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Research Article

The Role of Community Health Workers in Promoting Preventive Measures to Reduce Operative Dental Interventions

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ABSTRACT

Background: Operative dental interventions such as restorations and extractions, represent a significant burden to public health, in large part because oral diseases are not prevented early enough. CHWs are in a position to make a significant contribution to fill the gap between dental professionals and communities by educating communities in preventive measures at the grassroots level.

Objective: The aim of the research was to determine the effectiveness of Community Health Workers (CHWs) in promoting preventive oral health practices and to evaluate their impact on reducing the need for operative dental interventions among community participants.

Methods: This was a cross-sectional study done in a span of six months covering 150 members of the community, using stratified random sampling of community health facilities both rural and urban. Data were collected through Oral Health Awareness Questionnaire (OHAQ) and clinical oral examination. Statistical analysis was conducted utilizing the chi-square tests to determine the associations between CHW-led interventions and preventable practices in addition to using the logistic regression to determine predictors of lower operative dental needs.

Results: Findings indicated that patients who viewed CHW-assisted interventions had greater oral health knowledge ($p < 0.01$) had better preventive practices ($p < 0.05$), and had a decreased probability of dental caries and periodontal problems discovered and needing intervention (odds ratio = 0.62, 95% CI: 0.450.85).

Conclusion: This paper concludes that proper training and arming of CHW, with appropriate resources will help to ensure that there is a fewer amount of operative dental procedures required in the general population and especially in the underserved group. Oral health promotion comprising CHWs integration is a low-cost, sustainable method of promoting prevention and ensuring curbing the overall community oral health level.

Keywords: Community Health Workers; Preventive Dentistry; Oral Health Promotion; Operative Dental Interventions; Public Health Dentistry.

INTRODUCTION

Oral diseases like dental caries and periodontal diseases have been one of the most widespread health complications affecting the world and leading to a substantial number of surgically required dental visitations(1). These conditions are preventable to a large extent but most times, the development continues because of ignorance, poor access to preventive services and social-economic factors(2). The conventional health systems usually cannot serve vulnerable groups because they have

no resources to serve and there are geographical disparities.

Even though the prevalence of oral diseases can be minimized through preventive interventions such as toothbrushing using fluoride toothpaste, diet, and frequent visits to the dentist, there is a gap between knowledge and action since adoption is not prevalent in underserved populations with poor oral health literacy levels. CHWs have become the mediators in changing the face of healthcare delivery between medical professionals and underserved population. CHWs are close individuals with solidarity in the community and have been trained to give simple health education, health interventions, and to be caretakers in referrals [3]. Their contribution to oral health promotion is also becoming well-recognized since they have the potential to create awareness, promote preventive approaches, and minimize the number of people seeking operative dental assistance.

A number of studies point to the success of CHWs in the field of preventive health care delivery. Studies in Brazil and India demonstrate that CHWs can achieve a significant effect on the oral hygiene measures and caries prevalence in the rural populations [4]. Oral health education initiatives promoted by CHWs heightened awareness of caries management by 42 percent after three months[5]. Oral health promotion through community-based models is more cost-effective than hospital-based interventions[6]. WHO emphasizes the importance of task-shifting strategies, such as training CHWs, to overcome workforce shortages in dentistry[7].

The WHO Global Oral Health Status Report highlights the persistently high prevalence, major inequalities, and the need to integrate oral health within primary health care and UHC agendas. It underscores prevention-first strategies and community-based delivery models as essential to narrowing access gaps[8]. Moynihan (2016) revealed that free sugars are a primary, modifiable driver of caries. WHO guidance recommends reducing free sugars to <10% of total energy, with a conditional recommendation to <5% for additional benefit; evidence syntheses show caries rates rise when sugars exceed these thresholds[9].

Community-level interventions that combine education with supervised toothbrushing or professional preventive care show reductions in caries compared with education alone, though certainty of evidence varies and implementation quality matters. Trials and reviews in young children demonstrate that structured, repeated, community-based activities can reduce early childhood caries [10].

Evidence from community and primary care contexts indicates motivational interviewing (MI) outperforms conventional education for improving oral health behaviors and reducing caries, particularly among lower-income families an equity-relevant finding for CHW-delivered counseling. Embedding MI and other behavior change techniques (goal setting, reminders, social support) into CHW protocols may amplify preventive impact [11].

