

**FACTORS ASSOCIATED WITH PRACTICES OF HEALTH CARE
WORKERS TOWARDS INTEGRATING ORAL HEALTH INTO
PRIMARY HEALTH CARE IN IMENTI NORTH DISTRICT, KENYA**

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DECLARATION

I Dr Kaguru George Kariuki declare that this is my original work and that it has not been submitted by any other person for research purpose, degree or otherwise in any other university or institution.

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DEDICATION

I dedicate this work to Gladwel and Lisa.

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LIST OF ABBREVIATIONS

COHO	Clinical Oral Health Officer
DHRIO	District Health Records and Information Officer
DMFT	Decayed Missing and Filled Teeth
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
KAP	Knowledge, Attitude and Practices
KDHS	Kenya Demographic Health Survey
KEPH	Kenya Essential Package of Health
KNBS	Kenya National Bureau of Statistics
MOH	Ministry of Health
NGOs	Non-Governmental Organizations
NHSSP	National Health Sector Strategic Plan
PHC	Primary Health Care
WHO	World Health Organization

OPERATIONAL DEFINITIONS

- i) Age**
Refer to age in complete years at last birthday.
- ii) Area of training**
The field of study the respondent was trained and certified in.
- iii) Copy of Guidelines**
Booklet with written down instructions and regulations governing the delivery of health services (including dental services).
- iv) Infrastructure**
The physical and/or other structures laid down for provision of specific service.
- v) Level of facility**
The tier that a facility occupy within the hierarchy of the Kenya Essential Package for Health (KEPH)
- vi) Level of training**
The certified tertiary level of education attained by the respondent at the time of the study
- vii) Number of working years**
The number of complete years (from their first appointment) the respondent has served in the health sector.
- viii) Provision of oral health services by non-oral health workers**
Non-oral health care workers providing dental screening, oral health education and/or referral of patients with suspected dental conditions under their care.
- ix) Referral**
Linkage within a system that annex one level of facility to a higher or an equal level facility within the system which has the ability to offer more services.
- x) Sex**
Refer to whether the respondent is male or female.
- xi) Training in oral health**
Refer to any form of formal training in oral health that the respondent may have undertaken either in the pre-service or in-service period.

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ABSTRACT

Background

The prevalence of oral health diseases is on the rise in Kenya. The ratio of oral health care personnel to the population is however very low. Preventive dentistry remains is therefore key to reverse this trend. Integration of oral health into primary health care would utilize the non-oral health care providers to achieve the primary goal of preventive dentistry. Key to this integration is the knowledge, attitude and practices of health workers on their roles.

Methods

This was a cross sectional study among medical doctors, nurses and clinical officers in Imenti North district, Kenya. A self-administered questionnaire was used to assess their knowledge, attitude and practices on the three roles in integration, that is, diagnosis, oral health education and referral. A total of 214 participants took part in the study. Analysis for association was done using *Chi* square, odds ratio, Fishers exact test and logistic regression.

Results

Overall, 88.8% of interviewees had adequate knowledge on their role towards integration. There was relatively a lower score in health education (70.1%) than on diagnosis (82.7%) and referral (79.9%). Majority (83.6%) of the respondents had positive attitude towards their roles. There was generally poor dental screening practice with only 12% of the respondents carrying out screening on all their patients. A high percentage (65.4%) of the respondents offered oral health education while 95.5% referred patients with dental problems.

There was a significant positive association between dental training ($p=0.049$) or having a copy of the referral guidelines ($p=0.019$) and dental screening. Multivariate analysis using logistic regression showed a significant association between having a copy of referral guidelines ($p=0.040$) and dental screening. Barriers identified with dental screening included lack of equipment, poor attitude and lack of experience. Availability of a dentist and distance to a referral facility were key determinants of referral practices.

Conclusion

Social demographic characteristics do not influence provision of oral health services by non-oral health care providers. Provision of resources and equipment including referral guidelines on oral health, face masks and tongue depressors influenced provision of oral health services. Similarly, availability of a dentist influenced the decision to refer patients who had suspected dental diseases. Adequate knowledge by health workers on their role did not always result in provision of oral health services mainly due to lack of hands on experience. While attitude of health workers towards their role in integration of oral had no statistical significant association with provision of oral health services, positive attitude was linked with willingness to be trained in oral health and provide dental services.

Recommendation

Health care providers in Imenti North district should provide resources and equipment, train in-service health care workers in oral health and provide on-job skills training to health care workers to convert knowledge in oral health into practice. The number of facilities offering dental services should be increased to encourage referral by health care workers.

1.0 CHAPTER 1

1.1 BACKGOURD INFORMATION

Kenya has experienced an exponential growth of her population since the attainment of independence in 1963. Currently, the population is estimated at in excess of 38 million (KNBS, 2010). The country has witnessed emergence of lifestyle diseases including dental diseases and other oral health conditions. Dental caries and periodontal disease affect a majority of the population and continue to cause premature loss of teeth (Sanya, 2004; Kassim, 2006; Owino, 2010)

Kenya adapted primary health care concept from the Alma Atta declaration of 1978 (WHO, 1978). Dental health was part of the components of the primary health care. The main emphasis was to be on prevention services and the second level was treatment services. Over the years, even with continued training of healthcare personnel, the ratio of oral health personnel to the population remained very low (Dentist: population ratio of 1:378,000). There was only provision of minimal oral health services at the Provincial and District hospitals (MOH, 2002). Ten years later, the situation has not changed; focus is still on curative services. The Dentist: Population ratio of 1:187,783 in the public sector is still low (MOH, 2011). In contrast, there is a relatively better distribution of non-oral health care workers throughout the country (MOH, 2010). Their distribution covers all the levels of health care as defined by KEPH (MOH, 2005).

Integration of oral health care into primary health would take advantage of this extensive geographical distribution of primary health care facilities and providers (MOH, 2010). It would also satisfy the growing customization by the utilizers of health care (Federico, 2007). With the focus on preventive rather than curative services, the overall impact will be the reduction of prevalence of oral health conditions, effective utilization of tertiary levels of care and increased utilization of primary health care (Suter, 2007).

The national oral health policy and strategic plan 2002-2012 outlines the objectives and some strategies to achieve integration (MOH, 2002). Among the strategies is the use of both the oral and non- oral health workers to achieve this integration. Though their scope of service may be limited to dental education, screening and referral; as the majority in primary health care they

may be more accessible than an oral health provider (Leonard, 2009). They therefore play an important link by bridging the gap in oral health care (Marina, 2004).

This study aimed therefore to determine factors associated with practices of health care workers towards integrating oral health into primary health care in Imenti North district, Kenya; with an aim of recommending ways of improving integration.

1.2 INTRODUCTION

1.2.1 Dental Health as a component of General Health

In the delivery of services in the health sector, the health care for the oral cavity and surrounding structures, called dental care, is delivered by the oral health providers (dental officer, Community Oral Health Officers (COHO), oral hygienist and other dental auxiliaries). The systemic care for rest of the body, called medical care, is delivered by the medical personnel (medical officers, nurses and other carers in the health profession). The two groups are viewed as two independent entities right from training to the actual practice of managing patients. There has been a continued call however to integrate dental health into general health. The proponents of this integration have demonstrated unequivocally the great magnitude of relationship between dental health and general health. They have gone further to call for holistic approach to the management of a patient and to merge dental and medical care.

Oral health means absence of any disease or disorder of the craniofacial complex (WHO, 2003). The health or otherwise of the craniofacial complex impacts on the wellbeing of an individual. Quality of life is affected by the inability to perform functions of the craniofacial complex and may include effects like lowered esteem from the appearance, halitosis, disruption of feeding and speech. Dental health also has social impact especially related to pain affecting social interaction, sleeping and work activities (WHO, 2003).

Systemic diseases and syndromes have an oral manifestation. Ranging from enamel hypoplasia in hypophosphatemia, dental erosion in anorexia and bulimia, xerostomia, periodontitis and sialadenitis in diabetes, macular pigmentation of the gingiva in Addison's disease, mucosal swelling in Crohn's disease, atrophic tongue in pellagra, (Robert, 2008; Neville, 2010; oral pathology color atlas, 2011). Oral manifestations of HIV/AIDS include oral candidiasis, warts, leukoplakia, necrotizing periodontal disease and Kaposi's sarcoma.

Dental conditions have been shown to influence occurrence and progression of systemic conditions. Periodontitis increases the occurrence of cardiovascular diseases (Rose and Marley, 2002) and has been associated with diabetes mellitus, respiratory diseases, premature births and low birth weights (Azarpazhooh, 2012).

Dental care is influenced by the general health. Pre-medication is required if a patient has a heart conditions. The use of alternative type of local anesthesia, prescription or contraindication to particular medication influences provision of dental services. Clinicians may also be forced to limit the length of dental procedure among as part of medical related considerations in dental practice.

Oral health is determined by the same factors as general health. While good diet and good livelihood is associated with promotion of general health and prevention of diseases, so it does to oral health. Risk factors for conditions like diabetes and cancers for example social economic factors, alcohol intake and smoking, are also the same factors that are involved in dental caries, periodontal conditions and oral cancer. Addressing these factors would therefore have an all-round effect on the health of an individual (Kaufman, 2006).

The provision of medical and dental care should therefore be done at the same delivery point within the health care system. While different policies may be tailored to a particular cadre of health care providers, the overall impact will be on the health system in totality. When the focus for medical care is on primary health care, then dental health focus would invariably be on primary health care.

1.2.2 Primary Health Care in Kenya

Kenya has adapted primary health by continually modifying her health policies from the 1970s. The health policy developments lead to the formulation of Kenya Health Policy Framework in 1994 (MOH, 1994). The Framework set a clear guide line towards specific goals in health care. Though its implementation started on a low note with the challenges in the implementation of the National Health Sector Strategic Plan I, the National Health Sector Strategic Plan II (NHSSP II) rekindled the importance of repackaging health and increased community participation through the introduction of Kenya Essential Package for Health (KEPH) (MOH, 2005).

Primary health service provision is delivered by 4,214 health facilities. The public health system accounts for 51% through the Ministry of health and the County Governments. Other providers are NGOs who have 20% of the facilities, and private services (including Faith Based Organizations (FBOs)) accounting for 29%.

The referral system is at three levels: Level 6 (two hospitals), Level 5 (eight hospitals) and Level 4 (70 hospitals). Only 30% of the rural population has access to health facilities within 4 km, while such access is available to 70% of urban dwellers (KDHS, 2010). Each facility offers a range of services according to its level and the health care provider's scope. Nurses are in – charge and offer services at the Level 2 facilities. Other medical personnel including the clinical Officers (CO), medical officers and specialists offer services at various levels within the system.

KEPH provides a vertical referral system, but the level of entry into the system is not always at the bottom of the pyramid. Currently, oral health care is provided at some few level 3 facilities and majority at level 4, 5 and 6 facilities across the country.

1.2.3 Oral Health in Kenya

The distribution of oral health services is skewed. Majority (80%) of the oral health care personnel are found in the urban set up leaving only 20% to care for the majority rural population (MOH, 2002). Currently a total of 213 dentists, 110 clinical oral health officers, 50 dental technologists, 29 specialists and 1 dental hygienist are serving in the public sector (appendix ii). Most of the oral care financing as other health care financing, is done from out of pocket expenses (KDHS, 2010). There is very little allocation to oral health from the Ministry of Health (MOH, 2002). Dental cost is also complicated by the selective financing from the insurance sector (MOH, 2002).

In his review of oral health in Kenya, Kaimenyi reports a low score in Decayed index, Missing and Filled Teeth (DMFT) (Kaimenyi, 2004). Similar low DMFT (3.4) was reported by Kassim *et al* in 2006. Despite this low experience, dental caries remain the main cause of tooth loss in Kenya (Sanya, 2004). The number of Kenyans with calculus deposit is high and the level of gingivitis and periodontitis has remained high (MOH, 2002; Ngatia, 2008).

In 2002, the Kenya National Oral Health Policy and Strategic Plan was formulated. Like many countries globally, it called for the inclusion of oral health programs in all PHC level and activities using both oral and non-oral health care providers (MOH, 2002; Muhirwe, 2006; Masha, 1990; Santosh, 2009; Nosayaba, 2011).

1.2.4 Oral Health Priority Action Areas and the Dental Care Models

1.2.4.1 Safety net dental-care model

In this model of care, target groups or populations are identified. Programs are then designed to fit these groups. Once identified their needs are assessed and proper intervention and priorities are set towards the set objectives.

WHO identifies three target groups, school children and the youth, the elderly and people living with HIV/AIDS (WHO, 2003). However, other safety nets may include children under the age of 5years, pregnant mothers and persons with other chronic illnesses or severely ill.

1.2.4.2 Community dental care model

The Community Dental Care delivery system provides preventive and comprehensive treatment from fixed and mobile facilities, regardless of patients' ability to pay for services. Components of the Community Dental Care include school-based dental programs, mobile dental clinic, community health center sites offering comprehensive dental services (Allan, 2004). These programs have been reviewed and have reported improved indicators in oral health (Kawamura, 2010; Macnab, 2010). "The success of these programs is based on involving the community in planning and implementation, building upon the existing health system to link dental services with primary care and changing public or institutional policy to support the financing and delivery of dental care" (Allan, 2004)

1.2.4.3 The integrated model of care

In this model of care, oral health care is integrated into the primary health care. It allows for better access to oral health and because there are laid down guidelines better outcomes are expected (Beetsra, 2002).

Factors affecting general health are the same one that affects oral health. It would therefore be true to say that by focusing on these factors from a common front, holistic care can be achieved (Kaufman, 2006).

