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EFFECTIVENESS OF COMMUNITY HEALTH WORKER-LED ORAL CANCER AWARENESS PROGRAMS IN IMPROVING KNOWLEDGE AND PREVENTIVE PRACTICES AMONG RURAL POPULATIONS

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Abstract

Background: Oral cancer is a growing public health concern in Pakistan, particularly in rural communities where smokeless tobacco, gutka, naswar, and areca nut consumption are common. Limited awareness of risk factors and early warning signs may delay diagnosis and treatment. Community health workers can play an important role in providing health education and encouraging preventive practices at the community level.

Study Type: Community-based intervention study (Pre-test and post-test design)

Objective: To evaluate the effectiveness of a community health worker-led oral cancer awareness program in improving knowledge, recognition of risk factors and early warning signs, preventive practices, and willingness to undergo oral cancer screening among rural populations.

Methods: A community-based intervention study using a single-group pre-test and post-test design was conducted in selected rural communities of Sukkur. Adult participants were assessed using a structured questionnaire before and after an oral cancer awareness

intervention delivered by trained community health workers. Educational sessions focused on oral cancer risk factors, early symptoms, tobacco-related harms, prevention, and the importance of screening. Changes in knowledge, self-reported preventive behaviours, and screening willingness were assessed using appropriate paired statistical tests.

Results: The study evaluated changes in oral cancer knowledge, awareness of tobacco-related risks, recognition of suspicious oral changes, preventive practices, and screening willingness following the educational intervention. The direction, magnitude, and statistical significance of these changes remain to be reported from the actual pre-test and post-test data.

Conclusion: Community health worker-led education offers a practical approach to strengthening oral cancer prevention efforts in rural communities. Its effectiveness in the present study must be established using the observed findings. Integrating community education with tobacco cessation counselling, accessible screening, and referral services may support earlier recognition and timely healthcare-seeking behaviour.

INTRODUCTION

Oral cancer is a serious public health problem in many countries, especially in South Asia. It affects the mouth, including the tongue, gums, cheeks, lips, and other oral tissues. The disease can affect a person's ability to eat, speak, and perform normal daily activities. In advanced stages, treatment may involve major surgery, radiotherapy, or chemotherapy. These treatments can place a heavy financial and emotional burden on patients and their families. Although oral cancer is a major health concern, many people do not know its early warning signs or the factors that increase its risk. Lack of awareness can lead to delays in seeking medical advice and receiving appropriate treatment. According to Bray et al. (2024), cancer continues to cause a substantial burden of illness and death worldwide. This highlights the need for prevention, early recognition, and timely access to healthcare services.

Pakistan is among the countries facing a considerable burden of oral cancer. The disease is closely linked with the use of tobacco and areca nut products, which are commonly used in different parts of the country. These products include gutka, naswar, paan, betel quid, and other locally available chewing substances. Khan et al. (2024) identified smokeless tobacco, cigarette smoking, and areca nut consumption as important risk factors for oral cancer in Pakistan. Similarly, Hashmi et al. (2024) reported the importance of areca nut exposure in patients with oral squamous cell carcinoma. Many people start using these substances at a young age without fully understanding their harmful effects. Regular use may become a long-term habit, making prevention more difficult.

The relationship between smokeless tobacco and oral cancer is supported by research conducted in Pakistan. Khan et al. (2017) found a strong association between naswar consumption and oral cancer among participants in Khyber Pakhtunkhwa. The findings suggest that smokeless tobacco products should not be considered harmless alternatives to cigarettes. Similarly, Saleem et al. (2013) studied oral squamous cell carcinoma among Pakistani patients using gutka, niswar, and manpuri. These studies show the importance of raising public awareness about commonly used chewing products. Health education should explain the possible consequences of regular use and encourage people to reduce exposure to known risk factors.

Early recognition of oral cancer is another important part of prevention and control. The disease may first appear as an ulcer that does not heal, a red or white patch inside the mouth, an unusual lump, or difficulty in swallowing. However, these signs are sometimes ignored because they may not cause severe pain in the beginning. People may use home remedies or delay visiting a healthcare professional. Such delays can reduce the chances of detecting disease at an early stage. Sankaranarayanan et al. (2005) demonstrated that oral visual screening by trained health workers could reduce oral cancer mortality among high-risk individuals in a large community trial conducted in Kerala, India. Their later research also supported the value of organized screening and follow-up in high-risk populations (Sankaranarayanan et al., 2013).

