

**ROLE OF ORAL HEALTH CLINICIANS IN SCREENING FOR NON-  
COMMUNICABLE DISEASES IN KIAMBU COUNTY.**

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**A DISSERTATION SUBMITTED TO THE DEPARTMENT OF PUBLIC AND  
GLOBAL HEALTH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR  
THE AWARD OF A DEGREE OF MASTER OF PUBLIC HEALTH OF THE  
UNIVERSITY OF NAIROBI.**

**2023.**

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## **ACKNOWLEDGEMENTS**

I thank the Almighty God for good health, providence, and the opportunity to undertake this study.

My gratitude also goes to my immediate family members for their love & support.

I also want to thank my supervisors Dr. Richard Ayah, and Dr. Cyril Ogada for their invaluable support, encouragement, guidance and positive criticism throughout this study.

Finally, my utmost appreciation to all the oral health clinicians: Community Oral health Officers, Dental Officers & dental specialists in public health facilities in Kiambu county who participated in this study.

Thank you very much.

## **DEDICATION**

I dedicate this study to my late husband Dr. Allan Ngugi & our daughter Zawadi, for being my greatest motivation & cheerleaders.

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## **LIST OF ABBREVIATIONS/ ACRONYMS:**

<b>BMI</b>	Body Mass Index
<b>CMNN</b>	Chronic, Maternal, Neonatal, and Nutritional disorders
<b>DALY</b>	Disability Adjusted Life Years
<b>GBD</b>	Global Burden of Diseases, injuries, and risk factors study
<b>GoK</b>	Government of Kenya
<b>HCW</b>	Health care worker
<b>ICDP</b>	Integrated County Development Plan
<b>KEPH</b>	Kenya Essential Package for health
<b>KHSSP</b>	Kenya Health Sector Strategic Plan
<b>KMHFL</b>	Kenya Master Health Facility List
<b>KNBS</b>	Kenya National Bureau of Statistics
<b>KNH/UON-ERC</b>	Kenyatta National Hospital and University of Nairobi- Ethics and Research Committee
<b>LMIC</b>	Low- and Middle-income countries
<b>MoH</b>	Ministry of Health
<b>NCD</b>	Non-communicable diseases
<b>OH</b>	Oral health
<b>SAMHSA</b>	Substance Abuse and Mental Health Services Administration
<b>SDG</b>	Sustainable development goals
<b>SSA</b>	Sub-Saharan Africa

<b>UHC</b>	Universal Health Coverage
<b>WHO</b>	World Health Organization
<b>YLL</b>	Years of Life Lost

## **DEFINITION OF OPERATIONAL TERMS**

**Clerkship:** Process in which clinicians obtain patients' medical history and conduct a clinical/physical examination on the patients.

**Clinicians:** Qualified and licensed medical personnel in dental clinics, who diagnose, prescribe medication, and or perform treatment procedures on patients.

**Community Oral Health Officers:** Oral health clinicians with a diploma in community oral health. They mainly offer oral hygiene instructions, and dental education and work under the supervision of dental officers/specialists.

**Dental Clinic:** Departments within public hospitals that provide dental examination, advice, and treatment.

**Dental Officer:** General dentist with a degree in dental surgery who is licensed to practice by the Kenya Medical Practitioners and Dentists Council.

**Dental Specialist:** A dentist who, in addition to their dental Surgery degree, has completed a postgraduate degree in one of the dental areas of specialization and is licensed to practice by the Kenya Medical Practitioners and Dentists Council.

**Detection:** Sequencing and identifying/uncovering the existence of NCDs or their risk factors through measurement of weight, height, blood pressure, and blood glucose levels.

**Equipment and supplies:** All the Instruments, reagents, and/or materials that are necessary to conduct medical examination. These include (but are not limited to) blood pressure machines, glucometers, weighing scales, and measuring tapes.

**Excessive alcohol consumption:** Intake of five or more alcoholic drinks for males and four for females on the same occasion, for five or more days within a month (SAMHSA, 2015).

**Experience:** Knowledge and or skills acquired from practice, conferences, and continuous education.

**Healthcare integration:** Interprofessional healthcare, characterized by a high degree of communication and collaboration across various disciplines to provide complete treatment to patients and improve their overall well-being.

**Identification:** The action or process of pointing out or distinguishing individuals at risk of non-communicable diseases from the whole population.

**Index of suspicion:** Initial impression of the likelihood of a disease or condition by a clinician.

**Knowledge:** Information acquired through training in dental schools as stipulated in the specific cadre training syllabus/Manuals.

**Level 3 facilities:** Health centres, Maternity and Nursing homes (KMHFL), they have dental clinics, outpatient services & maternity in-patient services.

**Level 4 facilities:** Sub County hospitals (KMHFL); they have dental clinics, outpatient services, maternity in-patient services, and x-ray services.

**Level 5 facilities:** County referral hospitals (KMHFL); they have dental clinics, outpatient services, maternity in-patient services, imaging department, and specialists' clinics, they are involved in medical research.

**Non-communicable diseases:** Conditions or diseases with more than one causes that are not transferable from one person to another and are not infectious. They include diabetes, high blood pressure, cancers, and chronic non-infectious respiratory conditions (WHO).

**Oral diseases:** Conditions affecting the mouth and facial tissues causing pain, discomfort, impairing function, and or speech.

**Oral health clinicians:** Dental specialists, Dental officers, and community oral health officers that work in dental clinics.

**Risk Factors:** Attributes, features, and characteristics that increase an individual's likelihood of developing certain diseases.

**Roles of oral health clinicians:** Identification, education, diagnosis, control, and treatment of non-communicable diseases.

**Screening:** Suspicion, identification, and detection of the existence of NCDs through clerkship.

**Skills:** Technical ability to perform clinical procedures as outlined in the standard operating procedures. The learned ability to act with determined results with good execution, often within a given amount of time, energy, or both.

**Suspicion:** Intuition or feeling that an individual could be at risk or is suffering from a disease.

## **ABSTRACT**

### **Introduction:**

### **Background**

Oral health clinicians need to play a bigger role in preventing, identifying, and managing non-communicable diseases (NCDs). Dental clinics in public hospitals are often the only point of contact between patients and the healthcare system, so screening for NCDs within the dental setup could help manage these diseases effectively.

**Objective:** To assess the role of oral health clinicians in screening for non-Communicable diseases in Kiambu County.

### **Methodology:**

This was a cross-sectional qualitative study conducted in 10 dental clinics within select public health facilities in Kiambu County. A census sampling technique was used to select the study participants who were community oral health officers, dental officers, and dental specialists - A maxillofacial surgeon, a periodontologist, a prosthodontist, a paediatric dentist, and a public health dentist. The oral health clinicians' socio-demographic data – their cadre, gender, availability of a job description and years of professional training- was collected using self-administered questionnaires, while primary investigator-led interviews were conducted using an interview guide. Qualitative data was then transcribed and thematic content analysis was done. A verbatim approach was used during data transcription to describe the study findings.

### **Results:**

Oral health clinicians in Kiambu County have some knowledge on screening for non-communicable diseases and their risk factors. The oral health clinicians with more years of training, while more informed on NCDs, did not have a common reference point against which to screen for and detect NCDs. All the study participants agreed that they have a role in screening for non-communicable diseases; however, they are not aware of and do not participate in NCD screening activities in the sampled public health facilities. Oral health services in Kiambu County are not integrated with the general patients' care. There were no County or facility standard operating procedures for oral and NCDs care.

**Study Limitations:** Covid-19's occurrence adversely affected the primary investigator's ability to conduct the study on larger sample sizes, for a more conclusive outcome. This was occasioned by movement restrictions during this season and exposure risks associated with the disease. There is far too little material published on the research subject locally. There is a need to conduct this research in other areas within the country, under different set-ups -including the

private healthcare sector; to inform the kind and level of intervention needed for oral health clinicians to effectively participate in screening for NCDs.

**Conclusion:**

From the study findings, there is far too little material published locally and globally on the research subject. There is a need to conduct this research in other areas within the country, under different set-ups - including the private healthcare sector; to inform the kind and level of intervention needed for oral health clinicians to effectively participate in screening for NCDs.

**Recommendations:**

- 1). Capacity building for oral health clinicians in Kiambu County on why, when, and how to screen patients for non-communicable diseases, as well as how to engage and disseminate information to these patients on NCDs and their risk factors presentation, prevention, and control.
- 2). Development and implementation of County and facility standard operating procedures on oral health and NCDs management as well as proper channels of NCDs patient referral, from the oral health department, within and between public health facilities in the county.
- 3). Development and deployment of protocols on integration and involvement of oral health clinicians in screening for NCDs in dental clinics and outpatient centres in public health facilities in Kiambu County.



## CHAPTER 1: INTRODUCTION

### 1.1 Background

Oral diseases and non-communicable diseases have largely been shown to share most risk factors, notably harmful alcohol consumption, tobacco use, and improper unbalanced diet. Dental caries and periodontitis are the most common oral diseases and both are closely linked to poor oral hygiene, highly cariogenic diet-sugary, and highly refined carbohydrates (National Oral Health Survey, 2015).

Non-communicable Diseases (NCDs) also known as chronic diseases are conditions that are not passed from one person to the other; they are non-infectious, progress slowly, and last for long durations. Some of the most common NCDs are diabetes, hypertension, cardiovascular diseases, cancers, chronic respiratory conditions, and oral diseases (WHO, 2016). Oral NCDs account for a substantial percentage of the NCDs burden. Oral cancer, for instance, is one of the most prevalent types of cancer, ranking among the top 15 types of cancer worldwide. Wolf (T.G. *et al.*, 2021). They share common risk factors - harmful alcohol consumption, tobacco use, sedentary lifestyle, and unhealthy diets (WHO, 2016). Oral diseases are the most prevalent and preventable non-communicable/chronic illnesses that affect human beings throughout their life course (Varenne, 2015).

Non-communicable diseases influence oral health directly through their pathophysiology or indirectly through the disease or therapy-related changes (Dörfer et al. 2017). Oral diseases also have a significant influence on systemic diseases, especially non-communicable diseases such as cardiovascular conditions, diabetes mellitus, and chronic respiratory conditions (Dörfer et al. 2017). The prevalence of oral diseases in Kenya is relatively high; notably dental caries and periodontitis amongst both children and adults, affecting those in rural and urban areas equally. This has been attributed to rapid urbanization, lifestyle, and dietary shifts characterized by highly cariogenic, starchy foods and tobacco use (National Oral Health Survey, 2015). Individuals with periodontitis have been shown to be at a higher risk of non-communicable diseases (Lee et al. 2017). Oral diseases and NCDs have common risk factors such as tobacco use, excessive alcohol consumption, and unhealthy diets rich in processed sugars, starches, and minimal fruits and vegetables (Dörfer et al. 2017). Studies have shown that excessive alcohol consumption has various effects on oral health such as salivary glands inflammation, increased

susceptibility to periodontitis, dental caries, erosion of teeth, and oral cancer (Khairnar et al., 2017).

Like NCDs, the most common oral diseases risk factors are modifiable and generally preventable. Prevention and control of these risk factors would be achieved effectively in a health system that is keen on health promotion and prevention of diseases, right from the individual/community and primary health care level. The main focus of oral healthcare in Kenya is curative; with prevention and promotion not receiving the attention it requires (National Oral Health Survey, 2015). This happens in a background of a disjointed healthcare system with minimal, if any, integration of oral health and general health. Current healthcare systems in the country are not well equipped or prepared to handle this, hence there is a need to re-strategize and reorganize our care delivery models. With a well-informed healthcare workforce, and an integrated healthcare system, patients visiting public dental health facilities should be able to get screened for possible non-communicable diseases risk factors and managed or referred accordingly (Kenya National Oral Health Policy,2022).

