



POLICY AND PRACTICE OF HEALTH CARE WASTE MANAGEMENT IN
COMMUNITY-BASED CARE IN SOUTH AFRICA

By

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Submitted in partial fulfilment of the requirement for the degree
Doctor of Philosophy (Health Promotion)

DECLARATION

I declare that the work in this thesis has not previously been submitted for a degree in any other institution other than the University of KwaZulu-Natal.

I certify that this thesis is my original work and all information sources and literature used have been duly acknowledged. All the research assistants that provided assistance during the research process have been acknowledged.

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ACKNOWLEDGEMENTS

I am grateful to my supervisor Dr Olagoke Akintola for mentoring me throughout my studies.

I am grateful to my husband Peter Mudenda for the encouragement and support provided during this study.

I acknowledge and value the support of my research assistants Noloyiso Dlilanga, Samantha Moodley and Cassidy Shaw who assisted me with data collection.

I am grateful to my friend Dr Kwaku Opong Asante for his encouragement and moral support during the study.

My heartfelt gratitude goes to my friends Ola Adewumi, Ida manyina, Vimbai Chibango, Danford Chibvongodze, Bianca Netsai Gwelo, Alpha Kose and all my colleagues from Disability Unit for their encouragement and support while doing this study.

I would like to thank my family for their constant prayers and understanding during my school programmes.

I acknowledge and thank the Health Economics and HIV and AIDS Research Division for providing me with a three year PhD scholarship (2013-2015).

I also acknowledge and thank the African Doctoral Dissertation Research Fellowship (ADDRF) 2014-2016 programme for a doctoral research grant awarded by the African Population and Health Research (APHRC) in partnership with the International Development Research Centre (IDRC).

Most importantly I would like to thank God who has brought me this far and for providing me with all the blessings that I deserve.

ACRONYMS

AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral therapy
CBC	Community-based care
CBOs	Community-based care organisations
CHWs	Community health workers
DOH	Department of Health
HCW	Health care waste
HCWM	Health care waste management
LMICs	Low-and-middle-income countries
PLWHA	People living with HIV/AIDS
OVC	Orphaned and vulnerable children
UNEP	United Nations Environmental Programme
USAID	United States Agency for International Development
WHO	World Health Organization

ABSTRACT

Health care waste management (HCWM) is a growing concern more especially in the low- and middle-income countries (LMICs). Improper management of health care waste (HCW) has negative effects on the environment and on the health of the people. Unfortunately, no study has been found so far that addresses policy and practice of HCWM in community-based care (CBC) in South Africa. This thesis begins to address HCWM issues through five manuscripts that use various methods and approaches to develop an understanding of HCWM in CBC. The main scripts in this thesis present: 1) a scoping review that highlights the terminologies of HCW, definitions, categories and its classifications; 2) analysis of international and national policies that govern HCW in South Africa; 3) media analysis which explains how the South African media frames the issue of HCWM; 4) results from interviews with policy makers and stakeholders regarding their opinions on the practices of HCW in CBC; 5) results from focus group discussions, informal interviews and participant observations from the community health workers (CHWs) indicating their experiences about HCWM practices. This study is the first to be conducted in CBC. The methodologies used in this study provide useful insights into HCWM and the findings are an addition to the body of literature on HCWM in CBC, environmental health and public health.

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CHAPTER ONE

INTRODUCTION

Background of the study

Fay, Beck, Fay and Kessinger (1999) explain that, as modern medicine in the health care industry continues to maintain and sustain people's wellness and quality of life; by-products such as the health care waste (HCW). Health care waste that is generated could have adverse effects on both people and the environment. HCW is a by-product of health care activities and it includes waste that is produced in homes where there is care for the patient (Pruss, Giroult and Rushbrook, 1999). Usually, about 75% to 90% of the waste that is produced in health care facilities poses no risk as it is comparable to domestic waste. It contains waste from administrative and housekeeping sections of the facilities. The remaining 10% and 25% of it is hazardous (Pruss et al., 1999; Hossain, Santhanam, Norulaini and Omar, 2011). Proper health care waste management (HCWM) involves: segregation and classification of HCW according to the risks it poses, storage, collection, transportation, processing and disposal (Pruss et al., 1999). HCWM is important because it protects the health of the public and the environment (Zurbrugg, 2003; Ruoyan et al., 2010:246).

Literature on HCWM in low-and-middle-income countries (LMICs) shows that large volumes of HCW is produced (Alagoz and Kocasoy, 2008) and it is poorly managed (Hossain et al., 2011). The challenges that are reported with HCWM are lack of clear policies for HCWM (Leonard, 2005; Soliman and Ahmad, 2007; Alagoz and Kocasoy, 2008; Sawalem, Selic and Herbell, 2009), and most staff working in health care facilities lack sufficient knowledge on handling HCW (Abdulla, Qdais and Rabi, 2008; Kumar, Khan, Ahmed, Khan, Magan, Nausheen and Mughal, 2010; Ruoyan et al., 2010; Abah and Ohimain, 2011). HCW is not segregated (Mundia and Mbewe, 2006; Sawalem, Selic and Herbell, 2009; El-Salam, 2010; Ferreira and Teixeira, 2010; Mangaa, Fortonb, Moforc and Woodardd, 2011); it is transported using vehicles not meant for transporting HCW (Mohee, 2005; Mbongwe, Mmereki and Magashul, 2008; Franka, El- Zoka, Hussein, Elbakosh, Arafa and Ghenghesh, 2009; Sawalem et al., 2009; Gabela and Knight, 2010); HCW handlers do not have protective materials (Mohee, 2005; Soliman and

Ahmad, 2007; Mangaa et al., 2011); HCW is dumped in poorly managed dumpsites and scavenging is allowed without any measures put in place (Bendjoudi, Taleb, Abdelmalek and Addou, 2008; Sawalem et al., 2009); and HCW is incinerated openly (Nemathaga et al., 2008; Hassan et al., 2008; Bendjoudi et al., 2009; Patwary et al., 2009; Coker et al., 2009). Improper management of HCW causes environmental pollution (Drackner, 2005; Kassim and Ali, 2006; Abdulla et al., 2008; Ramokate, 2008). HCW in the environment also exposes the public to infections and toxins (Bdour, Altrabsheh, Hadadin and Al-Shareif, 2007; Harhay, Halpern, Harhay and Olliaro, 2009; Ferreira and Teixeira, 2010; Magdy and El-Salam, 2010).

As much as there are challenges with managing waste in health care facilities, the waste that emanates from community-based care (CBC) is of greater concern because unlike in hospitals, homes are not built to accommodate HCW (Verma, Mani, Sinha and Rana, 2008). CBC is the care that is provided to the chronically ill patients in the comfort of their own homes in the communities by community-based organizations (CBOs) (Buhler-Wilkerson, 2001). Wilson, Lavis and Guta (2012) argue that CBOs provide services and support to the marginalised, disadvantaged and stigmatised communities because they understand and are connected to the community members. Similarly in South Africa, CBOs provide various services that range from orphan and vulnerable children (OVC) programmes, home-based care and AIDS awareness programmes, antiretroviral therapy (ART), palliative care, counselling, education on increasing health of the patients, symptom control and psychosocial services (Akintola, 2008; Young and Busgeeth, 2010). Community health workers (CHWs) who are volunteers are recruited and trained by the CBOs to assist family members to provide basic nursing services to the patients (Akintola, 2006).

Some studies on CBC allude to the fact that CHWs are at risk of HIV or tuberculosis (TB) infections and have low knowledge of prevention of such infections (Akintola, 2006; Kang'ethe, 2009; McInerney and Brysiewicz, 2009). Furthermore, challenges that impede the CHWs' work in CBC are lack of materials for providing nursing care (Akintola and Hangulu, 2014), lack of toilets in some households (Phorano, Nthomang and Ngwenya, 2005; Kgalushi, Smits and Eales, 2008), lack of water taps in some homes (Azwidihwi and Davhana-Maselesele, 2009), CHWs are ridiculed by their friends and some family members of the patients (Akintola, 2008), there is lack of remuneration for CHWs (Akintola, 2006; Shaibu, 2006), and CHWs experience stress and

burnout (Dageid, Sedumedi and Duckert, 2009). However, it is not clear how and to what extent HCW is managed in CBC. I found no single study focused on this theme in South Africa.

The problem statement

Some previous studies on CBC in South Africa have focused on the global financial crisis and its impact on the CBOs (Akintola, Gwelo, Labonte and Appadu, 2015), infection control practices (Akintola and Hangulu, 2014), perceived burnout by caregivers (Akintola, Hlengwa and Dageid, 2013), perceptions of rewards among caregivers (Akintola, 2010), the burdens of care by CHWs (Akintola, 2008), and challenges faced by CHWs (Akintola, 2006). There is no study that has been conducted to explore the policies and practices of HCWM in CBC within South Africa. Furthermore, little is known about media framing of HCW in South Africa; the experiences of policy makers and stakeholders and CHWs regarding HCWM in CBC within the South Africa.

Main objective and the significance of the study

This study sought to explore health care waste management policies and practices in community-based care in Durban metropolis in South Africa. The findings could be useful for policy makers as well as programme planners for developing and designing policies aimed at improving HCWM in CBC across the country. The findings will also be an addition to the body of literature on CBC, public health and environmental health because health care waste management cuts across the mentioned disciplines. This main objective will be achieved through the following specific objectives and research questions.

Specific objectives

1. To explore the terminologies used in literature to describe, define, categorise and classify health care waste. This objective will help us understand the consistencies and the inconsistencies that exist with the terminologies.
2. To review international and South African national policies that govern health care waste management. Reviewing these policies will provide information on what the policies and

regulations say about how health care waste from homes in community-based care should be managed.

3. To explore media framing of health care waste management in South Africa. Media frames help to get the attention of policy makers. Thus, understanding how the media frames issues relating to health care waste management in South Africa could help inform policy and decision making about health care waste management in general and specifically in community- based care.

4. To explore the experiences of policy makers and stakeholders regarding health care waste management practices in community-based care in South Africa. The perspectives of policy makers and stakeholders on HCWM in CBC in South Africa are important because such insights will be useful for informing policy making and implementation of HCWM in CBC in South Africa.

5. To explore health care waste management practices of community health workers in South Africa. The experiences of CHWs help to understand how health care waste management policies are implemented in practice.

Specific research questions

1. What terminologies are used in literature to describe, define and categorise health care waste.
2. What are the international and South African national policies that govern health care waste and what do they say?
3. How does the print media frame issues relating to health care waste management in South Africa?
4. What are the experiences of policy makers and stakeholders regarding health care waste management in South Africa?
5. What are the practices of health care waste management by community health workers in South Africa?

Ethical considerations

Ethical clearance was sought and obtained from the Humanities and Social Science Research Ethics Committee of the University of KwaZulu-Natal, South Africa. Permission to conduct the

study in CBOs was sought and granted by the CBO managers/gatekeepers. Informed consent was also obtained from the participants: policy makers, stakeholders and community health workers. Participants were informed of the beneficence of the study, participation was voluntary and participants were informed of their right to withdraw from the study when they wished to do so. No names were mentioned in the study to ensure anonymity. For confidentiality purposes, participants were informed that all the data collected would be stored in the supervisor's offices and will be discarded after 5 years. Details of ethical approval and appendices are included in chapters 6 and 7.

Structure of the thesis

To answer the research questions, the ecological systems theory by Urie Bronfenbrenner (1974) will be used as a theoretical framework to guide this study. The theory is presented in Chapter 2 where I explain how the theory was developed; provide a brief discussion of its four levels, how it has been applied in other studies and how it applies to this overall thesis on policy and practice of HCWM in CBC.

Chapter 3 presents a scoping review to achieve the first objective. Scoping reviews are approaches used to map broad topics (Anderson et al., 2008; Davis et al., 2009; Brien et al., 2010; Pham et al., 2014). A scoping review was appropriate because it helped to map the broad terminologies used to describe HCW, its definitions, categories and classification of HCW. The scoping review includes literature with various study designs from different disciplines both from high as well as low-and middle- income countries.

To achieve objective two, Chapter 4 presents a review of international and South African policies that govern HCW. The context in which these policies were formed and what they say about HCWM in CBC is discussed.

Chapter 5 provides a print media analysis of HCWM in South Africa. This was conducted to achieve objective 3. Media analysis was conducted because the news media is known to be a major source of information for the public and it can be used as a platform for communicating policy initiatives by policy makers (Collins, Abelson, Pyman and Lavis, 2006). For example in South Africa, media analysis has been proved to provide media frames of the causes and solutions of the management of Multi-Drug Resistant and Extensive Drug resistance

Tuberculosis both at the individual and the health systems level (Daku, Gibbs and Heymann, 2012). Conducting media analysis will assist in understanding media frames of the problems and their causes and the options available as well as implementation considerations relating to HCWM in South Africa.

Chapter 6 presents the perspectives of policy makers and stakeholders about HCWM in CBC. This aims to achieve objective 4. Semi-structured interviews were conducted with managers of CBOs, the ward councillors who oversee development programmes in the communities, area cleansing officers who are responsible for overseeing waste management programmes in the communities and also education officers who are responsible for developing and conducting health awareness and waste management programmes in the communities.

Chapter 7 sought to achieve objective 5. The study drew on ethnographic techniques: focus group discussions (FGDs) and participant observations were used to gain a deep understanding of HCWM practices of CHWs and households? During and after observations, informal discussions were conducted with CHWs to help understand HCWM practices. An integrative conclusion of all findings is presented in Chapter 8. The aim contributions of the study will be discussed and the areas for further research.

Contributions of the study

As a whole, this study on policy and practice of HCWM in CBC is the first to be conducted in the country. Improper management of HCW has adverse effects on the health of the people and the environment. This makes HCWM an area of interest to public health and environmental health. The overall insights that are provided in this study will be an addition of knowledge to the body of literature on HCWM and to primary health care in general and to community-based care in particular. The study also contributes to the field of public and environmental health more broadly. Most studies on health care waste management have been conducted in hospitals and clinics. This is the first study that has been conducted in community-based care. Therefore, this study is a contribution to the body of literature on health care waste management in CBC. Methodologically, this is the first study that has combined various methods: a scoping review, review of policies, media analysis, qualitative interviews, ethnography: interviews focus group

discussions, participant observations and informal discussions on HCWM in CBC and in South Africa. Additionally, using the ecological systems theory, this study has explains the link that exists between policy and practices of HCWM in CBC in particular and HCWM in South Africa more broadly.

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CHAPTER TWO

PRESENTATION OF THE THEORY THAT IS GUIDING THIS STUDY:

THE ECOLOGICAL SYSTEMS THEORY

THE THEORY FOR HUMAN DEVELOPMENT

BY URIE

BRONFENBRENNER 1976

CHAPTER TWO

THEORETICAL FRAMEWORK

Introduction

A theoretical framework in research is needed because it emphasises the context in which the study is applied. It also justifies why a particular study is conducted and for which purpose it serves (Grossman, Smagorinsky and Valencia, 1999). This study was guided by the ecological systems theory (EST). This chapter will discuss what this theory is, who developed it and the various levels of the EST will be explained. The chapter will also discuss how the EST has been applied in various disciplines and how it applies to this study.

The ecological systems theory

The EST was first developed by Urie Bronfenbrenner as a theory of human development in the 1970s as shown in Figure 1 below. It explains how different environmental systems influence the development of an individual (Bronfenbrenner, 1994). The theory includes the term “ecological” which is borrowed from the word ecology. Using the scientific perspective, ecology is the study of interactions of organisms in their environment. Additionally, ecology from the sociological perspective explains how humans or groups relate to their existing environment (Begon, Harper and Townsend, 1996). The word “systems” involves beliefs that a person is in constant interaction with in the environment within networks. These networks can either have a positive or a negative impact on an individual (Wilder, 2009). The EST is used in social work as a meta- paradigm which is commonly referred to as “person in the environment”. This meta-paradigm describes how an individual and various complex environments interact with each other and how they affect each other (Weiss-Gal, 2008: p. 65). The ecological systems theory mainly focuses on individuals as part of and integrating with other systems in the environment (WeissGal, 2008).

The EST has been used in health promotion studies to design interventions directed at changing the intrapersonal, interpersonal, organisational, community and public policy (McLeroy, Bibeau, Steckler and Glanz, 1988). The EST has also been applied in different health research studies. For example, it has been applied in research to understand the experiences of family caregivers taking care of aging adults (Wilder, 2009), to understand the caregiver’s perceptions on financing

community-based long-term care (Davis, 2009) and to understand the experiences of

caregivers in practicing infection control in home-based care settings (Hangulu, 2012). The EST has four levels of influence and these are micro-system, meso-system, exo-system and macro-system (Wilder, 2009).

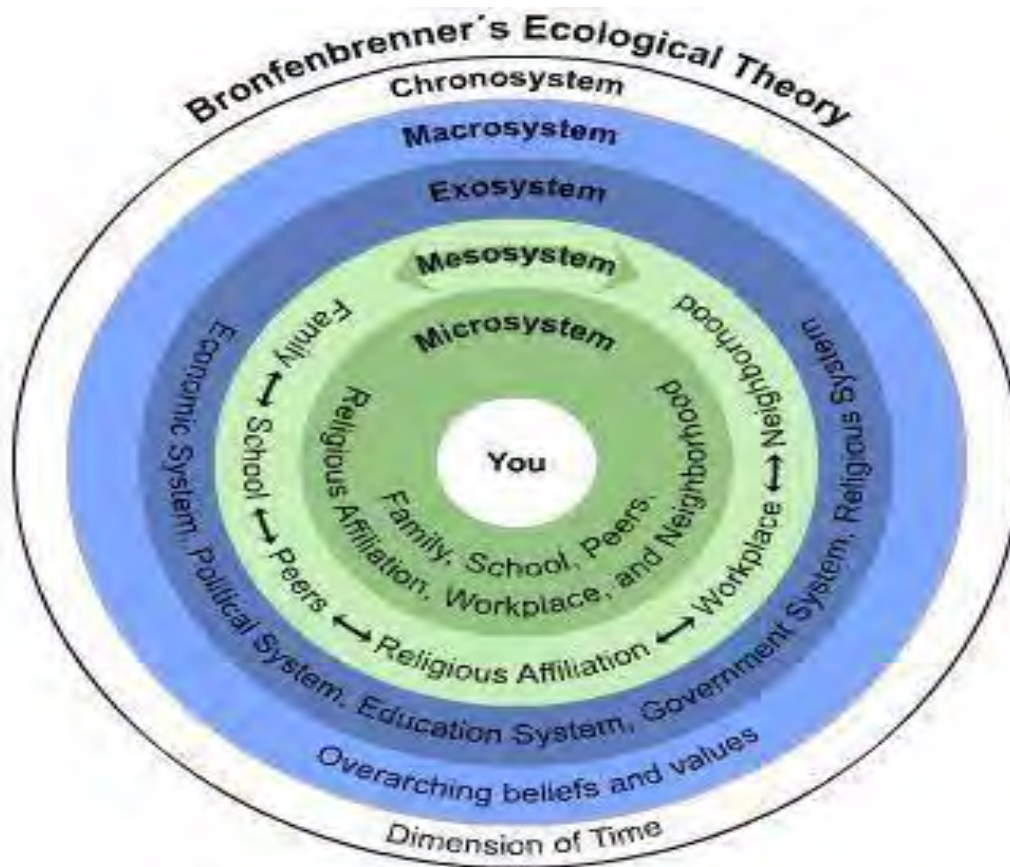


Figure 1 Ecological theory for human development (Bronfenbrenner, 1974)

The micro-system is where the individual belongs and it comprises the influences relating to the individual. These influences come from the individual's family, peer groups and the neighbourhood and these are called social agents. Social agents interact directly with an individual and influence the individual's behaviour either positively or negatively. The meso- system is the level where the social agents belong and it is related to the micro-system where the family experiences are related to the peers' experiences and the peers' experiences to the neighbourhood experiences (Wilder, 2009). The exo-system is a level where organisations belong. It shows an organisation that an individual works for. The organisation either affects an

individual's life positively or negatively and vice-versa. The macro-system describes the nation which describes the culture in which individuals live (Wilder, 2009). This level also includes developing and industrialised countries' socio-economic status, poverty and ethnicity (Woodside et al., 2006).

Assumption of the ecological systems theory

The EST is based on an assumption that, when a person or group is connected and engaged in a supportive environment, the functioning also improves (Davis, 2009).

Application of the theory to this study

This study applies four levels of the EST. The macro level: applied to this study, it is the international policies' level. The Exo level is the South Africa's national policies level. The meso level is the policy makers and the stakeholder's level. The micro level is the community health worker's level. All levels are summarized in Figure 2.

The international policy level: This is the macro-system level that helped to review and understand the international policies that govern health care waste (HCW). The review of international policies was conducted to fulfill the second objective. The review covered how the policies were developed, who developed them and the contexts in which they were developed. Exploring international policies governing HCWM was important for understanding the context and how such policies influenced the formation of policies at the national level.

The national policy level: This is the exo-system level that helped to review and understand national policies that govern HCWM in South Africa. The review of policies at this level was relevant to answer objective two. The policies governing health HCW were reviewed including the context in which they were developed as influenced by the international policy environment. Exploring these policies helped to understand how they are translated and implemented into practice by the policy makers and stakeholders.

The policy makers and stakeholders' level (municipality and community level): This is the meso-system level where policy maker (the ward councilors) and stakeholders are found. In this study, the stakeholders were: (1) the community-based care managers who are responsible for running community-based care organisations in the communities; (2) the area cleansing officers who are in charge of overseeing HCWM in the community; and (3) the education officers who are responsible for developing and providing HCWM education in the communities.



Figure 2 Ecological systems theory as applied to this study sourced from (Bronfenbrenner, 1974)

The policy and stakeholders work together with the community members to provide HCWM services that are needed in the community. This level links to objective number four. This level helped to explore the experiences of the policy makers and stakeholders about how HCWM policies are interpreted and implemented in practice, in the communities that they serve. All challenges and strategies used to address the challenges regarding implementation of HCWM policies were explored. Understanding how the HCWM policies from the policy makers and stakeholders' perspective was necessary to determine how these policies are in line with the international and national policies on HCWM.

The community health worker's level: CHWs belong to the micro-system level. They provide home-based care services to patients in homes within the community. Home-based care

involves nursing care activities that are responsible for generating HCW. This level is in line with objective number five. This level helped to explain how the HCWM policies are implemented in practice by the CHWs in the homes of the patients. The challenges confronted, and how these challenges are dealt with is explained. Understanding the CHWs' perspectives was important to determine how HCWM practices are in line with the international and the national policies on HCWM and also to point out the inconsistencies.

Conclusion

This study assumes that there is consistency among all levels when it comes to policy and practice of health care waste management (HCWM), meaning that if there are international and national policies that govern HCWM, policy makers and stakeholders are more likely to implement them hence the practices of HCWM are improved at the community level by the community health workers or members.

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CHAPTER THREE

A SCOPING REVIEW OF TERMINOLOGIES USED TO DESCRIBE

HCW, CATEGORIES AND CLASSIFICATION OF HEALTH CARE WASTE

Health care waste in the health care sector: A scoping review

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This manuscript has been prepared for submission to Health Research Policy and Systems.

I Lydia Hangulu [LH] was responsible for the conception and designing of this study. My supervisor, Dr Olagoke Akintola [OA], provided guidance. Samantha Moodley [SM] served as a research assistant and assisted with data searches, assessment of the journal articles and the development of the coding framework. The three of us worked together as assessors in developing concepts for the methods section. I drafted the chapter under the guidance of my supervisor.

Abstract

Background: Health care waste (HCW) is generated during the provision of health care and could have adverse effects on both the people and the environment if it is not managed properly. There is lack of uniform nomenclature for waste generated during the provision of health care services. This could undermine efforts to understand issues relating to HCW in developing and implementing appropriate policies to address issues relating to health care waste management (HCWM). The study sought to understand terminologies used to describe HCW, their definitions, categories and classification. It also sought to explore how the terms are in line with the ones that are provided in the WHO global manual on health care waste management from health care facilities. The study first identified terms from the existing literature, conceptually map the literature and identified gaps and areas of further inquiry.

Methods: We conducted a scoping review using six electronic databases: EBSCOhost, Open Access, ProQuest, PubMed, Web of Science and Google Scholar. A total of 112 studies were included in the study. The review selection and characterisation were performed by three assessors. All studies were mapped based on the source of literature, country focus, study design, academic discipline, terminologies used to describe HCW, their definitions, categories of and classes under each category of HCW.

Findings: There was more literature from low-and-middle-income countries (LMICs) with 87.5% (n=98) and 12.5% (n=14) from high income countries. The largest number of articles were from the public health discipline with 19.6% (n=22) followed by the discipline of environmental health with 8.9% (n=10). This scoping review found that HCW, medical waste, clinical waste, biomedical waste and hospital waste are the five dominant terminologies used to describe HCW both in high income countries and LMICs. The definition of the terminologies and the categorization and classification of health care waste were in line with the ones provided in the WHO global manual.

Conclusion and recommendations: Because all different terminologies used to describe HCW are in line with the WHO manual's recommendation, there is a need to adopt and use one standard term the one that is provided by the manual. Further studies must be conducted to explore how these terminologies are interpreted into practice. This will help to understand how their implementation aligns with the recommendations contained in the WHO manual.

Keywords: Health care waste, health sector, scoping review.

Introduction

The provision of health care such as operative procedures, diagnostic procedures which involve the administration of injections, medications, drips and surgery among others results in improved wellness and quality of life for people (Verma, Mani, Sinha and Rana, 2008). However, health care waste (HCW) generated during the provision of health care could have adverse effects on both the people and the environment (Pruss et al., 1999; Botelho, 2012). Literature on HCW shows that large volumes of HCW are produced in health care facilities settings throughout the world (Alagoz and Kocasoy, 2008) but it is poorly managed especially in the low-and-middle income countries [LMICs] (Hossain et al., 2011).

The main factors responsible for the poor management of HCW by the governments of many LMICs are: lack of financial investment and clear policies to manage HCW (Alagoz and Kocasoy, 2008; Sawalem, Selic and Herbell, 2009), low level of knowledge among health care staff on how to handle HCW (Kumar, Khan, Ahmed, Khan, Magan, Nausheen and Mughal, 2010; Abah and Ohimain, 2011), lack of segregation of HCW from point of generation to the point of disposal (Ferreira and Teixeira, 2010) and poor management of dumpsites which leaves room for scavenging (Leonard, 2005; Mundia and Mbewe, 2006). In addition, there are inadequate technologies for managing HCW. As a consequence, incineration is the most common method used (Soliman and Ahmad, 2007; Nemathagaet al., 2008; Hassan et al., 2008; Abd El-Salam, 2010). In many LMICs, HCW is transported together with other goods (Gabela and Knight, 2010); untrained people and those who are not registered to deal with HCW used as drivers of vehicles that transport HCW (Mbongwe, Mmereki and Magashul, 2008). Health care waste is also buried or burnt openly (Soliman and Ahmad, 2007; Mangaa, Fortonb, Moforc and Woodardd, 2011).

Poor management of HCW exposes health care workers to risks of infection with various diseases. Waste handlers and the community members confront the risk of infections, and exposure to toxins and injuries (WHO, 2007). In a study conducted in Tripoli, Libya, it was found that exposure to HCW among waste handlers caused 5% of them to develop hepatitis B virus and 0.3% had hepatitis C virus (Franka, El-Zoka, Hussein, Elbakosh, Arafa and Ghenghesh, 2009). Exposure to HCW can cause tuberculosis (TB) infections (Bdour,

Altrabsheh, Hadadin and Al-Shareif, 2007), and damage the respiratory, nervous and reproductive systems of the patients, family members and caregivers, and the general public. HCW have mutagenic, teratogenic and carcinogenic effects (Blackman, 1993). Exposure to HCW can also cause diseases like diarrhoea, leptospirosis, typhoid, cholera and HIV (Mato and Kassenga, 1997).

The disposal of HCW into unprotected dumpsites which is an improper practice carried out especially in LMICs, promotes scavenging in landfills for reusable items for reselling. For example in India, a study that was conducted by the India Clinical Epidemiology Network on the management of HCW, revealed that, in almost 10 of the health care facilities in the country, more than 30% of the 3-6 billion injections that were administered every year were done with used syringes and needles that were recycled by unskilled scavengers who sold them on the black market (Harhay, Halpern, Harhay, and Olliaro, 2009). Similarly, in 2009, 240 people in the state of Gujarat in India contracted hepatitis B because medical care was delivered with previously used syringes that were acquired through the black market (Solberg, 2009).

While the environmental and health impacts of HCW is well documented, the World Health Organisation in its global 1999 manual 'health care waste management from health care settings' provides guidelines for all issues relating to health care waste's definition, classification and its management. The manual uses the term 'health care waste' to mean all waste that is generated as a result of health care activities. The manual further classifies HCW into nonhazardous and hazardous waste (Pruss et al. (1999). However, different terminologies have been used to describe HCW by various authors from high income countries and low-and-middle income- countries. For example some have used the term 'medical waste' (Lee et al., 2002; Mato and Kaseva, 1999; Nemathaga, Maringa and Chimuka, 2008) while the United States Environmental Protection Agency (EPA) and Bdour, Altrabsheh, Hadadin and Al-Shareif (2007) use the term 'hazardous waste'. Diaz, Eggerth, Enkhtsetseg and Savage (2008) used the term 'biomedical waste', clinical waste, 'hospital waste' or 'yellow bag waste'. Given the various terminologies used to describe HCW, it is not clear how these terminologies align with the WHO 1999 manual. Moreso, we did not find any scoping review that describes, defines and characterises HCW.

A study of health care waste management practices in health care facilities in Botswana found that the use of the terminology: ‘clinical waste’ to describe HCW confused health care workers and the general public. For example the health care workers and the people correctly defined clinical waste as any waste from health care facilities without considering the fact that HCW is further categorised as non-hazardous and hazardous waste. Failure to categorise HCW into these categories resulted in improper segregation of the HCW (Mbongwe, Mmereki and Magashula, 2008). This suggests that the lack of uniform nomenclature for HCW could undermine efforts to develop and implement appropriate policies aimed at addressing health care waste management (HCWM) practices.

This scoping review aims at exploring the nomenclature that is used by the high income countries (HICs) and LMICs to describe HCW as well as how HCW is defined, classified and categorised. Doing so, will help to understand how and to what extent the nomenclature aligns with the ones that are provided in the HCWM global manual by WHO. This study will also help to identify inconsistencies. In this scoping review, we sought to answer four specific research questions: 1) What are the various terms used to describe HCW, and how is HCW defined and categorised in high-income and LMICs in existing peer-reviewed and gray literature on health care waste management? 2) In what ways and to what extent does the nomenclature in the literature align with the WHO manual? 3) What are the gaps and areas for further research with regards to the terms used to describe, define and categorise HCW?

Methods

Unlike systematic reviews that aim at combining, summarizing and synthesising findings of a particular research (Chircop, Basset and Taylor, 2014), scoping reviews are conducted for the purpose of mapping the key concepts underpinning a research area, and the main sources and types of evidence available (Mays, Robert and Popay, 2001; Arksey and O’Malley, 2005). Scoping reviews can be undertaken as stand-alone projects in their own right, especially where an area is complex or has previously not been reviewed comprehensively (Daudt, Mossel and Scott, 2013). We chose to conduct a scoping review because no such study has been conducted to explore a large body of literature and summarise the nomenclature used to describe, define,

and categorise HCW in HICs and LMICs. We conducted the scoping review using both deductive and inductive approaches: first we identified search terms from literature. Secondly we used the search terms that we identified in literature to search for literature from various databases. Thirdly, the relevant literature was reviewed and selected and finally all the selected literature was mapped.

Identifying search terms

We used an iterative process to conduct the searches. First, we used read the WHO manual in order to derive the first term ‘health care waste’ for the search. We then used the term health care waste to search for and conduct a broad but rapid review of the literature. In order to identify terms used by ordinary policy makers and stakeholders we conducted a rapid review of 20 media news stories using the search term HCW. The various searches yielded the following terms: *healthcare waste*, *medical waste*, *clinical waste*, *biomedical waste* and *hospital waste*.

Database search/literature search

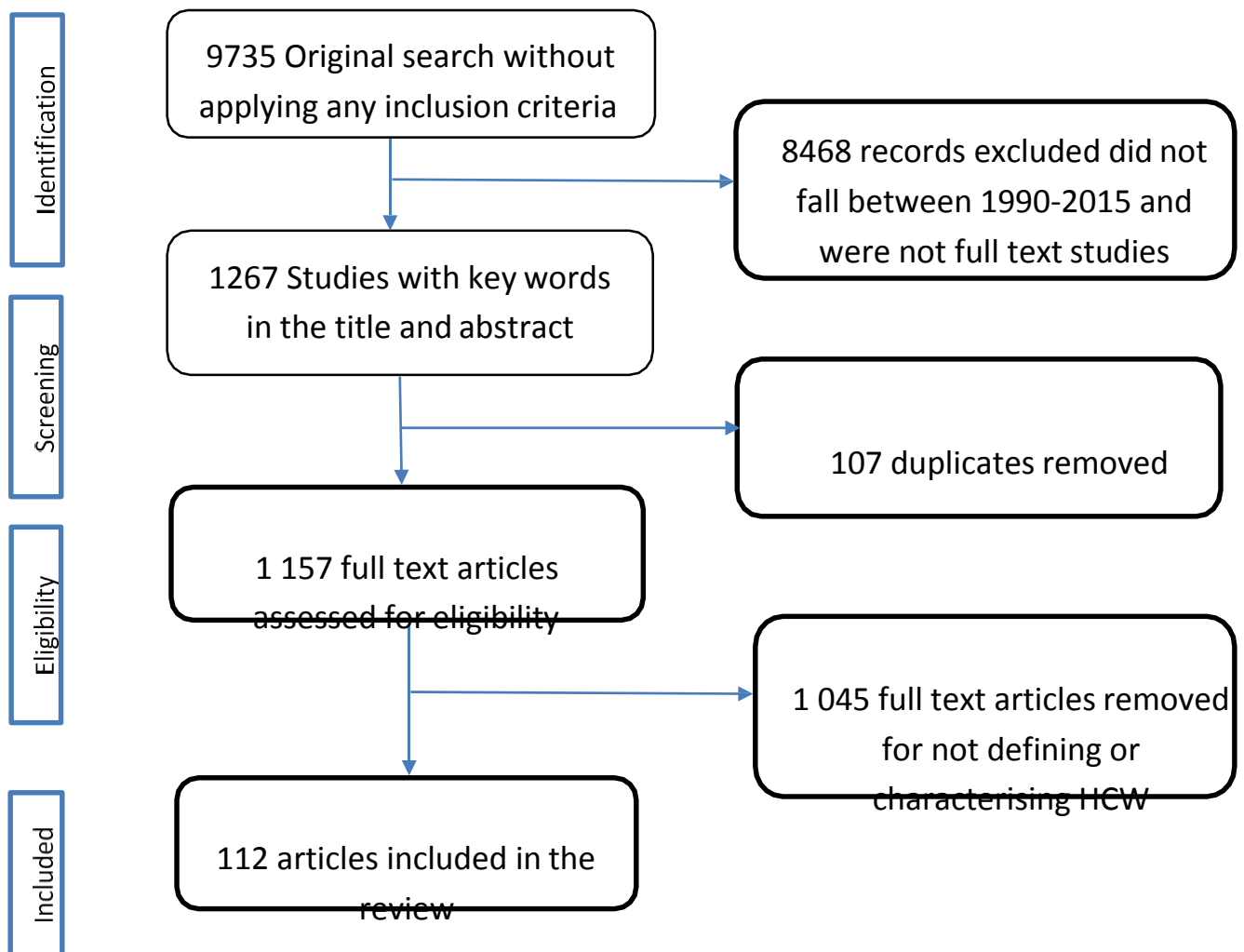
The initial search was conducted in September 2015 by two assessors (LH and SM) using six electronic databases: EBSCOhost, Open Access, ProQuest, PubMed, Web of Science and Google Scholar (see Appendix 1 for the table of all data bases). These data bases were those available at the University of KwaZulu-Natal, Durban, South Africa. We chose both grey and peer-reviewed literature in order to have broader coverage of the literature. From this search, the results hits were 9,735 and we realised that the search was too broad and therefore we put in place the following inclusion criteria: (1) full texts of both grey and peer-reviewed literature which were available through the library at the University of KwaZulu-Natal (2) literature must have been within date limit of 1990 to 2015 because this period had the highest hits (3) literature must be in English (4) literature must have key search terms in their title and/or their abstracts...