Public awareness plays an important role in encouraging people to seek medical advice when unusual changes appear in the mouth. However, awareness does not always mean that a person understands the risk factors or knows when to visit a healthcare facility. A study conducted in Lahore by Amin et al. (2022) identified gaps in public knowledge about oral cancer and its prevention. International research has reported similar concerns. Saleh et al. (2012) found that public education campaigns could improve awareness of oral cancer, although recognition of specific warning signs did not necessarily improve to the same extent. These findings suggest that awareness programs should provide practical information rather than only introducing the name of the disease.

In rural communities, access to reliable health information can be limited. People may face difficulties because of low literacy, financial problems, transport costs, or long distances from healthcare facilities. These problems may also influence their willingness to receive screening. Rural areas of Sukkur district in Sindh, Pakistan, provide an important setting for studying community-based oral cancer education. Residents may have different levels of education, health knowledge, and access to preventive services. Local language, cultural practices, and beliefs about tobacco use may also influence health-related decisions. Therefore, a community awareness program should consider the daily circumstances of the population rather than depend only on written information.

Community health workers can help address some of these problems. They work close to the population and can explain health messages through direct communication. They may also provide information during household visits, small community meetings, and individual counselling sessions. Their familiarity with local language and social practices can make health education easier to understand. Bellhouse et al. (2018) reported that community-based health worker interventions were associated with improved participation in screening for several cancers. Similarly, Okasako-Schmucker et al. (2023) found that community health worker involvement increased screening participation across breast, cervical, and colorectal cancer programs. Although these findings are not specific to oral cancer, they support the potential usefulness of community health workers in preventive health education.

Training is important for community health workers who provide oral cancer education. They should understand the major risk factors, recognize common warning signs, and explain when professional assessment is required. A recent intervention study by Ruhela et al. (2025) found improvements in oral cancer screening knowledge and skills after structured education among community health workers in India. This suggests that properly trained workers can play a useful role in communicating accurate health information. However, improved knowledge among health workers does not automatically mean that community members will change their behaviour. The effectiveness of education must also be assessed among the people receiving the intervention.

A community-based awareness program may include simple explanations, pictures, group discussions, and counselling about tobacco cessation and oral examination. These activities can help participants ask questions and clear up misunderstandings about oral cancer. They may also encourage individuals to seek professional advice if they notice persistent changes in their mouth. Baumann et al. (2023) reported positive findings from an oral cancer awareness campaign in Germany. Similarly, Eadie et al. (2009) described the development and evaluation of a public education intervention aimed at improving awareness and early detection of mouth cancer. These studies provide useful evidence for designing educational activities, although their findings must be considered in relation to the local community.

Despite growing research on oral cancer risk factors in Pakistan, there is still a need for locally evaluated awareness interventions in rural settings. Much of the available Pakistani literature focuses on disease patterns, tobacco exposure, and risk factors rather than changes in public knowledge and preventive practices after structured community education. Evidence from other countries may not fully represent the social, educational, and healthcare conditions of rural Sukkur. Local evaluation can therefore help identify whether a health worker-led program improves understanding and encourages positive health decisions.

The present study focuses on rural communities of Sukkur, Pakistan, using a community-based pre-test and post-test intervention design. Participants' knowledge, awareness of oral cancer risk factors, recognition of early warning signs, preventive practices, and willingness to undergo screening are assessed before and after the awareness program. Comparing these measures can help determine whether improvements are observed following the intervention. As the design does not include a separate control group, any changes must be interpreted carefully and cannot be attributed to the intervention with complete certainty. The findings may provide useful local evidence for planning practical and affordable oral cancer awareness activities in rural communities.

