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Original Research Article

Prevalence of jaw lesions in Bagalkot population a clinical and radiographic study

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ABSTRACT

Background: Objective of the study was to estimate the prevalence of the various jaw diseases/ pathology in a group of North Karnataka population. Jaw lesions will be further clinically assessed and investigated (radiographs, advanced imaging modalities and laboratory investigations).
Methods: During the investigation, 3500 patients attending the oral medicine department of P.M.N.M Dental College and Hospital for a period of 15 months were examined for the presence of jaw lesions. The population of this study consisted of males and females of all age groups. All the subjects were examined, diagnosed and referred to the appropriate department for dental treatment.
Results: Of 3500 patients screened, 1072 patients had lesions. Out of these, 567 were males and 505 were females. The most commonly found lesion was periapical abscess followed by localized periodontitis, Generalized periodontitis, periapical granuloma, Radicular cyst with least being malignant lesions and bone tumours.
Conclusions: This prevalence study in a dental institute showed lack of oral health \ awareness among the patients and calls for the importance of the role of dentist in educating the patients regarding maintenance of oral health and also the urgent need for treatment.

Keywords: Clinical, Radiology, Histopathology

INTRODUCTION

Oral health is important to the quality of life of all individuals. Oral lesions can cause discomfort or pain that interferes with mastication, swallowing, and speech, and they can produce symptoms such as halitosis, xerostomia, or oral dysesthesia, which interferes with daily social activities. Epidemiologic studies provide information important to understanding the prevalence, incidence, and severity of oral disease in a specific population. Given large number of alterations, developmental, physiologic, pathologic, diagnosis of wide variety of lesions is an essential part of dental practice to ensure appropriate treatment. An important element in diagnosis is knowledge of relative frequency of lesion. Although data is available from many countries, information they provide are not extrapolable to our population since cultural, ethnic, demographic differences do exist. The epidemiological study could be the basis for the planning of treatment centers as well as for training of health professionals. Furthermore, it could be used to educate health professionals and the public in general against unnecessary delay in reporting to hospital, which is one of the most prominent problems with regard to oral-maxillofacial tumors in most Third World Countries.[1]

Conventional radiography may reveal a variety of radiolucent/radiopaque/mixed lesions in the jaws. These represent a broad spectrum of odontogenic and non-

odontogenic lesions with a varying degree of malignant potential. Interpretation of these lesions can be challenging either because the clinical presentation may be non-specific or because the lesion may be detected incidentally. Jaw lesions are difficult to distinguish from each other on radiography. The patient's history and analytical approach to radiographs help in narrowing down the differential diagnosis.[3] In some cases, the diagnosis will be mainly made based on clinical symptoms. In other cases, although a thorough clinical evaluation is mandatory, clinical findings are non-contributory, as the lesion cannot be seen or palpated and laboratory findings are not abnormal. Imaging is essential not only for the diagnosis of jaw lesions but also to guide therapy and to monitor treatment response. Recognition of the common jaw lesions is essential for a rapid and correct diagnosis. With increased knowledge of the various jaw lesions, the practitioner is better equipped to reach a clinical diagnosis and, therefore, treat the patient accordingly. Additionally, such data may allow the development of health programmes by professional and health bodies to prevent disease.[2,3]

The need for this study was to identify meticulously the various radiographic changes that occur following a pathological condition, may be an inflammatory, a benign or a malignant disease, or a manifestation of a systemic disease.

METHODS

Individuals presenting to the out-patient department (OPD) of P.M.N.M Dental College and Hospital at Bagalkot district in the state of Karnataka in Southern India were screened from the month of Jan 3rd 2013 to August 15th 2015 over a period of 18 months by well-trained dental specialists.

Inclusion criteria

1. Patients of any age, both genders, all racial and ethnic groups with oral diseases or systemic diseases with oral manifestations that fulfilled the objectives.
2. Patients who willingly gave consent were considered for this study.
3. Only jaw lesions with suspected clinic-radiological manifestations combined were considered.

Exclusion criteria

1. Patients with any significant cognitive impairment will be excluded.
2. Uncooperative patients and unwillingness to participate were excluded.

