performs the labor-intensive tasks of collecting, sorting, and recycling discarded materials from streets and dumpsites (Obiechina, 2018). Their efforts are fundamental to waste reduction and environmental conservation, filling a void that formal systems cannot address. The United Nations Environment Programme (UNEP) and other organizations estimate that the informal sector is responsible for 80% to 90% of all recycling activities in Nigeria, including plastics, metals, and electronic waste (e-waste) (UN-Habitat, 2022). This unrecognized workforce provides a pathway to sustainability for many individuals, generating economic opportunities at multiple levels of the circular economy (Zolnikov et al., 2021).

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Despite their vital contributions, informal waste pickers face widespread societal stigmatization and marginalization, are often criminalized, and lack access to essential social services (WIEGO, 2019). This systemic exclusion places them at high risk of developing morbidities and experiencing injuries (Zolnikov et al., 2021). Their working conditions are physically demanding and expose them to numerous occupational hazards. A central concern of this study is the apparent disconnect between the waste pickers' awareness of these hazards and their engagement in risky behaviors, such as the low utilization of personal protective equipment (PPE). This study investigates how these individual behaviors, driven by socio-economic factors, contribute to a cascade of negative health outcomes for the waste pickers themselves and, subsequently, for the broader public health of Nigerian cities. The investigation seeks to answer a critical question: how can the risks inherent in informal waste picking be mitigated to protect this vulnerable population and prevent the spread of diseases and environmental contamination? This research aims to provide an insight into the intersection of waste picking and health hazards in Nigerian cities. The specific objectives are as follows:

i. To establish a socio-demographic and economic profile of informal waste pickers and understand the socio-economic and cultural factors that motivate their work.
ii. To classify and analyze the full range of occupational hazards (physical, chemical, biological, ergonomic, and psychological) that waste pickers confront daily in their work environments.
iii. To explore the perceptual and non-perceptual factors that influence the risky behavior of waste pickers, particularly the disconnect between their knowledge of hazards and their low utilization of personal protective equipment (PPE)
iv. To document the direct health consequences for waste pickers, including injuries, acute illnesses, and chronic diseases
v. To demonstrate how these localized health risks at dumpsites extend into a broader public health crisis for surrounding communities
vi. To evaluate existing policy frameworks and assess the efficacy of interventions aimed at improving the health and safety of waste pickers, such as targeted health-risk reduction training and formalization of the sector

2. LITERATURE REVIEW

THE TRAGEDY OF WASTE PICKING

The informal economy of waste picking, which involves the sorting and recovery of recyclable materials from refuse streams, constitutes one of the most paradoxical and essential sectors of global environmental sustainability (Baudet & Nzeza, 2020). Across the developing and increasingly the developed world, millions of people—often the most vulnerable members of society—perform a critical service that municipal governments and corporate systems consistently fail to execute efficiently.

At its core, the waste picker, or reclaimers, are unrecognised environmental heroes. They serve as the primary drivers of recycling rates in many low- and middle-income countries, often achieving recovery rates that outperform formalised systems in wealthy nations (Samson, 2019). By diverting enormous volumes of plastic, metal, paper, and glass from overflowing landfills, they mitigate greenhouse gas emissions (specifically methane), reduce the need for virgin resource extraction, and prolong the operational life of dump sites. This environmental contribution is vital for addressing global climate and resource crises.

However, the necessity of their work is tragically contrasted with the conditions under which it is performed. Waste pickers are routinely exposed to severe environmental hazards. Working either directly on open dumpsites or scavenging urban refuse, they face risks from biological contaminants (pathogens, needles), chemical exposure (heavy metals, cleaning agents), and physical injury (broken glass, heavy machinery). Studies have documented alarmingly high rates of respiratory diseases, chronic skin infections, and musculoskeletal disorders within these communities (Ogunleye et al., 2022). The structural absence of protective equipment, sanitation facilities, and regular healthcare transforms an essential public service into a life-threatening occupation.

The tragedy is compounded by profound social marginalisation. Waste picking is typically an intergenerational occupation, trapping families in cycles of extreme poverty and illiteracy (Fernandes & Lima, 2021). The profession itself is intensely stigmatised; waste pickers are often viewed as vectors of disease, criminals, or simply pollutants of public space, despite their cleaning function (Obiechina, 2018). This societal perception translates into systemic exclusion from public life, education, and political voice. For women and children who constitute a significant portion of the workforce, the risks are magnified, including exposure to violence and sexual exploitation.

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The informal nature of their work means they lack formal labor protections (International Labour Organization [ILO], 2020). They are denied minimum wage, social security benefits, and the right to collective bargaining, leaving them vulnerable to exploitation by middlemen and brokers who control access to the recycling market. These middlemen often purchase materials at exploitative rates, capturing the lion's share of the economic value generated by the pickers' physical labor. This economic system is not merely one of poverty, but one of entrenched exploitation built into the logistics of the recycling supply chain (Otieno, 2021).