1.3 CONCEPTUAL FRAMEWORK

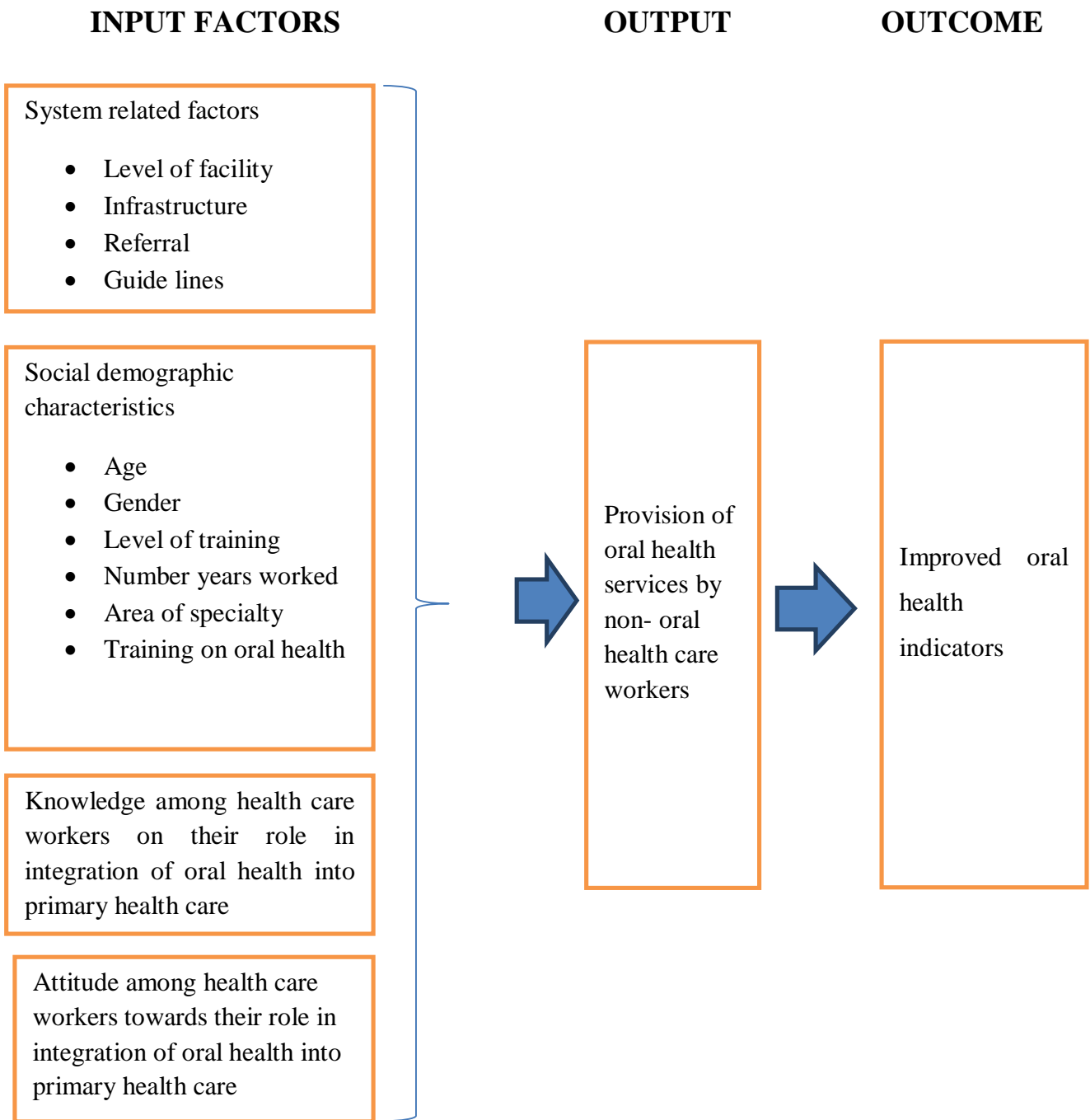


Figure 1: Conceptual framework

1.4 LITERATURE REVIEW

1.4.1 Oral health care, is integration the way to go?

The biggest challenge in delivery of health care is finding a strategy that will be effective clinically and still embrace prevention (Jane, 2002). Such a strategy should be evidence based, embraces change and diversity, universal, sustainable and ethical (Baelum, 2011; Jane, 2002).

The safety net dental care model focuses on target groups. It relies on situation analysis to set targets and interventions (WHO, 2003). Oral health is integrated into other programs of the target groups and run by a licensed oral health care provider (Simmer-Beck, 2011). The model has the advantage of ensuring that the extra attention need is met. There is also an expanded communication channels through the “Train the trainer” approach (WHO, 2003; Aghi, 2011). The strategy however faces obstacles in locating appropriate and sustainable program for integration. Poor coordination has been reported (Aghi, 2011). There may also be need to train oral health personnel to meet the need of these special groups who may be few or not willing to provide services (Kavita, 2004).

The community dental care model uses the school based programs, mobile dental clinics and community health centers to provide full range dental services (Allan J, 2004). Evaluation of such programs has reported improved indicators (Kawamura, 2010; Macnab, 2010). The program however relies heavily on the link to existing primary care system and institutional policy for successful implementation (Allan, 2004). Workforce is also a big challenge with oral personnel declining to work in the programs (Henri, 2002)

In the integrated model of care, oral health is integrated into PHC (Beetsra, 2002). A common approach is taken on risk factors to achieve an all-round effect (Kaufman, 2006). Integration ensures adherence to protocol which yields better indicators (Beetsra, 2002). It also encourages better utilization of primary health care and therefore allowing for appropriate and efficient use of tertiary care (Suterl, 2007). Effective management of diseases with continuum of care is also achieved at low cost through early diagnosis and referral (Federico, 2007; Suterl, 2007; Beetsra, 2002). However, independence in training, licensing, regulation and practice with the continued public perception of separated health fields continue to pose a challenge in service delivery (Kaufman, 2006).

With a history of oral health which is struggling to find its place in the health sector, integrated model would be the best suited to achieve desired outcomes (MOH, 2002; Marina, 2004; Santosh, 2009).

1.4.2 Primary health care, where are we?

At 20 years after widespread adoption, the strategy of health for all through primary health care still had not been fully implemented. In many countries, national capacity and resources were still insufficient to ensure availability of and access to essential health services of high quality for individuals and populations, especially in deprived communities (WHO, 2003). A decade later, only a few countries had achieved comprehensive primary health care. Most developing countries were still offering selective primary care while others were in transition towards a comprehensive care (Rohde, 2008).

Primary health care is still facing barriers like governance challenges, stewardship, finance, societal inequalities, and resource generation (Julio, 2009; Rohde, 2008). However, its elements (universal coverage, service delivery reforms, public policy reforms, leadership reforms and stakeholders participation) have stood the test of changing times (WHO, 2008). Rhodes recommends therefore a progression to comprehensive PHC if any further gains are to be expected in health care (Rohde, 2008).

1.4.3 Oral Health Care and its Position in Primary Health Care

As countries continue to review their oral health and its position in primary health care, common picture of neglected oral health emerges. Integration of oral health into primary health care remains elusive. This may be attributed to a host of factors which seem to cut across board.

Policy framework and guidelines

In recognition of the important role of a policy frame work and strategic plan, WHO in 1984 called for formulation of oral health policy (WHO, 1984). These policy frameworks were intended to facilitate integration of oral health into primary health care. In concurrence, Sherry

outlines four critical areas which anchor on policy i.e., financing, regulation of practitioners and facilities, health work force education and training and monitoring (Sherry, 2009).

Over the years however, few developing countries (32% in Africa) have developed oral health policies and strategic plans (WHO, 1998). Others like Nigeria are still struggling to integrate oral health strategies in to their PHC system (Nosayaba, 2011).

Minimal reviews have been done on the existing policies (Samuel, 2006). And most of the reviews have reported ineffective policies. For example the oral health care in United States was found to be expansive but had a poor provider network prompting calls for lasting solutions including utilization of non-dental PHC providers to bridge the existing gap (Castaneda, 2010; Marina, 2004). Similarly, New Zealand has developed a new strategic vision for oral health in the wake of resentment of the place of oral health in their existing PHC strategy (Santosh, 2009).

Prevailing internal and external factors certainly influence the outcome of any policy. Such will include the political and social environments which may foster or deter implementation (Richard, 2002; Yaffa, 2009). Others as echoed by Baelum are public and political commitment for success in the implementation of existing and new health policies (Baelum, 2011).

System factors

These have become the “commoners” in the struggle for better oral health care (Samuel, 2006). The ever growing demand for services against a poorly funded system; coupled with poor infrastructure and inadequate personnel, equipment and materials have crippled the goal to integrate oral health care into primary health care (Nosayaba, 2011; James, 2002; Heide, 2010; Marina, 2004; Kaimenyi, 2004; Henrie, 2002).

This is further aggravated by the high cost of treatment not to mention the opportunity and indirect costs (Marina, 2004). Moreover, services are not arranged in a manner that encourages uptake while the referral system is not properly constituted (Charlotte, 2009).

Sherry however urges despite all odds pointing towards these “usual suspects” the main culprit is poor policy (Shery, 2009).

Health care worker

Social Demographic Characteristics

A major link exists between oral health care providers' size, composition, characteristics and distribution with the delivery of oral health services within the precepts of primary care (James, 2002). Skewed distribution of providers reflects on service provision (James, 2002; Kaimenyi, 2004).

To improve oral health provision against such background, proposals to include dental general practitioner and the pediatric dentist as part of the primary care team have been floated from different quotas (James, 2002; MOH, 2002). Further, in countries where there is a shortage of oral health care providers, there have been calls for expanded mandate for existing oral health care providers like the dental therapist and paraprofessionals in the preventive oral health programs (Nash, 2009; James, 2002). Still there is continuing recognition and call for the use of non-dental primary health care providers in the provision of preventive dental services (James, 2002; MOH, 2002; Castaneda, 2010; Marina, 2004; Leonard, 2009).

Knowledge

Many healthcare workers know the importance of oral health and are willing to provide some dental services. A high of up to 90% of health workers in some studies said they knew they should carry out dental screening and education to their patients (Charlotte, 2009). Others support the introduction of dental programs in their centers (Eileen, 1998). However, their knowledge on oral health is generally poor (Nosayaba, 2011; Mosha, 1990; Coleman, 2005; Rabiei et al, 2012). There is also poor knowledge on screening (Charlotte, 2009; Romano, 2007), poor knowledge on application of fluoride (Charlotte, 2009) and poor knowledge on oral health education (Romano, 2007).

Different cadres have shown different knowledge levels e.g. Boylston found pediatricians to have better knowledge on fluoride than a family physician (Boylston et al, 2010). This is in agreement with a study by Lauren who found that different cadres have varying assessment on their adequacy to carry out procedures. The oral health personnel felt they were better with screening of oral diseases while the non-oral health professionals' felt more adequate with assessing risk factors (Lauren, 2006).

Similarly, in a study in Iran, while reporting a high score on knowledge on their job description in integration of oral health into primary health care, Abolghasem reported significant difference in knowledge among different cadres who participated in the study. However, there was no difference between the male and female participants (Abolghasem, 2012).

Assessing knowledge on specific dental conditions, Sankaranarayanan in India rated knowledge on diagnosis of oral cancer by non-oral health workers as satisfactory (Sankaranarayanan, 1997). In contrast though, a study by Gaitano reported varying knowledge on factors leading to oral cancer. There was relatively good knowledge of alcohol and tobacco as risk factors but a low of 2.8% and 31.5% indicated old age and previous lesion as risk factors (Gaitano, 2004).

Attitude

Attitude of health workers on their role in oral health will definitely affect integration. There is a great recognition of the importance of oral health (Charlotte, 2009). Health workers have also shown interest in the provision of oral health services (Wender, 1992). Other professionals have even recognized their position in oral health care (American Dietetic Association, 2003).

Poor attitude has however been reported by the staff in geriatric homes describing it as unpleasant as a result of unwillingness and resistance by the residents. This is despite the staff having adequate time to offer dental services (Marianne, 2010). Poor attitude has also been attributed to lack of training or insufficient knowledge (Donna, 2009; Alan, 2009; Coleman, 2005; Romano, 2007). Lack of referral has also been associated with poor attitude (Charlotte, 2009).

Non-dental health care workers' Training on oral health

Many non-oral health professionals receive their training on oral health either in college or in their residency (Leonard, 2009; Charlotte, 2009). This is through rotation in the dental department or joining the dental team in the field during outreaches (Coleman, 2005). However, current teaching approaches for non-oral health professionals have not assured effectiveness. Thus, new ways of oral health related education approaches are being sought (Donna, 2009; Eileen, 1998).

Varying results on the percentage of non-oral health care providers trained on any form oral health have been reported. Charlotte reports less than 25% have had training while Romano

reports 68% (Charlotte, 2009; Romano, 2005). A high percentage of those trained however still felt the training was insufficient and were willing to have more training on oral health (Allan, 2009; Coleman, 2005)

In several studies, lack of training has been associated with insufficient knowledge (Donna, 2009; Alan, 2009; Coleman, 2005; Romano, 2007). In contrast, Jill *et al* reports no association between training and practice. They however reported a positive relationship between training and confidence. Those with higher level of confidence were also more likely to follow the set guidelines (Jill, 2010).

Provision of oral health services by the non-oral health care providers

The non-oral healthcare professional role in integration of oral health into primary health care would be oral screening, oral health education, preventive oral health procedures and referral. This should be done for all patients attended by the healthcare worker.

In a study by Lockhart, the most frequently provided treatment was advice at 62% followed by prescription at 48% and some form of office treatment at 20% (Lockhart, 2000). Similarly, only 4% of pediatricians applied fluoride (charlotte, 2009)

While assessing oral health screening among non-dental health care workers, Eileen found a low number of pediatric cardiology staff provided any form of dental education or screening (Eileen, 1998). This is in agreement with Charlotte study in 2009 which reported a 54% rate of screening among pediatricians (Charlotte, 2009). Gaetano's study on physicians however reported a higher rate of 67.8% providing oral examination (Gaetano, 2004).

High numbers of health care providers' carry out referral for suspected dental conditions. In a study by Dela Cruz G in 2004 on pediatric primary care providers, 90% of the respondents carried out referral of dental patients under their care. Similarly, Yuosef study in 2011 found that 65% of pediatricians referred all children 12 months or older to a dentist in accordance with set out guidelines.

