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Unmet Oral Health Needs of Basic School Pupils in the Lower Manya Krobo Municipality of the Eastern Region of Ghana

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Abstract

Introduction

Prevalence of caries in young children is worldwide. Parent perception is a contributor in dental nonattendance. Reduction in prevalence of periodontal disease help reduce associated systemic diseases. This research seeks to assess the oral disease burden amongst basic school pupils and the knowledge, attitudes and beliefs of the people.

Method

The study was a school-based cross-sectional design with 300 study subjects using multi-stage sampling procedure from four schools. Parents were interviewed on their knowledge, attitude and behavior towards oral health. Ethical clearance was obtained from Ensign College of Public Health's Institutional Review Committee and the Municipal Office of the Ghana Education Service. Administrative permission was also sought from the heads of the school. Data collected was be analyzed with Stata.

Results

Prevalence of dental caries was 26.67%, not significant with age, consumption of sweets and drinks, and frequency of teeth cleaning. DMFT was 1.05 with only a decay component. Periodontal disease affected 59.33% of the study subjects and was significant with gender and high consumption of sweets. Prevalence of other oral diseases were low, being higher in rural schools. Parents' knowledge and attitude had no significant effect on the outcome of oral diseases.

Conclusion

Oral health of the school pupils is poor and prompt measures need to be implemented to control the problem.

Recommendations

Integration of healthy oral health behavior into primary health care programs.

Introduction

Oral health is a key indicator of overall health, wellbeing and quality of life. According to the World Health Organization, oral health is a state of being free from chronic mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing. It contributes to an individual's wellbeing and quality of life by affecting physical and mental wellbeing positively, appearance and interpersonal relationships [1]. The public health problems associated with oral disease are a serious burden on countries around the globe [2] and in spite of the great triumphs in oral health, burden of oral health diseases remains high in many communities around the world - particularly among underprivileged groups in high-income and low-income countries [3]. This could be a result of a myriad of reasons but mainly because of the lack of acceptance of healthy oral habits that are crucial in preventing the most common oral diseases such as, dental caries and periodontal disease which are considered as behavioural disease [4]. Countries where oral disease preventive programs have not been implemented still remain in the shadow of high prevalence of dental caries [5].

Oral disease in children and adults is higher among the poor and disadvantaged population groups. Risk factors for oral diseases include an unhealthy diet, tobacco use, harmful alcohol use and poor oral hygiene, and social determinants [6].

Dental caries and periodontal diseases have historically been considered the most important global oral health burdens. Severe periodontal (gum) disease, which may result in tooth loss, was estimated to be the 11th most prevalent disease globally [7]. It is estimated that 2.4 billion people suffer from caries of permanent teeth and 486 million children suffer from caries of primary teeth globally [8].

A similar situation occurs in Ghana as studies have identified high oral disease prevalence among children. A study in the Tamale Municipality, found a high prevalence of oral disease ranging from 52% to 68% for

periodontal disease and 12% to 24% for caries with poor knowledge and attitudes towards oral health [9]. Another in the Ho Municipality showed approximately eighty percent of the children had calculus and gum bleeding. Only 2.4% had visited the dentist in their lifetime whilst 92.9% with dental pain tend to seek self-medication [10]. Among peri-urban school children in Accra, plaque scores ranged from 78.9% to 97% in the 4-6-year-olds [11].

The general objective of the study therefore, was to investigate the unmet oral health needs of school pupils within the Lower Manya Krobo municipality. To assess the prevalence of oral disease in basic school pupils in the Lower Manya Krobo District and to explore the knowledge attitudes and practices impacting oral health of children in the Lower Manya Krobo Municipality.

Methods

Study Area

The Lower Manya Kobo Municipal District is one of the 26 administrative districts in the Eastern Region of Ghana with Odumase-Krobo as its capital. The District covers an area of 304.4 sq km, constituting about 1.7% of the total land area within the Region (18,310km). The major towns in the district include Odumase township (which incorporates Atua, Agormanya and Nuaso), Akuse and Kpong in the Lower Manya area. A review of the out-patient department (OPD) cases at Atua Government Hospital of the Lower Manya Krobo District in the Eastern Region of Ghana from 2016 to 2017 reveals a 3% drop in the patronage of dental services among children hence the need for investigating the prevalence of oral diseases and knowledge, attitude and behaviour towards oral health.

