



Characteristics of Waste Pickers in Nakuru and Thika Municipal Dumpsites in Kenya

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Authors' contributions

This work was carried out in collaboration among all authors. Author JMK designed the study, performed the statistical analysis and wrote the first draft of the manuscript. Authors MB and AM supervised the entire research process, the design, the analysis and write-up. All the authors read and approved the manuscript.

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ABSTRACT

Dumpsite waste picking is prevalent in many developing countries of which Kenya is one. Waste pickers play an important role in waste recycling by recovering and providing materials to the waste recycling industry.

Aim: The purpose of the study was to characterise the demographic and socio-economic factors of waste pickers in Nakuru and Thika municipal dumpsites.

Study Design: The research design was a cross-sectional social survey and the sample size was 167.

Place and Duration of Study: The study was carried out in the largest dumpsite in Nakuru and Thika towns found in Nakuru and Kiambu counties respectively.

Methodology: The data was collected by use of structured questionnaire. The data was analysed using the Statistical Package for Social Sciences. Analysis was by frequency tables, χ^2 test and t-test at 95% level of confidence.

Results: The results show that there was parity by gender in Nakuru but in Thika the proportion of females was much higher than that of males. There was significant association between age and

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site of operation with waste pickers in Thika being on average younger than in Nakuru ($\chi = 12.605$, d.f. = 3, $p = 0.006$). Waste pickers in Thika had on average attained a higher level of education than in Nakuru ($\chi^2 = 12.352$, d.f. = 3, $p = 0.006$). Most of the waste pickers (96%) only picked from exclusively from the dumpsite. Waste pickers in Thika spent an average of 10.26 ± 0.23 hours daily in waste picking which was significantly higher ($t = -3.709$, $n = 160$, $p < .001$) than at Nakuru (8.97 ± 0.27 hours). The mean number of years of waste picking in Thika was significantly less than in Nakuru ($t = 4.627$, d.f. = 158, $p < .001$).

Conclusion: In conclusion, waste pickers play an important role in waste recycling, with waste picking supporting hundreds of waste pickers in the study area, who are important in integrated waste management and need to be understood, appreciated and supported.

Keywords: Waste pickers; waste picking; dumpsites; solid waste; waste recycling.

1. INTRODUCTION

Waste picking in developing countries is at the base tied to the activities of informal stakeholders one of which is waste pickers. Waste pickers recover discarded materials in areas where it is generated or disposed and avail these materials to the waste recycling industries. Among the reasons why individuals engage in waste picking include low education level. Schenck et al. observes that waste pickers generally have low levels of education with most of them having only primary school qualification and thus lack skills or qualification [1]. National economic conditions for instance, high unemployment rate might also be a reason since waste picking might be the best or only option for income generation. Melanie argues that waste pickers engage in the activity because they are unable to find employment in formal sector [2]. Despite the important role of waste pickers in waste recycling, they are not highly esteemed in the society. In some places, they are seen as undesirable, as posing problems to society, considered as outcasts, seen as contravening bylaws and sometimes harassed as a result [1]. Waste pickers may be a microcosm of the general population in terms of factors such as gender composition, education level, work hours, income and so on but on the other hand they may be very different. Understanding the composition and characteristics waste pickers and waste picking is important since in the developing countries they are an important though mostly ignored stakeholder in solid waste management.

Waste picking appear to be a gender-neutral occupation although representation may differ from region to region due to local conditions. In Kampala, Uganda the proportion of females (60%) was more than males [3]. The converse was reported in Bogotá, Colombia with males being more than females at 55.5%. In Free State,

South Africa an almost equal proportion of female and males landfill waste pickers was noted by Schenck, Blaauw and Viljoen [4]. In some areas, waste picking may be practiced exclusively a specific gender group for instance, almost all waste picking was done by females in Lahore, Pakistan whereas in Enugu, Nigeria; Kinshasa, Congo; Accra, Ghana and Tafila, Jordan it was almost exclusively done by males [5-8].

Waste picking attract waste pickers of all ages and in some cases, children are also reported to engage in the activity. Children were observed in dumpsites in Lahore, Pakistan; Free Town, South Africa; Accra, Ghana; Tafila, Jordan; Kinshasa, Congo [3,6,8,9]. Sasaki et al. reported that 4.6% of daily waste pickers in Bantar Gebang dumpsite in Indonesia were children aged below 15 years and additionally many children assisted their parents in waste picking when the schools were closed [10]. Distribution across the age groups show that the ages 18-50 years are well represented but the numbers fall off rapidly beyond 50 years. In Batar Gebang, waste pickers aged above 50 years were 12.9%, while they were 9% in Kinshasha, 1.4% in Accra and 3.1% in Kampala [3,6,8,10].