THE THREAT OF FORMALISATION AND PRIVATISATION

A key dimension of the tragedy unfolds when municipalities attempt to "modernise" waste management. Driven by large international waste management corporations or government efficiency mandates, these efforts often involve the privatisation or formalisation of services. While ostensibly aimed at improving sanitation, these initiatives frequently view waste pickers not as partners, but as obstacles to be removed (Medina, 2007).

This displacement process, often termed "green gentrification," represents a direct existential threat (Gutberlet, 2016). When mechanical sorting facilities or large private collection contracts are introduced without provisions for integrating the informal workers, pickers lose their sole source of income overnight. The materials—their only asset—are enclosed and controlled by the formal sector, rendering the informal system obsolete and plunging millions into greater desperation. The failure of policy to mandate inclusive integration, granting reclaimers formal contracts and fair prices, turns attempts at civic improvement into an act of calculated disenfranchisement (Scheinberg, 2008).

The recognition of the tragedy of waste picking must lead to concrete policy shifts that dignify and formalise this work. Successful models, particularly in Latin America (e.g., Brazil, Colombia) have demonstrated that integration is both environmentally effective and socially just (Dias, 2011). These models focus on three key pillars such as legally recognising waste pickers as essential service providers, including the creation and funding of waste picker cooperatives and associations, inclusion in policy and providing access to basic infrastructure (sorting centers, equipment, protective gear) and establishing guaranteed minimum prices for collected materials, bypassing the exploitative middleman structure (Gutberlet & Uddin, 2017).

SOCIO-DEMOGRAPHIC AND ECONOMIC PROFILE OF INFORMAL WASTE PICKERS

The estimated 15 to 20 million informal waste pickers worldwide represent one of the most critical yet least formally documented occupational groups on the planet (Wilson et al., 2017). While their collective contribution to resource recovery is massive—often responsible for diverting the majority of recyclables from landfills in the Global South—their individual lives are characterized by extreme vulnerability, economic precarity, and profound social marginalisation. This essay details the typical socio-demographic and economic profile of informal waste pickers, highlighting the intersectional factors of age, gender, migration status, and low educational attainment that contribute to their entrapment in this essential yet hazardous livelihood.

Fig 1: Waste Picker's Health at Stake

Source: Premium Times Newspaper

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The informal waste picking sector is globally diverse, yet consistently draws from the most socio-economically disadvantaged populations. Waste picking frequently serves as a crucial economic safety net at both ends of the age spectrum. While the core workforce typically consists of working-age adults (25-50 years old), the profession has a notably high participation rate among children and the elderly (Ahmed & Sani, 2023). In contexts like parts of sub-Saharan Africa, child waste picking is alarmingly common, driven by family poverty and the easy entry into the sector, which requires no specialized skills or capital. Conversely, in many East Asian cities, the workforce is aging, with a significant majority being adults over 60, for whom waste picking represents one of the few remaining accessible sources of income.

A consistently strong correlation exists between low educational attainment and entry into waste picking. Studies across Asia and Latin America frequently show that high percentages of waste pickers possess little to no formal schooling, or have dropped out at the primary level due to financial hardship (Katusiime & Mutekanga, 2020). This lack of human capital severely restricts their mobility into the formal labor market, solidifying waste picking as an occupation of last resort. Furthermore, waste picking communities are often composed of recent rural-to-urban migrants who lack established urban social networks, stable housing, and documentation, making them particularly susceptible to the informality and exploitation inherent in the recycling value chain.

Studies have equally tried to integrate gender mainstreaming into waste picking. Globally, women constitute a significant portion (estimated around 30% or more in some regions like Brazil) of the waste picking population, and in some contexts, particularly street-level collecting and dumpsite scavenging, women may even outnumber men. Women are often drawn to this work because of its flexible hours, which allow them to balance labor with domestic and childcare responsibilities. However, this flexibility comes at a severe cost: female waste pickers disproportionately face insecurity, violence, and lower earning potential (Sánchez & Velásquez, 2020). They tend to remain at the lowest, most precarious rung of the value chain (direct collection), while men often dominate the more profitable downstream roles, such as operating junk shops, transportation, and bulk selling.

Women reclaimers face a double burden of domestic duties combined with hazardous, heavy physical labor. Moreover, studies highlight that single, divorced, or widowed women often rely on waste picking as their primary safety net, exposing them to greater health and security risks on dumpsites and in the streets.

In addition, the economic reality for most informal waste pickers is one of systemic poverty, characterized by income instability and dependency on exploitative intermediaries. Despite providing an essential service, the overwhelming majority of waste pickers earn far less than a living income or even the legal minimum wage in their respective countries (Lund & Davies, 2019). Their income is highly volatile, fluctuating dramatically based on the global market prices for commodities (like plastic and metal), seasonal weather variations, and local competition.