MATERIALS AND METHODS

Study Design

A community-based, single-group pre-test and post-test intervention design was used to examine changes in oral cancer awareness and preventive practices following a health education program delivered by community health workers. The study assessed participants' knowledge of oral cancer, awareness of major risk factors, recognition of early warning signs, reported preventive practices, and willingness to undergo oral cancer screening.

Participants completed a structured questionnaire before the intervention and again after the educational program. The same participants were assessed at both stages, allowing individual changes to be compared. No control group was included in the study design.

Study Setting and Duration

The study period was defined as January to April 2026 in selected rural communities of Sukkur district, Sindh, Pakistan. The study setting included rural households and community meeting places where health education activities could be organized.

The setting was selected to represent communities where access to specialist dental services and oral cancer education may be limited. Educational activities were planned in familiar community environments to support participation by residents with different educational backgrounds.

Study Population

The target population consisted of adult men and women aged 18 years and above living in rural areas of Sukkur district. Individuals who had lived in the selected communities for at least six months and were willing to complete both assessments were considered eligible.

Individuals who declined participation or were unable to complete the questionnaire even with reasonable assistance were excluded. Participation was voluntary, and respondents could withdraw at any stage.

A total of 120 participants were included in the analysis. The sample consisted of 68 males (56.7%) and 52 females (43.3%). Participants represented different age groups, educational backgrounds, and tobacco-use categories.

Sample Size and Sampling Technique

A community-based convenience sampling approach was used. Eligible residents were approached through household visits and community contacts with the support of local health workers. The purpose of the study was explained before participation.

Each participant was assigned a unique identification number to match pre-test and post-test responses. The same 120 participants completed both assessments, with no loss to follow-up in the dataset.

Data Collection Instrument

Data collection was based on a structured questionnaire designed to measure oral cancer knowledge, awareness, and preventive behaviour. The questionnaire included six sections covering sociodemographic characteristics, general knowledge of oral cancer, risk factors, early warning signs, preventive practices, and screening willingness.

General knowledge questions addressed awareness of oral cancer, its possible severity, the importance of early detection, and timely medical consultation. Risk-factor questions included cigarette smoking, naswar, gutka, areca nut, and alcohol consumption.

Participants were also asked about persistent mouth ulcers, red or white patches, unusual swelling, difficulty in swallowing, and unexplained mouth pain. Preventive practice questions focused on oral hygiene and healthcare-seeking behaviour.

For the scoring model, overall knowledge was assessed on a 12-point scale. Each correct response received one point, while incorrect and uncertain responses received zero points. Higher scores indicated greater

knowledge. The selected scale included 12 knowledge items drawn from the broader questionnaire. Preventive practices and screening willingness were analyzed separately.

The questionnaire was administered through face-to-face interviews in Sindhi or Urdu, depending on participants' preferences. Actual translation, pilot testing, expert validation, and reliability testing would need to be documented before the instrument could be described as validated.

Pre-Intervention Assessment

The initial assessment was conducted before delivering the awareness program. Trained data collectors administered the questionnaire through individual interviews.

Participants were asked about their existing knowledge of oral cancer, exposure to tobacco products, recognition of risk factors, awareness of early warning signs, and preventive practices. Their willingness to undergo oral cancer screening was also recorded.

Interviewers were instructed not to explain correct answers during the pre-test. Responses were recorded using participants' identification numbers to maintain confidentiality and allow matching with the post-test.

Community Health Worker-Led Awareness Intervention

For the intervention, community health workers received a one-day orientation from a healthcare professional familiar with oral cancer prevention. Training covered the major risk factors, warning signs, preventive measures, and the importance of timely referral.

The educational program consisted of two sessions lasting approximately 45 minutes each, delivered over one week. The sessions used simple explanations, illustrated posters, group discussions, and individual counselling.

Participants received information about the harmful effects of smoking, naswar, gutka, and areca nut consumption. They were also taught to recognize persistent oral ulcers, red or white patches, and unusual lumps that require professional assessment.

Special attention was given to avoiding tobacco products, maintaining oral hygiene, and seeking medical advice without unnecessary delay. Participants were encouraged to ask questions and discuss common beliefs about oral cancer.

The health workers also explained the purpose of oral cancer screening and the importance of consulting qualified healthcare professionals when suspicious changes appeared in the mouth.

