

Research Article

# Causes of Improper Waste Segregation among Second Year Degree Nursing Students at a University, Windhoek, Khomas Region

Joseph Galukeni Kadhila<sup>1\*</sup>, Selma Ndatimpililwa Kadhila<sup>2</sup> and Zeneyd Andima<sup>3</sup>

<sup>1</sup>Masters of nursing Science, Post Graduate Diploma in Clinical nursing education, Bachelors of Nursing Science, University of Namibia.

<sup>2</sup>Post Graduate Diplopma Health Service Management University of Namibia.

<sup>3</sup>Bachelors of Nursing Science University of Namibia.

**Corresponding Author:** Joseph Galukeni Kadhila, Masters of nursing Science, Post Graduate Diploma in Clinical nursing education, Bachelors of Nursing Science, University of Namibia.

Received: 📅 2024 Feb 24

Accepted: 📅 2024 Mar 14

Published: 📅 2024 Apr 01

## Abstract

Africa is facing a growing waste management crisis while the volume of waste is relatively small compared to the developed region, the mismanagement of waste in Africa is currently impacting human and environmental health and Namibia is no exception. Therefore, this paper assesses the causes that contribute to improper waste segregation. A quantitative, descriptive using simple random sampling was employed for this study. Data analysis used frequency distribution of tables and graphs. The results revealed that, n=20 (50%) strongly disagrees=18 (45%) strongly agreed, n=2 (5%) disagreed, that there are no signals /posters about color coding in the wards. The findings indicate lack of knowledge on how to discard waste properly among second-year degree nursing students as a contributing factor to non-adherence of proper waste segregation. The findings further indicated that lack of policies on color coding and unawareness of soiled waste management contributed to improper waste segregation. The study is of important to clinical resources as it might provide new knowledge to the students.

**Keywords:** Students, Improper, Waste, Segregation.

## Key points:

- Due to overpopulation, economic growth landfills are impossible to reclaim.
- Waste segregation is seen as a public health problem.
- The mismanagement of waste in Africa is currently impacting human and environmental health.

## 1. Introduction

Segregation of waste is the process of identifying, classifying, dividing and sorting of garbage and waste products in an effort to reduce, reuse and recycle materials. (Abubakar et al., 2020). Waste segregation is further described as the grouping of waste into different categories which happens by color coding plastics according to treatment and disposal requirement. Factors associated with improper segregation include inadequate awareness, ignorance, practices, and inadequate management by facility leadership [1].

According to, common problems faced in waste collection and dumping is mainly overflowing garbage bins and waste

segregation as per type. Due to overpopulation, economic growth landfills are impossible to reclaim because of the improper disposal of wastes on outskirts of cities that leads to a reduction in average lifetime of the manual segregator [2].

Waste segregation is seen as a public health problem. According to World Health Organization (WHO, 2015) around 75% to 90% of the waste generated across healthcare facilities can be considered as nonhazardous, and approximately 10-25 % are infectious, toxic and genotoxic items such waste items pose environmental and occupational health risks [3]. In China in 2018, the municipal waste reached 22.8 million tons, a quantity that is expected to climb up to 409 million tons by 2030 as China continues to urbanize and grow economically [4]. This swelling volume of garbage poses a threat to both the environment and the climate [5]. According to, Africa is facing a growing management crisis while the volume of waste is relatively small compared to the developed region, the mismanagement of waste in Africa is currently impacting human and environmental health [6].

In Africa 2012, approximately 125 million tons per annum of municipality waste generated, of which 81 million tons (65%) was from sub-Sahara Africa and this is expected to grow to 224 million by 2025 [7]. According to, about 80 to 90% of waste produced in African hospital, it's recyclable which make little sense that more than 90% of waste in Africa is still disposable [8].

In Southern Africa, has found that Proper Solid Waste Management (SWM) is crucial for environmental protection and the well-being of human beings [9]. If waste is improperly managed may contaminate soils, water and air thereby affecting the quality of life. He further argues that improperly managed waste may also create nuisance and make human beings feel uncomfortable [9]. The main components of SWM are generation, collection, transportation, and disposal whose processes tends to lack more in Africa then the rest of the world, [9].

According to WHO. (2015) healthcare waste is often not separated into hazardous or nonhazardous wastes, making the real quantity of hazardous waste potentially much higher. Meanwhile, an Infection Control Officer from one of the public training hospitals, (Personal communication, March 18, 2014) confirmed that general and infectious wastes were mixed while training and education of health care workers was not done regularly.

In Namibia, a study conducted by it was reported that only 22% of health facilities had policies and guidelines for health care waste and infection control measures [10]. It is against this background that this current study was conducted to assess and determine the causes of improper waste segregation among the second-year degree nursing students at UNAM, Main campus.