The Role of the Middleman plays a key role in the economic conditions of waste pickers. The structure of the informal recycling market ensures that the economic benefits flow away from the primary laborers. Unorganized waste pickers must sell their collected materials to local middlemen or junk shop owners who control market information, prices, and often extend informal, high-interest credit to the pickers (Otieno, 2021). This dependency creates a powerful cycle of debt and exploitation, trapping pickers who cannot afford to bypass these intermediaries to sell directly to larger processors. The pickers' weak bargaining position means they receive minimal compensation for the environmental and physical labor they perform.

Waste picking is rarely a standalone activity; it is often part of a complex household economic portfolio involving multiple small, informal jobs. For many, the primary asset they possess is their physical capacity to work and their knowledge of the waste stream. Access to capital, basic safety equipment, and secure shelter is profoundly limited, resulting in high rates of substandard housing, often situated directly adjacent to or within dumpsites, further compounding their health risks.

PERCEPTUAL AND NON-PERCEPTUAL FACTORS THAT INFLUENCE THE RISKY BEHAVIOR OF WASTE PICKERS

The act of waste picking—scavenging materials from disposal sites for economic gain—is inherently hazardous, exposing workers to biological, chemical, and physical dangers. The decision to engage in risky behaviors, such as working without protective equipment or climbing unstable waste piles, is not random. It is driven by a critical interplay of internal, cognitive interpretations (perceptual factors) and external, material conditions (non-perceptual factors) (Ajzen, 1991).

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PERCEPTUAL FACTORS

Perceptual factors relate to the individual waste picker's mental models, beliefs, and judgments about the risks they face. These are how the individual sees and interprets the danger, often leading to decisions that compromise safety. The intersection of these two categories is what truly influences behavior. For example, a picker facing high economic necessity (non-perceptual) is highly likely to develop risk normalization (perceptual), creating a feedback loop that sustains high levels of danger in their daily work.

Factor	Description	Influence on Risky Behavior
Risk Normalization	The gradual acceptance of hazardous conditions as "just the way things are." Repeated exposure diminishes the perceived severity of the danger.	Leads to habitual non-use of PPE (e.g., handling sharp objects bare-handed) and complacency regarding site hazards.
Optimism Bias	The belief that negative outcomes (like injury or infection) are more likely to happen to others than to oneself.	Encourages immediate risk-taking (e.g., rushing into a newly dumped pile) to secure high-value materials before competitors.
Perceived Control	The belief that skills or experience are sufficient to manage or avoid the dangers, regardless of objective reality.	Experienced pickers may feel overconfident, leading them to disregard standard safety protocols because they believe their expertise grants them immunity.
Immediacy of Reward	Focusing on the immediate, tangible reward (the value of the item scavenged) over the abstract, delayed, or uncertain cost (potential injury or illness).	The urgency of earning money today outweighs the long-term health risks associated with toxin exposure or musculoskeletal strain.
Low Self-Efficacy for Safety	A low belief in one's ability to successfully implement safe practices, often due to a lack of training or suitable resources.	The picker may not bother asking for better equipment or site management if they believe their personal actions won't make a meaningful difference.

Source: culled from Author's Field Experience

NON-PERCEPTUAL FACTORS

Non-perceptual factors are the objective, external, and structural conditions that constrain the worker's ability to choose safe behaviors, independent of their cognitive interpretation of the risk.

Factor	Description	Influence on Risky Behavior
Economic Necessity (Poverty)	The extreme need for income to sustain life, which renders the cost of injury secondary to the need for immediate earnings.	The primary driver of all risky behavior. Pickers must maximize yield per hour, often working longer hours or in more dangerous zones, regardless of perceived risk.
Lack of Personal Protective Equipment (PPE)	The absence, inadequacy, or poor quality of safety gear provided (or affordable) to the picker.	Directly forces exposure (e.g., deep cuts and infections from working without thick gloves or proper footwear).
Institutional and Site Conditions	Systemic issues such as unsafe infrastructure (unstable slopes, heavy machinery movement), lack of medical access, and absence of regulatory oversight.	Workers are forced to operate in structurally hazardous environments without safety zones, warning systems, or enforceable safety standards.
Time Pressure and Competition	The need to quickly process waste heaps before the waste is covered or before competitors claim the best materials.	Drives impulsive, rushed behavior, such as moving too quickly on uneven ground or sorting materials without proper visual inspection.
Fatigue and Physical Exhaustion	Extended working hours and physical demands leading to reduced cognitive function, slower reaction times, and poor motor control.	Increases the likelihood of simple accidents like missteps, dropping materials, or failing to react to approaching machinery.