Review and selection of literature

After applying the inclusion criteria, 8468 were excluded and 1,267 studies remained. Thereafter, two assessors (LH and SM) worked together to develop a set of explicit exclusion criteria. The exclusion criteria were applied independently by the assessors who met regularly to compare the assessments and resolve discrepancies. The criteria were applied as follows, studies were

removed if they: 1) were duplicate copies; 2) did not define or categorise and classify HCW in their full texts. Based on the exclusion criteria, 107 duplicates were removed while 1,157 studies remained. A total of 1,045 studies did not have define, categorise, or classify HCW in their full text hence they were excluded. A total of 112 studies were included for mapping and these are summarized in figure 1.

Figure1. A flowchart of study selection process



The 112 studies that met our criteria covered various topics for example, 44 (39.3%) covered

health care waste management practices, 14 (12.5%) discussed knowledge and attitudes of health

care staff about health care waste management, 13 (11.6%) covered segregation and quantification of HCW, 12 (10.7%) covered risks associated with HCWM, 11 (9.8%) focused on HCW treatment and disposal options, 9 (8.0%) reviewed existing policies on HCWM and 9 (8.0%) addressed models for HCWM. A list of the included studies is attached in Appendix 3.

Mapping of the literature

In order to extract information about terminologies used to describe HCW, definitions, categories and its classifications of HCW under each category, we used an extraction form. The extraction form was developed using both deductive and inductive approaches. First, we used a deductive approach to develop the extraction form: We used the World Health Organization's (1999) guidance manual on safe management of waste from health-care activities by Pruss et al. (1999) as a guiding framework for developing the extraction form. This framework was used because it is the most recent global guideline on all issues related to health care waste management. Further, we drew on the WHO manual to help us determine how and to what extent it is applicable in various contexts.

Health care waste is the term used to describe HCW in the manual. This term defines HCW as: 'all waste that is generated by health care establishments, research facilities and laboratories. It also includes waste from minor or scattered sources such as homes where waste is produced in the course of health care activities' (Pruss et al., 1999: 2). HCW is classified into two categories which are non-hazardous waste and hazardous waste. Nonhazardous waste is defined as waste that does not contain pathogens that can cause harm to the people or the environment while hazardous waste is defined as waste that is known to contain pathogens that can cause harm to the people and the environment (Pruss et al., 1999: 2). The manual further classifies HCW under each category as follows: Non-hazardous waste comprise all general waste that is comparable to municipal waste and includes waste such as used boxes, paper and empty tins. Hazardous waste comprises all infectious, pathological, sharps, pharmaceutical, genotoxic, chemical and radioactive wastes (Pruss et al., 1999:2).

Next, we used an inductive approach to improve on the extraction form. We developed more categories after conducting the trial coding of 20 articles (discussed earlier). The categories are non-pathological waste, pathological waste and biohazardous waste. Thereafter, the two

assessors met to discuss the extraction form and reached consensus to add new categories to the coding list. The extraction form was independently checked by a third assessor (supervisor, OA) for consistency and accuracy. Domains that were excluded from the extraction were sampling techniques and names of the authors because they were not part of the objectives of the studies. All changes that were made to the extraction form by the supervisor were discussed with the two assessors until consensus was reached before it was applied. We then used the form to extract information from the full text of all the articles in the sample. The final extraction form included the following themes: the source of literature, country focus, study design, academic discipline, and terminologies used to describe HCW, the definitions, categories and classes of HCW (see Appendix 2 for full coding framework).

Results

Mapping of literature

The 112 articles were then mapped according to source of literature, country focus, study design, discipline of the study, terminologies used to describe HCW, categories of HCW and classes of HCW under each category.

Source of literature: The overwhelming majority of the studies that are included in this scoping review were published in journals (n=100, 89.3%), while only 10.7% (n=12) were student dissertations.

Country focus: Only 12.5% (n=14) were studies from high income countries (Canada, Croatia, Japan, United Kingdom, Greece, Poland, Portugal and Italy). Most of the studies focused on LMICs with the highest number being 43% (n=49) from Asian countries (Bangladesh, China, India, Lao republic, Malaysia, Pakistan, Philippines, Romania and Thailand), followed by 23.2% (n=26) from African countries (Algeria, Botswana, Egypt, Ethiopia, Ghana, Libya, Nigeria, Tanzania and Zimbabwe); 11.6% (n=13) were from Middle East countries (Bahrain, Iran, Jordan and Palestine); 4.5% (n=5) were from the South America (Brazil) and another 4.5% (n=5) was from Europe (Turkey).

Study design: The methods of the studies included in the scoping review varied with the most common being cross-sectional studies (n=22, 19.6%), followed by those that used mixed methods (n=16, 14.3%), literature reviews (n=13, 11.6%), quantitative surveys (n=13, 11.6%), case studies (n=11, 9.8%), qualitative studies (n=8, 7.1%), experiments (n=6, 5.4%), document

analysis (n=5, 4.5%), commentaries (n=2, 1.8%) and systematic reviews (n=3, 2.8%), in that order. The source of literature, country focus and study design are summarized in table 1 below.

Table 1: Results of mapping of included studies

Mapping category	Number of studies (N=112)
Source of literature	
Dissertation	12 (10.7%)
Journal	100 (89.3%)
Country focus	
High income countries	14 (12.5%)
Low- and middle income countries	98 (87.5%)
Study design	
Case study	11(9.8%)
Commentary	2 (1.8%)
Cross-sectional study	22 (19.6%)
Document analysis	5 (4.5%)
Experiment	6 (5.4%)
Mixed method	16 (14.3%)
Literature review	13 (11.6%)
Systematic review	3 (2.8%)
Quantitative surveys	13 (11.6%)
Qualitative	8 (7.1%)

Disciplines of the studies: Similarly, the studies included were from various disciplines with most of the studies about public health (n=22, 19.6%), environmental engineering (n=16, 14.3%), environmental health (n=10, 8.9%), environmental management (n=9, 8.0%), community medicine (n=7, 6.3%), environmental sciences (n=5, 4.5%), community health nursing (n=3, 2.8%), preventive medicine (n= 2, 1.8%) and public health dentistry (n= 2, 1.8%). The discipline of a few of the articles (n=8, 7.1%) could not be determined while each of the following disciplines had one (0.9%) article: administrative science and policy, applied ecology, biotechnology and bioinformatics, biological sciences, chemistry, community dentistry, environmental and developmental sociology, energy and environment, environmental resources and development, forestry and environmental science, forensic medicine, industrial management, laboratory medicine, law, microbiology, nursing, obstetrics and gynaecology, optometry, ophthalmology, process engineering and applied sciences, pharmaceutical sciences and rural development. All the disciplines are summarized in table 2 below.

Table 2.A summary of the academic disciplines

Academic discipline	Number of studies (N=112)
Administrative science and policy Applied ecology	1 (0.9%)
Biotechnology and bioinformatics	1(0.9%)
Biological sciences	1 (0.9%)
Chemistry	1 (0.9%)
Community dentistry	1(0.9%)
Community medicine	7 (6.3%)
Community health nursing	3(2.8%)
Environmental and developmental sociology	1(0.9%)
Environmental engineering	16 (14.3%)
Energy and environment	1(0.9%)
Environmental health	10 (8.9%)
Environmental management	9 (8.0%)
Environmental resources and development	1(0.9%)
Forestry and environmental science	1 (0.9%)
Forensic medicine	1(0.9%)
Environmental sciences	5 (4.5%)
Industrial management	1(0.9%)
Laboratory medicine	1(0.9%)
Law	1(0.9%)
Microbiology	1(0.9%)
Nursing	1 (0.9%)
Obstetrics and gynaecology	1 (0.9%)
Optometry	1 (0.9%)
Ophthalmology	1 (0.9%)
Public health	22 (19.6%)
Preventive medicine	2(1.8%)
Process engineering and applied sciences	1(0.9%)
Pharmaceutical sciences	1(0.9%)
Public health dentistry	2(1.8%)
Rural development	1 (0.9%)
Waste management engineering	7(6.3%)
Not clearly stated	8 (7.1%)

Terminologies used in the study: The included studies used various terminologies to describe HCW (as summarized in table 3). HCW was the term with the highest number 33.9% (n=38) of all the articles followed by biomedical waste with 26.8% (n=30), medical waste with 17.9% (n=20), clinical waste 9.8% (n=11), hospital waste 8.9% (n=10), health care risk waste was 1.8%

(n=2) and infectious waste (n=1, 0.9%). All disciplines defined HCW as the waste that is produced from health care activities whether for humans or animals.

Table 3 terminologies and categories of health care waste

Terminologies used to describe health care waste	Number of studies (N=112)	Categories of health care waste	Number of studies (N=112)
Biomedical waste	30 (26.8%)	Non-hazardous waste	111 (99.1%)
Clinical waste	11(9.8%)	Non-pathological waste	1 (0.9%)
Health care waste	38 (33.9%)	Hazardous waste	81 (72.3%)
Medical waste	20 (17.9%)	Pathological waste	1 (0.9%)
Hospital waste	10 (8.9%)		30 (26.8%)
Infectious waste	1 (0.9%)	Biohazardous	
Health care risk waste	2(1.8%)		

Categories of health care waste: based on the two categories provided by the WHO: non-hazardous and hazardous waste, most disciplines categorised HCW as non-hazardous waste 99.1% (n=111), while the environmental engineering discipline categorises it as non-pathological waste (n=1, 0.9%). On the other hand, 72% (n=81) of disciplines categorised HCW as hazardous waste while those in the medical field categorised it as bio-hazardous waste (n=30, 26.8%). Those from the environmental engineering discipline categorised HCW as pathological waste (n=1, 0.9%). Under the non-hazardous and hazardous waste categories, HCW is divided into various classes. It should be noted that both high-income countries and LMICs classify municipal waste under the non-hazardous or non-pathological waste.

On the other hand, high-income countries have five classes of waste under the hazardous waste category these are: Group A waste which is all human tissue including blood, animal carcasses, tissue from veterinary centres, hospitals and laboratories; Group B waste which is all discarded syringe needles, cartridges, broken glass and any other contaminated disposable sharp instruments; Group C waste which is all microbiological cultures and all potentially infected waste from pathology departments such as clinical or research laboratories and post-mortem

rooms; Group D waste which is all pharmaceutical products and chemical wastes; and Group E waste which is all items that are used to dispose of urine, faeces, body secretions and excretions. Similarly, all the LMICs classify HCW into: infectious waste, pathological waste, sharps, pharmaceutical, genotoxic, chemical and radioactive waste, as hazardous waste. All this information is summarised in Table 4 and 5 below.

Table 4. Classification of health care waste by high income countries

Classification of health care waste	Examples	Number of studies (N=112)
Group A waste: All human tissue including blood, animal carcasses, tissue from veterinary centres, hospitals and laboratories	This kind of waste includes soiled surgical dressing, swabs, and other soiled waste from treatment areas	14 (12.5%)
Group B waste: All discarded syringe needles, cartridges, broken glass	Any contaminated disposable sharp instruments	14 (12.5%)
Group C waste: All microbiological cultures and all potentially infected waste	Waste from pathology departments such as clinical or research laboratories and post-mortem rooms	14 (12.5%)
Group D waste: All pharmaceutical products and chemical wastes	All discarded medicines, cytotoxic drugs	14 (12.5%)
Group E waste: All items that are used to dispose of urine, faeces, body secretions and excretions	Incontinence pads, disposable bedpans, urine containers	14 (12.5%)

Table 5. Classification of health care waste by low-and-middle- income countries

Classification of health care waste	Examples	Number of studies (N=112)
Infectious waste	Waste suspected to contain pathogens e.g. laboratory cultures; waste from isolation wards; tissues (swabs), materials, or equipment that have been in contact with infected patients; excreta	98 (87.5%)
Pathological waste	Human tissues or fluids e.g. body parts; blood and other body fluids; fetuses	98 (87.5%)
Sharp waste	Sharp waste: e.g. needles; infusion sets; scalpels; knives; blades; broken glass	98 (87.5%)
Pharmaceutical waste	Waste containing pharmaceuticals e.g. pharmaceuticals that are expired or no longer needed; items contaminated by or containing pharmaceuticals (bottles, boxes)	98 (87.5%)
Genotoxic waste	Waste containing substances with genotoxic properties e.g. waste containing cytostatic drugs (often used in cancer therapy); genotoxic chemicals	98 (87.5%)
Chemical waste	Waste containing chemical substances e.g. laboratory reagents; film developer; disinfectants that are expired or no longer needed; solvents	98 (87.5%)
Radioactive waste	Waste containing radioactive substances e.g. unused liquids from radiotherapy or laboratory research; contaminated glassware, packages, or absorbent paper; urine and excreta from patients treated or tested with unsealed radionuclides; sealed sources	98 (87.5%)

Table 6. Terms, definition and classification of health care waste

Term and meaning	Examples	Number of articles using the category
Non-hazardous/non-pathological waste is waste that does not contain pathogens	Used paper, boxes, cans	112 (100%)
Hazardous/Biohazardous/pathological waste is waste that contains pathogens that can cause harm to the health of the people and to the environment	Human tissue, body parts, chemicals, expired medicines	112 (100%)
1. Health care waste is waste produced from health care establishments as a result of health care activities	Examples of health care establishments, laboratories, research facilities, minor or scattered sources such as in homes	38 (33.9%)
2. Biomedical waste is any waste generated during the diagnosis, treatment or immunisation of human beings or in research activity	Human and animal anatomical wastes, fluids and secretions from patients, contaminated syringes and other "sharps", contaminated laboratory wastes	30 (26.8%)
3. Clinical waste is any other waste arising from medical, nursing, dental, veterinary, pharmaceutical or similar practices, investigation, treatment, care, teaching or research or the collection of blood from transfusion	Wholly or partly of human or animal tissue, blood or other body fluids, excretions, drugs or other pharmaceutical products, swabs or dressings or syringes, needles or other sharp instruments	11 (9.8%)
4. Health care risk waste is waste generated in health care facilities	Infectious and pathological matter, sharps, and discarded and expired pharmaceuticals	2 (1.8%)
5. Hospital waste is any solid waste that is generated in the diagnosis, treatment or immunisation of human beings or animals	Including but not limited to: soiled or blood soaked bandages, culture dishes and other glassware. It also includes discarded surgical gloves and instruments, needles, cultures, stocks and swabs used to inoculate cultures and removed body organs.	10 (8.9%)
6. Medical waste is any waste generated during medical diagnosis or treatment of humans or animals, in related research, or in the production of biologicals used in clinical activities	Swabs or dressings or syringes, needles or other sharp instruments, being waste which unless rendered safe may prove hazardous (incl. microbial infectious), pharmacological and/or physical dangers to any person coming into contact with it	20 (17.9%)

Discussion Principal Findings

Various studies (n=112) met inclusion the criteria and formed part of the analysis. This review shows that there were many journal articles than dissertations. Most of the studies focused on the LMICs. The studies used various methods employed to research the issue of HCW and these methodologies range from case studies, commentaries, cross-sectional studies, document analysis, experiments, literature reviews, systematic reviews, quantitative surveys, qualitative studies and mixed methods. The studies are spread across different disciplines with the largest number coming from the public health discipline followed by environmental engineering, environmental health, environmental management, waste management engineering and lastly community medicine. This scoping review has also found that both high income countries and LMICs use different terminologies but they define, categorise and classify HCW in the same way despite using various semantics.

Study meaning

The study attempted to answer the following questions: what are the various terms used to 1) describe HCW, and how is HCW defined and categorised in high-income and LMICs in existing peer-reviewed and gray literature on health care waste management? 2) In what ways and to what extent does the nomenclature in the literature align with the WHO manual? 3) What are the gaps and areas for further research with regards to the terms used to describe, define and categorise HCW? This study, to our knowledge, is the first attempt to conduct a scoping review on HCWM. Our findings show that health care waste is a multidisciplinary issue with the majority 22 (19.6%) coming from public health followed by environmental health with 10 (8.9%). This means it is of concern to a wide range of disciplines and these findings are consistent with those of Gabela (2007), Harhay, Halpern, Harhay and Olliaro (2012) and Njagi, Oloo, Kithinji and Kithinji (2012).

The review also shows that there is more information about HCWM in LMICs with 89.3% than in high income countries with 10.7%. This could mean that the issue of HCWM is more of a concern in these countries as described by Kassim and Ali (2006). The information about HCWM being more available in published articles is an important finding for policy makers

because Rutter, Luschen, von Lengerke (2003) argue that, in addition to the evidence that is derived from the real world, published literature also provides evidence that is used to generate public health policy models by policy makers. In this case, it is possible for policy makers to be able to use information from published journals in informing policies related to terminologies, definitions and categories of health care waste.

The findings reveal that terminologies used by various disciplines to describe HCW are: biomedical waste, clinical waste, HCW, health care risk waste, hospital waste, infectious waste and medical waste. Notwithstanding which of these terminologies are used, their definitions, categories and classifications under each category both for high and LMICs remain the same and are in line with those provided in the global manual for safe management of waste from health care activities by World Health Organization (Pruss et al., 1999). The findings of this review can be used to develop an understanding of the terminologies used to describe HCW, the meaning, how it is categorised and classified by various disciplines.

The studies of HCWM in LMICs are important because it is an issue that has implications for the well-being of the people and also the environment. The adverse consequences of improper management of HCW have been documented extensively (Abdulla, Qdais and Rabi, 2008; Ramokate, 2008). Using different terminologies to describe HCW can cause confusion when it comes to developing waste management policies by policy makers and can affect the practices of HCWM by ordinary people who are generators and handlers of HCW. For example, Mbongwe, Mmereki and Magashula (2008) in their study in Botswana on health care waste management current practices in health care facilities showed that, the term ‘clinical waste’ is known to mean all waste that is generated from health care facilities. Because of this definition, most health care workers and the general public ended up not segregating HCW into non-hazardous and hazardous waste. Instead health worker disposed of all categories of waste together as hazardous waste in red bags. The consequence of this practice was the unnecessary use and wasting of red bags, and the overloading of resources needed for transportation and storage of health care waste.

This scoping review has found that, although different terminologies are used to define, describe, categorise and classify HCW in literature from LMICs and HICs, their meanings are the

same and they align with those of WHO manual. Even if the study by Mbongwe et al. (2008) cannot be generalized, more of such studies are yet to be found. More importantly, a lesson learnt from Mbongwe's study is the need to have a standard term to describe, define, categorise and classify HCW. Therefore, we recommend that the WHO's terminology could be adopted since it is a global manual on health care waste management. A uniform terminology could be beneficial for the general public who are more involved in implementing policies in that, if they know what type of waste they are dealing with, they will also know how to manage it appropriately. A standard terminology could be beneficial to policy makers for designing policies aimed at addressing HCW.

Strengths and limitations

The primary strength of this scoping review is its ability to answer the following questions: what are the various terms used to 1) describe HCW, and how is HCW defined and categorised in high income and LMICs in existing peer-reviewed and gray literature on health care waste management? 2) In what ways and to what extent does the nomenclature in the literature align with the WHO manual? 3) What are the gaps and areas for further research with regards to the terms used to describe, define and categorise HCW?. Another strength of the scoping review lies in the use of transparent methods to conduct the review. Limitations to this scoping review are the fact that, we only used six databases given the limited resources (at the University of KwaZulu-Natal). Furthermore, the search only used five key search terms (HCW, medical waste, clinical waste, biomedical waste and hospital waste) because these are the most dominant terminologies found in the literature.

Future research

The studies attempted to answer the following questions: What are the various terms used to 1) - describe HCW, and how is HCW defined and categorised in high income and LMICs in existing peer-reviewed and gray literature on health care waste management? 2) In what ways and to what extent does the nomenclature in the literature align with the WHO manual? 3) What are the gaps and areas for further research with regards to the terms used to describe, define and categorise HCW?. Further research should be conducted to understand the reasons why various terms are used to describe, define, categorised and classify HCW were not explored. This

scoping review did to explore the extent to which the WHO's guidelines have been adopted and implemented in practices by various countries. Such studies could be conducted to provide more insights into HCW.

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CHAPTER FOUR

A REVIEW OF INTERNATIONAL AND SOUTH AFRICAN NATIONAL POLICIES THAT ADDRESS HEALTH CARE WASTE MANAGEMENT

**A REVIEW OF INTERNATIONAL AND SOUTH AFRICAN POLICIES THAT
ADDRESS HEALTH CARE WASTE MANAGEMENT**

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I Lydia Hangulu [LH] was responsible for the conception and designing of this study with guidance from my supervisor (Dr Olagoke Akintola [OA]). I wrote the chapter under the guidance of my supervisor.

Abstract

Background: To ensure good governance and improved health care waste management practices across countries, various policies have been developed internationally, nationally and at local government levels. This chapter will review international and South African policies that address health care waste management. This will help to know the kinds of policies that are there for HCWM in CBC.

Results: The WHO's 1999 manual on health care waste management from health care settings is the main policy that governs health care waste. The manual classifies community-based care establishments as minor generators of health care waste (HCW). Professional health care providers are responsible for providing information on potential hazards of HCW, promoting use of protective materials, emphasizing the importance of segregation and they are responsible for providing materials necessary for storing HCW. The professional health care provider must make necessary arrangement for the HCW to be removed from the home of the patient on a regular basis or arrangements must be made to have HCW transported to the nearest health care clinic or hospital.

Conclusion and recommendations: There is no global policy that specifically addresses health care waste management from community-based care. However, the WHO manual on health care waste from health care facilities provides bits of information on how HCW from homes should be managed. Currently, South Africa only has a draft policy on health care waste management. The SANS CODE 2004 provides all guidelines for HCWM and is a replica of the WHO's manual on HCWM. Without the national policy, HCW generators are not obligated to manage HCW according to the guidelines. There is need to promulgate the policy draft into an enforceable policy. More importantly, both the WHO manual and the SANS CODE 2004 fail to adequately consider CBC beyond home treatment and as a result, HCW generated is assumed to be in smaller quantities that can pose no harm to the people thus except for sharp waste, it is recommended that all other HCW be disposed of together with domestic waste.

Introduction

To ensure good governance and improved health care waste management practices across countries, various policies have been developed internationally, nationally and at local government levels. This chapter will review international and South African policies that address health care waste management. The main aim of this review is to understand the kinds of policies that specifically govern HCW in community-based care globally and in the South Africa. Understanding international policies helps to determine the influence they have on the South African national policies. Together, a review of policies that govern health care waste management in South Africa will help us understand how they are implemented in practice. The review will answer the following questions (1) When were the policies developed? (2) What is the context in which the policies were developed? (3) What do they say about health care waste management from health care facilities including community-based care?

Methods

This was a desktop study that involved sourcing for international national and South African national policies that govern health care waste management online using google database. The following search terms were used to search for policies online; ‘health care waste’ ‘clinical waste’, ‘hazardous waste’, ‘health care risk waste’ ‘hospital waste’, ‘infectious waste’, ‘medical waste’, ‘pathological waste’, ‘pharmaceutical waste’, ‘sharps’, and ‘used medical supplies’. The following websites from the named organisations were searched for policies regarding health care waste. The World Health Organisation (<http://www.healthcare-waste.org>), United Nations Environmental Programmes (<http://www.unep.org/gpwm/Default.aspx?tabid=104478>), Department of Environmental affairs (www.environment.gov.za), South African National Standards (<https://law.resource.org/pub/za/ibr/za.sans.10248.1.2008>), government gazettes from Sabinet (http://discover.sabinet.co.za/government_gazettes), the Institute for Waste Management in Southern Africa (Africa <http://www.iwmsa.co.za/>) and South Africa Waste Information Center (<http://sawic.environment.gov.za/?menu=47>). There was no limit with date so as to include as many policies as possible.

Review of the policies

We set explicit inclusion criteria for the policy documents. The documents were included if they: addressed issues relating to health care waste management 2) contain guidelines, policies, standards, rules, or regulations; 3) were produced by global or international bodies or South African governmental agencies 4) were produced for use various countries internationally or in the African region or in South Africa . All the policies that did not meet these criteria were not included in the study.

Analysis

We reviewed the policies to extract the following information (1) When they were developed (2) The context in which they were developed (3) the specific provisions relating to health care waste management from health care facilities, community-based care and other sources. Table 1 below is a time line for international policies that govern health care waste. A brief background to the development of these policies will be provided then the details of each policy will be discussed.

Table 1. Timeline for the international policies governing health care waste

Year of publication	Name of regulation	Main emphasis	The controlling authority
1992	Rio Declaration, principle 10	Requires states to address environmental issues, it promotes public participation in decision making and access to information on hazardous material and justice on environmental matters.	United Nations
1999	WHO First Edition Manual on Safe Management of Waste from Health Care	Its audiences are the medical staff, directors of health care facilities, health care workers, infection control officers and waste workers.	World Health Organisation
2000	World Bank manual for resource limited settings	Awareness of the risks posed by improper management of HCW resulting from humanitarian crisis mostly for World Bank audiences	World Bank
2003	Technical Guidelines on the Environmentally Sound Management of Biomedical and Health Care Wastes	It was developed at a time when developed and developing countries were disposing of health care waste into landfills without pre-treatment.	United Nations Environmental Program (UNEP)
2005	Manual with guidelines on health care waste management practices that are appropriate for sub-Saharan African countries	It was developed because between the year 2000 and 2004, there was a need to view health care waste management both as a public and an environmental health issue.	United Nations Environmental Program and World Health Organisation

2005	Manual on better health care waste management: an integral component of health investment	It provides manager and technical information that tackles poor health care waste management as part of their da-to-day programmes	World Health Organisation (WHO) and the World Bank
2005	A guide on management of solid health care waste at primary health care centres	The manual provides guidance to staff working primary health –care centres on the most appropriate options for managing solid waste from primary health care centres.	World Health Organisation (WHO)
2011	Practical tool in routine management of hospital waste, 2011.	It is intended as a practical tool in routine management of hospital waste in the year	Red Cross
2012	Manual for technologies to be used for treatment or destruction of HCW in middle and low income countries,	It was developed because most health care facilities in low and middle income countries do not have adequate technologies to dispose of HCW. Four major processes, thermal, chemical, irradiative and biological, are provided and explained.	United Nations Environmental Program (UNEP)
2013	Environmental guidelines on health care waste management	It was developed because small scale health care facilities still had inadequate HCWM programmes, disposal of HCW with solid waste, appropriate burial of HCW, improper operation of incinerators and dumping of HCW into sewage and water systems	United States Agency for International Development

Background to the development of health care waste management policies

The Stockholm Declaration on preservation of human environment, 1972: Most international policies that have to do with the conservation of the environment date back to the Stockholm Declaration on preservation of human environment made at a conference organised by the United Nations. The conference was prompted by air and water pollution and hazardous waste concerns globally. Thus the emphasis of the conference was on solving environmental problems by limiting human activities that can destroy the planet while considering the social, economic and developmental factors. The conference also stipulates the environmental protection principals and their implementation strategies. The conference established the United Nations Environmental Programme (UNEP) as an intergovernmental institution responsible for dealing with environmental issues. Since the conference, there have been various international agreements that have been ratified by various countries and these include but are not limited to the 1979 Geneva Convention on Long-range Transboundary Air Pollution, the Helsinki Agreement (an agreement among 21 nations to reduce sulphur dioxide emission) and the Basel Convention on Transboundary movements of Hazardous Wastes (United Nations, 1972). Among

the above mentioned agreements, the Basel convention is the one that addresses health care waste management issues and it will be discussed next.

The Basel Convention on the Control of Transboundary Movement and disposal of Hazardous Wastes, 1989.

The Basel Convention is an international agreement that was signed by 100 countries. It is an international legal instrument on the control of transboundary movement and disposal of hazardous wastes. In the 80s, due to the constricted environmental regulations in the industrialized countries, hazardous waste disposal became costly and western countries began shipping hazardous waste to developing and Eastern European countries. The Convention was created to address concerns about the management, disposal and transboundary movement of hazardous wastes. The main principles covered are: the reduction of transboundary movements of hazardous waste consistent with their environmentally sound management; emphasis on the need to treat and dispose of hazardous waste close to the point of generation and all hazardous wastes must be reduced at the point of generation. In addition, the ‘polluter must pay’ principle is emphasised and so is the need to aim at handling hazardous waste with utmost care and protecting the health of people and safeguarding the environment in the management of hazardous waste. It also provides a list of all hazardous and non-hazardous wastes (United Nations, 1989).

The Basel Convention in South Africa was ratified by the African National Congress (ANC) government in 1994 after the first democratic elections. All countries that signed the Convention, including South Africa, accepted that only developing countries that lack the facilities or expertise to dispose of hazardous waste are gazetted to ship such waste to countries that have facilities and expertise to manage it. Further, all hazardous waste may not be imported or exported from non-party to the treaty unless a bilateral agreement has been entered into; and that all transboundary movement of hazardous waste is not to be allowed to parties that have prohibited the import of such waste. In the year 1999, the Basel Governmental Declaration on Environmentally Sound Management of Hazardous Wastes was adopted at the fifth conference of the parties (COP-5). COP-5 outlined main areas of focus from the year 2000 to 2010 these are: increasing partnership, promoting the use of cleaner technologies and production methods, reduction of movement of hazardous waste, monitoring and prevention of illegal traffic, improvement of institutional and technical capabilities and developing regional centres for

training and technology transfer. African region centres are Egypt, Nigeria, Senegal and South Africa (United Nations, 1999). Reaffirming the Stockholm Declaration on Human Environment is the Rio Declaration on Environment and Development.

The Rio Declaration on Environment and Development, 1992: This is also called the ‘Earth Summit’ and was hosted by the United Nations. Delegates from more than 130 nations signed an agreement on Agenda 21 which is an action plan for developing a sustainable planet. Agenda 21 recommends nations to set up measures towards waste management including preventing and the production of waste, re-using and recycling waste as much as possible, treating waste with environmentally sound methods and disposing of all waste residues into landfills within the designated sites. Additionally, the Declaration also requires that all waste producers be responsible for dealing with waste from its generation point to the disposal point. Communities are encouraged to dispose of the waste within their boundaries (United Nations, 1992).

The Rio Declaration has 27 principles of which principle 10 is the most relevant to health care waste management. It encourages participation of all citizens at relevant levels in dealing with environmental issues. It recommends that individuals at the national level must have access to information concerning the environment that is held by the public authorities, including information on hazardous materials and activities in their communities. The Declaration also requires that communities must have the opportunity to participate in decision making processes and that all states facilitate and encourage public awareness and participation by making information widely available. The Rio Declaration obligates all states to provide access to judicial and administrative, compensation and remedy proceedings (United Nations, 1992). Following the adoption of this principle, most middle and low-income countries including South Africa have initiated the processes of strengthening public participation and have made international agreements on public health issues and issues that deal with the safe management of hazardous waste as controlled by the Basel Convention which is discussed next. To regulate all health care waste from health care facilities, the World Health Organization (WHO) developed and released a manual in 1999. This is the theme that will be discussed next.

The global health care waste management policies

The WHO's first edition Manual on Safe Management of Waste from Health Care Facilities, 1999

This is a global guide to health care waste management that was developed to protect the health of the public from infections that could be posed due to improper management of health care waste (HCW). The manual is for medical staff, directors of health care facilities, health care workers, infection control officers and waste workers. The manual recommends safe, efficient, sustainable and culturally acceptable methods of treatment and disposal of HCW within and outside health care establishments. The manual defines and characterises HCW as hazardous and non-hazardous. Hazardous waste includes all infectious waste, sharp waste, pathological waste, pharmaceutical waste, genotoxic waste, chemical waste and radioactive waste. All non-hazardous waste is compared to domestic and it does not pose harm as summarized in Table 2 below.

Table 2. Categories of health care waste

Waste category

<u>1.Hazardous waste</u>	<u>Description and examples</u>
Infectious waste	Waste suspected to contain pathogens, e.g. laboratory cultures; waste from isolation wards; tissues (swabs), materials, or equipment that has been in contact with infected patients; excreta or body fluids like dressings, bandages, swabs, glove, masks, gowns, drapes.
Sharps waste	This is waste that consists of used or unused sharps such as needles, auto disable syringes, syringes with attached needles, infusion sets, scalpels, pipette, knives, blades and broken glass.
Pathological waste	Human tissues or fluids, e.g. body parts; blood and other body fluids; fetuses; sharps waste, e.g. needles; infusion sets; scalpels; knives; blades; broken glass.
Pharmaceutical waste	Waste containing pharmaceuticals, e.g. pharmaceuticals that are expired or no longer needed; items contaminated by or containing pharmaceuticals (bottles, boxes).
Genotoxic waste	Waste containing substances with genotoxic properties, e.g. waste containing cytostatic drugs (often used in cancer therapy); genotoxic chemicals.
Chemical waste	Waste containing chemical substances, e.g. laboratory reagents; film developer; disinfectants that are expired or no longer needed; solvents; wastes with high content of batteries; broken thermometers; blood-pressure gauges; heavy metals; 51azette51es51 containers; gas cylinders; gas cartridges; aerosol cans.
Radioactive waste	Waste containing radioactive substances, e.g. unused liquids from radiotherapy or laboratory research; contaminated glassware, packages or absorbent paper; urine and excreta from patients treated or tested with unsealed radionuclides; sealed sources.
<u>2.Non-hazardous waste</u>	All waste that does not pose chemical, biological, physiological or physical hazard, for example, paper, cardboards, plastics, discarded wood, metal, glass, textiles and plastics.

Sourced from WHO safe HCW Guidance manual (Pruss et al., 1999).

Page eleven to twelve of the WHO manual identifies two major sources of health care waste: 1) Major sources include: hospitals, clinics, mortuaries and autopsy centres, animal research and testing blood banks, and nursing homes for the elderly, 2) Small scale contributors include physician's offices, dental clinics, health care establishments with low waste generation and all home treatment as shown in Table 3 (Pruss et al., 1999).

Table 3. Summary of sources of health care waste

Major Sources	Minor Sources
<p>Hospitals</p> <p>University hospital, general hospital, district hospital.</p> <p>Other health-care establishments</p> <p>Emergency medical care services, health-care centres and dispensaries, obstetric and maternity clinics, outpatient clinics, dialysis centres, first-aid posts and sick bays, long-term health-care establishments and hospices.</p> <p>Transfusion centres, military medical services.</p> <p>Related laboratories and research centres</p> <p>Medical and biomedical laboratories, biotechnology laboratories and institutions, medical research centres.</p> <p>Mortuary and autopsy centres</p> <p>Animal research and testing, blood banks and blood collection services, nursing homes for the elderly.</p>	<p>Small health-care establishments</p> <p>Physicians' offices, dental clinics, acupuncturists, chiropractors.</p> <p>Specialized health-care establishments and institutions with low waste generation</p> <p>Convalescent nursing homes, psychiatric hospitals, disabled persons' institutions.</p> <p>Non-health activities involving intravenous or subcutaneous interventions</p> <p>Cosmetic ear-piercing and tattoo parlours, illicit drug users, funeral services, ambulance services, home treatment.</p>

Sourced from WHO safe HCW Guidance manual (Pruss et al., 1999)

Details of health care waste management recommendation by WHO

The manual obligates all countries to develop their own national legislations aimed at improving health care waste management. It further emphasises that the Department of Health must ensure that the all legislation is implemented and that the ministry of environment or the national environmental protection agency must be involved. Additionally, there must be clear designated responsibilities among institutions responsible for implementation before the laws are enacted. The manual provides recommendations for developing national plans for managing HCW and it also provides guidelines on how to manage HCW from the point of generation to the point of disposal. The manual emphasizes that proper healthcare waste management involves segregation, storage, transportation, treatment and disposal (Pruss et al., 1999: 60-64). *Segregation and storage:* The manual prohibits mixing of HCW. It recommends that HCW must be segregated and must be stored in red bags marked ‘highly infectious’, with an international infectious symbol. HCW must be stored in appropriate areas made of hard floor and good drainage and the floors must be easy to clean and to disinfect, such floors must have water supply for easy cleaning, must be accessible for staff and waste collectors, must have good ventilation and lighting, must be protected from the sun, must be inaccessible from animals insects and birds and must not be near food preparation areas (Pruss et al., 1999: 64-65). All is summarized in table 4

Table 4. WHO recommended storage scheme

Type of waste	Colour of container and marking	Type of container
Highly infectious waste	Yellow, marked “HIGHLY INFECTIOUS” with biohazard symbol	Strong, leak-proof plastic bag, or container capable of being autoclaved
Other infectious waste, pathological and anatomical waste	Yellow with biohazard symbol	Leak-proof plastic bag or container
Sharps	Yellow, marked “SHARPS” with biohazard symbol	Puncture-proof container.
Chemical and pharmaceutical waste	Brown, labeled with appropriate hazard symbol	Plastic bag or rigid container
Radioactive waste	Labelled with radiation symbol	Lead box
General health-care waste	Black	Plastic bag

Sourced from WHO safe HCW Guidance manual (Pruss et al., 1999)

Transportation of health care waste within and to off-site facilities: The guidelines further stipulates that within health care facilities, HCW must be transported by means of trolleys, containers and carts and transported to off-site facilities by a licensed driver. It is recommended that all off-site transporters must adhere to the national regulations (Pruss et al., 1999).