Those who gave history of pain, swelling, trauma, discolored, mobile teeth and suspicious oral signs and symptoms of underlying disease of varied etiologies were considered. All patients were examined while seated on a dental chair and using a good artificial light randomly. Mouth mirror, probes were used to examine the lesion and to retract tongue and cheek. Cotton swabs and gauze were used in the examination procedure for removing debris. Oral examination was carried out by 2 post graduate and two house surgeons specially trained for the examination following the appropriate guidelines. During clinical examination, following elements including features of lesions, anatomic locations, extensions, dental and periodontal status with adjoining supporting structure examination as best suited for clinical diagnosis were analyzed. Parameters like medical, dental histories, drug histories, general physical examination, hard and soft tissue examination and specific examinations pertaining to lesions were stressed.

Radiographic examination of conventional, intraoral (Bisecting angle technique – 75 kvp, 8 mA), occlusal (X Mind- Satelac Acteon), digital panoramic radiographs (Kodak 8000C Digital Panoramic and Cephalometric System) and advanced imaging (as required) were meticulously observed for radiologic signs of particular pathoses. Descriptive data of the lesion including location, shape, size and condition of the adjacent and opposing teeth, condition of the lamina dura, periodontal ligament space and alveolar bone changes and involved adjoining appropriate radiologic anatomic information pertaining to suspicious clinical pathoses were recorded, interpreted using magnifying lens and X ray viewers in ambient atmosphere and supported by radiologic atlas. Additional tests and procedures like, Fine Needle Aspiration Cytology (FNAC) / Fine Needle Aspiration Biology (FNAB), biopsies, laboratory investigations and other tests needed for diagnosis that may be required for the study were done depending on the existing condition.

The findings of the study were analyzed by using Statistical Package for Social Sciences (SPSS) version 20. Chi-square test was used for statistical analysis.

Pattern based approach for clinicoradiologic diagnosis was followed and the following categorization of lesions was done:

1. Periapical pathosis
2. Gingival and periodontal diseases (aap classification)
3. Odontogenic and non-odontogenic cysts
4. Odontogenic and non-odontogenic tumours
5. Fibroosseous lesions
6. Temporomandibular joint disorders
7. Fractures of teeth, jaws and supporting structures
8. Developmental disturbances of oral and paraoral structures
9. Soft tissue calcifications.

Statistical analysis

Chi-square test was used for statistical analysis and was analyzed by using Statistical Package for Social Sciences (SPSS) version 20.

RESULTS

In total 3500 patients visiting the Department Oral Medicine and Radiology for routine dental check-up were randomly screened, 2027 were male and 1473 were female. There were more male patients (57.91%) in the study than female (42.08%) (Table 1).

Table 1: Total no of study population.

Gender	No. of samples	% of samples
Males	2027	57.91
Females	1473	42.08
Total	3500	100

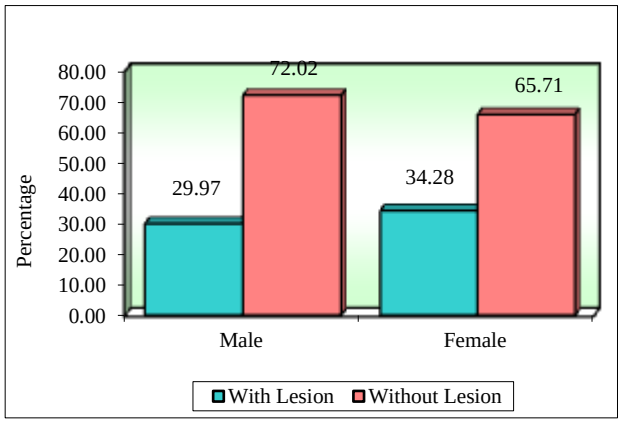

Figure 1: Comparison of male and female patients with and without clinico-radiologic features.

Among the study subjects, overall 1072 (30.62%) patients had lesions. 2428 patients (69.37%) did not have lesions. 1072 patients were diagnosed with atleast one lesion at the time of examination. (Chi-square = 15.9923 P = 0.0001*) (Figure 1).

Highest percentage of patients are of age groups 3rd (23.03%), 4th (20.76%) and 5th (24.23%) decades (Figure 2).