In some regions the proportion of waste pickers who are illiterate is very small ranging from single digits to low tens for instance in Accra the percentage was 12.5% [6]. On the other hand, in some regions the majority or a very high proportion of waste pickers were reported to be illiterate for instance 90% in Lahore and Bahawalpur both in Pakistan as well as in Delhi, India, 36% in Kinshasa, 40% in Kampala and 21% in Tafila, Jordan [3,7-9, 11-12]. Most waste pickers report as either married or single. In Lahore, Pakistan the largest proportion of the waste pickers was married [9] as were 58% in Tafila, Jordan [7]. On the other hand, in Kampala

Uganda the largest proportion (46.9%) of waste-pickers was reported as single [3].

In Accra Ghana, landfill waste pickers were working for up to 12 hours with those living close to the site operating longer hours than those living further away [6]. Majeed found that in Bahawalpur, Pakistan the work hours varied whereby young girls worked for up to 4 hours, young boys 4-8 hours, women 6-8 hours and males for 8-12 hours [12]. Aljaradin et al. reported that majority of waste-pickers in Tafila, Jordan treated waste-picking as supplementary and worked for 2-5 hours [7]. Most waste-pickers in Free Town South Africa started working 7-8am in the morning and stopped working at 5pm, spending 9-10 hours at the landfill [4]. In Kampala Uganda, more than 50% of the waste-pickers spent at least 6 hours at the dumpsite [3].

Generally, waste picking is a profession that is seen as a step-gap measure in which case a large proportion of the waste pickers reported to have worked less than 10 years. In Aba, Nigeria, only 20% had worked for more than 9 years [13] while in Kampala only 3.1% had worked more than 10 years [3]. Waste pickers in many regions live close to where they work. In Accra, Ghana most of the waste-pickers (75%) lived in communities close the dumpsites [6]. Kimbugwe and Ibitayo found that more than 70% of the waste-pickers in Kampala lived within 2 miles of the dumpsite [3]. In the present study, the purpose was to describe the social and demographic characteristics of the waste pickers and basic information relevant to the occupation of waste picking in Nakuru and Thika municipal dumpsites.

2. MATERIALS AND METHODS

2.1 Location and Population

The study area comprised Nakuru and Thika towns in the counties of Nakuru and Kiambu respectively. The total population of Nakuru county was of 1.6 million which was almost equivalent to Kiambu county's 1.67 million. Nakuru town's population was 307,990 which was higher than Thika town's 139,853. Whereas Nakuru Town was located 165 km from Nairobi, the capital of Kenya, Thika town was only 40 km away from the capital [14-16]. Nakuru Municipal dumpsite, commonly known as Gioto, was established in 1975 and is 3km from Nakuru town centre along Nakuru-Kabarnet road

[17]. Kiambu Municipal dumpsite, commonly known as Kang'oki was situated about 7 km from Thika town in the Kiganjo area.

2.2 Target Population

The target of the study comprised the waste pickers operating in the two dumpsites. The total population of the waste pickers was unknown prior to the study since no registration or records were kept of them. However, the working estimate was 300 for each dumpsite as given by the site managers (Personal communication: Chachi, dumpsite manager Nakuru, 2016; Mwaniki, dumpsite manager, Thika, 2016).

2.3 Study Design

The study design was a cross-section social survey. A key concept of cross-sectional survey is that data is collected once from the subject/area with the main tools of data collection being questionnaires or structured interviews [18].

2.4 Sample Size and Sampling Design

In the determination of the sample size, the guidelines by Kathuri and Pals for social survey research were followed whereby a size of 20-50 is required for a minor group and 100 for a major group [19]. In this study, the variables of interest were age and the sex of waste picker. The size of sub-sample within each variable was with respect to their proportion in the population. A sample size of 167 was achieved during the data comprising 77 from Nakuru and 90 from Thika. Convenience sampling was done whereby only those who accepted to be interviewed were so done taking care to ensure that data was collected from all ages and gender.