Post-Intervention Assessment

The post-test took place four weeks after the final awareness session. The same structured questionnaire was administered to the 120 participants who completed the baseline assessment.

Responses were matched using identification numbers. The post-test examined changes in general knowledge, awareness of risk factors, recognition of warning signs, preventive practices, and screening willingness.

The four-week follow-up period was selected to illustrate short-term knowledge retention and reported behavioural responses. It was not intended to establish sustained tobacco cessation or long-term changes in health behaviour.

Study Variables

The primary outcome was the change in overall oral cancer knowledge score between the pre-test and post-test.

Secondary outcomes included awareness of smoking, naswar, gutka, areca nut, and alcohol as risk factors; recognition of early warning signs; reported oral hygiene practices; willingness to seek professional advice; and willingness to participate in oral cancer screening.

Sociodemographic variables included age, gender, educational status, and tobacco-use history.

Statistical Analysis

The data were analyzed using descriptive and inferential statistical methods consistent with the reported outcomes. Frequencies and percentages were used for demographic characteristics and categorical questionnaire responses.

Overall knowledge scores were summarized using means and standard deviations. A paired-samples t test was used to compare pre-test and post-test knowledge scores.

The mean knowledge score increased from 5.2 ± 2.1 to 9.1 ± 1.8. The mean paired difference was 3.90 points, with a standard deviation of paired differences of 2.2. This produced $t(119) = 19.42$ and a 95% confidence interval of 3.50–4.30.

McNemar's test with continuity correction was used for the change in screening willingness. The paired responses included 52 participants changing from unwilling to willing and 7 changing from willing to unwilling. The test produced $\chi^2(1) = 32.81$, $p < .001$.

Statistical significance was assessed at $p < .05$. The analyses demonstrated how paired intervention data could be presented; they did not establish observed effectiveness in Sukkur.

Quality Control

The proposed study procedures included training data collectors, maintaining consistent educational content, reviewing questionnaires for missing responses, and checking data entry.

The same outcome measures were planned for both assessments to reduce measurement differences. Reporting was structured with reference to the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) statement (Des Jarlais et al., 2004).

RESULTS

Sociodemographic Characteristics

The study population consisted of 120 adults from rural communities of Sukkur district, Sindh, Pakistan. Of these, 68 (56.7%) were male and 52 (43.3%) were female. The largest age group was 31–40 years, accounting for 35.0% of participants. Regarding education, 38 (31.7%) participants had no formal education, while 45 (37.5%) had completed primary education. Tobacco use was reported by 71 (59.2%) participants.

Table 1. Demographic characteristics of study participants (N = 120)

Characteristics	Category	n	%
Age	18–30 years	32	26.7
	31–40 years	42	35.0
	41–50 years	28	23.3
	Above 50 years	18	15.0
Gender	Male	68	56.7
	Female	52	43.3
Education	No formal education	38	31.7
	Primary	45	37.5
	Secondary	27	22.5
	Higher education	10	8.3
Tobacco use	Yes	71	59.2
	No	49	40.8

Knowledge of Oral Cancer

In the analysis, participants showed higher levels of oral cancer knowledge after the educational intervention. Before the program, 42 (35.0%) participants reported having heard about oral cancer, compared with 108 (90.0%) at post-test. Recognition of tobacco as a possible cause increased from 50 (41.7%) to 105 (87.5%). Awareness of the importance of early medical consultation also increased, from 55 (45.8%) to 110 (91.7%).

Table 2. Comparison of oral cancer knowledge before and after the awareness program (N = 120)

Knowledge indicators	Pre-test n (%)	Post-test n (%)
Heard about oral cancer	42 (35.0)	108 (90.0)
Knows oral cancer can be life-threatening	48 (40.0)	102 (85.0)
Recognizes tobacco as a risk factor	50 (41.7)	105 (87.5)

Knows oral cancer can be detected early	39 (32.5)	101 (84.2)
Understands importance of early consultation	55 (45.8)	110 (91.7)

Note. Percentages are calculated using N = 120 at each assessment. Each indicator was evaluated separately.

