

Scavenging for wealth or death? Exploring the health risk associated with waste scavenging in Kumasi, Ghana

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Abstract

By sheer dint of necessity, the urban poor in Ghana have invented an endless series of survival strategies to endure the high rate of unemployment and widespread poverty by engaging in occupations such as waste scavenging. Whilst literature is replete with evidence of the economic significance of this livelihood activity, there is scanty empirical work on its health implications. This study examines the health implications associated with the occupation, using scavengers in Kumasi as a case study. The research is based on data collected through 10 key informant interviews with stakeholders in waste management and 30 personal interviews with waste scavengers drawn equally from the three largest solid waste dumpsites in the metropolis. The study reveals how scavengers are exposed daily to a myriad life threatening health problems as they sift for recyclable products. The paper concedes that given the economic implication of the enterprise, it is important that they benefit from intervention programs that can reduce the adverse health outcomes associated with their job.

Key words: scavenging; waste; livelihood activity; wealth; health

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Note: Names used in this research are not the real names of respondents

Introduction

In the past few decades, the process of urbanization has accelerated mainly in cities coping with informal hyper growth (UN-Habitat, 2012), most of which are located in sub-Saharan Africa. These cities are characterized by an economy heavily dependent on the informal sector and very extensive poverty (Hall, 2007). The high concentration of people in the emerging urban centres in the developing world has two implications: it leads to increases in waste generation and also creates a large pool of unemployed and underemployed residents with few alternative means of earning a living.

In Ghana, the unemployment situation has been compounded by years of economic decline following the shrinkage of the national economy, which started from the 1970s and persisted for over two decades (Owusu, 2001). In reaction, the Structural Adjustment Program, which was prescribed by the World Bank and the International Monetary Fund as a panacea to the economic crises, also brought in its wake austerity measures that led to the retrenchment of workers from state owned enterprises, among others. This economic downturn led to the development and growth of the informal sector in response to the unemployment growth. Among the informal activities that have grown in significance in response to the massive urban unemployment is waste scavenging.

A waste scavenger is a person who salvages reusable or recyclable materials to sell or for personal consumption (Hari, 2011). Scavenging from the waste stream is an important economic activity that provides income for over 15 million people worldwide, most of whom are in cities in developing countries, and it has a financial impact of several billions of US-dollars every year (Medina, 2010). Waste scavenging is a popular informal activity which depends on the quantity and quality of waste generated by the population. The proliferation of waste scavengers on the streets and waste dumpsites in Ghana since the early 1980s represents one of the most visible consequences of the deep economic crisis the country has been suffering.

Much of the accessible literature on waste scavenging has examined its economic significance as an efficient livelihood strategy, their participation in recycling policies (Reynals, 2002; Schamber and Suárez, 2002), their self-organization, especially the cooperative phenomenon (Dimarco, 2005; Escliar et al., 2005; Sorroche, 2009) and their asset accumulation process. Despite the burgeoning literature on this enterprise, scant attention has been paid to the health risks associated with it. Meanwhile, these scavengers live and work in unhygienic conditions and the nature of their occupation exposes them to potentially pathogenic bio-aerosols that may lead to the spread of various diseases (Thirarattanasunthon et al., 2012). The abundance of fleas and offensive odours in waste disposal sites, along with the lack of proper protective devices, make their working conditions even more precarious. Scavengers collect plastics, paper, glass bottles, rubber materials, and ferrous and non-ferrous metals from dump sites, which can be risky as they are exposed to various infectious agents (Ray et al., 2004) and toxic substances that may cause illness. In addition, they face social abuse from certain elements of society, which may lead to social problems. To overcome the hazards of the job, a greater majority has also taken to substance abuse such as smoking and alcoholism (Pisutthanon, 2004).