Factors that influences provision of oral health services by the non-oral health care providers include good motivation, personal interest, positive attitude, education qualification, supervision and incentives have been shown to (Sankaranarayanan, 1997). Those who have practiced medicine for longer are also more likely to perform an oral examination (Gaetano, 2004). Rabiei *et al* also reported those with higher scores in knowledge are more likely to offer oral health

services (Rabiei et al, 2012). Similarly, Increasing knowledge and experience was shown to yield better oral services provision among non-oral health workers (Yuosef, 2011). Although training is not directly associated with practice, those trained follow guidelines better than the untrained (Jill, 2010).

Unsatisfactory knowledge and poor attitude towards oral health affect negatively the decision to referral suspected dental cases (Sofola, 2009). Good knowledge on their roles does not always result in good oral health practices by non-oral health care workers (Abolghasem, 2012). Similarly, no difference in provision of oral health services has been observed between cadres (Gaetano, 2004).

1.5 RESEARCH QUESTIONS

1. Is there an association between systems related factors (level of facility, infrastructure, referral, guide lines) and oral health practises among healthcare workers?
2. Is there an association between social demographic characteristics of healthcare workers (Age, Gender, Level of training, Number of working years, Area of specialty / training, training on oral health) and their oral health practises?
3. Is there an association between health workers knowledge on their role in integration of oral health into primary healthcare and their oral health practises?
4. Is there an association between health workers attitude towards their role in integration of oral health into primary healthcare and their oral health practises?

1.6 RESEARCH OBJECTIVES

1.6.1 General Objective

To determine factors associated with practices of health care workers towards integrating oral health into primary healthcare in Imenti North district.

1.6.2 Specific Objectives

1. To determine the association between systems related factors and oral health practices among healthcare workers.
2. To determine the association between social demographic characteristics of healthcare workers and their oral health practices.
3. To determine the relationship between healthcare workers knowledge on their role in integration of oral health in to primary health care and their oral health practices.
4. To determine the relationship between healthcare workers attitude towards their role in integration of oral health in to primary health care and their oral health practices.

1.6.3 Hypotheses

1. There is no association between systems related factors and oral health practices among healthcare workers.
2. There is no association between social demographic characteristics of healthcare workers and their oral health practices.
3. There is no relationship between health workers knowledge on their role in integration of oral health in to primary healthcare and their oral health practices.
4. There is no relationship between health workers attitude towards their role in integration of oral health in to primary healthcare and their oral health practices.

2.0 CHAPTER 2

2.1 STATEMENT OF THE RESEARCH PROBLEM

Oral health is defined as one of the components of primary health care in Kenya. This would have gone a long way to improve oral health. Over the years however, oral health has not been given its appropriate place in primary health care. The number of oral health programs and providers remain low; the focus is on curative services with non-existent oral health education and preventive services resulting in increase in oral health diseases (MOH, 2002). Oral health problems in Kenya are on the rise and their prevalence is increasing (Ng'ang'a, 2002; MOH 2002; Kaimenyi, 2004).

The formulation of the Kenya National Oral Health Policy and Strategic Plan of 2002-2012 and the subsequent inclusion of oral health in the KEPH in 2005 seemed as the all-important link that was missing to have preventive oral health services properly integrated in primary health care. However a quick glance reveals very slight shift (if any) on the oral health indicators; preventive dentistry through the use of non-oral health care providers has not taken root.

This warrants an assessment of the integration process to determine the factors deterring this important process with an aim of recommending actions for improvement.

2.2 JUSTIFICATION OF STUDY

Preventive dentistry has been shown to be effective in improving oral health status (Gary, 2003; Rozier, 2006). With the number of oral health personnel still very low, the use of both the oral and non-oral health personnel to implement the preventive dentistry through integration of oral health into primary health care was a strategy in the Kenya National Oral Health Policy and Strategic Plan 2002- 2012 (MOH, 2002). The plan for integrating oral health as part of the PHC network emphasizes the prevention services at the first level; and treatment services at the second level. Both oral health personnel and non-oral health personnel are integral in the foresaid plans; the role of the latter being screening, oral health education and referrals.

Key to this integration is the knowledge, attitude and practices of health workers on their roles.

There is little or no literature on oral health integration into primary health care in Kenya. The study therefore aims to assess the factors associated with practices of health care workers towards integrating oral health into primary health care in Imenti North district, Kenya.

3.0 CHAPTER 3

3.1 METHODOLOGY

3.1.1 Study Design

This was a descriptive cross sectional study aimed at assessing the factors associated with practices of health workers towards oral health integration into primary health care.

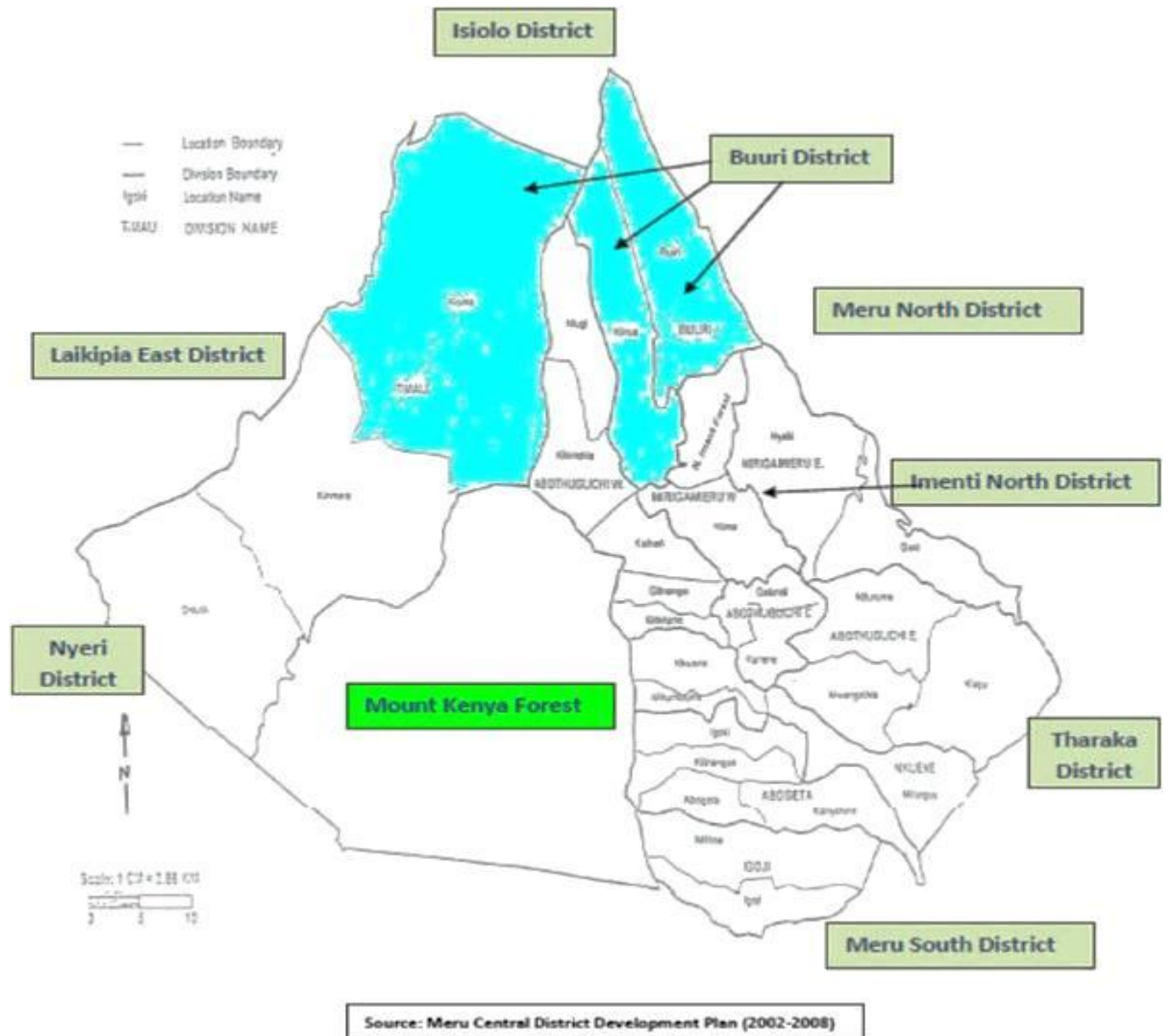
3.1.2 Study Area

The study was carried out in Imenti North district. Imenti North district is one of the districts that constitute the Meru County. It is geographically located to the East of Mt. Kenya. It borders Laikipia district to the West, Meru central districts to the South, Tharaka district to the East and Meru North and Isiolo districts to the North (fig. 2).

Imenti North covers an area of 1,541 km² with a population of slightly more than 258,947 people (Mars group, 2012). The main economic activity is farming with 42% of the population living below poverty line.

There are slightly over 140 health facilities of different levels spread all over the district (MOH, 2012). There is varied access to health facilities with an average of 7kms² to the nearest health facility. There is one maxillofacial surgeon, two dental officers and one COHO, all placed in Meru Level 5 hospital. The doctor to patient ratio is 1:33,259. This means that most facilities are run by other cadres of health workers. (National coordinating agency for population and development, 2005)

Figure 2: Study area; Imenti North district



3.1.3 Study Population

The study population comprised of doctors, nurses and clinical officers in Imenti North district.

Inclusion and Exclusion Criteria

All doctors, nurses and clinical officers offering clinical services in the public sector Imenti North district who consent to participate in the study were included in the study. Those who decline to participate in the study were excluded.

3.1.4 Sampling

Sample size

Sample size was calculated using the formula;

$$n = \frac{z^2 p(1-p)}{d^2} \quad (\text{Fisher } et \text{ al, } 1998)$$

Where n is the minimum sample size

Z is the standard normal deviate corresponding to 95% confidence interval.

p is the hypothesized prevalence of the factors (set at 50% since percentage of non-oral health workers providing dental services is unknown)

d is the level of precision which was set at 5%

Substituting the values in the above formula, the minimum sample size would be 384.

Because the number of doctors, clinical officers and nurses in Imenti North district is less than 10,000, this sample size was adjusted to that of a finite population as follows;

$$nf = \frac{n}{1 + (\frac{n}{N})}$$

Where nf is the desired size when the $N < 10,000$

N is the desired sample size when $N > 10,000$

n is the estimated number of health care workers

$$n = 29 \text{ doctors} + 339 \text{ nurses} + 52 \text{ clinical officers} = 420$$

Substituting the values in the above formula, the study population will be 201.

Distribution of participating health workers distribution by facility level

Health care workers were used as the sampling unit. All the health care workers in the public sector in Imenti North district were included in the sampling frame. Mixed sampling methods were used based on the health care facility level.

There was only one level 5 hospital, two level 4 hospitals and two level 3 hospitals in Imenti North district. Being the only level 5 hospital, Meru level 5 hospital was purposefully selected into the study. Timau sub-district hospital and Ruri health center had a better cadre representation and were also purposefully selected into the study.

The average number of health workers in each level 2 facilities was used to determine the number of level 2 facilities to be used in the study.

$$\text{No of level 2 facilities} = \frac{\text{Number of participants expected from level 2 facilities}}{\text{Average number of workers in each level 2 facility}}$$

The participating level 2 facilities were then identified using the simple random technique.

Table III: Participating health workers distribution by facility level

Facility level	Number of participants	Percentage	No. of Facilities
5	150	70.1	1
4	10	4.7	1
3	12	5.6	1
2	42	19.6	10
Total	214	100	14

Distribution of Participating Health Workers by cadre

Table IV below shows the distribution of participating health workers by cadre. The number and distribution of participating health workers from Meru level 5 hospital were selected using the proportion probability to size based on the number of health workers' in each cadre (see appendix v).

Table IV: Distribution of Health Workers by cadre.

	Level 2	Level 3	Level 4	Level 5	Total
Doctors	0	0	1	14	15
Clinical Officers	0	3	2	26	31
Nurses	42	9	7	110	168
Total	42	12	10	141	214

3.1.5 Data Collection

A self-administered semi-structured questionnaire was used to collect data on the healthcare workers. The questionnaire was constructed from emerging themes in the literature review. The questionnaire had four sections.

In Meru level 5, the number of nurses and clinical officers in each department were used to determine the number of questionnaires per department. 50% of the nurses and clinical officer in every department were targeted. The timing for distribution of the questionnaires was determined by the arrangement of duties within the departments. Each department was visited thrice on three different days. One visit was in the morning, one at night and one in the afternoon. All those present during a particular rotation selected for the study were included in the study. Participating doctors were identified through simple random technique.

All the health workers present in a level 2, 3 and 4 health facilities on the study day participated in the study.

3.1.6 Validation of data collection tool

The questionnaire was pretested at Kibirichia sub-district hospital. Kibirichia sub-district hospital was one of the facilities in the larger Meru central district before Imenti north district was hived off. It shares similar characteristics with most facilities in Imenti North district.

3.1.7 Variables

Predictor variables

- i) System related factors
 - (1) Level of facility
 - (2) Infrastructure
 - (3) Referral
 - (4) Guide lines
- ii) Social demographic characteristics
 - (1) Age
 - (2) Gender
 - (3) Level of training
 - (4) Number of working years
 - (5) Area of specialty / training
 - (6) Training on oral health
- iii) Knowledge on role in integration of oral health into primary health care.
- iv) Attitude on role in integration of oral health into primary health care.

Outcome variable

- 1) Provision of oral health services.

3.1.7 Data analysis and presentation

Raw data was coded and entered into the computer. Data cleaning and analysis was done using Excel and Statistical Package for Social Sciences (SPSS) version 17.0 computer packages.

To assess knowledge, questions were marked, right answers scored 1, wrong answers or non-response was scored zero. Each person's score was calculated as sum of the gained marks. A score of more than 50% was considered as adequate knowledge while that of 50% or less was poor knowledge. Questions regarding the attitude and practice were categorized to good or poor practice, and the percentage of personnel in each category was calculated.

Relations between different variables were tested using chi-square and Pearson correlation test. A *P* value of 0.05 was set throughout the analysis.

The results were presented using the in tables, charts and graphs. Both open ended and close ended questions which ask the why questions were analyzed manually and summarized according to emerging themes.

3.1.8 Minimizing biases and Errors

1. Standardized data collection tools were used on all the respondents.
2. The key investigator administered and collected the questionnaires to increase response.
3. Mixed method sampling technique was employed to select participating facilities and health workers to ensure equal representation.
4. A pre-test was conducted to ensure the validity of the data collecting tool.