2.5 Data Collection and Analysis

The main tools of data collection were a structured questionnaire and an observation checklist. Data was collected on social, demographic and occupational factors. Pretesting of the questionnaire was done in Embu and Meru municipal dumpsites. Reliability testing was done and the reliability coefficient (Cronbach alpha) was 0.75. Data was analysed by the use of the Statistical Package for Social Sciences by use of frequency tables, t-test and chi-square test.

3. RESULTS AND DISCUSSION

3.1 Gender of Respondents

Of the total respondents, the females made up 55% of all the respondents. Males were a slight majority in Nakuru (51.9%) and females were more than males in Thika at 60% (Fig. 1).

Kimbugwe and Ibitayo reported that 60% of dumpsite waste pickers as female in Kampala, Uganda which was a comparable to the study area [3]. Conversely in Bogotá, Colombia, the opposite was reported with more males (55.5%) than females [20]. In Free State province of South Africa an almost equal proportion of female and males landfill waste pickers was noted [4]. Observations of the composition of waste pickers dominated by one gender were observed in Lahore, Pakistan where Asim et al. found mostly women dumpsite waste-pickers with men only showing up in the mornings [9]. On the other hand, at Enugu dumpsite, Nigeria only males waste-pickers were operating [3] and similarly in Kinshasa city [8]. This was the same in Accra, Ghana [6] where 90% were male as were 99% in Tafila [7].

A fair representation of each gender in the present study could be attributed to the fact that there were no social or cultural barriers that were gender specific, that is, were against any particular gender engaging in waste packing in either of the sites. Further, there were no security concerns to any of the gender in either of the site as it would be expected that women might shy away in areas where they were likely to be harassed or molested.

3.2 Age of Waste Pickers

The mean age of the respondents was 32.7 ± 0.96 years with the youngest being 18 years and the oldest 80 years. In Thika, the majority of the respondents were below 30 years (53%) and the next largest proportion of the respondents was aged 30-39 years at 33.3% (Fig. 2). On the other hand, in Nakuru the first two age categories (below 30 years and 30-39 years) both had an almost equal percentage of respondents at 36% and 35%, respectively. Notable is that in Nakuru, the percentage of waste pickers equal to or above 50 years was substantially larger (17%) compared to Kiambu county (2%). The association between age and site was statistically significant ($\chi^2=12.605$, d.f. = 3, $p=0.006$) with respondents in Kiambu being significantly younger.

Similar to the present study where the largest proportion of all waste-pickers was below 30 years, Asim et al. [9] reported that in Lahore, Pakistan the age group of 20–30 years was dominant. Schenck et al. [4] also reported that a large proportion (42%) of waste-pickers in Free Town South Africa, were similarly aged although with a higher age cut-off (35 years). Kimbugwe and Ibitayo reported 43.8% of the respondents were aged 20-30 years [3].

While no children waste-pickers were observed at the dumpsites in the study area, comparison with other regions offer a contradiction. Kimbugwe and Ibitayo reported 9.4% of waste-pickers in Kampala as aged below 20 years with 3.1% aged below 10 years [3]. Asim et al. found that children, alongside women were major dumpsite waste-pickers at Lahore Pakistan [9]. Rockson et al. found waste-pickers as young as 15 years in Accra, Ghana [6] while Aljaradin et al., reported 38% of waste-pickers as aged between 4-16 years in Tafila, Jordan [7]. A large proportion of children waste-pickers was found in Kinshasa city [8]. In the present study, about 9% of the waste-pickers were at least 50 years old with the oldest being 80 years. In comparison, 1.4% of the waste-pickers in Accra, Ghana were over 50 years [6]. Schenck et al. reported the oldest waste picker in Free Town South Africa as 72 years [4].

Waste picking in the present study does not appear to be age specific and the distribution of the waste pickers by age appear to mirror the general national population trend where the majority are the young and the numbers tapers off with increasing age. The presence of all age groups may be due to the high unemployment and the fact that waste picking requires no prior experience hence anyone who has the energy and the interest can venture in. Waste picking is an energy intensive activity and hence it is no surprise that the proportion of waste pickers beyond 50 years was smallest which is in agreement with most studies.

3.3 Education Level

About 58% of the respondents had completed primary school or dropped out of secondary school, 17% had completed secondary school while 8% had no formal education (Table 1). In Nakuru, the percentage of respondents who had secondary education and higher was 10.6% whereas in Thika it was 18.6%. A chi-square test indicated that there was significant association

between the site and the level of education ($\chi^2=12.352$, d.f. = 3, $p =0.006$) with most waste pickers from Thika having attained a higher level of education than Nakuru.