This research has two objectives: it examines the health implications associated with waste scavenging in Kumasi from the perspective of waste scavengers who are directly engaged in the trade and also explores how an intervention strategy can be developed to ameliorate the health risks. This informative study will help bridge the gap in this nascent literature. The findings will help in developing an appropriate regulatory framework for waste scavenging in Ghana. The research is divided into five parts. After the initial introductory section, the conceptual issues guiding the study is given consideration in the next section. The third section discusses the methodological approach while section four is devoted to the results of the study. Section five discusses the results with the final section concluding the research and giving policy direction.

Waste Scavenging as Informal Livelihood Activity

Poverty and more specifically, wide income gaps within urban centres around the world have been without a doubt, one of the major challenges faced by governments in developing countries (UN-Habitat, 2012). Population growth has not only exacerbated these challenges, it has also led to insurmountable increases in unemployment figures. The result has been the growing significance of the informal sector, which is in direct response to the urban crisis (Mwangi, 2003). One such informal activity that is responding to this quandary is waste scavenging (Medina, 2007). In this study, waste scavenging is studied not in isolation, but as part of a broader concept of the informal economic activity common in developing countries, including Ghana.

Since the discovery of the concept ‘informal sector’ in Hart’s 1970 seminar work in Ghana, it has not lent itself to a comprehensive and a universally accepted definition. However, all definitions of the concept point to the fact that it is an unregulated livelihood enterprise (Hart, 1970). Owusu (undated) argues that the debate over the nature of African urban economies initiated by Hart’s concept of the informal sector seems not relevant in current academic discourses, irrespective of the intensification of informality in developing countries and the mounting evidence supporting the existence of similar urban economic structures even in the developed countries. He continues that this paradox is partly due to the inability of the major approaches in urban economic analysis to capture contemporary changes in the urban economy, particularly those relating to the proliferation of multiple livelihood strategies.

The issue of livelihoods has been a subject of debate in recent times (Owusu, undated). Many scholars have emerged with different definitions of the term livelihoods. According to Chambers (2006), a livelihood is “the means of gaining a living” or “a combination of the resources used and the activities undertaken in order to live” (as cited in Scoones 2009:172). Ellis and Freeman (2005) explain the term livelihood as what people do in order to earn a living and the resources that provide them with the capability to build a satisfactory living, taking into account risk factors as well as the institutional and policy context that either helps or hinders them in their pursuit of viable living. The most widely recognized and accepted definition is based on Chambers’ (2006) view of a livelihood. He posits that livelihood “encompasses the

capabilities, assets and activities required for a means of living: livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide opportunities for the next generation and which contributes net benefits to other livelihoods at the local and global levels in the long and short term” (as quoted in Hilson and Banchirigah, 2009: 175). This definition has different interpretations and meanings which are relevant to the livelihood framework.

The application of the livelihood strategy in the urban environment recognizes the fact that the ability of a household to achieve increased well-being is not only determined by its access to capital goods, but also the effects of external conditioning variables that constrain or encourage the productive use or accumulation of such assets (Oberhauser and Yeboah, 2011; Oteng-Ababio, 2012). In contrast, the Multiple Modes of Livelihood Approach that has its antecedent in the household survival strategy and the informal sector literature has been put forward as an alternative framework for understanding contemporary livelihood in urban areas (Owusu, 2007). Owusu (2007), argues that the definition of a livelihood system as the mix of individual and household strategies developed over a given period of time that seeks to mobilize available resources and opportunities is what should be supported.

This livelihood framework provides a better understanding of how a transitory population occupying the urban space struggles for a livelihood means in a globalizing city where the formal sector is not just struggling to keep pace with population growth but also the economic downturn has widened the poverty gap due to lack of employment opportunities. Equally, the framework helps point out how livelihoods are carved out through livelihood strategies/coping mechanisms which are reflected in livelihood outcomes. The urbanization processes have created opportunities and constraints for local communities in relation to their livelihoods and livelihood outcomes as explained in the livelihoods framework (Scoones, 2009). This, specifically, is based on the way trade liberalization policies with respect to economic restructuring have been designed and implemented in most developing countries. These policies have been designed such that the national government benefits in terms of removal of subsidies, introduction of taxes and job cuts. This in turn places hardships on the urban poor and deprives them of their source of livelihood (Akabzaa and Darimani, 2001).