Most patients present to health facilities depending on the symptoms that trouble them the most (Kane et al., 2017). The majority of patients with NCDs present late and they often self-direct in and out of care depending on the symptoms that bother them most (Kane et al. 2017). As a result of socio-economic and cultural factors, NCDs generally affect more females than males (MOH; Kenya National NCDs prevention and control strategy, 2015); health system barriers reduce access to what is often fragmented and suboptimal health care for all (Afshar et al., 2015).

NCDs and oral diseases prevention, control, and management require a multi-disciplinary and multi-sectoral approach, involving various stakeholders in both the public (the government through the Ministry of health, legislature, medical training, civic education) and private sector (private healthcare ownership, funding, and development partners); hence the need to reform the health systems in Kenya to integrate oral health into the already existing health programs, especially non-communicable diseases and primary health care (Kenya National Oral health policy, 2022). This may be achieved by including oral health as a component of health promotion in mother and child health clinics and by initiation of oral health programs and training in Health facilities and the community (Government of Kenya; Kenya National Oral

Health Survey Report, 2015). The national NCDs prevention and control strategy is focused on reducing NCDs-related morbidity, mortality, and disability through the common risk factors approach and multisectoral integration (MOH; Kenya National NCDs prevention and Control Strategy, 2015). Oral health clinicians may be instrumental in the attainment of this as they often are the first point of contact with patients visiting public dental facilities.

Globally, there is an epidemiological transition characterized by a rising prevalence of non-communicable diseases (NCDs). In 2015, there were 56 million deaths globally; of which 40 million were due to non-communicable diseases. Approximately 48% of the NCDs related deaths occurred prematurely, before the age of 70 years (WHO, 2015). In Sub-Saharan Africa, uncontrolled urbanization, relatively low socio-economic status, and weak health systems focused on managing infectious diseases may have led to inadequate understanding, prevention, and management of NCDs. Sub-Saharan Africa (SSA) is experiencing a rising prevalence of non-communicable diseases and their associated detrimental effects on the lives of those affected. In Kenya, 39% of deaths annually and 50% of admissions in hospitals are due to NCDs (Diseases et al., 2021).

As dental clinics in public health, facilities are one of the first, and most likely the only, point of contact between a patient and the healthcare system, screening for NCDs at this level will significantly improve the overall timely management of these diseases. Non-communicable diseases have been shown to cause negative social and economic effects on the affected individuals and their households (Mucheru, 2021). This is as a result of the prolonged duration of the illnesses, cost of diagnosis and treatment together with the reduced quality of life. Timely identification of the common NCDs risk factors and their control and behavioural modification could avert the onset, progression and possibly prevent the occurrence of these diseases as well as early initiation of treatment (Mucheru, 2021).

## **1.2. Statement of the research problem**

Majority of the non-communicable diseases are preventable, but they are still the leading causes of death, disability, and morbidity worldwide, with a higher prevalence in Low- and middle-income countries (LMIC), especially those in Sub-Saharan Africa (SSA) (WHO,

2018). NCDs account for over half of all hospital admissions in Kenya, and 39% of all deaths in the country (Kenyan Ministry of Public Health, 2015).

A review of the global burden of disease patterns between 1990 and 2017 with an emphasis on NCD-related DALY indicated a general rise in NCD-related DALY by 67 % between 1990 and 2017 cumulatively (H. Gouda et al., 2019). In Kenya, NCDs accounted for 37% DALY (Mwangi K, et al 2021). Like NCDs, oral diseases are on the rise and they have both been shown to share common risk factors (Jin, L. J. et al., 2016).

Non-integration of care between oral health and other non-communicable diseases - both in policy and in physical healthcare facilities- creates a missed opportunity to involve oral health clinicians in screening, detection, identification, management, and referral of NCDs for specialized care. Oral health clinicians are pivotal in making this a reality.

### **1.3 Justification**

The main focus of oral healthcare in Kenya is curative; with prevention and promotion not receiving the attention it requires (Ministry of Health-Kenya 2022). This happens in a background of a disjointed healthcare system with minimal, if any, integration of oral health and general health (Ministry of Health-Kenya 2022). Oral health clinicians in these facilities are not equipped and/or fully empowered to offer screening for NCDs.

Oral health clinicians are often the first points of contact between patients and the healthcare system (Government of Kenya, 2015); for this reason, they would play an important role in screening the patients they get into contact with, for NCDs. There has been no research in the country on what roles oral health clinicians play in the prevention, control, and management of the increasing NCDs menace. Research is necessary to determine their level of knowledge of NCDs and their risk factors, as well as how well they can be involved in NCDs screening in public health facilities. This would contribute to propelling the country towards the fulfilment of the provisions of the 2010 constitution of the highest standards of health for all (Kenya Constitution 2010) and the Kenya Health Act 2017 objectives of halting and reversing NCDs-related mortalities and morbidity (GoK, 2017). This will also be in line with the Ministry of health's objectives of establishing mechanisms for raising NCDs awareness and prioritization

in national and county governments, promoting and conducting research for NCDs prevention and control as well as integrating NCDs care within all levels of the health sector (MOH, 2015).

Research in this area will also be in line with the regional dynamics in oral health including; WHO, Africa Regional Oral Health Strategy 2016-2025 which seeks to integrate oral health into existing health programs, especially non-communicable diseases and primary health care.

#### **1.4 Research Question**

Do oral health clinicians have a role in the screening for non-communicable diseases?

#### **1.5 Objectives:**

##### **1.5.1 Main Objective**

To assess the role of oral health clinicians in screening for non-communicable diseases in Kiambu County.

##### **1.5.2 Specific Objectives**

1. To describe the knowledge of oral health clinicians on risk factors for non-communicable diseases.
2. To explore the oral health clinicians' perception of their index of suspicion of non-communicable diseases based on medical clerkship.
3. To assess the referral strategy in reference to non-communicable diseases from oral care.

## CHAPTER 2: LITERATURE REVIEW

Kenya is experiencing an epidemiological transition, characterized by declining infectious disease-related morbidities and mortalities and an increase in NCDs-related morbidities, mortalities, and low quality of life (Onyango & Onyango, 2018). Despite this, the country still grapples with poor quality/Inconsistent data on NCDs. Most NCDs are preventable, thus, more effort needs to be directed towards control of their risk factors. Some of the Kenya Health Sector Strategic Plan (KHSSP) 2014-2018 targets are to halt and reverse the rising burden of non-communicable conditions and put into place health promotion interventions that will address health risk factors such as health promotion and interventions aimed at improvement of individual-level behaviours, physical as well as societal environment (Kiarie et al, 2018). Effective disease surveillance requires reliable and valid data, but low- and middle-income countries (LMIC) still grapple with missing or poor-quality data (K. Jayanna, et al. 2019). The WHO NCDs progress report conducted in 2015 demonstrated a lack of proper data collection and collation, especially on NCDs-related mortality in Kenya (WHO, 2015). Studies conducted by WHO indicate that a large proportion of deaths in Low- and Middle-income countries (LMIC) are caused by NCDs, with cancers being the major cause. The 2015 Kenyan STEPS survey provides the first snapshot of major NCDs risk factors burden in the country, providing a baseline against which future progress will be monitored. There is a need for similar and/or complementary surveys to be conducted at regular intervals so that the country can develop a reliable NCDs database as well as be able to influence policy on NCD prevention and promotion beyond the health system (Wamai et al, 2018).

Non-communicable diseases, notably cancers, diabetes, respiratory and cardiovascular diseases are responsible for most of the world's deaths, the majority of which are premature and preventable. LMIC countries suffer approximately 86% of these premature deaths, resulting in great economic losses to the already underprivileged countries. There is a need to strengthen health systems and health sector stakeholders in LMICs to enable them respond adequately to their populations' health needs. To enable this, the World Health Assembly set specific NCDs related targets whose aim is to have a 25% relative reduction in preventable NCDs related deaths by 2025, a reduction of harmful alcohol use by 10%, reduced physical inactivity by 10%, reduction of salt intake and tobacco use by 25% as well as stop the rising prevalence of Diabetes (WHO, 2013).

The first population-based stepwise survey of NCDs prevalence and risk factors in Kenya was conducted by WHO in 2015, to enable planning and programming for NCDs prevention and control using accurate and reliable data. Kenya's population is estimated to be 45 million, with over 42 different ethnic groups. An estimated 46% of the population lives below the poverty line. Majority of Kenyans live in rural areas, but there has been a notable increase in rural-to-urban migration in search of jobs, education etc. The various NCDs share common risk factors- Unhealthy diets characterized by excessive salt consumption, foods rich in processed sugars, Trans-fats and inadequate quantities of fruits and vegetables, tobacco use, harmful use of alcohol and physical inactivity. It was found that the odds of NCD risk factors varied greatly between different ethnic groupings, as well as between males and females. Unlike a similar survey done in Uganda, in Kenya, no notable difference in the odds of NCDs risk factors was reported between those living in rural and those in urban areas. It was recommended that NCD indicators should be integrated with national health surveys to supplement the data collected in periodic STEPS survey for proper planning and projection of NCD prevention and control (WHO, 2016).

Non-communicable diseases have a negative impact on productivity, household expenditure, national income and general economic growth of a country/region. There is need for a multisectoral approach to control and manage NCDs beyond the health sector. This is because individuals of lower socioeconomic status and low education are more prone to NCDs. Sectors outside of health that play a crucial role in NCDs prevention include agriculture and food production to ensure the availability of a healthy balanced diet, the legislature/policy makers, urban planning and industrialization to control and curb the rise in rural to urban migration that results in emergence of poorly planned and congested informal settlements (Temu et al., 2014). WHO recommends promotion of 'best buy' interventions for control and prevention of NCDs, together with multisectoral involvement in tackling the common NCDs risk factors. These include, amongst others, an increment of taxation on alcohol and tobacco products, increased public education/awareness on harmful effects of alcohol, tobacco, sedentary lifestyles and unhealthy diets, and advertising restriction on alcohol and tobacco products (P. Juma et al., 2017).

### **2.1.1 Knowledge of oral health clinicians on risk factors for NCDs:**

There is a close relationship between oral health and systemic health. The most prevalent oral disease is periodontitis, a chronic inflammatory condition that has been shown to interact with several NCDs such as hypertension and diabetes. This is thought to be due to periodontitis contributing to the overall inflammatory burden in affected individuals. Periodontitis shares many common risk factors with NCDs, thus close collaboration between physicians and oral health clinicians is needed to increase the chance of early detection and improve the prevention and control of these conditions (*Dörfer et al. 2017*). There is also a need for oral health clinicians to change the scope of their service delivery to accommodate the changing healthcare environment, Population demographics and disease epidemiology characterized by the rising prevalence of NCDs. Oral diseases such as periodontitis have been identified as NCDs risk factors, further necessitating integration of dental care with the general health care system to improve patient management and disease outcome. This can be achieved within primary care through screening for conditions directly affected by oral diseases and prevention mechanisms focused on lifestyle changes (Laster et al., 2017).

The first national Oral health survey conducted in Kenya by WHO in 2015 indicated a gap in knowledge amongst dental health practitioners on their role in the prevention, promotion and detection of NCDs. Recommendations were made for the formulation of an oral health policy that would guide the delivery of oral health services in the country but this remains unachieved to date (MoH, 2015).