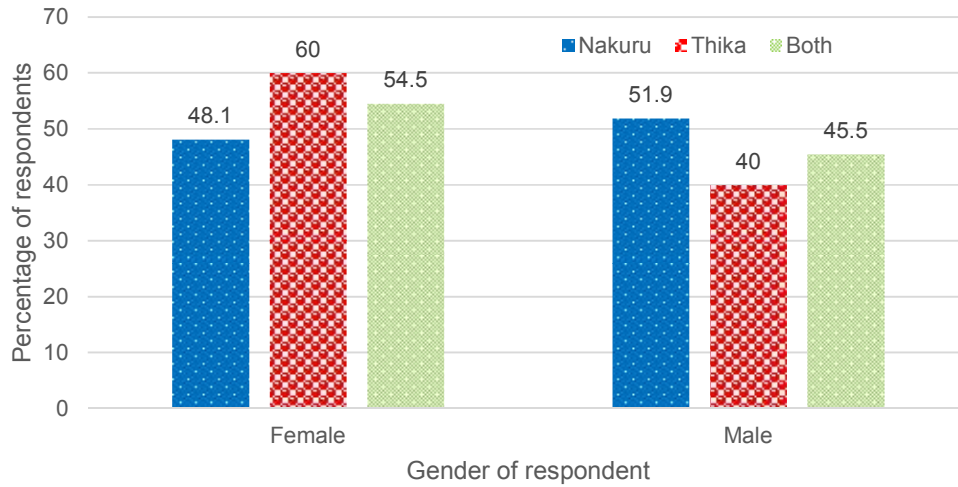


Fig. 1. Gender of respondents

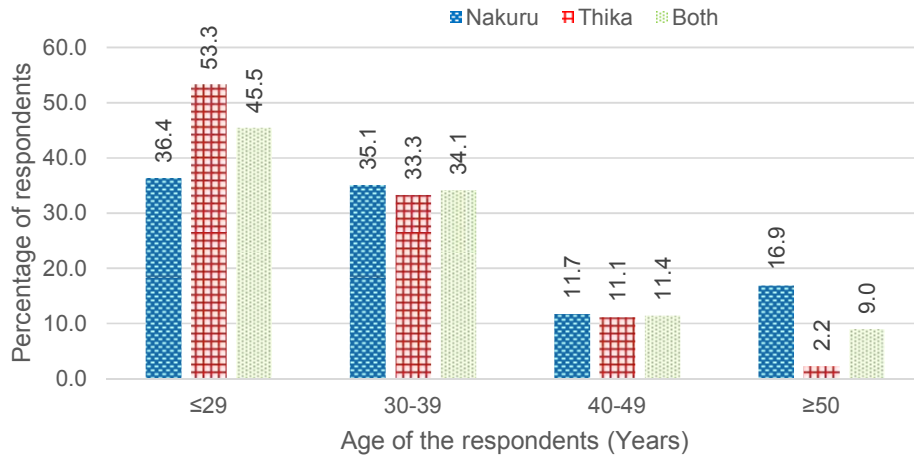


Fig. 2. Age distribution of the respondents

Table 1. Education level of the respondents

Education level	Nakuru		Thika		Both	
	*F	%	F	%	F	%
No formal education	11	14.7	2	2.2	13	7.8
Lower primary dropout (class 1-3)	3	4.0	3	3.3	7	4.2
Upper primary dropout (Class 4-7)	6	8.0	12	13.3	18	10.8
Primary	44	58.7	36	40.0	81	48.5
Secondary school dropout	3	4.0	14	15.6	17	10.2
Secondary	7	9.3	21	23.3	28	16.8
College	1	1.3	2	2.2	3	1.8
Total	75	100.0	90	100.0	167	100.0

Education level by site $\chi^2=12.352$, d.f. = 3, $p =0.006$; *F= Frequency

With only 7.8% of the respondents having no formal education and more than 60% of the waste-pickers having attained at least primary education, this population compares favourably with other regions. Whereas more than 50% of the waste-pickers in Accra had at least primary education, a large proportion (12.5%) were illiterate [6]. In Free Town, South Africa, more than 50% of landfill waste-pickers had had at least primary education [4]. Asim et al. found that the majority of the waste pickers in Lahore, Pakistan to be illiterate [9] compared to 90% in Bahawalpur, Pakistan [12]. Simatele and Etambakonga reported that 36% of waste-pickers in Kinshasa were illiterate [8], 40% in Kampala [3], and 21% in Tafila, Jordan [7].