Methodology

Study Area

Kumasi is located in the transitional forest zone and is about 270km north of the national capital, Accra. It is the second most populous metropolitan area whose population has grown from 346,336 in 1970 to an estimated 2,022,919 with an annual growth rate of 5.4% (KMA, 2010), which is one of the highest in the sub-region. The rapid population growth has also led to increases in solid waste generation.

Data Collection

To achieve the objective of the study, the three largest solid waste dumpsites in Kumasi, namely Aboabo, Owhim and Dompase, were selected. These sites were chosen taking into account the nature and number of years the practice has been going on (about 5 years or more) and the estimated population of those involved directly or indirectly. The study collected data from scavengers who are concentrated at the selected dumpsites because a reconnaissance survey had indicated that they spent more time (mostly not less than 5 hours a day) at their job place (dumpsites) sifting for their stock as compared to scavengers who move from one site to another or scavengers who search for their stock from the streets and homes. This means they were more likely to be exposed to health hazards than scavengers who were always on the move. Purposive sampling was employed in identifying those who were directly involved in the process. The study utilizes qualitative data gathered from in-depth interviews and focus group discussions, under the broader umbrella of the participatory research approach. Participants were first contacted using the snowballing approach due to the ‘negative’ outcry by some NGOs (BAN, 2005; Brigden et al., 2008) and the threat of tax payment by the KMA. An air of suspicion therefore greets any stranger who visits the sites; hence considerable effort had to be invested in building relationships and trust.