Periapical pathosis (13.25%) which has the highest prevalence of which periapical abscess total prevalence is 7.77%. Gingival and periodontal diseases which has the second highest prevalence of 10%. Odontogenic and Non-odontogenic cysts with a total prevalence of 0.91% of which Residual cyst has the highest prevalence of 0.40%.Odontogenic and Non-odontogenic tumours with a total prevalence of 2.82% which are the third most common lesions in the present study. Fibroosseous lesions with a prevalence of 0.20%. TMJ disorders (0.20%) which included bony ankylosis (0.057%) and condylar hypo and hyperplasia (0.14). Fractures with a total prevalence of 2.31%. Developmental disturbances (0.34%) and Soft tissue calcifications (0.57%) (Table 2).

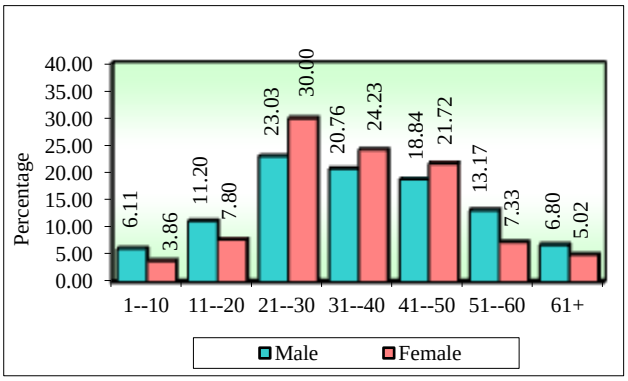

Figure 2: Distribution of study population based on age group and gender.

Table 2: Prevalence of individual lesions.

Diagnosis	Males		Females		Total	
	Cases (2027)	%	Cases (1473)	%	Cases (3500)	%
Periapical pathosis (odontogenic)						
Periapical abscess	145	7.15	127	8.62	272	7.77
Periapical granuloma	34	1.67	47	3.19	81	2.31
Osteomyelitis	25	1.23	21	1.42	46	1.31
Radicular	40	1.97	25	1.69	65	1.85
Total	244	12.03	220	14.93	464	13.25
Gingival, Periodontal diseases						
Localized periodontitis	97	4.78	100	6.78	197	5.62
Generalized periodontitis	60	2.96	63	4.27	123	3.51
Gingival enlargements	5	0.24	10	0.67	15	0.42
Generalized Aggressive periodontitis	10	0.49	5	0.33	15	0.42
Total	172	8.48	178	12.08	350	10
Odontogenic, Nonodontogenic Cysts						
Dentigerous	4	0.19	4	0.27	8	0.22
Residual	8	0.39	6	0.40	14	0.40
Mucous retention cyst	5	0.24	5	0.33	10	0.28
Total	17	0.83	15	1.01	32	0.91

Odontogenic, Nonodontogenic Tumours						
Benign						
Ameloblastoma	4	0.19	2	0.13	6	0.14
CEOT	0	0	1	0.067	1	0.028
KCOT	5	0.24	2	0.13	7	0.17
AOT	0	0	3	0.20	3	0.085
Pleomorphic adenoma	3	0.14	6	0.40	9	0.22
Osteoma	8	0.39	4	0.27	12	0.25
Osteoblastoma	0	0	1	0.067	1	0.028
Peripheral AOT	3	0.14	1	0.067	4	0.11
Malignant						
Squamous cell carcinoma	35	1.72	15	1.01	50	1.42
Adenoid cystic carcinoma	0	0	3	0.20	3	0.085
Osteosarcoma	0	0	1	0.067	1	0.028
Leukaemia	0	0	2	0.13	2	0.057
Total	58	2.86	41	2.78	99	2.82
Fibroossoeus lesions						
Fibrous dysplasia	0	0	2	0.13	2	0.057
Ossifying fibroma	0	0	1	0.067	1	0.028
Florid osseous dysplasia	0	0	3	0.20	3	0.085
Focal Osseous dysplasia	0	0	1	0.067	1	0.028
Total	0	0	7	0.47	7	0.20
TMJ disorders						
Bony Ankylosis	2	0.09	0	0	2	0.057
Condylar Hypoplasia and Hyperplasia	3	0.14	2	0.13	5	0.14
Total	5	0.24	2	0.13	7	0.20
Fractures						
Jaws	36	1.77	15	1.01	51	1.45
Teeth (Elli's)	21	1.03	9	0.61	30	0.85
Total	57	2.81	24	1.62	81	2.31
Developmental disturbances						
Amelogenesis imperfecta	4	0.19	5	0.33	9	0.25
Dentin Dysplasia	0	0	1	0.067	1	0.028
Cleido-cranial dysplasia	0	0	1	0.067	1	0.028
Ectodermal dysplasia	0	0	1	0.067	1	0.028
Total	4	0.19	8	0.54	12	0.34
Soft tissue calcifications						
Phleboliths	3	0.14	3	0.20	6	0.17
POF	4	0.19	3	0.20	7	0.20
Sialoliths	2	0.09	5	0.33	7	0.20
Total	9	0.44	11	0.74	20	0.57