### 1.2. Aim

The aim of this study was to assess and describe the causes of improper waste segregation among the second-year nursing degree students at the University of Namibia, Main Campus, and Windhoek, Namibia.

## 2. Method

The researcher used a quantitative, and descriptive study design. This design was used to identify and justify problems with current practice, measures all relevant variables objectively at a specific time and makes judgment. The study population was all second-year 40 nursing students based on the inclusion and exclusion criteria, using the Solvins sampling method during September 2022.

### 2.1. Data collection

A self-administered questionnaire was compiled in English. The questionnaire consisted of closed- ended of yes, no questions and Likert scale questions. The data was collected on the second-year nursing degree UNAM student's at clinical rotations as well as during the theoretical block. Data collection commenced as soon as ethical clearance was obtained from the authorities and after written informed consent from the participants. The questionnaires took approximately 15 – 20 minutes to complete. The total number

of respondents were 40 second year degree nursing students. Data was coded and analyzed using SPSS version 26 [11]. Frequency distribution tables, descriptive statistics and measures of variability were further used.

### 2.2. Ethical approval

Ethical clearance was obtained through the structures of the University of Namibia, School of Nursing and Public Health. Therefore, the following ethical considerations were adhered to, Justice, non-maleficence, beneficence, respect for person, written informed consent was obtained from each participant after the procedure was explained and risks were pointed out after adequate information were conveyed, possible risks were pointed out.

## 3. Results

### Demographic data

This section illustrates the data analyses on demographic data and the results are as follows:

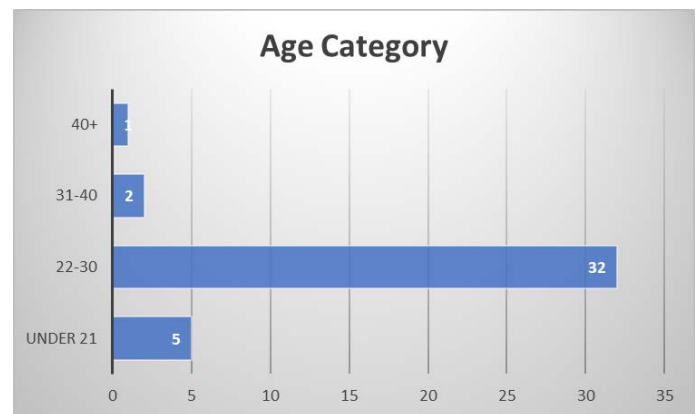


Figure 1: Age statistics.

The data presented in figure 1 indicates that the majority of the participant fall between the range of 22-30 with (32) 80%, 5 under the age of 21(12.5%), while 2 between the age of 31-39 (5%) and lastly only one from 40 +years (2.5%).

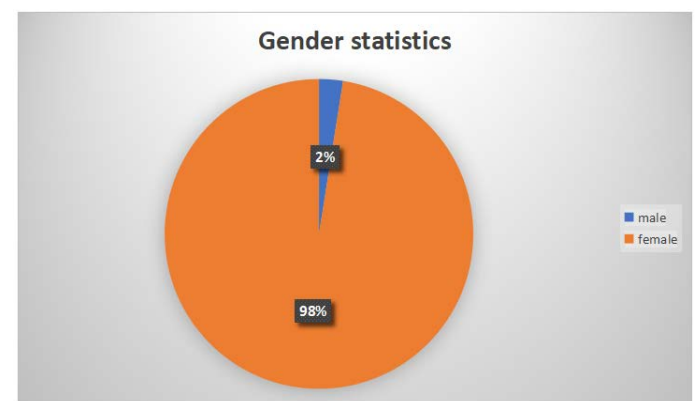
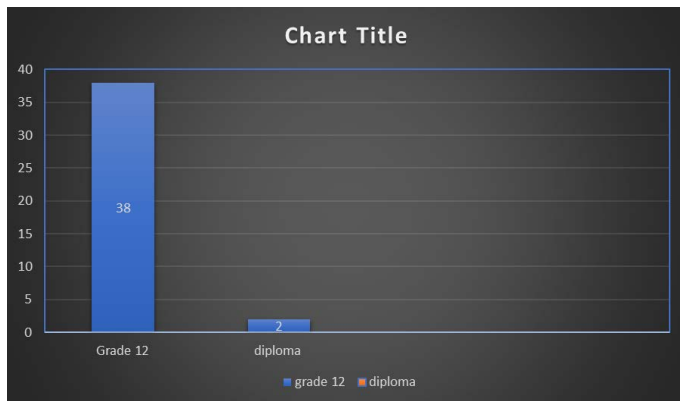


Figure 2: gender statistics.