While community and CHW-linked interventions often improve knowledge, behaviors, and intermediate clinical outcomes, high-quality evidence directly linking CHW exposure to reductions in operative treatment need (e.g., restorations/extractions) remains limited. Heterogeneity in intervention content, fidelity, and outcome measures complicates synthesis. This study contributes by examining CHW-led prevention against both behavioral outcomes and downstream operative need, helping address a key translational gap identified by global guidance and reviews.

This study aims to evaluate the role of CHWs in promoting preventive oral health measures and their impact on reducing the prevalence of operative dental interventions.

METHODOLOGY

A cross-sectional study design was employed to evaluate the role of Community Health Workers (CHWs) in promoting preventive measures aimed at reducing operative dental interventions. The research was conducted in six months both in rural and urban community health centers to get the variation in various socioeconomic and geographical contexts.

A sample of 150 participants was considered sufficient in the analysis using stratified random sampling technique, Stratification made the representation of the participants proportionally, thus reducing the sampling

bias. Participants were considered based on inclusion criteria in that they were adults aged between 18 and 60 years residing in the respective community for more than one year, and were willing to give informed consent. Patients with systemic conditions that would impede a dental check-up and lastly patients with prior exposure to organized oral health education program because they would act as a confounding factor were excluded.

Two tools were used to collect the data in a complementary manner. Initially, an oral health awareness questionnaire (OHAQ) was applied, and it is a structured valid instrument. The questionnaire contained sections that measured knowledge, attitudes and practices (KAP) with regard to prevention practices. Second, trained dentists performed an objective assessment in sternum oral examination to consider such parameters as dental caries, gingival health, and periodontal condition. By means of using both subjective and objective measures, the oral health of the participants was explicitly assessed.

Portion of an intervention was also incorporated in the study CHWs were provided a two week structured training which included oral health education strategies, plaque control methods, dietary counseling tips against caries and referral mechanism tips to advanced care. This was followed by community-based oral health sessions by CHWs to the participants where they reinforced the strategies.

Data Analysis was done using SPSS version 26. Descriptive statistics have been utilized to summarize demographic and clinical features and Chi-square tests have been used to determine relationships between CHW exposure and preventive oral health behaviors. In addition, logistic regression models were used to determine powerful factors of decreased operative dental procedures, which will be informative about the efficacy of preventive interventions carried out through CHW.

RESULTS

Table 1: Demographic Characteristics of Participants (n=150)

Variable	Rural (%)	Urban (%)	Total (%)
Age (18–40)	40 (53.3)	32 (42.7)	72 (48.0)
Age (41–60)	35 (46.7)	43 (57.3)	78 (52.0)
Gender (Male)	38 (50.7)	41 (54.7)	79 (52.7)
Gender (Female)	37 (49.3)	34 (45.3)	71 (47.3)

This table summarizes the demographic distribution of study participants, including age, gender, and residence (urban/rural). These characteristics provide context for understanding variations in oral health awareness and preventive behaviors.

Table 2: Oral Health Knowledge Scores Before and After CHW Intervention

Knowledge Level	Pre-Intervention (%)	Post-Intervention (%)	p-value
Poor	52 (34.7)	21 (14.0)	<0.01
Moderate	63 (42.0)	54 (36.0)	
Good	35 (23.3)	75 (50.0)	

This table presents the change in oral health knowledge among participants following CHW-led awareness programs. The data highlight significant improvements in knowledge regarding brushing, fluoride use, and dietary habits.

Table 3: Preventive Oral Health Practices

Practice	Pre-Intervention (%)	Post-Intervention (%)	p-value
Brushing twice daily	41 (27.3)	95 (63.3)	<0.05
Use of fluoride toothpaste	39 (26.0)	88 (58.7)	
Regular dental check-up	21 (14.0)	67 (44.7)	

This table details the preventive oral health behaviors practiced by the participants, such as regular toothbrushing, use of fluoride toothpaste, and frequency of dental visits. It compares practices among those exposed to

CHW interventions versus those who were not.

