The Role of Community Health Workers (CHWs) in Oral Health Promotion and the Impact of Programmes Utilising CHWs in Sub-Saharan Africa: A Systematic Review Protocol.

Introduction

"Oral health is multifaceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex (Glick et al., 2017)". Oral health is an important aspect of an individual's life, influencing general health/well-being, psychological (Kopelman, 2007), physiological and social functioning (Glick et al., 2017). Oral health is dynamic (subject to changes in an individual's expectations, perceptions, experiences and adaptability to conditions) and occurs along a continuum that is subject to the attitudes and values of individuals and communities (Glick et al., 2017).

Many diseases associated with poor oral health, like tooth decay (caries), are largely preventable; yet remain the most prevalent conditions affecting about half of the global human population (WHO, 2018). Oral diseases are also responsible for the loss of more than 220 healthy life years per 100,000 people (Marcenes et al., 2013). In addition, it is estimated that more than US $500 billion was spent globally on managing oral diseases in 2015 (Fonseca, 2018). This amount of money represents a significant strain on the rural populations living where the greatest burden of oral diseases exists and the resource envelope is thin (Skillman, Doescher, Mouradian, & Brunson, 2010; WHO, 2018).

In rural Sub Saharan Africa (SSA) the population experiences significant barriers that threaten the promotion of oral health (Barnett, Hoang, Stuart, & Crocombe, 2017; Petersen, Bourgeois, Ogawa, Estupinan-Day, & Ndiaye, 2005). These include scarcity of health care

professionals with knowledge and skills in oral health (Petersen et al., 2005), long distances to and high costs of accessing oral health services (Petersen et al., 2005), ignorance (Chhabra & Chhabra, 2012) and unhealthy cultural practices and beliefs (Swati et al., 2014).

There is therefore a need for community-led public health intervention such as the use of community health workers (CHWs) that utilises a preventative approach to tackle the problem. Authors such as Smit, Barrie and Louw (2017) have also advocated for the training of CHWs to increase the coverage of oral health programs and address the shortage of trained oral health professionals available to work at the community level. The implementation of CHWs program can provide a triple benefit to the society including prevention of diseases, promotion of good health practices and basic curative services to the members of the community (Ministry of Health - Uganda, 2016). The prospect of early identification and referral of HIV-related oral lesions in CHW led programmes could be key to determining antiretroviral treatment failure (Koyio et al., 2013).

Furthermore, the new framework for oral health definition emphasizes access to care as a determining factor and highlights the moderating effect of cultural factors on an individual's self-evaluation of their oral health (Glick et al., 2017). Also, CHW have been shown to improve the provision of culturally competent healthcare services (Handtke, Schilgen, & Mösko, 2019) and access to healthcare (Perry, Zulliger, & Rogers, 2014).

In light of the above, there is need to review existing literature to explore the effectiveness of the community health workers in supporting oral health in SSA.

Research question

1. What is the role of CHWs in promoting oral health in SSA.
2. What is the impact of using CHWs to promote oral health in SSA.

Objectives

1. To identify the roles played by CHW in oral health in SSA

2. To determine the impact of programmes/initiatives/interventions using CHW in promoting oral health at the community level in SSA (sub group analysis: by type of service provided (primary, secondary, tertiary preventive and curative or combination), by programme aim/goal (oral determinants targeted e.g access, social environment, health behaviours, physical environment, genetic/biological factors, or combination), by age (children, adults, elderly or combination), and by setting (institutionalised e.g schools or open to the wider community or combination).

The impact will be measured based on the core elements of the novel definition for oral health care (Glick et al., 2017). As improved physiological or psychological function or as a reduction in disease or condition status (severity). Disease reduction will be measured as decrease in the burden (prevalence, incidence, morbidity/mortality) of any priority oral health condition: tooth decay and cavities (dental caries); gum (periodontal) diseases; oral cancers; noma; oral manifestations of HIV and AIDS; oro-facial trauma from accidents and violence; cleft lip and palate (WHO Regional Office for Africa, 2016). An improvement in the oral health related quality of life will also be used in measuring programme effectiveness (Baiju, Peter, Varghese, & Sivaram, 2017).

3. To provide practice/policy recommendations for the utilisation of CHWs in oral health in SSA

Methodology

Electronic database searches were carried out to identify articles for review. The databases that were searched were PubMed, Web of Science, Ovid Medline, CINAHL. These databases are considered the most popular for healthcare subjects, in particular oral health.

A list of search terms were used to identify articles, with these terms developed around the topic using the Population, Intervention, Comparator, Outcome (PICO) framework used in Table 2.

Table 2: PICO Framework

Population	Sub-Saharan Africa
Intervention	Oral Health interventions utilising Community Health Workers
Comparator	Oral Health interventions not utilising Community Health Worker
Outcome	Improvement in oral health

The Medical Subject Heading (MeSH) terms will be matched with phrases from the PICO framework in Table 2 and included in the search together with free text terms. MeSH terms are a library of medical headings that are used by the PubMed database to categorise research articles. Free text terms are synonyms, abbreviations and alternative spellings of the terms used in Table 2. This list was compiled by the researchers and is displayed in Table 3.