Requirements for the driver: Drivers driving vehicles containing HCW must have appropriate training about handling and labelling, waste classifications and risks involved and spillage procedures, and they must be declared fit to drive the vehicles. All drivers must be vaccinated against tetanus and hepatitis A and B and such vaccination records must be recorded by the supervisor. Drivers must carry a consignment note for the vehicle carrying HCW and must specify the class of waste, waste sources, pick up date, waste destination, driver's name, name of the container and the volume of waste. After completing the transportation of the health care waste, the driver must return the consignment note to the HCW generator as proof of treatment. All vehicles used for transporting HCW must be washed with soap and disinfectants daily after use (Pruss et al., 1999).

Treatment and disposal of HCW: It is recommended that all treatment and disposal of HCW must be chosen based on the national and local situation. For example sharps can be incinerated or autoclaved, and anatomical waste may be incinerated or buried based on culturally appropriate methods. HCW can also be disposed of in a controlled landfill. It is recommended that for all health care facilities, major sources, small sources, private practitioners and nursing that do not have on-site treatment facilities, a private contractor be hired and must be responsible for collecting, transporting, treating and disposal of the HCW (Pruss et al., 1999).

Treatment and disposal of HCW from home: It is said that HCW from homes is very small and only consist of items contaminated by blood such as incontinence pads, dressings or syringes and hypodermic needles. Therefore, it is recommended that sharps used by the diabetic patients must be packed in small puncture-proof containers or boxes for hypodermic needles and must be disposed of with general refuse. Patients must be provided with such boxes which they must return to the physician in charge of the treatment when they are full. HCW other than sharps must be double-packed in plastic bags and then disposed of with household refuse. The HCW generated by chemotherapy treatment must be packaged safely and transferred to the treating

physician (Pruss et al., 1999:56). All the disposal methods for various waste are summarized in table 5 below.

Table 5. Summary of categories of wastes and their disposal methods

Category of waste	Treatment and disposal method
Human anatomical waste: Human tissues, organs, body parts	Incineration/deep burial
Animal waste: Animal tissues, organs, body parts, carcasses, fluid, blood, experimental, animals used in research, waste generated by veterinary polyclinics	Incineration/deep burial
Microbiology and biotechnology waste: Waste from laboratory cultures, stocks or specimens of micro-organisms, live or attenuated vaccines, human and animal cell cultures used in research, infectious agents from research and industrial laboratories, waste from production of biologicals, toxins, dishes and devices used to transfer cultures	Autoclave/microwave/ incineration
Waste sharps: Needles, syringes, scalpels, blades, glass, etc. capable of causing punctures and cuts. This includes both used and unused sharps	Disposal in secured landfills Disinfection (chemical treatment) autoclaving/ microwaving and mutilation/shredding
Discarded medicines and cytotoxic drugs: Waste comprising outdated, contaminated and discarded drugs and medicines	Incineration/ destruction of drugs
Contaminated solid waste: Items contaminated with blood fluids including cotton, dressings, soiled plaster casts, linens, bedding	Incineration/autoclaving/ microwaving
Solid waste: Disposable items other than the waste sharps, such as tubing, catheters, IV sets etc.	Disinfection by chemical treatment autoclaving/ microwaving and mutilation/shredding
Liquid waste: Waste generated from laboratories, washing, cleaning, housekeeping and disinfection activities	Disinfection by chemical treatment and discharge into drains Disposal in municipal landfill
Incineration ash: Ash from incineration of any medical wastes Chemical waste: Chemicals used in production of biologicals, disinfection, insecticides, etc.	Chemical treatment and discharge into drain for liquids and secure

Sourced from WHO safe HCW Guidance manual (Pruss et al., 1999)

Due to that fact that many countries are aware of the potential health and environmental effects of HCW, the WHO revised the first edition manual on safe management of waste from health

care facilities (WHO, 1999). The (2014) second edition includes a wide audience that has interest in the safe management of health care waste. The new audiences are environmental bodies, environmental health practitioners, regulators, policy makers, development organisations, voluntary groups, advisers, researchers and students. Although the audiences have changed, the information about proper HCWM from various health care facilities including homes has not changed (WHO, 2014). Besides the WHO's manual on health care waste management, the World Bank also developed its own manual.

Health Care Waste Management Guidance Note World Bank, 2000

Using the WHO 1999 manual on safe management of health care waste, the World Bank developed this manual for resource limited settings mostly for World Bank audiences. It was developed after realizing that most health care sectors in resource limited countries rely on international donor assistance when there is a humanitarian crisis or a natural disaster. As a result, the need arose to manage all the leftover HCW that is generated. The goal of the manual is to provide awareness of the risks posed by improper management of HCW and to emphasise the need to manage it. The guidelines provide a definition and classification of HCW. The classes of HCW are the same as those of the WHO (Pruss et al, 1999). The manual offers practical guidance on ways to assess and improve HCWM (Johannssen, Dijkman, Bartone, Hanrahan, Boyer and Chandra, 2000).

Other manuals that address HCWM and have similar guidelines to those of WHO

The following manuals target health care facilities and they tend to focus more on major facilities especially hospitals. Their guidelines about health care waste management are a replica of the WHO 1999 manual however; they do not provide information about HCWM in homes in community-based care. These manuals are (1) Technical guidelines on the environmentally sound management of biomedical and health care waste, developed by the United Nations Environmental protection [UNEP] (2003), (2) A guidance manual on preparation of national health care waste management plans in sub-Saharan African countries (UNEP and WHO, 2005), (3) Manual on better health care waste management: an integral component of health investment by WHO and the World Bank (Rushbrook and Zghondi, 2005), and (4) A guide on management of solid health care waste at primary health care centres (WHO, 2005). (5) Red Cross practical

tool in routine management of hospital waste, 2011. It is intended as a practical tool in routine management of hospital waste in the year 2011 (Red Cross, 2011). (6) UNEP manual for technologies to be used for treatment or destruction of HCW in middle and low income countries, 2012. It was developed most health care facilities in low and middle income countries do not have adequate technologies to dispose of HCW. Four major processes, thermal, chemical, irradiative and biological, are provided and explained. (7) USAID's sector environmental guidelines on health care waste management, 2013. It was developed after realizing that small scale health care facilities still had issues with HCWM, like inadequate HCWM programmes, disposal of HCW with solid waste, inappropriate burial of HCW, improper operation of incinerators and dumping of HCW into sewage and water systems. The guidelines provide possible environmentally sound designs of managing HCW in small scale health facilities in resource limited settings (USAID, 2013).

Health care waste management policies in South Africa

After South Africa got its first democratic election in 1994, the African National Congress (ANC) government ratified the Basel convention that same year to prohibit importation into the country. Prior to democratic rule, the South African local government administration provided unequal services in the communities (Nyalunga, 2006). After the democratic elections, the new constitution which aimed at providing the South African citizens with equal access to service, was drafted and promulgated in the year 1996. The South African 1996 constitution brought change to local government administration and removed disparities in service delivery and also integrated the segregated societies (Fakoya, 2014). The National Health Care Risk Waste Management (Draft) which was gazetted in the year 2012 is the only legislation that governs HCW in South Africa yet it is still a draft. This means that after the democratic elections, HCW in the country has been regulated by various pieces of regulations including the South African Constitution (Act 108 of 1996), the National Environmental Management Act, the National Health Act and the Occupational Health and Safety Act 85 of 1993. Due to lack of a national policy regulating HCW in the country between 1994 and 2012, the South African National Standards Authority developed guidelines for managing HCW in the country. Additionally, the Gauteng and Western Cape Provincial Governments developed their own regulations to govern HCW. The Acts will be discussed first, second the provincial regulations, after which the

National Health Care Risk Waste Management will be discussed. Table 6 is a timeline of health care waste management policies that will be discussed.

Table 6. A timeline of South African health care waste management policies

Year of publication	Name of regulation	Main emphasis	The controlling authority
1994	Basel convention ratified in South Africa by the the African National Congress (ANC) government in 1994 after the first democratic elections	Emphasises the reduction of transboundary movements of hazardous waste consistent with their environmentally sound management	United Nations, 1989
1996	Constitution of South Africa	Provides a right to a safe and clean environment for every person.	Republic of South Africa
1993	Occupational Health and Safety Act 85 of 1995	Provides guidelines on worker health safety and training.	Department of Labour
1998	The National Environmental Management Act 107 of 1998	Provides that the polluter must pay principal and regulation for establishing the environmental impact assessment (EIA).	Department of Environmental Affairs
2003	The National Health Act, 61 of 2003	Compels the province, municipality and health districts to deliver quality health care services including 'municipal health services' under which waste management and environmental pollution are listed.	Republic of South Africa
2004	South African national standards, SANS 254	Standards that provide for the safe and effective management of health care waste aimed at reducing risks to humans and the environment.	Republic of South Africa
2004	Gauteng Integrated Strategy and Action Plans for Sustainable Health Care Risk Waste	Aims at improving health care waste management in the province.	Gauteng Provincial Government
2004	The Western Cape Management Draft Bill	Aims at improving health care waste management in the province.	Western Cape Provincial Government
2008	Draft Health Care Risk Waste Management Regulations of	HCW generators are responsible for putting in place measures necessary to prevent pollution.	Department of Environmental Affairs
2008	KwaZulu-Natal Health Care Risk Waste Management policy	Aims at improving health care waste management in the province.	KwaZulu-Natal Provincial government

The South African Constitution (Act 108 of 1996)

To ensure good governance and improved HCWM practices in South Africa, the South African Constitution (Act 108 of 1996) is a framework for environmental governance in the country. Section 24 of The Constitution of the Republic of South Africa states that every person has a

right to a safe and clean environment and the government has an obligation to pass legislation that prevents pollution and ecological degradation, promote conservation, secure ecologically sustainable development and use of natural resources while promoting justifiable and social development. Schedule 4, of the South African constitution states that, the government at the national level is responsible for providing health services and protecting the environment. Departments that play a role in ensuring that HCW is managed properly are the Department of Environmental Affairs and Tourism, the Department of Health, the Department of Labour and the Department of Agriculture and Land Affairs. In schedule 5 (B), the constitution states that the local government has authority to govern and pass by-laws regarding air pollution issues, municipal health services, refuse removal, refuse dumps and solid waste disposal among others (Republic of South Africa, 1999). Considering the fact that various organs of states are involved in regulating health care waste management in the country, it is possible for such organs to suffer from lack of collaboration and cooperation. This could also delay the implementation process. Waste is also addressed in the White Paper on Integrated Pollution and Waste Management which is the theme that is turned to next.

The White Paper on Integrated Pollution and Waste Management for South Africa, 2000

This is a policy that was developed in partial fulfillment of the requirements of Agenda 21 of the Basel 1992 Rio Conference. It was developed at a time when there were fragmented and uncoordinated waste management plans and there were insufficient resources and monitoring of all legislations governing waste in the country. The policy does not cover any issue about HCW; it is relevant to HCWM because it addresses prevention of pollution, waste, impact management and remediation. The policy encourages partnerships between government and the private sector. The policy defines sustainable development as that which includes social, economic and environmental factors. It also states that sustainable development is an appropriate approach to ensuring resource management. It is an approach that establishes environmental sustainability in policy and practice (Department of Environmental Affairs and Tourism, 2000). The other relevant regulation to HCWM is the National Environmental Management Act.

The National Environmental Management Act 107 of 1998 (NEMA)

The NEMA was developed to give legislative effect to the White Paper on a National Environmental Management Policy for the country and it is a framework for protecting the environment. The Act provides sections that are relevant to HCW. Chapter 1, 2(1) mandates all organs of state to work together to ensure that the environment is protected through establishing guidelines for decision making in relation to the issues affecting the environment, establishing institutions that will implement and monitor compliance with the developed principles. Section 2 of the Act provides two principals: (1) in any environmental initiative, people must be protected and their interest must be served equitably, (2) any development must be socially, environmentally and economically sustainable. Chapter 7: part 1, 28(1) state that the polluter must take measures to prevent such pollution. The Act also requires all relevant organs of state to develop environmental implementation plans. This principle implies coordination in the development of HCWM plans, policies and regulations. In chapter five, NEMA also provides legislation on environmental impact assessment (EIA) through developing of tools and systems to manage the impact of activities on the environment (Department of Environmental Affairs, 1998). Another Act of importance to HCWM is the National Health Act.

The National Health Act, 61 of 2003

The National Health Act was promulgated to erase health inequalities of the past apartheid government with the aim of improving quality of life. It is an overall framework for a structured and uniform health system in the country. The Act in chapter 12 p. 11, defines a health establishment as any place where health care services are rendered. From this definition it is clear that community-based cares are health establishments. Chapter 6 of the Act provides mandate to the minister of health to classify a health care establishment based on its role and function within the health care system, the size and location of the communities it serves, level of health services provided, geographical location and reach, and whether it is private or not. The Act gives power to the minister to make regulations related to medical waste (Republic of South Africa, 2004). The Act uses the term ‘medical waste’ but it does not define it. In the absence of a definition, it is not clear if medical waste could also mean HCW, highlighting a gap that needs to be addressed. The Act further compels the province, municipality and health districts to address

health policy questions and delivery of quality health care services including municipal health services which include waste management. It is not clear as to whether waste management under ‘municipal health services’ implies HCWM. Such lack of clarity could cause confusion. The Act also compels public and private health professionals to cooperate and share responsibility within the context of national, provincial and district health (Republic of South Africa, 2004). HCWM is important to protect the health of the environment and the people. The Occupation Health and Safety Act will be discussed below.

The Occupational Health and Safety Act 85 of 1993

The Act regulates all health and safety matters. It provides regulations about the safety of workers in a work place where biological agents are produced, used, handled or transported. The Act provides information, training for employees and the duties of people who might be exposed to risks. In addition, it provides information for risk assessment, medical surveillance and the provision of protective clothing, and sets regulations on the establishment of an occupation health and safety advisory council and its functions. In 4.1(a), it states that any person who is in charge of management and control of a health care facility is a chief executive officer (CEO), thus in 4.7.1 reveals that the person in charge must explain to the employee about all the expected hazards at any place of work. Sections 4.2(f) and 4.6.2 indicate that if there is an accident at a place of work resulting in injuries, such incidences must be reported to the person in charge. The person in charge has the responsibility of keeping all the records of such incidences and investigations (Department of Labour, 2004). All these regulations are relevant to community-based care because they are also health care establishments.

Health care waste at the national level: The SANS CODE, 2004

The South African National Standards Authority developed the code SANS: 2004 as a quick regulation on HCW at the national level. The guidelines provide the definition of health care facilities and HCW that are in line with the WHO manual on HCWM. To reduce potential risks to humans and to the environment, the guidelines provide minimum standards for the safe and effective management of all HCW that is generated in health care facilities. It covers the ‘cradle to the grave’ concepts at all stages of waste management. The standards require proper Identification, classification, segregation, storage, transportation and disposal of HCW as

prescribed by the HCWM manual by WHO. In chapter 7, the guidelines give the responsibility to the waste generator to segregate all the waste. In section 7.1 to 7.3.5, the guidelines give the responsibility to the head of a health care facility to train all HCW handlers on how to segregate waste (Republic of South Africa, 2004).

Packaging: The SANS code stipulates that all general HCW must be packaged in black, beige or transparent plastics that do not easily tear during handling or transportation. In addition, all infectious waste must be stored in red packaging with a hazard symbol labelled 'Infectious Waste'. The packaging must be tied with non-Poly Vinyl Chloride (PVC) plastic sealing tags that are self-locking made specifically for sealing HCW. Closing of plastics by stapling is not allowed. All sharps must be *stored* in yellow puncture and leak proof containers labelled 'Danger, Contaminated Sharps'. The standards require that all HCW must be stored in storage facilities far away from the operation areas to prevent contamination (Republic of South Africa, 2004).

Requirements for storage areas: All storage areas must be sheltered from sunlight, have good ventilation, have enough lighting, have water facilities to facilitate cleaning and be vermin proof. The facility must be locked to prevent access to animals or birds. The time limit for storing HCRW is 72 hours; for all sharps it is 90 days.

Collection of HCW: All collection of HCW on the site must be made at the point of generation. All waste within the health care facility must be transported with trolleys, wheeled containers or carts that are easy to clean, easy to load and must be without sharp ends (Republic of South Africa, 2004).

Waste management team: The guidelines in chapter 8 require all health care facilities to have a waste management team that should oversee waste management activities from the point of generation to the point of disposal. The team must plan for all waste management programmes in the facility (Republic of South Africa, 2004). Members of the team must include a waste management team officer who should be responsible for overseeing all protective materials, ensuring sufficient containers and clean operational storage facilities and must also have a schedule for transportation of all HCW to on and off-site facilities. Other members of the team include: heads of department, an infection control officer, a chief pharmacist, a radiation officer,

a senior nursing manager and health and safety manager, a maintenance engineer or manager, a financial manager, a procurement manager, a waste management contractor, regional managers or union representatives (Republic of South Africa, 2004). The HCWM team is responsible for recommending a waste contractor who will be responsible for the collection, transportation, treatment and disposal of HCW.

Requirements of the waste management contractor: Section 8.3 of the guidelines stipulates that the contractor that has the contract with the health care facilities must provide their own documentation and those of a sub-contractor, treatment and disposal procedures and facilities that are licensed. The contractor must have a permit and must have all the requirements provided by the waste management team. The contract must be in writing and must provide the types and volumes of waste to be collected and to be disposed of, the type of treatment methods used, methods of accounting for the HCW collected by the contractor, physical verification of the packages received for treatment and disposal and the potential risk of the hazards and safety measures to be implemented. The contractor must have a back-up plan of providing transport for HCW to off-site treatment and disposal facilities. The waste management company must provide proof of treatment of waste to the waste management officer who must also monitor the contractor to ensure compliance. Chapter 10 of the guidelines provides guidelines for the disposal of HCW. The recommended methods for disposal of HCW are incineration and landfilling of the residues for hazardous waste. The relevant organs of state must carry out an environmental impact assessment to ensure compliance of such facilities (Republic of South Africa, 2004).

Disposal of health care waste from minor generators: All minor generators are responsible for managing their own waste. A manager of the health care facility is responsible for training of all staff regarding the identification, classification, handling, packaging and storage of all HCW. In the homes of the patients, those that assist to provide health care must be trained on the correct wearing of protective materials, classification, segregation, handling and storage of HCW, including proper disposal methods by a health care professional. All HCW must be identified, classified, handled, packaged, stored, labeled and transported in accordance with the South African National Standards. All the guidelines applicable to the major generators are also

applicable to the minor generators. SANS 2004, section 11, 1.2 prohibits minor generators from using domestic waste collection services provided by the local authority or a private contractor to dispose of any HCW that may pose harm to the people and the environment. The guidelines also stipulate that all minor generators can provide justifications of hiring their own waste contractor without such justifications; they must make arrangements to deliver the waste to the local hospital. All the waste transported to the hospitals must be stored in locked leak proof containers which must be disinfected after delivery and such information must be recorded (Republic of South Africa, 2004).

Disposal of health care waste from private dwellings: The guidelines in SANS 2004, section 11.3 states that the HCW generated in private dwellings is very small. It gives the responsibility to the professional health care provider to educate the family members about the proper management of the HCW and must provide waste disposal packages. The professional health care provider must make arrangements with the waste contractor to collect the waste from home on a regular basis. Alternatively, arrangements must be made for the waste to be delivered to the local clinic or pharmacy where a professional health provider will take inventory of its disposal. The guidelines regard sanitary pads, home-made bandages, bandages and condoms to pose low risk, hence they are allowed to be disposed of in the domestic waste stream (Republic of South Africa, 2004).

The provincial regulations on health care waste management

The Constitution of the Republic of South Africa entrusts various legislative powers including those regarding HCWM to the national and provincial levels of government (Bethlehem and Goldblatt, 1997). To regulate HCW in Gauteng province, regulations were developed, and these will be discussed below.

The Gauteng Health Waste Management Regulations, 2004: This policy was passed in the year 2004. The policy applies to all HCW generators and HCW service providers in the Gauteng province. The policy provides definitions, classification of all HCW and classification of HCW generators; the responsibilities of the waste generators; emphasises the need to segregate waste; correct storage and transportation of HCW; and the importance of wearing protective clothing by

handlers, that are consistent with those provided by the WHO. The policy classifies private homes as minor generators of HCW and it obligates the municipality to provide a safe collection service for all the HCW that is generated in homes. The policy gives power to the department of health to provide tenders to the most suitable waste contractors who meet the requirements. The policy also requires the waste transporters to apply with the department of health to keep audit reports and tracking documents of all HCW transported. All transporters are prohibited from transporting untreated waste with other goods (Gauteng Provincial Government, 2004).

The Western Cape Management Draft Bill, 2004: The bill was published for comments in the year 2004. It was developed to address illegal dumping of HCW in the province. Consistence with the WHO manual on the safe management of health care waste, the bill provides for the effective handing, storage, collection, transportation, treatment and disposal of HCW by all waste generators in the province. The bill obligates the provincial minister to regulate all HCWM in the municipality to conduct audits of HCW generators to ensure compliance (Western Cape Provincial Government, 2004)

KwaZulu-Natal Health Care Risk Waste Management Policy, 2008

The policy was developed at a time when incineration was the most common method for the treatment and destruction of HCW in most low-and-middle-income countries including South Africa. There was global environmental pressure for countries to ban incineration due to the effects it contributed to air pollution through the production of particulates, dioxins, furans and heavy metals. The policy was developed to phase out incineration of HCW in favour of alternative incineration technologies. The policy provides guidelines on the safe management of HCW from the point of generation to the point of disposal with the aim of protecting the environment and the health of the people in KwaZulu-Natal. The policy applies to all public health care establishments and all health care risk waste services provided that are contracted by the department of health. A contractor is responsible for supplying of containers, providing off- site transportation, treatment and disposal of all the residues. The contents of the policy are similar and in line with the Draft Health Care Risk Waste Management Regulations of 2008 (KZN Department of Health, 2008).

The National Health Care Risk Waste Management Regulations of 2008

This is a policy draft that regulates all HCW in the country and was gazetted in 2012. Please note that HCW is referred to as health care risk waste in this policy and other guidelines in South Africa. It is required that this policy be implemented together with the South African National Standards (SANS: 2004). The national health care waste draft (page 6) defines a health care facility as any place that provides health care services whether for humans or animals and includes places that carry out medical research. These places are hospitals, clinics, laboratories, rehabilitation centers, old aged homes, hospices, funeral homes, day clinics and mobile clinics. Although the definition is well articulated, the list of health care facilities does not include ordinary homes where patients are cared for (South African Government, 2012).

Further, the regulations categorise HCW into two groups: (a) health care general waste to mean all waste which is not hazardous; (b) health care risk waste: all waste that is hazardous. Hazardous waste is the waste that has potential to cause health effects on the general public and the environment. This kind of waste includes waste from laboratories, anatomical waste, genotoxic/cytotoxic waste, infectious waste, sharps waste, sanitary waste, nappy waste, low-level radioactive waste and pharmaceutical waste. It obligates the HCW generators to be responsible for HCW management from the point of generation to the point of disposal, in a way that protects the environment and the health of the people. Pages 5-6 of the policy categorises health care risk generators into two groups: 1) the major generator: one who generates more than 20 kilograms of health care risk waste – including nappy waste (nappy waste is used diapers) – per day that is calculated monthly as a daily average; 2) the minor generator: one that generates more than 150 grams and less than 20 kilograms of health care risk waste and also less than 10 kilograms of nappy waste per day both calculated monthly as a daily average (South African Government, 2012). In part 2 of the policy, no person is allowed to mix the HCW with any general waste at the point of generation or disposal of all untreated HCW into the environment. It is required that all HCW must be segregated, packaged, labeled and stored according to the SANS: 2004 standards. Part 1,(11) (1), emphasises that, a manager or a transporter must not accept any HCW major or minor generators that have not been segregated or packaged according to the standards (South African Government, 2012). This policy provides the definition, classification of HCW and categories of HCW generators that are the same as those provided by

the WHO manual. Thus going by this policy, community-based care clearly falls under the category of minor generators.

Discussion and conclusion

The WHO manual on health care waste from health care facilities provides global guidance for managing health care waste. Currently, South Africa's main piece of legislation on HCWM is still a draft. HCWM is governed by the SANS CODE, 2004 and it's a replica of the WHO guidelines on HCWM. The SANS CODE, 2004 guidelines recommends that professional health care providers assume the role of educators of potential hazards of HCW, use of protective materials, importance of segregation and must provide materials necessary for storing HCW. The SANS CODE further obligates professional health care providers to make necessary arrangements for the HCW to be removed from the homes of the patient on a regular basis, or make arrangements for the HCW to be transported to the nearest health care clinic or hospital. Despite the provision of SANS CODE guidelines, they cannot be enforced in the absence of a national policy. There is need to promulgate the policy draft into an enforceable policy.

More importantly, even if the SANS CODE has adopted the exact guidelines that are provided in the WHO manual, the adequacy of these guidelines is questionable. Firstly, CBC is referred to as 'home treatment' and does not define what this means no explain what it entails. This terminology is too broad and it is possible to assume that 'home treatment' may only mean taking medication from home. The ambiguity in the terminology also could mean that patient care by nurses and caring provided by family members are excluded. Yet these activities could be responsible for generating HCW.

Furthermore, the WHO manual recognizes CBC as minor generators whose HCW is in small quantities and include used syringes, needles, incontinent pads and bandages therefore such waste is recommended to be disposed of with domestic waste. In practice, the assumed 'smaller quantities of HCW with inability to cause 'harm' is a debatable issue. Although there are no studies that have been conducted to determine how much HCW is produced in CBC, it is a fact that CBC in the African and South African context is relevant and addressees the social effects of the HIV/AIDS pandemic on families and on the health care system (Akintola, Gwelo, Labonte

and Appadu, 2015; De Maesenneer and Flinkenflogel, 2010; Van Pletzen et al., 2014). For example, more patients are receiving nursing care at home that could potentially generate minimum quantities of HCW just like in nursing homes. Even if the HCW that comes from CBC is assumed to be in ‘smaller quantities’, it is still HCW and whether in smaller quantities or large quantities, it remains harmful to the people and the environment. Further studies must be conducted to explore the quantities of HCW produced in CBC. This will assist in revising the manual and provide adequate guidelines regarding HCWM in CBC for specific contexts.

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CHAPTER FIVE

PRINT MEDIA REPORTING OF HEALTH CARE WASTE MANAGEMENT IN SOUTH AFRICA

**PRINT MEDIA REPORTING OF HEALTH CARE WASTE
MANAGEMENT IN SOUTH AFRICA**

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This paper was prepared for submission to the Journal of Health Research Policy and Systems.

I, Lydia Hangulu [LH] was responsible for the conception and designing of this study. My supervisor, Dr Olagoke Akintola (OA), provided guidance. Cassidy-Mae Shaw (CS) conducted data searches and assisted with assessment of the newspapers. The three of us worked together as assessors in developing concepts for the methods section. I drafted the chapter under the guidance of my supervisor.

Introduction: Media has the ability to frame issues in a way that affects the attitudes and behaviour of the public in responding to policy issues. Given the ability of the media to frame issues in a way that influences policy-making and decision making more generally, an understanding of how the media frames issues relating to health care waste in CBC, South Africa could help inform policy-making about health care waste management in South Africa. However, it is unclear how the media frames issues related to health care waste in South Africa. We found no single published study on this theme. This study therefore aimed at exploring how print media reports on issues related to health care waste in South Africa. We sought to answer the following questions: 1) How does the print media frame problems related to health care waste management 2) How does the media frame options related to health care waste management.

Methods: Using the South African media database, a total of 189 news stories were retrieved from 20 newspapers. Analysis was conducted using thematic analysis.

Results: The media frames revealed health care waste management problems as caused mainly by government even if the main perpetrators are waste contractors. There is blame on the government for delaying in developing a national HCWM policy and for having inadequate HCW disposal and treatment facilities in the country. As a result, options for addressing the issue of illegal dumping were directed at the government. Options proposed include, developing of policies and providing HCW treatment and disposal facilities in the country. The most intriguing thing about the media frames is that, there was no mention of health care waste from homes. This raises questions as to whether HCW from homes is even considered as a policy issue in South Africa.

Conclusion: Failure of the print media to propose options that includes waste contractors who are the main perpetrators of illegal dumping and stockpiling could lead to half solutions that masks the real problem and focuses on palliatives instead of focusing on all levels of society: mainly the government policy makers and implementers; government agencies; waste contractors; health facilities; individual health care workers; health care professionals; waste workers and cleaners in the health facilities that contribute to this problem.

Introduction

Health care waste (HCW) results from health care activities in major health care settings like hospitals, doctors' private practices, pharmaceutical manufacturing plants, research laboratories, nursing homes and minor sources such as ordinary homes where there is care of a patient (Pruss et al., 1999). There are two categories of HCW: (1) hazardous waste which poses risks to the environment and the health of people. This comprises infectious waste, sharps waste, pathological, pharmaceutical, genotoxic, chemical and radioactive waste, and (2) non-hazardous waste, which is waste which does not pose harm to the environment or people. Non-hazardous waste comprise of packaging material like cud boxes, office paper, cans and leftover food from kitchens (Hossain, Santhanam, Norulaini and Omar, 2011). Proper management of HCW involves segregation, collection, storage, transportation, treatment, disposal, managing and monitoring of waste management practices (Pruss, et al., 1999).

HCW management is a global concern and was addressed in the Rio Declaration, Principle 10, which required all States to address environmental issues, promote public participation in decision making and access to information on hazardous materials and justice on environmental matters (United Nations, 1992). The major international policies that govern HCW are the WHO manual on the safe management of waste from health care facilities (Pruss et al.,1999), the technical guidelines on environmentally sound management of biomedical and HCW (UNEP, 2003), and a guide on management of solid HCW at primary health care centers (UNEP and WHO, 2005) [see Table1].

Many low-and-middle-income countries (LMICs) have developed their own policies to govern HCW. In line with international standards, South Africa has various policies that govern HCW. Prior to democratic rule which began in 1994, environmental management was neglected and was not seen as an environmental health nor a priority policy issue (Cock, 2007). However, the South African government's approach to HCWM changed after the democratic government of the African National Congress assumed power. HCW has been regulated by various pieces of legislations such as the Constitution of the Republic of South Africa (Act 108 of 1996), which is the main guiding policy aimed at preventing environmental pollution and improving health

(Republic of South Africa, 1996), the National Environmental management: Waste Act, 2008 (Act No.59 of 2008), which governs all waste in the country with the aim of protecting the health of the people and the environment, the Occupational Health and Safety Act 85 of 1993, which protects the safety of all health care providers and HCW handlers (Department of Labour, 1993), and the National Health Act, 61 of 2003 (Republic of South Africa, 2003).

As of the year 2000, South Africa did not have any national policy governing HCW but the Constitution of the Republic of South Africa entrusts legislative power to the national and provincial levels of government (Bethlehem and Goldblatt, 1997). Thus, in the absence of a national policy, most of the provincial governments in South Africa took some initiatives to develop regulations that address HCW. These include the Gauteng Health Waste Management Regulations passed in 2004 and the Western Cape Management Draft Bill which was published for comments in 2005. Additionally, the South African Standards Act of 2008 mandates the establishment of a national body that develops, maintains and promotes the standardisation of services for the management system, product testing and certification in the country. The South African Bureau of Standards was established in 1945. The Bureau of Standards developed some standards (SANS 10248) in the year 2004 to help regulate HCW in the country (Republic of South Africa, 2004). However, it was not until four years later in 2008 that the National Health Care Waste Management policy was drafted (Department of Environmental Affairs, 2012). Since then, this policy which is still a draft document has been the main legislation that governs HCW management in the country and it is supposed to be implemented together with the various South African National Standards (SANS) codes of practice for managing HCW (Republic of South Africa, 2004) as summarised in Table 1. In line with the national policy, KwaZulu-Natal province developed its own Health Care Risk Waste Management Policy in 2008 (KwaZulu-Natal Health Department, 2008).

In spite of the existence of the regulations that govern HCWM in South Africa, Van Schalkwyk (2013) argues that HCWM in hospitals and clinics is a growing problem. These health care facilities lack funding for HCWM programmes to manage the 45,000 tons of HCW that is generated annually in South Africa. As a result, HCW is removed, transported, treated and disposed of by private sector services (contractors).

Table 1: Key health care waste management policy developments relevant to South Africa

Date	Key policy developments
1989	United Nations developed the Basel Convention which is an international legal instrument on the control of transboundary movement and disposal of hazardous wastes.
1993	Department of Labour developed the Occupational Health and Safety Act 85 of 1995 which provides guidelines on worker health safety and training.
1994	First democratic elections; Africa National Congress (ANC) government assumes power and ratifies the Basel convention
1996	South Africa adopts a new constitution that provides a right to a safe and clean environment for every person.
1998	Department of Environmental Affairs adopts the National Environmental Management Act 107 of 1998 which provides that the polluter must pay principal World Health Organisation develops a First Edition Global Manual on Safe Management of Waste from Health Care facilities
1999	Department of Environmental Affairs mandates the provinces, municipalities and health districts to deliver quality health care services including waste management
2003	United Nations Environmental Program introduces Technical Guidelines on the Environmentally Sound Management of Biomedical and Health Care Wastes
2003	The South African Bureau of standards develops Standards ‘SANS CODE’ that provides for the safe and effective management of health care waste aimed at reducing risks to humans and the environment.
2004	Gauteng Provincial Government develops a Gauteng Integrated Strategy and Action Plan for Sustainable Health Care Risk Waste
2005	Western Cape Provincial Government develops The Western Cape Management Draft Bill aimed at improving health care waste management in the province.
2005	United Nations Environmental Program and World Health Organisation introduces a Manual with guidelines on health care waste management practices that are appropriate for sub-Saharan African countries
2007	Promulgation of a Western Cape Health Care Waste Management Act at improving health care waste management in the province.
2008	Department of Environmental Affairs promulgates a Draft Health Care Risk Waste Management Regulation of 2008
2008	KwaZulu-Natal Provincial Government develops a Health Care Risk Waste Management policy for improving health care waste management in the province.

Erasmus, Poluta, and Weeks (2012) explain that, the management of HCW by contractors makes it difficult to have tangible statistics on HCW in South Africa and makes it difficult to provide proper HCW management practices. To support this argument, research has shown that there is improper management of HCW from point of generation to the point of disposal in the country (Nemathanga, Maringa and Chimuka, 2008; Simonsen, Kane, Lloyd, Zaffran and Kane, 1999). In addition, there are insufficient technologies for managing HCW and as such HCW is burnt in the open and buried (Raphela, 2014; Abor, 2007). Other problems identified in the literature are the lack of training for health care providers and handlers (Akiter, 2000; Van Schalkwyk, 2013) and in fact waste handlers lack proper protective gear (Gabela and Knight, 2010).

Improper management of HCW has adverse impacts on the health of the people and affects animals and the environment (Erasmus et al., 2012). Most policies on HCWM in South Africa only emphasise proper management of HCW from major health facilities such as hospitals and clinics but do not address how HCW should be managed from minor sources such as homes where there is care of a patient. Yet the majority of the people living with HIV/AIDS and TB as well as other chronically ill patients receive care at home with the help of community health workers (Akintola et al., 2015; Young and Busgeeth, 2010; De Maesenneer and Flinkenflogel, 2010). The current scaling up of community-based care (CBC) services as part of the government's primary health care re-engineering initiative calls for researchers, policy makers and stakeholders to pay more attention to the HCW that is generated in homes.