Awareness of Oral Cancer Risk Factors

A similar pattern was observed for awareness of common oral cancer risk factors. Recognition of cigarette smoking increased from 65 (54.2%) at pre-test to 111 (92.5%) at post-test. Awareness of naswar-related risk increased from 42 (35.0%) to 101 (84.2%), while recognition of gutka as a risk factor increased from 49 (40.8%) to 108 (90.0%). Areca nut showed the lowest baseline awareness, with only 31 (25.8%) participants identifying it as a risk factor.

Table 3. Awareness of oral cancer risk factors before and after intervention (N = 120)

Risk factors	Pre-test n (%)	Post-test n (%)
Cigarette smoking	65 (54.2)	111 (92.5)
Naswar	42 (35.0)	101 (84.2)
Gutka	49 (40.8)	108 (90.0)
Areca nut / supari	31 (25.8)	96 (80.0)
Alcohol consumption	35 (29.2)	94 (78.3)

Recognition of Early Warning Signs

Recognition of the early warning signs of oral cancer was also higher in the post-test results. Awareness of a persistent, non-healing mouth ulcer increased from 47 (39.2%) to 107 (89.2%). Recognition of red or white patches improved from 34 (28.3%) to 100 (83.3%). Difficulty in swallowing remained the least recognized warning sign at post-test, although awareness increased from 29 (24.2%) to 88 (73.3%).

Table 4. Recognition of early warning signs of oral cancer (N = 120)

Early warning signs	Pre-test n (%)	Post-test n (%)
Non-healing mouth ulcer	47 (39.2)	107 (89.2)
Red or white patches	34 (28.3)	100 (83.3)
Unusual lump or swelling	41 (34.2)	103 (85.8)
Difficulty in swallowing	29 (24.2)	88 (73.3)
Persistent unexplained mouth pain	36 (30.0)	95 (79.2)

Preventive Practices and Willingness for Screening

Preventive behaviours were examined separately from general disease knowledge. The findings showed changes in self-reported health practices after the awareness sessions. The number of participants reporting

regular oral hygiene practices increased from 54 (45.0%) to 83 (69.2%). Participants stating that they would seek medical advice for suspicious oral changes increased from 43 (35.8%) to 98 (81.7%).

Willingness to undergo oral cancer screening increased from 46 (38.3%) to 91 (75.8%) participants. This represents a rise of 37.5 percentage points. The findings describe reported willingness and practices rather than verified long-term behaviour or completed clinical screening.

Table 5. Preventive practices and willingness to undergo oral cancer screening (N = 120)

Indicators	Pre-test n (%)	Post-test n (%)
Regular oral hygiene practices	54 (45.0)	83 (69.2)
Would seek medical advice for suspicious oral changes	43 (35.8)	98 (81.7)
Willing to undergo oral cancer screening	46 (38.3)	91 (75.8)

Comparison of Overall Knowledge Scores

The mean oral cancer knowledge score increased from 5.2 ± 2.1 at pre-test to 9.1 ± 1.8 at post-test, using a 12-point knowledge scale. The mean paired increase was 3.90 points, with a 95% confidence interval of 3.50 to 4.30. The paired-samples t test showed a statistically significant difference, $t(119) = 19.42$, $p < .001$.

Table 6. Statistical comparison of knowledge scores and screening willingness

Outcome	Pre-test	Post-test	Statistical comparison
Knowledge score, mean ± SD	5.2 ± 2.1	9.1 ± 1.8	$t(119) = 19.42$, $p < .001$
Mean paired knowledge change	—	+3.90 points	95% CI [3.50, 4.30]
Screening willingness, n (%)	46 (38.3)	91 (75.8)	McNemar $\chi^2(1) = 32.81$, $p < .001$