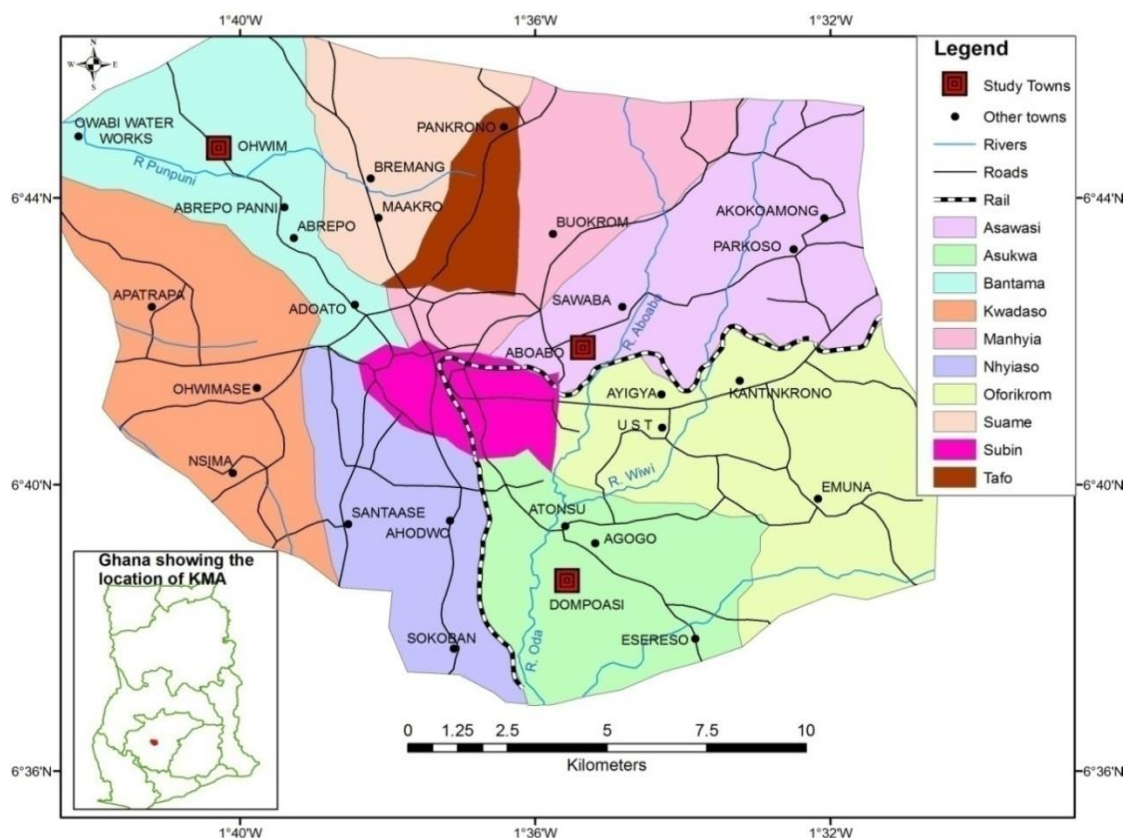


Fig 1: Map of Ghana Showing the Study Sites

Source: Author's construct

Participatory approaches enable a much deeper understanding of the social dynamics, as well as perceptions of the structure of power, of rights, of cultural change and behaviours (Yaro, 2013). A systematic approach was employed in all the waste dumpsites. Thirty waste scavengers (24 males and 6 females) who were purposively drawn equally from the three solid waste dumpsites were interviewed using an unstructured interview guide. The reason for choosing relatively unstructured interviews was to allow for flexibility and to adjust the questions to each of the scavengers. In addition, the use of unstructured interviews allowed frank expression of views so as to not betray the trust and relationships we had built together. It also offered me the opportunity to obtain other information that could be of interest to the study. These interviews elicited information about their activities, experiences, opinions and feelings concerning their operations. Of greater concern were the issues on health.

Scavengers were asked to mention some of the diseases and injuries they had suffered repeatedly in the last twelve months preceding the study. Specific questions about illness included skin disease, shortness of breath, sore throat, diarrhoea and malaria. They were also asked whether they had fallen down while sifting for the recyclable materials, had been hit by any hard or sharp objects, had lifted more than their capacity, had been pricked by hypodermic needles, or had been in contact with harmful chemicals. The rest of the questions centred on the types of injury sustained and the part of the body affected; the frequency of occurrence and how it impacts on their activity.

Additionally, ten separate key informant interviews were done. The informants were made up of two staff each from the waste management department, the environmental sanitation office, the public health department of the Ghana health service, the employment desk of the social welfare department and managers of the dumpsites. Each key informant gave his/her perspective, understanding and knowledge of waste scavenging as a livelihood activity in the metropolis. Their responses are aptly captured in the form of narratives in the subsequent sections of this research. Lastly, three focus group discussions were held at the three dumpsites where scavenging takes place. Each group had five members made up three males and two females, a situation which reflects the gender bias of the profession. The groups delineated the positive socioeconomic changes that have taken place in their lives, showing both past and present trends, but also lamented on the escalating health problems with the enterprise and were even more concerned about the amount of money they spend on medications to remediate some of the health problems associated with their work.

Data Analysis

The Data obtained was thematically analyzed using Interpretive Phenomenological Analysis. The aim of this analytical approach is to explore the participants' view to understand and integrate as far as possible an "insiders' perspective" on the phenomenon under study (Smith & Osborn, 2003). Following verbatim transcription of all interviews, notes were made to throw light on interesting or significant comments in relation to the health risk and diseases reported.

Results

Socio-Demographic Characteristics of Respondents

The mean age of the research participants was 34. Approximately 20% of respondents were under age 18, while the rest ranged between 20 and 49 years. This age statistics shows that the enterprise is not for the aged, who are often described as weak and fragile. The daily exposure to health hazards and the daily loads of materials they have to carry means that they must have a certain kind of strength to endure and enjoy the trade. Approximately 83% of the participants included in the study were males and 13% were females, none of whom was sufficiently literate or numerate to gain quality employment in the formal sector. A female scavenger conceded in an interview that the male dominance in the occupation was not strange because the strain and stress associated with the job makes it unfit for women who are normally considered as the weaker sex.