Table 3: Presenting features or symptoms.

Symptoms	Cases	Percentage (%)
Pain	378	35.26
Swelling	122	11.38
Sinus tract, pus discharge	98	9.14
Difficulty in swallowing	54	5.03
Trismus	72	6.71
Ulcerations	61	5.69
Loose teeth	135	12.59
Paraesthesia	28	2.61
Non-healing socket	36	3.35
Bleeding	67	6.25
Enlarged lymph nodes	21	1.95

Table 4: Histopathological diagnosis (excisional /incisional/ FNAC).

	With Biopsy	%	Without Biopsy		Total
Periapical pathoses					
Periapical granuloma	23	28.39	58	71.60	81
Periapical cyst	24	36.92	41	63.07	65
Odontogenic and Non odontogenic Cysts	27	84.37	5	15.62	32
Odontogenic and Non odontogenic tumours					
Benign					
Ameloblastoma	6	100	0	0	6
KCOT	7	100	0	0	7
CEOT	1	100	0	0	1
AOT	3	100	0	0	3
Pleomorphic adenoma	6	66.66	3	33.33	9
Osteoma	10	83.33	2	16.66	12
Osteoblastoma	1	100	0	0	1
Peripheral AOT	4	100	0	0	4
Total	38	88.37	5	11.62	43
Malignant	42	75	14	25	56

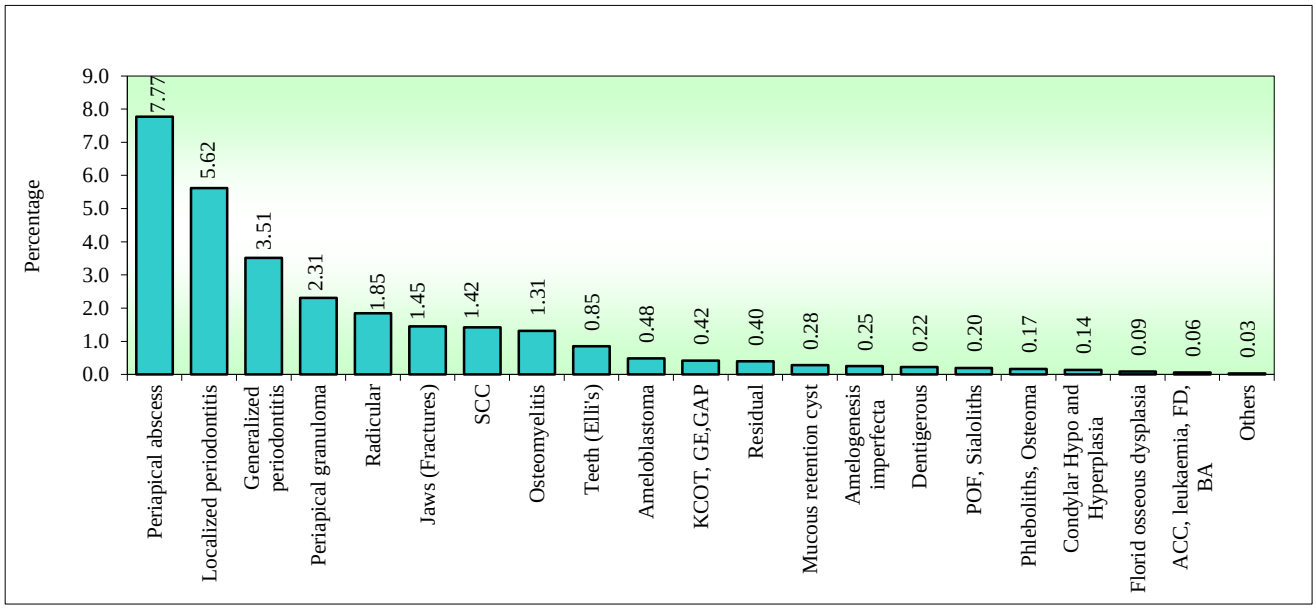

Figure 3: Lesions percentage in decreasing order.