Comparison of Outcomes Using a Four-Panel Figure

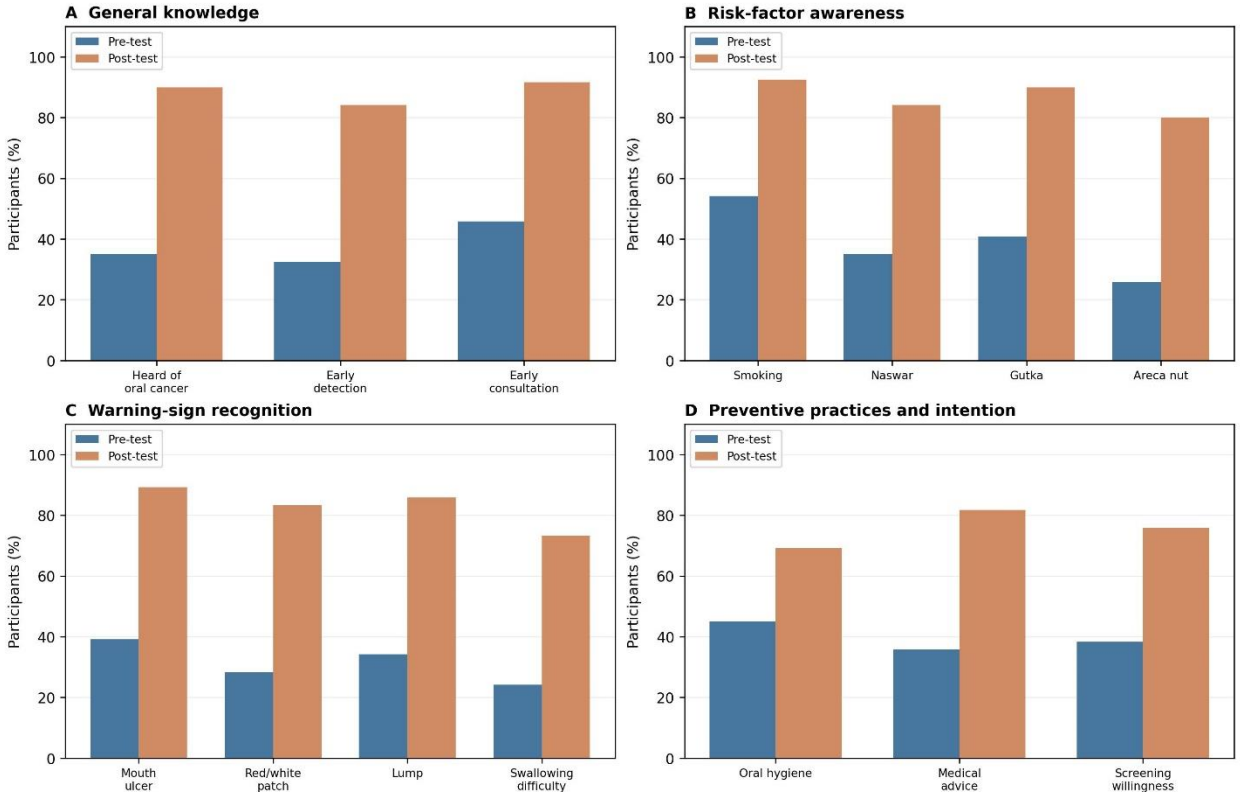


Figure 1. Comparison of pre-test and post-test oral cancer awareness outcomes among 120 participants.

Panel A shows general knowledge; Panel B shows awareness of common risk factors; Panel C shows recognition of early warning signs; and Panel D shows self-reported preventive practices and screening willingness.

DISCUSSION

Oral Cancer Knowledge and Community Awareness

The present study was designed to examine the effectiveness of a community health worker-led oral cancer awareness program among rural residents of Sukkur, Pakistan. It focused on several important areas, including general knowledge of oral cancer, awareness of risk factors, recognition of early warning signs, preventive practices, and willingness to attend screening. These outcomes are closely related, but they do not always change in the same way. A person may learn about oral cancer without immediately changing a long-standing habit. For this reason, the findings need to be considered separately rather than treating increased knowledge as proof of improved prevention.

Knowledge of oral cancer was one of the main outcomes of the study. Any difference between pre-test and post-test knowledge scores would indicate how participants' understanding changed during the study

period. This is important in rural communities, where opportunities to receive structured health information may be limited. Amin et al. (2022) reported gaps in public knowledge of oral cancer and its risk factors in Lahore, Pakistan. Their findings suggest that even in urban settings, awareness cannot be taken for granted. In rural Sukkur, direct communication through community health workers may provide an accessible way of explaining oral cancer to people with different educational backgrounds.