Study Design and Variable

The study was carried out using a cross-sectional study design which involved the administration of a questionnaire and oral examination of school pupils in 4 selected schools in Lower Manya Krobo and the administration of questionnaire to their caregivers

The sample size of 300 pupils was calculated based on the prevalence of oral disease of 79.6% in a similar study in Ho [10]. The examination was done using an Oral examination tool for school pupils and adolescents modified from the World Health Organization from the Oral Health Survey Basic Methods (5th Edition) The questionnaire sought to obtain information on the knowledge, socio-demographic characteristics, knowledge, attitude and behavior towards oral health among the school pupils and their caregivers. The adult questionnaire included 47 items for the evaluation of the oral health knowledge, attitude and behavior of parents and scored and characterized as excellent, good, average or poor. The prevalence of oral diseases was identified and the KAB of the caregivers.

Data Analysis

Prevalence of oral diseases were calculated using the recommended indices DMFTs and CPITN. Pearson Chi square test was used to test the association/relationship between the prevalence of oral diseases and socio-demographic characteristics, knowledge, attitude and behaviors among the school pupils and their caregivers.

Results

Socio-Demographic Characteristics

A total number of 300 school pupils between the ages of 4 years and 20 years with the mean age as 10.78 years and standard deviation of ± 3.58 years made up the study population. School pupils belonging to the age group 10-15 years constituted the greatest percentage (52.67%) of the sample. One hundred and fifty-four (51.33%) urban and one hundred and forty-six (48.67%) rural school pupils were examined. Males constituted 44.33% and females 55.67% of the study population (Table 1).

Table 1: *Demographic Characteristics of School Pupils*

Demographic Characteristics of Pupils	Frequency		Total Pupils N (%)
	Urban School N (%)	Rural School N(%)	
Gender			
Male	66 (22.00)	67 (22.33)	133 (44.33)
Female	88 (29.33)	79 (26.34)	167 (55.67)
Total	**154 (51.33)**	**146 (48.67)**	**300 (100%)**
Age Group			
4-9years	52 (33.77)	61 (41.78)	113 (37.67)
10-15years	88 (57.14)	70 (47.95)	158 (52.67)
15+Years	14 (9.09)	15 (10.27)	29 (9.67)
Total	**154 (51.33)**	**146(48.67)**	**300(100%)**
Mean Age = 10.78	**Standard Deviation= 3.58**		

Two hundred and twenty-seven (227) caregivers were effectively sampled out of three hundred (300) giving a response rate of 75.67%. Majority of caregiver respondents were female, 54.19%. The predominant ethnic group was Ga-Adangme which constituted 58.15% of the respondents. Most caregivers had secondary school level education or below, 6.17% had no formal education (Table 2).

Table 2: *Demographics Characteristics of Caregivers*

Caregiver Demographics	Frequency (%)		Total
	Urban (N 114)	Rural (N = 113)	
Male	54 (23.79)	50 (22.03)	104 (45.82)
Female	60 (26.43)	63 (27.75)	123 (54.18)
Total	**114 (50.22)**	**113 (49.78)**	**227**
18 – 40 Years	57 (25.11)	62 (27.31)	119 (52.42)
41 – 60 Years	52(22.91)	46 (20.26)	98 (43.17)
61 – 75 Years	5 (2.20)	5 (2.20))	10 (4.41)
Total	**114**	**113**	**227**