The second-year degree nursing students were asked to specify their gender as part of the data collection procedure and the results on this perspective can be summarized as below in figure 2.

The figure 2 above indicates that the nursing students that participated in this study majority were female with the number of 39 (98%) and minority were male with 1 (2%).



**Figure 3:** Highest level of education.

The student nurses under this study were asked to mention their highest level of qualification. The summary on this perspective is illustrated below in figure 3:

Figure 3 above indicates that most of the participants had grade 12 as their highest qualification which are 38(95%) and this also shows that only 2 (5%) of the participants holds the diploma as their highest qualification.

The following section represents data obtained from the study regarding the causes of improper waste segregation, the results are as follows Table 1:

**Table 1: Causes of Improper Waste Segregation.**

Causes of improper waste segregation	Yes	No
1.1 Nurses always tell students to throw waste everywhere.	0 (0%)	40(100%)
1.2 Lack of knowledge on how to dispose the waste properly and unaware of color coding.	29 (72.5%)	11(27.5%)
1.3 I saw nurses putting all type of waste in one plastic I thought it was the right way to dispose waste.	38 (95%)	2 (5%)
1.4 I thought all waste as a collection belongs to one group of waste	0(0%)	40(100%)
1.5 Some hospitals and clinics don't have the necessary plastics for disposal.	40(100%)	0(0%)
1.6 Student nurses were not taught from college neither given orientation in hospitals on how to dispose waste properly.	20 (50%)	20(50%)
1.7 Cleaners at the hospitals does not give plastics to students for disposal.	0 (0%)	40 (100%)
1.8 Sometimes waste is a lot to discard separately hence I put all in one plastic.	2(5%)	38(95%)
1.9 There's no infection control guide in the wards where I was allocated.	35(87.5%)	5(12.5%)
1.10 There's no guideline and standing orders at the clinics and hospital that encourage proper waste segregation.	37(92.5%)	3(7.5%)

**Table 2: Factors Contributing to Improper Waste Segregation.**

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.1 I don't know what waste segregation is.	40(100%)	0(0%)	0(0%)	0(0%)	0(0%)
1.2 Some hospitals and clinics don't have policies on color coding therefore we don't know which plastics is for which waste.	0 (0%)	3(7.5%)	2(5%)	30(75%)	5(12.5%)
1.3Hospitals and clinics don't have dustbins and plastics for disposal, so students are forced to dispose waste anywhere.	40(100%)	0(0%)	0(0%)	0(0%)	0(0%)
1.4 The nurses in the hospitals and clinics always refuse to give student orientations on waste segregation.	37(92.5%)	0(0%)	0(0%)	3(7.5%)	0(0%)
1.5 I am not aware that discarding soiled waste make cause health hazards.	20(50%)	17(42.5%)	0(0%)	0(0%)	3(7.5%)
1.6 Some nurses get angry if we dispose waste properly since it's the culture to dispose the way they want.	40(100%)	0(0%)	0(0%)	0(0%)	0(0%)
1.7 I am always ignorant in disposing waste	40(100%)	0(0%)	0(0%)	0(0%)	0(0%)
1.8 There is no signals /posters about color coding in the wards.	20(50%)	2(5%)	0(0%)	0(0%)	18(45%)

## 4. Discussion

The demographic data of this study was made up of three questions namely age, highest education level and gender. This study had shown that out of n=40 shows that the majority of the participant fell between the range of 22-30 (32) 80%, 5 under the age of 21 (12.5%), while 2 between the age of 31-39 (5%) and lastly only one from 40 +years (2.5%) and that the majority of the second-year degree nursing students that participated in the study where young.

Highest level of education, results indicated that that most of the participants had grade 12 as their highest qualification 38 (95%) and this indicated that only 2 (5%) of the participants held diploma as their highest qualification, which translated that most of the participants were only grade 12 holders that made them still new to the profession and that might had contributed to improper waste segregation. Study indicated that lack of knowledge was one of the causes of improper waste segregation which proved the study right. On gender, most participants in the study were female with the number of 39 (98%) and minority were male with 1(2%) [12].

### 4.1. Causes of Improper Waste Segregation

The study in table 1 as disclosed strongly that all n=40 (100%) respondents indicated that nurses don't always tell the students to throw the waste everywhere which meant that none of the nurses contributed on the causes of improper segregation of waste. On the lack of knowledge on how to dispose waste properly and unaware of color coding, majority of the participants n=29 (72.5%) agreed while n=11 (27%) disagree about lack of knowledge and color coding that contribute to improper waste segregations. In support of this current study, Liao, reported lack of sensitivity and knowledge on the causes of improper waste segregation. The majority of the respondents n= 38 (95%) indicated that they have seen the nurses putting all the type of waste in one plastic bag, and thought that was the correct way to dispose of waste, while the minority n=2 (5%) respondents indicated that that's not the cause of improper segregation of waste [13].