Table 3: Keywords for database search

Sub Saharan Africa	**Oral Health**	**Intervention**	**Community Health Workers**	**Effect**
Africa	Oral conditions	Initiative	Community Health Worker	Result
Southern Africa	Oral disease	Treatment	Community Health Extension Worker	Outcome
East Africa	Oral disorders	Therapy	Lay Health Worker	Impact
West Africa	Oral health	Programme(s)	Community Health Assistant	Efficacy
Sub-Sahara	Oral healthcare	Outreach	Village Health Worker	Contribution
	Oral pathology	Scheme(s)	Village Health Team(s)	Acceptability
	Mouth diseases	support	Village Health Volunteer(s)	Receptiveness
	Dental diseases	Health information	Community Oral Health	

			Workers	
	Dental health	Health provision	Community Health Outreach	
	Mouth health	Health education	Outreach volunteer	
	Dental conditions	Health promotion	Health volunteer	
		Screening	Community volunteer	
			Health support volunteer	
			Community helper	
			Rural health volunteer	

-

Updating searches

A database search to update results will be carried out before the final analysis stage is completed. The initial database search took place in February 2020 with the final analysis of papers anticipated in March 2020. The final search will be run to ensure that relevant newly published articles are not missed from the review. An e-mail alert will be set up with PubMed, Web of Science and Ovid Medline to ensure that the researchers are notified of new articles that would have shown up in the initial search.

Managing references

Database search results will be screened by title for inclusion by one researcher and stored electronically as an easier way to access articles electronically (Akers, Aguiar-Ibáñez, & Baba-Akbari Sari, 2009). A second screening of the full results will be conducted by two other researchers separately, in order to avoid bias. The selected articles were exported to the researchers Mendeley account for storage and future analysis. Mendeley tools will be used for removing any duplicated research papers.

Inclusion and exclusion criteria

Studies will be assessed against the inclusion criteria namely language, population location, type of publication, year of publication, and country of study. Studies that are unavailable in English, population residing in other locations than SSA, opinion or editorial pieces, and published in a year other than 2000 – 2019 will be excluded. The inclusion and exclusion criteria are outlined in Table 4.

Table 4: Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
English language	Non-English language
Peer reviewed journal articles and grey literature	Opinion pieces/editorials
Published between 2000 – 2019	Other year of publication other than 2000-2019
Sub-Saharan African country	Country other than Sub-Saharan Africa

2.1.1 3.3.1 Language

Studies published in the English language or subsequently translated to English and then published will be included in the systematic review since the researchers are proficient in English. Moreover, the databases from which the studies will be extracted are in the English language.

3.3.4 Type of publication

Research papers published in full in peer-reviewed journals will be included in the study. Abstract-only documents will not be included in the systematic review as the details published in the full paper may differ from those in the abstract (Rice, Shrier, Kloda, Benedetti, & Thombs, 2016). Ongoing studies that match all the other inclusion criteria found during the literature search will be excluded from the systematic review, although these studies will be classified as "in progress" and the relevance to these future studies discussed in the discussion section. Previous systematic reviews will be excluded from this study as are keen on not replicating the findings of previous systematic reviews (Song et al., 2000). Opinion pieces and editorials will be excluded from this systematic review.

Reporting study selection

Study selection was reported using the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) flowchart. PRISMA was developed to provide researchers with a transparent manner of reporting study selection (Moher, Liberati, Tetzlaff, & Altman, 2009).

Data extraction

Data extraction was conducted to capture all necessary information from the studies identified from the selection process. The data extraction form was designed to record necessary information that relates to the topic and objectives of the study. General identifying facts about an article such as the name of the researcher carrying out the data extraction, the

date of data extraction, a code identifying the article, author name, article title, citation, type of publication, country where study was published/carried out and funding.

Other details recorded during the data extraction process related to the characteristics of the study and population. The study section of the data extraction form recorded details describing aims and objectives of the study, study design, the inclusion and exclusion criteria, enrolment of participants (giving details of randomisation), and types of units used for comparison (e.g. individuals, dental practices etc.). Participant characteristics such as age, gender, ethnicity, socio-economic status, oral health status and coexisting health conditions were captured.

The nature of the intervention section, the setting of the intervention (e.g. care home, home visit, dental practice etc.), the evolution and theoretical background of the intervention, and description of CHW involvement were chronicled. Additionally, information regarding the differences between the intervention and control groups was recorded.

A definition of each of the outcomes tested for in the study was noted. The technique used to determine the outcome, specific units measuring the outcome, along with nature and quantity of follow-up was registered.

Quality assessment

Databases for the search

EMBASE, PubMed, CINAHL, Web of Science, Global Health Library, HINARI, African Journals OnLine, Dentistry & Oral Sciences Source, TRIP and Cochrane Oral Health.