|			
Single	25 (11.01)	27 (11.89)	52 (22.91)
Married	74 (32.60)	75 (37.44)	149 (65.64)
Co-Habiting	2 (0.88)	1 (0.44)	3 (1.32)
Widow	7 (3.08)	6 (2.64)	13 (5.73)
Divorced	6 (2.64)	4 (1.76)	10 (4.41)
Total	**114**	**113**	**227**
Ga-Adangme	30 (13.22)	102 (44.93)	132 (58.93)
Akan	13 (5.73)	2 (0.88)	15 (6.61)
Ewe	66 (29.07)	6 (2.64)	72 (31.72)
Other	5 (2.20)	3 (1.32)	8 (3.52)
Total	**114**	**113**	**227**
No Formal Education	5 (2.20)	9 (3.96)	14 (6.16)
Primary	14 (6.17)	18 (7.93)	32 (14.10)
Junior High	31 (13.66)	39 (17.18)	70 (30.84)
Senior High	31 (13.66)	32 (14.10)	63 (27.75)
Tertiary	33 (14.54)	15 (6.61)	48 (21.15)
Total	**114**	**113**	**227**
Unemployed	4 (1.76)	2 (0.88)	6 (2.64)
Self Employed	79 (34.80)	98 (43.17)	175 (77.09)
Private Employment	20 (8.81)	8 (3.52)	28 (12.33)
Government	11 (4.85)	5 (2.20)	16 (7.05)
Total	**114**	**113**	**227**
Mother	40 (17.62)	55 (24.23)	95 (41.85)
Father	40 (17.62)	40 (17.62)	80 (35.24)
Guardian	23 (10.13)	17 (7.49)	40 (17.62)
Other	11 (4.85)	1 (0.44)	12 (5.29)
Total	**114**	**113**	**227**

Oral Diseases

From Table 3, the mean DMFT of the study population was 1.05 (±2.68). The minimum and maximum DMFT recorded were 0 and 22 respectively. Decayed teeth was the only observed component of the DMFT index. Approximately 73.33% of school pupils were caries free.

Table 3: DMFT Distribution By Gender

Variable	DMFT Scores (Frequency)																Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	22	DMFT>0
Gender																	
Male	94	11	11	6	2	2	1	0	1	1	0	0	1	2	1	0	39
Female	126	13	8	4	4	0	3	2	1	0	3	2	0	0	0	1	41
Total	220	24	19	10	6	2	4	2	2	1	3	2	1	2	1	1	80
Mean DMFT = 1.05								Standard Deviation = 2.68									

Figure 1 illustrates caries distribution among the age groups. Pupils belonging to 4-9 years age group recorded the most caries prevalence with DMFT score ranging between 0 and 14. The highest DMFT recorded was 22 in the 10-15 year age group. The oldest age group tend to have DMFT score of 0.
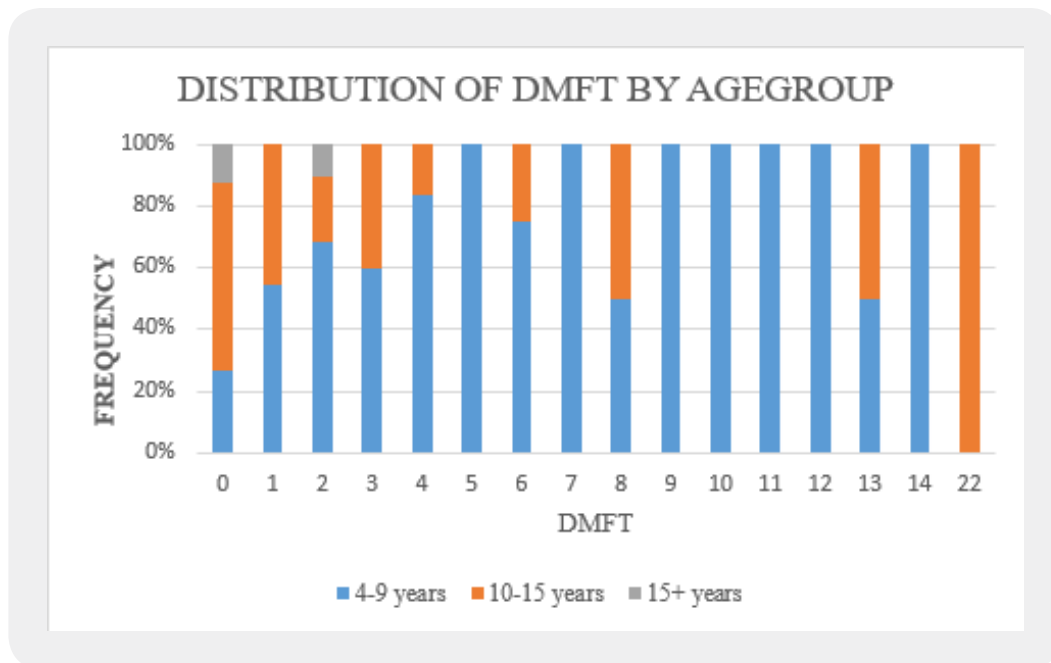
Figure 1: DMFT by Age Group

