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EARLY CHILDHOOD CARIES AMONGST PRE-SCHOOL CHILDREN AND THEIR CAREGIVERS' PERCEPTIONS OF ORAL HEALTH IN A KENYAN RURAL SETTING

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## EARLY CHILDHOOD CARIES AMONGST PRE-SCHOOL CHILDREN AND THEIR CAREGIVERS' PERCEPTIONS OF ORAL HEALTH IN A KENYAN RURAL SETTING

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### ABSTRACT

**Objective:** To evaluate the oral health knowledge and attitudes among caregivers of three to five year old children in a rural setting in Kenya.

**Design:** Descriptive cross-sectional study.

**Setting:** Kiamba Division of Kiambu County, Kenya.

**Subjects:** Three hundred and forty three caregivers participated in the study. A pre-tested self-administered questionnaire on the causes of dental caries was sent to the caregivers, and 67% of them were returned.

**Results:** Slightly over half (59.5%) of the children had dental caries. The majority of the caregivers (96.1%) reported that consumption of sugary foods causes tooth decay. Approximately 85% of the caregivers reported that deciduous teeth were important but 57% preferred extraction of carious deciduous tooth.

**Conclusion:** Whereas the knowledge of and attitude towards oral health among caregivers was relatively high, the role of infant feeding practices on dental caries was reportedly low. Although the majority of the children brushed their teeth, less than half of them received assistance from their caregivers.

### INTRODUCTION

Early childhood caries (ECC) is a virulent form of dental caries, characterised by its initial involvement of smooth surfaces of the primary incisors followed by the occlusal surfaces of the maxillary first molars and later the rest of the primary dentition (1). While its prevalence varies from one population to another, it has been known to have no boundary to the race, ethnicity and culture. However, the most disadvantaged children are the most vulnerable in the society (2). The aetiology of ECC is the interaction of cariogenic bacteria (*Streptococcus mutans*), fermentable carbohydrates and susceptible tooth surfaces within an appropriate time (3). The major reservoir of *S. mutans* from which infants acquire the bacteria is the mother (1), with other options being the horizontal transmission from peers at nursery schools (4). The risk factors include frequent consumption of foods containing fermentable carbohydrates without good oral hygiene (5).

The treatment of ECC is usually extraction or restoration of affected teeth plus oral health education and modification of feeding habits. Depending on the extent of the damage caused, the treatment can be expensive in the face of the anxiety and fear in the child, when sedation and general anaesthesia have to be used during treatment. Yet, restorations have no long-term impact on the population of *S. mutans*, and hence the possibility of recurrence of the disease (6). Modification of feeding behaviours may also have very minimal impact on the affected children, especially due to the often low socio-economic status of their families. While treating these children, it is important to note that their level of cooperation is less than ideal and prevention of the disease is the most desirable solution. Since pre-school children are unlikely to effectively maintain their oral hygiene, the caregiver is expected to lend a hand in this activity. Thus the caregiver needs to be aware of the effects of poor oral hygiene and feeding practices. Prevention strategies play an important role in improving the

oral health of children and should target the infectious components of the disease (7). This includes increased frequency of tooth brushing with the assistance of the caregiver, reduction in daily between meals exposure to sugars and on demand bottle feeding.

Although previous studies have reported varied findings on the relationship between ECC and caregivers' oral health knowledge, it is possible that the knowledge, attitude and practice of the caregiver may influence the general oral health of the children under their care. Thus the purpose of the present study was to evaluate the oral health knowledge, attitude and practice among the pre-school caregivers in Kiambaa County, Kenya.

## MATERIALS AND METHODS

The present study was conducted in Kiambaa Division in Kenya. The study included three to five year-old children attending nursery schools. Of the listed schools in Kiambaa, a stratified random sampling method was used to select pre-schools from the private and public categories. A total of 336 children were selected and examined for caries using WHO guidelines with dental mirrors and probes (8). The children sat on a cushion on the examiner's lap under natural light. Additionally, a pre-tested self-administered questionnaire was sent home to the respective caregiver through the head teachers of the children's schools. The questionnaire was constructed in English based on a similar tool (9). Both the questionnaire and the child's individual clinical form had the same identification number for ease of

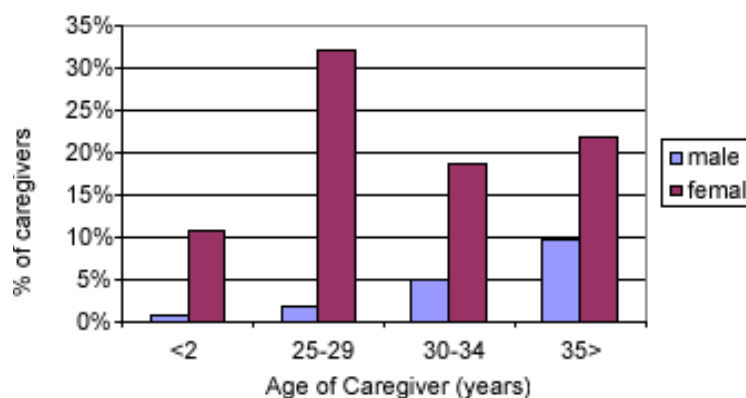
analyses. The survey instrument included questions on oral health knowledge, attitudes and practices of the caregiver.