The relatively higher literacy levels among the waste pickers reflects the general literacy level in the country in comparison with its peers. Kenya has been reported to have the highest youth literacy levels in Africa [21] with World Bank observing that the percentage of the population that have completed primary education stands at 58% [22]. This scenario could be attributed to the fact that the dumpsites are in the urban areas where many people venture in search of employment with those with relatively higher education known to migrate to the urban centres more. In addition, in Kenya there is little social stratification and no social group is likely to be more educated or more likely to engage in waste picking. In contrast, Medina noted that waste picking in developing countries has been the preserve of outcasts and marginal groups like slaves, gypsies and migrants like harijans

(formerly untouchables) in India and non-Muslims in Muslim countries [23].

3.4 Marital Status

The majority of the respondents were married (52.1%) while the next largest group of respondents were single (33.1%). In Thika there was a higher proportion of respondents who were married (57.8%) as compared to Nakuru's 45.5% (Fig. 3) while the proportion of single people were similar in the two dumpsites (about 33.5%). The percentage of the separated and widowed in Nakuru was higher than in Thika.

Some studies have comparable marital status to the current study where the majority of the respondents were married. Asim et al. reported that at Lahore, Pakistan the largest proportion of the waste pickers were married [9]. This was also the case in Tafila, Jordan where 58% of the waste pickers were married [7]. On the other hand, in Kampala Uganda the largest proportion (46.9%) of waste-pickers was reported as single [3].

With the majority of the waste pickers being married, it appears that waste picking does not impede one from leading a family life. The waste pickers may even be expected to marry earlier than their counterparts who may have pursued higher levels of education. This is because having started working early (since most have up to primary education) chances are that they may decide to settle down earlier.

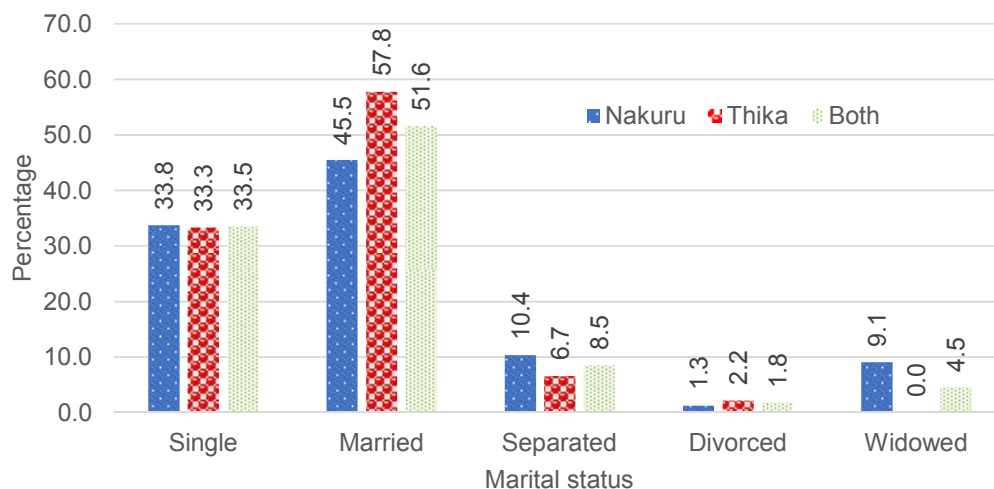


Fig. 3. Marital status of the respondents

3.5 Occupations Other than Waste Picking

Whereas waste picking was reported as the main occupation by 98% of the respondents, 21.6% of the respondents reported engaging in other occupations in addition to waste picking. Thika had a higher proportion of the respondents who had no other occupation apart from waste picking (83.3%) as compared to Nakuru's 72.7% (Fig. 4). These other occupations included non-skilled casual labour, skilled casual labour and business. Casual non-skilled work was reported by the highest percentage of respondents in both Nakuru (23.4%) and in Kiambu (12.2%).

While 78% of respondents in the present study had no other occupation apart from waste picking, full time waste-pickers who had no other

occupation in Accra, Ghana comprised 75% [6]. This is not surprising because waste picking is usually a last option alternative and hence by the time one has taken the occupation, chances are that one may have tried other occupations first, be they self-employment or formal employment. Consequently, by the time they settle on waste picking, a good majority may have not had other fall-back occupations. This could also result from the high unemployment rate in the country.