The mass media is a podium that facilitates the public's opinion and expectations about policies. It acts as a channel between the government and the public (Kingdon, 1995; Collins, Abelson, Pyman and Lavis, 2012). It can inform the public about government's actions and policies and can also help convey the attitudes of the public to government officials (Entman, 2007). Through framing, the media decides what specific issues to cover at the expense of others (Akintola, Lavis and Hoskins, 2015). Framing is a process where the media defines and constructs a political issue or public controversy. The media can get and sustain the attention of the public over policy debates through framing or using rhetoric. Media framing aims at persuading particular audiences (Nelson, Clawson and Oxley, 1999). The media can use frames to identify

policy problems, their causes, consequences and policy solutions to be sought, in a way that changes the attention paid to such issues (Entman, 1993; Harrington, Elliot and Clarke, 2011). For example, Daku, Gibbs and Heymann (2012) in their study on Multi-Drug Resistant and Extensively Drug Resistant Tuberculosis (MDR and XDR, TB), found that media frames of blame on the patients for spreading MDR and XDR in South Africa, ignored the role of social drivers in the spread of MDR and XDR. They argue that, such media framing of blame on an individual could only influence policy makers to develop policies that are person centered ignoring the environment/society where the individual comes from. The news media can also decide to frame issues in a way that draws attention to the players who are involved in the policy process and can also highlight their role in the decision making process (Jha-Nambiar, 2002).

Therefore the media can play a role in setting policy agendas by focusing on specific social issues at the expense of others in such a way that influences politicians, policymakers and other policy actors to adopt particular options at the expense of others (Soroka, 2002). Of interest to our study is the ability of the media to frame issues in a way that affects the attitudes and behaviour of the public in responding to policy issues (Kingdon, 1995; Boaz, 2005; Collins et al., 2012). Given the ability of the media to frame issues in a way that influences policy-making and decision making more generally, an understanding of how the media frames issues relating to health care waste in CBC, South Africa could help inform policy-making about health care waste management in South Africa. However, it is unclear how the media frames issues related to health care waste in South Africa. We found no single published study on this theme. This study therefore aimed at exploring how print media reports on issues related to health care waste in South Africa. We sought to answer the following questions: 1) How does the print media frame problems related to health care waste management 2) How does the media frame options related to health care waste management.

Methods

We used the South African media database, which is the only media database available at the University of KwaZulu-Natal, to search for news stories for our analysis of print media framing of HCWM. The South African media database is compiled and maintained by the institute for

contemporary history (INCH) located at the Free State University. The institute collects and scans newspaper cuttings and periodicals daily and then categorises and indexes them into Afrikaans and English, before uploading them on the database. The media database contains various South African newspaper articles from the year 1978 onwards.

Newspaper search and selection strategy

We (LH and CS) developed a search strategy in order to help us retrieve newspapers from the South African media database that were relevant to our study. Using an iterative process that involved brainstorming and trial searches of the South African media database, we developed a set of explicit inclusion criteria, which are that all newspapers to be included in the study must be: 1) classified as a South Africa newspaper, and 2) published in English and 3) cover a health care waste issue. A total of 20 newspapers met the inclusion criteria (see Table 2) and were included in the study. The search covered all news stories that were available in the South African media database from 1 January, 2004 to 31 December, 2014, a ten-year period.

Table 2: Characteristics of newspapers covered in analysis

Geographical circulation of newspapers	Newspapers	Frequency	Publisher
National newspapers			
	Citizen	Monday-Friday	CTP/Caxton
	City Press	Sunday	Media24
	Mail & Guardian	Weekly	M & G Media Ltd Johannesburg
	New Age (The)	Daily	TNA Media
	Star (The)	Monday-Saturday	
	Sunday Independent (The)	Weekly	Independent Newspapers, Johannesburg
	Sunday Times	Weekly	Independent Newspapers, Johannesburg
	Sunday Tribune	Weekly	Johannesburg
	Times (The)	Weekly	Avusa Media Ltd, Johannesburg
			Independent Newspapers, Johannesburg
			Avusa Media Ltd, Johannesburg
Provincial Newspapers			
Eastern Cape	Daily Dispatch	Monday-Saturday	Avusa Media Ltd, Johannesburg
	Herald (The)	Monday-Friday	
	Weekend Post	Weekly	Avusa Media Ltd, Johannesburg
			Avusa Media Ltd, Johannesburg

Gauteng	Pretoria News	Monday-Saturday	Independent Newspapers, Johannesburg
	Sowetan	Daily	Avusa Media Ltd, Johannesburg
KwaZulu-Natal	Business Day	Daily	BDFM Publishers (Avusa Media Ltd)
	Daily News	Daily	Independent Newspapers, Johannesburg
	Independent on Saturday	Saturday	Independent Newspapers, Johannesburg
	Witness	Daily	Independent Newspapers, Johannesburg Media24
Western Cape	Cape Argus/Argus Weekend	Monday-Sunday	Independent Newspapers, Johannesburg
	Cape Times	Daily	Independent Newspapers, Johannesburg

Search strategy for news stories

We searched for news stories from the 20 newspapers using specific terms related to health HCWM in South Africa. News stories that had specific terms/concepts related to HCW that are mainly used in the literature on HCWM in South Africa were included in our sample. Because we wanted to include a wide range of news stories on HCW, we searched for news stories that had used the keywords/search terms both in their titles and full texts. Relevant stories that were covered from all sections of newspapers were also selected if they met the explicit inclusion criteria. Two broad categories of concepts for the search were used. The first being “healthcare waste”, the broad concept that is widely known for describing waste that results from health care activities and the second involved using the common terms from literature that are used in various contexts to refer to healthcare waste. These terms are “clinical waste”, “hazardous waste”, “health care risk waste” and its variant spellings and acronyms: “hospital waste”, “infectious

waste”, “medical waste”, “pathological waste”, “pharmaceutical waste”, “sharps”, and “used medical supplies” (see Appendix 1 and 2 showing news stories retrieved using various search terms).

Selection and analysis of news stories

We retrieved a total of 901 news stories from 20 South African newspapers (see Appendix 1). In order to remove news stories that were not relevant to the study, we developed a list of explicit exclusion criteria. First, from a total of 901 news stories, we removed 74 news stories that were published in languages other than English and 827 remained. Second, we excluded 105 news stories that were published in non-South African newspapers, like the Nigerian publication, *This Day*, and the Namibian publication, and *The New Era*. After removing non-South Africa news stories, 722 news stories remained. Third, we removed 360 news stories that did not cover HCW and a total of 362 news stories remained. Fourth, we removed 64 news stories that did not have a focus on HCW in their main text and 298 news stories remained. Fifthly, from the 298 news stories, 109 articles overlaps –same news stories retrieved using various search terms - were removed. A total of 189 news stories were left and analysed the summary is provided in Figure 1.

Data analysis

The two assessors (SM and LH) analysed both newspapers and 189 news stories in our sample. We adopted an approach to data analysis that struck a balance between a more structured deductive approach that uses pre-set themes and categories derived from existing theories, and an inductive approach that starts with immersion in the data and allow themes to emerge strictly from the data. This was done because we were interested in the policy and public health relevance of media reporting of issues relating to health care waste management in South Africa.

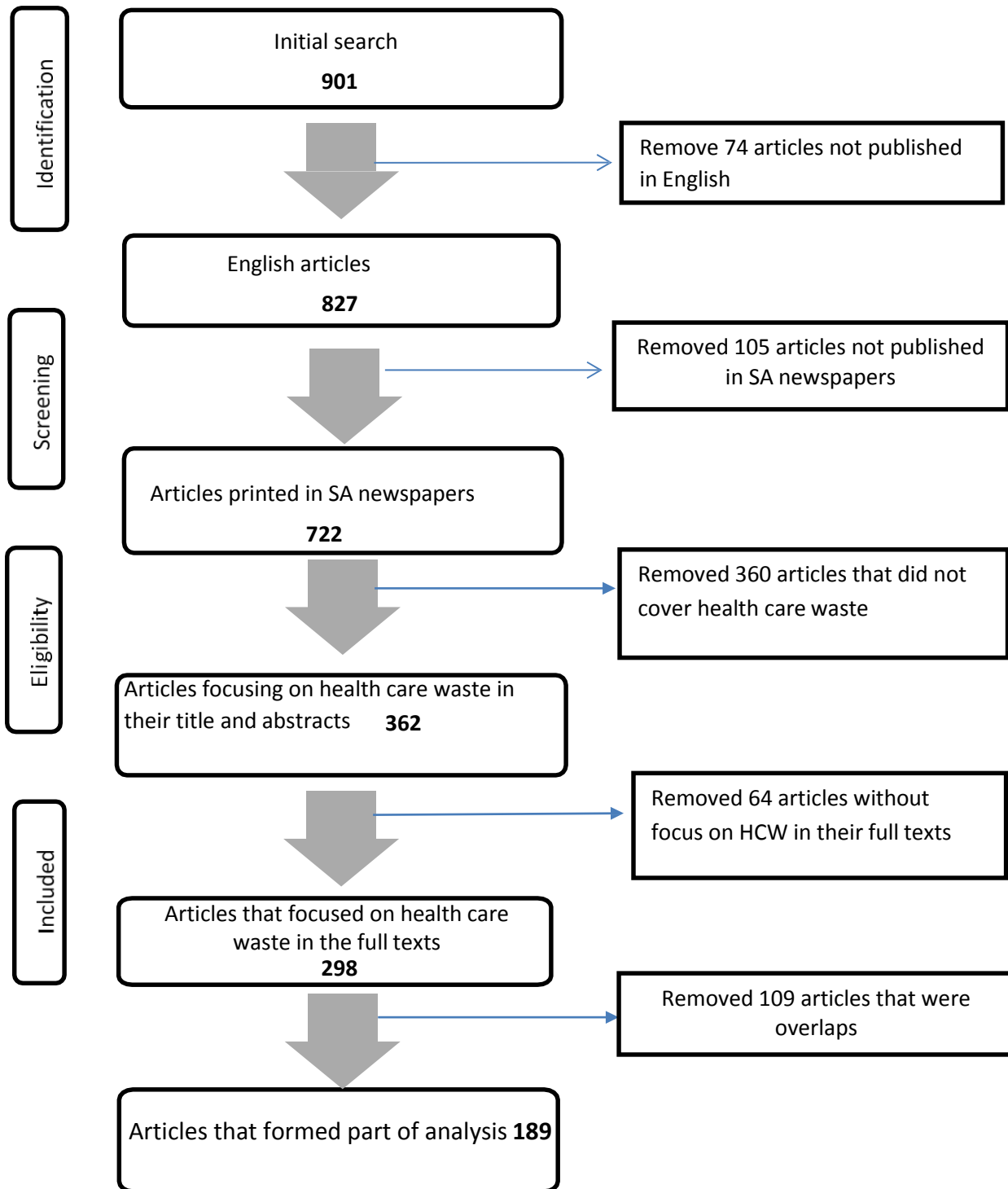


Figure 1: Flow chart showing sample selection process analysed for basic characteristics

As such, we chose to draw on literature related to policy and public health systems to help develop concepts that could sensitise and guide us while conducting thematic

analysis. Our analysis proceeded in two phases: In the first phase, we drew on existing literature on policy and health systems; in particular, Kingdon's conceptualization of policy problems in the agenda setting process (Kingdon, 2003) and literature about the health policy process more generally (Lavis et al., 2012) to develop sensitizing concepts that served as prompts for our thematic analysis that followed in the second phase.

Two groups of concepts were derived from this process and were agreed upon by the two assessors and reviewed by the third assessor (OA) for accuracy. The first group of concepts dealt with issues related to the nature of health policy problems (eg. what problems are identified and how are the problems being framed to motivate different stakeholders including policy makers; and how did it come to attention), and at what level are the problems being defined (eg who or what level of governance is responsible or should be held accountable for the problem). The second group included concepts related to the nature of policy options proposed by the news stories to address the problems identified (eg. What are the options being proposed and how are the options being framed, and at what level are the options being framed or defined?).

In the second phase, we used the two concepts derived in the first phase as organizing categories for our data and proceeded to analyse the news stories following the six steps of thematic analysis proposed by Braun and Clarke (2006). Firstly, we read news stories in order to familiarise ourselves with the data. Secondly, the news stories were read again to identify and categorise the data into the three organizing concepts: problems and their causes, options and implementation considerations. In the third stage, codes were identified and generated. In the fourth step, all subthemes were identified from the codes. In the fifth stage, the sub-themes were grouped together and in the sixth stage, all themes were grouped together and presented in the results section. The analysis was conducted in an iterative manner by the two assessors and a third assessor (OA, the supervisor) helped in resolving discrepancies where the assessors could not reach consensus and in checking for accuracy.

Results

Characteristics of the newspapers and news stories

As shown in Table 3, more news stories 107 (56.6 %) were published by national newspapers than by provincial newspapers (82, 43.5%). Of the 189 news stories published in national and provincial newspapers, the largest grouping was published in newspapers in the Eastern Cape 56 (29.6%) followed by newspapers in KwaZulu-Natal province with 23 (12.8%), the Western Cape provincial with newspapers 21(11.1%) and Gauteng provincial newspapers had 7 (3.7%). Of the total number of news stories published in both the national and provincial newspapers, Daily Dispatch had the highest number of news stories (29, 15.3%) followed by the Star and The Herald with 24 (12.7%) each.

Table 3. Characteristics of news stories on health care waste (N=189)

Variable	Sub-variable	Total	%
Newspaper source			
National newspapers		126	42
Citizen		18	6.0
City Press		9	3.0
Mail & Guardian		8	2.7
New Age (The)		2	0.7
Star (The)		2	11.0
Sunday Times		33	5.3
Sunday Tribune		16	7.3
Sunday Independent (The)		22	0.7
Times (The)		2	4.7
Sowetan		2	0.7
Provincial newspapers		174	58%
Eastern Cape newspaper articles		71	23.6
Daily Dispatch		42	14.0
Herald (The)		26	8.7
Weekend Post		3	1.0
Gauteng newspaper articles		12	4.0
Pretoria News		12	4.0
KwaZulu-Natal newspaper articles		43	14.3
Business Day		7	2.3
Daily News		18	6.0
Independent on Saturday (The)		3	1.0
Witness (The)		15	5.0
Western Cape newspaper articles		48	16.0
Cape Argus/Argus Weekend		34	11.3
Cape Times		14	4.7

The news stories covered in this study were published between 2004 and 2014 as shown in figure 2. The number of news stories on health care waste fluctuated between 2004-2006. However, there was a steady increase from 2007 with a peak in 2010 and a sharp decline in 2011 and a gradual decline in the number of news stories was observed from 2011 to 2014.

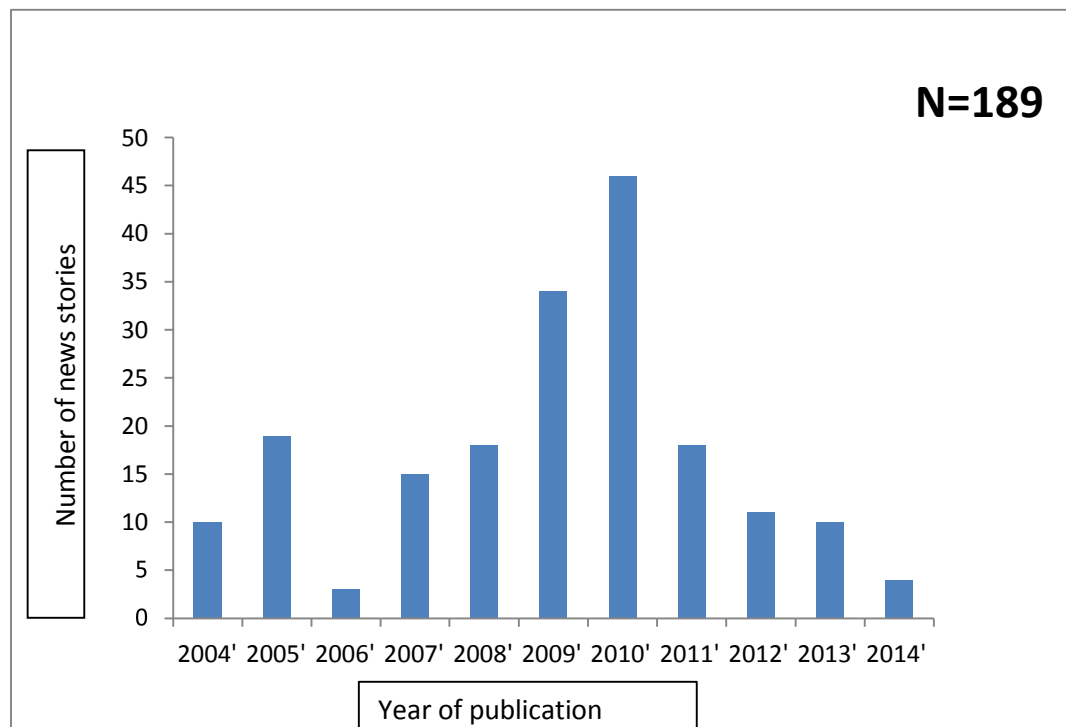


Figure 2. Number of news stories and year of publication

Presentation of the news stories

The news stories will be presented under the two broad themes 1) the problems related to health care waste management and their causes; 2) the options proposed for dealing with the problem. The summary of themes and sub-themes are presented in Table 5.

Table 5: Summary of the themes generated from the news stories

Problem and causes		Options	
Problems	causes	Proposed solutions to the problems	What is already being done about problems
1. Illegal dumping of health care waste	a. There is lack of a national health care waste management policy; existing ones are fragmented and not implemented. b. Insufficient treatment facilities c. Lack of capital to handle HCW by government e. Corrupt tender processes f. Incompetence of contractors to handle health care waste	1. Government should develop regulations or review the existing ones 2. Government should open more disposal sites.	a. Development of a health care waste management Bill in Eastern Cape b. Development of disposal sites and a waste management team was established in KwaZulu-Natal c. Education awareness programmes
2. Illegal storage and stock piling of health care waste	a. Lack of capacity for storage of health care waste by contractors b. Contractors face Stiff competition and end up not honoring their contracts	3. Government should monitor health care waste management.	1. Raids: are conducted on the premises of the contractors. 2. Inspections and audits are conducted in hospitals
3. Financial impropriety by department of health	Not mentioned		
4. No personal protective equipment for the waste handlers	a. Incompetence of contractors to afford PPE for their workers		
5. Lack of segregation of health care waste.	a. Incompetence of hospitals to segregate health care waste		
6. Use of inappropriate transport by contractors	a. Incompetence of contractors to afford appropriate transport		
7. Re-use of HCW containers	a. Incompetence of contractors		

Problems and causes

This theme will discuss the problems that are identified in the news stories, the level at which the problem is defined and who is blamed for the problem. The theme comprise nine sub themes, illegal dumping of HCW, illegal storage of HCW, HCW management operating without permits, corrupt tender processes, financial impropriety by the department of health, lack of personal protective equipment for waste handlers, news stories identified lack of resources for health care waste management, lack of segregation of HCW, use of inappropriate transport for HCW and re-use of HCW containers. These problems come to the attention of the media mainly through “tip offs’ that are provided by people who work in these sectors. The problems are discussed in detail below.

Illegal dumping of health care waste by waste management companies: This was a problem that was reported by the overwhelming majority of news stories. Dumping of HCW waste is done on privately owned land, on the streets, in open veld, in municipal landfills, in residential areas and near school premises. Residents are represented as heroes, whistle blowers who

discover the acts and alert the media, the Health Department and the Municipality. Most newspapers attributed various negative consequences such as infestations of disease-causing organisms such as rats, flies and cockroaches to illegal dumping. The stench produced by the HCW is another effect highlighted by the media and children were represented as being at risk of poor health because they were said to have been seen playing with HCW. Illegal dumps near homes were also framed as affecting landlords who claimed that prices of their properties went down due to the existence of illegal dumps close to their properties. Illegal dumps in residential areas were framed as attracting scavengers who also used such places for toileting. Waste scavengers were in turn seen as responsible for house break-ins in the residential areas.

The print media framed the issue of illegal dumping as caused mainly by the lack of a national policy to regulate HCW management in the country. The government is blamed for taking long to develop a national policy and for ‘dragging its feet’ on passing the national health care waste management draft policy into law. The blame on the government largely originates from the Democratic Alliance (DA), the main South African opposition party to the governing African National Congress (ANC). Further, news stories also emphasise that HCW is governed by provincial laws which are fragmented thereby causing a lack of uniformity in the implementation of the laws.

“The problem that we have as a country is that, currently, policies for medical waste are individually driven by nine provincial governments causing a substantial overload of regulation for service providers!...There is inconsistencies in implementing health care waste management laws in the country...”(The Saturday Weekend, 7th March, 2009)

The second cause of illegal dumping according to the news stories is a lack of financial and human capacity for HCW management at the national level. This was attributed

“The total amount of waste generated in South Africa amount to 42200 tons per year but available commercial treatment facilities could only handle 31,690 tons per year...We do not have the financial capacity or skills to obtain more incinerators that cost millions of Euros...” (The Saturday Weekend Argus, 7th March, 2009)

The news stories recognized that large amounts of HCW are produced in the country yet there are only five incinerators available for treating HCW. The incinerators are only available in the Free State, Western Cape and Gauteng provinces. Therefore the provinces that do not have

incinerators transport the HCW to these provinces with the incinerators. One news story quoted a chairperson of environmental activist group who said:

“The fact that medical waste incinerators are failing is neither surprising or news...in provinces such as KwaZulu-Natal, North West, Limpopo, Mpumalanga, and Northern and Eastern Cape where no incineration capacity exists...health care risk waste is transported to Free state, Western Cape, or Gauteng to be incinerated” (The Sunday Tribune 6th March, 2011)

The news media reported that only recently, one incinerator was built in KwaZulu-Natal province. Further, because the government lacks financial capital to provide facilities needed for treating and disposing of HCW, it relies on private waste companies (contractors) to manage all HCW in the country. The government is also blamed for not having human resources in the Department of Health and the Department of Environmental Affairs and Tourism that can help to offer advice on how to handle and manage HCW. Hence the healthcare waste management sector is seen as being in ‘*a national waste crisis*’ (The Star 12th February, 2010). In emphasising the problem of lack of human resource, one news story reports:

“South Africa generates more medical waste than it can handle. This is a disaster! The government insists that waste must be handled properly yet there are few or no officials in the provincial departments with the expertise to offer advice on how the industry works.” (The Cape Argus, 14th October, 2009)

Thirdly, most news stories reported that the other cause of illegal dumping is corrupt tender processes. The news stories accused officials in The Department of Health who are responsible for awarding contracts on waste management to the private companies of corruption. The news stories framed the issue of corruption as very serious and wide spread, and as caused by lack of standards for awarding tenders to the waste management companies. They indicated that as a result, tenders are awarded based on the price that the waste management companies are willing to bid other than on their capabilities to provide HCWM services. One news story indicated:

“...Policy oversights...dodgy tenders and the milky delineation of responsibility between the government and the government departments are the root of the problem (of illegal dumping)...” The Business Day, 14th, October, 2009)
“Members of the forum (the tender board) have been approached by waste disposal contractors who say: we will give you bigger margin if you bring the waste to our plant; there is a lack of compliance...” (The Sunday Tribune, 28th February, 2010)

It is also reported by a few news stories that due to lack of standards for awarding tenders by the Department of Health, there have been disputes between the waste management companies and the Department of Health. Some waste management companies have taken the department of health to court because of tender irregularities and in most cases the department has lost several court cases thereby wasting a lot of money which could have been invested in the HCWM sector. The news stories also claimed that because of the corrupt tender process, the companies that are awarded the contracts do not possess the requisite competencies and capacity to treat or dispose of waste appropriately.

“It costs millions to set up a plant... many of those contractors who submit contracts to process health care waste lack the capacity to do so legally...to survive you end up getting pulled into the web and it becomes a cartel with a big spider at the top” (28th February, 2010)

Illegal storage and stockpiling of health care waste by waste management companies

Most news stories framed this issue of illegal storage and stockpiling as a serious and rampant problem. Stories of illegal dumping are reported to the media by workers. Most newspapers also indicate that some contractors pile HCW for several weeks or months in warehouses which produce a strong stench and affect the workers. One news story revealed a particular waste company whose truck drivers told the news crew about the health and social impact of exposure to HCW:

“The smell of rotting human bodies is so potent; it had penetrated my skin and body. I go home at night and smell so bad that my wife makes me sleep in another room...” (The Star, 23rd February, 2009)

The news stories blamed the problem of illegal storage of HCW on the lack of incinerating or capacity to process HCW and lack of sufficient funds to own appropriate HCW storage facilities. As a consequence some of them rent and store HCW illegally in warehouses. The waste companies do not have treatment facilities of their own and therefore they rely on the government facilities which are few and sometimes non-functional. As a result of non- functional facilities, there are backlogs with HCW treatment processes causing the contractors to stock pile the HCW.

“Waste companies were being forced to stockpile dangerous medical waste because the country’s legal incinerators couldn’t cope...” (29th November, 2009).

Some news stories also had frames about some waste management companies failing to pay their landlords the rents for the warehouses that they use to store waste and as such, they are evicted from the warehouses. The evicted companies end up stockpiling the HCW in their own trucks that are meant for transporting purposes. The trucks are hardly cleaned and when they are cleaned, the cleaning is done from the provincial hospitals without using any disinfectant. In the Northern Cape, there was a report about an instance where the vehicles used for storing waste was used to transport liquor to a end of year function.

“The trucks for the contractors are hardly ever washed. And when they are washed, it takes place at the provincial hospital without using any disinfectant to clean and sanitize the vehicles. At one stage the contractors used one of the trucks to collect liquor at a liquor store in Kimberly to have it transported for the end of year function.” (The Mail and Guardian, 9th June, 2011)

Most stories have framed this problem of stockpiling as caused by stiff competition among HCWM companies. As a result, they find it difficult to survive in the industry and end up failing to honour their contracts.

“The bigger problem with waste management by the contractors is that the smaller emerging companies many of whom have won tenders by the Department of Health are squeezed by the well established players who have dominated the industry...so the smaller companies feel the heat...some of them have invested millions to set up specialist disposal plants but stiff competition makes them use short cuts and do illegal things.” (The Sunday Times, 2nd December, 2007)

Financial impropriety: A few newspapers also reported financial impropriety by the department of health (DOH). The DOH is responsible for awarding tenders and paying the contractors who are responsible for removing, transporting and disposing all HCW from health care facilities around the country. Although no cause was identified as responsible for this problem, it is further reported that the department of health fails to pay the waste contractors who in turn find it

difficult to keep their operations running. For example, it is reported that there have been instances when the waste management companies have stopped collecting waste from all hospitals in protest. Such acts have been said to cause backlogs with waste management processes in most health care facilities. Some waste companies have been reported to be on the verge of closing down due to the fact that the department did not pay them for several months. One news story revealed:

“We have not been paid since November and have been told we will only get the money in mid-April. The department promised payment of the debt.”(The Sunday Star, 17th April, 2010)

Lack of personal protective equipment (PPE) for workers: One news story also reported that some workers that are hired by some waste management companies are not provided with any PPE such as masks and gloves for use when handling waste. As a result, such workers felt that they were at risk of infections because they were pricked by needles. Others claimed that they had become accustomed to the stench produced by the rotting waste:

“We have to use our bare hands to pick up everything that we find here and handle dangerous waste from hospitals...since I started here I have never been given anything [protective equipment] to wear. Initially it was difficult for me to withstand the stench but I am now used to it.” (The Star, 25th May, 2005)

Lack of segregation of health care waste: Some news stories reported that most hospitals in South Africa do not segregate waste. Most newspapers reported that such cases come to the attention of the public through anonymous ‘tip offs’ that are made to the media by ‘insiders,’ those working for the companies. The problem of lack of segregation was framed by one news story (the Daily News, 3rd of February, 2012) to be more prevalent in KwaZulu-Natal province where 12 out of the 14 hospitals were said to be guilty of this practice. However, most news stories framed this challenge as caused by incompetent waste management companies who give hospitals unmarked containers for storing HCW.

Hospitals are complaining about unmarked (waste) containers that were delivered to them by waste management companies” (Mail and Guardian, 9th June, 2011)

These news stories also report that due to lack of proper segregation of waste in hospitals, there have been cases where dead babies have been found by scavengers among general waste while another case of a leg floating in an abandoned and flooded boiler room was reported at one hospital. Another news story framed this issue as a big problem affecting all hospitals in the Eastern Cape Province. It is reported that the hospital administrations were trying to save money by rationalising services. There were many instances when the hospitals were never cleaned, wards and toilets were filthy and HCW was uncollected and seen lying around causing stench:

“The Livingstone Hospital has become a ‘ghost hospital’ which is ‘half closed’ because services there have been streamlined significantly.” (The Weekend Post, 17th September, 2005)

It is further reported that some nurses became fed up with unhygienic working conditions, and therefore went on a protest:

“Today the cleaners did not pitch for work, the floors and the wards are dirty. It is depressing. Our young doctors are refusing to work in the conditions and are leaving the country.” (The Weekend Post, 17th September, 2005)

Use of inappropriate transport: A few news stories reported that lack of use of appropriate transport by waste management companies was a problem. Most of the waste management companies used open vans to transport HCW. The news stories framed the problem of use of inappropriate transport by waste companies to transport HCW as caused by lack of finances to purchase recommended vehicles. It was reported that HCW was found on the highways, which is suspected to have fallen from moving vehicles and was causing obstruction to the motorists.

... ”*The companies that are awarded tenders do not have the right vehicles. The vehicles are not clearly identified as carrying hazardous waste, a legal requirement!*” (The Mail and Guardian, 9th June, 2011)

“...*Hazardous waste which fell from a moving truck along Port Elizabeth’s freeways shock motorists by causing obstruction...*” (The Herald, 2nd February, 2004)

Reuse of containers for storing and transporting of anatomical waste: One news story reported that some contractors reused buckets containing anatomical waste which are supposed to be incinerated. They framed this issue as caused by incompetence of the waste management companies who do not have the appropriate materials equipment for managing HCW.

Options proposed or provided to address the problems

The news stories identified three solutions to the problems of health care waste management. These are the need for government to develop regulations or review the existing ones, opening up of disposal sites and to monitor health care waste management. These themes are discussed together with the options that the government is providing to address the problems and these are: development of a health care waste management Bill in Eastern Cape, establishment of disposal sites a waste management team in KwaZulu-Natal, education awareness programmes, raids, inspections and audits.

The government should develop regulations or to review the existing regulations: Most news stories proposed solutions to deal with the issue of improper management of HCW across the country. The news stories framed this option as doable by the government. To address the problem of illegal dumping in the Western Cape, news story (The Cape Time, 26th November, 2007) reported that a bill on HCWM (draft) in the Western Cape was initiated by the provincial government in 2005 in response to an incident where 40 children pricked themselves with discarded needles found in HCW that was illegally dumped in residential areas.

“The ‘years in making’ Western Cape Health Care Waste Management Act that will make dumping of medical waste a criminal offence will be signed by the Government. This legislation was initiated when more than 40 children had to go for an HIV test in 2005 for injecting themselves with discarded needles in Delft and Mitchells Plain...” (The Cape Time, 26th November, 2007)

After the bill on HCWM (draft) in the Western Cape was released for comments by the public in 2005, it was promulgated into law in 2007 and now it is called the Western Cape health Care Waste Management Act of 2007.

“This act will change the way in which the HCW is managed in the province...for the first time... there will be a uniform provincial standards for managing HCW...” (26th November, 2007)

To address the issue of insufficient treatment and disposal facilities: the government opened disposal sites in KwaZulu-Natal province.

“The EnvironServ Company will now install a state-of-the-art facility using a thermal process...the decision to establish was made, because if such facilities were not established, HCW would continue to be transported to other provinces increasing the risk of exposure to communities...” (The Sunday Tribune, 22nd July, 2007)

Some news stories revealed that, to address the issue of illegal dumping of HCW, some partnerships between the governmental departments and environmental activist groups were formed. Awareness campaigns are held to educate community health workers about HCWM and the implications for its improper disposal. A few newspapers also indicated that conferences and meetings were held to put together a HCWM strategy to regulate HCW in South Africa.

To address the problem of lack of segregation in the KwaZulu-Natal Province, one newspaper (the Daily News, 3rd February, 2012) indicated that the Department of Health created the waste manager posts. Additionally, medical waste management strategy document was also developed, HCWM committees were established and there was

incorporation of transportation of HCW from clinics into the waste management strategy service contract to ensure compliance. All tenders for waste management contractors are published to ensure transparency.

The government should monitor health care waste management: It was suggested that the government should monitor all the HCW that is produced in the country.

“The government must create a specialised agency to oversee medical waste management which will be responsible for regulating medical waste disposal chain; it would enforce laws, create clear guidelines and keep records of medical care waste management activities.” (The Business Day, 14th October, 2009)

In order to ensure that waste management companies comply with the standard waste management procedures, most news stories report that random raids at the warehouses of the waste management companies are conducted by the Green Scorpions (the environmental management inspectors). Those that are found operating without permits are given 24 hours to shut down their operations and are fined. Companies that fail to pay the fines and persistent offenders are imprisoned for five to ten years, and those who stockpile are ordered to remove and dispose of the HCW within 24 hours. Companies that are found guilty of illegal dumping are given 24 hours to clean up. In situations where the offenders are not found, clean up sessions are organised by the government through the health unit in the municipality. The government officials also fence and monitor such areas after cleaning up. Some waste companies have had their contracts terminated by the Department of Health due to non-compliance.

“Wasteman, a waste management company that was allegedly responsible for being the South Africa’s biggest medical waste dumper, was raided by the South African watch dog the ‘Green Scorpions’ in the last two weeks and has been ordered to shut down; the chief executive director has been arrested and charged for being a persistent offender.” (The Saturday Star, 17th April, 2010)

Inspections and audits by the Department of Health are carried out in hospitals to ensure that they comply with proper procedures of HCWM from point of generation to the point of disposal.

“Provincial Health Department spokesman expresses shock about problems at Livingstone hospital. ‘We promise inspections and audits will be carried out in all hospitals to ensure that this problem does not persist,’ said the provincial Health Department spokesperson.” (The Weekend Post, 17th September, 2005)

Discussion

This study explored how the media frames issues relating to problems and options about HCW management in 20 newspapers in South Africa. Although the implementation of policies occurs at the provincial level in South Africa, there were a few more national newspapers reporting issues relating to HCWM than were provincial newspapers. This might reflect the concern that HCWM is generating among policy-makers and various stakeholders and actors at the national level; as National newspapers might therefore be interested in covering these issues in order to influence policy makers (Entman, year, Daku et al, 2012). It is striking that most of the news stories were from the Eastern Cape and were reported by the major Eastern Cape newspapers: The Daily Dispatch and The Herald. The Eastern Cape is one of the five provinces that does not have a provincial policy on HCW management and a treatment plant for health care waste. It is possible that it has more HCW management issues or concerns due to a lack of a provincial policy on HCW and waste treatment plants. Of the five provinces, Eastern Cape is the only one with more newspapers in our sample. Unfortunately, we are unable to compare this figures with that of other provinces with similar HCWM challenges since we do not have newspapers from the other four provinces in our sample.

We note a steady increase in the frequency of news stories from 2007 to 2010 with a peak in 2010. It is also interesting that there was a gradual decline in the number of news stories from 2011 onwards. While some news stories discussed the publishing of the Western Cape Waste Management Policy in 2007, none of them discussed the national health care waste draft policy which was published for public comments in 2008. It is not clear what is responsible for the spike in the number of news stories on HCW in 2010 as no policy documents were published in

2010. During this period, most of the news stories discussed the problems of health care waste management, linking it to the lack of a national policy and/or a failure to implement existing policies. The gatekeeping literature suggests that newspapers choose what issues to report based on the newsworthiness of the issue (Soroka, 2012). It is possible that the various policy developments which took place from 2004 to 2008 helped to sensitise the media to health care waste management issues in the country to the extent that media organizations considered it newsworthy. At the same time stakeholders might have been sensitized by these draft policies. These two factors may have contributed to an increase in the number of reports relating to health care waste management.

The most dominant representation in the new stories was on illegal dumping by HCW waste companies/contractors. The WHO global health care waste manual (Pruss et al., 1999) and the South African National Standards on HCW (the SANS 10248 (Republic of South Africa, 2004) prohibits illegal dumping of HCW due to its environmental and public health effects. While many studies have found that illegal dumping is widespread in South Africa (Gabela and Knight, 2010) and other low-and-middle-income countries (Mundia and Mbewe, 2006; Bendjoudi, Taleb, Abdelmalek and Addou, 2008; Sawalem, Selic and Herbell, 2009; Mangaa, Fortonb, Moforc and Woodardd, 2011), there is no literature on the perpetrators of illegal dumping. We are therefore unable to assess the accuracy of this frame. Therefore, this issue warrants empirical research that seeks to gain a deep understanding of illegal dumping of health care waste. The media portrayed the waste management contractors as out of control because of their illegal practices. The contractors were portrayed in most of the news stories as engaging in illegal dumping and illegal storage and stockpiling of HCW, using inappropriate vehicles to transport health care waste and re-using containers used for anatomical waste which is supposed to be incinerated. The print media's representation of contractors is that of villains whose activities have gone unchecked by government structures that are portrayed as 'looking the other way' while the contractors perpetrate their dastardly acts. Their activities were also represented as causing health hazards for the environment, residents of communities close to the sites where the illegal dumping of HCW occurs, and their own workers who are not provided with protective devices when handling health care waste.