The data collected were analysed using the Statistical Package for Social Sciences (SPSS) version 12.0. Univariate analyses were performed using Chi square statistics and a p-value of less than 0.05 was considered significant. Ethical approval to conduct the research had been obtained from the Kenyatta National Hospital and University of Nairobi Ethics and Research Standards Committee; and a written consent was sought and obtained from the caregiver before the child was included in the study. Prior to the study, calibration for the principal investigator was done in respect to caries diagnosis and Kappa values of 0.89 (n=10) and 0.92 (n=10), indicating very good agreement.

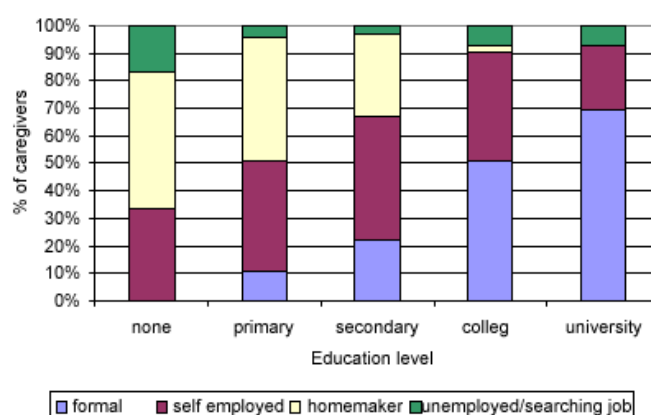
## RESULTS

*Socio-demographic characteristics of the caregivers:* Three hundred and forty three questionnaires were sent home to the respective caregivers. A total of 229 (66.8%) were returned. Among the respondents, 84% were female and the rest were male (Figure 1). The age range of the caregivers was 17 to 65 years, with a mean of 31.66 years (+8.2 SD). With regard to the caregivers level of education, 100 (45%) and 64 (28.4%) of the caregivers had attained secondary and primary education respectively. In addition, two-thirds of the caregivers were engaged in some form of economic activity (Figure 2).

**Figure 1**  
*Age and sex distribution of the 206 caregivers*



**Figure 2**  
The education and employment status of the 225 Caregivers



*Early childhood caries (ECC):* Slightly over half 201 (59.5%) of the children had dental caries. The prevalence of caries by age was 47%, 55% and 63% for the three, four and five year old children respectively. The mean decayed, missing and filled teeth (dmft) was 2.46+3.2SD.

*Caregivers' oral health knowledge:* A majority of the caregivers, 220 (96.1%) reported that consumption of sugary foods caused tooth decay, and about three-quarters of them agreed that eating sugary snacks between meals caused dental caries. However, only a quarter (24.9%) reported that bottle feeding at night could cause caries, while 11.4% of the caregivers

reported that breast feeding on demand increased the risk of dental caries.

*Attitude of the caregivers:* The results of the study showed that 194 (84.7%) of the caregivers thought that deciduous teeth were important, however slightly over half (56.8%) of the caregivers preferred extraction of a carious deciduous tooth. With regard to the dental health seeking behaviour, 202 (88.2%) of the caregivers agreed that children should visit a dentist every six months for check-up. In addition, the prevalence of caries in the study population was high regardless of their caregivers' attitude towards the deciduous dentition (Table 1).

**Table 1**  
Caries prevalence and attitude of caregiver (n=229)

Statement Response	N	(%)	(% Caries)	$\chi^2$	p-value	
Deciduous teeth are not important	True	35	(15.3)	(62.8)	2.06	0.151
	False	194	(84.7)	(75.8)		
Dental treatment preferred for decayed deciduous tooth	Remove	130	(56.8)	(62.7)	2.72	0.605
	leave it alone	11	(4.8)	(72.7)		
	Clean and fill	72	(31.4)	(69.4)		
	Others	8	(3.5)			
Children should visit dentist every 6 months	True	202	(88.2)	(65.2)	0.13	0.131
	false	27	(11.8)	(61.5)		
Decayed deciduous teeth can affect permanent teeth	True	65	(28.4)	(57.8)	1.88	0.170
	false	164	(71.6)	(67.5)		
Tooth decay is inherited	True	25	(10.9)	(69.6)	0.26	0.609
	False	204	(89.1)	(64.2)		

Oral hygiene practices among the children: Almost all the caregivers (95.6%) reported that their children brushed their teeth. Further, a similar number of caregivers reported that their children used a commercial toothbrush and toothpaste. However, slightly less than half of the caregivers (47.9%) reported assisting their children to brush.