Figure 2 Shows that 122 pupils did not have any obvious gingival bleeding whilst the rest had different degrees of gingiva bleeding. Severe bleeding was identified in fifty-three pupils.
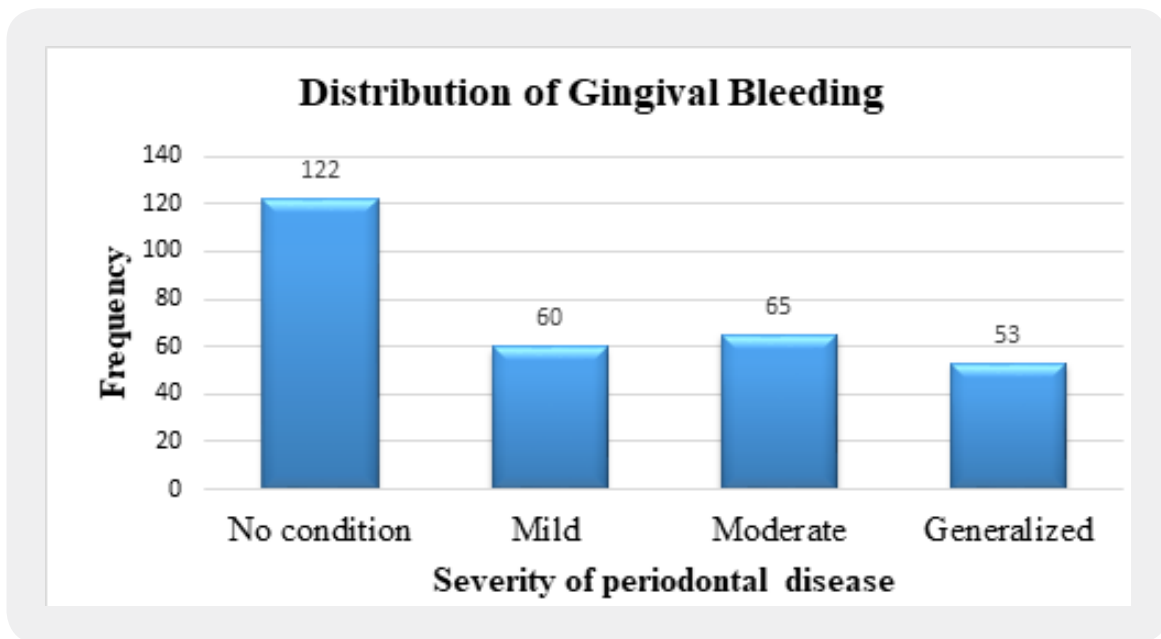
Figure 2: *Distribution of Gingival Bleeding Among the School Pupils*