Interestingly, the overarching dominant frame of the cause of the problems of health care waste management in South Africa was the government's lack of proper oversight and control of the waste management sector. The contractors were presented as operating in a very difficult environment that was disabling. The news stories blamed the problem on the governments' inability to create the necessary enabling environment for proper health care waste management and for contractors to do their jobs properly. Given the manner in which the cause of the problems of health care waste management was framed, the options for dealing with the problem were focused mainly at the level of government [namely the Department of Health and Department of Environmental Affairs]. News stories constructed the contractors' actions as being left to go unchecked and therefore proposed the development of appropriate regulations that will set up an agency to monitor contractors and enforce laws and regulations on the entire health care waste management chain.

While the framing of solutions may sound logical and sensible, some news stories, at the same time, ironically portrayed contractors as victims of a system that was not conducive for them to carry out fair and proper waste disposal practices. They were portrayed as 'victims' of circumstances created by governments' lack of funding of the health care waste management sector. This it was said led to inadequate financial and human capacity for developing disposal sites and effectively managing the industry as a whole respectively. Government departments were accused of financial impropriety and waste contractors were said to be owed money by government which hampered their ability to comply with regulations. As a consequence, the options proposed were those designed to increase capacity for the incineration of health care waste across the country which most news stories said were only able to process only about 75% of the large volume of health care waste that is generated in the country and sometimes not functional. There were also proposals for government to purchase modern technology for the treatment of health care waste.

In addition government was blamed for corrupt tender processes which led to the appointment of incompetent contractors. Government was also vilified for financial impropriety which led to delays in the payment of contractors which in turn further exacerbated their woes. There are

studies that have found corruption as a major challenge that has dodged procurement processes in the public sector in South Africa (Ambe, 2012; Jeppesen, 2010; Abadenhorst-Weiss; 2012). The authors of these studies argue that corruption in the government sector in South Africa is as a result of decentralization of public procurement. Although news stories constructed the issue of corruption as widespread in the health care waste management sector, there is no empirical research evidence on corruption in the health care waste management sector. Research that seeks to explore this issue would be a welcome contribution to knowledge on health care waste management.

By identifying the illegal and unprofessional practices of waste contractors but blaming government for their reprehensible activities and proposing options that focus mainly on the government, the print media creates a situation that indirectly absolves waste companies. While some news stories mentioned the need to monitor contractors closely, this was not the dominant frame. Further, rarely did the print media emphasise the legal and contractual as well as moral responsibility of the contractors as corporate entities to comply with existing laws and regulations. Instead, there was a strong emphasis on the need for government to do more for contractors and the industry. The SANS 10248 (2004) prohibits illegal dumping of health care waste and recommends that specific HCW must be disposed of in a specified manner. For example, anatomical waste must be dumped at a class A dumpsite where it must be burnt in a controlled manner. While the dominant representations of problems vilify both the contractors and government, the dominant representations of options have the potential to justify the malpractices of the contractors albeit indirectly thereby tacitly encouraging them to break the law.

Stockpiling by waste management companies is in contravention of the law in terms of the National Environmental Management Waste Act 59 of 2008 (Republic of South Africa). The dominant media frame could lead to a fixation with narrow solutions that focuses on government's failures and responsibilities while neglecting the legal and contractual obligations, and moral responsibilities of waste companies to deliver services within the confines of their contracts and the laws of the country which prohibit their illegal activities (SANS, 2004; Republic of South Africa, 2008). The dominant media representations of government as the

cause of the problem in the industry perhaps largely reflect the views of the opposition party – the Democratic Alliance which dominated the coverage of the problems contained in the news stories. As Nelson and Oxley (1999) argue, a frame could marginalize other frames of understanding. The frames used by the news stories in our sample could undermine the development of comprehensive solutions that holds the main perpetrators of the illegal activities to account for their actions.

Another dominant representation in the media is that of lack of a national health care waste management policy which has led to a fragmentation or provincialisation of policies. A review of policy and literature shows that there is no national policy governing HCWM in South Africa (Akiter, 2000; Nemathanga, Maringa and Chimuka, 2008). The current national guiding document on health care waste management has been in draft form since 2008. Recent studies by Van Schalkwyk (2013) and Erasmus, Poluta, and Weeks (2012) argue that a lack of a national policy and the fragmentation of policies (i.e. development of policies by various provinces) on HCW management makes it difficult to have uniform implementation in the country and to quantify and monitor HCW. The way the media frames the problem of fragmentation in policy on HCWM is consistent with empirical evidence on this issue. This media representation could potentially help influence and policy makers to take appropriate action (Entman, 1993; Akintola, et al., 2015). But as noted earlier, the problem of health care waste management cannot be focused on the government's policies alone but must include other levels of society that contribute to the problem. We now turn to the other levels contributing to the problem of waste management in the country as described by the news media.

The other dominant frame in the print media is the lack of segregation of HCW by health care facilities. The media frames this as an institutional (health care facilities) problem. The WHO policy, the SANS 10248, the South African Constitution and all South African provincial policies, puts the responsibility on all waste generators of HCW to segregate waste. Health care institutions are given the responsibility to oversee all health care waste management activities in order to ensure that HCW is properly managed (Pruss et al, 1999; Republic of South Africa, 1996). Evidence from low-and-middle-income countries (Sawalem, Selic, & Herbell, 2009; Magdy & El-Salam, 2010; Ferreira & Teixeira, 2010; Libya ;Mangaa, Fortonb, Moforc, &

Woodardd, 2011) and specifically in South Africa (Leonard, 2005; Muswema , 2005; Gabela & Knight, 2010) suggest that health care facilities do not segregate HCW. The reasons for lack of segregation of HCW are that waste generators and handlers do not have skills to do so due to lack of training. However, the media rarely discussed the specific factors or individuals to be held accountable for this problem at the health facility (institutional) level. Some of the news stories blamed the waste companies for not supplying the hospitals with the appropriate facilities for segregating waste.

However, they did not identify who should be held accountable for non-segregation at the institutional level. It was not clear from the reports whether the problems of lack of segregation was caused by medical professionals, cleaning staff, the hospital management or contractors responsible for waste management. Factors like the level of knowledge and skills about segregation of health workers or waste handlers or the availability of the appropriate facilities needed for segregation at the facility level were rarely discussed. This makes it difficult to judge how consistent the news media frames are with the literature and could send confusing signals to policy-makers who are influenced by news media frames (Daku et al., 2012). A few of the news stories blames non-segregation of waste on the contractors for not supplying appropriate facilities. By blaming the problem of non-segregation on the waste companies, the media deflects the responsibility for segregation to the companies. This is inconsistent with the provisions of the Constitution of the country, and all other policy and standards on HCWM (SANS, 2004). This might absolve the hospitals and health professionals and lead to solutions that are not comprehensive enough for the dealing with the problem.

Completely absent from the media frames is a discussion of issues relating to HCW that emanates from homes in community based care. The primary health care re-engineering model in South Africa which aims at providing basic home treatment, community assessment and campaigns on a national scale (Naledi, Barron & Schneider 2011) will inevitably lead to an increase in the amount of nursing and care activities such as bathing patients, changing soiled nappies, cleaning and dressing their wounds, washing soiled clothes and beddings in the homes. These activities could potentially lead to an increase in the amount of HCW generated. While a previous analysis of the South African print media coverage of primary health indicate that the print media has covered the primary health care re-engineering initiative extensively (Akintola et

al, 2015), our study shows that the issue of health care waste management in primary and community health care was not covered by any news story. This raises questions as to whether HCW at the primary health care and community health care level is seen as an issue of concern by stakeholders and whether the print media considers this issue newsworthy (Lewin, 1950; Soroka, 2012).

The gate-keeping literature suggests that news that does not meet the criteria set for newsworthiness by media organizations are either not covered in the first place or discarded during gatekeeping process thereby helping to influence policy agendas by determining the news that is elevated and therefore that will get the attention of the policy-makers and stakeholders (Lewin, 1950; Soroka, 2012; Akintola et al., 2015). The lack of coverage of health care waste management in community-based care portrays health care waste management as an issue that is solely at the level of health facilities level.

Conclusion

The media framing of health care waste management problems as caused mainly by government, results into failure of the print media to propose options that includes waste contractors who are the main perpetrators of illegal dumping and stockpiling could lead to half solutions that masks the real problem and focuses on palliatives instead of focusing on all levels of society mainly the government policy makers and implementers; government agencies; waste contractors; health facilities; individual health care workers; health care professionals; waste workers and cleaners in the health facilities that contribute to this problem.

While there is a lot of media reporting on health care waste management from hospitals in South Africa, nothing is mentioned about HCW that emanates from community-based care (CBC). This raises questions as to whether HCW from CBC is seen as important. Seeing that media is a podium for communicating policy issues, it could be used as a podium for sensitizing people about health care waste that comes from homes. For example, through awareness programmes collaborated by CBO managers, community health workers, the waste handlers and community members and the municipality in the communities, people in the community will know the importance of HCW that originates from homes therefore, such awareness programmes could get

the attention in media which in turn, media could be a podium used to get the attention of policy makers regarding policy initiatives for governing HCW from CBC.

Strengths and limitations

This study used rigorous and transparent methods throughout the entire process. The use of the South African media database allowed us to have a broad search strategy. The key terms that we used to search for the newspaper articles were reviewed thoroughly. The limitations of this study are: (a) most researchers (Akintola, Lavis and Hoskins, 2015; Cheung, Lavis, Hamandi, El- Jardali, Sachs and Sewankambo, 2011; Mountcastle et al., 2003) that have conducted media analysis on health issues have used LexisNexis to identify newspapers for news stories. In this study, LexisNexis was not used because it was not accessible by the University of KwaZulu- Natal at the time of the research. The South African media database was the only reliable database at the time of research; (b) this study is only limited to the print media; other types of media like the television, radio and social media were not used but could also play a role in reporting issues related to HCWM; (c) this study only focused on news stories that were covered in English and excluded those in the local languages which may be an important source of information.

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Appendix 1: Number of news stories retrieved using various search terms (n=298)												
Search Term	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
1. Chemical waste	0	0	0	0	0	1	0	0	0	0	0	1
2. Clinical waste	0	0	0	0	0	0	0	0	0	0	0	0
3. Hazardous waste	3	5	1	5	0	7	3	3	1	0	1	29
4. HCRW	0	0	0	0	0	1	1	0	0	0	0	2
5. Health care risk waste	0	0	0	1	1	2	1	2	2	1	0	10
6. Health care waste	0	2	0	2	2	5	1	0	1	1	0	14
7. Healthcare risk waste	0	0	0	0	0	2	0	2	0	0	0	4
8. Health-care risk waste	0	0	0	1	1	2	1	2	2	1	0	10
9. Healthcare waste	0	0	0	2	0	3	2	1	0	1	0	9
10. Health-care waste	0	2	0	2	2	5	1	0	1	1	0	14
11. Hospital waste	0	2	0	0	1	1	1	0	0	0	1	6
12. Infectious waste	1	0	0	0	0	3	0	0	0	1	0	5
13. Medical waste	10	18	2	15	18	34	46	18	11	10	4	186
14. Pathological waste	0	0	0	0	0	0	0	1	0	0	0	1
15. Pharmaceutical waste	1	0	0	0	0	0	0	0	0	0	0	1
16. Sharps	0	1	0	1	0	1	1	2	0	0	0	6
Total	15	30	3	29	25	69	58	31	18	16	6	298

Appendix 2: No. of news stories retrieved from various newspapers using various search terms																	
Search Terms	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total I
Newspaper																	
Citizen	0	0	2	0	0	2	0	0	2	2	0	1	9	0	0	0	18
City Press	0	0	0	0	0	0	1	0	0	0	0	0	7	0	0	1	9
Mail and Guardian	0	0	1	0	0	0	0	0	1	0	0	0	5	0	0	1	8
New Age (The)	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
Star (The)	0	0	4	0	0	0	1	0	0	0	2	0	23	1	1	1	33
Sunday Independent	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Sunday Times	0	0	2	0	0	0	0	0	1	0	0	1	10	0	1	1	16
Sunday Tribune	0	0	1	0	2	2	0	2	1	2	0	0	11	0	0	1	22
Times (The)	0	0	1	0	0	0	1	0	1	0	0	0	11	0	0	0	14
Daily Dispatch	0	0	2	0	1	2	0	1	0	2	2	1	30	0	0	1	42
Herald (The)	0	0	0	0	0	0	0	0	0	0	1	0	23	0	0	0	24
Weekend Post	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3
Pretoria News	1	0	1	0	1	0	1	1	0	0	0	0	7	0	0	0	12
Sowetan	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Business Day	0	0	1	0	0	1	0	0	1	1	0	0	3	0	0	0	7
Daily News	0	0	2	1	3	1	0	3	0	1	0	0	7	0	0	0	18
Independent on Saturday	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	3
Witness (The)	0	0	0	0	1	1	0	1	0	1	0	0	11	0	0	0	15
Cape Argus	0	0	6	1	2	3	0	2	0	3	1	2	13	0	1	0	34
Cape Times	0	0	2	0	0	2	0	0	1	2	0	0	7	0	0	0	14
Total	1	0	29	2	10	14	4	10	9	14	6	5	186	1	3	6	298

CHAPTER SIX
HEALTH CARE WASTE MANAGEMENT IN COMMUNITY-BASED CARE IN
SOUTH AFRICA: PERSPECTIVES OF POLICY-MAKERS AND
STAKEHOLDERS

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This paper was prepared for submission to the Journal of Development Studies.

I was responsible for the conception and designing of this study with guidance from my supervisor (Dr. Olagoke Akintola). I collected data and was assisted by Noloyiso Ddilanga, a research assistant who conducted the interviews with Zulu speakers (IsiZulu, the local language in the study area). I drafted the chapter under the guidance of my supervisor.

Abstract

Background: In South Africa, a new primary health care (PHC) re-engineering initiative aims to scale up the provision of community-based care (CBC). A central element in this initiative is the use of outreach teams comprising nurses and community health workers to provide care to the largely poor and marginalised communities across the country. The provision of care will inevitably lead to an increase in the amount of health care waste (HCW) generated in homes and suggests the need to pay more attention to the HCW that emanates from homes where there is patient care. CBC in South Africa is guided by the home-based care policy. However, this policy does not deal with issues about how HCW should be managed in CBC. This study sought to explore health care waste management (HCWM) in CBC in South Africa from the policy makers' and stakeholders' perspective.

Methods: Semi-structured interviews were conducted with 9 policy makers and 21 stakeholders working in 29 communities in Durban, South Africa. Interviews were conducted in English and were guided by an interview guide with open-ended questions. Data analysis was conducted using the six steps of thematic analysis suggested by Braun and Clarke.

Findings: The Durban Solid waste (DSW) unit of the eThekweni municipality is responsible for overseeing all waste management programmes in communities. Lack of segregation of waste and illegal dumping of waste were the main barriers to proper management practices of HCW at household level while at the municipal level, corrupt tender processes and inadequate funding for waste management programmes were identified as the main barriers. In order to address these issues, all the policy makers and stakeholders have taken steps to collaborate and develop education awareness programmes. They also liaise with various government offices to provide resources aimed at waste management programmes.

Conclusion and recommendations: HCW is generated in CBC and it is treated as domestic waste and is poorly managed. With the rollout of the new primary health care model, there is a greater need to consider HCWM in CBC. There is need for the Department of Health to work together with the municipality to ensure that they devise measures that will help to deal with improper HCWM in the community.

Introduction

Following the Alma Ata Declaration on Primary Health Care in 1978, many low-and middle-income countries (LMICs) have made it a policy priority to shift the care of chronically ill patients from hospitals to the community (Schneider et al., 2008). The World Health Organization (WHO) has also promoted home and community-based care (CBC) and the concept of task-shifting to deal with health worker shortages in LMICs (Akintola, Lavis and Hoskins, 2015). In recent years considerable increases in the funding for HIV/AIDS/TB and the need to meet the millennium development goals have led to a renewed focus on CBC in many LMICs (Schneider et al., 2008; Akintola et al., 2015).

In sub-Saharan Africa, community based organisations (CBOs) are a key element in the provision of primary health care services in poor and marginalised communities (Akintola, Gwelo, Labonte and Appadu, 2015; De Maeseneer and Flinkenflogel, 2010; Van Pletzen et al., 2014). In the HIV/AIDS sector for example, CBOs often provide care and resources to marginalised populations like sex workers, drug users, gay men, the aged, the poor and the homeless (Wilson, Lavis and Guta, 2012; Akintola, Labonte, Gwelo & Appadu, 2015). CBOs are relevant in providing health care because they understand their local communities and they are linked to the populations that they serve (Chillag et al., 2002). They serve as a link between the health care system, decision makers, and stakeholders in developing health policies and programmes (Oxman, Lewin, Lavis and Fretheim, 2009). CBOs are involved in research development that aims at informing policy (Bhan, Sign, Upshur, Singer and Daar, 2007) and they also help to facilitate the involvement of communities in planning and implementation of health care in order to achieve ‘health for all’, a key principle for primary health care (Wilson, Lavis and Guta, 2012).

CBC in South Africa is guided by the home-based care policy that was developed in 2001 which is still a draft document. The main thrust of the policy is the provision of CBC in the homes of the patients. The policy encourages community members to participate in the provision of care to the ill people (South Africa Department of Health [DOH], 2001). However, this policy does not deal with how health care waste (HCW) should be managed in CBC. The WHO defines HCW as all waste that is generated in health care facilities, research centres, and laboratories

that are related to medical procedures. It also includes waste produced from health care activities in minor and scattered sources including in homes where there is recuperative care, self-administration of insulin and dialysis (Pruss et al., 1999). HCW management (HCWM) involves segregation, collection, storage, treatment, transportation, safe disposal (Ananth, Prashanthini and Visvanathan, 2009) and monitoring of these activities (Pruss et al., 1999). When HCW is not properly managed, it could transmit infectious diseases such as HIV/AIDS and hepatitis B and C to the public, and could cause death (Akter, 2000; Magdy and El-Salam, 2010). HCW could also reduce environmental aesthetics (Phorano et al., 2005), cause social contagion (Kassim and Ali, 2006) and the breeding of disease-causing vectors such as cockroaches, flies and rodents (Drackner, 2005; Ramokate, 2008).

In South Africa, a new primary health care (PHC) re-engineering initiative aims to scale-up the provision of CBC. A central element in this initiative is the use of outreach teams, comprising nurses and community health workers, to provide care to the largely poor and marginalised communities across the country (Naledi, Barron and Schneider 2011). The provision of care will inevitably lead to an increase in the amount of HCW generated in homes and suggests the need to pay more attention to the HCW that emanates from homes where there is patient care (Hossain et al., 2011).

In KwaZulu-Natal province where this study was conducted, some challenges with HCWM have been documented. For example, a study was conducted in 30 clinics in iLembe health district, the findings of which revealed that HCW was frequently not segregated from the point of generation to the point of disposal; it was sometimes transported together with goods and passengers, and the vehicles were driven by people who are untrained, unequipped and not registered to handle HCW (Gabela and Knight, 2010). Given the recent policy direction of the department of health to promote home and community-based care on a national scale, the perspectives of policy-makers and stakeholders could help shed light on particular issues relevant for policy decision making on health care waste management in community-based care. Regrettably, little is to be found about the perspectives of policy makers and stakeholders regarding HCWM in community-based care in South Africa. In this study, we sought to answer the following questions: What are policy makers' and the stakeholders' perceptions regarding HCWM in community-based care? How do policy makers and stakeholders describe the

challenges regarding HCWM in CBC? How do policy makers and stakeholders address the challenges related to HCWM in CBC?

Methods Research design

This was a descriptive qualitative study (Ulin et al., 2012) that helped to provide in-depth insights into stakeholders' perceived challenges with HCWM and their causes as well as descriptions of how challenges with HCW were addressed.

Study setting and context Background

This study was conducted in 29 resource-scarce communities located on the outskirts of Durban, KwaZulu-Natal, South Africa. Of these communities, 21 were peri-urban communities. Peri-urban communities are segregated communities that were created by the apartheid government in the 1950s and 1960s and were racially structured to stabilise black labour in the industrial economy. These communities are characterised by the presence of small sized houses named after the reconstruction and development programme (RDP) that was initiated by the government in 1994 to promote service delivery. The RDP houses are for the poor who earn less than R3500 per month (Gilbert, 2004). Currently, because the government provides low subsidies for developing these houses, RDP houses are usually built on cheap land located away from economic opportunities. The minibus taxi industry provides community members with transport which links dwellers to the cities to access economic opportunities. Because most people in these communities do not work and/or have an unsteady income, they tend to build 'back rooms' which are extensions of the main house. They rent the backrooms out to people who are still waiting for RDP houses as a way of earning themselves a living. Some households rent out the RDP houses and opt to live in the backrooms (Gardner, 2010).

Furthermore, three of the communities that were included in the study were informal settlements. Informal settlements consist of houses that are illegally built on private land, government owned land or tribal land. People who live in informal settlements travel from various places such as rural areas or peri-urban communities and some are foreign nationals who are in search of formal housing and employment. Informal settlements have a high rate of unemployment, food insecurity and poverty (Crankshaw, 2008; Del Misto and Hensher, 2009).

Five were rural communities: these are areas that are in between, they are neither peri-urban nor informal settlements. The communities are settlements usually located far from economic centres and affordable transport is limited and expensive. They are occupied mainly by the older populations that have retired and rely on subsistence agriculture, social grants and allowances from family members who work in cities (Hunter and Posel, 2012). All the 29 poor resource communities are characterised by high rates of unemployment and poverty; there is a lack of quality social services such as education, health and transport services. Municipal services such as water, sanitation and electricity are basic and free (Molefe, 1996; Allen and Brennan, 2004; World Bank, 2013). These communities are serviced by the eThekweni Municipality of KwaZulu-Natal

Participants

Four kinds of participants were included in our sample: nine ward councillors who are policy makers, five area cleansing officers, ten managers of CBOs and six education officers who are stakeholders in charge of overseeing general waste management activities in the communities. The range of service in the community was one to 13 years as described in Table 1 below.

Table 1: Roles and demographic characteristics of policymakers and stakeholders

Post of the official	Role in the community	Total number of participants	Range of years of service of participants
Ward councillors	These are policy makers who are employed by the government at the municipality level. They are community representatives who provide leadership and guidance to the community and facilitate communication between the community and the government at the municipality level.	9	4-6
Area cleansing officers	These are stakeholders and are government employees at the municipal level. They supervise waste management contractors, inspect communities to ensure that waste is collected and they oversee garbage bag distribution within the communities.	5	4-5
CBO managers	These are stakeholders who manage non-profit organisations that provide community-based care programmes in the communities.	10	8-13
Education officers	They are stakeholders who are employed by the government at the municipal level. They develop and facilitate education programmes on waste management in the communities.	6	1-3

Sampling procedure for the participants

CBO managers were selected using snowball sampling. We contacted two CBO managers known from previous research. These managers provided contact details of the other managers that they knew. From the contact details provided, eight CBO managers from different communities were recruited purposively if their organisations offered home-based care services. CBO managers were included in the study because they oversee CBC programmes that are responsible for generating health care waste. The CBO managers were chosen if they were willing to participate in the study. Ten CBO managers (one per organisation) participated in the study while three were not available. Contact details of the ward councillors, area cleansing officers and education officers who served the 29 communities were obtained from CBO managers. The ward councillors, area cleansing officers and education officers were chosen if they were willing to participate in the study and if the CBOs fall within their jurisdiction. Ten ward councillors served the thirteen communities (one per community). However, only nine of them participated in the study, the remaining one declined to participate in the study. Five area cleansing officers and six education officers participated in the study because the thirteen communities fell within areas of their jurisdiction. All participants were selected if they worked for a period of six months because respondents with such length of work experience were in a better position to provide insight to the study.

Data collection procedure

Ethical approval for this study was obtained from the Humanities and Social Science Research Ethics Committee of the University of KwaZulu-Natal, South Africa (See appendix 1). Semi-structured interviews were conducted with nine policy makers and twenty-one stakeholders and these were guided by an interview schedule with open-ended questions (see Appendix 3). The interview schedule covered three main themes: 1) the policy makers' and the stakeholders' perspectives regarding health care waste management in community-based care 2) the policy makers' and stakeholders' perceived challenges regarding health care waste management in community-based care 3) strategies employed by policy makers and stakeholders to address the challenges related to health care waste management in community-based care. Participation in the study was voluntary and anonymity was achieved through the use of titles and not names.

The objectives of the study were explained to the participants; informed consent was sought and all participants gave both written and verbal informed consent (see appendix 2 for consent form). Permission to record all interviews was sought and granted. All interviews were conducted in English in the participants' offices and they lasted from 40 to 60 minutes. Data collection took place from August 2014 to March 2015.

Data analysis

All the recorded data was transcribed verbatim in English by the research assistant (ND). Data analysis was conducted using the six steps of thematic analysis suggested by Braun and Clarke (2006). The first step involved familiarisation with data through reading all the transcribed scripts. I (LH) read all the transcribed scripts to familiarise myself with the data. At the second stage, I read the scripts, and identified and generated some themes. For the third step, I re-read the transcripts and I identified and generated some codes. At the fourth stage, I read the scripts again and generated themes from the codes. Fifth, I read the scripts again, identified and grouped all the main themes and sub-themes that I identified. After which I presented all the themes and subthemes that I generated to my supervisor. We discussed each of the themes and sub-themes. We reached consensus as such all grouped main themes and sub-themes are presented in the findings below.

Results

The following themes were derived from the data: Perceived HCWM practices in community-based care by policy makers and stakeholders, and the perceived challenges, the perceived causes of the challenges and strategies used to address the challenges of HCWM practices in community-based care by policy makers and stakeholders. All the major themes are in bold while minor themes are italicised in bold.

The perceived health care waste management practices in community-based care

Participants were asked to state who was responsible for managing HCW in the communities that they served. They all explained that the Durban Solid waste (DSW) unit of the eThekweni Municipality is responsible for overseeing all waste management programmes in their communities. All participants indicated that health care waste is mixed, treated as domestic

waste and is removed together with domestic waste from all homes. They further explained that, DSW has garbage trucks and waste collectors that remove all domestic waste which is mixed with health care waste from suburbs. While waste management services are free for those in rural, peri-urban communities and informal settlements, because they are subsidised by the government. The ward councillors indicated that, as a way of empowering communities, the municipality awards tenders to community members. The selected community members work as waste management contractors whose jobs are to remove all waste from homes to the disposal sites. Ward councillors and area cleansing officers indicated that all tenders are advertised in the media and the most competent contractors are offered the tenders. Contractors sign contracts with DSW and they are given rules and regulations on how they should operate:

“Yes they sign a contract document that binds them on how to work. It is a very thick document which constitutes what they are supposed to do and how and what is expected of them and their staff.” (Area Cleansing Officer 1)

All participants were asked to give an account of how HCW is managed in the communities that they served. The CBO managers explained that they advised their community health workers (CHWs) who provide home visits to the patients to dispose of the HCW in black garbage bags or in any other plastic bag. They also advised CHWs to tie the plastics containing HCW to prevent spillage. Contrary to what the CBO managers said, most area cleansing officers were defensive when they were asked to explain how HCW is managed and removed from homes in the communities that they served. They said that they were not aware of any HCW that was produced in homes:

“The thing is we do not know that there is a problem like that, if we knew of a house that has a patient, then maybe we can make an arrangement.” (Area Cleansing Officer 5)

Area cleansing officers emphasised that there is a private company responsible for removing HCW from hospitals and clinics, yet nothing was mentioned about who is responsible for removing HCW from homes where there is patient care. They insisted that their main role is to ensure that all domestic waste and not HCW, from homes is removed by community waste management contractors:

“A private company collects all the waste for the hospitals and the clinics, but us in the DSW unit we only collect domestic waste.” (Area Cleansing Officer 2)

Only two area cleansing officers and all education officers were willing to openly discuss the issue of HCW. The two acknowledged that they are aware that HCW is generated in homes and is usually treated and removed together with domestic waste. The two area cleansing officers explained that they handle HCW as domestic waste because it is not in large quantities unlike at the hospitals. One of them said:

“Such cases are few that we have health care waste... so because it may be only one residence that has a patient, we encourage such people to put everything (HCW) in a plastic bag and tie it up, then place it in the house bin, because there is no other way. Unless if there is a lots of people, then we can refer them to those that deal with medical waste in the clinics and the hospitals, they have their own special truck that collects medical waste.” (Area Cleansing Officer 3)

All participants were asked to describe the challenges related to HCWM in the communities that they served as well as their perspectives about the causes of these challenges. The challenges are discussed at the household/community and the municipal levels. At the household level, the main themes that emerged are lack of segregation of waste by households and illegal dumping and these are discussed in detail below.

The perceived challenges with health care waste management practices in community- based care at household level

This theme will discuss the challenges that impede health care waste management practices in CBC, the causes and the strategies used to deal with the challenges. The themes are presented at the community level and municipality level. At the community level, challenges ranges from lack of segregation of HCW by households to illegal dumping. At the municipality level the challenges range from corrupt tender processes to and inadequate funding for general waste management. A wide range of causes of the challenges and strategies used to deal with the challenges are provided and all themes and sub-themes are summarized in Table 2 and will be discussed in detail.

Table 2. Summary of the challenges, causes and solutions to the challenges of health care waste management

Sources of the problems	Problems	Causes of the problems	Solution provided to the problems
The community level	1. Lack of segregation of health care waste	<ul style="list-style-type: none"> ○ Lack of knowledge about segregation of health care waste. ○ Laziness to take out health care waste on the day of collection ○ Negative attitudes about waste management. ○ Irregular collection of health care waste by waste ○ Lack of sufficient garbage bags. ○ Lack of participation of community members regarding waste management programmes. 	<ul style="list-style-type: none"> ○ Collaboration of providing education about waste management in general ○ Liaising with government for adequate resources
	2. Illegal dumping		
The municipality level	1. Corrupt tender processes	<ul style="list-style-type: none"> ○ The presence of back rooms. ○ Long distance between the waste storage facilities and homes in the informal settlements. ○ Slow change in the rural areas 	
	2. Inadequate funding for the waste management in general		

Lack of segregation of waste in homes by households

All participants revealed that generally, waste segregation is a responsibility of the households and that waste collectors are responsible for collecting the waste from homes and transporting it to the landfill. They also explained that households do not separate the HCW and as a result, waste collectors ended up collecting and transporting the unsegregated HCW to the landfill. There were incidences of waste collectors being pricked by needles while collecting waste from homes. Participants revealed that, such incidences were investigated and the pricked individuals sought medical attention.

“Another thing is, needles which people use when they have diabetes or anything, they just throw them away. We have had incidences where our workers have been pricked by them because even if you give them gloves a needle is a needle, it goes through. But such incidences are thoroughly investigated.” (Education Officer 1)

All participants felt that the possible cause of lack of segregation of waste by the household members was lack of knowledge about waste segregation. They believed that there was a need for community members to be educated on how to handle HCW. One area cleansing officer said:

“...Communities must be taught to at least wrap a needle with a tissue or something before disposing it...Just for them to learn simple things like that for now.” (Area Cleansing Officer 5)

Illegal dumping

All respondents felt that all communities were facing challenges with illegal dumping. Community members disposed of HCW together with domestic waste illegally in the bush, roads and in streams.

“There is litter all around. You go to the roads, rivers and streams you find that they are full of litter. People throw dirty diapers and other things there...” (Ward Councillor 7).

All participants said that illegal dumps are a hazard to children who make these dumps their playgrounds and scavenged for used items. One CBO manager said:

“With these illegal dumps that are right next to our homes, you find that children go to these areas and play there! It is dangerous!” (Manager C)

Ward councillors believed that illegal dumps created a leeway for criminal activities in the community. One councillor narrated a story where they found women’s bodies that were burnt in an illegal dump in the bush. They said that another woman was beaten up and left to die at a dumpsite. Participants said that they found foetuses at the illegal dumps and they believed that they were from illegal abortions by young girls in the community. They also felt that illegal

dumpsites were a hiding place for boys who used injectable drugs and disposed of the needles illegally at the illegal dumps.

The perceived causes of challenges with health care waste management practices in community-based care at the household level

All respondents revealed that illegal dumping of HCW was the main challenge. The reasons provided were ranged from laziness to lack of space in the communities.

Laziness and negative attitudes towards waste management: All participants thought that community members were illegally dumping HCW because they were too lazy to take it out on a particular day of waste collection. They reported that community members disposed of HCW illegally because they believed that they were creating jobs for the waste collectors. This kind of misconception angered all education officers and the area cleansing officers who felt that these acts undermined their work because their superiors think that they are not doing their jobs effectively. One area cleansing officer, with an angry tone, said:

“The mind-set of the people is terrible! Their attitude towards waste management is unacceptable! Throwing away litter! Anywhere and everywhere! Because they believe that they are ‘creating jobs’! Who does that? Really? (Area Cleansing Officer 4)

Irregular collection of health care waste by contractors: All participants agreed that irregular collection of HCW caused the creation of illegal dumps. For example, CBO managers and ward councillors explained that there were several instances when HCW was left uncollected from the communities for several days without any notices from the waste contractors. They revealed that uncollected HCW is scattered by animals that tear up the garbage bags to scavenge for food. To ensure that waste management services continue, area cleansing officers seek permission to use the DSW trucks (meant to serve suburbs) to collect all waste from the communities. The education officers and the area cleansing officers revealed that they have the power to fine and penalise the contractors who fail to adhere to the contracts. Those that do not deliver the required services or pay the fines are reported to top management so that their contract can be cancelled and their services terminated.

“We report those that do not pay the fines and those who continually fail to deliver services according to the stipulated contract. We recommend to the top

management that they should not be paid the full amount or their contracts should be cancelled.” (Area Cleansing Officer 4)

Insufficient garbage bags: Education officers and area cleansing officers provided more insights about this issue because they are directly involved with waste management and related issues. They explained that households in peri-urban, rural areas and informal settlements receive only two garbage bags per week while those in the suburbs received two months’ supply. The cause of the discrepancy according to the education officers is that most households in the suburbs adhere to proper waste management practices and they use the garbage bags for the intended purposes, while those in peri-urban, rural areas and informal settlements use the garbage bags for other purposes such as storing clothes, committing crimes such as storing dead bodies or storing foetuses resulting from illegal abortions.

Education officers also felt that they were protecting the community members, especially children, from playing with the plastics to avoid fire accidents which could result in burning of the houses. Most area cleansing officers said that two garbage bags per week were not sufficient to accommodate the HCW that is generated on a daily basis. They said that this was an issue beyond their control and there was nothing they could do to rectify the problem because they work with a given budget which was limited. They also said that they are in contact with their superiors, having dialogue to find a possible solution regarding budget increments. One area cleansing officer said that they negotiated with their superiors in management for several years to offer households at least a three months’ supply of garbage bags but nothing has been changed.

“There is nothing we can do because it is something we have raised with the management, saying that people should be given a three month supply as it happens with the suburb... They said that they have problems relating to budget and the money is not adequate for buying garbage bags for households...” (Area Cleansing Officer 2)

Lack of participation in waste management programmes: Education officers stated that with the help of community leaders and ward councillors, they organise clean-up campaigns in the communities aimed at removing all illegal dumps. They hold workshops with community

members and teach them about the importance of keeping the environment clean. During the campaigns, education officers encourage community members to take ownership of the problem (illegal dumping). After that they chose a day for cleaning and removing all the illegal dumps in the communities. Education officers said that they felt disappointed because community members do not commit to such programmes. They indicated that many community members do not show up for clean-up sessions. They believed that such acts are a drawback to their work.

Back rooms in peri-urban communities: Area cleansing officers blamed some households for creating enabling environments for illegal dumping in the community. They revealed that some households have illegal backrooms. They said that backrooms are structures that most households build as an extension of their own house in peri-urban communities. Residents rent out these rooms to tenants as a way of earning a living. Area cleansing officers revealed that when such structures are built, no toilets or refuse bags are provided to the tenants, because they are not legal occupants. They said that occupants of such back rooms are also expected to share all the sanitation facilities with the landlords but many of them dump their HCW illegally.