References:

Baiju, R. M., Peter, E., Varghese, N. O., & Sivaram, R. (2017). Oral Health and Quality of Life: Current Concepts. *Journal of Clinical and Diagnostic Research : JCDR*, *11*(6), ZE21–ZE26. https://doi.org/10.7860/JCDR/2017/25866.10110

Barnett, T., Hoang, H., Stuart, J., & Crocombe, L. (2017). The relationship of primary care providers to dental practitioners in rural and remote Australia. *BMC Health Services Research*, *17*(1), 1–13. https://doi.org/10.1186/s12913-017-2473-z

Chhabra, N., & Chhabra, A. (2012). Parental knowledge, attitudes and cultural beliefs regarding oral health and dental care of preschool children in an Indian population: A quantitative study. *European Archives of Paediatric Dentistry*, *13*(2), 76–82. https://doi.org/10.1007/BF03262848

Claessen, J., Bates, S., Sherlock, K., Seeparsand, F., & Wright, R. (2008). Designing interventions to improve tooth brushing. International Dental Journal, 58(S5), 307-320.

de Silva, A. M., Hegde, S., Nwagbara, B. A., Calache, H., Gussy, M. G., Nasser, M., . . . Meyenn, L. K. (2016). Community-based population-level interventions for promoting child oral health. Cochrane Database of Systematic Reviews, (9)

Fonseca, E. P. da. (2018). Oral Health Challenges: Global Burden of Disease as Information Resource for Policy-Making and Health Situation Analysis. *Dentistry: Case Report*, *2*(1).

Glick, M., Williams, D. M., Kleinman, D. V., Vujicic, M., Watt, R. G., & Weyant, R. J. (2017). A new definition for oral health developed by the FDI World Dental Federation opens the door to a universal definition of oral health. *American Journal of Orthodontics and Dentofacial Orthopedics*, *151*(2), 229–231.

https://doi.org/10.1016/j.ajodo.2016.11.010

Handtke, O., Schilgen, B., & Mösko, M. (2019). Culturally competent healthcare – A scoping review of strategies implemented in healthcare organizations and a model of culturally competent healthcare provision. *PLOS ONE*, *14*(7), e0219971. https://doi.org/10.1371/journal.pone.0219971

Hobdell, M., Petersen, P. E., Clarkson, J., & Johnson, N. (2003). Global goals for oral health 2020. International Dental Journal, 53(5), 285-288.

Kopelman, P. (2007). Health risks associated with overweight and obesity. Obesity reviews, 8, 13-17.

Koyio, L. N., Van der Sanden, W. J. M., Van der Ven, A., Mulder, J., Creugers, N. H. J., Merkx, M. A. W., & Frencken, J. E. (2013). A community-based oral health promotion model for HIV patients in Nairobi, East District in Kenya: a study protocol. *Journal of Public Health Research*, *2*(1), 5. https://doi.org/10.4081/jphr.2013.e5

Marcenes, W., Kassebaum, N. J., Bernabé, E., Flaxman, A., Naghavi, M., Lopez, A., & Murray, C. J. L. (2013). Global burden of oral conditions in 1990-2010: A systematic analysis. *Journal of Dental Research*, *92*(7), 592–597. https://doi.org/10.1177/0022034513490168

Ministry of Health - Uganda. (2016). *Ministry of health Community Health Extension Workers Strategy in Uganda* (p. 64). p. 64.

Perry, H. B., Zulliger, R., & Rogers, M. M. (2014). Community Health Workers in Low-, Middle-, and High-Income Countries: An Overview of Their History, Recent Evolution, and Current Effectiveness Keywords. *Annu. Rev. Public. Health*, *35*, 399–421. https://doi.org/10.1146/annurev-publhealth-032013-182354

Petersen, P. E., Bourgeois, D., Ogawa, H., Estupinan-Day, S., & Ndiaye, C. (2005, September). The global burden of oral diseases and risks to oral health. *Bulletin of the World Health Organization*, Vol. 83, pp. 661–669. https://doi.org//S0042-96862005000900011

Skillman, S. M., Doescher, M. P., Mouradian, W. E., & Brunson, D. K. (2010). The challenge to delivering oral health services in rural America. *Journal of Public Health Dentistry*, *70*(SUPPL. 1). https://doi.org/10.1111/j.1752-7325.2010.00178.x

Smit, D. A., Barrie, R. B., & Louw, A. J. (2017). The burden of dental caries in the Western Cape and a recommended turn-around strategy. South African Dental Journal, 72(8), 360-365.

Swati, J., Ashish, S., Basavaraj, P., Hansa, K., Khushboo, S., & Shilpi, S. (2014). Assessing the influence of culture on oralhealth-a review. *Journal of PEARLDENT*, *2*, 1–8.

WHO. (2018). Oral health.

WHO Regional Office for Africa. (2016). *World Health Organization (WHO)*. Retrieved from https://apps.who.int/iris/bitstream/handle/10665/205886/9789290232971.pdf