3.1.9 Ethical Consideration

1. Approval was sought from Kenyatta National Hospital/University of Nairobi Ethics and Research Committee (Ref: KNH-ERC/A/7)
2. Clearance for research was sought from the Ministry of Medical Services, Districts Research Committees and the District Medical Officers of Health.
3. Informed consent was obtained from all the participants before filling the questionnaire.
4. Confidentiality was assured by using serial numbers and not names to conceal identity.
5. All data was under lockable cabinet accessible by the key investigator only.

3.2 STRENGTH AND LIMITATIONS OF THE STUDY

The study had a high response rate increasing the value of the results. The cross sectional design allows for investigation of association between different factors, however, investigations for causality would require a longitudinal study. The study used a self- administered which is prone to no-response misconception and errors. These were minimal in the study since the respondents were educated health care workers.

The mixed sampling method allowed for extensive and equitable representation of different characteristics within the targeted study group. The strata chosen are a representation of a typical health setup and the results of this study may be generalized to the Kenyan health system.

5.0 RESULTS

A total of 214 health care workers participated in the study.

5.1 SOCIAL DEMOGRAPHIC CHARACTERISTICS

Out of the 214 respondents, 72% were female while 28% were male.

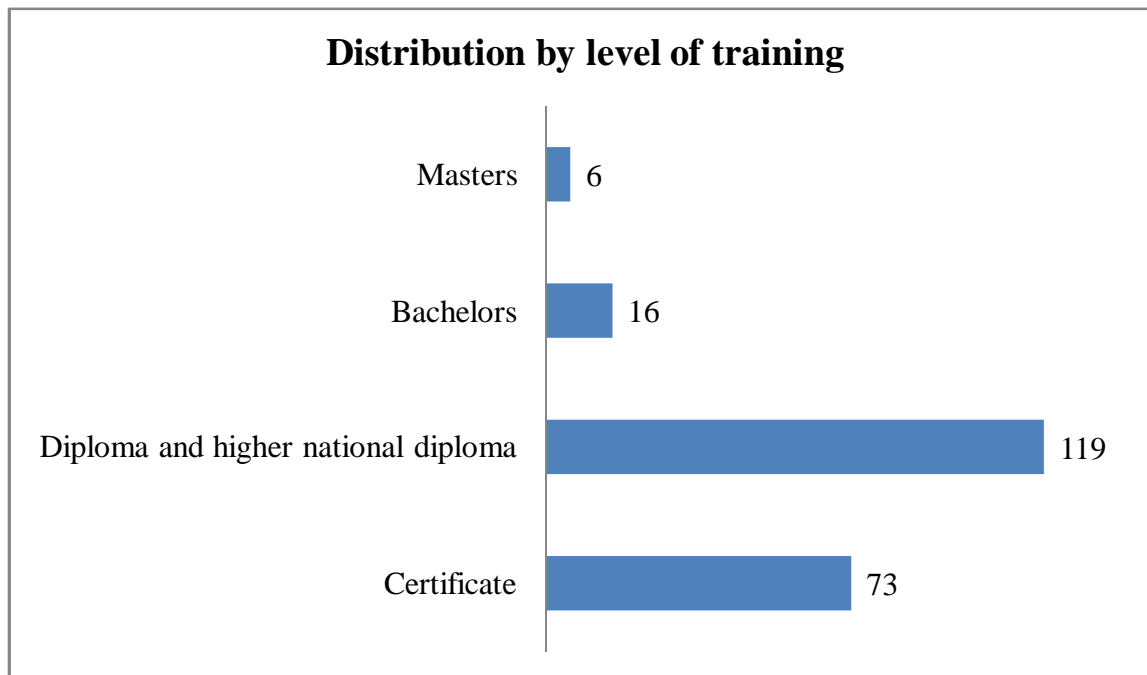
The age of the respondents is as shown in table 5. The age ranged from 22 to 55 with a mean age was 40.2 (\pm 10.6).

Table 5: Distribution of respondents by age (n=214)

Age (in years)	Frequency (%)
20-29	38 (17.8)
30-39	45 (21.0)
40-49	63 (29.4)
50-59	47 (22.0)
Missing	21 (9.8)

Twenty nine point four percent (29.4%) of the respondents were in the 40-49 age group and the least (17.8%) were in the 20-29 age group. A high number of the respondents (9.8%) did not indicate their age.

Figure 3: Distribution of respondents by level of training (n=214)



Majority, 119 (55.6%) of the respondents were holders of diploma and higher national diploma. Only 6 (2.8%) of the respondents were masters degree holders. 73 (33.6%) were certificate holders while 16 (7.5%) had a bachelor degree in their respective fields of study (figure 3).

Table 6: Distribution of respondents by years of service since training (n=214)

Years of service	Frequency (%)
<10	71 (33.2)
10-19	53 (24.8)
20-29	53 (24.8)
30-39	33 (15.4)
Missing	4 (1.9)

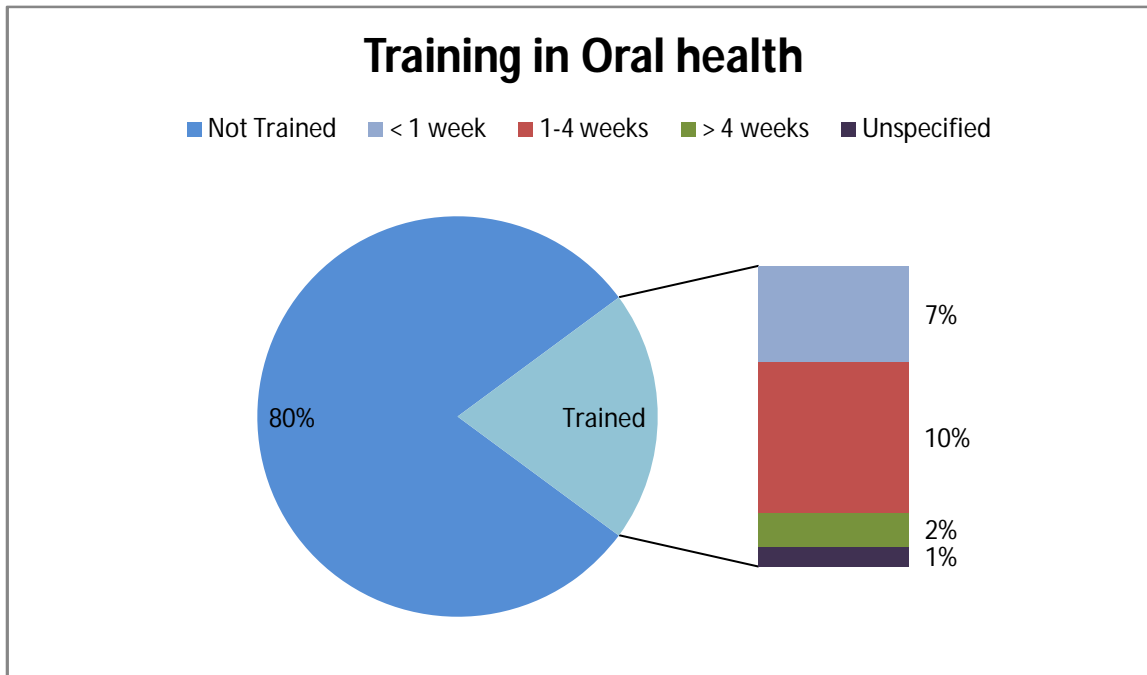
The number of working years ranged from 1 to 38. The median was 17.0 (IQR 4.8- 24.0). About a third (33.2%) of the respondents had less than ten years of service since last training (table 6).

Table 7: Distribution of respondents by cadre (n=214)

Qualification	Frequency (%)
Nurse	168 (78.5)
CO	31 (14.5)
Doctor	15 (7.0)

Table 7 shows that 168 nurses participated in the study. This represented 78.5% of the respondents. 14.5 % (31) of the respondents were clinical officers while 7.0% (15) were medical doctors.

Figure 4: Distribution of respondent by training in oral health (n=214)



Eighty percent (80%) of the respondents indicated they do not have any form of training in oral health with only 20% indicating that they had some form of training. Only 2% of the respondents had training lasting over four weeks. Half of those trained had training between one and four weeks while one third of those trained had only been trained for less than a week (figure 4).

5.2 SYSTEM RELATED FACTORS

Participants were drawn from all the four levels of health facilities in Imenti North district. Table 8 shows the number of facilities from each level and the distribution of participant by facility level.

Table 8: Distribution of respondents by facility level (n=214)

Facility level	Number of participants	Percentage	No. of Facilities
5	150	70.1	1
4	10	4.7	1
3	12	5.6	1
2	42	19.6	10
Total	214	100	14

Most (70.1%) of the interviews were conducted in a level 5 facility since it had the largest percentage of health care workers in the district. Only 19.6% of the respondents were from level 2 facilities. Other respondents (4.7 % and 5.6%) were from level 4 and 3 facilities respectively (table 8).

Table 9 shows the distribution of the respondents by cadre and facility level. There was no medical doctor in level 2 and 3 facilities with only one medical doctor respondent in level 4 facilities. All the rest were in a level 5 facility.

Of the 31 clinical officer respondents, 83.9 % were from level 5 facility while only 6.5% and 9.7% were from level 4 and 3 respectively. There was no clinical officer in level 2 facilities.

Majority of the nurses (65.5%) were in a level 5 facility with the rest being distributed among the other health facility levels, majority (72.4%) being in level 2 facilities.

Table 9: Distribution of the respondents by cadre and facility level (n=214)

	Level 2	Level 3	Level 4	Level 5	Total
Doctors	0	0	1	14	15
Clinical Officers	0	3	2	26	31
Nurses	42	9	7	110	168
Total	42	12	10	141	214

Only Meru level 5 hospital had a dental clinic within the study area. All the respondents within the hospital indicated that they referred their patients to the dental clinic within the facility; which a majority of the respondents indicated was always functional.

Respondents in levels 2, 3 and 4 facilities indicated a distance ranging from 1 to 50 kilometers between the facility and the nearest dental referral facility. The average distance was 15 kilometers.

When asked whether they had a copy of the referral guidelines, only 17% of the respondents replied in the affirmative while 83% said they do not have.

5.3 KNOWLEDGE OF HEALTH CARE WORKERS ON THEIR ROLE IN INTEGRATION

5.3.1 Knowledge on diagnosis of oral diseases and conditions

A high percentage (82.7%) of the respondents had adequate knowledge on diagnosis of oral diseases. The poorest score (39.7%) was in response to the question on whether dental carries was always visible clinically. Others with low scores (67.8%) were those relating to presentation and diagnosis of tartar/calculus.

While a high number, 81.8%, of respondents knew that oral cancer may present in the form of a swelling, only 69.6% indicated that a persistent oral ulcer could be indicative of oral cancer. Knowledge on presentation of fluorosis and cleft lip and palate was also high at 79.9% and 84.1% respectively.

More female respondents had better knowledge on diagnosis than male respondents (table 10). However, knowledge on diagnosis was not significantly statistically different between the genders ($p=0.253$).

Older respondents had better knowledge on diagnosis of oral diseases than the younger respondents. Similarly those with more years of service exhibited better knowledge levels. There was only a significant association between knowledge on diagnosis of oral diseases and respondents more than 30 years of service (OR 4.1 (95% CI 1.3 – 12.6), $p=0.015$).

While training in oral health is associated with knowledge on diagnosis (OR 5.3 (95% CI 1.2 – 22.9), $p=0.014$), the results showed an even stronger association between level of education and knowledge on diagnosis (OR 4.8 (95% CI 2.3 – 10.2), $p<0.001$).

Results also showed that those with a dental clinic within the facility were more likely to have adequate knowledge on diagnosis than those without a dental clinic in the facility. The association was statistically significant (OR 2.5 (95% CI 1.2 -5.1), $p=0.012$).

There is however no significant association between having a copy of the guidelines and knowledge on diagnosis ($p=0.096$) nor was there a significant association between having a positive attitude towards oral health and knowledge on diagnosis of oral diseases and conditions ($p=0.316$).

Table 10 Relationship between knowledge on diagnosis and other variables (n=214)

Variable	Diagnosis score		OR (95% CI)	p value
	Adequate knowledge	Poor		
Age				
20 – 29	35 (92.1)	3 (7.9)	1.0	
30 – 39	41 (91.1)	4 (8.9)	1.1 (0.2 – 5.4)	0.871
40 – 49	50 (79.4)	13 (20.6)	3.0 (0.8 – 11.4)	0.101
50 – 59	35 (74.5)	12 (25.5)	4.0 (0.1 – 15.4)	0.044
Gender				
Male	46 (79.3)	12 (20.7)	0.6 (0.3 – 1.4)	0.253
Female	127 (85.8)	21 (14.2)	1.0	
Level of training				
Certificate	49 (67.1)	24 (32.9)	1.0	
Diploma/Bachelors/Masters	128 (90.8)	13 (9.2)	4.8 (2.3 – 10.2)	<0.001*
Dental health training				
Yes	41 (95.3)	2 (4.7)	5.3 (1.2 – 22.9)	0.014*
No	136 (79.5)	35 (20.5)	1.0	
Duration of service				
<10	65 (91.5)	6 (8.5)	1.0	
10 – 19	43 (81.1)	10 (18.9)	2.5 (0.9 – 7.4)	0.094
20 – 29	43 (81.1)	10 (18.9)	2.5 (0.9 – 7.4)	0.094
30 – 39	24 (72.7)	9 (27.3)	4.1 (1.3 – 12.6)	0.015
Dental clinic in facility				
Yes	128 (87.1)	19 (12.9)	2.5 (1.2 -5.1)	0.012*
No	49 (73.1)	18 (26.9)	1.0	
Copy of referral guidelines				
Yes	32 (91.4)	3 (8.6)	2.5 (0.7 –8.7)	0.136
No	145 (81.0)	34 (19.0)	1.0	
Overall attitude level				
Positive attitude	146 (81.6)	33 (18.4)	0.6 (0.2 – 1.7)	0.316
Negative attitude	31 (88.6)	4 (11.4)	1.0	

5.3.2 Knowledge on oral health education

A high percentage of the respondents (70.1%) had adequate knowledge on oral health education. Most of them had knowledge on changing of tooth brush (89.7%), frequency of brushing (88.3%) and mouth rinse use (72.9%). However, only 145 (68.2%) knew that chew stick could be used to clean teeth. Additionally, 45.8% knew that dental floss should be used daily and only 50% knew that everybody should use fluoridated tooth paste.