“The refuse bag distributors know that they should give one plastic bag to each household, but then there are houses with 4 or 5 tenants. Tenants also need refuse bags, but they do not get them because the people who give bags don’t know them, they are not appearing on their database so they are staying illegally.” (Area Cleansing Officer 1)

All area cleansing officers suggested that government must take responsibility for addressing this problem because it has to do with service delivery.

Long distance between homes and waste storage facilities: Ward councillors and area cleansing officers revealed that in informal settlements, roads are inaccessible for the waste collectors. As such, waste collection points are built close to the main roads. All households are expected to remove their waste from homes and store it in these facilities on a daily basis. They explained that the long distance between the homes and the waste disposal facilities was a disincentive for community members which negatively affected their use of such facilities. Area cleansing officers said that this issue is beyond their control and felt that it is a service delivery issue that is supposed to be addressed by the government.

Slow change in rural areas: This was an issue that was raised by only one education officer. The education officer believed that change in rural areas is slow. Households in rural areas still buried HCW even if they were educated about its negative impacts. In response to this challenge, she said that all education officers continue to offer education about proper management of waste. The education officer also believes that there is a need for the municipality to put extra effort into monitoring waste management activities in these areas.

Perceived challenges with health care waste management practices at the municipality level

Ward councillors, area cleansing officers and education officers are government employees whose duties are to serve the communities and mediate between the community and government at the municipal level. They all felt that there are challenges at the municipal level that hamper proper management of waste in homes in the communities. They identified corrupt tender processes and insufficient funding for waste management services as problems at the municipal level.

Corrupt tender processes: All participants believed that the service delivery issue was not within their purview and is an issue that they could not address. All area cleansing officers were saddened by the process involved when choosing contractors responsible for managing waste in the communities. They felt that the tender process was corrupt and lacked transparency. The area cleansing officers revealed that most contractors got their tenders because they had political connections with the tender board. They complained that they are not involved in the selection of the contractor even though they are in a better position to do so because they work directly with the people and are able to know their capabilities. They criticised the process and were sure that this interfered with waste management services in the communities. They observed and believed that the contractors that are offered the tenders are incompetent and unskilled to handle waste in general. They said that some waste contractors used open vans when collecting HCW and domestic waste:

“You find that they use open vans and staff in the same vans to collect the waste.” (Area Cleansing Officer 5)

The education officers revealed that the contractors' trucks constantly broke down and as a result, HCW is left uncollected from communities for several weeks:

"I won't lie, there are times when the trucks break down and waste is left uncollected. When we ask them they say they are doing something about it. They delay to replace the trucks." (Education Officer 2)

Area cleansing officers and education officers felt the constant breakdown of the contractors' trucks caused households to resort to illegal dumping. They also said that they have powers to fine and terminate the contracts of the offending contractors. However, area cleansing officers felt that their powers were undermined by the tender board that turned down their recommendations. They indicated that such acts caused conflict between them and the contractors. Area cleansing officers believed that most contractors lost respect for them and undermined their job.

"Most of the contractors are politically connected. Sometimes you report and recommend that the contractor's contract should be cancelled because he or she is not performing but you find that they have been rewarded with a tender again. Then we look like we are bad people and contractors cannot respect us anymore, they do what they want, you know! We end up dealing with one problem that is not getting solved." (Area Cleansing Officer 4)

Inadequate funding for health care waste management programmes: Ward councillors, area cleansing officers and the education officers believed that generally, all waste management issues compared to housing issues, were not seen as a priority issue by the government. They gave an example of insufficient funding towards waste management by the government. These participants felt that this was the reason why the municipality was supplying insufficient garbage bags to community members. Two education officers felt that the municipality was not willing to provide sufficient funds for clean-up sessions because it was not a priority issue to the government.

"Collection trucks and resources for clean-ups are costly. One of the challenges is funds. There are limited funds for clean-ups." (Education Officer 1)

One education officer said that insufficient funding has a negative impact on human resources. He said that the job of an education officer requires more human resources due to the fact that they inspect all communities and also attend meetings. Some meetings were held on the same day and same time, and as such it is hard for them to prioritise where to go because all meetings are important and require their attendance. Even though they are each assigned to attend various meetings, they are still unable to attend all of them.

“There are 18 meeting rooms and only three of us and the challenge is that sometimes there are multiple meetings on the same day due to a lot of war rooms. We then have to separate ourselves between the war rooms but we cannot make it. There is so much demand and we are few.” (Education Officer 3)

On the other hand, ward councillors revealed that general waste management issues were not a priority on a list of their community development programmes. They revealed that the top developmental issue is housing, then unemployment. They also indicated that even community members do not listen to any waste management issues because they are more concerned with housing and employment issues.

“People are hungry, they want jobs and houses. So when you talk about waste no one will listen they all leave you because they are not interested.”
(Ward Councillor D)

Strategies used to deal with health care waste management challenges in community-based care combined at the household and municipality levels

All participants indicated that, they do not provide programmes directly related to health care waste management. All programmes that are provided aim at managing waste in general and these strategies are discussed below.

Collaboration: Education officers said that they have taken some steps to address the problem of lack of segregation of waste in general, illegal dumping and lack of participation by community members. This includes working with CBO managers, community leaders, ward

councillors and area cleansing officers, who said that they collaborate with Departments of Health, Housing, Environmental Affairs and Environmental Health to provide various education programmes to community members. They offer door to door education on general waste management and distribute pamphlets that have information on waste management. They also hold monthly ‘*Masakhane road shows*’ where the public is educated on the separation of various waste. *Education trucks* (mobile classrooms) are provided on site to schools and organisations, to offer training on waste minimisation. *Enviro-forums* are conducted with the business owners, health organisations, community members and councillors that aim at having effective coordination on issues regarding the protection of the environment. *Special days* are set aside to raise issues on the environment and the importance of managing general waste.

Weekly *landfill site tours* that cover general waste management topics, financial issues, recycling and conservancy management are conducted. Lastly, *buy back and drop off centres* are advertised. These are recycling initiatives where community members can drop off recyclable products in exchange for money at buy back centres and also drop off recyclable products for non-reimbursement at drop off centres.

Education officers also indicated that they hold clean-up sessions. In instances where community members do not show up, they reschedule such sessions and continue to mobilise the community members. They collaborate with the Environmental Health Department and hold workshops with the community members to educate them about the importance of the managing various kinds of waste.

“We postpone it. We do not just give up at the first point. We call another meeting and we involve the ward councillors and the environmental health department so that they advise the community on the hazards that come with a dirty place.”

(Education Officer 3)

Education officers also encourage people to adopt a spot. This is usually done after cleaning the area that was an illegal dump. Various people are encouraged to adopt and own such spots to use them as gardens or a play park. Names of the owner (the adopters) are displayed on those spots and are published in community newspapers. Annual competitions are held and prizes are given to the adopters that manage and sustain the spots. This is a way of encouraging people to participate in the clean-up sessions. They also indicated that they focus more on providing

education in schools to target children. They do this with the hope that the children would implement what they learn at school in their homes. They also hoped that the households would learn from the children.

“What we do is increase the levels of education in schools. So we won’t need a lot of money. Therefore, the more people are aware about proper waste mismanagement, the more they take initiative and the less money spent.”(Education Officer 3)

Reporting and liaising with government: All ward councillors, area cleansing officers and education officers felt powerless to address issues about corrupt tender processes. They said that these are issues beyond their control because they are involved with politics. However, to address issues regarding distance between homes and waste storage they said that the only way possible is to report the matter to the Department of Human Settlements that is in charge of housing issues. On the other hand, all ward councillors, area cleansing officers and education officers explained that to deal with the insufficient funding for clean-up sessions and for garbage bags, they are still negotiating with the government to increase its budget:

“We do have meetings where we present all our challenges. So it is in these meetings that we try and negotiate with our superiors that we need resources for waste management, for example they must provide more garbage bags for the households...” (Ward Councillor A)

Discussion

Previous studies show that HCW is improperly managed in hospitals and clinic settings (Mbongwe, Mmereki and Magashul, 2008; Magdy and El-Salam, 2010; Ferreira and Teixeira, 2010; Gabela and Knight, 2010; Mangaa, Fortonb, Moforc and Woodardd, 2011; van Schalkwyk, 2013). Our study provides nuanced qualitative findings on HCWM in CBC which illustrates that HCW is also not properly managed in CBC. This finding contributes to the body of knowledge on HCWM. The finding that the municipality is in charge of overseeing all domestic waste management in the communities including HCW is consistent with the requirements by South African National Standards (SANS, 2004) on HCWM. Going by the

SANS (2004) standards, HCW that is generated in homes as a result of care for a patient is assumed to be in small quantities hence SANS (2004) requires municipalities in charge of managing domestic waste to handle, transport and treat this waste before its disposal. However, the findings reveal that HCW is treated as domestic waste which contravenes the SANS (2004) requirements.

Furthermore, it is intriguing to find that HCW that is generated in homes as a result of care for a patient is assumed to be in small quantities yet, South Africa has the highest HIV prevalence in the world and has about 5.6 million people living with HIV (Statistics South Africa, 2014). Most the HIV/AIDS patients receive care at home (Akintola and Hangulu, 2014). South Africa also has the largest number of TB incident cases in the world (WHO, 2015). Given that the standards were developed in the year 2004, it therefore does not take into account subsequent policy events that have led to the rise in the home-based care activities in South Africa (Akintola et al., 2015). These include the recent primary health care re-engineering initiative which aims to scale-up the provision of home health care services to communities across the country through outreach teams. The existing and new policy developments highlight the need for policy makers to revise the policy on HCWM in CBC.

Area cleansing officers provided conflicting claims about the management of waste in the homes. While some claimed that they are not aware that HCW was being generated in homes, others acknowledged that it is mixed with domestic waste. This indicates that HCW from homes is not treated as it should. The fact that it is assumed that the volume of HCW generated in homes is small, this does not change the risks that it poses on the environment and the people. Moreover, this shows a misunderstanding about how HCW from homes must be handled by the stakeholders in the municipality. The SANS (2004) requires that all HCW from homes be treated as HCW and not as domestic waste. The standards further require the health care providers who are assigned to the patients to provide containers for storing sharp waste specifically for diabetic patients. As for the other infectious HCW besides sharps, it is recommended that private arrangements with hospitals or clinics should be made for the collection and disposal of HCW from homes by contractors responsible for collecting HCW from hospitals and clinics.

It was clear from our study that health care providers do not provide storage facilities for HCW to the households where there are patients being cared for. Additionally, no private arrangements are made for the collection of HCW from homes of the patients in CBC. Participants did not seem to know whose responsibility it was to provide these facilities. These findings highlight a need for the Department of Health to develop policies that will govern HCW from CBC and other minor sources as is the case with hospitals, clinics and other facilities. Further the Department of Health and the Durban solid waste unit (DSW) should develop formal partnerships that will help delineate responsibilities relating to the provision of storage facilities for HCW and the disposal of these facilities.

Stakeholders in this study indicated that separation of HCW in homes is a responsibility of households. Mixing of HCW with domestic waste makes treatment of such waste difficult (Schalkwyk, 2013). Improper segregation of HCW exposes family members to injuries resulting from sharp waste and exposes them to infections (Diaz, Savage and Eggerth, 2005). Although education officers indicated that they provide education and awareness programmes to community members in the communities, it is clear from our findings that this has not yielded the desired results. There is need for the Department of Health to work with the area cleansing officers to develop mechanisms for identifying and providing households that have patients with HCW with storage bins as recommended by the SANS (2004). There must also be mechanisms put in place to monitor HCWM activities in homes to ensure sustainability.

From the policy makers' perspectives, the main reason for illegal dumping by community members is the lack of sufficient allocation of budgets for HCWM which results in shortages in the supply of garbage bags specifically for domestic waste. The area cleansing officers stated that they are in constant negotiation with their superiors for adequate allocation of budget. We found that most households are poor and rely solely on government to provide them with houses and basic services including waste management services. As a consequence, some households in peri-urban communities build backrooms to generate income. Occupants of the backrooms are illegal occupants and they contribute to the problem of illegal dumping of HCW which causes air, land and water pollution (Adewole, 2009). There is need for the Department of Housing to

develop and tighten enforceable housing laws to prohibit building of illegal structures. Steps must also be taken to deter defaulters.

Furthermore, illegal dumping was caused as a result of irregular collection of waste by waste collectors. Both irregular collection of waste and insufficient supply of garbage bags are a problem of poor service delivery. All participants in this study revealed that these problems were caused by inadequate funding. The issue of inadequate funding is common in the service delivery literature in sub-saharan Africa. Odaro (2012) and Briceno-Garmendia, Smits and Foster (2008) explain that government taxes, usage fee revenues and aid are the main source of funding for water, sanitation and electricity in sub-saharan Africa and yet the allocation of funding for these services is only 0.5% of the gross domestic product (GDP). Mdlongwa, (2014) argues that, besides lack of finances as a cause of poor service delivery in South Africa, municipalities also lack skilled people in the local government to run services delivery programmes adequately; the process of rolling out services to the communities is slow and hampers the quality and efficiency. Poor allocation of funding for waste management programmes could mean such services are not a priority to government. Waste on the environment has the ability to cause environmental pollution and pose public health risks. The government must make sanitation programmes as one of the priority issues for protecting the health its citizens. Adequate funding should be allocated.

Our study reveals a lack of cooperation from community members in the removal of waste from homes and also during clean-up sessions in the community. The education officers revealed that they provide various education programmes in the communities and clean-up campaigns that aim at changing people's attitudes towards waste management. Clean-up campaigns are really important and that can they give community members a sense of ownership not only of community goods but also of community problems. Clean ups can also serve as deterrents to improper waste disposal. If participants know that they will be called out to clean up then they might be less likely to dispose waste improperly and also likely to discourage those who do so. However, it can be noted that, lack of cooperation from community members could be as a result of lack of place attachment which is a bond that exist between people and places (Altman and low, 1992). This is expressed by their lack of interest with waste management issues but housing

issues. Further, Perkins and Long (1995) argue that people do not feel a sense of community just by sharing a common neighborhood space. Instead, they feel a sense of community if they share history, interests or concerns. A sense of community and place attachment both serve as a motivation for people to participate in community improvement efforts (Manzo and Perkins, 2006).

Research has shown that corruption is a persistent issue facing public service institutions in LMICs (Davis, 2004). This study reveals that corrupt tender processes for waste contractors affected service delivery. Mpehle (2012) conducted a study on service delivery in South Africa and found that most municipal officials in charge of awarding tenders were corrupt and were only interested in enriching themselves. Furthermore, policies on fighting corruption were not implemented and this led to misappropriation of funds among municipal officials without any accountability. Our study shows that incompetent contractors were hired to provide waste collection services in the communities and this undermined waste collection which had negative ramifications for the community as a whole. Further, Bruce (2014) argues that, corruption in South Africa is an outcome of a weak and unaccountable government. One of the reasons of failure to confront corruption is the fact that there is political patronage. Most political party control usually translates into control of the local council and ultimately controls the local government. Moreover the corrupt individuals are at the top management and are protected because of their political influence. Considering that issues of corruption are not broader and cannot be dealt with one clear cut solution, we recommend that efforts to solve the problem of corruption related to health care waste management must be aligned with wider interventions on corruption at the national level..

Conclusion

This qualitative study provides new knowledge by demonstrating that community-based care contribute to the generation of HCW. The study also shows that the waste generated in community-based care is poorly managed. The HCW that is produced in homes cannot be assumed to be in small quantities owing to the fact that South Africa has the highest HIV and TB prevalence in the world. With the rollout of the new primary health care model, there is a greater need to consider HCWM in CBC a priority issue. Home-based care policies must be revised to include waste management practices. HCWM is important because it is a strategy of maintaining

hygiene and sanitation and plays a role in preventing diseases for the general public thereby improving their well-being and achieving health for all.

Strengths and Limitations

The major strength of this study lies in its method. The qualitative approach illuminates how and why HCW is improperly managed in CBC. The policy makers and stakeholders were the appropriate participants who provided insight into the issue of HCWM. The main limitation of the study was the fact that the perspectives of the people overseeing HCWM at the Department of Health were not explored. Their perspectives would have added more insight into waste management policies and practices at the level of the department.

Areas for further research

More research could be conducted to find out how much waste is produced in CBC. Further research could be conducted with the Department of Health to find out its perspectives about HCWM in homes. Research could be conducted with households and waste collectors to understand their challenges with handling HCW. This could also assist to understand the actual health risks posed by HCW to the households and waste handlers. Waste handlers could also be interviewed to understand how they handle, transport and treat HCW from homes. This could provide wider perspective on how HCW is managed from homes to the point of disposal.

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18 March 2013

Mrs Lydia Hangulu 210546147
School of Applied Human Sciences
Howard College Campus

Dear Mrs Hangulu

Protocol reference number: HSS/1307/012D

Project title: Policy and Practice of home care waste management in home/community-based care

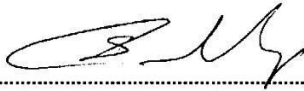
EXPEDITED APPROVAL

I wish to inform you that your application has been granted Full Approval through an expedited review process.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully



.....
Professor Steven Collings (Chair)

/pm

cc Supervisor: Dr Olagoke Akintola
cc Academic Leader: Professor DP McCracken
cc School Admin.: Ms Ausie Luthuli

Professor S Collings (Chair)
Humanities & Social Sc Research Ethics Committee
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Founding Campuses: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville

INSPIRING GREATNESS



Appendix 1: Introducing the study to the policy makers and stakeholders

Good morning/afternoon, my name is Mrs Lydia Hangulu. I am a student at the School of Applied Human Sciences. I am doing my PhD in Health Promotion and Communication (Student number: 210546147) at the University of KwaZulu-Natal, 4041, Durban, South Africa. I am conducting a study on policy and practice of home care waste management in community-based care organisations. I would like to speak to you only if you agree to speak to me.

The discussion will take about 40 minutes to one hour. I will ask you about health care waste management practices in the community, the kinds of challenges that you perceive and the kinds of strategies that are used to deal with the challenges. I will need your permission to use audiotape recorders to capture our discussion. All information that you give will be kept confidential and only my supervisor guiding me on this research will have access to it. Information will be used for research purposes alone and raw data will be destroyed as soon as the study is completely over. Also, we will not use your actual name or designation in reporting the findings of the study but will use disguised names to make sure that no one links the information you have given us to you. You will not be given any monetary payments for participating in the study but your organisation, communities and the government will benefit from this study immensely. The results will help us to understand the challenges encountered by your organisation in accessing support for homebased care especially with regards to health care waste management.

Your participation in this study is voluntary and you have the right not to participate if you do not want to. If you agree to take part in the study, I will ask you to sign a form as an indication that you were not forced to participate in the study. Please note that you will not be at any disadvantage if you choose not to participate in the study. You may also refuse to answer particular questions if you don't feel comfortable answering them. You may also end the discussion at anytime if you feel uncomfortable with the interview. In case you want to withdraw information given after the interview, you can call me on: cell: 073 335 6091 and email: lydiahangulu@yahoo.com and my supervisor Dr O. Akintola on 031-2607426 or Akintolao@ukzn.ac.za

Appendix 1: Introducing the study to the policy makers and stakeholders (the Zulu version)

Sawubonaigamalamingingu Mrs. Lydia Hangulu ngifunda e Nyuvesiya Kwa- Zulu Natal , ngenza I PhD yami kwezokuthuthukiswa Kwezempilo ‘‘Health Promotion’’ (inombolo yomfundi : 210546147). Ngenza ucwaningo ngemigomo nemithetho mayelana nezokuqoqwa kwadoti weziguli ezinakekelwa yizinhlangano.Ngingathanda ukuxoxa nawe uma ungangivumel.

Lengxoxo izothatha imizuzu engamashumi amane kuya kwi hora.Ngizokubuza ngemigomo nemithetho emayelana nokuhlelwa nokulahlwa kuka doti weziguli, ngizobuza nangolwazi eninalo ngodoti wazempilo neziguli.Ngizonibuza nangezizigqinambi enibhekana nazo mayelana nokuqoqa nokulahlwa kwalodoti, nokuthi nizixazulula kanjani lezo zinkinga.

Ngizodinga imvume yakho yokuku rekhoda nokugcina ingxoxo yethu. Yonke imininingwane ozonginika yona izoba imfihlo , izogcinwa yimi ne supervisor yami, akekho ozokwazi ukuyithola. Lemininingwane engizoyithola kuwe izosethsensiselwa ucwaningo kuphela futhi, imininingwane izosuswa eminyakeni emihlanu.Ngeke sisebenzise igama lakho langempela ngesikhathi sibhala imiphumela yalolu cwaningo.

Angeke unikezwe mali kulolu cwaningo, noma izipho, umphakathi nomongameli bazozuza kakhulu ngalolu cwaningo. Imiphumelo izosisiza ngokwazisisa ngokwazi izinkinga enihlangabezana nazo, nokuthi imiphakathi nezinhlangano zizozuza ekwazini kabanzi ngosizo abangaluthola kwi home-based care/ enhlanganweni yenu.

Kukuweukuthiuyalenzalolucwaningo, unaloilungelolokungaphenduli uma ungathandi. Uma uvumaukubaingxeny yalolu cwaningo kuzomeleungwaliseamaphephaukuzekucaceukuthiasizangesikuphoqeukuthiwenzelolucwaningo. Ngicelakucaceukuthiakumeleuphenduleimibuzoongafuniukuyiphendula, futhi ungayekaukuqhubekauphendule uma ungathandi noma ungazwisisi, uma ufunangingawusebenzisiumniningwanengithintekulydiahangulu@yahoo.com my supervisor Dr O. Akintola on 031-2607426 Akintolao@ukzn.ac.za

Appendix 2: Consent Form

I have read the information about this study and understand the explanations of it given to me verbally. I have had my questions concerning the study answered and understand what will be required of me if I take part in this study.

Signature _____ Date _____

Zulu version

Incwadi Yemvume

Mina, _____ Sengfundile mayelana nokuqukethweinhlolovo noma
ngiyaqondaizincazelozenhlolovonjengobangazisiwe futhi
ngachazelwangazongomlomo. Isiphenduliweimibuzo yami
ngalenhlolovo, ngakhongiyagondaukuthiiyiniebhekekekimina uma
ngibayngxemyeyalenhlolovu

Signature _____ Usuku: _____

Appendix 3: interview guide for the education officers

- ✓ What is the role of your office or your position in this organisation?
- ✓ What are your duties in this community?
- ✓ What kind of education do you offer to community members?
- ✓ Please name the people that you work/collaborate with when doing your work.
- ✓ What are the duties/roles of these people?
- ✓ What kind of education do you offer with regards to waste management?
- ✓ What do you focus on?
- ✓ What materials do you use?
- ✓ Who develops these materials?
- ✓ What influence do you have in developing these materials?
- ✓ Is it possible to have a copy of this material?
- ✓ From your observation, how do people view waste?
- ✓ Do they see it as something serious?
- ✓ From your observation, how do people react to your education about waste?
- ✓ How do you assess your education programme?
- ✓ What challenges do you face while doing your work?
- ✓ What could be the cause of these challenges?
- ✓ How do you deal with these challenges?
- ✓ What do you think could be done about these challenges?
- ✓ How many wards do you serve? Name the wards ✓ How do you like your work?
- ✓ What are some of the best moments of your work?
- ✓ How long have you been working in the organisation?

Appendix 3: interview guide for the area cleansing officers

- ✓ What is your post in this organisation?
- ✓ What does your job entail?
- ✓ How is waste handled in this community?
- ✓ How often is the waste collected from these communities?
- ✓ Why not everyday?
- ✓ Are people provided with garbage bags? If not, why, and what do they use?
- ✓ What kind of garbage bags?
- ✓ How many per house and why?
- ✓ Who is supposed to separate this waste from homes?
- ✓ Are people supposed to put all the garbage in that plastic given to them?
- ✓ What kind of rules do you follow regarding management of waste? Briefly what do they say?
- ✓ Do you have any copies of these rules/guidelines?
- ✓ Is it possible for us to have these copies?
- ✓ What influence do you have in developing these rules?
- ✓ How and where can we get these rules and guidelines?
- ✓ Who is in charge of developing these rules/guidelines?
- ✓ How are these rules developed?
- ✓ How do you feel about these rules/guidelines? How do they help you?
- ✓ In your view, are these rules working?
- ✓ What is stopping them from working?
- ✓ What makes them work?
- ✓ What challenges do you face while managing waste in this community?

- ✓ What could be the causes of these challenges regarding waste in this community?
- ✓ How do you deal with these challenges?
- ✓ What do you think is the importance of handling waste properly?
- ✓ What could be done to improve handling of waste in this community?
- ✓ What efforts have you made to address these challenges?
- ✓ What have been the successes of the efforts that you have made?
- ✓ What challenges did you face in trying to make efforts?
- ✓ How did you deal with these challenges?
- ✓ How do you feel about how these challenges are dealt with?
- ✓ How would you like these challenges to be addressed?
- ✓ Is there a specific way in which waste from patients is handled, e.g. diapers, gloves, needles?
- ✓ What are those ways?

Appendix 3: interview guide for ward councillors and community-based care managers

- ✓ What is your role in this community?
- ✓ What are your duties in this community?
- ✓ What are your major focus areas of development?
- ✓ Please name the people that you work/collaborate with when doing your work.
- ✓ What are the duties/roles of these people?
- ✓ From your observation, how do people view waste?
- ✓ Do they see it as something serious?
- ✓ What is your role with regards to waste management in this community?
- ✓ From your observation, what are the challenges that this community are having regarding waste?
- ✓ What could be the cause of these challenges?

- ✓ How do you deal with these challenges?
- ✓ What do you think could be done about these challenges?
- ✓ How many wards do you serve? Name the wards ✓ How do you like your work?
- ✓ What are some of the best moments of your work?
- ✓ How long have you been working in the organisation?

Appendix 3: interview guide for the education officers (Zulu version)

- ✓ Udlalayiphiingxenyelaphakulelihhovisi, futhi
isiphiisikhundlasakho?
- ✓ Wenzamuphiumsebenzikulomphakathi?
- ✓ uhlobolunilemfundoofundisaamalungaomphakathi
- ✓ Yishoabantuenisebenzisananabokulomsebezi?
- ✓ Labobantubadlalayiphiindimakulomsebenzi?
- ✓ Hlobolunilemfundoenilunikezaumphakangokuqoqwa nokuhlelwa kwadoti?
- ✓ Nigxilakephi?
- ✓ Nisebenzisaziphiizintozokusebenza?
- ✓ Ubanionakhela lezo zintozokusebenza?
- ✓ Unamuphiumtheleloekwakheniizintozokusebenza?
- ✓ Celaungikhombisalokhoenikusebenzisayo?
- ✓ Ngokubonakwakhoabantubawubona kanjani udoti? Bawuthathanjengentoephusile?
- ✓ Ngokubhekakwakhoabantubayalwamukelayiniulwaziobaphalonamayelanodoti?
- ✓ Uluhlola kanjani uhlelolemdiso?
- ✓ Iziphiizingqinambaobhekana nazo?
- ✓ Yiniimbangelalayalezizingqinamba?
- ✓ Ubhekana kanjani nalezizingqinamba?
- ✓ Yiniengenziwangalezizingqinamba?
- ✓ Nisizaizigcemeezingaki, celauwabale?
- ✓ Uwuthandakangananiumsenenziwakho?
- ✓ Iziphiizikhathiezikhokozisangomsebenziwakho?
- ✓ Ususebenzeisikhathiesingakananikulenkampani?

Appendix 3: interview guide for the area cleansing officers (Zulu version)

- ✓ Isiphiisikhundlasakho?
- ✓ Kulomsebeziwenzani, yinioyenzayo?
- ✓ Udotiuphathwa kanjani kulomphakathi?
- ✓ Udotiuqoqwakangakikulomphakathi?
- ✓ Yindabaungaqqwanjalo?
- ✓ Abantubayanikezwaoplastiki?,umabengekbhobasebenzisani?
- ✓ Abanjanioplastikibadoti?
- ✓ Nitholaabangakioplastiki, futhi ngobani?
- ✓ Obaniobahlukanisayolaboplastikibadoti?
- ✓ Kumeleyiniabantubahlangiseudotikuplasti lo owodwaabasukebenikezwewona?
- ✓ Iyiphii migomo eniyilandelayo mayelana nodoti?,ithinileyomgomo?
- ✓ Celaungikhombiselemigomo uma unayo?
- ✓ Ningakwazi ukungikhombisalemigomo?
- ✓ Imiphii mitheloleninayo ekusungulilemigomo?
- ✓ Singayitholakuphi futhi kajanilemigomo ?
- ✓ Ubaniobhekenenokusungulalemigomo?
- ✓ Yakhiwa kanjani lemigomo?
- ✓ Uzizwa kanjani ngalemigomo, nimilandelo, inisiza kanjani?
- ✓ Ngokubonakwakholemigomoiyasebenza?
- ✓ Yinieyenzaingasebenzi?
- ✓ Yinieyanzaisebenze?
- ✓ Iziphiizingqinbambiobhekana nazo ngokuhlelwa kwadoti?
- ✓ Yini engabaimbangelayalezozingqinambiemphakathini?

- ✓ Nibhekana kanjani nalezizingqinambi?
- ✓ Yiniebalulekilengokuphathaudotingendlela?
- ✓ Yiniengenziwaukundlondlobalisaukuphathwa kwadoti laphaemphakathini?
- ✓ Umuphiumdlandlaowenzileukubhekananalezizingqinambi?
- ✓ Yimiphiimizamoeniyenzileukubhekananalezizingqinambi?
- ✓ Yiniziphi izinkinga enibhekana ekuzameniukuxazulula lezo zingqinambi?
- ✓ Nizixazulile kanjani lezizingqinambi?
- ✓ Uzizwa kanjani ngendlelalezi zinkinga ezaxazululwangayolezo enabhekana nazo?
- ✓ ngathandazixazululwe kanjani lezi zinkinga?
- ✓ Ikhonayiniindlelaenilahlangayoudotilweziguli?,ngengamanabukeni , nemijovo?
- ✓ Iziphiizindlela lezo?

Appendix 3: interview guide for ward councillors and community-based care managers (Zulu version).

- ✓ Udlalayiphiingxenye kulomphakathi?
- ✓ Kulendima yakho wenzani?
- ✓ Ugxilakuyiphiingxenyee kuthuthukiseni izindabazodoti?
- ✓ Celaungibalele osebenzisananabo?
- ✓ Badlalayiphi indimalabobantu?
- ✓ Ngombonowakho abantubazizwa kanjani ngodoti?
- ✓ Bawubonanjengento ebalulekile udoti?
- ✓ Udlalayiphiingxenye kulomphakathi kwezokuhlelwa kukadoti?
- ✓ Ngokubona kwakho iziphizingqinambie zibeke umphakathi mayelana nokuhlelwa kukadoti?
- ✓ Yini imbangelayale zizingqinambi?
- ✓ Uzixazulula kanjani lezi zinkinga?
- ✓ Zingaxazululwa kanjani lezi zinkinga?
- ✓ Usebenzisanane zigceme zingaki?, ziqambe?
- ✓ Uwuthandakanganani umsebenzi wakho?
- ✓ Ususebenze isiikhathiesingakanani kulomsebenzi?

CHAPTER SEVEN

HEALTH CARE WASTE MANAGEMENT IN COMMUNITY-BASED CARE

PERSPECTIVES OF COMMUNITY HEALTH WORKERS IN SCARCE

RESOURCE COMMUNITIES IN SOUTH AFRICA

**HEALTH CARE WASTE MANAGEMENT IN COMMUNITY-BASED CARE:
PERSPECTIVES OF COMMUNITY HEALTH WORKERS IN SCARCE
RESOURCE COMMUNITIES IN SOUTH AFRICA**

Lydia Hangulu¹ Olagoke Akintola^{2,3}

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This manuscript was prepared for submission to the Canadian Journal of Development Studies

I Lydia Hangulu [LH] was responsible for the conception and designing of this study with the guidance from my supervisor (Dr Olagoke Akintola [OA]). Noloyiso Dllilanga [ND] was a research assistant who assisted with facilitating focus group discussions. I wrote the chapter under the guidance of my supervisor.

Abstract

Introduction: Health care waste (HCW) is a by-product of health care activities. In South Africa, most HIV/AIDS patients who are also co-infected with tuberculosis (TB) receive care at home through community-based care programmes. Community health workers (CHWs) provide nursing care whose activities generate HCW. Improper management of HCW poses health risks to the people and tampers with environmental aesthetics. There is also a need to be concerned with HCW that is generated in community-based care because unlike hospitals/clinics, homes are not meant to accommodate HCW. There is more literature on HCW management in hospitals/clinics but there is none on community-based care (CBC) in South Africa. The study aimed at exploring health care waste management (HCWM) in community-based care in Durban, South Africa from the community health workers' perspective.

Methods: Ethnographic methods (Focus group discussions, participant observations and informal discussions) were conducted with 112 CHWs in 29 communities in the Durban metropolis and were selected using snowball sampling. Focus group discussions were guided by a focus group guide with open-ended questions. All observations were guided by an observation guide.

Results: Sharps and infectious waste was generated in homes of the patients and was mixed with domestic waste in the house bins. Due to irregular waste collection services, inadequate water and long distance to access the toilets, HCW was illegally dumped along roads or in bush, burnt openly and buried. Liquid HCW such as vomit, urine and sputum were disposed of in the yards and were accessible to animals and children.

Conclusion and recommendations: With the increased levels of flooding, HCW can find its way into drinking water sources causing contamination. Increased temperatures can cause HCW to ferment and become a breeding ground for disease-causing organisms thereby affecting the most vulnerable populations, women and children. Even if South Africa has the largest antiretroviral programme, it is undeniable that HIV/AIDS patients do receive care at home. Proper disposal of HCW is a way of improving hygiene and sanitation in order to protect the patients from opportunistic infections. There is need for policy-makers to address service delivery issues at household level to improve HCW management in CBC. This could improve the health of the patients, the general public and the environment.

Key words: Health care waste, community-based care, caregivers, HIV/AIDS.

Introduction

Globally, the management of health care waste (HCW) is a major challenge (Harhay, Halpern, Harhay, and Olliaro, 2009). HCW is the waste that is generated in health care facilities such as hospitals, clinics, pharmaceutical manufacturing plants, research laboratories, nursing homes and other settings like homes where there is care for a patient (Pruss, Giroult and Rushbrook, 1999; Botelho, 2012). In low-and middle-income countries (LMICs), there is poor management of HCW (Hossain et al., 2011; Wilson, Velis and Cheeseman, 2006). Studies in selected hospitals and clinics in LMICs found that there are various challenges that are encountered while trying to manage HCW. For example, in most African countries, there is insufficient knowledge on how to handle HCW among health care workers and other staff working in health care settings (Mundia and Mbewe, 2006). Moreover, there is lack of segregation of HCW from point of generation to the point of disposal, most dumpsites are poorly managed and there are no interventions to prevent scavengers from having access to dumpsites (Gabela, 2007). Studies also reveal that there is lack of clear financial investment and clear policies to manage HCW (Phorano, Nthomang and Ngwenya, 2005; Mbongwe et al., 2008). This together with inadequate technologies for managing HCW make the use of incineration the most common method for management of HCW (Abah and Ohimain, 2011).

Similarly in South Africa, as in many other African countries, HCW management is improperly managed. For example, a desk top study by Leonard (2005) found that about 45% of HCW in KwaZulu-Natal province is unaccounted for. There are instances where HCW is dumped in communities that are inhabited by poor black people. Gabela and Knight (2010) conducted a study on health care waste management (HCWM) in 30 health care clinics in a rural health district in KwaZulu-Natal province and found that HCW was not segregated from point of generation in all the facilities and four of the 30 facilities burnt and buried the HCW in shallow pits in the premises of the clinics. Improper management of HCW has negative ramifications for a variety of people, including exposing the general public, health care workers, waste handlers, caregivers, patients, waste pickers and animals to injuries (Pruss et al., 1999). Ferreira and Teixeira (2010) reported 44 injuries from contaminated material among staff members in a

hospital in the Algarve region of Portugal. Regrettably, there is lack of comparable data in South Africa.