## DISCUSSION

In the present study, the prevalence of caries was 59.5%. ECC continues to pose a huge challenge to developing countries like Kenya because of its multifactorial nature and high cost of treatment. The consequences of ECC on the child are both short and long term. Initially, the child may experience pain during feeding. Subsequent irreversible pulp damage may lead to premature loss of teeth which predisposes the child to malocclusion in the permanent dentition. Other effects include increased risk of caries in the permanent dentition (10) and insufficient physical development (11). In addition, the child suffers diminished oral health related quality of life (12). Thus it is important for caregivers to have adequate knowledge on the causes of ECC and prevention strategies because of the debilitating effects of this condition on the affected child.

The ability of the children's caregivers to recall past events such as breast and bottle-feeding may have influenced the validity of their responses. In addition, the response rate among the caregivers was only 66.8%. Non-response bias related to the questionnaires that were not returned may have occurred in the present study. It is possible that caregivers of children with healthy teeth lacked the interest in participating in the study. Additionally, there is a possibility that among the respondents, socially desired and undesired attitudes may have been over- and underestimated in this study. With the ratio of respondents having been 84% female to 16% male, the gender disparity of the caregivers in the study may reflect socio-cultural roles with the women being the main caregivers in the family. The literacy level of the caregivers was relatively high. Forty five percent and 28.4% had attained secondary and primary education respectively. This correlated with Kiambu District Development Plan (KDDP) reported adult literacy of 94% and 91% for males and females respectively (13).

Regarding oral health knowledge, majority of the caregivers (96.1%) acknowledged that consumption of sugary foods caused caries. Other perceived causes of caries reported by the caregivers were 'lack of brushing' (81.5%) and 'eating sugary snacks done in between meals' (71.2%). In a study in Hong Kong, 92.5% of parents/caregivers knew the aetiological factors of caries (14). The disparity between the studies

may be attributed to existing oral health education programmes. It is possible that developed countries have more resources allocated to oral healthcare programmes targeting caregivers. The role of infant feeding practices on caries initiation was unknown to majority of the caregivers. The practice of 'breast feeding on demand' and 'bottle feeding at night' was reported to cause caries by 11.4% and 24.9% of caregivers respectively. The practice of breast feeding is encouraged by the Ministry of Health in the Antenatal Clinic and Maternal and Child Health/Family Planning clinics but is possibly not accompanied by oral health education. In my opinion, community oral health workers can be deployed to these clinics to educate the caregivers regarding the oral health of their children.

Social scientists have studied the role of attitudes on human behaviour in many aspects. In this study, 84.7% of the caregivers agreed that the deciduous dentition was important, yet 56.8% opted for an extraction of a carious primary tooth. A study among immigrant Latino children reported that 76% of parents thought that baby teeth were important (15). On the contrary, a study in Poland reported that 66% of mothers agreed that milk teeth need not be looked after because they eventually fall off (16). Despite having a positive attitude, half of the respondents in this study preferred extraction of carious primary tooth. It is possible that the caregivers were not as keen on retaining the deciduous dentition until exfoliation or were unaware and/or ignorant of options available. The practice of seeking dental services is likely to be influenced by the attitude of caregivers towards dental health. In this study, 88.2% of the caregivers reported that children should visit a dentist every six months for check-up. Similarly, 90% of Polish mothers reported the same (16). However, the high dental treatment need of the children in the study reflects a contradiction to this finding. The mean dmft in the study was  $2.4 \pm 3.21$  SD with the decayed component contributing 95% of the score. It is possible that social desirability may have influenced the responses of the caregivers. However, the study did not elicit the reasons for not seeking dental services for the children. It is important to note that at the time of the study, only two Government Hospitals were offering dental services in Kiambaa.

The practice of regular tooth brushing is important in the removal of dental plaque. In this study, majority of caregivers (95.6%) reported that their children brushed their teeth. Similarly, Ngatia *et al.* (17) reported that 94.4% of the three to five year-old children brushed their teeth. Despite the widespread practice of tooth brushing, the prevalence of caries was relatively high in the study population. This finding could be attributed to inaccurate responses regarding the frequency of brushing or an ineffective brushing technique. The majority of the children in



this study (95.4%) were reported to use commercial toothbrushes and toothpaste. The findings were comparable to other studies. Ngatia *et al.* (17) reported that toothbrush and toothpaste were used by 90% and 93% of pre-school children respectively. Similarly, in Uganda Kiwanuka *et al.* (18) reported toothpaste use in 99% of the three to five year-old children. The widespread use of toothbrush and toothpaste in this study may be attributed to the marketing campaigns of the local companies. The proximity of the study area to the capital city implies improved accessibility.

The assistance of a caregiver is likely to improve plaque removal from the child's teeth. In this study, 47.9% of the caregivers reported assisting their children to brush. In Nairobi, Ngatia *et al.* reported that 71% of the children received assistance from a parent or guardian to brush their teeth. The low level of caregiver assistance in the present study may be attributed to either their unavailability to help or lack of awareness. Absence of the caregiver in the present study is reflected by the observation that two thirds of them (67%) were engaged in some form of employment.

In conclusion, oral health knowledge among caregivers was relatively high, but the role of infant feeding practices on dental caries was low. Slightly over half of the caregivers preferred extraction of a carious deciduous tooth. A majority of the children brushed their teeth, while less than half received assistance from their caregivers.

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