

## The Impact of Sibling Behavior on Oral Health: A Narrative Review

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### INTRODUCTION

The repetition of any behavior until it becomes established as a learned behavior begins in early childhood. A child may learn appropriate or inappropriate behaviors by observing models around them, as proposed by Bandura. This type of learning discerns the importance of one's environment, cognition, and behavior in determining how an individual functions.<sup>[1]</sup> Oral health practices being no exception to this, are also acquired at this tender age, and have the potential of greatly affecting the individual in later parts of their life. Health behaviors are attained through a multifactorial interplay, of which the family is a crucial and relatively unexplored area.<sup>[2]</sup>

Existing literature highlights the importance of the parents,<sup>[3]</sup> mostly the mother<sup>[4]</sup> from whom these

### ABSTRACT

**Objective:** The repetition of any behavior until it becomes a learned behavior begins in childhood. Oral health practices being no exception to this, are also acquired at this tender age, and have the potential of greatly affecting one in their lives. Oral health behaviors are learned through a multifactorial interplay, of which the family is a crucial and relatively unexplored area and will be highlighted in this review. This review discusses gender differences among siblings in relation to oral health, familial influence on acquisition and maintenance of oral hygiene habits, media influence on oral health attitudes and more.

**Methods:** A thorough literature search between 1972 and 2017 was done using Scopus, PubMed, and Google Scholar databases, results reviewed, prioritized, and findings compiled. The keywords of the search strategy was as below: Siblings, sibling behavior, sibling oral health, siblings in dentistry, maternal oral health, family influence on oral health. 35 studies were evaluated for the review. The keywords were limited to activities of siblings and their behavior patterns in relation to dentistry and oral health.

**Results:** Results showed that sibling dynamics have been involved in influencing the learning of oral health behaviors in children. Other factors include peer pressure and maternal influences.

**Conclusion:** Sibling relationships play a vital role in shaping behavior characteristics including tooth brushing, oral hygiene, dental perceptions, and snacking behaviors which are pertinent to dentistry.

**KEYWORDS:** Adolescent, maternal health services, oral health, oral hygiene, siblings

practices are picked up by children. There is, however, little known about the influence that siblings have on each other's oral health attitudes and the behavioral variations that exist between them in health-related dynamics, parent-child-sibling relationships, as well as the relationship of siblings with other impressionable people during their development.

Several years of study in the field of sibling relationships and their importance has yielded results which state that a child with warm and supportive sibling relationship is more likely to have superior cognitive abilities, greater

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social intelligence, better emotional understanding, greater moral awareness, and better psychological well-being when compared to children who do not have a close sibling relationship.<sup>[5]</sup>

The greatest influence on the acquisition of various behaviors is no doubt maternal. However, parent-child relationships may have certain barriers owing to the generation gap due to which children show some reservation to approach them, friendships are often ephemeral or short-lived and spousal relationships begin later in life when one is relatively set in their ways, and there is little scope for influential change. Interestingly, the relationship between siblings is the longest lasting of all. This bond is formed early in life and is strengthened through time, holding tremendous potential to influence patterns of oral care.<sup>[5]</sup>

**BACKGROUND**

Through the years, there has been very little attention drawn toward how oral behaviors are learned from one’s parents and translated to one’s siblings. This is nonexistent as of today as part of the curriculum for students. Although it is an important area when viewed from a behavioral sciences perspective, there is further exploration warranted to uncover its richer and finer aspects and provide a better understanding for health professionals as well as families. This would ultimately improve health-care utilization by the appropriate leveraging of facts.

**AIMS**

This review aims to highlight the possible impactful relationship between siblings on each other’s oral health behaviors in various complex scenarios.

**METHODS**

**PROCEDURE**

A thorough review of literature search between 1972 and 2017 was done using Scopus, PubMed, and Google Scholar databases, results reviewed, prioritized, and findings compiled as per Table 1 below. The keywords of the search strategy was as below: Siblings, sibling behavior, sibling oral health, siblings in dentistry, maternal oral health, family influence on oral health. 35 studies were evaluated for the review. The keywords were limited to activities of siblings and their behavior patterns in relation to dentistry and oral health.