Oborpa school recorded the highest prevalence of fluorosis among the study sample as shown in Figure 3 below:
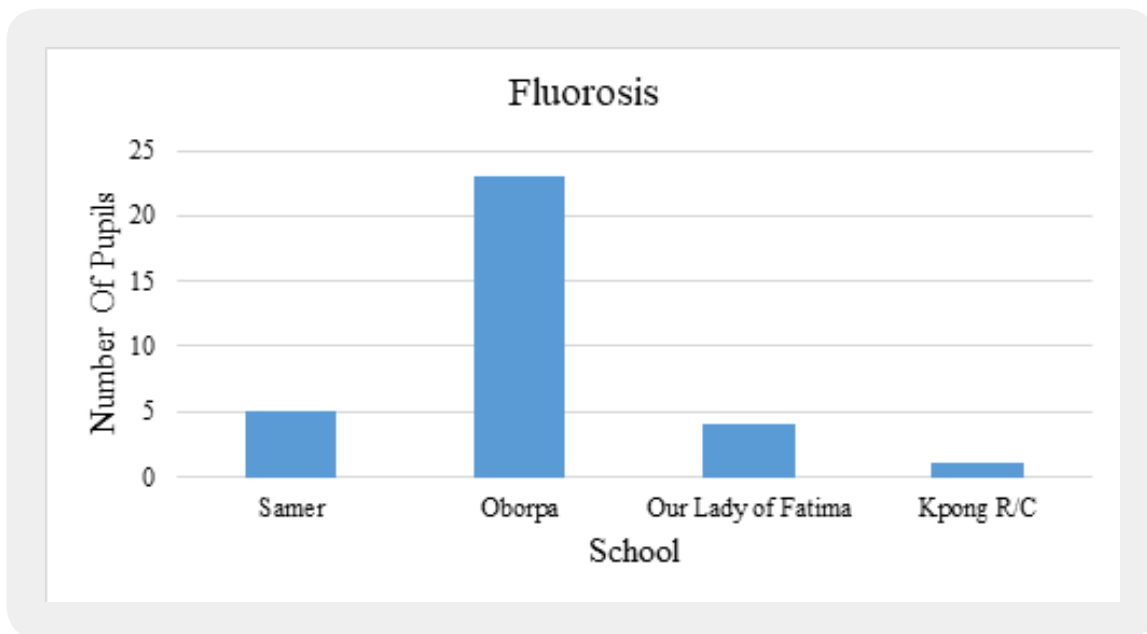
Figure 3: *Fluorosis Prevalence by School*

The most prevalent oral condition was gingival bleeding occurring in 59.3% of pupils. Dental erosion occurred the least, affecting 0.67% of the sample population. Oral mucosal lesions were 2% and 11% respectively. This is shown in Figure 4 below.
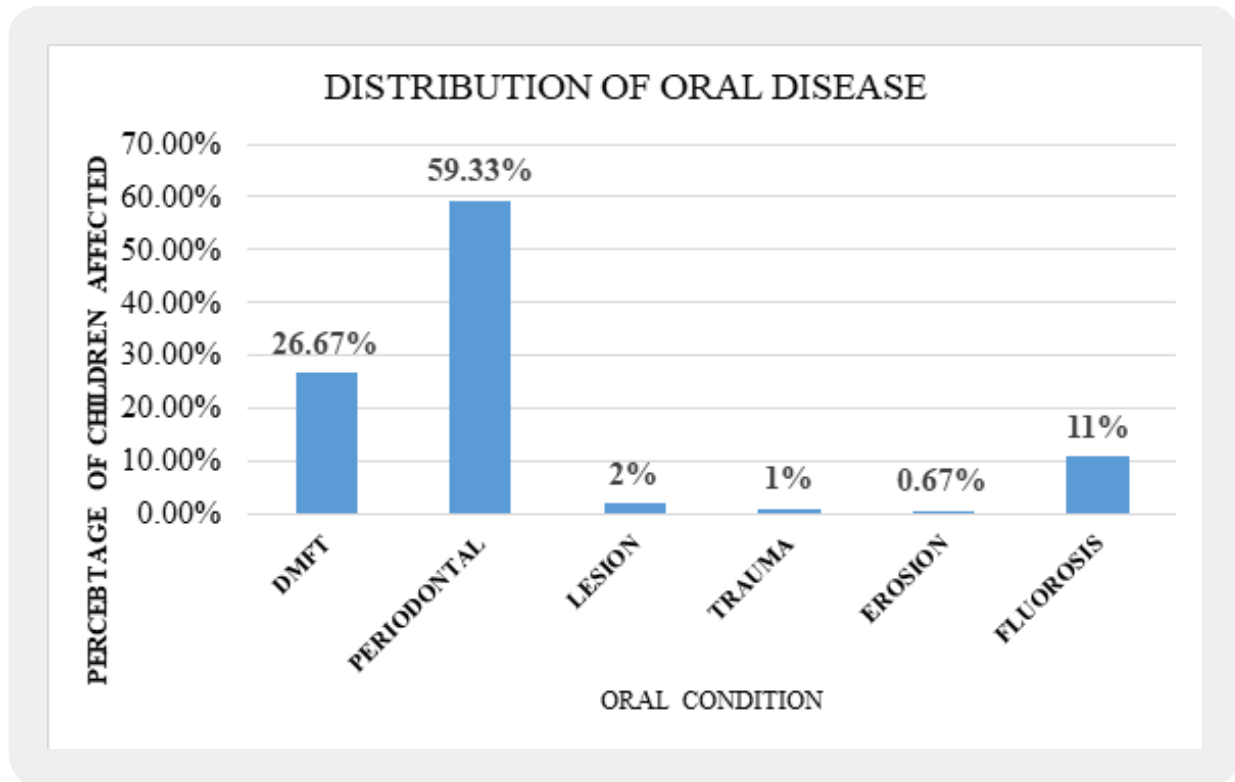
Figure 4: *Oral Disease Conditions*