Additionally, all the participants n=40 (100%) revealed that they did not think all waste belonged to one group which made none of this a cause of improper waste segregation problem. All the participants n= 40 (100%) have indicated that the hospitals did not have necessary plastics for waste disposal. In support of the current study, Hasan et al., (2015) states that proper segregation is jeopardized by the unavailability of some waste plastic bags in the hospitals and clinics, as some wastes ended up in wrong plastic bags. Half of the respondents n=20 (50%) indicated that student nurses were not taught from college neither given orientation in hospitals on how to dispose waste properly and n=20 (50%) have indicated that they were given orientation and taught at college on how to dispose of waste.

All the second-year nursing degree students that participated in the study n= 40 (100%) indicated that cleaners at the hospitals do give plastics to students for disposal. Majority of the respondents n=38 (95%) indicated that, sometimes

waste is not a lot to discard separately hence they do not put all in one plastic and about n=2 (5%) of the respondents indicate that this was not one of the causes of improper waste segregation. The results are similar to the following study that review lack of reliable information about waste generation and availability of appropriated services to treat and dispose these wastes causes to improper waste segregation [14].

Most of the respondents n=35 (87.5%) indicated that there was no infection control guideline in the wards where I was allocated and n=5 (12.5%) indicated no to this statement which made this statement one the causes of improper waste segregation. This results are similar to the study that was conducted by indicating lack of knowledge, insufficient waste disposal equipment and improper training as some of the contributing factors to improper waste segregation [15]. Most respondents n=37(92.5%) respondents indicated that there were no guidelines and standing orders at the clinics and hospital that guided proper waste segregation and n= 3 (7.5%) indicated that there are guidelines in the hospitals.

### 4.2. Factors contributing to improper waste segregation

Table 2 indicates the contributing factors of improper waste segregation, the second-year degree nursing students that participated in the study were asked to rate their answers. All the respondents n=40 (100%) strongly disagree of not knowing what waste segregation was all about. In support of this study findings, study shows that lack of knowledge, insufficient waste disposal equipment and improper training were some of the contributing factors to improper waste segregation [15].

n=30 (75%) Of the respondents agreed, n=5 (12.5%) strongly agree, n=2 (5%) disagreed, n=2 were neutral that some hospitals and clinics did not have policies on color coding therefore they do not know which plastics is for which waste showing that majority of the participant have agreed with this statement. These results have similar findings as the study that review, lack of reliable information about waste generation and availability of appropriated services to treat and dispose these wastes contributing to improper waste segregation [14].

All the respondents n=40 (100%) strongly disagreed that hospitals and clinics do not have dustbins and plastics for waste disposal, so students are forced to dispose waste anywhere. States that proper segregation is jeopardized by the unavailability of some plastic bags in the hospitals and clinics, as some wastes ended up in wrong plastic bags [16]. A total of n=37(92.5%) strongly disagrees, while n=3(7.5%) agrees that the nurses in the hospitals and clinics always refuse to give student orientations on waste segregation this result are similar to the literature that revealed that lack of trainings of hospital staff can cause improper waste segregation [16].

The respondents n=20 (50%) strongly disagreed, n=17 (42.5%) disagrees=3 (7.5%) agree that they were not aware that discarding soiled waste causes health hazards, these results are similar to the study that stated that, lack of waste

management and disposal, insufficient financial and human resource, and low priority given to the topic hindered proper waste segregation, [15]. All the participants, n=40 (100%) strongly disagree that some nurses get angry when they dispose waste properly since it's the culture to dispose the way they want. All the participants n=4 (100%) had strongly disagreed that they are always ignorant in disposing waste, which made ignorant a no factor that contributed to improper waste segregation.

The results have revealed that, n=20 (50%) strongly disagrees=18 (45%) strongly agreed, n=2 (5%) disagreed, that there are no signals /posters about color coding in the wards. Mugo, [16]. in their study highlighted inadequate awareness, poor health care workers attitudes and practices and inadequate management by facility leadership as factors associated with improper segregation and this study have proven that this was not one of the contributing factors to improper waste segregation among the second-year degree nursing students.

