*East African Medical Journal Vol. 93 No.9 September 2016*
EFFECT OF HEALTH EDUCATION ON ORAL HEALTH-RELATED QUALITY OF LIFE AMONG PERSONS LIVING WITH HIV AT TWO COMPREHENSIVE CARE CENTRES IN KENYA
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# EFFECT OF HEALTH EDUCATION ON ORAL HEALTH-RELATED QUALITY OF LIFE AMONG PERSONS LIVING WITH HIV AT TWO COMPREHENSIVE CARE CENTRES IN KENYA

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## ABSTRACT

***Objective:*** **To evaluate the effect of health education on quality of life of persons living with HIV/AIDS.**
***Design:*** **Quasi-Experimental study.**
**Setting: Comprehensive Care Centres (CCC), at Kenyatta National Hospital and Mbagathi District Hospital.**
***Subject:*** **One hundred and ninety five persons living with HIV/AIDS attending CCC.**
***Results:*** **At baseline, 48.2% of the participants had at least one oral health related attribute. There was a significant decrease in the prevalence of oral health related attributes among the cases but not the controls. A large effect size was observed in physical pain subscale among the cases after health education. Change in psychological discomfort psychological disability, handicap and functional subscales were significantly associated with change in gingival inflammation.**
***Conclusion:*** **Oral health education is a viable strategy in reducing oral health related attribute, leading to improved oral health related quality of life.**

## INTRODUCTION

Oral diseases and disorders affect people physically and psychologically, and influences how the enjoy speech, chew, taste food and socialise. The quality of life may be disrupted due to pain, discomfort, eating and sleep disruption1-4. Measures of oral health perceptions are an important component in assessing oral health status of an individual. They include integrating different component such as disease, functioning, symptoms and feelings5.

Oral health attributes are common occurrences. In a study done in Burkina Faso, 27.7% of the adults had experienced an oral health problem in the last one year, of these, 62.2% had toothache due to hot, cold or sweet things while 43.6.% had toothache when chewing. Over a quarter, 27.3% had trouble sleeping due to pain and 21% had fever and abscess6. While a study by Okunseri7 reported that 25.7% of the participants' had pain and discomfort, 14.7% had anxiety/depression 32.3% were uncomfortable eating food and 48.8% felt self conscious8. A Nigerian study reported that 53% of the participants reported that oral issues had an effect on their oral health related quality of life.

Oral health intervention strategies have been found to improve oral health related quality of life. According to Hyde *et al(*9) 79% of the participants exhibited improvement in their OHIP-14 scores after health education . Large effect sizes were found in psychological discomfort (1.09), psychological disability (1.00) and handicap subscales (0.74).

Although cross-sectional studies have reported a relationship between oral hygiene and dental health there is hardly any well-documented longitudinal studies on the relationship between oral hygiene and oral health among PLWHA after oral health education. Oral health education has been found to reduce the burden of oral lesions among HIV seronegative patients in other parts of the world(1). However, the impact of oral health education among PLWHA is not well documented in the literature and no study has so far been done in Kenya. This study was undertaken to determine the impact of oral health education on the knowledge, oral hygiene practices, oral health status and quality of life of PLWHA. The data would hopefully aid in shaping policy regarding oral health care provision for PLWHA.

## MATERIALS AND METHODS

This was a quasi-experimental study conducted at the Kenyatta National Hospital (KNH) and Mbagathi District Hospital (MDH) Comprehensive Care Centres (CCC), as intervention and non-intervention groups respectively. A standard method was used to give oral health education to the intervention group at baseline.This included giving knowledge verbally about causes and prevention of tooth decay and gum diseases. After which, a demonstration on toothbrushing was conducted using a mouth model and a toothbrush. Emphasis was laid on thorough brushing of teeth at least twice daily, after breakfast and before going to bed. Participants were also shown pictures of normal and decayed teeth, healthy and diseased periodontium and calculus. Using a face mirror, the participant was asked to look at their gums and comment on whether they thought their gums were healthy or not, after which the correct position was given on the state of their gums by the principal investigator. Data were collected using OHIP-14 questionnaire. The questionnaire was interviewer administered questionnaire. The information was collected at baseline, at three months (review 1) and at six months (review 2).