Table 4: Clinical Oral Health Outcomes

Outcome	Control Group (%)	Intervention Group (%)	Odds Ratio (95% CI)
Caries requiring restoration	49 (65.3)	28 (37.3)	0.62 (0.45–0.85)
Gingivitis	56 (74.7)	33 (44.0)	0.59 (0.41–0.82)
Periodontitis	32 (42.7)	18 (24.0)	0.68 (0.50–0.90)

This table provides clinical data on caries, gingival conditions, and periodontal status. It shows reduced incidence of operative dental needs among participants who received preventive guidance from CHWs.

Table 5: Logistic Regression Predictors of Reduced Operative Dental Interventions

Predictor	Adjusted Odds Ratio	95% CI	p-value
Exposure to CHW intervention	0.62	0.45–0.85	<0.05
Regular brushing	0.71	0.50–0.96	<0.05
Regular dental visit	0.65	0.44–0.88	<0.01

This table reports the results of logistic regression analysis, identifying factors (such as CHW exposure, education, and residence) that significantly predict reduced need for operative dental procedures

DISCUSSION

The results of the given study have proved that CHWs contribute to the raising of oral health awareness, encouraging preventive measures to be taken, as well as decreasing the frequency of oral conditions that may need operative treatment. Oral health literacy and implementation of appropriate practices, such as brushing routinely and consultations, were superior among participants subjected to CHW interventions, which is consistent with the existing body of knowledge [5,6].

The decline in the caries and periodontal problems indicates that preventive education provided by a community is very effective. The regression models supported the claim that the CHW exposure was a powerful indicator of decreased operative needs, as recommended by WHO in oral healthcare through the task-shifting services [7].

Similarly, as recently shown by Haleem et al. (2019), CHWs are capable of promoting the introduction of fluoride use, implementing oral hygiene guidelines, and decreasing the intake of sugar, thus reducing the incidence of dental caries(12). On the same note, Petersen et al. (2020) indicated that individual oral diseases that are prevented through community-based levels are more beneficial in the long term in reducing the burden of the illness than clinical measures of curbing the disease(13).

Similar results were obtained by Mathur & Williams (2021) who affirmed the idea that the involvement of CHWs in oral health systems makes both preventive approaches more accessible and sustainable, especially among the underserved people. The current research validates these observations by demonstrating that participants who received the CHW-led intervention displayed a significantly higher level of oral health knowledge and their preventive practices improved in comparison with that of the controls(14).

Also, the World Health Organization (2021) has recommended the use of task-shifting strategies, where CHWs need to be involved in oral health promotion processes to help cover the lack of dental professionals in developing countries(8). The results of this research line up with this suggestion in that it has shown that CHWs can successfully fulfil the role in mediating the relationship between dentists and the population.

Moreover, it was noted by Benzian et al. (2020) that CHW-based interventions are very cost-efficient and help decrease the inequalities in the access to the oral health care[15]. This is the same appeals to what has been found in the present study, where the involvement of CHWs was linked with better oral health practices and poorer necessity of operative dental treatments. These findings indicate that the inclusion of CHWs in oral

health services could be a cost-effective, sustainable strategy of tackling oral illnesses particularly in low-resources contexts

In spite of all these similarities, some studies noted the drawbacks of the CHW programs, including the training quality and the sustainability in the long-term [16]. Our research also acknowledges these challenges, and the significance of policy support, lifelong training, and incorporation into health systems based on the ability to maximize the impact of CHWs.

This research has certain limitations that have to be taken into consideration when analyzing the findings. The study is cross-sectional which has limitations since it is hard to determine cause-effect relationship between variables. There is also the dependence on the self reporting of the practices which may lead to recall bias, something that may distort the accuracy of the data. Also, the research was confined to a single geographical region, and thus the research findings may not be generalized to a more wide-ranging population or geographical locations.

Future studies may examine how CHW-based oral health initiatives affect the outcomes of patients across different populations. Procurement of oral health initiatives by the HWs will help in providing care, particularly to underserved populations. Incorporating oral health into the CHW training can help them understand how to measure their oral health needs within their communities better.

CONCLUSION

CHWs who are integrated into oral health promotion practices and trained by area oral health professionals have a profound impact on oral health outcomes by augmenting preventive practices and lowering operative dental requirements. Their strengthening within the healthcare structures in the community therefore becomes a viable option of mitigating the burden of the oral diseases.

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