### **2.1.2 Oral Health Clinicians' Index of suspicion of NCDs based on medical clerkship:**

A study conducted in the United States of America on the need to increase the scope of dentists' work in their offices concluded that there is a need for inter-professional training and collaboration between oral health practitioners, and physicians for effective and timely detection and treatment of NCDs (Lamster & Myers-Wright, 2017). This is echoed in the Kenya Oral Health Policy 2019-2029, which remains a draft and is yet to be adopted or published for implementation. A study conducted in Bamako on the knowledge, attitude and practices of doctors and dentists on the relationship between periodontitis and NCDs revealed a large gap in knowledge and practice; most doctors had no or little knowledge on the



identification of periodontal disease, thus they rarely examined or questioned patients about it. Dentists were found to have some knowledge of NCDs, from their training in dental school although they often overlooked symptoms beyond the mouth and only referred patients with NCDs symptoms on rare occasions (Diawara et al., 2018). In Kenya, an almost similar study on health promotion attitudes and practices towards NCDs amongst healthcare workers in KNH revealed that a positive attitude by healthcare workers towards health promotion was necessary, for them to be able to practice or participate in any health promotion activities. As a result, it was established that there is a need for capacity building and development of health promotion manuals/activities for both health care workers and the general population (Kamau, 2017).

Results from the 2015 WHO STEPS survey on NCDs risk factors indicate that healthcare workers did not routinely advise patients on proper diet, minimization/cessation of alcohol and or tobacco use as well as the importance of regular physical exercise. This further emphasizes the need for capacity building of healthcare workers and provision of accurate and timely information on NCDs and their risk factors (MoH, 2015).

### **2.1.3 Referral strategy of NCDs in Reference to Oral care:**

Globally, oral health remains a major public health burden, hence the need to integrate oral health into the global agenda through the common risk factors approach (Jin et al., 2016). The changing epidemiological picture of diseases especially in LMIC necessitates a reorganization of our health systems and models of care from the disease-specific models currently in use, to a service and patient-focused model, involving integration of care, especially at primary care levels for better patient experiences and health outcomes (Tegu, F. et al 2014). In Kenya, for example, oral health is excluded from the government's KEPH list of services, as well as in the community health strategy list of services to be offered (WHO Prymases, 2017). As a result, the healthcare workers who make primary contact with patients in the communities and public health facilities are not in a position to offer comprehensive care to those in need. For integrated health care to be realized fully, there is need to explore the effectiveness of task shifting where non-physician cadres are trained to effectively identify NCD risk factors, educate and refer clients accordingly. The training can be incorporated into the various Clinicians' learning environments, including the Oral health clinicians training curriculum or through the various available e-learning platforms (Temu et al., 2014).

The cost of diagnosing and treating NCDs is relatively high, especially in LMICs. Governments in this region need to prioritize and allocate more resources to NCDs programs (P. A. Juma et al., 2018). A retrospective cohort study conducted in a primary care facility in England demonstrated a strong association between multiple NCDs, female gender, lower socioeconomic status and increasing age. Primary healthcare facilities are majorly run by general practitioners, and the majority of their consultations, prescriptions and referrals were associated with Multiple NCDs. NCDs also accounted for a majority of the hospital admissions. Amongst the patients with NCDs, a majority had mental and physical illness comorbidities more common in the younger age groups, those of low socioeconomic status and in females (Cassel, A. Et al. 2018). Clinical management of patients with multiple NCDs is often complex due to how uniquely the different multiple chronic diseases tend to overlap and or interact in individuals. Challenges faced by those with NCDs include lack of support while making care-related decisions, poor or inadequate communication and fragmented, uncoordinated, incomplete, inefficient and ineffective healthcare systems. Therefore, there is a need for health system decision-makers to support bottom-up, person-centred approaches to developing models of care that are specific for patients with several non-communicable diseases at the same time (Forum, M. H. 2016).

A household survey in Kenya of the association between types of regular primary care and hospitalization among those with and those without NCDs showed that with the increasingly ageing population, there is an increasing prevalence of chronic diseases, which is associated with an increase in health care spending, especially amongst those with several NCDs (Subramanian et al., 2018). This study also demonstrated that having regular primary care visits reduced spending on health care and resulted in better health outcomes. Despite an emphasis on the management of chronic conditions in healthcare systems across the world, the delivery of care in Kenya is generally built upon the management and treatment of single diseases; evidence on the effectiveness of interventions to improve outcomes of multimorbid patients is still limited (Achoki et al., 2016).

The Kenya health sector referral strategy 2014-2018 clearly stipulates how patients, expertise (personnel), specimens and patient parameters such as their information are to be handled within and between clinicians, facilities and even counties. Like many other health-related policies, the implementation has been wanting due to inadequate monitoring of the process,

inadequate resource allocation, personnel and structures (Ministry of Health, 2014). This greatly affects service delivery and patient outcomes (Ministry of Health, 2014). The Kenya national NCD prevention and control strategy was intended to minimize the preventable burden of morbidity, mortality and disability due to non-communicable diseases through multi-sectorial collaboration at the county and national levels, but this is yet to be realized as this strategy has not been devolved and fully adopted in the counties. The strategy only mentions inter-sectorial collaboration and integration, with no clear guidelines on the role of oral health clinicians in this (P. Juma et al., 2017).

## 2.2 CONCEPTUAL FRAMEWORK

### Oral Health Clinicians:

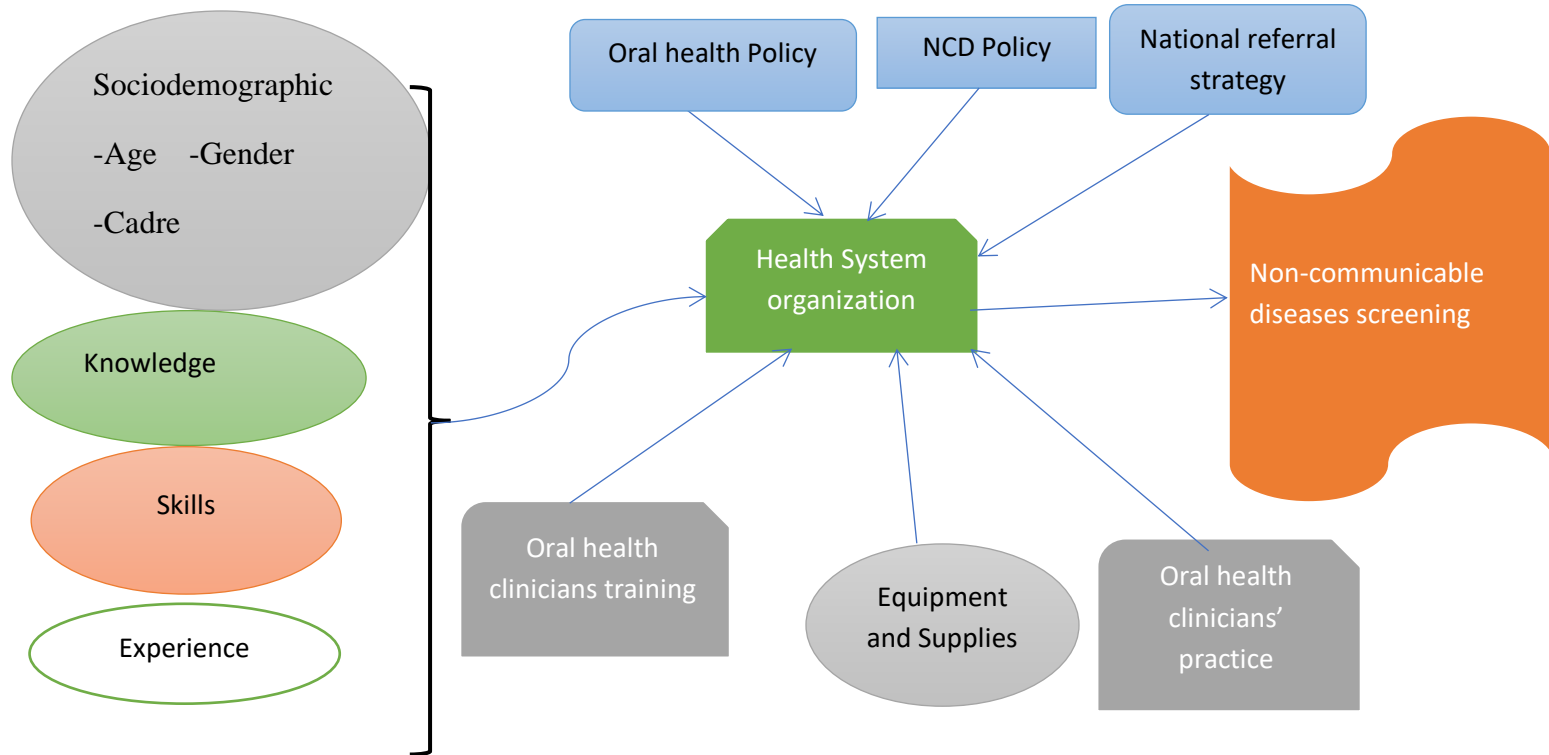


Figure 1: Conceptual framework

Adapted from Nola Pender (2011)

### 2.2.1 Predictor (Independent) Variables:

#### i) Social Demographic characteristics

1. Age
2. Gender- male, female
3. Cadre- dental specialist, dental officer, community oral health officer

#### ii) Oral health clinicians:

**Knowledge:** Information acquired through training in medical/dental schools as stipulated in the specific cadre's training syllabus; this variable evaluated the knowledge acquired by the various cadres pertaining to NCDs and their risk factors during their formal training in school.

**Skills:** technical ability to perform clinical procedures as outlined in the standard operating procedures. We evaluated the oral health clinicians' skill sets that they have, and that they put into practice at their work places, in the identification and detection of NCDs. Their skill sets were compared with those outlined in the standard operating procedures for NCDs diagnosis.

**Experience:** Knowledge and skills acquired from practice, conferences, continuous education. We sought to find out the oral health clinicians' source of knowledge and skills- formal training, continuous medical education in their respective facilities, self-study, scientific conferences or from their peers in the line of duty.

### 2.2.2 Intervening variables

**Health system organization:** Policies, strategies and guidelines on health services delivery at the national and county levels. Outlines enabling or hindering factors for oral health clinicians' ability and role in the identification of NCDs and their risk factors.

**Oral health policy:** Legal document providing guidelines on scope and procedures to be followed by oral health clinicians in their service delivery in Kenya. Availability or lack thereof of Oral health policy directly influences knowledge and practice of oral health clinicians in the identification and, or detection of NCDs and their risk factors.

**NCDs policy:** Legal guidelines on screening, diagnosis and management of NCDs in Kenya. This gives clear guidelines on what to look out for, how to identify and detect NCDs and their

risk factors as well as the various preventive, control and treatment guidelines for the various NCDs and their risk factors.

**National Referral strategy:** Guidelines by the ministry of Health that gives directives on the movement of patients, their specimens and or information within the health system as well as between medical personnel. This gives guidance on processes to be followed in the event of identification or suspicion of NCDs or their risk factors by oral health clinicians and other medical personnel involved in patient care in hospitals.

**Oral health clinicians training:** Scope of training in medical/ dental school of the various oral health clinicians in reference to NCDs and oral care. This influences the practice and skill set of oral health clinicians in NCDs identification and detection.

**Oral Health Clinicians Practice:** Processes and procedures followed by oral health clinicians in their line of duty; this determines whether they suspect, identify, detect and or refer patients with, or at risk of, NCDs.

**Instruments and supplies:** Armamentarium such as blood pressure machines, glucometers, weighing scales, measuring tapes, and laboratory reagents available to oral health clinicians in their line of duty. These enable the detection of NCDs in patients suspected or identified to be at risk.

### **2.2.3 Outcome (dependent) variable**

Non-communicable diseases screening; this is the outcome derived from clinicians' knowledge, suspicion and practice using the above-mentioned instruments and a thorough clerkship.