**RESULTS**

Oral health behaviors are acquired at an early age, through a complex interplay of factors of which “the family” is an area which is crucial yet still relatively unexplored. The familial role is very strong with regard to the child’s ability to attain various oral health practices, especially maternal influence followed by sibling influence. Studies conclude that it is the mother who teaches the child to care for his/her oral health, by tooth brushing, introducing the child to interdental

**Table 1: Summary of findings from reviewed literature**

Search category/key terms used to search	Number of articles under each category	Brief overview of major findings
Relationship of sibling behavior and general health	4 (Wallinga, 1984; Avidan, 2016; D’amico, 1997; Sanders AE, 2005)	Siblings of children with a chronic illness were seen to display disturbances in behavioral adjustment as well as in the quality of sleep. The parents often underreported illnesses of the well child owing to a reduction in healthcare utilization. The sibling was found to be protective of the unwell child
Maternal influence on oral health	7 (Aishwarya A, 2013; Zeedyk MS, 2005; Virdee PK, 2007; El Tantawi M, 2017; Wilson RA, 2017; Poutanen R, 2007; Peterson PE, 2011)	Majority of studies showed a positive effect of the mother’s oral health attitudes on that of her children. Maternal influence on the child’s ability to learn oral health behaviors was disproportionately more than paternal influence
Social learning theory applied to siblings	3 (DO Catherine, 2004; Wu L, 2017; Wen, A 2017)	The elder sibling was shown to positively reinforce good habits in the younger sibling. The quality of this interaction was improved as the age gap between siblings reduced. The best dental application of this has been in the reduction of anxiety in the dental clinic
Toothbrushing and sibling behavior	2 (Franzman MR, 2004; Rossow I, 1992)	The strongest influence in the acquisition of interdental cleaning habits, was found to be between siblings
Family size and its influence on sibling oral health	5 (De Castilho AR, 2013; Isong, 2010; Aishwarya A, 2015; Wen. A, 2017; Folayan, 2004)	An increased number of siblings led to the family having to economize and more efficiently utilize their financial resources. This contribute to the use of nonfluoridated toothpaste and led to poorer oral health
Peer pressure and oral health	5 (Honkala, 2011; Brocklehurst P, 2012; S. Hugh, 2017; El Tantawi M, 2017; Martins, 2017)	Oral habits which were influenced by peers in this age group included alcohol consumption, tobacco smoking, stress eating, and consumption of carbonated drinks. Increased consciousness of appearance led to higher utilization of dental care by females

cleaning, as well as general hygiene. The presence of siblings showed children to have better cognition, social intelligence as well as better psychological well-being when compared to those who do not have siblings. It was seen that the elder sibling provides the younger one with a familiar space for learning and development as well as a steady source of guidance as they tread on unexplored territory and obstacles. This was illustrated by vicarious learning of tooth brushing from the elder sibling, through modeling; refraining from indulging in risky behaviors such as smoking/drinking despite peer pressure, due to sibling experience, as well as alleviation of fear in the dental clinic. Having siblings displayed intangible oral health benefits in children, however as the number of children increases in the family, it impacted the quality of healthcare available to each individual child due to a massive financial investment in other areas of their lives such as basic living as well as education.

Same-sex dyads of siblings were found to have a more nurturing relationship, maximum being observed in sisters who displayed an environment conducive to mutual growth and personal development as well as healthy competition. The role of parental influence, sibling relationship variables on a child's oral health attitudes were elaborated and discussed.

## DISCUSSION

### MOTHERS AND THEIR INFLUENCE ON ORAL HEALTH OF CHILDREN

In countries like India, children are well integrated into the family and surrounded by adults until they are in the adolescent/adult age group. This atmosphere reinforces observational learning in various areas of their lives and teaches them about responsibility. It can be agreed across various cultures, that the mother is considered to be the primary caregiver and that an extension of her own oral health habits are then adopted by her children. As expected, mothers with extensive knowledge of and positive attitudes toward oral health, raise children with sound dentitions, by reinforcing twice daily brushing. Their positive attitudes have an additive effect.<sup>[6,7]</sup> A study conducted at Saveetha Dental College, Chennai, Tamil Nadu, India, revealed that tooth brushing was introduced to the children 96% times by the mother, 2% by father, 1.3% by their siblings, and 0.7% by grandparents.<sup>[8]</sup> Alarmingly, the role of siblings in teaching an oral health practice was comparable to that of fathers in this study, with the mother being the main influence. Another study showed a major influence of the mother on the child's oral health behaviors, and identified three styles of brushing, with families being consistent in their use of at least one of these styles: exclusively parent-led (least common), exclusively child-led, and shared between parent and child (most common).<sup>[9]</sup> During their early years, children

spend majority of their time in close proximity with their parents due to constant dependence for care and adopt their mannerisms and behaviors as their own as they learn about the world and their surroundings.