The research also revealed that most of the scavengers were first generation migrants, mainly from the three northern regions of Ghana where, according to GSS statistics, the poverty rate is the highest. The poverty situation is exacerbated by neo-liberal government policies, the failure of agriculture to absorb the youth, climate change and persistent civil conflicts (GSS, 2010). On average, respondents reported spending 5.5 hours each day sifting through the deposits of refuse for their stock. This means that every respondent, irrespective of age or gender, had a certain level of exposure to the health hazards from the waste dump.

Again, the study investigated how long respondents had been in the business since the number of years may be associated with the level and magnitude of exposure. A greater number of respondents (over 59%), had been in the business for more than 10 years and also lived in rented houses, kiosks and tents near the waste dump communities. This offered them the opportunity to catch the ‘early bird’ anytime fresh deposits were made, which normally took place early in the morning or late at night. Secondly, the home also constituted the warehouse and therefore carting their ‘catch’ to the warehouse was convenient in terms of distance and cost. Besides this, the home served as the marketplace where prospective buyers met their suppliers and transacted business. This shows the connections scavengers have with their place of work. While the home may be an asset, it also indicates how the waste scavengers are perpetually exposed to health hazards from the waste dump sites.

Scavenging for Wealth

This section presents some of the narratives from respondents as reasons for engaging in the enterprise, the preferred items and the income from daily sales, among others. Overall, joblessness and economic considerations dominated the discussions on why they engage in the activity. For instance, Musah, a scavenger and a migrant from Bimbilla in the Northern Region of Ghana, recounted with disappointment how he combed through the city in search of a job but never found one. He continued:

“When we were coming from Bimbilla, my brother told me once we get to Kumasi we shall continue to Obuasi and work in the mines. This did not materialize after two years of waiting. We then came back to Kumasi and my boss, for three years, no job. How can I cater for the three children I left behind? So for the last six years I have been doing this. Though we look dirty and smelly most of the time, it is better than not doing anything at all”.

The story of Musa provides a tiny snapshot of the experiences of most respondents. Other scavengers revealed the difficulty in securing jobs in the formal sector after they had been retrenched from their formal employment. Their emotional storylines which depict images of loss of hope and disappointment clearly unmask how the implementation of the structural adjustment program prescribed by the World Bank has further increased the figures of unemployment. Stating her experiences, Cynthia, a 38-year-old mother of one from Tumu, recounted how the government policy to put a freeze on employment as prescribed by the World Bank had dimmed her chances and hope of finding a job. She intimated as she was struggling with colleagues to sift through the mountain of refuse:

“My friends [scavengers] told me they came here to join this trade because they have not found any job after completing senior high schools. We have searched for jobs everywhere, but to no avail. It is therefore better to do this job than to stay at home. Though I know it is not an easy job for us the ladies, especially as one has to carry heavy loads from one end to another, we have no option than to learn to live with it”.

From all indications, the scavengers are in the occupation, not by choice, but due to increased levels of unemployment and poverty. For this reason, they considered the occupation as a stepping stone whereby after acquiring some money, they would move to a more ‘dignified’ profession.

Waste scavenging as a livelihood strategy derives its significance, not merely from its existence, but from the economic value of the waste recovered. Scavengers scavenge for anything recyclable, including plastics, metals and glass bottles. The degree to which a particular material is scavenged depends on the existence of a market for such a commodity (i.e., the price and demand) and the need for secondary raw materials. The findings reveal that scrap metals from vehicles, earth moving equipment and electronic waste (e-waste) are the most preferred. Studies by Oteng-Ababio (2013) have revealed that e-waste contains valuable metals like copper, gold and silver, which Halada (undated) calls ‘Urban Ore’, that are of significant value when recovered (figure 2).