## 5. Conclusion

In answering the first research objective of the study which was to determine the factors that contributes to improper waste segregation, it was found that the study discovered that most of the second year degree nursing students have lack of knowledge on how to dispose waste properly and color coding, insufficient segregating plastics and the ignorance of the staff members, and this have negatively affected the second year nursing degree students to participate in actual and proper waste segregation.

The second objective was to determine the factors contributing to improper waste segregation. The results indicated that there were no policies on color coding and unawareness of soiled waste that can cause hazards, is one of the points the student cannot properly segregate wastes. The study further revealed that the overall quality of the approach to waste segregation among the second-year degree students at the University of Namibia was poor, and poor encouragement normally result in non-adherence to proper waste segregation amongst these students.

## Funding

No funding was received for this manuscript.

## Acknowledgement

We would like to thank all students that took part in our study.

## Bibliography

- Mahbobeh, O., Mohsen, M., Charles J, P., Mina, D., & Mehرداد, A. (2014). < A> qualitative study of the causes of improper segregation of infectious waste at Nemazee hospital, Shiraz, Iran.
- Gangwani, M., Pandey, M., Punjabi, N., Khatwani, P., & Sahu, S. (2019). A comprehensive study on waste segregation techniques. *International Journal of Engineering Research & Technology (IJERT)*, 8(04).
- Agarwal, S., Gudi, R., & Saxena, P. (2020, November). One-Shot learning based classification for segregation of plastic waste. In *2020 Digital Image Computing: Techniques and Applications (DICTA)* (pp. 1-3). IEEE.
- Brindha, S., Praveen, V., Rajkumar, S., Ramya, V., & Sangeetha, V. (2020). Automatic medical waste segregation system by using sensors. *EasyChair*.
- Saha, H. N. (2017). Health monitoring using internet of things (IoT). In *2017 8th Annual Industrial Automation and Electromechanical Engineering Conference (IEMECON)*.
- Ahmed, M. T., Louty, N. M., Osman, M. A. M., & Godfrey, L. K. (2018). Impacts of waste in Africa. *United Nations Environment Programme*.
- Hosono, T., & Aoyagi, K. (2018). Effectiveness of interventions to induce waste segregation by households: evidence from a randomized controlled trial in Mozambique. *Journal of Material Cycles and Waste Management*, 20, 1143-1153.
- Banerjee, S., Aditya, G., & Saha, G. K. (2013). Household disposables as breeding habitats of dengue vectors: linking wastes and public health. *Waste management*, 33(1), 233-239.
- Kihila, J. M., Wernsted, K., & Kaseva, M. (2021). Waste segregation and potential for recycling-A case study in Dar as Salaam City, Tanzania. *Sustainable Environment*, 7(1), 1935532.
- Amparado, M. A. P. PAYING SCHOOL FEES THROUGH WASTES: EXPERIENCES AND HEALTH RELATED CHALLENGES OF AN ECO SCHOLAR. *NationalEditors/Consultants*, 345.
- Krueger, W. S., & Wade, T. J. (2016). Elevated blood lead and cadmium levels associated with chronic infections among non-smokers in a cross-sectional analysis of NHANES data. *Environmental Health*, 15(1), 1-13.
- Ismail, A. (2016). Islamic approach on public awareness campaign of solid waste management. *Journal of Contemporary Islamic Studies*, 2(2), 55-74.
- Liao, N., Bolyard, S. C., Lü, F., Yang, N., Zhang, H., et al. (2022). Can waste management system be a Greenhouse Gas sink? Perspective from Shanghai, China. *Resources, Conservation and Recycling*, 180, 106170.
- Mmereki, D., Baldwin, A., & Li, B. (2016). A comparative analysis of solid waste management in developed, developing and lesser developed countries. *Environmental Technology Reviews*, 5(1), 120-141.
- Kumar, M., Singh, R. K., & Rawat, V. (2015). Awareness and practices about bio-medical waste among health care workers in tertiary care hospital of Haldwani, Nainital. *National journal of medical research*, 5(01), 47-51.
- Mugo, L. N. (2017). Factors Influencing Waste Management in Public Hospitals in Nakuru County, Kenya (Doctoral dissertation, University of Nairobi).
- Abubakar, R., Kumar, K. S., Acakpovi, A., Ayinga, U. W., Prempeh, N. A., et al. (2020). Convolutional neural networks for solid waste segregation and prospects of waste-to-energy in Ghana.
- Chang, N. B., & Pires, A. (2015). Technology matrix for solid waste management.
- Hasan, M., Hasan, S., Umar, M., Azad, A. H., & Haroon, S. (2015). Situation analysis of health care waste management in private sector hospitals in federal capital territory, Islamabad, Pakistan. *Rawal Medical Journal*, 40(4), 437-440.