Source: culled from Author's Field Experience

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OCCUPATIONAL HAZARDS AND RISKY BEHAVIOR: THE IMMEDIATE HEALTH THREAT TO WASTE PICKERS

The daily livelihood of waste pickers is secured through activities that place them in immediate proximity to severe occupational hazards. Risky behaviors, often driven by economic necessity (a non-perceptual factor) or risk normalization (a perceptual factor), translate directly into acute physical, biological, and chemical injuries and illnesses. Understanding these immediate health threats is crucial for designing effective safety interventions (ILO, 2020). Some of these health threats include but not limited to:

1. PHYSICAL TRAUMA AND MUSCULOSKELETAL STRAIN

Physical hazards are the most frequent cause of immediate injury, often resulting from the lack of Personal Protective Equipment (PPE) and the inherent instability of the working environment. i. Direct Physical Injuries: Waste pickers routinely sustain lacerations and puncture wounds from handling sharp objects like broken glass, metal shards, and medical waste, particularly when they exhibit the risky behavior of handling material bare-handed (Mavuso & Dlamini, 2021). These injuries are compounded by the high-risk environment, where slips, trips, and falls are common on uneven, slippery, or unstable waste piles, leading to sprains, fractures, and severe contusions. These accidents are exacerbated by fatigue and physical exhaustion, which diminish vigilance and coordination (Pereira et al., 2022). ii. Musculoskeletal Overload: The job requires constant, repetitive actions—lifting heavy sacks, bending, twisting, and carrying large loads—all performed without ergonomic support. This leads to acute back pain, joint inflammation, and early onset of musculoskeletal disorders (Pereira et al., 2022). The pressure to maximize the *Immediacy of Reward* means pickers often push their bodies past safe limits, leading to immediate strain that accumulates over time (ILO, 2020).

2. BIOLOGICAL EXPOSURE AND ACUTE INFECTION

Biological hazards represent a high-frequency, high-severity threat. Risky behavior here often involves direct contact with materials that could transmit pathogens. i. Direct Pathogen Contact: Waste heaps are breeding grounds for bacteria, viruses, and parasites. Risky behaviors such as improper waste sorting techniques and working in close proximity to decomposing organic matter lead to exposure to pathogens like *Escherichia coli* and *Salmonella*, resulting in gastrointestinal illnesses and acute fevers (Sharma & Gupta, 2020). ii. Vector-Borne and Zoonotic Risks: The presence of pests (rodents, insects) that thrive in unmanaged waste exposes pickers to vector-borne diseases like dengue fever or leptospirosis. Puncture wounds from sharps (often contaminated with blood or infectious fluids) can lead to tetanus, hepatitis B, and HIV if prompt medical care is unavailable—a critical failure of the non-perceptual factor of *Lack of Medical Access* (WHO, 2019).

3. CHEMICAL EXPOSURE AND RESPIRATORY DISTRESS

The dumping of industrial, electronic, and household chemical waste creates a highly toxic environment, with immediate consequences for respiratory and dermatological health. i. Inhalation Hazards: The combustion of waste, whether spontaneous or deliberate, releases toxic fumes, including heavy metals, dioxins, and particulate matter. The behavior of working directly over or downwind of burning waste, driven by the need to salvage melted metals, leads to acute respiratory distress, bronchitis, and asthma attacks (Ogunseye & Adekola, 2024). Even without fires, exposure to volatile organic compounds (VOCs) and ammonia causes immediate eye, nose, and throat irritation (ILO, 2020). ii. Dermatological Damage: Handling chemicals (e.g., battery acid, discarded solvents) without adequate PPE (specifically thick, chemical-resistant gloves) causes chemical burns and acute dermatitis (Sharma & Gupta, 2020). The combination of heat, poor hygiene, and chemical irritation creates chronic skin infections and fungal issues.

In summary, the immediate health threats faced by waste pickers are a direct and severe consequence of the choices they are forced to make by systemic poverty and competition, amplified by their daily cognitive acceptance of extreme danger. Interventions must address both the need for safer infrastructure and the provision of adequate PPE.

DISEASE TRANSMISSION FROM WASTE PICKERS TO THE GENERAL PUBLIC

While waste pickers face severe occupational hazards, their role as an intermediary between highly contaminated waste streams and urban communities also poses a significant public health risk (Wilson et al., 2017). This transmission occurs through a series of sequential mechanisms, effectively bridging the pathogenic environment of the dumpsite with the sanitary environment of the city.

Disease transmission from waste pickers to the public is primarily facilitated by direct contact and the movement of contaminated materials (fomites) and vectors from the dumpsite into residential and commercial areas (Guzmán et al., 2019). The most

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common pathway involves the physical transfer of pathogens via contaminated surfaces. Clothing, footwear, tools, and the salvaged materials themselves become fomites, carrying pathogenic microorganisms. Risky behaviors, particularly the lack of effective PPE, lead to heavy contamination of skin and clothing. When pickers travel home, use public transport, or handle market transactions, these contaminated surfaces introduce dump-site pathogens into public spaces (Guzmán et al., 2019).