Frequencies were computed for the different phases of the study. McNemar test was done to assess the difference in the proportion of each attribute for both study sites. The change in scores was calculated by subtracting the OHIP-14 scores at baseline from those of the follow-up visits. The effect size was calculated by dividing change scores by the OHIP-14 baseline standard deviation. An effect size of 0.2 was defined as small, 0.4 as moderate and 0.8 as large. Oldham's Correlation was used to assess the association between change in gingival scores and change in various sub-scales.

## RESULTS

Only the 195 seropositive persons who completed the study were included in the analysis, 102 from KNH and 93 from MDH. Of these, 66.2% were females and 33.8% were males. The age ranged between 19-73 years with a mean of 36.78+9.52 SD. Participants from MDH (mean 35.50+9.22) were slightly younger than those from KNH (mean 38.00+9.70), however the difference was not statistically significant (t=1.81, p=0.072).

Overall, slightly below two thirds 65.3% of the participants were married, 27.9% were single and 6.7% had were either divorced, separated or widowed. Majority 76.3% of the participants were from Nairobi with only 23.7% coming from outside Nairobi. On the level of education, 45.8% had secondary education, 35.1% had primary education, 16.7% had tertiary education while 2.4% had never been to school. More than a third 39.9% were aged between 30-39 years, 26.6% between 40-49 years, 24.5% between 19-29 years and 9.0% were 50 years and above. Table 1 shows the socio-demographic characteristics of the participants by site. There was significant difference on type of employment with more participants from KNH being in the informal employment as compared to those from Mbagathi ($X^2$=9.85, p=0.007). All participants from KNH had attended school while 4.5% of MDH participants had never been to school.

**Table 1**
**Socio-Demographic characteristics of KNH and Mbagathi participants**

| Characteristic | | Site | | | | $X^2$ | P value |
|---|---|---|---|---|---|---|---|
| | | KNH N=102 | % | Mbagathi N=93 | % | | |
| Age | | | | | | | |
| | 19-29 years | 17.7 | | 31.5 | | | |
| | 30-39 years | 43.8 | | 35.9 | | 8.97 | 0.03 |
| | 40-49 years | 25.0 | | 28.3 | | | |
| | 50 years and above | 13.5 | | 4.3 | | | |
| Gender | | | | | | | |
| | Male | 32.4 | | 35.5 | | 0.213 | 0.64 |
| | Female | 67.6 | | 64.5 | | | |
| Marital | | | | | | | |
| | Single | 25.3 | | 30.8 | | 3.74 | 0.15 |
| | Married | 64.6 | | 65.9 | | | |
| | Ever married | 10.1 | | 3.3 | | | |
| Education | | | | | | | |
| | None | 0 | | | | 10.74 | 0.013 |
| | Up to 8 years | 26.6 | | 42.7 | | | |
| | More than 8 years | 73.4 | | 52.8 | | | |
| Geographical location | | | | | | | |
| | Nairobi | 72.4 | | 80.4 | | 1.68 | 0.20 |
| | Outside Nairobi | 27.6 | | 19.6 | | | |
| Occupation | | | | | | | |
| | Formal | 24.2 | | 7.8 | | 9. 85 | 0.01 |
| | Informal | 63.9 | | 73.3 | | | |
| | Unemployed | 12.1 | | 18.9 | | | |

At baseline, 48.2% of the participants had an oral health related attribute. The major attributes reported by the participants were painful ache in the mouth 35.7%, sense of taste worse 25.4% and sleep disruption 24.2%. Table 2 shows the change in prevalence of various oral attributes among the participants. Statistically significant change were observed for painful-ache in the mouth (X=10.47, p=0.00), sleep disruption (X=12.99, p=0.00) and discomfort when eating food (X=4.12, p=0.00) among the KNH participants between baseline and end of follow-up.