Improper management of HCW promotes scavenging in landfills. In India, a study conducted by the India Clinical Epidemiology Network in 2004 on HCWM revealed that in almost 10 of the health care facilities nationwide, more than 30% of the 3-6 billion injections that were administered every year were done with used syringes that were recycled by unskilled scavengers who sold them on the black market (Harhay, et al., 2009). Additionally, health care workers, waste handlers and the general public exposed to HCW can be at risk of infection with hepatitis A, B and C (Harhay et al., 2009; Franka et al., 2009). Exposure to HCW can cause diseases like diarrhoea, leptospirosis, typhoid, cholera, and HIV and Tuberculosis [TB] (Mato and Kassenga, 1997; Bdour et al., 2007) all of which could cause death. Indeed, approximately 5.2 million people globally die every year due to diseases caused by improper management of HCW (El-Salam, 2010). While there are challenges with managing HCW in health care facilities, the waste that emanates from community-based care (CBC) settings is of greater concern because unlike in hospitals, homes are not built to accommodate HCW (Miyazaki et al., 2007; Verma et al., 2008).

Achieving equitable access to health care and equitable health outcomes is the goal of primary health care (Akintola, Lavis, Hoskins, 2015). However, most health care systems worldwide are faced with shortages of funds and medical personnel (Schneider, Hlophe and Rensburg, 2008); burdens with communicable diseases and the HIV/AIDS pandemic (Maher, Ford, Unwin and Fronti, 2012). CBC is a primary health care strategy to provide on-going care to the chronically ill patients in their own homes within the community (Aantjes, Quinlan and Bunders, 2014). Most CBC programmes in sub-Saharan Africa assist in dealing with the impacts of HIV/AIDS. They aim at improving access to care, and initiating and managing patients on antiretroviral treatment (ART) (Callaghan, Ford and Schneider, 2010). Task shifting in CBC involves the use of community health workers (CHWs) who are nonprofessionals but are trained to provide home-based care, social services, palliative care, psychological and social support to the patients and family members (Akintola, 2008).

In South Africa, CBC is a health policy priority. Thus, community-based organisations (CBOs) are heavily relied upon to provide health and social services to poor and marginalised communities (Akintola, Gwelo, Labonte and Appadu, 2015). Community-based organizations provide on-going care to people with chronic illnesses such as HIV/AIDS, TB and cancer in their homes with the help of CHWs living in these communities. These activities could potentially generate HCW (Akintola, Gwelo, Labonte and Appadu, 2015; Young and Busgeeth, 2010; De Maesenneer and Flinkenflogel, 2010; Akintola and Hangulu, 2014). However, this issue has rarely been explored in the literature. Current reforms in primary health care (PHC) seek to scale- up CBC through the re-engineering of PHC as a fundamental component of the national health insurance (NHI). The reform which has been rolled out in pilot sites since 2012 entails the use of outreach teams led by nurses providing care in marginalised communities across the country (Shasha and Schneider, 2010). The scaling up of health care services provision in CBC brings into sharp focus the issue of HCWM in homes and communities. Given the potential for home- based care activities to generate HCW there is the need to understand issues related to HCWM in homes. However, we found no research exploring the perspectives of community health workers who provide the bulk of the care activities. This study therefore aims to explore how HCW is managed in CBC from the perspective of community health workers.

Methods

This was a qualitative study and it was appropriate because it focuses on the subjective perceptions and understanding that result from the experiences of participants (Ulin, Robin, Tolley and McNeil, 2002) within the social context (Ospina and Wagner, 2004). The qualitative approach allowed us to explore what is real for the participants in their own language (Terre Blanche, Durrheim and Painter, 2006). Using the design, we were able to explore the community health workers' perspectives about HCWM in CBC in South Africa.

Study setting and context

We conducted the study in KwaZulu-Natal (KZN), the province with the highest HIV and TB prevalence in the country (Statistics South Africa, 2014). Additionally, 80% of TB patients in KZN are co-infected with HIV (Kavanagh, 2014). We drew participants from thirteen CBOs providing health and social services in 29 resource poor communities located on the outskirts of Durban, South Africa (see Table 1). These comprise three informal settlements, 21 peri-urban and five rural communities. According to the Housing Development Agency (2013), informal

settlements are communities that are occupied by migrants from rural areas or foreign nationals who are in search of employment and social services. Municipal services in these areas are often free, very basic and are mostly unavailable. Peri-urban communities are neither rural nor urban; they are densely populated and underdeveloped. Rural communities consist of scattered elderly populations who rely on social grants. Municipal services in these areas are also basic and free. All these communities are occupied by the poor blacks (Indigenous African people classified as blacks under the apartheid era) (Roma et al., 2010). All the communities fell within the jurisdiction of eThekweni metropolitan municipality.

Table 1: Demographics of the organisations

Name of CBOs	Location of the organisations	Year organisation was founded	Number of communities served	Number of participants in FGDs
A	Informal settlement Rural area	2006	3	8
B	Peri-urban	1999	2	7
C	Peri-urban	1998	2	6
D	Peri-urban	2001	3	7
E	Peri-urban	1992	2	7
F	Peri-urban	2002	1	6
G	Peri-urban	1999	2	5
H	Peri-urban	2000	2	8
I	Peri-urban	2000	1	8
J	Rural area	1990	3	6
K	Peri-urban	1996	2	6
L	Peri-urban	1999	3	5
M	Peri-urban	1997	3	6

All organisations provided education programmes on HIV/AIDS/TB, drug abuse, rape and antiretroviral treatment (ART) awareness programmes. They offered life skill programmes such as gardening and bead work. Basic counselling programmes were also offered to patients to help them to accept their HIV positive status, develop coping mechanisms such as dealing with stigma, adherence to ART and coping with bereavement. Social services offered include referrals to relevant social support structures, help with accessing pension grants for the elderly citizens, child grants and accessing national identity cards. These organisations provided home-based care and day care services for orphans and vulnerable children. Activities carried out in home-based

care are basic nursing care offered to people living with HIV/AIDS (PLWHA), TB and most of them have other lifestyle diseases such as diabetes and hypertension.

Participants

A list of community-based organisations was obtained from the AIDS Care Foundation and the first two organisations were chosen and contacted. We used snowball sampling, a technique used to locate participants through referrals (Ulin et al., 2012, p, 61), to identify other organisations; the first two organisations provided referrals to the other organisations that they had partnered with. All organisations were selected if they were willing to participate in the study and if they provided home-based care to people living with HIV/AIDS/TB, because we believed that CHWs working in such organisations will be in a better position to provide insights into HCWM. The gate-keepers of the CBOs provided permission for the study to be conducted in their organisations. A total of 112 CHWs were purposively recruited to participate in the study; if they were willing to participate, they had worked in these organisations and provided home-based care to people living with HIV/AIDS/TB for a period of six months or more. This criterion was necessary because participants with such work experience were thought to be in a better position to provide rich insight about the study topic (Ulin et al., 2005). CHWs in the study were all female and their ages ranged between 23 and 60. Their work experience ranged between one and 21 years and they served a total of twenty-nine (29) communities (see Table 1).

Data collection method and procedure

Ethical approval for this study was obtained from the Humanities and Social Science Research Ethics Committee of the University of KwaZulu-Natal, South Africa (see appendix A). All the CBOs approved of the study and gave permission to conduct the study with the CHWs. We employed three ethnographic research approaches to collect data: focus group discussions, participant observations and informal discussions. The three data collection approaches were appropriate for triangulation purposes which aim at eliminating the researchers' biases, and to improve the quality of data (Babbie and Mouton, 2001).

Firstly, we conducted focus group discussions (FGDs) with CHWs to capture a wide range of responses (Kidd and Parshall, 2000) and to understand normative practices (Blanche et al., 2006) about HCWM. All focus group discussions were guided by a focus group schedule which

contained open-ended questions (see appendix 3). Open ended questions were appropriate because they provided participants with the opportunity to provide detailed responses and for the research to probe (Ulin et al., 2012). The focus group guide covered three main themes: 1) various nursing activities provided to the patients and the nature of the HCW that is generated in the process, 2) management of HCW in CBC: how HCW is handled and managed in CBC, and 3) barriers and facilitators to the management of HCW and 4) strategies used to respond to challenges of health care waste management. One FGD was conducted in each of the thirteen organisations and between 5 and 8 CHWs participated in each focus group (see Table 2).

The focus group discussions were conducted in meeting rooms provided by the organisations. Participation in FGDs was voluntary; the aims of the study were explained to participants, informed consent was sought from participants prior to the commencement of FGDs and all CHWs gave written (see appendix 2) and verbal informed consent. We also obtained permission to record all FGDs. All FGD were conducted in IsiZulu, the main local language spoken in the communities. FGDs were facilitated by a trained research assistant (ND) who was a native IsiZulu speaker and lasted between 60 and 85 minutes. Data collection took place from July 2013 to August 2014.

Table 2. Characteristics of community health workers

Name of the organisations	Number of participants in FGDs	Years of services in CBOs	Age range
A	8	2-6	23-39
B	7	1-2	23-39
C	6	3-9	34-59
D	7	2-15	27-54
E	7	1-6	29-48
F	6	2-10	34-54
G	5	2-19	38-45
H	8	1-10	32-44
I	8	1-2	27-52
J	6	1-8	33-37
K	6	6-21	30-50
L	5	1-8	37-60
M	6	2-3	31-41
Total: 13	112	1-21	23-60

Secondly, following all focus group discussions, observations were conducted on the HCWM practices of CHWs within the homes of the patients. Participant observation was important because it enhances data quality and interpretation (DeWalt and DeWalt, 2010). I (LH) accompanied the CHWs on daily visits to the homes of the patients. Permission was also obtained from families to conduct observation of the state of the homes and HCWM practices. At the household level, the environment of all households was observed and documented. These included the availability, type and state of toilets in the households, access to water facilities, waste storage facilities and equipment such as house bins and garbage bags. Hygiene and HCWM practices of the CHWs were also observed. At the community level, observations were made on the location of communal toilets and distance to patients' homes, accessibility of roads, community waste storage facilities and the general cleanliness of the environment (streets, paths, cliffs, surrounding bushes and some streams where necessary). Thirdly, during observations, informal discussions were conducted with CHWs for clarity on HCWM practices. The observed

activities, events and responses provided from the informal discussions were written down in a note book.

Data analysis

All the recorded data from focus group discussions was transcribed verbatim and translated from IsiZulu into English by the research assistant who facilitated the focus group discussions. Both authors met to discuss how to apply the six steps of thematic analysis proposed by Braun and Clarke (2006). One of the authors (LH) conducted the analysis in active discussion with the second author (OA). Both authors met regularly to review the coding. We followed the six steps proposed by Braun and Clarke (2006): 1) to familiarise ourselves with the data, we read all the transcribed scripts from the focus group discussions, field notes obtained during observations and informal discussions, (2) we also read the data to identify and generate the codes, (3) we then identified themes from all the generated codes, (4) all identified themes were reviewed and sub-themes were generated, (5) all the reviewed themes and sub-themes were grouped together, and (6) all the grouped themes are presented as shown in the results below.

Results

The findings present an overview of what goes on in the homes of the patients in the 29 communities with respect to HCWM. The findings are presented using three themes. The first theme describes the nature of activities and how HCW is generated in CBC. The second describes how HCW is handled and managed in homes of the patients. The third theme describes the barriers to management of the HCW and the strategies used to deal with such barriers. All bold themes are discussed together with sub-themes (in bold and italicised) and are supported by direct quotes from the participants in italics.

Activities responsible for generating health care waste in community-based care

In starting out the focus group sessions, we sought to understand what activities contribute to generating HCW in CBC. We therefore asked CHWs about the services that they provide to the patients on a day-to-day basis and the waste that is generated in the process. Their responses revealed that they provide nursing care activities to HIV/AIDS patients who are incontinent, bedridden, have stroke or are diabetic. Some of the diabetic patients have wounds resulting from

amputations while other patients have opportunistic infections such as TB and diarrhoea. Most of the patients also have other diseases such as asthma, arthritis and high blood pressure.

CHWs provide nursing care activities such as cleaning and dressing of wounds, changing of diapers, bed baths, brushing of teeth, washing of linen and administering insulin injections. While performing the nursing care activities, waste materials such as used gloves that are worn when providing care to the patients, soiled diapers, swabs, used bandages and soiled linen are generated. These materials are typically contaminated with faecal matter and bodily fluids such as urine, blood, vomit, pus, sputum and phlegm. There is also waste water resulting from giving bed baths to the patient and cleaning containers used to receive sputum, phlegm and vomit by patients with nausea and TB. Additionally, CHWs described instances where incontinent patients and those that are too weak to walk to the toilet use buckets for toileting purposes because they cannot afford to buy diapers.

“Some patients cannot walk to the toilet. They pee (urinate) and do everything on themselves, so at the end of the day you find that we have urine...even faeces in a bucket because some patients do not have diapers so you put a bucket for them to use.” (Focus group D)

Management of health care waste in community-based care

According to the World Health Organisation’s (WHO) guidelines, proper handling of HCW involves protecting the health of the handlers and the environment. The handler is supposed to be protected through wearing of personal protective equipment (PPE) and avoiding contamination of HCW waste in the environment (Pruss et al., 1999). CHWs in the study indicated that they received training that equips them with knowledge and skills on how to handle waste. They were taught that HCW is hazardous and that they must wear gloves when handling it in order to protect themselves from infections. In instances where they do not have gloves, they are expected to improvise by wearing plastics as protective devices. CHWs pass on this knowledge to the family members of the patients by training them. During FGDs, CHWs said that they apply the skills that they learnt during training in practice. This position is consistent with what we observed during our home visits. CHWs were seen wearing gloves or plastics when handling HCW. We also noted that they seemed to be disgusted when handling HCW due to the fact that it has a repulsive smell.

However, contrary to the training, some of the CHWs in FGDs indicated that, due to lack of gloves, there are occasions when they do not wear plastics as protective devices because they believe that plastics hamper their work. They said that plastics do not cover all the fingers as gloves do and therefore does not protect them from being exposed to HCW. The cited instances when they end up handling HCW with their bare hands while wearing plastic for protection. We confirmed this assertion during observations. In particular, we observed some CHWs changing diapers of the patients, picking up all the used diapers and the containers containing vomit, sputum and phlegm with their bare hands. When asked why they did this during informal discussions, one of them said that she she had no time to look for a plastic to wear because that she was pressed for time to attend to other patients. She also said that she was going to wash her hands afterwards to prevent any infections.

WHO recommends that HCW be segregated according to the risk it possesses and its storage must be done in a way that does not pose risk to the people or the environment. Collection entails carrying and transporting HCW to the disposal sites, while disposal requires that HCW is discarded in a way that does not allow pollution of the environment (Pruss et al., 1999). Based on WHO's recommendations, section 5 of the Constitution of the Republic of South Africa gives the responsibility of management services including refuse storage, refuse removal and refuse dumps to the local government (Republic of South Africa, 1996). As such, the Municipal Systems Act (Act No. 32 of 2000) gives the municipality power to provide municipal health services including waste management services from homes in the community (Department of Labour, 2000). Effecting these regulations, the municipalities in South Africa are in charge of removing all domestic waste from homes. They provided all households with black plastic bags for storing all domestic waste.

To ensure proper management of HCW, the South African National Standards on HCW management in health care facilities requires that all infectious waste must be segregated according to the risk it poses and must be stored in red plastic bags with a clear label that reads 'infectious waste' and sealed with a non-polyvinyl chloride (PVC) tag. The standards also stipulate that sharps must be stored in yellow puncture and leak proof containers labelled

‘danger, contaminated sharps’. And all general/domestic waste is required to be stored in black plastic bags without any hazard label (South African Bureau of Standards, 2011). Although CHWs indicated that they received training regarding segregation of HCW in FGDs, observations revealed that the training only equipped them with knowledge and skills to segregate HCW from domestic waste. In homes, CHWs did not separate HCW. Households are not provided with yellow containers for storing sharps, and as a result, all sharp waste was mixed with other HCW. In addition, we observed that neither CHWs nor households are given red plastics to store infectious waste as stipulated by the standards. As a consequence, all households and CHWs store all HCW in black plastic bags meant for domestic waste. CHWs felt that the reason why they are not provided with red plastics for storing HCW is a lack of supply of materials and home-based care kits by the funders.

During FGDs, they indicated that prior to the year 2010, most home-based care programmes were funded by the European Union and that CBOs had fairly regular supply of home-based care kits from the department of health which contained all necessary supplies for providing nursing care. The kits contained items such as bandages, swabs, sanitisers, gloves, masks, medication, linen savers and aprons. Red plastic bags were included in the kits and were meant for storing the HCW resulting from nursing care activities. According to the participants, they used to store all HCW in the red plastics and thereafter, took the red plastics containing HCW to their organisations from where the HCW was transported to local clinics and finally taken for disposal by the relevant authorities. They however indicated that most CBOs experienced funding cuts since 2010 and since then they have experienced shortage of these materials. At the time of the study, none of the CBOs were receiving materials or HBC kits from the Department of Health. CHWs indicated that they have had to rely on alternative sources of donations for these materials including from the nearest clinics, individual donors and local business owners. All the black garbage bags containing HCW in homes are tied ‘*to prevent smell or spillage*’ and also to prevent children from scavenging for used gloves.

“...*We put everything in a big plastic [black plastics] and tie it [them]so that children will not access it [them] because they like to get gloves to use as balloons...*” (Focus Group D).

The plastic bags that are tied to prevent spillage are then stored in the house bins together with domestic waste. In informal settlements, most houses are clustered together and as a result, there are no formal roads. The municipality provides communal waste storage facilities that are located close to the main roads. All households are expected to store their waste in these facilities on a daily basis. Communities in peri-urban and rural areas, on the other hand, have access to roads therefore all households are expected to have bins for storing their waste and they are expected to remove the waste to the kerbside for collection by the waste collectors on particular waste collection days. Observations on environmental hygiene in homes showed that some households in the informal settlements and peri-urban communities did not have house bins. In such homes, black garbage bags containing HCW were stored in a hidden corner of the house without any proper protection or supervision, and were therefore accessible to children who were seen scavenging for toys.

Barriers to proper health care waste management

Barriers to the proper management of HCW in homes include: lack of co-operation from family members, irregular waste collection services by waste collectors, inadequate water to practice hygiene and sanitation and also long distances between the toilets and the homes of the patients.

Lack of assistance from family members

In hospital settings, incontinent patients and those that are too weak to walk to the toilet are usually given bed pans to use. In CBC, the majority of patients are too poor to afford bed pans and diapers. Some patients cannot afford to buy diapers and are too weak to stand, hence they use buckets for toileting. TB and nausea patients use containers to vomit and spit, and this means that in the absence of CHWs, family members are supposed to help lift the incontinent and weak patients for them to use the buckets. Family members are also supposed to help empty and clean all buckets used for defecation and containers used for spitting and vomiting. For patients who use diapers, family members are supposed to help change diapers. Family members are also supposed to remove all the HCW that is generated in homes to the curbs for collection. CHWs reported that most family members did not provide care to incontinent and weak patients as such; patients end up relieving themselves on their beds thereby developing bedsores. Further, some

family members did not change the patients' diapers and did not dispose of HCW appropriately. This made the patients' rooms and indeed some homes smell badly and repulsive.

“... They do not change the diapers, they do not dispose of the diapers that we leave behind, instead we find them in the same room where the patient is when we come back. So how can a person heal like that? It is just not fair! You find that the room is smelling because of the nappies [soiled diapers] ...” (Focus Group J).

With such a challenge, CHWs feel helpless and frustrated but they also continue to educate the family members about HIV/AIDS and the importance of practicing hygiene to promote the wellbeing of the patient.

“There is nothing we can do...but we teach the family members how to take care of a patient because that is what we are trained to do and we cannot force them to do it if they do not want to...” (Focus Group A).

Irregular waste collection by waste collectors

All households in the communities are provided with waste collection schedules and are expected to remove all waste from homes onto the curbs on a particular day set for waste collection. With the responses from FGDs and from observations, all HCW and domestic waste from house bins or yards is put in one black plastic bag that is tied and then it is taken to the curbs to make it accessible to the waste collectors who pick it up and transport it to the landfills for disposal. All waste from homes is supposed to be collected at least once a week. Despite having waste collection schedules, there were several instances when waste was left uncollected. CHWs and households felt that they are 'left in the dark,' which means that no reasons or warnings were provided to them. Waste was usually left on the curbs for long periods of time, and was blown away by strong winds and scattered by dogs.

“We put the plastic bags on the road side every Wednesday so that [the] municipality will pick it up but you find that they do not come so it is blown away

by [the] wind...also dogs come and tear it up and the waste will be all over everywhere” (Focus Group H).

Because the waste collectors only collect waste that is packaged, the waste that is scattered by the wind or animals is neither swept nor removed by the waste collectors. This makes it accessible to children and waste scavengers that are at risk of being exposed to injuries and disease-causing organisms in the waste. CHWs also complained that the uncollected waste created extra work for them because they had to clean it up, so that their work is not undermined. This means that they spent more time at a particular patient’s house while they had other patients to care for.

“It is too much work for us...even the waste collectors they leave it [the uncollected waste] like that because they only collect the waste that is packaged; it is not their duty to clean up... so we have to clean it...” (Focus Group K).

Observations showed that irregular collection of waste made community members resort to unfriendly environmental practices. For example, in peri-urban townships, households resorted to dumping the waste illegally along the road sides, forest or bush. In some rural communities, waste is buried and is also burnt openly in the backyards causing the production of smoke due to incomplete combustion of waste, especially diapers. In the informal settlements, CHWs during FGDs revealed that households dumped waste illegally due to irregular waste collection services. However, it was also observed that waste disposal facilities are far from homes. As a result, some households dig shallow pits and dispose of the waste while others dump their waste on any unoccupied spaces such as paths, cliffs, roads and streams.

Inadequate water for practicing hygiene and sanitation

Adequate water is needed for practicing hygiene such as washing clothes and linen. In informal settlements, households do not have piped water and toilets are communal. Therefore, CHWs confronted challenges in washing their patients’ clothes and linen. CHWs stood in long queues to have access to water to wash linen for the patients. CHWs felt stigmatized because there was no privacy for their patients. They said that everyone who uses the communal toilets knows whose clothes are being washed by the CHWs. Sometimes CHWs were not given a chance by some community members to wash because some of them feared contagion.

“...When we wash the clothes everyone now knows whose clothes you are washing. You just hear them gossiping, some, pointing fingers at you...you will be

waiting in the queue, they won't give you space, they feel you will infect them..."

(Focus Group B).

Water is also needed for cleaning containers used for spitting/vomiting and buckets used for defecation by incontinent and weak patients. For sanitation purposes, water is also needed to flush waste water used for bed baths, vomit, urine, sputum and faeces. It is also important for cleaning the toilets and also for washing hands after providing care to the patient. From observations on water sources and sanitation facilities in homes of the patients, some households did not have piped water. As such, it was difficult to keep the patients clean, to flush the waste and to wash hands. For example, in one rural home where there was no piped water, we observed that the patient was not given a bath; a community health worker (CHW) was seen pouring urine at the back of the house. We also observed that the CHWs neither washed the container nor their hands afterwards. The CHW had other patients to attend to, as such little attention was paid to the patient and little time was spent at that particular house. When asked why she did that, she complained about her schedule:

"I cannot go and fetch water now, the next house where I can get water is far and I have another patient who I am supposed to take to the clinic. So I will just come back tomorrow and do everything properly..." (CHW, community, J).

Long distance between the house and the toilets

In most peri-urban communities, homes have flush toilets. In informal settlements, there are flushable communal toilets but they are located far from homes. These facilities consist of urinals and toilets with separate units for females and men that consist of toilets or urinals; they have hand washing basins and showers and are connected to a local sewer where the effluent is channeled. They also have storerooms and wash stands. The municipality provides all installation costs while the users are expected to manage the facilities. The community members appoint care takers who clean the toilets either on a voluntary basis or through a pay per use scheme. The care takers also liaise with the municipality on the maintenance requirements and costs (Roma et al., 2010). The challenge with communal toilets is that they are only open from 5am to 6pm daily. In the night, households are expected to find their own alternatives.

Long distances between toilets and homes made CHWs reluctant to use communal toilets because they feared being robbed of their belongings. They indicated that they had been victims

of crime in the past citing instances where their belongings and the patient's antiretroviral drugs (ARVs) were stolen from the patient's home by the 'Whoonga boys' (the boys who are known to use drugs made from ARVs in the communities) while escorting a patient who is unable to walk to the toilet or while washing linen in the communal toilets. Because of this challenge, CHWs felt compassionate for the patients and encouraged them to use diapers at night. But for those that could not afford to buy diapers and did not have anyone to assist them to go to the toilet, they encourage them to just relieve themselves on the bed and they visited such patients on a daily basis including those that lived alone or those who do not have any assistance from family members.

In rural areas, most homes have pit latrines which are located outside the house. CHWs said that it was impossible for weak patients to walk on their own, as they needed help from family members or CHWs to access the pit latrines. Another challenge is that latrines were frequently vandalised by boys in the community who stole all the roofs and doors and sold them for money to buy drugs. Vandalism of pit latrines make them repulsive to the households and patients. Those who use the pit latrines are deprived of their privacy and dignity. To deal with these challenges, CHWs used bed sheets as doors just to allow the patients who were able to walk to use the toilets. I observed that because of the long distance to reach the communal toilets or pit latrines, CHWs end up pouring liquid HCW like urine, waste water, sputum and vomit in the open yards. Chickens were also seen scavenging for food from such HCW.

“... Instead of going all the way to the toilet to flush the waste water or urine or vomitus you just pour on the yard because you have other things to do...it will dry up...” (Focus Group C).

Discussion

Findings of this study reveal factors that influence the management of HCW at two different levels.

1) At the community level, we discuss practices relating to HCWM in the homes of the patients within the community. 2) At the municipality level, we discuss practices relating to HCWM officers responsible for overseeing HCWM in the communities.

The community level

Previous studies that have been conducted in clinics and hospitals in low-and-middle-income countries show that HCW is not usually separated (Leonard, 2005; Mundia and Mbewe, 2006; Harhay, Halpern, Harhay and Olliaro, 2009). Our findings regarding segregation of HCW in homes extends knowledge about waste management by revealing some inadequacy in the training for CHWs. CHWs received training only on the segregation of HCW from domestic waste but not on the segregation of HCW according to the risk posed. The insufficient training is reflected in the knowledge and skills of family members who rely on CHWs for education on proper segregation and overall management of HCW. The lack of segregation of waste such as sharp waste exposes family members, CHWs, community members and waste handlers to physical injuries and psychological issues like anxiety/stress disorders (Cairncross et al., 2003; (Dounias et al., 2005).). There is a need for CBOs and the department of health to train CHWs on the correct segregation techniques for HCW. Mechanisms to monitor HCW management practices by CHWs must be introduced in CBC and there must be constant discussions with the trainers and CHWs to see and understand the kinds of challenges that hamper proper HCWM practices.

In hospital settings, patients who are too weak to walk to the toilets, incontinent and bedridden are given bedpans, diapers, portable urinals, catheters or urine collectors to use (Heller, 1999; Tomes and Ernest, 2013; Cottenden et al., 2013). However, most households in our study were too poor to afford any of the required materials for care of the patients. As a result, most of the patients used buckets for toileting; patients with nausea used containers to vomit while those with TB used containers for spitting. The use of containers and buckets can easily expose the CHWs and family members to bacteria that cause diarrhoea, cholera, typhoid and leptospirosis (Mato and Kassenga, 1997). Family members and CHWs are also exposed to TB infections and may also cause death from such infections (Joshi, Reingold, Menzies and Pai, 2006; Lonroth et al., 2010; Akintola and Hangulu, 2014). These findings highlight the need for the department of

health to develop means of assisting patients in CBC with materials. This could help in improving the well-being of the patients.

Our findings also show that due to insufficient supply of gloves, some CHWs used their bare hands. The Occupation Health and Safety Act of Act 85 of 1993 in South Africa, states that any health care provider must not accept to handle any hazard without PPE. HCW is hazardous and providing care without wearing PPE puts CHWs at risk of infection like HIV, hepatitis A, B and C and could result in death of the CHWs. For instance, in the year 2000, about 21 million hepatitis B, 2 million hepatitis C and 260 000 HIV infections were reported globally due to exposure of HCW (WHO, 2005). In Libya, HCW handlers had either hepatitis B virus or hepatitis C virus due to exposure of HCW (Franka et al., 2009). The lack of supply for PPE has tended to lead to negative attitudes among CHWs. Given that family members rely on CHWs for training and for modelling proper health behaviour and practices, incorrect HCWM and infection prevention and control practices by CHWs could send the wrong message to the family members of the patients who may imbibe such wrong practices. In addition, lack of PPE compromises the quality of care given to the patients and the risk of infection by CHWs (Akintola and Hangu, 2014). There is a need for CBOs to work together with the Department of Health to ensure that CHWs are provided with adequate training on the importance of using PPE. Even so, training alone is not enough to ensure good practices of HCWM. CHWs should also be provided with PPE and this could assist CHWs in modelling appropriate health behaviours and practices for family members in the community. The activities of CHWs should also be monitored to ensure sustainability of proper HCWM practices.

Our finding that some homes did not have access to piped water is an impediment to proper hygiene practices such as keeping the patients clean, washing linen, flushing the HCW, cleaning the buckets and containers and washing of hands. Hygiene practices such as washing hands with soap and proper disposal of faecal matter and other bodily fluids like vomit and sputum prevents the transmission of diseases such as diarrhoea (Gorter et al., 1998) and respiratory illnesses (St Sauver et al., 1998). It has been documented that hygiene practices help in reducing mortality and morbidity (Aiello and Larson, 2002; WHO, 2007). There is a need for government to revise its water policies for the poor communities to ensure equity.

Previous studies in South Africa have reported shortages of home-based care kits and inadequate supply of materials (Akintola and Hangulu, 2014; Mabude, Beskinska, Ramkissoon, Wood and Folsom, 2008). Most CBC programmes in middle and low-income countries including South Africa are funded by government and international donor agencies as well as private and individual donors (Arieff et al., 2009; Akintola, Gwelo, Labonte and Appadu, 2015; Akintola, Lavis and Hoskins, 2015; Seguino, 2009). However, funding has dwindled in recent years due to the credit crunch created by the global financial crisis as well as change in donor policy agendas (Akintola et al., 2015 a). This reduction in funding has had negative ramifications for most of the CBOs who have experienced a drastic reduction in financial and material support.

Lack of appropriate storage facilities left households with little choice but to store HCW in their yards. This made it accessible to children, waste scavengers and animals. Proper storage of HCW is needed to protect the health of the people and it makes it easier for the waste collectors to transport it correctly to designated disposal sites as stipulated by the South African National Standards (SANS, 2004) on health care waste management (Republic of South Africa, 2004). In the hospitals, the Department of Health is responsible for overseeing issues relating to HCW management; it is not clear, however, which government agency is responsible for providing red plastics and yellow containers for accommodating HCW in homes. Lack of supply of red plastics and yellow boxes for sharps in CBC by the municipality could mean that the municipality and the policy makers are not paying the necessary attention to HCWM in CBC. This is emblematic of a larger problem of poor service delivery by the municipalities in South Africa. Research has shown that service delivery in sub-Saharan Africa is failing due to lack of funds, misallocation of public funds and corruption (Odoro, 2012; Wolf, 2007). Mdlongwa (2014) has attributed poor service delivery in South Africa to lack of skilled personnel to assist municipalities with rendering quality services to the people, lack of transparency in the provision of services for the people, and insufficient funds at the municipal level, and this affects the quality of the services that are rendered.

The fact that CBC aims at improving the quality of life and well-being of the patients highlights the importance of HCWM which should be addressed by all relevant organs of the state such as

the Departments of Water and Sanitation, Department of Environmental Affairs and Department of Health. Insights provided by this study can help inform the rollout of the primary health care re-engineering model in South Africa. The finding shows that HCW is an issue that must be given priority attention in the new national initiative. The Department of Health needs to liaise with the relevant authorities to ensure that red plastics and yellow containers are supplied in homes where there is patient care. There should be a link between the patients in homes and the nearest clinics to ensure monitoring of such patients in CBC. This could help in monitoring the generation of HCW in CBC, and could help facilitate its disposal. There is need to carry out further investigations with the policy makers from the municipality and Department of Health to understand who is responsible for supplying materials in CBC, what causes the shortages with the supply of materials, and why red plastics bags and yellow containers are not supplied in homes.

At the household level, family members did not assist with the removal of HCW from the patients' rooms for collection by waste collectors. Most studies about caregiving and family support indicate that there is lack of support from family members (Akintola, 2008) and this has been linked to stigma and discrimination (Akintola, 2006, 2008). In this study, lack of removal of HCW by family members could be due to three different reasons: (a) stigma towards the patients, (b) fear of contagion, and (c) lack of proper education about HCWM in homes. The non-removal of HCW exposes patients and CHWs to a dirty environment and foul odour which has negative ramifications for them. It could also demoralise and discourage CHWs from performing their duties, thereby compromising the quality of care given to the patients (Uys, 2002; Akintola, 2006). There is need for CBOs to work together with the Department of Health, Department of Sanitation and Water and the Department of Environmental Affairs to develop intervention at the primary health care level aimed at addressing the importance of hygiene and sanitation, and HCWM in promoting the well-being of people in the community. This could improve the well-being of the patients and could prevent cross-infections in homes and the community as a whole.

The municipality level

Inadequate waste management services are a common issue in LMICs (Ogu, 2000; Katusiimeh, Moi and Burger, 2012). The major contributing factor is the increase in population which puts a

strain on governments that have inadequate resources and finances of providing waste management and other services to households (Fay, Beck, Fay and Kessinger, 1999; Kassim and Ali, 2006). In this study, irregular waste collection services were affecting HCWM in the communities. In South Africa, literature suggests that irregular waste collection in the hospitals and clinics is as a result of lack of reliable transport (Gabela and Knight, 2010; Mbongwe, Mmereki and Magashul, 2008). In our present study, CHWs or households could not provide reasons for this problem. This suggests the need for exploration of the perspectives of relevant stakeholders in charge of waste management in the communities to gain a deeper insight into the issue.

Irregular collection of waste from the communities caused illegal dumping of the HCW on the environment like streets, bushes, off cliffs and water sources. HCW was also buried in the yards and also burnt openly. Disposal of HCW in the environment has both negative environmental and health ramifications. HCW in the environment reduces environmental aesthetics (Phorano et al., 2005). HCW in the streets can cause social contagion in that when HCW is seen in the streets, people always assume that people living in that street are also dirty (Kassim and Ali, 2006). Additionally, the foul odour from the HCW can cause the breeding of disease causing vectors such as cockroaches, flies and rodents in the environment (Ramokate, 2008; Drackner, 2005). HCW that is buried can find its way into water sources which can cause water pollution, adversely affecting the health of the people (Blackman, 1993). Most of the HCW that is produced in CBC is incombustible. Burning of HCW and other waste in open air can cause air pollution through the production of dioxins and furans. Dioxins and furans are carcinogens that are produced due to incomplete combustion (Ketlogetswe et al., 2004).

Lack of access to piped water in some of the study communities could cause households in the communities to opt for open defecation (Thilde et al., 2010; Sahoo et al., 2015). In our study, lack of piped water had a negative impact on hygiene practices. Adequate water supply is needed for practicing good hygiene which helps to reduce opportunistic infections which are caused by unhygienic practices (Mafuya and Shukla, 2005). Practicing good hygiene can also prolong the lives of the patients (WHO, 2008). There is need for policy makers to address water issues in the community.

In some communities, pit latrines and communal toilets were located far from the homes of the patients. Tshililo and Davhana-Maselesele (2009) found that long distance between the toilets and the homes of the patients made them soil themselves before reaching the toilets. However, our study shows that patients who were too weak to walk to the toilets used buckets for toileting due to fear of soiling themselves before reaching the toilets. Another finding is that CHWs were afraid to travel long distances to access toilets with their patients because of fear that their belongings and those of a patient might be stolen while away at the toilets. As a consequence they disposed of liquid waste like urine, vomit and sputum in the open yard.

A study conducted in three HIV/AIDS affected settlements in Limpopo province of South Africa revealed that the majority of the households lacked toilet facilities for disposing of human excreta and other solid waste. As a result they resorted to using the bush while some used their neighbours' toilets (Kgalushi, Smits and Eales, 2004). The pit latrines in some communities did not have doors or roofs as such, patients who are weak but able to walk, felt uncomfortable using them. In a recent study by Sahoo et al. (2015) on sanitation-related psychological stress among women in India, women were afraid to use toilets without doors because they felt vulnerable to sexual violence. To deal with this challenge of lack of doors, most CHWs used bed sheets as doors to allow patients to use them. These are not effective or sustainable methods; there is need for the municipality to provide toilets that are durable. There is need for the municipality, the Department of Health and other relevant departments to address crime issues in the communities. Residents must be provided with education about the need to keep their toilets clean.