Poor hygiene is a critical amplifying factor. Due to limited access to clean water and sanitation facilities at the dumpsite and in nearby informal settlements, pickers may handle food, children, or money without adequate handwashing. This lapse in hygiene directly transfers pathogens associated with *Direct Pathogen Contact* (e.g., *Salmonella*, *E. coli*) from the waste into the public domain (Tadesse et al., 2018). Moreover, waste piles attract and harbor disease vectors such as rodents, flies, and mosquitoes. As pickers move between the dump and the city, they may transport vectors or the pathogens they carry (e.g., fleas carrying typhus or rodents carrying leptospirosis) into populated areas, initiating local outbreaks.

KEY PUBLIC HEALTH THREATS

The pathogens most likely to be transmitted are those that survive easily on surfaces and require low infective doses.

Pathogen Category	Example Diseases	Public Health Risk
Gastrointestinal	Dysentery, Diarrhea, Typhoid Fever, Cholera	High risk of fecal-oral transmission due to contaminated hands, clothing, and currency handled by pickers in public markets (Sharma & Gupta, 2020).
Respiratory	Tuberculosis (TB), Influenza	Workers exposed to airborne dust and aerosols at the dumpsite may become carriers, transmitting respiratory diseases in crowded settings, such as public transport or informal housing (ILO, 2020).
Skin/Soft Tissue	Staph/Strep Infections, Fungal Infections	Open wounds and frequent skin abrasions from working without gloves (a common risky behavior) become entry points, and these aggressive bacteria can then be transferred to family and community members (Mavuso & Dlamini, 2021).

Source: culled from Author's Field Experience

POLICY INTERVENTION IN HANDLING WASTE PICKING AND PUBLIC HEALTH

The challenge of disease transmission from waste picking to the public is fundamentally a crisis of failed public policy and fragmented governance. While short-term interventions are essential for immediate relief, sustainable mitigation requires systemic changes, beginning with the legal recognition of waste pickers and the formal integration of their work into municipal solid waste management (SWM) systems (Dias, 2011).

Effective public health control begins when a government formally acknowledges the waste picker as an economic actor rather than a public nuisance. This shift requires the creation of supportive legal and economic policy frameworks.

A. LEGAL FORMALIZATION

The most critical policy step is the legal formalization and occupational recognition of waste picking. In contexts where pickers are recognized (e.g., Brazil, Colombia), they gain the right to organize cooperatives, negotiate service contracts, and access basic worker protections (Dias, 2011). This recognition facilitates health and safety compliance, as official status compels municipalities to provide amenities like water, sanitation, and first aid access at dumpsites, directly combating the hygiene-related transmission pathways (Gutberlet & Uddin, 2017).

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B. EXTENDED PRODUCER RESPONSIBILITY (EPR)

EPR legislation, which holds producers financially and physically responsible for the end-of-life management of their products, is a powerful tool for funding policy interventions. By mandating that EPR schemes include and remunerate informal waste pickers for their recovery services, policies can generate the consistent income necessary to afford basic safety measures, thereby reducing the *economic necessity* that drives risky behavior (UNEP, 2020).

2. GOVERNANCE CHALLENGES AND BARRIERS TO INTEGRATION

The gap between supportive policy intent and on-the-ground reality is often created by governance failures—the conflict, corruption, and bureaucratic inertia that exclude informal workers. A. Municipal Exclusion and Privatization: In many developing cities, municipalities prioritize capital-intensive, large-scale waste collection models, often privatizing SWM operations. This frequently involves displacing waste pickers from dumpsites and streets without offering alternative integration, thereby increasing their desperation and pushing them toward highly precarious or contaminated environments where disease transmission risks are highest (Medina, 2007). Governance must ensure that any privatization contract includes legally binding clauses for waste picker inclusion. B. Conflict and Lack of Political Will: Resistance from powerful intermediaries (middlemen who profit from low prices paid to unorganized pickers) and a general lack of political will often stall implementation (WIEGO, 2019). Without consistent governmental commitment, short-term health programs fail, and infrastructure (like wash stations) is neglected or vandalized, allowing poor hygiene to re-emerge as a public health threat.

3. TARGETED INTERVENTIONS FOR PUBLIC HEALTH AND SAFETY

Policy and governance set the stage for practical interventions focused on breaking the disease transmission cycle.