**Table 2:**
**Attributes to the effect dimensions of oral health related quality of life after oral health education by site and phase (N: KNH =102, Mbagathi =93)**

| Attribute | Site | Phase | | | $X^2$ | P value |
|---|---|---|---|---|---|---|
| | | Baseline % | Phase 1 % | Phase 2 % | | |
| Difficulty with speech | KNH | 6.7 | 6.7 | 4.6 | 0.89 | 0.64 |
| | Mbagathi | 8.6 | 7.7 | 7.6 | 0.83 | 0.66 |
| Sense of taste worse | KNH | 13.6 | 9.0 | 9.2 | 13.38 | 0.12 |
| | Mbagathi | 38.7 | 38.5 | 39.1 | 0.08 | 0.96 |
| Painful aching in the mouth | KNH | 34.8 | 16.9 | 13.8 | 10.47 | 0.00 |
| | Mbagathi | 37.6 | 38.5 | 38.0 | 0.03 | 0.99 |
| Sleep interruption | KNH | 22.5 | 5.6 | 4.6 | 12.99 | 0.00 |
| | Mbagathi | 26.9 | 26.4 | 27.2 | 0.000 | 1.00 |
| Uncomfortable to eat food | KNH | 11.2 | 5.6 | 2.3 | 4.12 | 0.00 |
| | Mbagathi | 19.4 | 18.7 | 18.5 | 0.00 | 1.00 |
| Self conscious | KNH | 7.9 | 3.4 | 1.1 | 2.998 | 0.22 |
| | Mbagathi | 8.6 | 7.7 | 8.7 | 0.000 | 1.00 |
| Felt tense | KNH | 5.6 | 3.4 | 2.3 | 0.924 | 0.63 |
| | Mbagathi | 7.5 | 7.7 | 7.6 | 0.000 | 1.00 |
| Difficult relax | KNH | 4.5 | 3.4 | 1.1 | 1.05 | 0.59 |
| | Mbagathi | 6.5 | 6.6 | 6.5 | 0.00 | 1.00 |
| Embarrassed | KNH | 4.5 | 3.4 | 2.3 | 0.354 | 0.84 |
| | Mbagathi | 6.5 | 6.6 | 6.5 | 0.000 | 1.00 |
| Life less satisfactory | KNH | 4.5 | 3.4 | 0 | - | - |
| | Mbagathi | 4.4 | 3.9 | 2.2 | 0.00 | 1.00 |
| Avoid smile because of teeth | KNH | 5.6 | 3.4 | 0 | 2.85 | 0.24 |
| | Mbagathi | 5.4 | 5.5 | 5.4 | 0.00 | 1.00 |
| Diet less satisfactory | KNH | 8.0 | 3.4 | 0 | 3.86 | 0.15 |
| | Mbagathi | 4.3 | 4.4 | 3.3 | 0.00 | 1.00 |
| Interrupted meals | KNH | 10.1 | 2.2 | 0 | - | - |
| | Mbagathi | 3.2 | 3.3 | 4.4 | 0.15 | 1.00 |
| Irritable to others | KNH | 0 | 3.4 | 1.1 | 1.85 | 0.15 |
| | Mbagathi | 3.2 | 3.3 | 3.3 | 0.51 | 1.00 |
| Difficulty doing usual jobs | KNH | 2.2 | 2.2 | 0 | - | - |
| | Mbagathi | 3.3 | 3.3 | 3.3 | 0.15 | 1.00 |
| Reduced participation in social activities | KNH | 4.5 | 2.2 | 0 | 3.88 | 0.17 |
| | Mbagathi | 3.2 | 3.3 | 3.3 | 0.15 | 1.00 |
| Days off | KNH | 2.2 | 2.2 | 0 | - | - |
| | Mbagathi | 2.2 | 2.2 | 2.2 | 0.22 | 1.00 |
| Total unable to function | KNH | 1.1 | 2.2 | 0 | 1.84 | 0.78 |
| | Mbagathi | 2.2 | 2.2 | 2.2 | 0.22 | 1.00 |