Most common presenting feature is pain (35.26%), followed by loose teeth (12.59%), swelling (11.38%), sinus tract and pus discharge is seen in 9.14%, difficulty in swallowing in 5.03%, trismus in 6.71%, Ulcerations in 5.69%, Paraesthesia in 2.61%, Non-healing socket in 3.35%, Bleeding in 6.25% and enlarged lymph nodes in 1.95% (Table 3).

Most common lesion presenting to the department in the present study is Periapical abscess (7.77%), followed by

localized periodontitis (5.62%), generalized periodontitis (3.51%) and least were seen in Ameloblastoma, KCOT (0.14%), and FlCOD (0.085%), ACC, Leukaemia, FD and bony ankylosis (0.057%) and others (0.028%) (Figure 3).

Histopathology is gold standard for diagnosis. In most of the cases biopsy was performed and diagnosis was confirmed. In cases where biopsy was not possible based on clino-radiologic features diagnosis was confirmed. 28.39% cases of Periapical granuloma and 36.92% cases of Periapical cyst were diagnosed with biopsy. Biopsy was performed in 27 cases (84.37%) of Odontogenic and Non-odontogenic cysts. Out of 43 cases biopsy was performed for final diagnosis in 38 cases (88.37%) of benign tumours. In 42 cases (75%) of malignant tumours biopsy was performed (Table 4).

DISCUSSION

Several epidemiological studies have been carried out to record the prevalence of the developmental dental anomalies in different geographical areas across the globe and have shown wide variations in the prevalence percentage, anomaly distribution with respect to gender, arch and quadrant. The discrepancies in the various results have been attributed to the racial differences, variable sampling techniques and different diagnostic criteria. No such epidemiological study has been carried out to record all the Jaw lesions in Bagalkot, North Karnataka, India. Hence, this was chosen as the geographical study area of interest.

***Periapical pathosis*:** Total of 464 cases (13.25%) were reported (Table 4). This was the most common lesion in the present study. Males (52.58%) were more than females (47.41%). Although we strongly accept that histopathology is the gold standard, differentiation between periapical cyst and granuloma has a little importance in treatment managing and histopathologic evaluation is not usually necessary. According to a study which was done retrospectively in New Zealand in which 17038 lesions were included of which 4983 were radiolucent lesions. The most common periapical pathosis in that study was periapical granuloma (43.2%) followed by Radicular cyst (21.1%), Periapical abscess (1.8%) and Osteomyelitis (0.1%).[2] One more study conducted by faculty of dental medicine in Jerusalem in which total 889 patients were included of which Rarefying osteitis involved 80% of the cases, followed by radicular cyst and condensing osteitis.[4] The second most common lesion in the present group included periapical granuloma (2.31%). Females (58.02%) were more frequently involved than males (41.97%). Radicular cyst constituted 1.85% of all the lesions in the present study with more prevalence in males (61.53%) than females (38.46%). Osteomyelitis constitutes 1.31%.

Gingival and periodontal diseases: The prevalence of periodontitis in general population given according to the literature was 97.51%.[5] It is more than the prevalence in our study 10%. Prevalence of 0.42% of aggressive periodontitis was reported. Prevalence of 0.66% has been reported in general population.[4] The most common lesion in the present study was periapical abscess (7.77%), with more prevalence in males (52.58%) than females (47.41%).

***Odontogenic and non-odontogenic cysts*:** Constitutes 0.91% of all the lesions in the present study. Males (53.12%) are more commonly affected than females (46.87%). Lesions included in this group are Dentigerous cyst associated with unerupted teeth (0.22%), Residual cyst (0.40%), Mucous retention cyst (0.28%).