While 86% of the respondents knew of the association of alcohol and smoking being with oral diseases, only 10.3% knew that dental check-up should be done at least twice a year. Similarly, a high percentage (83.6%) of the participants knew that the best treatment for teeth is not extraction. However, only 42.1% knew that primary teeth can be restored.

Table 11 shows relationship between knowledge on provision of oral health education and social demographic and system related variables.

A higher percentage of female respondents (77%) as compared to male respondents (53.4%) had adequate knowledge on oral health education. The association between sex and knowledge on oral health education was statistically significant (OR 0.3 (95% CI 0.2 – 0.6), $p=0.001$).

Those who had a higher level of training had better knowledge on oral health education. A significant association was established between level of training and knowledge on oral health education (OR 2.0 (95% CI 1.1 – 3.7), $p=0.024$). Those with dental training were also more likely to have adequate knowledge on oral health education. This association was however not significant ($p=0.488$).

Having a positive attitude was not associated with better knowledge on oral health education. Similarly, a positive non- significant association is shown between having a dental clinic in the facility or having a copy of referral guidelines and knowledge on oral health education ($p=0.110$ and $p=0.554$ respectively).

Table 11 Relationship between knowledge on oral health education and other variables (n=214).

Variable	Score on oral health education		OR (95% CI)	P value
	Adequate knowledge	Inadequate knowledge		
Age				
20 – 29	27 (71.1)	11 (28.9)	1.0	
30 – 39	37 (82.2)	8 (17.8)	1.8 (0.7 – 5.3)	0.231
40 – 49	45 (71.4)	18 (28.6)	1.0 (0.4 – 2.5)	0.968
50 – 59	30 (63.8)	17 (36.2)	0.7 (0.3 – 1.8)	0.482
Gender				
Male	31 (53.4)	27 (46.6)	0.3 (0.2 – 0.6)	0.001*
Female	114 (77.0)	34 (23.0)	1.0	
Level of training				
Certificate	44 (60.3)	29 (39.7)	1.0	
Diploma/Bachelors/Masters	106 (75.2)	35 (24.8)	2.0 (1.1 – 3.7)	0.024*
Dental health training				
Yes	32 (74.4)	11 (25.6)	1.3 (0.6 – 2.8)	0.488
No	118 (69.0)	53 (31.0)	1.0	
Duration of service				
<10	50 (70.4)	21 (29.6)	1.0	
10 – 19	40 (75.5)	13 (24.5)	1.3 (0.6 – 2.9)	0.533
20 – 29	34 (64.2)	19 (35.8)	0.8 (0.4 – 1.6)	0.460
30 – 39	23 (69.7)	10 (30.3)	1.0 (0.4 – 2.4)	0.940
Dental clinic in facility				
Yes	108 (73.5)	39 (26.5)	1.6 (0.9 – 3.1)	0.110
No	42 (62.7)	25 (37.3)	1.0	
Copy of referral guidelines				
Yes	26 (74.3)	9 (25.7)	1.3 (0.6 – 3.0)	0.554
No	124 (69.3)	55 (30.7)	1.0	
Overall attitude level				
Positive attitude	125 (69.8)	54 (30.2)	0.9 (0.4 – 2.1)	0.850
Negative attitude	25 (71.4)	10 (28.6)	1.0	

5.3.3 Knowledge on referral of suspected oral diseases

A high percentage of the respondents (79.9%) had adequate knowledge on referral of patients with suspected oral diseases. Best score (95.8%) on referral was on offering of emergency treatment before referral. Others were 79.9% on difference between the functions of clinical oral health officer and the dentist and 79.4% on where dentist can be found.

The lowest scores were 59.8% on which treatment cases should be referred to a dentist. Also scoring lowly was 64.5% on whether there exist any guidelines on referral and 72.4% on patient having a referral note to the dentist.

Comparing knowledge on referral with other variables, as shown in table 12 below, no difference was observed in knowledge levels between male and female respondents. However, a non-significant positive relationship was observed between respondents in the older age group and knowledge on referral ($p>0.05$).

While level of training was significantly associated with knowledge on referral, (OR 3.6 (95% CI 1.8 – 7.1), $p<0.001$), dental health training was only positively but not significantly associated with knowledge on referral ($p=0.121$). Additionally, duration of service after training had a strong relationship with knowledge on referral ($p<0.05$).

Having a copy of referral guidelines and a positive attitude towards oral health are not significantly associated with knowledge on referral. On the other hand, having a dental clinic in the facility on the other hand, was significantly associated with knowledge on referral (OR 5.1 (95% CI 2.5 – 10.4), $p<0.001$).

Table 12: Relationship between knowledge on referral with social demographic and system related variables (n=214).

Variable	Referral score		OR (95% CI)	P value
	Adequate knowledge	Poor		
Age				
20 – 29	34 (89.5)	4 (10.5)	1.0	
30 – 39	36 (80.0)	9 (20.0)	2.1 (0.6 – 7.5)	0.244
40 – 49	49 (77.8)	14 (22.2)	2.4 (0.7 – 8.0)	0.145
50 – 59	34 (72.3)	13 (27.7)	3.3 (1.0 – 11.0)	0.058
Gender				
Male	46 (79.3)	12 (20.7)	1.0 (0.4 – 2.0)	0.894
Female	119(80.4)	29 (19.6)	1.0	
Level of training				
Certificate	48 (65.8)	25 (34.2)	1.0	
Diploma/Bachelors/Masters	123 (87.2)	18 (12.8)	3.6 (1.8 – 7.1)	<0.001*
Dental health training				
Yes	38 (88.4)	5 (11.6)	2.2 (0.8 – 5.9)	0.121
No	133 (77.8)	38 (22.2)	1.0	
Duration of training				
<10	65 (91.5)	6 (8.5)	1.0	
10 – 19	42 (79.2)	11 (20.8)	2.8 (1.0 – 8.3)	0.056
20 – 29	38 (71.7)	15 (28.3)	4.3 (1.5 – 12.0)	0.006
30 – 39	23 (69.7)	10 (30.3)	4.7 (1.5 – 14.4)	0.007
Dental clinic in facility				
Yes	130 (88.4)	17 (11.6)	4.8 (2.4 – 9.8)	<0.001*
No	41 (61.2)	26 (38.8)	1.0	
Copy of referral guidelines				
Yes	30 (85.7)	5 (14.3)	1.6 (0.6 -4.5)	0.348
No	141 (78.8)	38 (21.2)	1.0	
Overall attitude level				
Positive attitude	144 (80.4)	35 (19.6)	1.2 (0.5 -2.9)	0.655
Negative attitude	27 (77.1)	8 (22.9)	1.0	

5.3.4 Overall knowledge on roles in integration

Majority (88.8%) of the respondents had adequate knowledge on their role towards integration while 11.2% have inadequate knowledge.

When comparing overall knowledge on their roles with other variables, as shown in table 13, a female respondent was more likely to have adequate knowledge compared to their male counterparts. Similarly, the younger respondents had better knowledge than the older respondents. Concurrently, those with shorter durations of service since training had better knowledge.

Those with higher level of training had better knowledge score on their roles as were those with dental health training. A respondent with a copy of referral guidelines also scored better than those without. Additionally, a respondent in a facility where there was a dental clinic also had better knowledge on their roles in integration.

The level of training was significantly associated with knowledge on roles towards integration (OR 5.8 (95%CI 2.3-14.8), $p < 0.001$). Other factors which had statistically significant association with knowledge on roles towards integration are dental health training ($p = 0.005$), and having a dental clinic in the facility (OR 5.5 (95% CI 2.2 – 13.5), $p < 0.001$).

Table 13: Relationship between overall knowledge and social demographic and system related variables (n=214).

Variable	Overall knowledge score		OR (95% CI)	P value
	Adequate knowledge	Poor		
Age				
20 – 29	35 (92.1)	3 (7.9)	1.0	
30 – 39	41 (91.1)	4 (8.9)	0.9 (0.2 – 4.2)	0.871
40 – 49	56 (88.9)	7 (11.1)	0.7 (0.2 – 2.8)	0.602
50 – 59	39 (83.0)	8 (17.0)	0.4 (0.1 – 1.7)	0.223
Gender				
Male	50 (86.2)	8 (13.8)	0.7 (0.3 – 1.7)	0.365
Female	134 (90.5)	14 (9.5)	1.0	
Level of training				
Certificate	56 (76.7)	17 (23.3)	1.0	
Diploma/Bachelors/Masters	134 (95.0)	7 (5.0)	5.8 (2.3 – 14.8)	<0.001*
Dental health training				
Yes	43 (100.0)	0	-	0.005*
No	147 (86.0)	24 (14.0)		
Duration of training				
<10	67 (94.4)	4 (5.6)	1.0	
10 – 19	46 (86.8)	7 (13.2)	0.4 (0.1 – 1.4)	0.153
20 – 29	47 (88.7)	6 (11.3)	0.5 (0.1 – 1.7)	0.259
30 – 39	27 (81.8)	6 (18.2)	0.3 (0.1 – 1.0)	0.055
Dental clinic in facility				
Yes	139 (94.6)	8 (5.4)	5.5 (2.2 – 13.5)	<0.001*
No	51 (76.1)	16 (23.9)	1.0	
Copy of referral guidelines				
Yes	34 (97.1)	1 (2.9)	5.0 (0.7 – 38.4)	0.139
No	156 (87.2)	23 (12.8)	1.0	
Overall attitude level				
Positive attitude	158 (88.3)	21 (11.7)	0.7 (0.2 – 2.5)	0.773
Negative attitude	32 (91.4)	3 (8.6)	1.0	

5.4 ATTITUDE TOWARD ORAL HEALTH

Table 14 summarizes the respondents' answers to different questions on oral health.

Table 14: Respondents answer to oral health questions (n=214)

Question	Frequency (%)
Oral health important to general health Yes No	212 (99.1) 1 (0.5)
Dental screening be done to all patients Yes No	196 (91.6) 17 (7.9)
Oral health education is important Yes No	212 (99.1) 2 (0.9)
Is it possible to maintain good health hygiene Yes No	210 (98.1) 2 (0.9)
Dental health training for non- dental health care providers Yes No	203 (94.9) 7 (3.3)
Willing to attend dental health if given a chance Yes No	204 (95.3) 5 (2.3)
If all barriers were removed would you be willing to offer dental services Yes No	203 (94.9) 3 (1.4)
Overall attitude level Positive attitude Negative attitude	179 (83.6) 35 (16.4)

Almost all respondents had a positive attitude towards oral health with 99.1% agreeing that oral health is important to general health. While a similar large majority believes that oral health education is important and it is possible to maintain good oral hygiene, 98.1% and 99.1% respectively, a relatively lower percentage (91%) agree that dental screening should be

done for all patients.

Among reasons given for the importance of dental screening and oral health education were to create awareness, early detection and treatment of oral diseases and conditions. A clinical officer states *“Early dental screening can help in detecting dental diseases”*. This is repeated by a medical doctor who stated that *“Asymptomatic conditions can be detected early and treated early”*. Similarly a nurse in a level 4 facility states that it will enable *“To detect any abnormality in good time for treatment”*

Some Respondents felt this is part of holistic approach to health and should therefore be part of general examination. *“Health problems should be dealt with holistically”* commented one of the level 2 facility nurses. A level 4 facility nurse also comments *“(Dental screening) is part of general examination of patients and management of problems within the system”* another nurse from a level 5 facility adds that *“Some systemic diseases may present with dental problems”*

Others felt that this may be the only opportunity to do dental screening for the otherwise “dental health ignorant” patients. They added that this will guide in pacing oral health education. Affirming this, a clinical officer in a level 5 facility states *“Because people are not serious about their teeth unless when it pains and by then all damage is done”*. Similarly, a doctor in level 4 facility laments that *“Dental diseases are easily overlooked”*. A medical doctor in a level 5 facility also states that this *“May be the only opportunity to screen patients and this could avoid missed diagnosis”*

Those who disagreed with dental screening for all the patients (7.9%) stated that dentists are better placed to do so. Additionally, they urged that the numbers of health personnel is not enough to screen all patients. Further, only patients presenting with dental complaint should be screened. A male nurse in level 4 facility stated *“A patient presents with a problem if there is a dental problem”* while a clinical officer states *“There are not enough officers to carry out the activity to every patient”*. Like many other respondents, a level 5 facility nurse states *“This is because not all patients have tooth problems”* and another in the same facility states *“It is only the dentist who can detect a problem concerning teeth easily”*.

On the other hand, a high number of respondents, 94.9%, agreed that dental health training was important for non-dental health care providers. And in equal measure, 95.3 % of the respondents

were willing to attend training on oral health if given chance to. 94.9% were also willing to offer dental services if all barriers to service provision were removed.

Those who agreed with dental training for non-oral health workers urge that the oral health officers are few and other health professionals are more accessible. A nurse in level 5 facility commented that *“This is because other health care workers are more than dental health practitioners and in order to provide comprehensive care, dental health training should be a component (of their training)”*. A doctor within the same facility states if trained *“Primary contact health workers can significantly decrease oral disease burden by ensuring early detection and referral where there are no trained dental health workers”*

Similarly, a level 3 facility clinical officer states that this is *“To make dental care accessible”* while a nurse in the same facility level states that this is *“Because dental health workers are not in all level 1 and 2 health facilities i.e. dispensaries and health centers”*.