*X and p-value= between baseline and review 2.*

***Oral Health Impact Profile (OHIP-14) change scores***

Table 3 shows Oral Health Impact Profile (OHIP-14) change scores . Overall the effect size for the KNH participants was 0.28 while for Mbagathi participants there was no effect size (0.00) Small effect size was recorded for all attributes except for physical pains (0.96) subscale which was large and social disability (0.35) and physical disability (0.27) subscales which was moderate for patients from KNH . No effect size was recorded for patients from Mbagathi except functional limitations had small effect size.

Table 3 gives Oldham's correlation between change in gingival inflammation and change in oral health related quality of life individual subscales. Psychological discomfort, psychological disability handicap and functional limitations displayed significant correlation with change in gingival scores. All the other sub-scales did not display significant correlation.

**Table 3**
**Oral Health Impact Profile (OHIP-14) change in scores by site**

| OHIP-14 subscales and questions | Site | Baseline | Follow up mean(SD) | Change Score(SD) | Effect Size |
|---|---|---|---|---|---|
| Psychological discomfort | KNH | 0.17(0.51) | 0.08(0.37) | 0.09 | 0.18 |
| Self conscious | Mbagathi | 0.16(0.05) | 0.16(0.05) | 0.00 | 0.00 |
| Felt tense | | | | | |
| Psychological disability | KNH | 0.13(0.46) | 0.08(0.37) | 0.05 | 0.11 |
| Difficult relax | Mbagathi | 0.13(0.47) | 0.13(0.47) | 0.00 | 0.00 |
| felt Embarrassed | | | | | |
| Handicap | KNH | 0.06(0.46) | 0.01(0.10) | -0.04 | 0.09 |
| Life less satisfying | Mbagathi | 0.65(0.29) | 0.65(0.29) | 0.00 | 0.00 |
| Total unable to function | | | | | |
| Physical pain | KNH | 0.47(0.27) | 0.21(0.48) | 0.26 | 0.96 |
| Painful aching in the mouth | Mbagathi | 0.57(0.77) | 0.57(0.77) | 0.00 | 0.00 |
| Uncomfortable to eat food | | | | | |
| Social disability | KNH | 0.03(0.17) | 0.20(0.48) | -0.17 | 0.35 |
| Irritable to others | Mbagathi | 0.65(0.36) | 0.65(0.36) | 0.00 | 0.00 |
| Difficulty doing usual jobs | | | | | |
| Physical disability | KNH | 0.17(0.49) | 0.04(0.24) | 0.13 | 0.27 |
| Diet less satisfactory | Mbagathi | 0.08(0.37) | 0.08(0.37) | 0.00 | 0.00 |
| Interrupted meals | | | | | |
| Functional limitations | KNH | 0.20(0.47) | 0.14(0.35) | 0.06 | 0.13 |
| Trouble pronouncing words | Mbagathi | 0.48(0.64) | 0.47(0.68) | 0.01 | 0.02 |
| Sense of taste worse | | | | | |
| Total OHIP-14 score | KNH | 1.10(2.11) | 0.50(1.33) | 0.6 | 0.28 |
| | Mbagathi | 1.55(2.61) | 1.53(2.56) | 0.02 | 0.00 |

**Table 4**
**Oldham's correlation for oral health impact quality of life (QHIP-14) and gingival score among KNH participants.**

| OHIP-14 subscales | $r^2$ | P=value |
|---|---|---|
| Psychological discomfort | 0.219 | 0.003** |
| Psychological disability | 0.211 | 0.003** |
| Physical pain | 0.001 | 0.987 |
| Handicap | 0.200 | 0.005* |
| Social disability | 0.086 | 0.235 |
| Physical disability | 0.038 | 0.602 |
| Functional limitations | 0.244 | 0.001** |

## DISCUSSION

In the current study, there were more females (66.2%) than males (33.8%). This may be a reflection of the prevalence of HIV infection which has been reported to be higher among females than males with a ratio of 1.9:110. Most of the participants were in the 31-40 years age group. A study by Koech et al 200812 in the same facility and one in a Nigeria13 found this age group to constitute majority of HIV infected respondents. This probably reflects the current HIV infection epidemiology in Kenya where there is a peak at 35-39 years10.