Table 4: *Caregivers' Knowledge, Attitude and Behaviour*

Variable	Frequency				
	Samer	**Oborpa**	**OLAF**	**Kpong R/C**	**Total**
Knowledge on oral health					
Poor	10 (21.28)	16 (24.24)	6 (12.77)	20 (29.85)	52 (22.91)
Good	31 (65.96)	45 (68.19)	30 (63.83)	45 (67.16)	151 (66.52)
Excellent	6 (12.77)	5 (7.58)	11 (23.40)	2 (2.99)	24 (10.57)
Total	**47 (100)**	**66 (100)**	**47 (100)**	**67 (100)**	**227 (100)**
Attitude towards oral health					
Poor	2 (4.26)	13 (19.70)	3 (6.38)	11 (16.42)	29 (12.78)
Good	45 (95.74)	53 (80.30)	44 (93.62)	56 (83.58)	198 (87.22)
Total	**47 (100)**	**66 (100)**	**47 (100)**	**67 (100)**	**227 (100)**

Behaviour towards oral health					
Poor	3 (6.38)	3 (4.55)	1 (2.13)	4 (5.97)	11 (4.85)
Average	40 (85.11)	60 (90.91)	40 (85.11)	57 (85.07)	197(86.78)
Good	4 (8.51)	3 (4.55)	6 (12.77)	6 (8.96)	19 (8.37)
Total	**47 (100)**	**66 (100)**	**47 (100)**	**67 (100)**	**227 (100)**

Table 4 showed that oral health behaviour among the guardians was average (Scored between 40-70%). Majority (66.52%) had good knowledge (scored >70%) of oral health. Also, their attitude towards oral health was good. Classification of parents' knowledge, attitude and behaviour into the groups was adopted and modified from Shabeer Ahamed *et al.,* (2015).

Table 5: *Bivariate Analysis between Demographic Characteristics of School Pupil and Carie*

Variables	Category	Frequency	Presence of Caries	P-Value
Gender	Male	133 (44.33)	39 (29.32)	0.36
	Female	167 (55.67)	41 (24.55)	
Age group	4-9 years	113 (37.67)	54 (47.79)	
	10-15 years	158 (52.67)	24 (15.19)	<0.001*
	15+ years	29 (9.67)	2 (6.90)	
Location	Urban	154 (51.33)	39 (25.32)	0.60
	Rural	146 (48.67)	41 (28.08)	
School Type	Private	130 (43.33)	41 (31.54)	0.11
	Public	170 (56.67)	39 (22.94)	

Caries affected 29.32% of males and 24.55% of females. The prevalence of caries had no significant association with gender (p value 0.36). Pupils between 4-9 years were found to have the highest caries prevalence. There was a significant association between caries prevalence and age group (p value < 0.001). There was no significant association between the occurrence of caries and location or school type (p values = 0.60, 0.11 respectively).