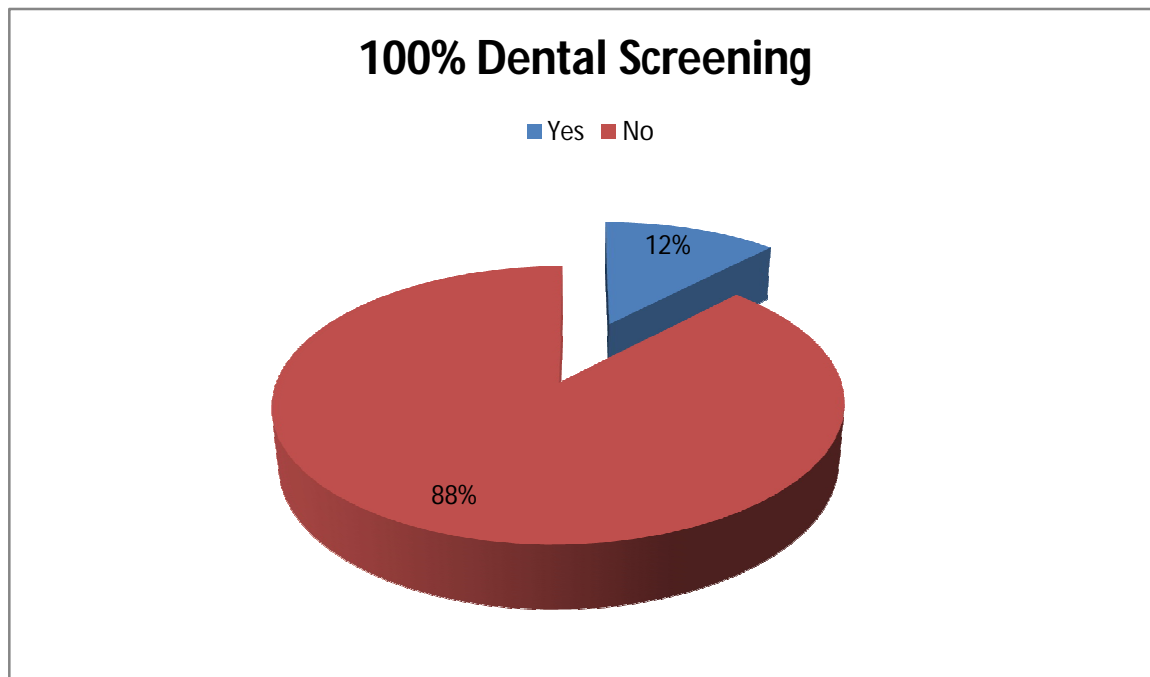
Admitting their lack of knowledge but emphasizing on their important role a nurse in level 4 facility states that *“Most health workers have little knowledge on dental health and they are the ones who come into contact with most patients”*

They further argue that the training is a prerequisite for knowledge on oral health to enable them carry out oral health education, dental screening and referral of dental cases. A doctor in a level 5 facility states that they should be trained *“So that health care providers can know where to refer the patient, and when to refer and to who”*. Additionally, a level 4 nurse states that this *“Can help in detecting, and also offer avenue for education and referral”*

However, those opposed to their training and offering of dental services by a non-oral health worker stated that *“it will no add value to their clients”*. Some stated it’s a specialty and should be left to the dentist. Others simply stated they were *“not interested”*.

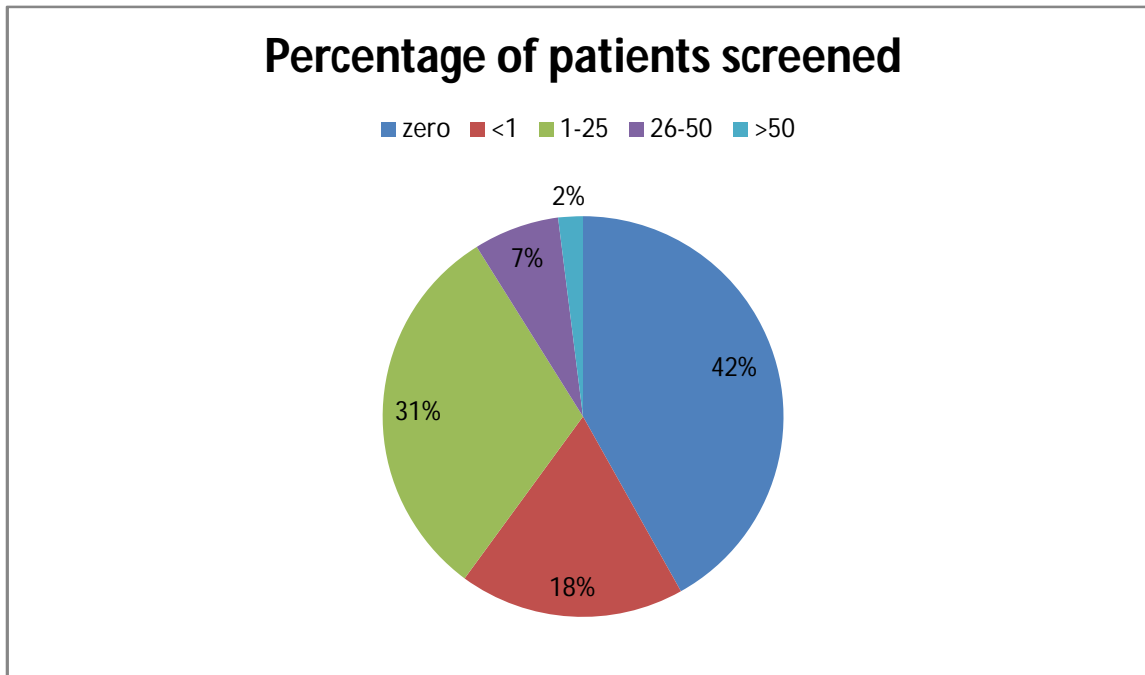
5.5 PROVISION OF ORAL HEALTH SERVICES

Figure 5: Percentage of respondents doing dental screening for all their patients (n=214)



Only 12% of the respondents did dental screening for all the patients that they attended to. (Figure 5). Of the remaining 88%, as shown in figure 6, majority only perform dental screening to less than 10% of their patients. Majority stated that they only screen those who present with dental problems. Others gave varying reasons for not screening all the patients.

Figure 6: Percentage of patients screened (n=214)



Majority of the respondents indicated lack of knowledge on dental screening as the main reason for not screening their patients. This, they added, was due to lack of training and experience. A nurse in level 5 stated *“because am not well trained on the procedure”* while another in level 4 states *“am not trained what to look for”*. Similarly, a level 2 nurse indicates *“we are not trained about much of screening”* and a level 5 medical doctor simply states *“no experience”*.

Lack of dental screening equipment and facilities especially dental masks and tongue depressors were also stated as a reason for not screening patients. Similarly were lack of proper guidelines on delivery of dental services and culture. Most respondents stated *“lack of equipment”* or *“no guidelines”*. A clinical officer in level 5 stated *“I have no time and have not been instructed to do so”*. Still, another clinical officer in level 4 explained that it is *“not a key issue in my service delivery”*. A nurse in level 5 urges that *“in our set up, everybody does his/her work”* and she was *“not mandated to do so (dental screening)”*.

“We are very few health workers with so much workload” states one of the respondents in a level 2 facility. This is echoed by a respondent in a level 4 facility who states *“(there is) staff shortage leading to jump of dental assessment”*. Similarly a level 5 clinical officer indicates *“not enough personnel”* among the reasons for not doing dental screening for all her patients.

Most of these respondents had a negative attitude towards dental screening. A doctor in level 5 facility asserts “*am not a dentist*” while a nurse in the same facility states “*we have very little to do with them*”. Another nurse indicates that “*patients who have dental problems take themselves to the dental clinic*”. Elsewhere, a nurse in a level 2 facility says “*it is meant for dental health people*” while a clinical officer in a level 4 facility indicates “*am specialized in something else*”.

Patients were also blamed for the non- performance of dental screening. “*Some patients are not ready*” asserts one of the level 2 respondents. A clinical officer in level 5 also states that “*some may not be willing to be screened*”. Reinstating this, a nurse in a level 4 facility observes that “*patients are not ready*”. He goes ahead to add “*a good number of patients with dental problems attend (only) facilities where dentists are available*”.

When dental screening for all patients was compared with other variables as shown in table 19, the male respondents were less likely to perform dental screening as compared to their female counterparts. Those with high level of education were also more likely to do dental screening. Association between gender and level of education with dental screening were not significant, (p=0.333 and p=0.441 respectively)

Those with dental training were more likely to do dental screening than those without any training. This associations was significant (OR 2.4 (95% CI 1.0 – 5.8), p=0.049). There was however no association between age and duration of service with dental screening.

Those who have a copy of referral guidelines were more likely to do dental screening than those without a copy of the guidelines. The association was statistically significant (OR 3.3 (95% CI 1.3 – 8.2), p=0.019). Similarly those with a dental clinic within the facility were more likely to do screening than those whose facilities do not have a dental clinic. This association was however not significant (p=0.062).

A higher percentage of those who had adequate knowledge in diagnosis, health education and referral did dental screening than those with inadequate knowledge. However, these associations were not significant (p=0.265, p=0.091, p=0.081 respectively).

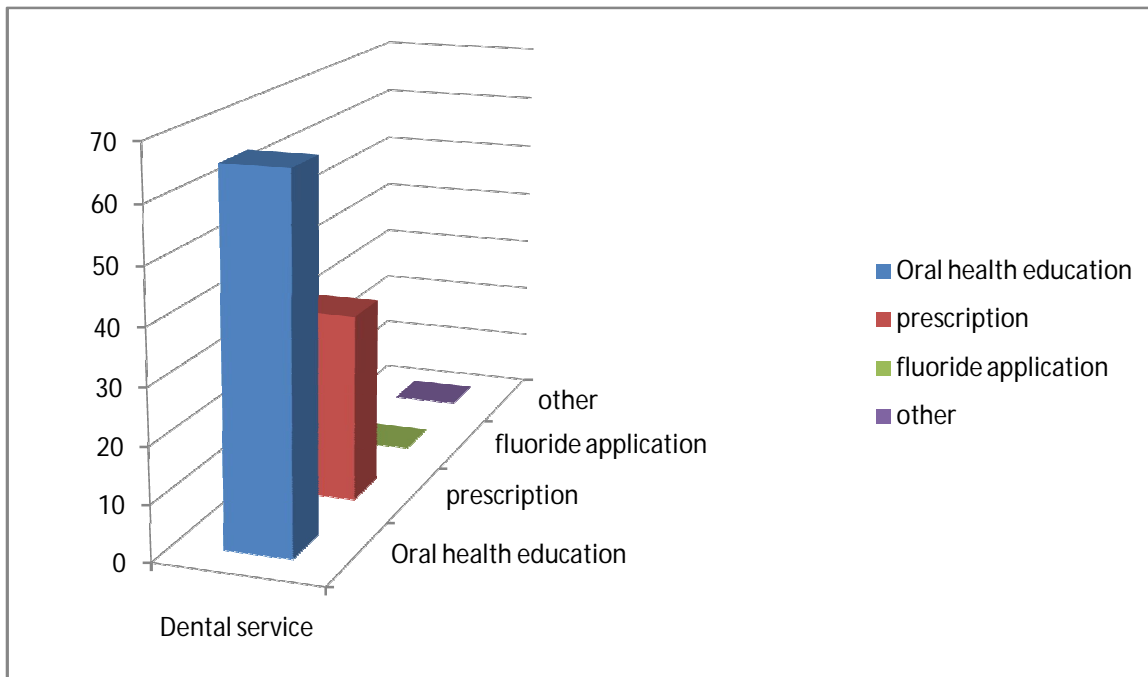
Table 15: Relationship between dental screening and predictor variables (n=214)

Variable	Dental screening /diagnosis for ALL patients		OR (95% CI)	P value
	Yes (n=26)	No (n=188)		
Age				
20 – 29	5 (13.2)	33 (86.8)	1.0	
30 – 39	6 (13.3)	39 (86.7)	1.0 (0.3 – 3.6)	0.981
40 – 49	4 (6.3)	59 (93.7)	0.4 (0.1 – 1.8)	0.254
50 – 59	7 (14.9)	40 (85.1)	1.2 (0.3 – 4.0)	0.819
Gender				
Male	5 (8.6)	53 (91.4)	0.6 (0.2 – 1.7)	0.333
Female	20 (13.5)	128 (86.5)	1.0	
Level of training				
Certificate	7 (9.7)	65 (90.3)	1.0	
Diploma/Bachelors/Masters	19 (13.4)	123 (86.6)	1.4 (0.6 – 3.6)	0.441
Dental health training				
Yes	9 (20.9)	34 (79.1)	2.4 (1.0 – 5.8)	0.049*
No	17 (9.9)	154 (90.1)	1.0	
Duration of service				
<10	10 (14.1)	61 (85.9)	1.0	
10 – 19	3 (5.7)	50 (94.3)	0.4 (0.1 – 1.4)	0.142
20 – 29	6 (11.3)	47 (88.7)	0.8 (0.3 – 2.3)	0.650
30 – 39	6 (18.2)	27 (81.8)	1.4 (0.4 – 4.1)	0.591
Dental clinic in facility				
Yes	22 (15.0)	125 (85.0)	2.8 (0.9 – 8.4)	0.062
No	4 (6.0)	63 (94.0)	1.0	
Copy of referral guidelines				
Yes	9 (25.7)	26 (74.3)	3.3 (1.3 – 8.2)	0.019*
No	17 (9.5)	162 (90.5)	1.0	
Diagnosis score				
Adequate knowledge	24 (13.6)	153 (86.4)	2.7 (0.6 – 12.2)	0.266
Poor	2 (5.4)	35 (94.6)	1.0	
Oral health score				
Adequate knowledge	22 (14.7)	128 (85.3)	2.6 (0.9 – 7.8)	0.084
Poor	4 (6.2)	60 (93.8)	1.0	
Referral score				
Adequate knowledge	24 (14.0)	147 (86.0)	3.3 (0.8 – 14.8)	0.092
Poor	2 (4.7)	41 (95.3)	1.0	
Overall knowledge scores				
Adequate knowledge	26 (13.7)	164 (86.3)	-	0.051
Poor	0	24 (100.0)		
Overall attitude level				
Positive attitude	1 (2.9)	34 (97.1)	0.2 (0.0 – 1.4)	0.087
Negative attitude	25 (14.0)	154 (86.0)	1.0	

5.6 DENTAL SERVICES OFFERED BY RESPONDENTS

When asked on the dental services they offered, 65.4% of the respondents indicated that they offered some form of oral health education. 33.6% indicated that they gave a prescription related to dental treatment. None of the respondents offered any form of fluoride application or other form of dental services (Figure 7).