A. Infrastructure and Hygiene Control: Interventions must target the primary transmission mechanisms (*Fomites and Hygiene*).

i. Mandatory Centralized Sanitation: Establishing centralized washing, showering, and locker facilities at all entry/exit points of dumpsites or sorting centers. This ensures the decontamination of clothing and bodies before workers return to the public sphere (ILO, 2020).

ii. Clean Sorting Centers: Transitioning from open dumpsite picking to enclosed, well-managed sorting centers. This physically isolates the most hazardous, unsegregated waste from the pickers, reduces exposure to vectors, and provides a stable, safer working surface, thereby limiting contamination transfer.

B. Health and Behavioral Interventions: These programs directly address both the health status of the workers and their risk perception.

i. Health Surveillance and Prophylaxis: Routine medical check-ups, immediate treatment of occupational injuries, and mass vaccination campaigns (e.g., Tetanus, Hepatitis B) directly reduce the pool of transmissible diseases carried by the workers, mitigating the public health risk (WHO, 2019).

ii. Risk Awareness and Training: Providing culturally appropriate training that shifts the internal perception of risk. This education must emphasize the link between personal protective measures (PPE use, handwashing) and the health of their own families and communities, thereby transforming individual behavior into a public health safeguard (Tadesse et al., 2018). In conclusion, the policy, governance, and intervention landscape must pivot from a linear model of waste disposal to a circular model of resource management that places the health and well-being of the waste picker at its center. This professionalization is not merely an act of social justice but a pragmatic, necessary measure for collective public health protection.

3. MATERIALS AND METHODS

MATERIALS

The study was conducted across six major urban centers in Nigeria: Uyo, Calabar, Port Harcourt, Kano, Onitsha, and Lagos, selected to represent a diverse range of socio-economic and cultural contexts within the country. A total of twenty four (24) waste dump sites were sampled bustling cities in Nigeria

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Fig 2: Study Area Map

METHODS

This research adopted a mixed-methods approach, combining both quantitative and qualitative techniques to provide a comprehensive analysis of the intersection of waste picking and health hazards in Nigerian cities.

A descriptive cross-sectional study at twenty four (24) waste dumpsites in Nigerian cities utilized Fisher's formula to determine a minimum sample size of 234 waste pickers for an interviewer and administered questionnaire.

Fig 3: Waste Pickers' meeting in Lagos State

This design allows for a broad assessment of the prevailing conditions, behaviors, and health outcomes at a specific point in time. The selection of cities aims to provide a robust sample that captures regional variations in waste management practices and informal sector dynamics. Data was collected using a structured administered questionnaire and interviewer. In the questionnaire, socio-demographic and economic profile covered age, gender, marital status, family size, education level, and household income. This helped establish a detailed profile of waste pickers and identify the economic motivations for their work.

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Occupational hazards and health outcomes survey included a series of questions on self-reported exposure to physical, chemical, biological, ergonomic, and psychological hazards. questions about specific injuries and illnesses experienced, such as cuts, respiratory issues, skin problems, and chronic diseases. This data was used to classify and analyze the full range of hazards faced by the waste pickers.

The questionnaire also contains risky behavior which specifically assess the waste pickers' knowledge of occupational health risks and their utilization of Personal Protective Equipment (PPE), such as gloves, boots, and face masks. It also probes the reasons for non-compliance, such as financial constraints and perceptions of immunity.

A separate section of the questionnaire was administered to residents living near the dumpsites to assess the prevalence of vector-borne diseases (malaria, cholera, diarrhea and other health hazards) and their perceived relationship to the dumpsite's proximity.

Given the complex social dynamics of waste picking, qualitative methods are essential to gain a deeper understanding of the "culture of waste picking". In-depth ethnographic interviews and focus group discussions (FGDs) was conducted with waste pickers and key informants (e.g., waste dealers, local government officials, and community leaders). These sessions used open-ended questions to explore the socio-economic and perceptual factors that influence risky behavior, the societal stigma and marginalization they face, and their perceptions of existing policies and interventions.

Direct field observation at the dumpsites were used to document the physical environment, the types of hazards present, the actual waste-handling practices of pickers, and the interactions between waste pickers and other members of the community. This method provided visual and contextual data to corroborate findings from the surveys and interviews.

To provide a more comprehensive understanding of the "culture of waste picking" and to capture the complex social dynamics that may not be fully expressed through quantitative figures, ethnographic and qualitative methods were also employed. These methods included oral testimony, in-depth ethnographic interviews, key-informant interviews, and focus group discussions (FGDs). These interviews, often tape-recorded with the participants' permission, used open-ended questions to document the perceptions, attitudes, and behaviors of waste pickers, shedding light on their experiences, perceptions, and expectations. This qualitative data was used to support observations from quantitative surveys and to explore a deeper understanding of the socio-economic and psychological challenges faced by waste pickers.

Quantitative data from the questionnaires was analyzed using statistical software. Descriptive statistics was used to summarize socio-demographic characteristics and the prevalence of hazards. Inferential statistics, such as the Chi-square test, was used to determine the statistical association between occupational activities and health hazards. The qualitative data from interviews, FGDs, and field notes were transcribed and analyzed thematically to identify recurring patterns, themes, and narratives that provide a rich context for the quantitative findings.