## **CHAPTER 3: Methodology**

### **3.1 Study area**

The study was carried out in public health facilities within Kiambu County. Unlike most private dental clinics that are ‘stand-alone’ without affiliation to hospitals, dental clinics in public hospitals are a department that should ideally be working closely with other departments in the hospital. A systematic analysis of the GBD 2016 on health disparities across counties in Kenya between 1990 and 2016 indicated that out of the 47 counties in Kenya, Kiambu County alongside Nairobi and Nyeri had higher rates of NCDs related DALYs than those due to communicable, maternal, neonatal and nutritional disorders (T.Achoki et al 2019). In addition, the County is mainly cosmopolitan (Kiambu County ICDP 2018-2022) making it an ideal location for the study.

Kiambu county, total area of 2,538.6 Km<sup>2</sup>, is one of the 47 counties in the Republic of Kenya (Kenya National Bureau of Statistics (KNBS), 2019).

Kiambu County borders Nairobi and Kajiado Counties to the South, Machakos to the East, Murang’a to the North and North East, Nyandarua to the North West and Nakuru to the West. The county lies between latitudes 00 25’ and 10 20’ South of the Equator and Longitude 360 31’ and 370 15’ East. According to the 2019 Population and Housing census, Kiambu County had 2,417,735 people with 1,187,146 and 1,230,454 being males and females respectively. The density of people in Kiambu County is 952.4/km<sup>2</sup> (KNBS,2019).

The county has a total of 505 public and private health facilities divided as follows; 108 are public health facilities, 64 are faith-based health facilities and 333 are private health facilities. The public health facilities can be further divided by Kenya Essential Package for Health (KEPH) levels. 70 Dispensaries offering Level 2 Services; 24 Health centres providing Level 3 Services; 11 Hospitals providing Level 4 Services; 3 Hospitals offering Level 5 Services. The county’s oral health clinicians/population ratio is 1:30,000; while the nurse population ratio is 1:1110.

### **3.2 Study design**

This was a qualitative, cross-sectional census study. Qualitative study design was most preferred for this study since the population of interest was small (approximately 35 oral health clinicians) and it enabled the collection of detailed information on the study.

### **3.3 Study population**

The study population were oral health clinicians working in dental clinics in public health facilities in Kiambu County. These included dental officers, dental specialists and community oral health officers (CoHos).

Private dental facilities were excluded because the majority of them are stand-alone (Kenya National Oral Health Policy, 2022); they operate independently unlike those in public facilities that are usually part of a whole hospital set-up. Private facilities augment government facilities; they are owned & run by oral health clinicians that are not necessarily employees in public service in Kiambu county.

### **3.4 Sample**

Census, Purposive sampling method was used. At the time of the study, there were 35 oral health clinicians in Kiambu County. These included one dental public health specialist, 14 dental officers, four dental specialists, and sixteen community oral health officers (Kiambu County ICDP 2018-2022).

#### **3.4.1.1 Sampling**

##### **Stage 1: Categorization of health facilities**

Stratification of the health facilities was done based on their administrative levels-level V, Level IV, and Level III (KMHFL). This was to enable the investigator know which level of facilities in the county had functional dental clinics as well as their scope of services in reference to NCDs.

The ten public health facilities in which the study was conducted were identified from data available in the Kiambu County integrated development Plan (2018-2022) that indicated the public health facilities that had functional dental clinics.



### **3.4.1.2 Stage 2: Selection of Study Participants**

Purposive total population sampling technique was used where all oral health clinicians in the county were included in the study.

## **3.5 Data Collection**

### **3.5.1 Inclusion and Exclusion Criteria**

#### **3.5.1.1 Inclusion criteria:**

All registered oral health clinicians in dental clinics within public health facilities in Kiambu County.

Oral health clinicians in dental clinics within public health facilities in Kiambu County who gave consent to participate in the study.

#### **3.5.1.2 Exclusion criteria:**

Oral health clinicians in dental clinics within public health facilities in Kiambu county who did not consent to participate in the study.

Oral health clinicians working in private dental clinics within the County.

### **3.5.2 Data collection process**

Data collection was conducted in dental clinics in ten public health facilities within Kiambu county, between 12<sup>th</sup> August 2020 and 24<sup>th</sup> September 2020. Administrative permission, a list of registered oral health clinicians in the county and their qualification details were obtained from the county Department for health. The ten facilities were visited and permission sought - often verbal from the facility in-charge and/or the medical superintendent, to whom the study and its significance was clearly explained. A list of all the registered oral health clinicians in each of the facilities was also obtained.

Contact details of the dental clinics' heads of department (HoD) were obtained for planning and scheduling visits during which the scope and significance of the study was explained. Upon request, a departmental duty roster in each facility, a room was provided for conducting the interviews; ensuring observation of social distancing protocols of being at least one metre apart from each other.

The dental clinics' heads of department provided secluded meeting areas within their departments, where the interviews were conducted. On the respective interview days, the HOD in each facility would facilitate a verbal introduction between the individual study participant and the principal investigator. After taking the participant through the objectives, scope, and significance of the study, and once assured of the voluntary and confidential nature of the study, the individual respondents were invited to sign a consent form (Appendix 3) after which they filled in a self-administered questionnaire (Appendix 4) with biodemographic information. Once done, each participant was taken through the interview. Each interview session lasted 10-15 minutes. An interview guide (Appendix 5) with interview questions was used.

In cases where information provided by the participant was not clear, the principal investigator sought clarification by asking follow-up questions. Participants were also given an opportunity to ask questions or seek clarification. A detailed daily record of the day's activities formed part of the fieldwork notes.

### **3.6 Data analysis**

This describes in detail the process involved in analysing the data collected during this study.

#### **Study variables**

##### **3.6.1 Predictor (Independent) Variables:**

###### **I. Social Demographic characteristics**

These included age, gender (Male or female) and cadre (dental specialist, dental officer or community oral health officer).

###### **II. Oral health clinicians:**

- a) **Knowledge:** Information acquired through training in medical/dental schools as stipulated in the specific cadre training syllabus/Manuals.
- b) **Skills:** Technical ability to perform clinical procedures as outlined in the standard operating procedures.
- c) **Experience:** Knowledge and skills acquired from practice, conferences, continuous education.

### **3.6.2 Intermediate variables:**

- a) Health system organization: Policies, strategies and guidelines on practice a health services delivery at the national and county levels.
- b) Oral health policy: Legal document providing guidelines on the scope and procedures to be followed by oral health clinicians in their service delivery in Kenya.
- c) Non-communicable diseases policy: Legal guidelines on screening, diagnosis and management of non-communicable diseases in Kenya.
- d) National Referral strategy: Guidelines by the Ministry of health that give directives on the movement of patients, their specimens and or information within the health system as well as well as between medical personnel.
- e) Oral health clinicians training: Scope of training in medical/ dental school of the various oral health clinicians in reference to non-communicable diseases and oral care.
- f) Oral Health Clinicians Practice: Processes and procedures followed by oral health clinicians in their line of duty.
- g) Instruments and supplies: Armamentariums such as blood pressure machines, glucometers, weighing scales, measuring tapes, and laboratory reagents available to oral health clinicians in their line of duty.

### **3.6.3 Outcome (dependent) variable**

Non-communicable diseases screening

#### **Data analysis process:**

The data collected was checked for completeness. Frequency counts and proportions were calculated for age and gender. Frequency was used to summarise categorical variables; the data is presented using contingency tables.

For qualitative data, the recorded interviews were transcribed, and content analysis of thematic areas done. Thematic-aligned Insights were drawn from the field notes written during the interviews.

The data was coded by categorizing it into various groups based on the information and feedback that highlighted the contents of the data.

Major themes (study objectives) and minor themes (responses to the objectives) were identified from the coded data, using frequently appearing responses.

The data set was reviewed against the identified themes and adjusted, combined or discarded accordingly, in the event that a new perspective or piece of information was deducted from the raw data; followed by a final definition and naming of the themes to help explain the collected data.

## CHAPTER 4: RESULTS

This chapter describes in detail the findings of this hospital-based mixed study, whose main objective was to determine whether oral health clinicians have a role in screening for non -non-communicable diseases.

### **Sociodemographic attributes of oral health Clinicians:**

There was a total of 35 participants in this study; 18 were female, while 17 were male. Dental officers were 14; 9 females and 5 males. Community oral health officers were 16; 4 females and 12 males. There were five dental specialists: one (1) periodontologist, one (1) prosthodontist, one (1) paediatric dentist, one (1) maxillofacial surgeon and one (1) public health specialist.

Most of the study participants reported having a job description (26/35), 3 did not have one while 6 participants were not sure if they had a job description or not.

*Table 1: Table summarizing attributes of oral health clinicians interviewed, their cadre and number of years in current profession.*

<b>what is the label for the axis?</b>	<b>Category</b>	<b>Frequency</b>
Gender	Male	18
	Female	17
Cadre	Dental Specialists	5
	Dental Officers	14
	Community Oral Health Officers	16
Job Description	Yes	26
	No	3
	Unknown	6
Years of professional training	3 years	13
	4 years	17
	5+ years	5

*Table 2: Distribution of the facilities by levels*

<b>Name of the facility</b>	<b>Administrative level</b>
Kigumo	Level 3
Lusigeti	Level 3
Lari	Level 4
Karuri	Level 4
Kihara	Level 4
Tigoni	Level 4
Githunguri	Level 4
Gatundu	Level 5
Kiambu	Level 5
Thika	Level 5

All cadres did not participate in screening with the exception of 2 COHOs, and 2 dental officers that had been involved in screening activities for hypertension and diabetes. 88.5% of the study participants had not participated and had no idea that their facilities have any screening activities. 74.3 % of the study participants reported having job descriptions but they could not confirm whether screening was one of their responsibilities. 25.7% did not have, or did not know they had a job description. Interdepartmental collaboration was higher among study participants with more than 5 years of professional training.

Level 3 facilities had only four oral health clinicians, while the remaining thirty-one were distributed between level 4 & level 5 facilities within the county.

### **Oral health clinicians' knowledge of non-communicable diseases:**

Most of the respondents defined non-communicable diseases as diseases that cannot be transmitted from one person to the other.

*"In my understanding, NCDs are diseases that once you get you cannot easily pass it to another person"* clinician 004.

While a majority of the respondents understood non-communicable diseases as non-transmittable, a few of them reported that non-communicable diseases were lifestyle diseases.

*"Non-communicable diseases are mainly lifestyle diseases"*- Clinician 001.

Most respondents described NCDs as diseases that are not transmitted through physical contact or air.

*"These are diseases that are not transmitted either by physical contact or by air"* Clinician 012.

Most respondents had knowledge on NCDs risk factors; risk factors mentioned were: sedentary lifestyle, diet, alcohol, smoking, family history, genetics, obesity and environmental factors.

32/35 respondents reported NCDs risk factors to be diet, obesity, sedentary lifestyle, alcohol consumption, genetics and environment. Community oral health officers mostly mentioned diet, lifestyle & genetics as the risk factors.

*"Risk factors are things that can increase your chances of getting that illness, they are factors mostly related to lifestyle that can increase the risk, I know of two lifestyle and genetics that is for cancer and diabetes"* Clinician 013.

*"Risk factors are the types of food that we eat, the environment that we live in"* clinician 016.

Dental officers reported a sedentary lifestyle, diet, alcohol, smoking and genetics as the risk factors for NCDs (10/14).

*"Obesity, sedentary lifestyle and genetics"* clinician 004.

*"Obesity, poor dieting, lack of exercise, the issue of genetics"* Clinician 009.