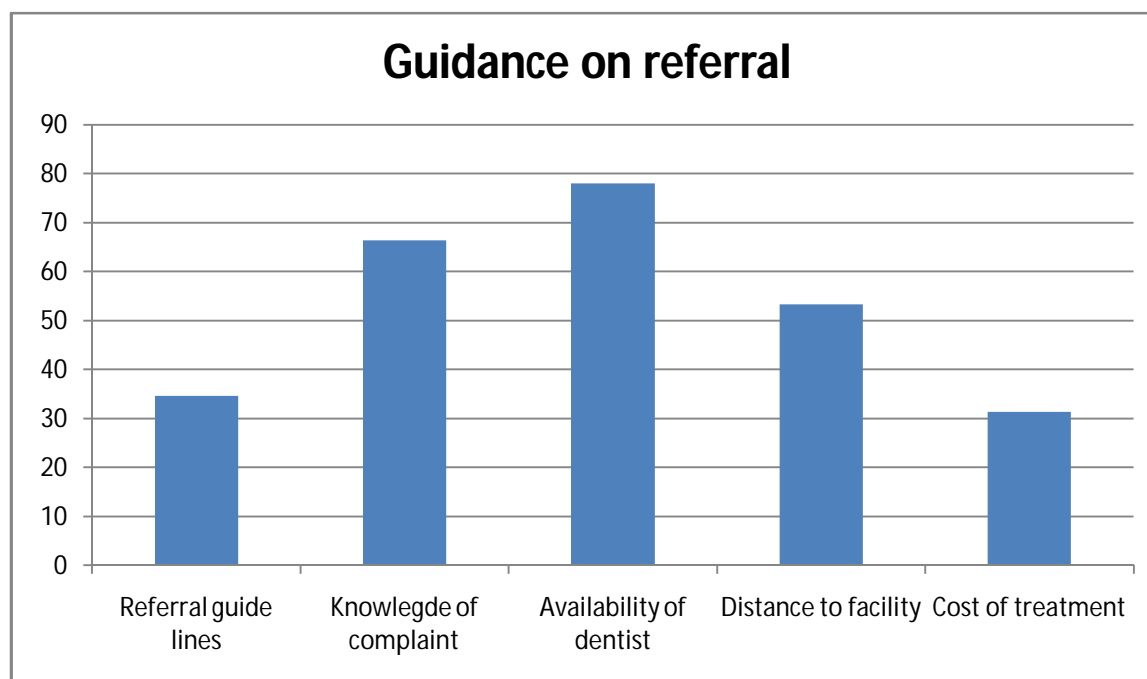
Figure 7: Percentage of respondents offering different dental services (n=214)



5.7 REFERRAL OF PATIENTS WITH SUSPECTED DENTAL CONDITIONS

When asked whether they refer patients who have dental conditions for treatment, 95.3% indicated that they do. Only 4.7% did not refer their patients. When asked on what informs their decision on where to refer, majority (78%) indicated availability of a dentist. Knowledge of the presenting complaint was indicated by 66.4% and distance to the referral facility by 53.3%. Only a few (31.3%) indicated cost of treatment as one of the consideration for choice of referral. Similarly only 34.5% cited referral guidelines as a guide to referral (figure 8)

Table 8: Guidance to choice of referral facility (n=214)



While those in Meru level 5 referred their dental patient to the dental clinic within the facility, those in facilities without dental clinic refer their patients to Meru level 5, Timau catholic dispensary or Nanyuki district hospital.

Those in Timau level 4 hospital referred their patients to Timau catholic dispensary and Nanyuki district hospital while those in Ontulili dispensary referred their patients to Nanyuki district hospital. Those from other facilities in the study area referred their patients to Meru level 5 hospital. This was informed by the distance between the facility and the availability of a dental clinic.

A nurse in level 5 facility indicated there is no need for referral since “*the dentist is always available*”. A clinical officer in the same facility further indicated that “*dental patients are seen from Monday to Friday*” and therefore need for referral does not arise. A level 5 nurse also says she does not refer her patients because “*there are no laid down guidelines on referral*”.

5.8 MULTIVARIABLE ANALYSIS

Dental screening was modeled using logistic regression with predictor variables that are likely to influence the practice of dental screening among the respondents. *Chi* square was used and the level of significance set at $\alpha = 0.05$.

As shown in table 19, having a copy of the referral guidelines was significantly associated with dental screening for all patients ($p= 0.040$). Those with a copy of referral guidelines were 2.7 more times likely to do screening than those without.

There was no significant association between dental health training and dental screening for all patients. However, those trained were almost 2 times more likely to do screening for all their patients than those who were not trained on oral health.

Table 16: Relationship between dental screening and likely predictor variables (n=214)

	Dental screening /diagnosis for ALL patients	
Predictor variable	OR (95% CI)	P value
Dental health training		
Yes	1.7 (0.7-4.3)	0.250
No	1.0	
Referral copy guidelines		
Yes	2.7 (1.0-6.8)	0.040*
No	1.0	
Overall knowledge scores		
Adequate knowledge	-	0.999
Poor		

DISCUSSION

Preventive rather than curative oral health care is the key to improved oral health indicators. And integration of oral health in to primary health care may be the only feasible avenue to achieve this goal. With a very low number of oral health care workers and a health care system dominated by non- oral health care workers, the latter remain the key players in this integration. Success will however be pegged on their knowledge, attitude and practices on their three roles in integration; diagnosis, oral health education and referral.

In relation to knowledge, this study aimed at answering the question if the respondents had adequate knowledge on diagnosis of oral health conditions, oral health education and referral. It further sorts to determine factors associated with this knowledge. The significance of this is that literature has linked knowledge with practice and therefore, any factor that affects knowledge will eventually affect practice (Sofola, 2009; Abolghasem, 2012; Rabiei et al, 2012).

The current study showed that majority of the respondents had adequate knowledge in the overall score on the three roles. 82.7% had adequate knowledge on diagnosis, 70.1% on oral health education and 79.9% on referral. This is encouraging since adequate knowledge has been associated with greater comfort and confidence in dealing with oral health conditions (Yousef, 2011).

In a similar study, Abolghasem *et al*, in 2012 found that 90% of healthcare workers had adequate knowledge on their job description in integration of oral health into primary health care, which is comparative to the findings of the current study. However, several studies have reported poor knowledge on oral health by health workers involved in primary health care (Nosayaba, 2011; Mosha, 1990; Coleman, 2005). These studies focused on general dental knowledge other than the knowledge on specific roles towards integration. It would therefore be safe to presume the level of knowledge within the narrow range of role on integration may be higher than overall knowledge on oral health.

Among the questions that scored lowly on knowledge in this study were those relating to persistent oral ulcer turning cancerous (69.6%), dental carries visibility clinically (39.7%), use of fluoridated toothpaste (50.0%), dental check-up (10.3 %) and restoration of primary teeth (42.1%). This is similar to the results shown by Gaitano in 2004 where he found that only 31.5%

of the health workers associated previous lesions with oral cancer. Charlotte *et al* also indicate poor knowledge on fluoride application among family physicians (Charlotte, 2009). Similarly, Romano *et al* finds poor knowledge on oral health education among graduating pediatric residents (Romano, 2007).

This raises pertinent questions of the non-oral health care provider effectiveness in the integrated model bearing in mind the rising number of oral cancers and the increasing incidence of dental caries (Ng'ang'a, 2002; MOH 2002; Kaimenyi, 2004). It also casts a doubt on the two major frontiers against dental carries i.e. use of fluoride and regular dental check-up.

The younger health care workers and those with a higher level of education in the current study were more likely to have adequate knowledge on diagnosis and referral. This is comparable to the findings of Sofola in Nigeria who concluded that those who had graduated recently had better knowledge than those who graduated more than fifteen years ago (Sofola, 2009). This could be as a result of changing curricular or different approach in teaching techniques.

There was no difference observed between the older health workers and their younger health workers counterparts in relation to adequate knowledge on oral health education. These results contrast those of Rabiei *et al* who reported that older physicians' dental knowledge was found to be higher than that of their younger counterparts (Rabiei et al, 2012). This could be due to a similar curricular being used over a period by the medical training institutions.

The need for dental training to improve knowledge on oral health cannot be re-emphasized. Similar to the findings of Charlotte who reported less than 25% training in oral health, the current study showed only 20% of the health workers were trained in oral health (Charlotte, 2009). As was also found out by various studies in the literature (Donna, 2009; Alan, 2009; Coleman, 2005; Romano, 2007), despite these few numbers, training had a strong positive relationship with knowledge ($p=0.005$). Having a dental clinic within the facility was also associated with better knowledge. This could be as a result of the continuous dental education that is administered by each department, dental included.

In the current study, health workers had a general positive attitude towards their role in oral health. An excess of 83.6% scored as having positive attitude. Similar great recognition of the importance of oral health was demonstrated from pediatricians by Charlotte *et al* in 2009

(Charlotte, 2009).

This positive attitude was magnified when almost all the health workers in the study are affirmative that there is need to have dental training for non-oral health care workers. Even more encouraging was the willingness to attend dental training if given a chance irrespective of any prior training. This could be a result of realization of the important role they can play in oral health and their insufficiency in knowledge like the nurses, physicians and pediatricians in Allan and Coleman's studies (Allan, 2009; Coleman, 2005).

Dissenting views on oral health were given by a minority. Among the emerging issues is lack of knowledge. This is similar to findings by Donna, Alan, Coleman, and Romano where poor attitude was attributed to lack of training or insufficient knowledge (Donna, 2009; Alan, 2009; Coleman, 2005; Romano, 2007).

The most commonly offered dental service by health workers in this study was referral (95.4%). Others were oral health education, dental screening and dental prescription at 65.4%, 63.0% and 33.6% respectively. These findings are comparable to those of a study by Lockhart on family physicians where the most frequently provided treatment was advice at 62% followed by prescription at 48% and some form of office treatment at 20% (Lockhart, 2000).

On the other hand, this study showed that only 12% of the health workers screened all their patients. This means that very few refer their patients based on their findings on screening, rather, it's a bracket referral based on patient's complaint. This contrasts the findings in literature (Charlotte, 2009 and Gaetano, 2004) where the rate of screening is relatively higher at 54% and 67.8% respectively. The difference could be due to the different target group of patients in the Charlotte and Gaetano and this study. While health workers in this study attend to all patients, those in Charlotte and Gaetano study were pediatricians and physicians respectively.

Results of this study show a positive association between knowledge and dental screening. Dental training and having a copy of referral guidelines were also significantly associated with dental screening. This is in agreement with the finding of Abolghasem study in Iran which showed a positive association between knowledge and oral health practices by non-oral health care workers (Abolghasem, 2012). Similarly Rabiei *et al*, reported that those with higher scores in knowledge were more likely to offer oral health services compared to those who have

inadequate knowledge (Rabiei et al, 2012).

Despite having adequate knowledge on their roles, very few of the respondents carried out screening on all their patients. Majority of the respondents still cited lack of knowledge as the major barrier to dental screening. In a similar study, Abolghasem in 2012 found that good knowledge on their role does not always translate into good oral health practices (Abolghasem, 2012). This could be as a result of lack of hands on training in addition to the theoretical teaching. This represents a clear opportunity to provide practical dental training to improve confidence which will ultimately lead to good oral health practices (Jill, 2010).

Another barrier cited by the health workers was lack of equipment and experience. This is in line with Yuosef conclusion on his study among physicians that increasing knowledge and experience could lead to better attitude and practices among non-oral health workers (Yuosef, 2011). Related to this, this study also found that some of the health workers had negative attitude towards dental screening and were skeptical of patients' acceptance of their oral health services.

A large percentage (95.4%) of respondents said they referred their patients. This is similar to the findings of Dela Cruz et al in 2004 who reported 90% of the physicians referring dental patients who they came across (Dela Cruz, 2004). While the high rate of referral among the physicians was associated with monetary gain, the higher referral rates in this study could be as a result of generalized referral without any specific guidelines.

As this study also found out only 34.5% used the set guidelines for referral. This is in contrasts with the findings of Yuosef where 65% of the respondents followed the laid out referral guidelines. This could be as a result of the few copy of referral guidelines in this study which may not be accessible to all.

The major factor that the respondents in this study cited as affecting their choice of referral facility was availability of a dentist. This draws a parallel to the availability of a dentist under the medic aid program in the United States (Lewis et al, 2000).

CONCLUSION

1. Social demographic characteristics do not influence provision of oral health services by non-oral health care providers.
2. Presence of a copy of referral guide lines and being trained in oral health had statistically significant association with provision of oral health services. Availability of facemask and tongue depressors influenced the decision to do dental screening. Similarly, availability of a dentist influenced the decision to refer patients who had suspected dental diseases.
3. Adequate knowledge by health workers on their role towards integration of oral health into primary health care did not always result in provision of oral health services. This was mainly due to lack of hands on experience.
4. Attitude of health workers towards their role in integration of oral health into primary healthcare had no statistical significant association with provision of oral health services. Positive attitude was however linked with the willingness of non-oral health care providers to be trained in oral health and provide dental services.

RECOMMENDATIONS

1. Health care providers in Imenti North district should provide resources and equipment including referral guidelines on oral health, face masks and tongue depressors needed by health workers to provide oral health services to patients under their care.
2. Health care providers in Imenti North district should train in-service health care workers in oral health.
3. Health care providers in Imenti north should provide on-job skills training to health care workers to convert knowledge in oral health into practice.
4. Health care providers should increase the number of facilities offering dental services to encourage referral by health care workers.

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APPENDICES

Appendix I : Participants' Consent form

I, Dr. Kaguru George Kariuki, a postgraduate student pursuing a Master's degree in Public Health at the University of Nairobi, School of Public Health, am conducting a research study on **“Factors associated with practices of health care workers towards integrating oral health into primary health care in Imenti north district, Kenya”**. The approval to carry out this study has been given by the Kenyatta National Hospital / University of Nairobi Ethics and Research Committee.