Furthermore, most pit latrines and communal toilets were unclean, malodorous and repulsive to patients and households. These findings are similar to the findings of Roma et al. (2010) and Rheinlader et al. (2010). O'Reilly and Louis (2014), in a study on understanding successful sanitation in rural India, found that households are motivated to use toilets if those toilets are comfortable, convenient, and promote privacy and dignity of an individual. They also found that women were reluctant to use toilets because of fear of contracting infections (Sahoo et al., 2015). Findings of this study show that communal toilets in informal settlements only opened from 5am to 6pm. Community members were expected to improvise in the night. Such conditions could cause open defecation. Roma et al. (2010) argue that most water and sanitation programmes in

South Africa fail because service providers only focus on meeting the deadlines. Furthermore, unskilled people are hired and as a result, there is inadequate allocation of finances (Eales, 2010). O'Reilly and Louis (2014) also argue that sanitation and hygiene practices by individuals are not based only on knowledge, but also on designs that are socially acceptable and culturally appropriate. Our study calls for the South African government to provide water and sanitation facilities that are socially acceptable and designs that are culturally appropriate. To ensure sustainability of such facilities, the government must involve the people from the designing process to its implementation process.

Conclusions

Our qualitative study provides insight into overall activities responsible for generation of HCW and various factors influencing its management at the community and municipality levels. Our findings together highlight the interaction between the practices of individual caregivers, and community health workers at the level of the household and community and the lack of availability of regular waste disposal infrastructure and services at the municipal level. These findings highlight the need to address the issue of health care waste management at different levels. The training of CHWs and households to enhance their knowledge and skills on HCW management as a way of practicing hygiene and sanitation to improve their well-being and that of the patients is an imperative. At the municipality level policy makers should work together with the Department of Health and CBC managers to recognise CBC as contributors of HCW and must ensure the issue of training, materials and facilities necessary for HCWM are addressed. In addition, service delivery challenges which undermines health care waste management and indeed the management of other kinds of waste at the municipality level needs to be addressed as part of broader interventions at the national and provincial levels. With the rollout of a primary health care model, there is need to develop policies that aim at HCW management in CBC and to monitor the implementation of such policies at the municipal level.

Strengths and limitations of the study

The study has various methodological strengths. The qualitative approach was necessary for this study because it helped to answer the what, when, where, why and how questions about HCWM in CBC. The approach provided more insights into the study. The use of ethnographic methods: focus groups, participant observations and informal discussions were appropriate because they

provided insights into the experiences of CHWs regarding HCWM. The study also made use of CHWs who are more hands on with the HCWM practices in CBC. As such, their experiences provide a clear picture of what goes on in the homes of the patients in CBC. The main limitations were that, the experiences of the patients and the households were not explored and yet they could have added more valued information to the study. In addition, the waste collectors were not included in the study therefore, their contribution could have deepened our understanding of health care waste management practices in community-based care

Areas for further research

There is need to conduct further research to understand how health care waste is managed in homes of the patients from the patient's and the household's perspectives. More research should also be conducted with waste collectors in order to understand how they collect, transport, treat and dispose of the HCW from homes. Such kind of a research will provide detailed information on the process of waste management from the point of generation to the point of disposal.

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18 March 2013

Mrs Lydia Hangulu 210546147
School of Applied Human Sciences
Howard College Campus

Dear Mrs Hangulu

Protocol reference number: HSS/1307/012D
Project title: Policy and Practice of home care waste management in home/community-based care

EXPEDITED APPROVAL

I wish to inform you that your application has been granted Full Approval through an expedited review process.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

.....
Professor Steven Collings (Chair)

/pm

cc Supervisor: Dr Olagoke Akintola
cc Academic Leader: Professor DP McCracken
cc School Admin.: Ms Ausie Luthuli

.....
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INSPIRING GREATNESS

Appendix 1: Introducing the study to the community health workers

Good morning/afternoon, my name is Mrs Lydia Hangulu. I am a student at the School of Applied Human Sciences. I am doing my PhD in Health Promotion and Communication (Student number: 210546147) at the University of KwaZulu-Natal, 4041, Durban, South Africa. I am conducting a study on policy and practice of home care waste management in community-based care organisations. I would like to speak to you only if you agree to speak to me.

The discussion will take about 40 minutes to one hour. I will ask you about health care waste management practices in the community, the kinds of challenges that you perceive and the kinds of strategies that are used to deal with the challenges. I will need your permission to use audiotape recorders to capture our discussion. All information that you give will be kept confidential and only my supervisor guiding me on this research will have access to it. Information will be used for research purposes alone and raw data will be destroyed as soon as the study is completely over. Also, we will not use your actual name or designation in reporting the findings of the study but will use disguised names to make sure that no one links the information you have given us to you. You will not be given any monetary payments for participating in the study but your organisation, communities and the government will benefit from this study immensely. The results will help us to understand the challenges encountered by your organisation in accessing support for homebased care especially with regards to health care waste management.

Your participation in this study is voluntary and you have the right not to participate if you do not want to. If you agree to take part in the study, I will ask you to sign a form as an indication that you were not forced to participate in the study. Please note that you will not be at any disadvantage if you choose not to participate in the study. You may also refuse to answer particular questions if you don't feel comfortable answering them. You may also end the discussion at anytime if you feel uncomfortable with the interview. In case you want to withdraw information given after the interview, you can call me on: cell: 073 335 6091 and email: lydiahangulu@yahoo.com and my supervisor Dr O. Akintola on 031-2607426 or Akintolao@ukzn.ac.za

Appendix 1: Introducing the study to the community health workers (the Zulu version)

Sawubonaigamalamingingu Mrs. Lydia Hangulu ngifunda e Nyuvesiya Kwa- Zulu Natal , ngenza I PhD yami kwezokuthuthukiswa Kwezempilo ‘‘Health Promotion’’ (inombolo yomfundi : 210546147). Ngenza ucwaningo ngemigomo nemithetho mayelana nezokuqoqwa kwadoti weziguli ezinakekelwa yizinhlangano.Ngingathanda ukuxoxa nawe uma ungangivumel.

Lengxoxo izothatha imizuzu engamashumi amane kuya kwi hora.Ngizokubuza ngemigomo nemithetho emayelana nokuhlelwa nokulahlwa kuka doti weziguli, ngizobuza nangolwazi eninalo ngodoti wazempilo neziguli.Ngizonibuza nangezizigqinambi enibhekana nazo mayelana nokuqoqa nokulahlwa kwalodoti, nokuthi nizixazulula kanjani lezo zinkinga.

Ngizodinga imvume yakho yokuku rekhoda nokugcina ingxoxo yethu. Yonke imininingwane ozonginika yona izoba imfihlo , izogcinwa yimi ne supervisor yami, akekho ozokwazi ukuyithola. Lemininingwane engizoyithola kuwe izosethsenziselwa ucwaningo kuphela futhi, imininingwane izosuswa eminyakeni emihlanu.Ngeke sisebenzise igama lakho langempela ngesikhathi sibhala imiphumela yalolu cwaningo.

Angeke unikezwe mali kulolu cwaningo, noma izipho, umphakathi nomongameli bazozuza kakhulu ngalolu cwaningo. Imiphumelo izosisiza ngokwazisisa ngokwazi izinkinga enihlangabezana nazo, nokuthi imiphakathi nezinhlangano zizozuza ekwazini kabanzi ngosizo abangaluthola kwi home-based care/ enhlanganweni yenu.

Kukuweukuthiuyalenzalolucwaningo, unaloilungelolokungaphenduli uma ungathandi. Uma uvumaukubaingxeny yalolu cwaningo kuzomeleungwaliseamaphephaukuzekucaceukuthiasizangesikuphoqeukuthiwenzelolucw aningo. Ngicelakucaceukuthiakumeleuphenduleimibuzoongafuniukuyiphendula, futhi ungayekaukuqhubekauphendule uma ungathandi noma ungaswisisi, uma ufunangingawusebenzisiumniningwanengithintekulydiahangulu@yahoo.com my supervisor Dr O. Akintola on 031-2607426 Akintolao@ukzn.ac.za

Appendix 2: Consent Form

I have read the information about this study and understand the explanations of it given to me verbally. I have had my questions concerning the study answered and understand what will be required of me if I take part in this study.

Signature _____ Date _____

Zulu version

Incwadi Yemvume

Mina, _____ Sengfundile mayelana nokuqokethweinhlolovo noma ngiyaqondaizincazelozenhlolovonjengobangazisiwe futhi ngachazelwangazongomlomo. Isiphenduliweimibuzo yami ngalenhlolovo, ngakhongiyagondaukuthiiyiniebhekekekimina uma ngibayngxemyeyalenhlolovu

Signature _____ Usuku: _____

Appendix 3: Focus group guide for community health workers Checklist for Caregivers

A. Organizational demographics questions

1. What is your gender?

Female Male

2. What is the name of your organization?

3. What is your post in this organization?

Caregiver Manager

4. How long have you been working in this organization?

5. How many wards/communities does your organization serve?

Name all the areas:

6. What is the type of your organization?

NPO CBO FBO

7. How is your organisation funded?

General questions

- What kind of patients do you care for?
- How many do you see in a day?
- What kind of help do the family members offer you?
- How do community members react to you when they see you work with the sick clients?
- How do you feel about your job?
- What challenges do you face while doing your work in the community?
- What could be the cause of these challenges in your own opinion?
- How do you deal with each of these challenges?
- How is the situation of water in these communities that you work in?
- Does water flow everyday? if not why?
- How do you do your work when there is no water?
- How do you feel about that?

- What do you think could be done to help the water situation in this community?
- How will that improve your work?
- What kind of toilets are there in these communities that you work in?
- How do these toilets work or operate?
- Do they function properly?
- If not, how could they be improved?
- What materials do you use when caring for the sick? name all of them?
- Where do you get these materials?
- What challenges do you face with regards to materials?
- How do you do your work in situation when you dont have the materials?
- What do you think could be improved regarding materials?
- What kind of training do you receive regarding caring for the sick?
- What exactly were you taught?
- When do you receive the training?
- How does this training help you with your work?
- How do you feel about the training? is it enough? if not how? How could it be improved?
- ✓ What kind of waste do you generate while performing your duties?
- ✓ How do you handle this waste that is generated?
- ✓ Where do you dispose it?
- ✓ Where do you store it?
- ✓ When is it collected? how many times does the track come to collect it?
- ✓ What happens when it is not collected?

What kind of rules/guidelines do you follow when handling waste? ✓ How did you come to know of these guidelines?

- ✓ How do these guidelines assist you in your daily duties?
- ✓ How could these guidelines be improved?
- ✓ What kind of training have you received with regard to handling waste?
- ✓ How long is the training?
- ✓ What are the things that you are taught during this training?
- ✓ How do you feel about the training that you have received with regard to handling waste?
- ✓ How has the training helped you in your daily work and life?
- ✓ What do you think is the importance of handling of this waste?
- ✓ What could be done to improve handling of this waste?
- ✓ May you please tell us the challenges that you face when handling the waste that you generate while performing your daily duties?
- ✓ How do these challenges affect your work?

- ✓ What do you think are the reasons for having such challenges regarding handling of waste?
- ✓ How do you feel about these challenges?
- ✓ How do you deal with these challenges?
- ✓ How would you want to improve HCWM in your organisation?

Appendix 1: Focus group guide for community health workers the (Zulu version)
Checklist for Caregivers

Organizational demographics questions

1. ubulili Owesifazane Owesilisa

2. Ibizwa ngani inhlangotho yakho/igama?

3. Yini igama lesikhundla sakho?
Onakekela iziguli Umphathi
4. Usunesikhathi esingakanani ukulenhlangano?

5. Inhlangotho yenu isebenzisana nama wards amangaki?

6. Iwuliphu uhlobo inhlangotho yenu?

NPO CBO FBO

7. Niyitholaphi imali yokuhamba inhlangotho yenu?

general questions

- **Ninakekela iziguli ezinjani?**
- **Nibona ezingaki ngosuku?**
- **Uluphi usizo eniluthola emindenini yeziguli?**
- **Umphakathi wona uziphatha kanjani uma ubona nisebenzisana neziguli, uyaye uthini?**
- **Uzizwa kanjani ngomsebenzi wakho?**
- **Iziphi izingqinamba ohlangabezana nazo ngesikhathi usebenza emphakathini?**
- **Ngokubona kwakho yini ebanga lezi zingqinambi?**
- **Uzixazulula kanjani ngalezi zingqinambi?**
- **injani indaba yamanzi kulemiphakathi enisebenza kuyo?**
- **Akhona yini amanzi, uma cha, yindaba engekho?**
- **Niwenza kanjani umsebenzi uma engekho amanzi?**
- **Uzizwa kanjani ngalokho?**
- **Ucabanga ukuthi indaba yamanzi ingaxazululwa kanjani?**
- **Ingakuzisa kanjani emsebenzini lokho?**
- **kulemiphakathi kusetshenziswa ama thoyilethe anjani?**
- **Asebenza kanjani lama thoyilethe?**
- **Kungabe asebenza kahle?**
- **Uma cha, kungenziwani ukuthi ukuze abe ngcono?**
- **Nisebenzisa ziphi izinto ukuze ninakekele iziguli?**

- **Nizitholaphi izinto zokulapha, nokunakekela?**
- **Nivelelwa iziphi izinkinga mayelana nezinto zokunakekela iziguli?**
- **Uwena kanjani umsebenzi uma ningeazo izinto zokusebenza?**
- **Yini engenziwa kangcono kulezo zinto zokusebenza?**
- **Niyaqeqeshwa yini mande nikwazi ukusiza iziguli?**
- **Nafundiswani kahle kahle? □ Niqeqeshwa nini?**
- **Lokukuqeqeshwa kukusiza ngani?**
- **Uzizwa kanjani ngokuqeqeshwa, futhi ngabe kwanele yini, uma cha, yindaba usho njalo?**

• **Kungalungiswa kanjani lokho? Kuvela luphi uhlobo ladoti uma nisiza iziguli?**

- **Niluhlela kanjani lowodoti?**
- **Niwulahlaphi lodoti?**
- **Niwugcinaphi?**
- ✓ **Uma seniwuqoqile , imoto iza nini ukuzowulanda futhi kangaki?**
- ✓ **Kwenzekani uma ingafikanga ukuzowulanda?**
- ✓ **Imiphi imigomo nemithetho eniwulandelayo mayelana nokuqoqwa kwadoti?**
- ✓ **Lemigomo nemithetho ikusiza kanjani emsebenzini wakho?**
- ✓ **Lemithetho ingalungiswa kanjani yenziwe ibe ngcono?**
- ✓ **Nike naqeqeshwa mayelana nokuqoqwa kwadoti, nokuwuhlela?**
- ✓ **Loko kuqeqeshwa kathatha isikhathi esingakanani?**
- ✓ **Nafundiswani ngenkathi niqeqeshwa?**
- ✓ **Uzizwa kanjani ngalokho kuqeqeshwa enakuthola mayelana nokuhlelwa kwadoti?**
- ✓ **Lokho kuqeqeshwa kwakusiza kanjani empilweni yakho?**
- ✓ **yini oyibona ibalulekile gokuqoqwa kwalo doti?**
- ✓ **Yini engenziwa ukuze lokuqoqwa kwadoti kwenziwe ngobucwepheshe?**
- ✓ **Ngicela usho izinkinga ohlangabezana nazo ngenkathi nihlela udodi eniwuthola ngesikhathi nisiza iziguli?**
- ✓ **Lezi zingqinamba ziwuhlasela kanjani umsebenzi wenu?**
- ✓ **Uma ucabanga lezi zingqinamba ziqhamukelaph I, futhi zibangwa yini?**
- ✓ **Uzizwa kanjani ngalezi zingqinamba?**
- ✓ **Ubhekana kanjani nalezi zingqinamba?**

Ungenzani ukuthuthukisa kulenhlango?

CHAPTER EIGHT

Integrative Conclusion

Introduction

This chapter presents an integrative conclusion drawn from all the chapters in the thesis. Using Bronfenbrenner's theory of human development as a framework, this chapter presents mini abstracts for each chapter (starting with chapter 2; theoretical framework) and then integrates all the findings and practical implications. I conclude with a discussion of the overall contribution of the study, limitations and recommendations.

Chapter two: Theoretical framework

The ecological systems theory (EST) is a theory of human development developed by Urie Bronfenbrenner in the 1970s. The EST proposes that, when a person or group is connected and engaged in a supportive environment, the functioning also improves. The EST has four levels of influence on a group or an individual: 1) the micro-system level for the individual, 2) meso-system a level for the social agents, 3) the exo-system level for the organisations, 4) the macro- system level which describes the nation in which individuals lives.

The four levels of the EST that have been applied to this study as follows. At the macro-level, I discuss the international policy environment. International health care waste management (HCWM) policies were reviewed at this level to understand laws, provisions, regulations, standards and requirements relating to HCWM in health care facilities and in community-based care. At the exo-level is the South Africa's national policy environment. South African national policies about HCWM were reviewed to understand the laws, provisions, regulations, standards and requirements relating to health care waste management from health care facilities and in community-based care. The meso-level is the municipality and community level where policy makers (ward councillors) and stakeholders (CBC managers, area cleansing officers, education officer) are found. Policy makers and stakeholders oversee service delivery issues in the community including waste collection and refuse bag distribution programmes. At this meso-level, I discuss the perceptions of HCWM in community-based care among policy makers and the stakeholders. The micro level describes the HCWM practices of community health workers

and household members. All levels are summarized in Figure 1 below. The main assumption guiding this study is that, there is consistency among all levels when it comes to policy and practice of health care waste management (HCWM). This means that, if there are international and national policies that govern HCWM in South Africa, policy makers and stakeholders are more likely to implement them hence the practices of HCWM are improved at the community level by the community health workers.



Figure 1 Ecological systems theory as applied to this study sourced from (Bronfenbrenner, 1974)

Chapter 3: The scoping review

To achieve the first objective, a scoping review was conducted. The scoping review was more applicable to the international and national policy level. Terminologies such as biomedical waste, clinical waste, HCW, health care risk waste, hospital waste, infectious waste and medical waste were found to be the most common terms used to describe health care waste in high income and LMICs. Using the WHO manual on health care waste management from health care facilities as a guide, the scoping review sought to understand how the different terminologies used to describe HCW align with the definition, categories and classifications provided by the WHO manual.

One hundred and twelve (112) articles met the criteria and were analysed using thematic analysis. Findings showed that, notwithstanding the different terminologies used both in high- income and LMICs, their definitions, categories and classification of HCW align with those provided by the WHO manual. Therefore, the terminology provided by the WHO manual could be adopted. This could help with policy formation, interpretation and implementation and could improve health care waste management practices in homes and other health care facilities. A broader scoping review that uses more terms and more data bases should be conducted whose findings can be used as a bases for developing common terms for use in all countries and settings.

Chapter 4: Review of international and South African policies governing health care waste management.

International and South African national policies that govern HCWM were reviewed to achieve the second objective: understanding the international and the South African policies governing health care waste. Policy documents were accessed online and were reviewed. The main findings are that, at the international level, the World Health Organisation manual on ‘health care waste management from health care facilities is a global guide for all health care facilities including home care settings. The main finding about HCWM provided by the WHO manual is that, it assumes that HCW from homes is in small quantities hence recommends that it must be removed from homes by the municipal waste authorities and must be treated before disposal (Pruss et al., 1999:55). Other options provided by the manual are 1) Health care providers are responsible for ensuring that patients who are sent to receive care from home are provided with containers for

storing needles and syringes. 2) The health care provider must make arrangements for the HCW to be removed from homes by a contractor or arrangements can be made with the nearest clinics or hospitals where the patients or the health workers can take the waste for disposal (Pruss et al., 1999:55). Considering the fact that community-based care organisations in LMICs play an important role in the HIV/TB care (Akintola and Hangulu, 2014), their ability to generate health care waste cannot be ignored. There is need for the WHO to revise its guidelines n about HCW that is generated in CBC.

In South Africa, provincial HCWM policies are fragmented. The main guidelines relating to health care waste management in South Africa are those provided by the African National standards (SANS, 2004) and the national health care waste management draft policy. Both policies are replicas of what is provided by the WHO manual. The national policy on HCW is still a draft. The main strength of the draft policy is that, it recognizes CBC as generators of HCW however, just like the WHO manual; it assumes that HCW from CBC is in small quantities. It is a replica of WHO Manual on health care waste. Its limitation is that, given the fact that South Africa has the highest HIV/AIDS/TB prevalences in the world; it does not adequately recognize community-based care as contributors of health care waste that needs greater attention.

This chapter provides new insights highlighting the need for policy makers to pay attention to health care waste management in homes. Considering health care waste management as a policy issue in community-based care could promote hygiene practices and could help improve the wellbeing of the patients and of the community members. This could also help in the fight against the spread of HIV and TB. There is need for the government to pass the draft policy into law. There is need for the policy makers to come up with uniform standards for regulating health care waste in the country. The SANS (2004) should be revised by policy makers to consider health care waste that comes from homes in the context of HIV/AID/TB and other lifestyle diseases. More research should be carried out to understand the quantity of health care waste that is produced in homes where there is care of the patient. This will help in the development of HCWM policies that accommodates HCW from CBC. There is need for the further research to be conducted to understand health care waste management policy formulation processes and the

contexts in which they are formed. This could assist with the appropriate recommendation of policies aimed at health care waste management in community-based care.

Chapter 5: Print media analysis

This chapter achieved the third objective of exploring how the media frames the problem of healthcare waste in South Africa. The aim was to understand media frames of HCWM in South Africa. Using the South African media database, a total of 189 news stories were retrieved from 20 newspapers and were analysed using thematically. The media frames revealed health care waste management problems as caused mainly by government even if the main perpetrators are waste contractors. There is blame on the government for delaying in developing a national HCWM policy and for having inadequate HCW disposal and treatment facilities in the country. As a result, options for addressing the issue of illegal dumping were directed at the government. Options proposed include, developing of policies and providing HCW treatment and disposal facilities in the country. Failure of the print media to propose options that includes waste contractors who are the main perpetrators of illegal dumping and stockpiling could lead to half solutions that mask the real problem. Half solutions could only focus on palliatives instead of focusing on all levels of society such as the government policy makers and implementers; government agencies; waste contractors; health facilities; individual health care workers; health care professionals; waste workers and cleaners in the health facilities that contribute to this problem. The most intriguing thing about the media frames is that, there was no mention of health care waste from homes. This raises questions as to whether HCW from homes is even considered as a policy issue in South Africa.

Chapter 6: Interviews with policy makers and stakeholders

This chapter addresses the fourth objective. This is the municipality and community level. The aim was to explore the perspectives of the policy makers and the stakeholders about HCW management in community-based care. Semi-structured interviews were conducted with 30 policy makers and stakeholders working in 29 communities offering CBC. At the municipality level, it was found that the Durban Solid waste (DSW) unit of the eThekweni Municipality is responsible for overseeing all waste management programmes in communities. At the micro- level (household) the main findings are that nursing care activities are responsible for generating

HCW in CBC. HCW is mixed and removed together with domestic waste from homes. There is illegal dumping of HCW in CBC mainly due to irregular collection of HCW by the waste collectors and insufficient supply of garbage bags for storing waste. At the municipality level, factors affecting HCW management practices include corrupt tender processes and insufficient funding for waste management programmes.

To deal with the barriers of proper HCWM, all the policy makers and the stakeholders collaborate and work together to provide education campaigns to community members about proper waste management. Issues related to inadequate resources are reported to their superiors. The WHO manual (Pruss et al., 1999) and the SANS (2004) prohibit mixing of HCW and illegal dumping. Based on the findings in this study, it can be concluded that HCW is not managed in a manner which it is supposed to be managed. The findings are an addition to the body of literature on health care waste management in homes in community-based care. There is need to conduct studies to understand how HCW is collected, treated and disposed of by the waste collectors. The government should address the issues of corruption, inadequate garbage bags, in order to improve health care waste management services and practices.

Chapter 7: Practices and perspectives of community health workers on HCWM

This study was conducted to achieve the fifth objective. This is the micro-level and described the HCWM practices of CHW in the homes of the patients. The aim of the study was to explore the perspectives of CHWs on HCWM in CBC. Using ethnographic methods: focus group discussions, participant observations and informal discussions were conducted with 112 CHWs. The study found that CHWs provided nursing care performing activities which are responsible for generating HCW. The HCW generated include, used gloves, used diapers, used needles and syringes, urine, faeces in buckets, vomit, and waste water. All HCW was mixed with domestic waste and was removed by the DSW unit of the eThekweni municipality. The main barriers to proper management of HCW found are irregular waste collection services, inadequate garbage bags for households, inadequate water supply in some homes and long distance to access the toilets in the informal settlements. As a result, solid HCW was illegally dumped along roads or in bush, burnt openly and buried. Liquid HCW such as vomit, urine and sputum were disposed of in the yards and were accessible to animals and children. The findings point to the need for the

managers of community-based care organisations and policy makers to work together to see to it that health care waste from homes is managed properly. There is need for the municipality to distribute garbage bags in homes that are meant for storing health care waste. Secondly, there is need to further investigate how HCW is transported and treated and how it is disposed of. The government should see to it that adequate services such as waste and sanitation facilities are provided to the people. This could improve health care waste management.

Convergence of all the findings

Based on the assumption of the ecological systems theory which states ‘when systems work together, their function also improves,’ there is a link among the findings of all the studies that have been conducted for this thesis. The convergences of the findings are in two categories: the policy and the practice aspects of health care waste management on community-based care. Media analysis is at the intersection of these studies.

1. The policy aspect of health care waste management in community-based care

The scoping review of terminologies used to describe, define, categorise and classify health care waste revealed that the WHO manual uses the term ‘health care waste’ while the most common terms used in high and LMICs are biomedical waste, clinical waste, HCW, health care risk waste, hospital waste, infectious waste and medical waste. It is not clear why these various terms are used meanwhile their definition, categorization and classification are consistent with the one provided by the WHO manual. A study from Botswana found that, the term ‘clinical waste’ is known to mean all waste that is generated from health care facilities. Because of this definition, most health care workers and the general public ended up not segregating HCW into non- hazardous and hazardous waste. Instead health workers disposed of all categories of waste together as hazardous waste in red bags. The consequence of this practice was the unnecessary use and wasting of red bags, and the overloading of resources needed for transportation and storage of health care waste (Mbongwe, Mmereki and Magashula, 2008).

Although there are no similar studies in South Africa, the use of different terminologies to describe HCW can cause confusion when it comes to developing waste management policies by policy makers and can affect the practices of HCWM by ordinary people who are generators and handlers of HCW. There is need for further studies to be conducted to understand the extent to

which terms used to describe HCW are understood in the context of policy formulation and how they among practitioners: health facility managers/directors, health professionals, cleaners, waste handlers and collectors in the communities and waste companies working with health facilities.

Internationally and in South Africa, there are no policies that specifically address HCWM in CBC. So far, internationally, the WHO global manual on the safe management of health care waste management provides HCWM guidelines. By assuming that HCW from home is in “small quantities”, the manual fails to adequately recognize the role that CBC plays in the context of HIV/AIDS/TB and other communicable diseases like diabetes that requires home care. The way that WHO manual describes HCW from homes, has influenced South Africa to inadequately define HCW from CBC. Instead what the South African draft policy contains is a replication of the WHO’s recommendation on how HCW from homes must be managed without a putting the context of the country-HIV, AIDS and TB prevalence and the recent initiative to scale-up primary and community care into consideration. Empirical studies on HCWM in LMICs show that inadequate policies that govern HCW in most health care facilities serve as barriers to proper management of HCW (Soliman & Ahmad, 2007; Sawalem, Selic, & Herbell, 2009, Gabela and Knight, 2010). In South Africa, a lack of a national policy is known to have been the cause of fragmentation and lack of uniformity in the implementation of provincial HCWM policies (Erasmus, Poluta and Weeks, 2012; Van Schalkwyk, 2013).

Additionally, from the media analysis chapter, one of the dominant media frames of the causes of the problem of HCWM in South Africa is a lack of national policy and fragmentation in policies. These media frames align with the findings from empirical studies. This shows that the media has reported the issue of lack of policy correctly. However, the media framing of health care waste management problems as caused mainly by government, results into failure of the print media to propose options that includes waste contractors who are the main perpetrators of illegal dumping and stockpiling. One sided options directed at the government could lead to half solutions that do not address the real problem and may ignore important levels of society (mainly the government policy makers and implementers; government agencies; waste contractors; health facilities; individual health care workers; health care professionals; waste workers and cleaners in the health facilities) that contribute to the problem. Furthermore, the problem of lack of

policies for HCWM focuses on the health care facilities mainly ‘hospitals and clinics’ unlike CBC. The finding of a lack of CBC policy on HCWM is a new finding both internationally and in South Africa as this is the first study that has been conducted to explore HCWM in CBC. These findings could be used for policy makers to re-think policy about how HCW from CBC managed and to develop relevant policies aimed at improving HCWM in CBC. In the context of HIV and AIDS and TB, policies on proper management of HCW is an imperative because of its potential role in promoting hygiene practices and in turn improve the wellbeing of the patients. Together, these studies provide empirical evidence that can inform a review of existing draft national policy on health care waste management.

2. The practices of health care waste management in community-based care

The two studies: the policy makers’ and stakeholders’ perspective and also the community-health worker’s perspectives address the practice aspects of health care waste management in community-based care and are complimented by media frames in the media analysis chapter. The common themes found regarding practices of HCWM are lack of segregation, illegal dumping and insufficient supply of garbage bags.

Lack of segregation of HCW

The HCW from homes is mixed with domestic waste instead of segregating it into hazardous and non-hazardous categories as recommended by the WHO manual and the SANS 2004 (Pruss et al., 1999; Republic of South Africa, 2005). The lack of segregation of HCW from domestic waste is a new finding in the context of CBC. Studies from health care facilities indicate that lack of segregation of HCW is caused by insufficient knowledge by HCW handlers (Mbongwe, Mmereki and Magashul, 2008; Magdy and El-Salam, 2010; Gabela and Knight, 2010). Although the policy on the management of HCW in CBC is not adequate as discussed earlier, what was clear from this study is that stakeholders and policy-makers at the community level lacked a common understanding of how to deal with health care waste in CBC. There responses indicated confusion and a lack of implementation of the existing draft national policy. These findings call for the relevant agencies such as the Department of Health and the Department of Environmental Affairs and Tourism to put in place appropriate mechanisms for monitoring the implementation

of existing policies while working on developing more appropriate and up to date policies that addresses the current needs in CBC.

Illegal dumping

This study found that illegal dumping is a problem that is mainly facilitated by insufficient supply of HCW bags by the municipality and irregular collection of HCW by contractors. Illegal dumping of HCW is prohibited (Pruss et al., 1999) and makes the HCW accessible to animals, waste scavengers and children (Bendjoudi, Taleb, Abdelmalek, Addou, 2008). The findings of insufficient supply of HCW bags in CBC are an addition of knowledge on HCWM in CBC. They indicate how big the issue is and these insights need the attention of policy makers. Most literature about HCWM in health care facilities indicate that there is irregular collection of HCW (Bendjoudi, Taleb, Abdelmalek, Addou, 2008; Mbongwe et al., 2008) without mentioning who is responsible for collecting the HCW. The findings about who is responsible for collecting HCW from homes are new in the context of CBC in South Africa and they are important as they provide insights where more insights about collection of HCW can be found, and also specifies where the intervention should be targeted. More importantly, this study reveals that corrupted tender processes facilitates the problem of irregular collection because contractors are chosen based on their political connections unlike their ability to provide HCWM services. There is need for further studies to be conducted to gain more insights of the extent of corrupt tender processes regarding HCWM. Adequate information will help to provide recommendations for addressing the problem.

Furthermore, the problems of lack of segregation of HCW and illegal dumping were framed as caused by the government who delay developing HCWM policies and also for having corrupt tender process resulting in contracting of incompetent waste contractors. Empirical studies about HCWM in health care facilities in African countries (Gabela and Knight, 2010; Mundia and Mbewe, 2006; Bendjoudi, Taleb, Abdelmalek and Addou, 2008; Sawalem, Selic and Herbell, 2009; Mangaa, Fortonb, Moforc and Woodardd, 2011), do not indicate the perpetrators of illegal dumping. Further studies should be conducted to determine the accuracy of the media frame. Large scale studies should be conducted to have more insights about the issue of illegal dumping in the health care sector in South Africa.

Practical interventions

Applying the ecological systems theory to this study, I found that the existence of international and national policies influence policy makers and stakeholders to implement such policies of HCWM at the national level, this in turn influence practices at the municipal by waste collectors: the DSW unit, waste contractors and the community-health workers at the community and household levels. The findings have shown that a lack of adequate policy at the international level has negatively influenced the formulation of the South African HCWM policies in CBC hence the practices have also been affected negatively. Thus, at the macro-level (international policy level) WHO should revise its manual and re-define HCW from CBC. WHO should take into account the role of CBC and the context in which it was introduced. Alternatively, being the governing body in issues related to health and HCWM, WHO should develop a policy specifically for CBC.

At the exo-level (the South African national policy level), there is already a draft policy on HCWM but it does not adequately provide for HCW from CBC. The definition of HCW that is in the draft policy should be revised to in cooperate HCW from CBC. At the meso-level (policy makers and stakeholders), CBC managers should collaborate with ward councilors and environmental activists to advocate for a policy regarding proper management of HCW in CBC. This should help to get the attention of the public and the policy makers. Policy makers should begin to think of a way of revising the home-based care policy and in-cooperating management aspects of HCW from CBC into the policy. To address the issue of lack of garbage bags for storing HCW in homes, the stakeholders and the CBC managers should negotiate and advocate for red garbage bags and leak proof containers for storing HCW to be provided in homes. At the micro-level (homes where community health workers work), since CHWs are a link with the health care facilities, they should continue to educate people on the importance of segregation of HCW. The CHWs should also join forces with environmental activists, nurses, CBC managers and ward councillors to protest against lack of attention for HCW and inadequate resources for CBC. This could catch the attention of the media, possible donors and the policy makers. The attention could facilitate the formulation of HCWM policies in CBC and also address the issue of inadequate materials.

Overall academic contribution of the study

The overall thesis has the following strengths: firstly, to my knowledge, this is the first study that has been conducted in South Africa regarding HCWM in CBC. The findings of this study have shown a link between policies and practices of HCWM from the international level to the community health workers' level in South Africa. The study shows that CBC establishments are contributors of HCW which is improperly managed. The HCW that is produced is more than just sharps and needs more attention. HCWM is an issue that affects the health of the public and the environment. The findings about improper management of HCW from CBC are an addition to the body of literature on HCWM in CBC, environmental health and public health. These findings can be used as a guide to develop various inquiries about HCWM and policies in CBC.

Secondly, the strength of this dissertation lies in the use of various methodologies in exploring and understanding policy and practices of HCWM in CBC in South Africa. The use of scoping review, analysis of policy documents, media analysis, interviews of policy makers and stakeholders, focus group discussions, informal interviews and participant observations have provided in-depth understanding of HCWM from various perspectives by answering the what, where, when, why and how of health care waste management. These questions are vital in understanding health problems in society as they determine how a particular health issue can be addressed. Using the levels provided by the ecological systems theory has helped to identify HCWM policies and practices. This helps policy makers and stakeholders identify the nature of the issues relating to health care waste management and the level at which to address design interventions aimed at addressing particular problems at those specific levels.

Overall limitations and recommendations

Some of the limitations of the study are: these findings cannot be generalised to all communities, thus, there is a need to conduct a similar study from different settings to further understand the issue of HCWM in CBC. I did not investigate the quantities of HCW that is generated in CBC. There is need for further research to conduct a study to determine the amount of HCW generated. This will help understand the magnitude of the problem of improper HCWM in CBC. Although I observed the practices of family members providing care to the ill, I did not explore their

perspectives directly yet they could have provided more insight to the study. There is need for this issue to be explored further. The opinions of the people in charge of HCWM from the Department of Health and those of the contractors were not explored, yet they could have added more insight to the study. Such studies should be conducted as they could be useful for informing policies on HCWM in CBC. This study did not examine how HCW is handled, transported, treated and disposed of. Such studies will add more insight about what happens to the HCW from CBC, beginning from the point of generation to the point of disposal.

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