Table 6: *Bivariate Analysis of Caregiver's Knowledge, Attitude and Behaviour on Caries*

Variables	Category	Frequency	Pupils With Caries	P- value
Knowledge	Poor	52 (22.91)	11	0.20
	Good	151 (66.52)	43	
	Excellent	24 (10.57)	3	
Attitude	Poor	29 (12.78)	4	0.17
	Good	198 (87.22)	53	

	Poor	11 (4.85)	1	
Behaviour	Average	197(86.78)	49	0.27
	Good	19 (8.37)	7	

Knowledge, attitude and behavior of caregivers on oral health was not significantly associated with the occurrence of caries among the pupils. Caries occurred mostly among pupils whose caregivers had average knowledge.

Discussion

Human dentition is very important. Its primary function is efficient chewing. Untreated diseases of the mouth cause dysfunction and eventual tooth loss. The study set out to investigate the unmet oral health need of school pupils in the Lower Manya Krobo Municipality. The discussion focuses on oral diseases identified among the pupils as well as the knowledge, attitude and behavior of their caregivers towards oral health.

Oral Diseases

The main conditions identified included dental caries, bleeding gums, fluorosis, dental trauma and oral mucosal lesions.

Dental Caries

Dental caries is a public health menace in many high-income countries [12] especially among the poor and marginalized [13]. In developing countries and countries of low socio economic status, dental caries is not as prevalent [14]. The study showed a DMFT of 1.05 which significantly exceeds the WHO target of DMFT of below 3 for 12 year olds [15]. This means that pupils in Lower Manya Krobo Municipality have very low caries incidence, better than what is expected by WHO. This could be attributed to the relatively lower sugar intake by the school pupils. Majority of these children had never taken in jam. Consistent with this finding, a study conducted in the Ho Municipality, a district in Ghana with similar characteristics also had low caries prevalence [10]. The 4-9-year-old group had more frequent caries than the other group. They represented 67% of all pupils with caries experience. This is a matter of concern because they are the children with mixed dentition and are more likely to have negative effect on both their primary teeth and the permanent teeth.

Gender, location and type of school, whether public or private, did not have any association with the prevalence of caries, with p values of 0.36, 0.60 and 0.11 at a significant level of $p<0.05$. Age group, however, showed a strong association with $p < 0.001$. This varies from the Nigerian study which showed a significant association between dental caries and the type of school, $p = 0.014$ [14]. Pupils with caries showed a strong association with suffering from toothache within the last 12 months, $p = 0.042$ ($p < 0.05$). This is similar to results from a survey conducted in Nigeria where 8 to 12 year olds self-reported dental pain which was significantly associated with dental caries with $p=0.04$ [14].

It is important to advocate for early intervention to prevent pain and discomfort and to protect permanent teeth from caries experience. The introduction of atraumatic restorative technique (ART) will be of benefit to these children as shown in the 5 year study of children in the South African province of Gauteng [16].

Periodontal Disease

Gingival bleeding occurred in 59% of all pupils. Teeth cleaning and periodontal disease was found to be statistically significant with age group p - value 0.003. This may be because older pupils are expected to possess better dexterity than younger pupils thus clean their teeth better. About 60% of children who brushed their teeth once a day had bleeding gums compared to 59% of children who brushed twice daily. The frequency of tooth brushing alone, is inadequate in preventing periodontal disease because the skill to clean well is also very important. It should however be noted that in this study, the caregivers' involvement in the cleaning of the pupil's teeth did not have a significant effect on the prevalence and severity of bleeding gums, p> 0.504. Meta-analysis done has proven that for improved oral hygiene, there is a need to brush twice daily for a minimum of two minutes to achieve adequate levels [17].

Periodontal disease is of marked importance due to its association with cardiovascular disease, respiratory disease and diabetes mellitus and also with systemic disease [18,19].

Periodontal disease is expected to increase; hence policy makers need to be proactive in planning towards its prevention. This is because the world population is growing and people are keeping their teeth longer [20].

Fluorosis

Prevalence of dental fluorosis was 11% among the school pupils. A large majority of the children with fluorosis, 23 out of 33, constituting 69.7% were from Oborpa, a rural community with bore hole as their source of water. Dissolved chemicals such as fluoride can be found in underground water, which when ingested accumulate in hard tissues such as the teeth and bones and causes fluorosis. Government needs to ensure the safety of ground water to prevent adverse effects of fluoride [21].