All the respondents mentioned high blood pressure and diabetes as the common NCDs they knew and focused on during their day-to-day work.

*“For example, Diabetes, high blood pressure, cancer”* Clinician 011.

All respondents reported that the presence of NCDs affected dental treatment outcome.

*“We have to think about non-communicable diseases we talk about diabetes which may cause delayed wound healing after a procedure like a tooth extraction. In patients with high blood pressure, they may experience excessive bleeding after a tooth extraction or any dental surgery procedure”* Clinician 00.

The clinicians often have to make adjustments to treatment plans depending on the severity of the disease.

*“The signs and symptoms of NCDs definitely alter my treatment plan and often brings on board other health workers who are going to help me manage those patients because for example something like high blood pressure, something like diabetes you have to stabilize the patient first for us to proceed with the surgical procedure that we do in the dental clinic like extractions”* Clinician 017.

Community oral health officers and dental officers refer patients they suspect to have NCDs to the outpatient departments for management of the NCD, after which they return to them for dental treatment.

*“For the patients who have high blood pressure and are not on medication, we send them to the outpatient department for management of the blood pressure before further treatment here at the dental department”* Clinician 004.

*“First, if someone comes here and you realize there is an elevated blood pressure, we first refer to the clinician to manage the pressure and postpone the dental treatment for a later date, that’s the first thing we do”* Clinician 007.

All dental Specialists interviewed reported the presence of one or more NCDs in their patients often led them to alter their treatment plan; they had to take on a multi-disciplinary approach by involving other clinical teams in the care of their patients.



*“The signs and symptoms of NCDs definitely alter my treatment plan and often brings on board other health workers who are going to help me manage those patients because for example something like high blood pressure, something like diabetes you have to stabilize the patient first for us to proceed with the surgical procedure that we do in the dental clinic like extractions. Somebody who have high blood sugars we don’t do surgical procedures before we stabilize that patient because of fear of bleeding during the procedure. We collaborate with others so that we can delay the treatment plan of the patient”* Clinician 017.

All respondents acquired knowledge on NCDs and their risk factors through formal training in their college syllabus for the community oral health officers and university syllabus for the dental officers and dental specialists.

*“I can say it is more or less formal training”* Clinician 001.

*“Majority of this information I acquired during our undergraduate training we rotated in internal medicine and internal surgery and pharmacology for one year I think as well as during post graduate training and a little bit of the experience we pick up as we work in the facilities”* Clinician 018.

*“Yea, we were taught general medicine in the initial years before we specialized in dental health. I also did a study on diabetes and periodontal diseases so I also tend to have a lot of background information on especially diabetes, because I have done a local study within this facility relating diabetes and oral health particularly gum disease”* Clinician 017.

The respondents also acquired knowledge on NCDs from their daily practice.

*“I learnt it in college as well as clinical experience over time”* Clinician 004.

*I learnt it in college and I think the clinical experience over time that has increased my awareness”* Clinician 023.

and Continuous medical education (CMEs) such as webinars, conferences.

*“From our training in college, during internship, sometimes from CMEs and conferences”* Clinician 023.

*“It was part of our core curriculum in our training in college, also during conference and continuous medical education forums (CMEs)” Clinician 026.*

Other sources of knowledge on NCDs were through research, which only one respondent had been involved in as they conducted a study on diabetes and periodontal disease.

*“I also did a study on diabetes and periodontal diseases so I also tend to have a lot of background information on especially diabetes, because I have done a local study within this facility relating diabetes and oral health, particularly gum disease” Clinician 024.*

Dental officers & Community oral health officers reported that they were not involved in the planning for continuous medical education (CME) topics; they therefore had to go out of their way to attend continuous medical education forums.

*“Not really much, nobody has come out to tell us, we are training in this and that, even seminars, we are not really given opportunities” Clinician 019.*

*“I think we work in silos in this hospital, things are very fragmented. Actually, the interdepartmental interactions are very minimal; you may not even know where the CMEs are taking place” Clinician 20.*

All the respondents reported that the facilities conduct and facilitate little or no continuous medical education forums for oral health clinicians. However, this may not be the case with the other medical departments. *“For other departments yes, but for dental, No and surgical department I don’t know about the others.” Clinician 025.*

*“Whenever these medical education fora are organized the dental teams are never informed and are not given a chance to present their cases”. Clinician 004.*

**Oral health clinicians’ perception of their index of suspicion of non-communicable diseases:**

All the respondents reported that during history taking, they asked patients if they had a non-communicable disease, specifically diabetes and high blood pressure or if they are on medication for any illness. Depending on the feedback given, patients were asked to present the medication they were on.

*“We usually ask patients, like do you have high blood pressure, do you have diabetes. If they are not sure and if they are someone that are of age and can show signs that could be risk factors, we go further and do the investigation”* Clinician 004.

*“Now also depending on the condition because they don’t present the same way. From observation you can tell this person is suffering or at risk of a given condition. From examining you can tell if someone is suffering from a given condition; from the history you are able to pick if they have a given condition”* Clinician 008.

All interviewed respondents reported not being in a position to manage non-communicable diseases, they refer those suspected or confirmed to have NCDs to physicians. Patients suspected of having diabetes are usually sent for random blood sugar tests, after which they either proceed to receive dental treatment or they are referred to the physician and reappointed to a later date. As a routine, all patients have their blood pressure levels checked at the triage, prior to going in for dental consultations. Oral health clinicians attending to them usually review the parameters, they also enquire from the patients how they are feeling. In cases where the blood pressure parameters are above normal, a repeat check is done and if they are still above normal ranges, the patients are referred to the physician for further management. Those with normal blood pressure levels receive care within the dental department. *“First, since they do vitals, if someone comes here and we realize there is an elevated pressure, we first refer to the clinician to manage the pressure. If it’s a chronic condition, we first manage the pressure and postpone the dental treatment for a later date. That’s the first thing we do”* Clinician 008.

*During history taking, patients in the dental clinics are evaluated physically for signs and symptoms of an illness, abnormal appearance, body weight, gait etc. Intraorally, signs & symptoms of non-communicable disease such inflammations, change in appearance and or texture of oral mucosa are evaluated. Depending on their presenting complaints and symptoms, the patients are offered dental treatment or it’s delayed till they have been reviewed by a physician clinician 009.*

There was no consensus amongst the respondents on what parameters to use when determining if a patient was at risk or had a non-communicable disease; especially in reference to the most commonly encountered NCDs-diabetes & high blood pressure. *“For blood pressure I look at*

*anything above 140/90 and for RBS anything about 10ml/litre would warrant some more investigation” Clinician 010.*

*“Yes, the one presenting with a blood sugar reading of between 3-8, I would say that’s normal but above 9 you start questioning; Blood pressure, you look for something an average of 120-130, 80 to around 87 above which you start questioning” clinician 014.*

*“Yes, of course there are reference measures, let’s take an example of diabetes you test the blood sugar levels after they have eaten should not go beyond 11 that is the highest point, you know 3.1 to 6.2 those are the normal levels” Clinician 015.*

*“The normal is around 140-150 is not bad we can do the extraction at that, but now the diastolic should not be high, but if a person is old you cannot do at 150 but normal is 140, I mean less than 140 and less than 90” Clinician 015.*

All respondents described screening of diseases as the processes carried out to determine if one has a particular illness or not; this involved checking patients’ vital signs-temperature, weight & blood pressure.<sup>2</sup> dental officers and 2 community oral health officers reported having participated in community outreach programs where screening for diabetes & high blood pressure was done.

31 of the 35 respondents had no idea of the screening activities in the facilities, despite noting that this is an important process that should be conducted regularly.

*“I’ve never participated in any; I don’t think there’s any” Clinician 021.*

When asked how often they are likely to suspect non-communicable diseases on a scale of 1-5, where 1 is very unlikely & 5 very likely, majority of the respondents reported that they are likely to suspect NCDs (20/35); 5 of the respondents were very unlikely while 10 of the respondents were not sure.

*“In a day in a span of 20 patients we can get 2 to 3, it’s not something that is common but very frequent, I can say it’s very likely” Clinician 017.*

All 35 respondents were aware of some of the instruments & equipment used in NCDs screening; they reported blood pressure machines, weighing scales and glucometers as the most

commonly used equipment. They hardly used them, as they relied on the triage department for the results.

*“No, because this dental department is not well equipped. We don’t have pressure checking machine, weighing scale or a blood sugar machine; these are tested at the triage”* Clinician 023.

*“It depends for diabetes we need random blood sugar testing kits and fast blood sugar testing kits, for blood pressure basically the BP machine those are the minimal basics”* Clinician 035.

Most of the respondents encountered several challenges during screening of patients; these included: *“lack of personnel, testing machines, patients refusing to take part in screening”* Clinician 032.

The respondents identified their role in the screening of NCDs as that of detection, identification but not management, which they referred to the physicians *“The most important thing especially for me is that I can be able to detect the presence of NCDs, its most likely it’s for the specialists to do that part not necessarily me treating but detecting and referring for the physician to do the necessary, in case of any emergency I am in apposition to maybe stop the bleeding and maybe advice the patient on what to do to bring down sugars before things go bad”* Clinician 017.

The respondents’ agreed screening for NCDs was important as it enables early detection and management of diseases, thus improving the patients’ quality of life. *“We can be the first people who identify, and therefore probably refer the patient for management, and also treating because of the relationship of some entities and oral health, then management of dental conditions will be better therefore the patient will have a better quality of life”* Clinician 006.

All the respondents reported having no written Standard operating procedures (SoPs) in their respective departments, that guided their day-to-day duties at work. They often relied on what each thought was the right procedure or ‘common sense’.

*“Common sense, what we have learnt is that you handle the patient depending on your findings”* Clinician 003.

*“Basically, we have the County minimal standards of operations that apply for all clinicians and the universal clinical SOP, we have local ones that we came up with for our clinic, though they are verbal and we don’t have a written down framework; but we have the normal procedure on how to treat a patient”* Clinician 018.

Most of the respondents had no knowledge of the existence of an oral health policy (25/35)

*“I don’t know if there is one”* Clinician 34.

Five respondents speculated there could be an oral health policy that guides their practice, although they had not read or interacted with it;

*“No, I have not familiarized myself with its contents, I just know there is a policy”* Clinician 35.

Five respondents reported knowledge of an oral health policy. *“Yes, I know, the role of the policy is to improve the oral care in the country”* Clinician 033.

All respondents had no knowledge of a non-communicable diseases policy in Kenya.

*“I believe there is but I am not sure, I have not come across it”* Clinician 032.

### **Referral strategy in reference to NCDs from oral care:**

Most of the respondents reported they refer all patients they suspect to have or are at risk of non-communicable diseases to physicians or medical officers within their facilities. *“Basically, once you get a patient whom you suspect to be suffering from NCD, you liaise with the medical officer from this health facility and they are directed to the relevant NCDs clinics that we run because we have a diabetic clinic and hypertensive clinic, whereby we get them to the system and the clinician or medical officer takes over”* Clinician 018.

*“Yes, they do and, in some cases, not all patients that come to the dental clinic pass through a clinician, some come here as a first time and its now our duty to be able to pick out the said conditions to be able to refer”* Clinician 014.

Most of the respondents felt they are not able to adequately detect or play a role in the management of NCDs due to poor equipping of the dental clinics *“I would say No, because dental departments are not well equipped, we don’t have pressure checking machine, weighing*

*scale it's all done elsewhere and at times the waiting hours might not be favourable for patients to be tested*" Clinician 014.

The form of communication between the dental clinics and other departments on referred patients is either through medical notes written by the attending physician or clinician on the patients' files; or in the hospital management information systems which tends to be incomplete.