3.6 Options for Waste Picking Sites

About 96% of the respondents reported picking materials from the dumpsite only (Fig. 5). In addition to dumpsites, the other waste pickers also picked from bins in commercial areas and from pits and bins from the estates. The rest were also involved in buying of waste materials.

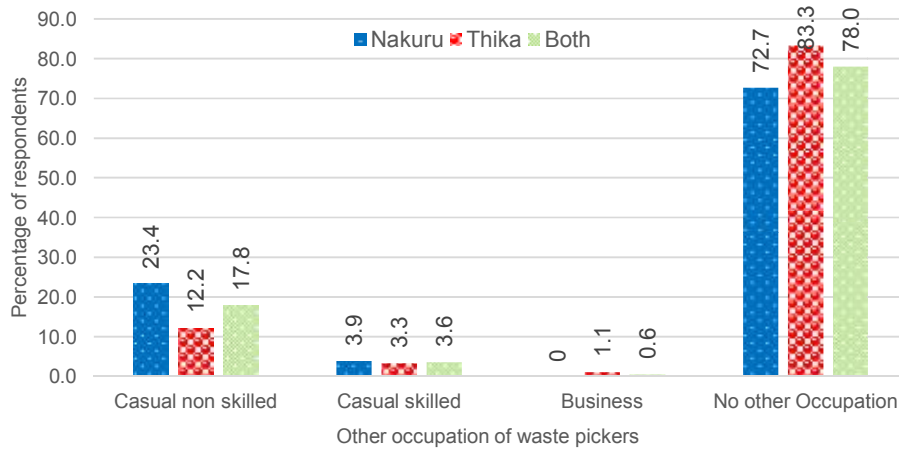


Fig. 4. List of other occupation of waste-pickers

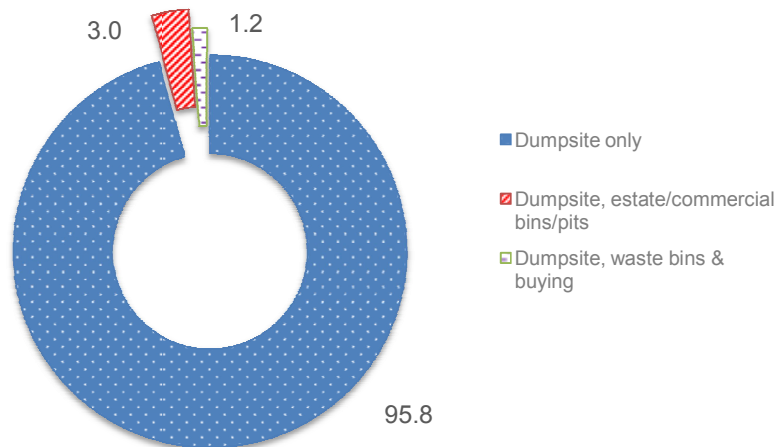


Fig. 5. Sources of recovered waste materials

In the present study, whereas only 4% of the respondents would pick materials from places other than the dumpsite, in Aba, Nigeria, waste pickers were reported to move from one dumpsite to another to pick materials [13]. Sim et al. observed that dumpsite waste pickers work for long periods of time and because they have a larger amount of waste to recover materials from, are more productive than those who walk between bins [24]. In the present study most of the waste pickers were limited to the dumpsite which could be because each of the two dumpsites were located far away from the centre of the towns hence picking from other areas would have been time consuming and probably not very productive in terms of waste amounts recovered.

3.7 Work Hours

The largest percentage of respondents in both sites worked between 9-12 hours per day (44.4%) while the next largest proportion worked for 6-9 hours (Fig. 6). In Kiambu, the majority (52.9%) worked for 9-12 hours while in Nakuru the largest proportion (48%) worked for 6-9 years. In the category of 12-18 hours, the percentage in Kiambu (12.6%) was larger as compared to 5.3% in Nakuru. The mean work hours were 9.7 ± 0.18 hours for both sites, 8.97 ± 0.27 hours for Nakuru and 10.26 ± 0.23 hours for Kiambu. The number of hours were significantly higher in Kiambu as compared Nakuru ($t = -3.709$, $n = 160$,

$p < .001$). Males worked for a 10.3 ± 2.3 and females for 9.1 ± 2.1 hours per day which was significantly different ($t = 3.44$, $d.f. = 160$, $p < .01$).