Initially, when they start to talk and begin to mimic words they hear and actions they see around the house. Toddlers usually start to imitate their parents at an age as young as 2.5 years, by pretending to get ready for work and school and saying the last word that an adult says before leaving home. They often accompany their parents to various health-care appointments and form their own perceptions, which influence the oral care patterns that they grow to learn.

A study in England showed that the majority of pediatric patients were found to attend appointments with their mothers, less frequently accompanied by either parents or their father only.<sup>[10]</sup> The extent that a mother influences a child's oral health in the general sense has been illustrated across literature over the years,<sup>[4,5]</sup> and specific traits highlighted in literature are the mothers' oral hygiene and sugar intake, which have been shown to be the strongest influential factors on adolescents' oral health attitudes. Paternal factors include smoking which plays an important role.<sup>[11]</sup> As expected, the level of education of both parents has been linked inversely to the incidence of caries in their children, especially among siblings.<sup>[12]</sup> However, some studies reveal no such association.<sup>[13]</sup> The maternal role is dominant in the elder child's learning of brushing and oral care behaviors in comparison to the second born. The younger child usually picks up these habits from their older siblings through modelling and parental reinforcement to follow the elder child's example.<sup>[14]</sup>

### ROLE OF SIBLINGS IN CHILDREN'S ORAL HEALTH PRACTICES

Explanations dating back to Albert Bandura's social learning theory can be applied to the younger sibling learning vicariously from a role model most often the elder sibling. It is important to reflect on how learning is different from performing. The distinction between the two comes from motivation, which causes the repetition of behavior and can be in the form of rewards, like parental appreciation. When children perform with a person more skilled than them and receive positive instructions, they perform better.<sup>[11]</sup> Studies are now showing that individuals with close sibling relationships are more emotionally mature, happier, have enhanced psychological well-being, and have closer friendships than those without warm sibling relationships.<sup>[5]</sup> Siblings who are closer in age, living together, and constantly competing for attention, resources, and space offer each other a great milieu to begin learning about the world. During the

day, children find themselves in countless basic social situations with their siblings that can offer them a training ground for working on cognitive, social, and emotional development.<sup>[5]</sup> This reflects in the very fact that children who have siblings have better oral health when compared to those who do not.<sup>[15]</sup>

Infants and toddlers are far more likely to imitate children, who are closer to them in both age and appearance, than adults. However, it is unknown whether the age of the model has a role to play in observational learning, as during early observational studies, only adult models were taken into consideration.<sup>[16-19]</sup>

Siblings not only pick up rewarding behaviors from models, but the younger siblings' tendencies to engage in risky behaviors such as alcohol consumption are significantly related to their perceptions of the older siblings' behaviors and the consequences these bring.<sup>[20]</sup>

An area of dentistry which applies this theory in behavior management is dental anxiety in a fearful child in the dental clinic. Majority of behavior modification is regarded as a preventive mechanism through modeling, as once the fearful child has entered for his/her dental appointment; it is too late to intervene in a true sense. The anticipated disruptive behavior of a fearful child has been countered by displaying video models who are coping well with a situation similar to theirs, or even by observing their siblings responding well to dental treatment.

The utilization of live models shows a higher reduction in their anxiety and undesirable behavior. The live model must be of a perceived superior status for the child to hold him/her in high regard and follow his/her example. Coping models are considered more impactful in comparison to a mastery model, as it shows fear that the child can identify with, and overcome by small behavioral adaptations whereas the latter shows no evidence of fear or difficulty in adapting, which is too ideal for the child to relate to.<sup>[17]</sup>

The benefits of having a sibling are intangible, however it has been suggested that past sibling memories and current relational dynamics can often impede healthy psychological adjustment.<sup>[5]</sup>

The first oral health practice that a child acquires is tooth brushing which is learned from his/her parents, and having a sibling would add an extra dynamic to this behavior. Those with siblings have been shown to have a higher inclination to use fluoridated toothpaste in contrast to those who are primogenitors or only children, thus providing better oral hygiene and health.