*"Yes, there is nowhere where we communicate. Yes, we have a system, HMIS, but it has quite a lot of weaknesses; even if we are able to read notes that aspect of being able to deduce BPs is not there in the system. Yes, there is no clear communication between us and the medical department"* Clinician 013.

*"Written, on the patients file"* Clinician 014.

Referring oral health clinicians do not follow up on the referred patients; they wait for the referred patients to return to the dental department at a later date and when this does not happen, the patients are lost to follow up.

*"We have never done; They don't give us their contacts and when we refer them maybe they don't come back and we assume they are well"* Clinician 012.

*"We refer for the needful to be done, we don't usually follow up on that"* Clinician 017.

On rare occasions, oral health clinicians engage the attending clinicians to follow up on the status and progress of the referred patients. *"Yes, of course I do follow up, we work together, we follow up and see how they are doing"* Clinician 019.

Depending on the presentation of the patients visiting the dental clinics, some patients are referred to other public facilities within the county, usually those of a higher level where there are specialists. Hardly will the referring oral health clinician follow up on such referrals.

*"There is no follow up. There is no way you can do a follow up because once the patient leaves the dental clinic, if the patient never comes back to the clinic, you will never know how he is progressing"* Clinician 010.

All the 35 respondents were unaware of the existence of any guidelines or policies, whether at the county or national levels, that guided patients' referral within facilities; from one department to the other within a facility and between facilities, both within and outside the county. they all reported that they followed procedures they found in the facilities, or what they deemed appropriate. *“Yes, once a patient has been referred to dental and we manage properly as is supposed to be, there is always feedback to whoever sent the patient if it's within the facility. But if it is from outside now it's to the discretion of the patient. We can either go back or not. In most cases they come without any contact”* Clinician 008.

## **CHAPTER 5: DISCUSSION OF THE RESULTS**

### **Introduction**

This chapter presents the summary of the findings of this study. In seeking to address the question of whether oral health clinicians had a role to play in screening for non-communicable diseases at public healthcare facilities in Kenya, it was imperative to engage with the various oral health clinicians that are a representative sample of the situation across the country's 47 counties.

Results from this study showed differing levels of knowledge of NCDs by oral health clinicians, depending on their skill set, level of training and years of experience. There was a glaring disparity in the level of screening for NCDs, approach (including referral), as well as a homogenous policy resource deficit, that would inform the structure and framework against which prevention, detection, and management of NCDs ought to occur in public health facilities in the county. The findings did not show any significant difference between the two genders' understanding and execution of their role in screening for NCDs.

### **Oral health clinicians' knowledge of non-communicable diseases:**

From the study, the more exposed, and academically advanced oral health clinicians-dental specialists displayed a more informed position on what NCDs were, their risk factors, and how to manage them as compared to the other oral health clinicians-dental officers and community oral health officers. In their study, Z. Yonel and E. Cerullo *et al.*, 2020 postulate that informed dental teams in primary care settings can better raise awareness about non-diabetic Hyperglycaemia and type 2 diabetes. This, in their findings, helps with prevention and management, leading to better oral and overall health outcomes. It also increases the role of



dental teams in addressing the challenges of type 2 diabetes. This reinforces the findings from this study that oral health clinicians that were more aware of NCDs, either through professional training or from involvement in NCDs-related interactions either in or outside their workplaces - like pertinent research, and/or community outreach activities around NCDs - were more likely to be more informed to suspect or detect NCDs as compared to the rest of the respondents, and much better placed to offer screening for NCDs. All the oral health clinicians interviewed indicated to some extent, some knowledge of NCDs, their risk factors, as well as elemental approaches to managing NCDs, with all of the respondents unanimously indicating their reluctance to manage NCDs.

In a qualitative systematic review and thematic synthesis study on a review of gaps in the provision of integrated care for NCDs in India, Manoj Kumar, N. Swaroop *et al.*, 2020 identified a shortage of health workers and limited capacity, along with poorly functioning community groups and inadequate knowledge of NCD risk factors, as major contributors to poor outcomes in managing NCDs. At the facility level, they observed additional issues with poor infrastructure, lack of provider knowledge about NCD care standards, and subpar quality of care, all of which made it difficult to manage NCDs effectively. From these findings, an oral health clinician is able to advise and assist a patient on NCDs better if they are more knowledgeable about the diseases. That there is no integrated standard of care that is well-known by the various clinicians -oral health practitioners included -in public health facilities is a further indictment of the current state of NCDs management, and as such the need to provide a base of reference against which all providers can engage patients, amongst other additional approaches as highlighted in this and other studies.

### **Oral health clinicians' perception of their index of suspicion of non-communicable diseases:**

The study findings suggest that the most informed oral health clinicians (clinicians with more than five (5) years of training) were more likely to accurately detect, refer for screening of various NCDs, identify and articulate NCDs risk factors, as well as highlight management approaches for the diseases, oral procedures notwithstanding. The clinicians with the longest training (over 5 years) and experience, as the data suggests, tended to have a sense of intuition that allowed them to better highlight patients that needed further NCDs screening, before or during oral procedures.

In their study on Factors affecting hypertension control; Perspectives of front-line Health professionals, G. N. Nyaaba et al., 2019 observed three crucial elements adversely affecting Hypertension control in rural Ghana. Two of these elements, namely; the health practitioners themselves through poor communication, an inability to effectively collaborate and refer their patients to other specialists, as well as limited exposure to training on NCDs, and the health system itself where the system suffered human, pharmacological, equipment and policy resources deficiency, provides crucial pointers to the healthcare situation in LMICs. From their findings, they concluded that the approach most likely to work in the African healthcare context requires an investment in the healthcare workers' capacity - training more so, a robust healthcare system and policy as well as an involved community, to better handle the health challenges posed by diseases in general, and NCDs in particular. This view directly correlates to the findings of this study on both of these aspects; the healthcare professional, in this case the oral health clinicians, with differing levels of training on NCDs prevention, identification, screening and management, and the healthcare system and policy aspects with a notable absence of both a structured SOP guiding the oral health clinicians on how to handle NCDs within their departments, and a reliable system through which managing NCDs can be coordinated wholistically. With NCDs accounting for a majority of hospital admissions in Kenya, morbidities and mortalities both locally and globally, these findings suggest a better understanding of the various attributes around them by a clinician (in this case, the oral health clinician that is most likely the first and only point of contact between the patient and the healthcare system) – prevention, risk factors identification, screening and management approaches, are likely to result in better patient outcomes.

### **Referral strategy in reference to NCDs from oral healthcare clinicians:**

The unanimous findings from this study indicated that the various oral health clinicians were more likely to refer than offer screening or management of NCDs to their patients at the department level. This is, in part, owing to poor equipping of the dental department in various facilities, as noted by a majority of the respondents, for NCDs screening. Similarly, the lack of a structured, coherent and well-established guideline - the SOPs in this case - on how to manage NCDs at the point of interaction between a health facility and a patient also resulted in a higher likelihood of the oral health clinician referring the patient to other specialists and or facilities. This outcome, coupled with a weak and unreliable HMIS in managing referred patients translated to lower follow-up and follow-through for these patients as highlighted by the

respondents, thereby, adversely affecting the ability of the oral health care clinicians to address the patients' needs. Designing, developing, and implementing a robust and integrated approach to NCDs – a structured SOP- at the facility and county level is likely to contribute to better patient screening, detection, management, and referral at any point of the patients' interaction with a healthcare facility in general, and with the dental department in particular.

In the same study highlighted above, the findings suggested that failure to properly refer a patient to a clinician that could manage Hypertension in their case would more often result in poorer patient outcomes. Correct referring requires referring the patient to the relevant specialist, and for the clinician to know who the right specialist is, foundational training on screening and detection of NCDs is needed. From this study's findings, all the oral health clinicians interviewed agreed that NCDs screening for all patients was crucial, but they then proceeded to handoff the screening responsibility to other departments. For a patient whose sole contact is the dental department, referring with no prior screening, and no follow through after the fact is likely to result in poorer outcomes at the point when the diseases will be diagnosed.

**Study Limitations:** Covid-19's occurrence adversely affected the primary investigator's ability to conduct the study on larger sample sizes, for a more conclusive outcome. This was occasioned by movement restrictions during this season and exposure risks associated with the disease. There is far too little material published on the research subject locally. There is a need to conduct this research in other areas within the country, under different set-ups -including the private healthcare sector; to inform the kind and level of intervention needed for oral health clinicians to effectively participate in screening for NCDs.

**Conclusion:** Oral health clinicians have a role to screen for non-communicable diseases.

**Recommendations:** Capacity building for oral health clinicians in Kiambu County on why, when, and how to screen patients for non-communicable diseases, as well as how to engage and disseminate information to these patients on NCDs and their risk factors presentation, prevention, and control.

Development and implementation of County and facility standard operating procedures on oral health and NCDs management as well as proper channels of NCDs patient referral, from the oral health department, within and between public health facilities in the County.

Development and deployment of protocols on integration and involvement of oral health clinicians in screening for NCDs in dental clinics and outpatient centres in public health facilities in Kiambu County.

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## **6. APPENDICES**

### **6.1 APPENDIX 1: CODE BOOK**

Objectives;

1. To determine knowledge of oral health clinicians on risk factors for NCDs



2. To explore the oral health clinicians' perception of their index of suspicion of NCDs based on medical clerkship.
3. To assess the referral strategy in reference to NCDs from Oral care

**Table 3- Code Book**

Themes	codes	Illustrations
Knowledge	Definition of NCDs	Non- communicable diseases are mainly lifestyle diseases <b>Clinician 001, DO, female.</b>
		are disease that cannot be transferred from one person to another <b>Clinician 002, Coho, Male</b>  Cannot be transmitted to a second person even if there is contact, contact is either through fluids, breathing  <b>Clinician 013, Dental officer, Female,</b>  They are non-infectious diseases  <b>Clinician 005, Dental officer, Male</b>  they don't need an intermediary agent of transmission  <b>Clinician 018, Dental specialist, Female</b>  Signs & symptoms of NCDs- something limiting your daily activities maybe fatigue, headache or pain. <b>Clinician 013, Dental officer, Female</b>
		<b>Interviewer:</b> Ok. Examples?  Diabetes, high blood pressure, cancer <b>Clinician 011, Dental officer, Male</b>  HIV/AIDS

		<p><b>Clinician 012, Male, Coho</b></p> <p>Epilepsy</p> <p><b>Clinician 014, Male, Coho</b></p> <p>Kidney disease</p> <p><b>Clinician 015, Male, Coho</b></p> <p>Dental caries</p> <p><b>Clinician 016, Dental officer, Female</b></p> <p>Arthritis</p> <p><b>Clinician 017, Coho, Female</b></p>
	Risk factors of NCDs	<p>Age, gender, diet, weight, smoking, and alcohol Clinician 001, Dental officer, female.</p> <p>Obesity, Genetics</p> <p><b>Clinician 002, Coho, Male</b></p>
		<p>patients who are elderly, and for those you notice are a little bit overweight</p> <p><b>Clinician 001, Dental officer, Female</b></p> <p>hardly suspect especially Hypertension in teens, twenties &amp; thirties</p>
		<p>Decisions of lifestyle, mostly the sedentary lifestyle where like people are not doing enough exercise</p> <p><b>Clinician 003, Dental officer, Male</b></p>
		<p>Genetics</p> <p><b>Clinician 004, Dental officer, Female</b></p>