Purpose of the Study & Procedure

The purpose of this study is to determine **Factors associated with practices of health care workers towards integrating oral health into primary health care in Imenti north district, Kenya**.

If you agree to participate in this study, then you will be required to answer questions in a questionnaire which comprises of both close ended and open ended questions.

Perceived benefits

You will not benefit personally from the study. However the results obtained from this study will provide information towards the development of a protocol to improve integration of oral health into primary health care.

Risks

There are no anticipated risks for participating in the study. The only risk is that some of required information is personal.

Costs and payments:

This study is strictly voluntary and no monetary compensation will be given.

Confidentiality:

All the information that you provide will be strictly confidential. Your names will not appear anywhere on the data collection form. Only identification numbers will be used on the forms.

Withdrawal privilege:

If you decide to withdraw from the study then you are free to do so at any time without penalty or prejudice.

Contact

In case you have any questions or issues regarding the study during or after the study, then you are free to contact me through P. O Box 6967-00100, Nairobi, Mobile: 0722716272 OR the Secretary, KNH-UoN Ethics and Research Committee, P.O Box 20723 - 00202, Nairobi, Tel. No. Tel: (254) 020 726300 EXT 44102, 44355

Voluntary consent:

I certify that I have read and understood all of this consent explanation and questions pertaining to the research have been answered to my satisfaction. My signature below means I freely agree to participate in this study.

Signature of participantDate:.....

Investigators statement:

I certify that I have explained to the above individual the nature and purpose of this study, potential benefits and possible risks associated with participation in this study. I have answered any questions that have been raised. I have also explained the above to the participant on the date on this consent form.

Investigator.....Date:.....

Appendix II: Health care worker questionnaire

Serial Number Date

Social demographic characteristics (please tick against the choices given or fill in the blank space provided)

1. Age (at last birthday)
2. Gender
 - (1) Male
 - (2) Female
3. Level of training
 - (1) Certificate
 - (2) Diploma and higher National Diploma
 - (3) Bachelors
 - (4) Masters
 - (5) PHDOther, please specify
4. Years of service since last training
5. Have you received any form of dental health training?
 - (1) Yes
 - (2) No

If no please move to question no 7

6. What was the duration of dental training/rotation?
 - (1) Less than a week
 - (2) 1- 4 weeks
 - (3) More than 4 weeks

System related factors

7. Is there a dental clinic in your facility?
 - (1) Yes
 - (2) No

If no please move to question no 9

8. Is the dental clinic fully functional?
 - (1) Always
 - (2) Most of the time
 - (3) Never

9. Do you have a copy of referral guide lines?

(1) Yes

(2) No

10. Where is the nearest dental referral facility (in kilometers)?

.....

11. Assessment of Knowledge on Diagnosis of oral diseases and conditions (please indicate true or false)

		TRUE	FALSE
(1)	Dental decay/caries can present without pain		
(2)	Dental swelling always represent a dental abscess		
(3)	Fluorosis can present as yellow or gray teeth		
(4)	Sensitivity can be a sign of gum disease		
(5)	Tartar/calculus presents as yellow deposit on teeth		
(6)	Tartar/calculus affects front teeth only		
(7)	Oral cancer may present in form of a swelling		
(8)	Tongue tie is diagnosed at six months		
(9)	Tooth fracture can cause tooth mobility		
(10)	Cleft lip and cleft palate cannot present together		
(11)	A persistent oral ulcer could be Oral cancer		
(12)	Dental caries is always visible clinically		

12. Assessment of Knowledge on Oral Health Education (please indicate true or false)

		TRUE	FALSE
(1)	Toothbrush should be changed after three months		
(2)	Dental floss should be used every day		
(3)	Mouth rinse can be used in place of tooth brushing		
(4)	Everybody should use fluoridated tooth paste		
(5)	Dental Checkup should be done once every year		
(6)	The tongue should also be brushed		
(7)	Alcohol and smoking are associated with oral diseases		

(8)	Chewing stick should not be used to clean your teeth		
(9)	Primary teeth should never be filled		
(10)	The best treatment for teeth is extraction		

13. Assessment of Knowledge on Referral of suspected oral diseases (please indicate true or false)

		TRUE	FALSE
(1)	All dental treatment cases should be referred to a dentist		
(2)	Dentists are only found in level 5 hospitals		
(3)	Clinical oral health officers can perform all the functions of a dental officer		
(4)	There are no written guidelines for dental referral		
(5)	Emergency services should be offered before referral		
(6)	Patients should always have referral notes to the dentist		

Assessment of Attitude (please indicate yes or no)

14. Is oral health important to general health?

- (1) Yes
- (2) No

15. Do you think dental screening should be done for all patients?

- (1) Yes
- (2) No

Please explain your answer,

16. Do you think oral health education is important?

- (1) Yes
- (2) No

Please explain your answer,

17. Is it possible to maintain good dental hygiene?

- (1) Yes

(2) No

If your answer is no, why?.....

18. Do you think dental health training is necessary for non-dental health care providers?

(1) Yes

(2) No

Please explain your answer.....

18. Would you be willing to attend training on dental health if given a chance?

(1) Yes

(2) No

If your answer is no, why?.....

19. If all barriers were removed would you be willing to offer dental services?

(1) Yes

(2) No

If your answer is no, why?.....

Assessment of Oral Health Practices (please indicate yes or no; or give narrative as indicated)

20. Do you do dental screening /diagnosis for **ALL** your patients?

(1) Yes

(2) No

If your answer is yes please move to question 23

21. What percentage of your patients do you do dental screening?

.....

22. Why don't you do dental screening for all the patients?

(1)

(2)

(3)

23. Please tick alongside the dental services you offer from the list below

(1) Oral health education

(2) Prescription

(3) Fluoride application

(4) Other, please specify.....

24. Do you refer patients for dental treatment when you detect a dental problem?

(1) Yes

(2) No

If your answer is no, please go to question no 27

25. Where do you refer your patients to?

.....

26. What informs your choice of referral facility?(indicate yes or no)

(1) Laid down guide lines on referral yes no

(2) Knowledge about the presenting complaint..... yes no

(3) Distance to the nearest facility yes no

(4) Availability of a dentist..... yes no

(5) Cost of treatment yes no

Other, please specify.....

27. Why don't you refer your patients?

(1)

(2)

(3)

Appendix III: Criteria for Assessment of Knowledge, Attitude and Practices.

Assessment of Knowledge on Diagnosis (please indicate true or false)

	TRUE	FALSE
Dental decay/caries can present without pain	×	
Dental swelling always represent a dental abscess		×
Fluorosis can present as yellow or gray teeth	×	
Sensitivity can be a sign of gum disease	×	
Tartar/calculus presents as yellow deposit on teeth	×	
Tartar/calculus affects front teeth only		×
Oral cancer may present in form of a swelling	×	
Tongue tie is diagnosed at six months		×
Dental fracture can cause tooth mobility	×	
Cleft lip and cleft palate cannot present together		×
A persistent oral ulcer could be Oral cancer	×	
Dental caries is always visible clinically		×

X Indicates the correct answer

One mark for each correct answer

Total marks = 12

Score > 6 = adequate knowledge

Score ≤ 6 = poor knowledge

Assessment of Knowledge on Oral Health Education (please indicate true or false)

	TRUE	FALSE
Toothbrush should be changed after three months	×	
Dental floss should be used every day	×	
Mouth rinse can be used in place of tooth brushing		×

Everybody should use fluoridated tooth paste	×	
Dental Checkup should be done once every year		×
The tongue should also be brushed	×	
Alcohol and smoking are associated with oral diseases	×	
Chewing stick should not be used to clean your teeth		×
Primary teeth should never be filled		×
The best treatment for teeth is extraction		×

One score for each correct answer

Total score = 10

Score > 5 = adequate knowledge

Score ≤ 5 = poor knowledge

Assessment of Knowledge on Referral (please indicate true or false)

	TRUE	FALSE
All dental treatment cases should be referred to a dentist	×	
Dentists are only found in level 5 hospitals		×
Clinical oral health officers can perform all the functions of a dental officer		×
There are no written guidelines for dental referral		×
Emergency services should be offered before referral	×	
Patients should always have referral notes to the dentist	×	

One score for each correct answer

Total score = 6

Score > 3 = adequate knowledge

Score ≤ 3 = poor knowledge

Assessment of Attitude (please indicate yes or no)

- 1. Is oral health important to general health?
 - (1) Yes
 - (2) No
- 2. Do you think dental screening should be done for all patients?
 - (1) Yes
 - (2) No

Please explain your answer,

- 3. Do you think oral health education is important?
 - (1) Yes
 - (2) No

Please explain your answer,

- 4. Is it possible to maintain good dental hygiene?
 - (1) Yes
 - (2) No

If your answer is no, why?.....

- 5. Do you think dental health training is necessary for non-dental health care providers?
 - (1) Yes
 - (2) No

Please explain your answer.....

- 6. Would you be willing to attend training on dental health if given a chance?
 - (1) Yes
 - (2) No

If your answer is no, why?.....

- 28. If all barriers were removed would you be willing to offer dental services?
 - (1) Yes
 - (2) No

If you answer is no, why?.....

A yes answer will be scored as positive attitude towards the specific action. A no in any of the actions will be scored as a negative attitude. Narratives will be analyzed manually according to emerging themes.

Assessment of Oral Health Practices (please indicate yes or no; or give narrative as indicated)

1. Do you do dental screening /diagnosis for ALL your patients?
 - (1) Yes
 - (2) No
2. What percentage of your patients do you do dental screening?
.....
3. Why don't you do dental screening all the patients?
 - (1)
 -
 - (2)
 -
 - (3)
 -
4. Please tick alongside the dental services you offer from the list below
 - (1) Oral health education
 - (2) Prescription
 - (3) Fluoride application
5. Do you refer patients for dental treatment when you detect a dental problem?
 - (1) Yes
 - (2) No
6. Where do you refer your patients to?
.....
7. What informs your choice of referral facility?(indicate yes or no)
 - (1) Laid down guide lines on referral yes no
 - (2) Knowledge about the presenting complaint..... yes no
 - (3) Distance to the nearest facility yes no
 - (4) Availability of a dentist..... yes no
 - (5) Cost of treatment yes no

Other, please specify.....

8. Why don't you refer your patients?

- (1)
- (2)
- (3)

A score of good practice on screening will be given to those who indicate yes on question 1; a no will be scored as poor practice.

Practice of oral health education, prescription, fluoride application or other dental service will be scored from question 4. A tick against a procedure will be scored as good practice otherwise it is a poor score.

Good practice on referral will be scored for those who indicate yes in question 5. A no will be scored as poor practice.

Question 6, 7 and 8 will be analyzed manually according to emerging themes.

Appendix IV: Oral health care providers in Kenya in public sector.

COUNTY	DENTAL OFFICERS	CLINICAL ORAL HEALTH OFFICERS	TECHNOLOGISTS	SPECIALISTS	HYGIENISTS
BARINGO	2	3	1	-	-
BOMET	3	2	1	-	-
BUNGOMA	5	3	3	-	-
BUSIA	2	4	1	-	-
E. MARAKWET	1	2	1	-	-
EMBU	5	1	1	1	-
GARISSA	3	-	1	-	-
HOMABAY	2	2	1	-	-
ISIOLO	1	1	1	-	-
KAJIADO	6	1	2	-	-
KAKAMEGA	5	2	3	2	-
KERICHO	4	2	2	-	-
KIAMBU	17	4	7	3	-
KILIFI	5	2	4	-	-
KIRINYAGA	4	2	2	-	-
KISII	1	3	1	-	-
KISUMU	9	4	3	2	-
KITUI	2	1	1	-	-
KWALE	2	1	1	-	-
LAIKIPIA	1	2	1	-	-
LAMU	1	1	-	-	-
MACHAKOS	10	5	4	3	-
MAKUENI	4	4	1	-	-
MANDERA	-	-	-	-	-

MARSABIT	1	1	-	-	-
MERU	7	4	1	1	-
MIGORI	1	2	1	-	-
MOMBASA	14	5	4	2	-
MURANGA	5	3	1	-	-
NAIROBI	47	17	6	11	1
NAKURU	10	5	7	3	-
NANDI	3	1	-	-	-
NAROK	1	1	1	-	-
NYAMIRA	1	-	-	-	-
NYANDARU A	3	1	2	-	-
NYERI	10	3	1	1	-
SAMBURU	-	1	-	-	-
SIAYA	2	3	1	-	-
T.TAVETA	2	3	2	-	-
TANA RIVER	-	-	1	-	-
THARAKA NITHI	1	1	-	-	-
TRANS NZOIA	2	-	2	-	-
TURKANA	-	1	1	-	-
UASIN GICHU	4	2	2	-	-
VIHIGA	1	2	2	-	-
WAJIR	-	-	-	-	-
WEST POKOT	2	1	1	-	-
TOTAL	213	110	50	29	1

Source: ministry of Health, 2011

Appendix V: Public Health Facilities Distribution in Imenti North District

Facility Name	Facility Level	Doctors	Clinical officers	Nurses
Meru Level 5 Hospital	5	28	48	220
Giaki sub-district Hospital	4	-	1	7
Timau sub-district Hospital	4	1	2	8
Ruiri-Rural Demonstration Centre	3	-	1	10
Naari Health Centre	3	-	-	10
Chabuene Dispensary	2	-	-	5
Chugu Dispensary	2	-	-	5
Ex- Lewa Dispensary	2	-	-	4
Gakoromone Dispensary	2	-	-	8
Gankere Dispensary	2	-	-	6
G. K Prison, Meru Dispensary	2	-	-	4
Igoki Dispensary	2	-	-	2
Kathithi Dispensary	2	-	-	5
Kiburine Dispensary	2	-	-	5
Kiirua Dispensary	2	-	-	8
Kinoru Dispensary	2	-	-	6
Kithithina Dispensary	2	-	-	5
Ngare-Ndare Dispensary	2	-	-	2
Njuruta Dispensary	2	-	-	6
Nkando Dispensary	2	-	-	4
Ontulili Dispensary	2	-	-	5
Rwanyange Dispensary	2	-	-	4
TOTAL		29	52	339

Source DHRIO, Imenti North