The working hours of waste pickers in the study area is comparable to those of waste pickers in other regions where waste picking was the main or sole occupation. In Accra Ghana, the work hours were up to 12 hours [6] whereas Majeed reported that in Bahawalpur, Pakistan the work hours varied between 4-12 hours which was different for girls, boys, women and men [12]. In Free Town, South Africa waste pickers spent 9-10 hours at the landfill [4] whereas in Kampala the majority spent at least 6 hours at the dumpsite [3]. In Tafi waste picking was done for 2-5 hours per day [7].

Waste picking is a kind of self-employment and hence as seen in the present study the pickers can work for much longer hours than in formal employment. Apart from the need to maximise the income, the working hours could be attributed to gender roles where women work for less hours since they have more chores at home of taking care of their family. Safety concerns is another issue that may make vulnerable groups like retire from the work earlier for instance hardly no female would be willing to work until darkness whereas some males did this.

3.8 Years of Experience

In Thika the majority of respondents had only worked at the dumpsite for at most 5 years

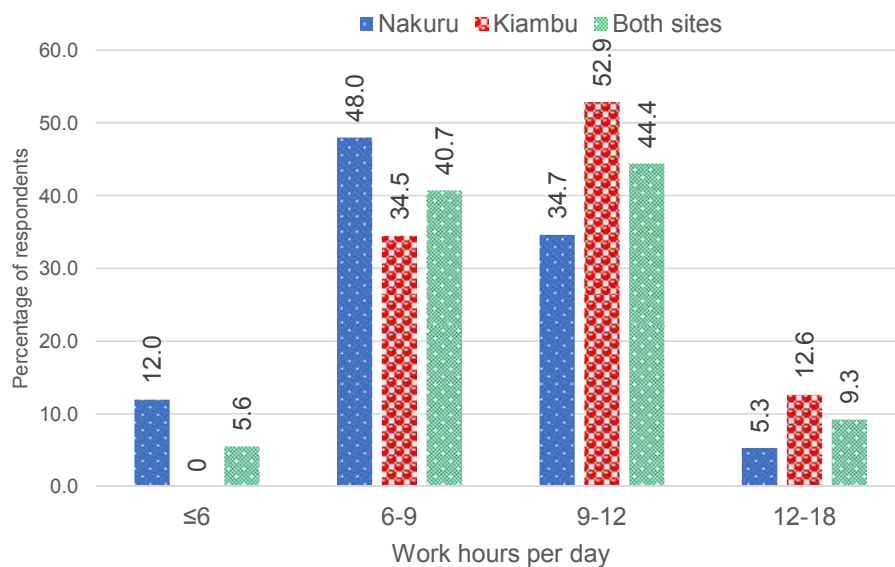


Fig. 6. Work hours per day

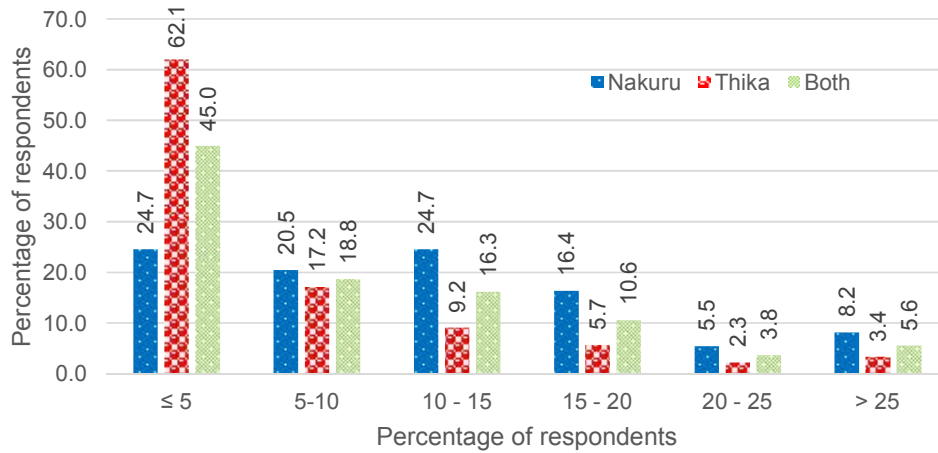


Fig. 7. Number of years of working at dumpsite

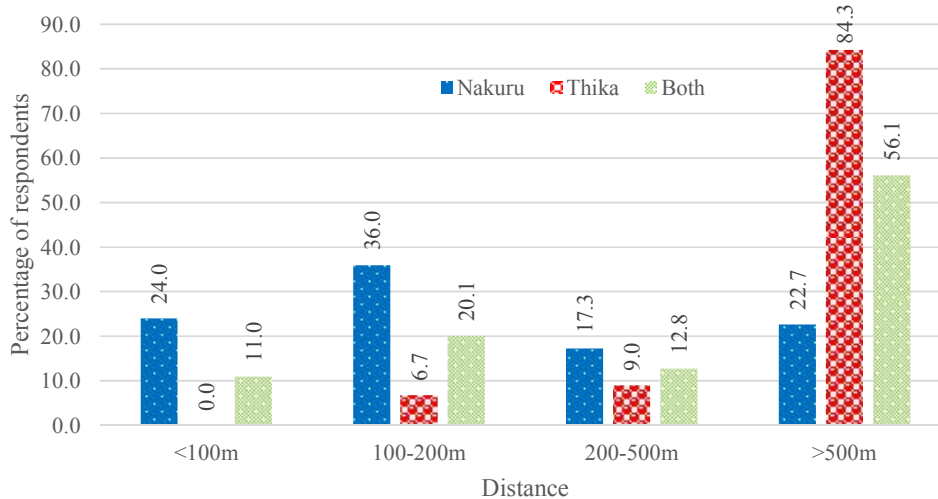


Fig. 8. Distance of residence from dumpsite

(62.1%) with the next largest proportion of respondent (17.2%) having worked 5-10 years (Fig.7). In comparison, in Nakuru the respondents were more evenly distributed across the categories with 24.7%, 20.5%, 24.7% and 16.4% reporting working for ≤5, 5-10, 10–15 and 15 – 20 years. The mean average number of years for both sites was 9.41 ± 0.71 . The mean years in Nakuru (12.8 ± 1.07) was significantly higher than in Thika with a mean of 6.6 ± 0.8 ($t=4.627$, $d.f.=158$, $p<.001$).

Waste-picking in the two sites have been going on for long, with some waste-pickers having worked for more than 40 years in Nakuru. In Aba, Nigeria 20% had worked for more than 9 years [13] while in Kampala only 3.1% had worked

more than 10 years [3]. Thika town, being very close to Nairobi, the capital city of Kenya, may have more alternative formal and informal occupations and hence people would abandon waste picking as soon as they got another option. On the other hand, in Nakuru county, alternative occupations may have been more limited hence waste pickers would remain in the profession for much longer.