There was a significant association between a pupil having fluorosis and being teased by peers p < 0.03. It is worth noting that fluorosis was not significantly associated with the use of fluoride containing toothpaste, teeth cleaning frequency or satisfaction with appearance of the teeth. It can therefore be deduced that, the fluorosis observed in these pupils is not due to the use of fluoride toothpaste.

Dental Trauma

Dental trauma was rare, occurring in only 4 pupils. Though the numbers are few, dental trauma is of significance because of its impact on the sufferer. It affects quality of life of the individual [22]. It forms a significant portion of trauma occurring globally [23]. Aetiology of dental trauma is varied and wide and include factors related to the mouth and environment [24].

Oral mucosal Lesions

Oral mucosal lesions were also uncommon. Two pupils had oral abscesses which needed immediate attention whilst 4 had other mucosal abnormalities. Global prevalence of oral mucosal lesions is much higher with leukoplakia varying from 0.1% to 10.6% depending on geographical distribution [3]. Some of the presentation of lesions include dry mouth, discolouration, periodontitis and poor oral hygiene. Among

the global goals for oral health 2020, oral mucosal lesions have been targeted for early diagnosis by increasing the number of health care providers [25].

Dental Erosion

Changes in diet and lifestyle is associated with the emergence of diseases such as dental erosion, diabetes, obesity and hypertension [3]. Alcohol consumption, an integral part of many cultures, is also associated with dental erosion [26]. During the study, only 2 pupils were found to be having erosion of the teeth, though majority of the pupils drink fizzy drinks several times a week.

Prevalence of Oral Diseases

Oral disease is the most prevalent non-communicable disease affecting people throughout their lifetime. It can cause pain and discomfort and sometimes lead to disfigurement and death. The Global Burden of Disease Study (2016), estimated that oral diseases affect about half of the world's population, a staggering 3.8 billion people. Periodontitis, characterized by gum bleeding was found to be the 11th most common disease in the world [27].

It was therefore not surprising that almost all pupils examined had at least one oral disease condition present with only 4.7% of them not needing intervention.

Knowledge, Attitude and Behaviour of Pupils and Caregivers Towards Oral Health

Majority of caregivers had good knowledge of oral health, 66.52%, and a few had excellent knowledge, 10.57%. Attitude towards oral health was mostly good, 78.22%, and behaviour was mostly average. This is similar to work done in New Delhi, where the awareness of parents and attitudes exhibited regarding their children's oral health were relatively good. Similarly, there was a need for professional dental intervention, which was not commensurate with the findings on knowledge, attitude and behaviour, which were good. This buttresses the fact that knowledge alone is not sufficient if attention is not paid to changing caregivers' behaviour and attitudes (Kumar *et al.*, 2019). Thus, there is a need to focus on the promotion of healthy behaviour.

Conclusion

Oral disease is the commonest non-communicable disease in the world. The study identified a high burden of oral diseases among basic school pupils in Lower Manya Krobo Municipality and the need for professional intervention appeared to be largely unmet. Though knowledge and attitude towards oral health of pupils by care givers can be considered as good, behaviour towards oral health is not commensurate and thus the findings. It is therefore essential to integrate healthy oral health behavior into primary health care programs such as antenatal and postnatal care to target mothers who form the majority of caregivers and health educators. Community based Atraumatic Restorative Treatment (ART) services should be introduced at the community level to improve dental care access.

Limitation of Study

The limitations of this study included caregivers most likely not give factual answers because of social desirability or conformity. Given that the study was cross-sectional, it may have missed the capture of some pupils who were exposed to oral health diseases.

The use of only daylight without the aid of radiographs during the oral examination could have resulted in an underestimation of dental caries.

Ethical Consideration

Ethical approval was obtained from the Ensign College of Public Health's Institutional Review Committee. Administrative permission was also obtained from the Municipal Education Directorate of the Ghana Education Service and from Head teachers of the selected schools. Interviewers were trained. Verbal and written consent was obtained from the school pupils and caregivers selected for the study. Pupils who were found in need of dental treatment were referred to the Atua Government Hospital. Data was collected anonymously using identification numbers to ensure accurate pairing/matching.

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