These materials are normally obtained from computers, refrigerators, sound systems, used or discarded mobile phones and television sets. The findings further revealed that on a good day, a scavenger can earn an average income of about \$4.50, a figure above the daily minimum wage of \$2.15 (January, 2014 exchange rate). These figures were based on estimates of responses because the scavengers do not keep any records on quantities of collected commodities or financial revenues that accrue from their transactions. This figure represents about two and a half times the average income of most formal workers in Ghana as reported

by Grant and Oteng-Ababio (2011). Significantly, they do not pay tax on their income, a situation that needs to be re-examined by policy makers in Ghana. But even with the immense potential as a livelihood opportunity, waste scavenging is fraught with adverse health hazards. This is what the subsequent section seeks to explore.



Fig 2: (A) Scavenged scrap metals (B) Scavenged e-waste materials

Waste Scavenging and Health

As indicated previously, more than 90% of solid waste generated in the metropolis is deposited in open dumpsites without any source separation. This means that first grade recyclable materials from households and institutions are dumped together with hospital waste from the various private hospitals, liquid waste from baby diapers as well as other hazardous substances from the light industries in Kumasi, thus increasing the risk of infections (Mensah, 2005). In this study, respondents confessed to the negative impact of waste scavenging on their health, albeit at different degrees and in varying dimensions. The specific self reported health problems mentioned by the study participants are discussed in detail below:

Low Back Pain

The occupation of waste scavenging entails a great deal of heavy lifting as well as pushing and pulling of scrap metals. The study participants explained that the high prevalence of musculoskeletal disorders of the neck, shoulders and back stem from constantly repeating awkward movements, such as lifting and running with heavy loads. The weight and the often-awkward positions caused back strain and ankle sprains. For instance, Mensah narrated how he got the pains which have persisted for years:

"I was pushing the truck with my load, then all of a sudden, I felt a sharp pain in my waist. I stopped and rested for a while. As I bent to continue with my business, I realized my waist had become stiff. It has been painful since then".

Mensah says he takes pain-killers during working hours, but has to endure the pain late at night. Of all the kinds of pain reported, lower back pain (LBP) dominated.

Low back pain, or lumbago as it is also called, was the most prevalent musculoskeletal condition and the most common cause of disability among waste scavengers in Kumasi. The participants further revealed that the experience of LBP morbidity was significant enough to cause them to stop work for at least two consecutive days. One interesting finding of the study was that while low back pain was regarded as a major problem, only a small percentage (less than 16%) reported seeking proper medical diagnosis and treatment, while the remaining majority confessed they relied on self-medication or stopped work until their condition abated. LBP resulted in significant levels of disability and produced a significant restriction on usual activity, a situation that was a source of worry to the scavengers.

Skin Infection

Skin infection was due to the considerable amount of manual handling, which made skin contact nearly unavoidable. The high response for skin infection was due to the activities of micro-organisms which were persistently present on the hands and clothes of waste scavengers. As a 27 year old scavenger at the Aboabo dump site narrated in the group discussion:

“Apart from mosquitoes, there are some black insects that when they bite you, it feels like you have been pinched; it is really painful and leaves you with some skin rashes. Just have a look at my skin”, he requested.

Again, careless disposal of pesticides, herbicides, paints, solvents, assorted cleansers, acids and other volatile and flammable compounds resulted in severe burns and skin irritation elicited by crushing and splashing. The common skin abnormality observed in the study was Callus formation on the palms or Palmar digits, usually due to the refusal to wear gloves, particularly in younger worker populations. One participant in an interview noted that the formation of Calluses was a response to repetitive mechanical trauma. Punctures, lacerations and abrasions from broken glasses, metals, plastics and wooden objects were also reported by scavengers. Needle stick punctures were also a source of concern even though it is illegal to dump medical waste at public dump sites. Overall, the scavengers believed that the improper disposal of domestic and medical waste from residents and medical facilities was responsible for their predicament.