***Odontogenic and non-odontogenic tumours*:** Tumours accounted for 2.82% of all jaw lesions in the present study and is slightly more in males (58.58%) than in females (41.41%). According to Reichart relative frequency has been reported as between 5% to 22%. No date is available concerning prevalence and incidence.[6] Of the 6 cases of Ameloblastoma (0.14%), 4 (0.19%) were present in males and 2 (0.13%) in females. Of the 7 cases of KCOT (0.17%), 5 (0.24%) were in male and 2 (0.13%) were in females. According to the literature prevalence (4.4%) is more than our present study due to the large sample in the former, wide population age range and inclusion of wide variety of cases in the present study.[2] 3 cases of AOT (0.085%) and CEOT (0.028%) were reported in female patients which is comparable to the literature (<0.1%). Total of 56 Malignant tumours were included of which maximum were Squamous cell carcinoma (1.42%) followed by Adenoid cystic carcinoma (0.085%), Leukaemia (0.057%) and Osteosarcoma (0.028%). In India, 20 per 100000 population are affected by oral cancer which accounts for about 30% of all types of cancer.[7] According to literature Adenoid cystic carcinoma was the third most common malignant tumour with a prevalence of 6.3% in a study of 380 cases from Northern California.[8] In our study 3 cases were reported. One case of Osteosarcoma (0.028%) was recorded in a female patient of 25 years affecting maxilla which is comparable to that in literature (<0.1%).[2]

Fibroosseous lesions: Fibro-osseous lesions (0.20%) were reported which included Fibrous dysplasia (0.057%), Ossifying fibroma (0.028%), Florid osseous dysplasia (0.085%) and Focal osseous dysplasia (0.028%). Concurrent with literature of Florid osseous dysplasia, 2 cases were reported in 48years and 1 case in 28 year old female patients for age and gender predilection.[9] Fibrous dysplasia (0.057%) presented in 22 and 25 years old female patients concurrent to literature.[10]

***Temporomandibular joint disorders*:** (0.20%) were included in the study which constituted Bony Ankylosis (0.057%) and Condylar Hypoplasia and Hyperplasia (0.14%).

Fractures of teeth, jaws and supporting structures: Total of 81 cases (2.31%) of fractures were reported which included Jaw fractures (1.45%) and Elli's fracture of teeth (0.85%).

***Developmental disturbances of oral and paraoral structures*:** During screening we came across the following developmental disorders (12, 0.34%) - Amelogenesis imperfecta (0.25%), Dentin dysplasia (0.028%), Cleido-cranial dysplasia (0.028%) and ectodermal dysplasia (0.028%). Amelogenesis imperfecta presented with varying degree of severity represented 0.2%. Our sample included 9 cases (0.25%) of amelogenesis imperfecta.[11]

Soft tissue calcifications: (0.57%) were included in this study which constituted, Phleboliths (0.17%), Peripheral ossifying fibroma (0.20%) and Sialoliths (0.20%).

CONCLUSION

This study is first of its kind where all jaw lesions are included. Many of the studies conducted in literature have not included Fractures, Soft tissue calcifications, Developmental disorders and TMJ disorders in their study. The dentists must be aware of the clinical and radiographic features of all lesions to avoid unnecessary treatment or retreatment. Knowledge of the characteristic imaging features of lesions narrows the differential diagnosis and is crucial for the identification of these lesions. In addition, they should be aware of the indications of tissue biopsy, and if necessary, refer the patient to the specialist. The definitive diagnoses can be obtained by histopathologic evaluation and as a result, the best treatment will be performed for the patients. This study signifies importance of thorough clinical knowledge to subject the patient to radiographic examination for proper evaluation and thus appropriate treatment and further referrals.

Clinico-radiologic diagnosis may be strengthened by adjuvants like FNAB, biopsies and other serologic investigations. Periapical pathoses, Gingival and periodontal diseases represented the most common followed by odontogenic and non-odontogenic tumours, Fractures, Odontogenic and Non-odontogenic cysts, Soft tissue calcifications, developmental disorders, Fibro-osseous disorders and TMJ disorders representing the plethora of oral diseases among dental school population so the basic knowledge of this entities from the standard literature is essential for graduates and practitioners specifically of oral medicine and radiology speciality. This prevalence study in a dental institute showed lack of oral health \ awareness among the patients and calls for the importance of the role of dentist in educating the patients regarding maintenance of oral health and also the urgent need for treatment. The data obtained in this study will be used as an oral health education in a few primary health programs in the country.

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