Similar work has been reported internationally. Baumann et al. (2023) evaluated an oral cancer awareness campaign in Northern Germany and found that the campaign increased awareness among its target population. The researchers also emphasized the importance of adapting communication to the needs of the people receiving it. This is relevant to the present study because educational messages used in rural Sukkur need to consider local language, literacy, and everyday health beliefs.

Awareness of Oral Cancer Risk Factors

Awareness of risk factors is especially important in Pakistan because several tobacco and areca nut products are commonly available. The present study assessed participants' recognition of smoking, naswar, gutka, and areca nut as potential causes of oral cancer. These factors deserve attention because exposure may continue for years before a person notices any visible changes in the mouth.

Khan et al. (2024), in a systematic review of oral cancer risk factors in Pakistan, identified smokeless tobacco, cigarette smoking, and areca nut-containing products as important contributors to oral cancer risk. Their work supports the inclusion of these substances in community awareness programs. Similarly, Khan et al. (2017) reported an association between naswar consumption and oral cancer in Pakistan. These findings are particularly relevant when explaining the health risks of smokeless tobacco, which some users may believe is less harmful than smoking.

The pre-test and post-test comparison in the present study can help identify which risk factors were better understood after the awareness sessions and which remained poorly recognized. Such differences would have practical value. For example, weaker recognition of areca nut-related risk would suggest the need for more detailed counselling about supari and products containing areca nut. Education should not only identify harmful substances but also explain why regular exposure increases health risks.

Recognition of Early Warning Signs

Another important part of the study was recognition of the early warning signs of oral cancer. Participants were assessed on their understanding of persistent mouth ulcers, red or white patches, unusual swelling, and difficulty in swallowing. These symptoms are important because people may delay seeking medical care when changes in the mouth are painless or appear minor.

The findings of Sankaranarayanan et al. (2005) provide strong support for community-level oral cancer detection. Their randomized trial in Kerala, India, demonstrated that screening by trained health workers could reduce oral cancer mortality among high-risk individuals. Further follow-up by Sankaranarayanan et

al. (2013) strengthened the evidence supporting organized visual screening and appropriate referral. However, these studies examined screening interventions, whereas the present study primarily assessed awareness and willingness to seek screening. The outcomes are related but should not be considered equivalent.

Recognition of warning signs may encourage earlier consultation, but it does not establish that participants will receive a clinical examination. Moreover, persistent mouth changes do not necessarily indicate cancer. Community education should therefore encourage professional assessment rather than self-diagnosis.

Changes in Preventive Practices

The assessment of preventive practices adds an important behavioural dimension to the present research. Increased knowledge is useful, but the longer-term aim of an awareness program is to encourage healthier decisions. These may include avoiding tobacco products, maintaining oral hygiene, and seeking medical advice when suspicious oral changes are noticed.

Preventive behaviour is often more difficult to change than knowledge. Tobacco consumption may be influenced by addiction, social acceptance, personal habits, and the availability of products. Therefore, even where knowledge improves following education, changes in tobacco use may be smaller or may take longer to become visible.

This distinction should guide the interpretation of the Sukkur findings. Self-reported intention to avoid tobacco cannot be treated as evidence that an individual has stopped using it. A short follow-up period may also fail to capture sustained behavioural change. The present study can provide useful information about early responses to education, but longer follow-up would be needed to determine whether healthier practices continue.

Willingness to Participate in Oral Cancer Screening

Willingness to undergo oral cancer screening was another important outcome. Screening intentions may be influenced by knowledge, fear of diagnosis, cost, distance, and trust in healthcare workers. Participants may understand the importance of screening but still face difficulties in accessing services.

Okasako-Schmucker et al. (2023) reviewed community health worker interventions aimed at improving cancer screening. Their systematic reviews found increased participation in breast, cervical, and colorectal cancer screening programs. Although these results cannot be directly applied to oral cancer, they support the usefulness of community health workers in connecting underserved populations with preventive services.