Eye Irritation and Acute Respiratory Infection

The concentrations of chemicals, bioactive dusts and other potentially irritating compounds which come into direct contact with the face/eyes were mentioned by the participants as being responsible for irritation and inflammation. Again, the airborne emissions such as diesel emissions from trucks hauling waste and from the equipment used to move waste at the waste dumps was a source of worry to the scavengers. This situation was compounded by the perpetual smoke that engulfed the waste dump sites as a result of continuous burning. In this study, scavengers reported having regular problems with eye irritation and acute respiratory disorders. This was not surprising because as already conceded, the scavengers engage in the burning of plastic wires to liberate copper. Though they were aware of the possible effect of the burning on their health, alternatives to the practice were not readily in sight. A key informant in an in-depth interview shared his opinion on the issue:

“We are aware the burning of electronic cables and other electrical components in order to melt off the plastic coating to reclaim the copper wires may affect our health, [but] there is nothing we can do now. We are very certain that it negatively affects the environment as toxic chemicals are constantly released into the atmosphere”.

While conceding that the open burning of the refuse dump was generally not a good practice, respondents were of the view that it was another means of controlling the mosquito population from breeding which has been the bane of most scavengers.

Participants also listed a plethora of specific hazards which affect them on a daily basis from the release of waste dump gasses. The amount and type of gases emitted are affected by the characteristics of the waste such as the composition and moisture content of the waste, the oxygen level and temperature (Goldberg, 2008). The most commonly emitted gasses were methane (40-60%) and carbon dioxide. Smaller concentrations of nitrogen, oxygen, hydrogen sulfide, water vapour, ammonia and a variety of non-methane organic compounds (benzene, vinyl chloride and trichloroethylene) were also found. The airborne emissions coming from the waste had an adverse effect on the health of the waste scavenger through physiological responses to chemical and physical agents such as eye irritation and acute respiratory infection (ARI).

Intestinal Infection

Again, the scavengers conceded to their constant exposure to the aerosols emitted from the refuse in the disposal bags and this resulted in repeated incidence of intestinal infection. The passage below captures what scavengers thought was the cause of the frequently occurring intestinal infection:

“The most common way of infection is by hand-to-mouth contact during eating, drinking and smoking or by wiping the face with contaminated hands or gloves or by licking splashes from the skin”.

A 28 year old participant in the group discussions observed:

“The high levels of bacteria and endotoxin from the waste which gets into our body is the cause of the acute gastrointestinal symptoms (onset as quickly as one half hour) we often suffer”.

Intestinal infection, which manifested itself as diarrhoea and nausea was a common health problem reported by scavengers, and this they blamed on high concentrations of airborne gram negative bacteria.

Injury

Of the 30 scavengers interviewed, a great percentage (over 90%) reported injury as the most common health problem they face. The cause of injury was the manual disassembly and recovery of valuable components from wires and cables, cathode ray tubes (CRTs) and printed circuit boards. A particular hazard associated with the disassembly stage was the possibility of

accidental release and spillage of hazardous substances upon breakage of the shell. An example is mercury, which is found within light sources as well as switches. CRTs present the risk of implosion due to the vacuum inside the tubes and inhalation of hazardous substances due to the phosphor coating on the inner side of the glass. The scavengers confirmed during the interviews that the injuries occurred during lifting, dumping or walking with heavy loads. The most frequent type of injury reported pertained to the back, knee and hand. The back and knee injuries were predominantly related to twisting. Frequently, injuries occurred when workers were hit by or bumped into objects or when they fell or overloaded themselves. The injury was often linked with high working speeds and the carrying of multiple materials.

Discussions

Scavengers working at the three dumpsites selected for the study were exposed to various health risks (infections, injury, disability) while working, albeit, at different magnitudes. The health risks were associated with the manual handling and lack of protective clothing/equipment, resulting in direct contact with waste. Studies conducted by Cointreau support these findings, (Cointreau undated). Risks from manual handling of mixed waste originated from direct contact with broken glass; human/animal faecal matter and paper that have become saturated with toxic materials; containers with residues of chemicals; pesticides or solvents from needles and bandages from hospitals. Inhalation of bioaerosols, smoke and fumes produced by open burning of waste also caused health problems. Although there are insufficient data on the long-term effect of exposure to airborne bacteria as well as infectious or toxic materials present in solid waste, studies have shown that respiratory and dermatological problems, eye infections and low life expectancy are common (Owusu-Sekyere et al., 2013). Other scholars (e.g., Oteng-Ababio, 2013) have illuminated some health impacts of waste toxicants wafting into the immediate atmosphere or leaching into soils, vegetation and nearby water bodies. This has also been echoed by Pinto (2008), table 1.