3.9 Distance of Residence from Dumpsite

In Nakuru 24% of the respondents lived within 100m of the dumpsite and 36% within 100-200 m (Fig. 8). In comparison, no respondent from Kiambu lived within 100 m of dumpsite while only 6.7% lived within 100-200 m. During the study, it

was observed that in Nakuru, some of the waste-pickers had settled next to the dumpsite whereas no such settlements were observed in Kiambu. Most of the respondents in both sites lived in the communities around the dumpsites.

Kimbugwe and Ibitayo found that more than 70% of the waste-pickers lived within 2 miles of the dumpsite [3] while in Accra about 75% lived close to the dumpsites [6]. Living close to or next to the dumpsite could result from inability to make enough money that would enable one to afford fare on a daily basis. On the other hand, if the income is not enough for rent some waste pickers may prefer to construct temporary shelters next to the dumpsite in order to avoid paying rent. In this regard, it is noteworthy that in Nakuru where the waste amounts recovered and income earned were much lower a good proportion of the waste pickers were living either next to or close to the dumpsite. In comparison, in Kiambu no waste pickers had constructed houses next to the dumpsite.

4. CONCLUSION

In conclusion, the waste picking in the study area appear to be an equal opportunity occupation especially with regard to gender and age. Since use of dumpsites may persist in the near future in Kenya, it is important to understand the composition and characteristic of waste pickers and waste picking as they are key stakeholders in waste recycling whose voice should be heard. Waste pickers should be recognised in waste management policies and included in any future plans of waste management as it is not possible in the short-term for waste recycling to succeed without them and as well the occupation is a real source of income which should be treasured in view of high levels of unemployment in the country.

ETHICAL APPROVAL

Ethical clearance was granted by Institutional Ethics Clearance Committee of Chuka University. The approval number was CU/IERC/NCST/16/21.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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