Birth order as well as number of siblings are likely to increase the incidence of caries, possibly because larger families would need to minimize expenses by purchasing a less expensive toothpaste which makes it more likely for it to be nonfluoridated.<sup>[5]</sup> It is interesting to note that the incidence of decayed/missing/filled teeth in a second born is more than in the first child, which is in support of the earlier explanation.<sup>[15]</sup> Two or more siblings, who are not living with their parents show less frequent brushing habits and irregularity in dental visits.<sup>[19]</sup> Geographical variation may impact the availability of and access to resources, which could be a factor which affects the oral health status of a family. Research on sibling age gap and closeness shows that in childhood, siblings closer in age serve as playmates and are thus more likely to be close. On the other hand, during the adolescent years, the opposite may be true. Closely spaced siblings may develop greater conflict during the adolescent years as they each work on carving out their own identity. Having a sibling close in age may trigger comparisons which may serve as an impediment to identity formation. This, in turn, may lead to sibling rivalry and hostility.<sup>[5]</sup> The least intimate sibling dyad is the older brother–younger sister pair.<sup>[5]</sup>

As the child's age advances, manual dexterity develops, and there is an emphasis on interdental cleaning. Of all the possible pairs in the family, the strongest association in regard to interdental brushing was found between siblings, which is explained by equality in rules, parental control and reinforcement of the behavior, in addition to the immense influence of the elder sibling's interdental cleaning behavior on that of the younger sibling.<sup>[14]</sup>

#### ADOLESCENTS AND ORAL HEALTH

Another factor which gains eminence as the child matures is a slow a shift in needs and a desire to detach from parents and family when the adolescent strives for an independent personality. This does not necessarily mean that the child loses regard for their opinions, but simply that friends and their social circle gain a paramount position in their decision-making including health matters.<sup>[20]</sup> The parent–adolescent relationship still holds its importance when it comes to avoidance of risky behaviors including suicides, violence, and tobacco/substance abuse. Most of these risky behaviors arise from “the majority illusion,” leading the individuals to perceive those in their immediate circle to engage in certain activities, which then due to this assumption are adopted and considered to be the norm, for example, smoking and alcohol consumption.<sup>[21]</sup> Past studies have shown that the young usually drink more with peers who they trust because of a tacit acknowledgment of reliability and unspoken rules.<sup>[21]</sup>

Peer pressure and peer influence are of emerging importance during this phase as the adolescent wishes to fit in as well as be liked by others. Oral health-care utilization and practices are also affected greatly at this age, as individuals may indulge in tobacco use, alcohol consumption, altered diets, to gain social acceptance. There has been a documented reduction in exercise and rise in stress eating in this age group.<sup>[22]</sup> Peer-driven strategies arrive at the forefront when compared to those driven by teachers. Younger adolescents have been shown to brush their teeth more frequently compared to older ones, suggesting that there is a lesser influence of peers at a younger age.<sup>[11]</sup> Peer selection is exhibited, where the adolescent associates with those who display behaviors similar to their own; confounding occurs, where one has some innate characteristics which increase the likelihood of them adopting the same practices as their friends and; peer influence or peer pressure, where friends could influence the adolescent to adopt certain practices in exchange for social acceptance.

This is an area which can potentially be targeted in health education programs, to empower teenagers to help their friends adopt healthier behaviors.

Motivational interviewing has been found to be more effective than prevailing health education strategies, in eliciting positive changes in adolescent's oral health behaviors.<sup>[23]</sup> Oral health is one of the most unmet health needs of this age group.<sup>[24]</sup> Health-care utilization rates have been shown to decline during the transition from childhood to adolescence, after which young girls have a higher utilization compared to young boys, owing to better oral health in girls.<sup>[25,26]</sup> A study among 15-year-old school children in Udipi, Southern India showed the rate of dental visits among the studied population to be around 18.2%<sup>[27]</sup> indicating that a higher awareness through health education and modeling is warranted at this age.

The psychological development in the tender teenage years is complex and can unravel into a variety of directions. The perception of a supportive class or friend environment has been shown to be associated with lower odds of tooth brushing and higher odds of snacking on sugary foods. This paradoxical association can be explained by the peer support leading to acceptance, and thus there being no urge or necessity to adopt practices which may increase their popularity or social status.<sup>[11]</sup> In certain studies, poor oral health has also been linked to feelings of loneliness and social maladjustment.<sup>[28]</sup> Evidence suggests that poor tooth brushing habits are often accompanied by other health-detrimental behaviors such as regular smoking,<sup>[29]</sup>

unhealthy eating habits and low levels of physical activity,<sup>[30]</sup> which are common risk factors for several noncommunicable diseases.<sup>[31]</sup> Consequently, oral health promotion should be integrated within general health promotion.<sup>[32]</sup> By understanding the dynamics that influence an adolescent through their transition into adulthood, one can intervene for the greater good. As children become more conscious of their external appearance and self-grooming, importance to facial esthetics and oral health begins to develop and must be harnessed to inculcate beneficial oral health habits and behaviors.

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#### CONFLICTS OF INTEREST

There are no conflicts of interest.

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