Despite the seriousness of the health hazards delineated, respondents seem to over-simplify the health problems. This might be due to their scanty medical information. The serious health implications of this enterprise were aptly captured by the public health officer of the KMA when he pointed out that Computers, Mobile phones, old pen drives, outdated TVs, refrigerators, music systems and many electronic devices contain hazardous substances that find their way back into our system. If the situation is not checked, Ghana may soon face rising environmental damage and health problems from the waste sector. What makes the situation worse is that most of these workers are either young people or women who are exposed to deadly toxins. The framework and the concept discussed provide an understanding of how livelihoods are constructed. As waste scavengers in Kumasi construct a means of earning a living, they are also exposed to health problems that have the potential to affect their economic activity.

Table 1: Health hazards associated with poor electronic waste

e-waste component	Processes	Potential Occupational Hazard
Cathode ray tubes	Breaking, removal of Copper yoke and dumping	Silicosis Cuts from CRT glass Inhalation or contact with phosphor containing cadmium or other metals
Printed circuit boards	Desoldering and removing computer chips	Tin and lead inhalation Possible brominated dioxin, beryllium, cadmium and mercury inhalation
Dismantled printed circuit board processing	Open burning of waste boards	Toxicity of workers and nearby residents from tin, lead, brominated dioxin, beryllium, cadmium and mercury inhalation
Chips and other gold plated compounds	Chemical stripping using nitric and hydrochloric acid along river banks	Acid contact with eyes, skin may result in permanent injury Inhalation of mists and fumes of acids, chlorine and sulfur dioxide gases can cause respiratory irritation to severe effects, including pulmonary edema, circulatory failure and death
Plastics from the computer and peripherals	Shredding and low-temperature melting	Probably hydrocarbon, brominated dioxin and PAH exposure to workers living in the burning works area
Secondary steel or copper and precious metal smelting	Furnace recovers steel or copper from waste	Exposure to dioxins and heavy metals
Wires	Open burning to recover copper	Brominated and chlorinated dioxin and PAH exposure to workers living in the burning area

Source: Pinto, 2008

Conclusion

This study paints a picture of how people who are socially or economically challenged are forced to rummage through waste for their livelihood because of the deficiencies in the formal employment sector in providing the needed job opportunities. The reality from this study is that as waste scavengers scavenge for wealth, they are also exposed to a myriad of health problems—a case of wealth juxtaposed with health. This is a situation that should be appreciated by all stakeholders concerned with refitting the national economy. Meanwhile, the public policy on waste management in Ghana pay no attention the traditional skills, endurance and resourcefulness of these people. Their health needs have traditionally been ignored. There is no well defined institutional and legal context in which people engaged in informal recycling operate. Public policies towards them are therefore largely negative. However, given the significance of waste scavenging, both as a livelihood activity and a waste management strategy, it is important that their health and wellbeing are safeguarded.

A more plausible potential means to alleviate the dangers associated with waste scavenging is by implementing simple and cost-effective safety procedures. The research proposes that the Thailand safety model can be replicated in Ghana as a starting point (Thirarattanasunthon et al., 2012). With this model, a comprehensive system of health risk protection behaviours, knowledge, attitudes, and practices were piloted among scavengers in open dump sites. The research revealed that the scavengers who benefited from the program showed massive reduction in adverse health impact than those who did not. Waste scavengers in Kumasi can benefit from interventions such as the use of personal protective equipment, health protection, training and other measures to reduce adverse exposure during waste collection.

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