		<p>Cultural practices</p> <p><b>Clinician 014, Coho, Male</b></p>
		<p>Low immunity and poor diet</p> <p><b>Clinician 006, Coho, female</b></p>
		<p>Environment we live in</p> <p><b>Clinician 016, Dental officer, Female</b></p>
	NCDs and oral health	<p>It can affect the outcome of the treatment that you give</p> <p><b>Clinician 001, Dental officer, female.</b></p>
		<p>diabetic patients, it takes too long to heal especially after extraction and for hypertensive patients they tend to bleed a lot especially when the pressure is high.</p> <p>Clinician 004, Dental officer, Female</p> <p><i>Complications may arise after treatment in cases of diabetes and hypertension</i></p>
		<p>NCD can predispose patients to oral disease.</p> <p><b>Clinician 005, Dental officer, Male</b></p>
		<p>those conditions might affect the way we treat them here; the medicines we use, the procedures we do</p> <p><b>Clinician 008, Coho, Male</b></p>
		<p>If you are hypertensive and you have been taking drugs like nifedipine for a long time you know some of the side effects are gingival hyperplasia.</p> <p><b>Clinician 011, Dental officer, Male</b></p>

		<p>bidirectional relationship between the two diseases, so you tend to see very severe gum disease in patients who are diabetic especially those who are poorly controlled</p> <p><b>Clinician 017, Coho, Female</b></p>
	Source of Knowledge	<p>I can say it is more or less formal training</p> <p><b>Clinician 001, Dental officer, female</b></p>
		<p>Source of knowledge both training and experience <b>Clinician 002, Coho, Male</b></p> <p>Training in college, during internship, sometimes from CMEs and conferences <b>Clinician 023, Dental Specialist, male</b></p> <p>Part of our core curriculum in our training in college, also during conference and continuous medical education forums (CMEs) <b>Clinician 016, Dental officer, Female</b></p>
	Knowledge on policy on oral health and NCD	<p>I don't know the details</p> <p><b>Clinician 001, Dental officer, female</b></p> <p>No, I have not familiarized myself with its contents, I just know there is a policy <b>Clinician 015, Coho, Male</b></p> <p><i>(Aware of available oral health policy but does not know the contents)</i></p> <p>I don't know if there is one <b>Clinician 034, Coho, Male</b></p> <p><i>No knowledge of existence of an oral health policy</i></p>
Perception of their index of suspicion of NCDs	Screening	<p>all the patients who come in will have their blood pressures checked <b>Clinician 001, Dental Officer, Female</b></p>

		<p>Screening is trying to find out if somebody has a condition that maybe he or she doesn't know.</p> <p><b>Clinician 010, Coho, Female</b></p>
		<p>Do you understand what screening means when it comes to non-communicable diseases?</p> <p><b>Interviewee:</b> Not really</p> <p><b>Clinician 008, Coho, Male</b></p>
		<p><b>Interviewer:</b> Are you the one to do those measurements or you send them to the laboratory then they bring you the results?</p> <p><b>Interviewee:</b> We send them to the triage where there is a bp machine then they bring the results</p> <p><b>Clinician 016, Dental Officer, Female</b></p>
		<p><b>Interviewer:</b> What are the signs and symptoms that your patients present with?</p> <p><b>Interviewee:</b> Persistent headaches, dizziness, breathlessness</p> <p><b>Clinician 009, Dental officer, Female</b></p>
		<p>Normally I'm very aware when BP is above 140; that's the borderline that I work with 140/90. Diabetes it depends I will ask the patient if they have had anything for breakfast so if they had I wouldn't accept anything less than 7.</p> <p><b>Clinician 020, Dental officer, Male</b></p>
		<p>Severity of gum disease that is not explained by local factors</p> <p><b>Clinician 002, Coho, Male</b></p>

		<i>They look for symptoms of chronic disease during general exam</i>
		for certain age groups, 40 and above may be for BP we have to do the screening and if need be, we have to ask for history and if we are suspecting sugar level issues or the history towards a suspected blood sugar levels and we have to do random blood sugar tests for that age group but 40 and below unlikely  <b>Clinician 018, Dental specialist, Female</b>
		Screening for diseases is the tests that are done to detect if someone has the disease or not.  <b>Clinician 006, Coho, female</b>
	Challenges to screening	Patients may refuse screening. And sometimes patients' results get misplaced  <b>Clinician 006, Coho, female</b>  <i>improper record keeping =loss of data</i>
		we don't have a weighing scale; we don't have a pressure checking machine here  <b>Clinician 007, Coho, Male</b>
		funds, transport, personnel  <b>Clinician 010, Coho, female</b>  some patients view it as a waste of time to carry some of these screenings in view that they are coming to seek for dental services they don't understand the correlation between the

		<p>two another aspect is human resource, we don't have enough employees to adequately do the screening</p> <p><b>Clinician 018, Dental specialist, Female</b></p>
		<p>we are always in a hurry....to clear the queue.</p> <p><b>Clinician 010, Coho, female</b></p>
		<p>Long queues at screening points a challenge for screening</p> <p>Faulty machines is another challenge</p> <p><b>Clinician 004, Dental officer, Female</b></p> <p>Unavailability of screening machines-bp machines, weighing scales</p> <p><b>Clinician 014, Coho, Male</b></p>
		<p>I may see a patient that might be knowing that they are probably hypertensive or even diabetic but since they want their tooth extracted or any procedure done, they tend to hide</p> <p><b>Clinician 020, Dental officer, Male</b></p>
		<p>We are talking about, if at all is hypertension the normal range depends with the age of the patient, so if at all we suspect they are high we send the patient for the bp measurement and then if it's still high we refer the patient for management until their parameters are within the normal ranges.</p> <p><b>Clinician 016, Dental officer, Female</b></p> <p><b>Interviewer:</b> You mention that you do screening for blood sugar levels and what are the parameters?</p>

		<p><b>Interviewee:</b> Basically, for hypertension, if it's more than 3 consecutive BP readings of above 140 and for blood glucose levels they are two random blood sugar levels reading above 7.4</p> <p><b>Clinician 018, female, Dental specialist</b></p> <p><i>Parameters of reference not standard, seem ambiguous or based on clinician's experience</i></p>
		<p><b>Interviewer:</b> Ok. What challenges do you think are encountered during screening activities for non-communicable?</p> <p><b>Interviewee:</b> Patients may not tell you the truth and mostly fear to participate</p> <p><b>Clinician 024, Dental specialist, Female</b></p>
		<p><b>Interviewer:</b> Why is screening necessary?</p> <p><b>Interviewee:</b> There are people who can live with a disease but they don't know they are sick. They only come when the disease is so progressed and the treatment is difficult and so expensive.</p> <p><b>Interviewer:</b> Do you take part in screening facility?</p> <p><b>Interviewee:</b> No, I don't take part in screening</p> <p><b>Interviewer:</b> Why?</p> <p><b>Interviewee:</b> I only deal with patient who have come for the treatment</p> <p><i>Lack of initiative/interest</i></p> <p><b>Clinician 016, Dental officer, female</b></p> <p>what we usually get in hospitals is the end stage of the disease so if you can detect it early, you start the treatment early and</p>



		you improve quality of life of the patients. <b>Clinician 018, Dental specialist, Female</b>
		False positives or negatives <b>Clinician 029, Dental Officer, Female</b>
	History	<b>Interviewer:</b> Does that mean you don't have any guidelines for how you practice? <b>Interviewee:</b> Yes <b>Interviewer:</b> Does that mean you don't have any guidelines for how you practice? <b>Interviewee:</b> Yes  must ask the patient <b>Clinician 001, Dental officer, female</b>
		Severe gum disease may mean diabetes <b>Clinician 002, Coho, Male</b>
		I would ask the patient if they have any chronic illness or if they have any treatment they are continuing with <b>Clinician 003, Dental officer, Male</b>
		We usually ask patients, like do you have high blood pressure, do you have diabetes. If they are not sure and if they are someone that are of age and can show signs that could be risk factors, we go further and do the investigation. <b>Clinician 004, Dental officer, Female</b>
	Role in management of NCDs & Risk factors	Yes, I believe I do <b>Clinician 001, Dental officer, female</b>
		Role limited to referral

		<b>Clinician 002, Coho, Male</b>
		NCDs may manifest early in the mouth leading to early diagnosis  <b>Clinician 004, Dental officer, Female</b>
		In the morning before we start, we conduct an awareness to the patients... it was the HOD's idea  <b>Clinician 004, Dental officer, Female</b>
		In most cases yes. Personally, I'm bothered about detecting not the management because I know there are those who are supposed to be dealing with the management.  <b>Clinician 009, Dental officer, Female</b>  We are able to detect and identify some risk factors for NCDs but not comprehensively manage them  <b>Clinician 018, Dental specialist, Female</b>
		You could be the first person the patient encounters so if you make the right diagnosis or if you refer the patient to the right clinician, he could be diagnosed early and treatment could commence early.  <b>Clinician 010, Coho, female</b>
		Talking to patients advising them on the importance of a balanced diet, healthy living and regular physical exercise; Patient referrals  <b>Clinician 021, Dental officer, Male</b>
Referral strategy in reference to NCDs	Management of NCDs	yes, hypertension because it's fairly common but for most of the others no

		Participant 1, DO, female
		<i>We have a role in educating and referral of patients</i> <b>Clinician 003, Dental officer, Male</b>
		<b>Interviewer:</b> As a facility, do we have standard operating procedures on oral health and NCD care?  <b>Interviewee:</b> not on paper, just generally, if you are questioning some pressure or some procedure, you either consult further or you let it go or you refer to another department.  <b>Clinician 020, Dental officer, Male</b>
		Some come here as the first office to visit, and now it is our duty as oral health officers to be able to pick out if there is any condition and then we refer accordingly  Ok. Do you think you are doing that adequately?  <b>Interviewee:</b> No. I'd say no.  <b>Clinician 008, Coho, Male</b>
	Where to refer	if I have any suspicions I must liaise with the physicians  <b>Clinician 001, Dental officer, female</b>
		if someone comes here and you realize there is an elevated blood pressure, we first refer to the <i>clinician</i> to manage the pressure  <b>Clinician 007, Coho, Male</b>

	Role of Oral health clinicians in NCD care	I think it's one area that maybe it's been a bit neglected <b>Clinician 001, Dental officer, female</b>
		Role limited to detection and management by referral. No role in prevention. <b>Clinician 002, Coho, Male</b>
		I have a very big role to play especially not only just in the clinics here where the patients are streaming one after the other but also in the community where we go for community outreach or when we go for health education where we go to do screening <b>Clinician 017, Coho, Female</b>
	After referral	We do follow up <b>Clinician 001, Dental officer, female</b>
		Communication with other clinicians is through written notes <b>Clinician 002, Coho, Male</b> <i>We rely on patient feedback only to know the outcome of the referral.</i>
		We refer for the needful to be done, we don't usually follow up on that <b>Clinician 017, Coho, Female</b>
		<b>Interviewer:</b> Do you have a way you do follow up on the ones that you have referred there?