Most (65.3%) of the participants were married. Studies have identified marriage as a risk factor in HIV transmission in populations where the prevalence of HIV is high. With-in marriage transmission is thought to be due to extra-marital incidences14. It could also be a reflection of the population structure where most of the persons in the general population are married15. Almost all the participants (97.6%) had been to school (Table 1). This correlates closely with a previous finding where literacy levels were reported to be 94% and 91% for males and females respectively14. Majority (63.9%) of the participants were in the informal sector as compared to 26.2% in formal employment. In Kenya, the informal employment has been reported to contribute to 63% of the employment16. The high levels of participants in the informal sector could be explained by the economic status of the country which translates to low levels of persons employed in the formal sector.

In the sub-Saharan Africa, the burden of oral diseases and illness is growing as a social and public health problem. Poor oral health related to HIV seropositive persons represents a double burden particularly to people living in economically deprived communities. Not only do oral diseases negatively impact on quality of life, causing pain and suffering but PLWA often face stigma because of their appearance and foul smell. In addition, this group of people are underserved in oral health care as they are ignored or neglected by dentists17. Traditional methods of measuring oral health focuses on the presence or absence of disease and not information on well being of the people, in terms of how they feel about their mouth. At the same time, these measures are not suitable for advocacy at political level since they do not give the impact of the problem on individual's daily life. OHIP is more appreciated by policy makers in terms of impaired quality of life than clinical indices.

In the present study, slightly below half (48.2%) of the participants had at least one oral health related attribute at baseline. A Ugandan study among HIV positive individuals, 68.4% of the participants had an oral health attribute 18. This high prevalence of participants complaining of oral attributes could be a reflection of unmet need among the participants. The main attribute in the current study was pain (35.6%). According to Brennan et al. 200419 , 25.7% of participants had pain. This is because pain is one of the major symptoms of oral diseases.

In the current study, there was a significant reduction in pain, sleep disruption and discomfort when eating food. This may probably be explained by the fact that oral health education leads to better oral hygiene and reduction in gingival inflammation, which could have lead to reduction in the three attributes. In the current study, there was a small effect size (0.28) among KNH participant but no effect size for MDH participants. This could be explained by the

reduction of oral attributes among KNH participants after oral health education. A large effect size was recorded for the physical pain subscale while the social and physical disability subscale had moderate effect size. Our findings are different from those of Hyde *et al.* 20069 where the main change was observed in the psychological subscale, followed by psychological disability and handicap respectively with physical pain coming in fourth. This could be due to the fact that in Hyde et al 20069 study, patients received comprehensive oral health care which included health education and treatment. Thus they were likely to have been more satisfied with the treatment leading to improved psychological status as compared to the current study where no treatment was offered, social cultural factors among the study populations may also have played a role in the observed differences.

On other correlation, change in psychological discomfort psychological disability, handicap and functional subscales was significantly associated with change in gingival inflammation. The study contradicts with that of Hyde et al. 20069 where change in physical pain was found to have been related with the change in oral health related quality of life. This could be due to the different strategies used. In the Hyde et al9. Study, the carious lesions were treated which could have led to the reduction in pain.

In areas where there is scarcity of resources, intervention using oral health education on one on one basis alone can be a worthwhile measure that can be implemented to enhance Oral Health-related Quality of Life (OHRQoL) among PLWHA.

## ACKNOWLEDGEMENT

The University of Nairobi Deans Committee for financial support. Kenyatta National Hospital and Mbagathi District Hospital administration for granting me the permission to conduct the study.

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