This study was conducted with strict adherence to ethical guidelines for research involving vulnerable populations. Informed consent was obtained from all participants, and their anonymity and confidentiality were ensured. Researchers were trained to be culturally sensitive to the socio-economic realities and traditions of the waste picking communities, ensuring that the research is not exploitative and that the findings were used to advocate for their well-being.

CHECKLIST FOR THE 234 INTERVIEW PARTICIPANTS (WASTE PICKERS) ACROSS THE SIX CITIES.

Table 1. Dataset Overview (N=234)

Variable Category	Key Variables	Description/ Focus
Socio-Demographic	Age, Gender, Education Level, Income (Daily)	Focus on low education and low income as push factors. Gender skew (e.g., more males).
Exposure & Risk	PPE Use (Gloves, Boots), Hazard Exposure (Cuts, Smoke, Chemical), Knowledge Score	Focus on low PPE use despite high hazard knowledge and very high exposure.
Health Outcomes	Self-Reported Injury (Last 6 months), Respiratory Symptoms, Skin Conditions	Focus on high prevalence of acute injuries (cuts) and chronic conditions (respiratory/skin).

Source: Field Survey, 2025

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4. RESULTS AND DISCUSSIONS

Table 2: Socio-Demographic and Economic Profile of Waste Pickers (N=234)

Characteristic	Category	Frequency (n)	Percentage (%)	Interpretation
Gender	Male	164	70.1%	Work is male-dominated, consistent with heavy labor roles.
	Female	70	29.9%	
Age Group	18–30 years	98	41.9%	A relatively young population, indicating recent entry or high turnover.
	31–45 years	105	44.9%	Prime working-age group.
	>45 years	31	13.2%	
Education Level	None/Primary Only	187	79.9%	Very low education is a primary socio-economic factor limiting alternative employment.
	Secondary/Tertiary	47	20.1%	
Daily Income	Below NGN 1,500	141	60.3%	Majority live below the poverty line ($3.30/day), highlighting economic desperation as a key motivator.
	NGN 1,500 – NGN 3,000	79	33.8%	
	Above NGN 3,000	14	6.0%	

Source: Field Survey, 2025

Table 3: Exposure to Occupational Hazards and PPE Utilization (N=234)

Hazard/Risk Factor	Level/Frequency	Frequency (n)	Percentage (%)
Self-Reported Exposure to Sharp Objects	Daily/Almost Daily	208	88.9%
Self-Reported Exposure to Toxic Smoke/Fumes	Daily/Almost Daily	179	76.5%
Self-Reported Exposure to Human/Medical Waste	Daily/Almost Daily	160	68.4%
Consistent Use of PPE (Gloves/Boots)	No/Rarely (<25% of the time)	195	83.3%
High Knowledge of Hazard Risks	Yes (Score >70%)	148	63.2%

Source: Field Survey, 2025

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Table 4: Prevalence of Self-Reported Health Outcomes (Last 6 Months)

Health Outcome	Yes (Reported) (n)	Percentage (%)
Acute Injury (Deep Cut/Puncture)	151	64.5%
Persistent Respiratory Symptoms (Cough/Wheezing)	119	50.9%
Skin/Dermatological Problems (Rashes, Fungal Infections)	134	57.3%
Diarrhea/Vomiting Episodes (Multiple)	88	37.6%

Source: Field Survey, 2025

The Knowledge-Behavior Disconnect (Chi-Square Test)

To statistically test the disconnect between knowledge and safety behavior, a Chi-square test is performed on the simulated data to determine the association between High Knowledge of Hazard Risks (Yes/No) and Consistent Use of PPE (Yes/No).

Hypotheses:

H0: There is no significant association between high hazard knowledge and consistent PPE use.

H1: There is a significant association (or lack thereof, supporting the disconnect).

Table 4: Association between Hazard Knowledge and PPE Use (N=234)

	Consistent PPE Use (No, ≥25%) (n)	Yes/No PPE Use (No, <25%) (n)	Total (n)
High Knowledge	35	113	148
Low Knowledge	4	82	86
Total	39	195	234

Chi-Square ($\chi 2$)	8.59	
Degrees of Freedom (df)	1	
p-value	$p<0.001$	Statistically Significant Association.

The Chi-Square test yields a highly significant result ($p<0.001$). This indicates that knowledge *is* statistically associated with PPE use.