		<p><b>Interviewee:</b> Not necessarily in terms of NCDs, but we do follow ups in terms of oral health care. If there is a patient you sent them to outpatient or MOPC that's it.</p> <p>In terms of management of NCDs, but if they come back for oral health care reviews, we want to know how the BPs are or how the blood sugars are but we don't do a clinical follow up. We make sure the parameters are ok for us to be able to conduct our oral healthcare.</p> <p><b>Clinician 018, Dental specialist, Female</b></p>
	Institutional Policy/SOP	<p>I doubt if we have it. <b>Clinician 001, Dental officer, female</b></p> <p>it is not on paper and even if it is on paper then I'm not aware.</p> <p><b>Clinician 013, Dental officer, Female</b></p>
		<p><i>The policy exists but I don't know about it. Dental care is integrated as part of the hospital.</i></p> <p>No SOP, I feel we need one.</p> <p><b>Clinician 003, Dental officer, Male</b></p>
		<p>If you are hypertensive and you have been taking drugs like nifedipine for a long time you know some of the side effects are gingival hyperplasia; The policy is able to give us a direction and guidelines in what we are supposed to do and in the changing technology in oral health care</p> <p><b>Clinician 014, Coho, Male</b></p>
		<p><b>Interviewer:</b> Does that mean you don't have any guidelines for how you practice?</p> <p><b>Interviewee:</b> Yes</p>

		<b>Clinician 016, Dental officer, Female</b>
		<b>Interviewer:</b> what guides what you do here? <b>Interviewee:</b> Common sense and experience <b>Clinician 029, Dental Officer, Female</b>
	National oral/NCD policy	The role of the policy is to of course improve the oral health care in the country and also to take the dental services to most people in the community <b>Clinician 014, Male, Coho</b>
		Aware of oral health policy, unaware of the contents <b>Clinician 015, Coho, Male</b>
	Integration of dental department	Yes, they(training) happen but the communication is mainly given to the medical teams so we don't have the training for dental and NCDs.  (We have not offered any training on NCDs and oral health) Could be due to lack of interest. <b>Clinician 004, Dental officer, Female</b>
		Integration can be achieved through education of patients and clinicians. patients through medical camps and during clinics <b>Clinician 005, Dental officer, Male</b>
		Yes, I think there should be a form of communication because at some point a patient maybe has a chronic condition and has been on treatment for long but when he comes to the dental clinic he comes with a new card. So, there

		<p>is no way of knowing the kind medication he is on or the kind of treatment he is on.</p> <p><b>Clinician 010, Coho, female</b></p>
		<p>we have a system, HMIS, but it has quite a lot of weaknesses; even if we are able to read notes that aspect of being able to deduce BPs is not there in the system. Yes, there is no clear communication between us and the medical department</p> <p>lack of proper training, induction and forums for the various medical &amp; dental teams to meet or integrate</p> <p><b>Clinician 013, Dental officer, Female</b></p>
		<p>I think we need to integrate the medical and oral aspect in terms of managing the patients, as opposed to you doing the oral health bit and sending them to the medical officer who will do their bit and sending back the patient</p> <p><b>Clinician 018, Dental specialist, Female</b></p>

## **6.2 APPENDIX 2 (Kenya National Oral Health Policy, 2022.)**

<https://www.health.go.ke/wp-content/uploads/2022/06/KENYA-NATIONAL-ORAL-HEALTH-POLICY-2022-2030.pdf>

## **6.3 APPENDIX 3: CONSENT FORM**

**Title of Study: Role of Oral health clinicians in the screening of non-communicable diseases in Kiambu County**

**Principal Investigator: Dr. Gladys Maina**

### **Introduction:**

This consent form gives you information that will help you decide whether to participate in this study or not. You are free to ask about the purpose, scope, risk and benefit of the study and your rights as a study participant. Once all your questions and concerns are satisfactorily answered, you are free to agree to take part in the study or not. If you decide to take part in this study, we'll request you to sign your name on this form. It's important for you to understand the general principles that apply to all participants in medical research: i) Your decision to participate is entirely voluntary ii) You may withdraw from the study at any time without necessarily giving a reason for your withdrawal iii) Refusal to participate in the research will not affect the services you offer in this health facility or other facilities. We will give you a copy of this form for your records.

May I continue? **YES / NO**

This study has approval by The Kenyatta National Hospital-University of Nairobi Ethics and Research Committee protocol no. **P069/20**

### **PURPOSE OF THE STUDY**

The study is aimed at collecting information on the role of oral health clinicians i.e. dental officers, dental specialists and Community Oral Health Officers in the screening of non-communicable diseases in the county. Participants in this study will be asked questions about their age, gender, cadre, levels of qualification for their current roles, Knowledge on Non-communicable diseases and their risk factors, how they gather patient medical history, the kind of questions they ask their patients and what they look for during medical examination, medical



parameters for the various non-communicable diseases, how to measure them, process of offering care to those in need of medical services other than dental treatments and the referral guidelines and procedures they follow, levels of collaboration and patient referral between departments.

### **WHAT HAPPENS IF YOU DECIDE TO PARTICIPATE IN THIS RESEARCH STUDY**

You will be interviewed by a trained interviewer in a private area where you feel comfortable answering questions. The interview will last approximately 30 minutes. The interview will cover topics such as Non-communicable diseases and their risk factors, non-communicable diseases signs and symptoms, patient referral strategies, Diagnostic equipment and supplies for non-communicable diseases, NCDs guidelines, and oral health integration into general health.

We will ask for a telephone number where we can contact you if necessary. If you agree to provide your contact information, it will be used only by people working for this study and will never be shared with others. The reasons why we may need to contact you include: clarification of information shared and feedback on study findings.

### **RISKS, HARMS DISCOMFORTS ASSOCIATED WITH THIS STUDY**

Participation in medical research may pose emotional, psychological and physical risks; therefore, we will put effort to minimize the risks such as loss of privacy. We will minimize this risk by using serial number as identifiers instead of names; collected data will be stored in password protected storage devices such as computers, hard drives and cloud storage spaces. The written forms will be stored in a secured, lockable cabinet. We do not guarantee 100% confidentiality though, as some unauthorized people may still manage to access your information.

In case you feel uncomfortable to respond to some questions, kindly feel free to skip them. The principal investigator and the research assistants have been trained specifically for this study. Feel free to contact either of them through the number provided at the end of this form.



**Participant signature and serial number:** \_\_\_\_\_ **Date** \_\_\_\_\_

**Researcher's statement**

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has willingly and freely given his/her consent.

**Researcher's Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Signature**

\_\_\_\_\_

**Role in the study:** \_\_\_\_\_ [i.e., study staff who explained informed consent form.]

For more information, contact **Dr Gladys Maina** on: +254721600809 from  
**0800hrs to 1700hrs**

**Participant** \_\_\_\_\_

Witness Printed Name (*If a witness is necessary, a witness is a person mutually acceptable to both the researcher and participant*)

**Name** \_\_\_\_\_ **Contact information** \_\_\_\_\_

**Signature /Thumb stamp:** \_\_\_\_\_ **Date;** \_\_\_\_\_

#### 6.4 APPENDIX 4: QUESTIONNAIRE

**Objective:** To assess the role of oral health clinicians in screening for NCDs in Kiambu County.

Serial No.....

Date.....

Facility Name: .....

Duration in facility (Yrs.) .....

Gender: Male

Female

Other(s)

Cadre: Dental Officer

Dental Specialist

Coho

Highest level of education: Post graduate degree

Undergraduate degree

Diploma

Marital status:

Single

Married

Widowed

Separated

Age as of last birthday..... (years)

1. Do you have a job description?

Yes

No

Unknown

2. Years of professional training

3 years

4 years

5+ years

3. Time in current profession (in years)

Less than 1 year

1 to 3 years

4 to 6 years

7 to 12 years

13 +years

4. Time in current health facility (in years)

Less than 1 year

1 to 3 years

4 to 6 years

7 to 12 years

13 + years

5. Have you attended at least one workshop during the past 12 months?

No

Yes

## 6.5 APPENDIX 5: INTERVIEW GUIDE

### ROLE OF ORAL HEALTH CLINICIANS IN SCREENING OF NON-COMMUNICABLE DISEASES IN KIAMBU COUNTY

#### Interview Guide

**Participants: Oral health clinicians**

Date:	Interview ID:
Venue:	Verbal/ Written consent acquired?
Name of Facilitator:	No. of participants: _____ Male _____ Female _____
Name of scribe:	

#### Facilitators notes:

- Before beginning, the facilitator will get verbal and written consent and document it in the field log
- When ready to begin, the facilitator will tell the participant: Hello, my name is \_\_\_\_\_ and I am working with Dr. Gladys Maina. The interview should be about 1 hour. Your participation in today's discussion is voluntary. You can choose to leave at any time. You will not lose any benefits if you do not participate. You will also not gain any additional benefits if you do participate. Everything we discuss here is confidential. Nothing that you say will be linked to your name. Before we begin, do you have any questions?
- Respond to all questions, then ask, would you all like to continue?

#### 1. *Knowledge of oral health clinicians on NCDs and their risk factors:*

a) What are NCDs?

*Probes: explain what NCDs are with examples*

b) What are the risk factors for NCDs?

*Probes: discuss the different risk factors and mechanism for causing NCDs*

- c) Discuss NCDs signs & symptoms

*Probes: Which are the NCD signs & symptoms? How are they picked or identified?*

- d) What is the relationship between NCDs and oral health?

*Probes: Discuss the relationship between NCDs and dental health. What do you look for in patients you suspect to be at risk of NCDs?*

- e) Where did you acquire the knowledge on NCDs and their risk factors?

*Probes: Were you taught about NCDs during your course? How long was the training? With the current knowledge, do you think you are able to detect, diagnose and manage NCDs or those at risk of developing them?*

## **2. Index of suspicion based on clerkship**

- a) How often do you suspect NCDs in the patients visiting the dental clinic?

*Probes: What do you look for in patients you suspect to have NCDs like diabetes, hypertension, cancers etc.? On a scale of 1-5 (1= Very unlikely, 2=Unlikely, 3= not sure, 4= likely, 5= very likely) how likely are you to suspect a patient to be at risk or has an NCD during clerkship?*

- b) What are the parameters for NCDs?

*Probes: Do you know the parameters used to determine if one is at risk for NCDs such as diabetes, high blood pressure, cancers, chronic respiratory illness? how do you measure them? Which are the normal parameters?*

- c) What is screening for diseases?

*Probes: Why is screening important? how is screening for NCDs done? Talk about the available NCD screening tests you know about*

- d) Do you take part in NCD screening in this facility?

*Probes: which diseases do you screen for? How do you go about the screening?*

- e) Do you encounter any challenges during NCDs screening?

*Probes: what are the challenges? How are the challenges addressed? Do you think the challenges have been addressed adequately?*

- f) What are the instruments and equipment required to screen for NCDs?

*Probes: Do you have the required equipment and machines to enable you to detect, diagnose NCDs? Is the equipment well maintained?*

- g) Do oral health clinicians have a role in the prevention, detection, diagnosis and management of NCDs?

*Probes: what is the role of oral health clinicians in the prevention, diagnosis and management of NCDs? Do they play this role adequately? What can be done to improve their involvement?*

### **3. Referral strategy in reference to NCDs from oral care**

- a) Do you know if there is an oral health policy in Kenya?

*Probes: how long has the policy been in place? What role does the policy play to enable you carry out your duties at work? Have there been education forums in which the oral health policy is discussed?*

- b) Does the oral health policy elaborate the role of oral health clinicians in NCDs management?

*Probes: what does it state about oral health clinicians and NCDs care? Do you think the role of oral health clinicians is adequately elaborated in the oral health policy?*

- c) Is there a national referral strategy in Kenya?

*Probes: Do we have knowledge of Kenya's national referral strategy? What does it entail on matters oral health & NCD care? How are patients at risk or those with NCDs managed between the oral health teams and the relevant medical teams?*



d) Do we have standard operating procedures on Oral and NCD care in this facility?

*Probes: Discuss the available standard operating procedures available in this facility concerning NCDS management and oral care. Do you think they are adequate? What can be changed on these standard operating procedures?*

e) How can oral and NCD care be improved?

*Probes: what should be done to improve NCDs patients care between the oral health team and the other hospital departments?*

**Facilitator notes:**

- After the last question has been asked, tell the participants: We have now come to the end of our discussion. Before we close, do you have any final questions for me?
- Answer the remaining questions, then thank the respondents for their time.