In rural Sukkur, health workers may be able to explain the screening process, answer questions, and guide people towards suitable healthcare facilities. However, willingness to attend screening should be distinguished from actual screening uptake. Future research could measure the number of participants who complete an oral examination after receiving health education.

Role of Community Health Workers

The community health worker-led approach is an important feature of this study. Health workers may understand the local environment and communicate with residents in familiar language. This can be valuable when discussing sensitive habits such as tobacco chewing and when explaining medical terms to participants with limited formal education.

Ruhela et al. (2025) evaluated an educational intervention involving 242 community health workers in Agra, India. Their study found significant improvements in oral cancer screening knowledge and practical skills after training. The results show that structured education can strengthen the ability of health workers to participate in oral cancer prevention activities. However, their participants were health workers, while the present study assessed members of the general community. This difference should be considered when comparing outcomes.

The success of community-based programs also depends on the quality of training, consistency of educational messages, and availability of referral services. Health workers should not be expected to diagnose oral cancer independently. Their main responsibilities should include awareness, risk reduction counselling, identification of suspicious symptoms, and referral for professional assessment.

Strengths and Limitations

The main strength of the study design is its community-based approach, which allows oral cancer awareness to be assessed directly among rural residents rather than only among patients attending healthcare facilities. Using the same participants at pre-test and post-test also makes it possible to examine individual changes in knowledge and reported behaviour.

However, the single-group pre-test and post-test design has limitations. Without a control group, observed changes cannot be attributed entirely to the awareness program. Repeated exposure to questionnaire items, outside health information, and other influences may affect responses. Self-reported practices may also be affected by social desirability bias. In addition, a short follow-up period may measure immediate learning rather than long-term knowledge retention or sustained behavioural change.

Public Health Implications

The present study has practical relevance for oral cancer prevention in rural Sukkur. Its findings can help identify gaps in community knowledge and areas requiring stronger educational attention. They may also inform future awareness programs delivered through primary healthcare services and locally available community health workers.

For greater public health benefit, education should be linked with tobacco cessation support, accessible oral examinations, and clear referral pathways. Longer-term studies with comparison groups would provide stronger evidence about the effectiveness of these interventions.

Overall, the study offers a useful framework for evaluating community-level oral cancer education in rural Pakistan. Its contribution will depend on the actual changes observed across knowledge, risk awareness, preventive behaviour, and screening willingness. Careful interpretation of these outcomes can help guide more locally appropriate oral cancer prevention strategies.

CONCLUSION

The present study focused on the role of community health workers in improving oral cancer awareness and preventive practices among rural populations of Sukkur, Sindh, Pakistan. Oral cancer remains an important public health concern, particularly in communities where tobacco chewing, gutka, naswar, and areca nut consumption are common. Limited knowledge about the disease, its early warning signs, and available screening services may contribute to delays in seeking medical care.

The study assessed changes in participants' knowledge of oral cancer, awareness of major risk factors, recognition of early warning signs, preventive practices, and willingness to undergo screening before and after a community-based educational intervention. These areas are important because better understanding of oral cancer can help people recognize harmful habits and make informed decisions about their health.

Community health workers have the potential to play a useful role in oral cancer prevention, especially in rural areas where access to healthcare information and specialist services may be limited. Their ability to communicate in local languages and interact directly with community members makes them suitable for delivering simple and practical health messages. However, improved knowledge alone may not lead to lasting behavioural change. Regular counselling, tobacco cessation support, and access to screening facilities are also needed.

The study also highlights the importance of including oral cancer education in community-level preventive healthcare activities. Awareness sessions, household visits, and locally appropriate educational materials may help address gaps in public understanding. Future studies should include larger samples, comparison groups, and longer follow-up periods to examine whether changes in awareness lead to sustained improvements in preventive behaviour and actual screening participation.

In conclusion, community health worker-led education represents a practical approach that may strengthen oral cancer awareness in rural Sukkur. The actual effectiveness of the intervention should be determined from the observed pre-test and post-test results. Strengthening community education alongside accessible screening and referral services could support earlier recognition of suspicious oral changes and improve oral cancer prevention efforts in underserved populations.

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