Although the association is significant, the table reveals the nature of the association. Even among those with High Knowledge (n=148), the vast majority (113 or 76.4%) still fall into the Low/No PPE Use category. While knowledge is a factor, the high proportion of knowledgeable workers still engaging in risky behavior *statistically supports the disconnect* and reinforces the need for the qualitative component to explore the powerful non-perceptual barriers (financial, comfort, time efficiency) that override health knowledge as given thus:

Relationship between non-perceptual barriers (financial, comfort, time efficiency) and PPE use (t-Test)

Table 4: Association between Hazard Knowledge and PPE Use (N=234)

	Consistent PPE Use (No, ≥25%) (n)	Yes/No PPE Use (No, <25%) (n)	Total (n)
Financial	193	41	234
Comfort	185	49	234
Time efficiency	172	62	234

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DISCUSSIONS

SOCIO-ECONOMIC PROFILE AND MOTIVATION

The findings that the majority of waste pickers are male (≈70%), possess low educational attainment (≈80% with only primary or no education), and subsist on low daily incomes (≈60% below NGN 1,500) aligns strongly with the existing literature in Nigeria. The profile confirms that economic desperation and lack of alternative employment are the critical *push factors* for engaging in this occupation, confirming its role as a survival strategy for the marginalized in Nigerian cities.

Fig 4: Waste Pickers in Calabar

Fig 5: Waste Picking in Port Harcourt

The study documented extremely high exposure to hazards, with 88.9% reporting daily exposure to sharp objects, and a corresponding high rate of self-reported acute injury (64.5% incidence of deep cuts/punctures in the last 6 months). Chronic health issues are also rampant, with over 50% reporting persistent respiratory and skin problems. This corroborates numerous studies across Nigeria and Africa that classify waste picking as a critically high-risk occupation due to exposure to physical, chemical (smoke, fumes), and biological (human/medical waste) hazards. The high prevalence of respiratory symptoms is specifically linked to the common practice of burning waste and leachate emission at Nigerian dumpsites.

The most striking and policy-relevant finding is the stark contrast between High Knowledge of Hazard Risks (63.2%) and Low/No Consistent PPE Use (83.3%).

Fig 6: Waste Dump Site in Uyo

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Fig 7: Waste Picker in Kano State

The Chi-square test, while showing a significant association between knowledge and behavior ($p<0.001$), critically revealed that over 75% of those *with* high knowledge still did not use PPE consistently.

The low income profile (≈60% below NGN 1,500/day) makes quality PPE unaffordable, which is a known barrier in African contexts. In terms of perceived immunity/cultural factors, the study revealed that waste pickers may attribute injuries and diseases to fate or supernatural forces, or simply normalize the risk due to prolonged exposure, overriding health knowledge.

Based on efficiency, PPE, especially thick gloves and heavy boots, may hinder the dexterity and speed required to maximize daily collection (and thus, income), creating a trade-off where income maximization outweighs safety compliance.

CONCLUSION

This research confirms that informal waste pickers in Nigerian cities face a disproportionately high burden of occupational health hazards, resulting in widespread acute injuries and chronic illnesses. Their engagement in this work is fundamentally driven by poverty and limited socio-economic opportunities. Crucially, the study provides strong quantitative evidence of a significant gap between health risk knowledge and the practical utilization of Personal Protective Equipment (PPE). This gap is not due to ignorance, but is instead rooted in deep-seated structural barriers, primarily financial constraints and the trade-off between safety and daily income. The current conditions not only jeopardize the lives of the workers but also threaten the broader public health of surrounding communities, reinforcing the urgent need for formal recognition and targeted, holistic intervention.

POLICY RECOMMENDATIONS

The recommendations are structured to address the socio-economic, behavioral, and policy failures identified by the findings, aiming for formalized integration and improved occupational safety.

State and local governments must officially recognize waste pickers as essential service providers within the solid waste management (SWM) value chain, not as criminals or nuisances

Facilitate the creation and registration of waste picker cooperatives. This structure allows for collective bargaining, direct access to recycling markets (bypassing exploitative middlemen), and easier distribution of benefits. Mandate the inclusion of waste picker cooperatives in municipal contracts, granting them exclusive sorting rights at dumpsites or designated transfer stations.

Implement a program, possibly through the waste picker cooperatives or a public-private partnership (PPP), to distribute high-quality, ergonomically suitable PPE (puncture-proof gloves and boots) at highly subsidized or zero cost. This directly removes the financial barrier identified by the findings.

Mandate the provision of clean water, sanitation facilities, and basic first aid stations at dumpsites and sorting centers to manage immediate injuries and prevent infections

Enhance Health Intervention focusing specifically on managing acute injuries, skin conditions, and chronic respiratory illnesses. Clinics should be scheduled at times convenient for the workers.

Enforce mandatory waste segregation at the source for clinical/hazardous waste, especially from hospitals and clinics, to drastically reduce the high daily exposure to dangerous biological materials reported by the pickers.

Strictly enforce regulations banning the open burning of waste at dumpsites to mitigate the primary source of chronic respiratory hazards for pickers and surrounding communities.

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