

ORIGINAL ARTICLE

Influences of parents, close friends and classmates on four co-existing oral health practices in Saudi male teenagers

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ABSTRACT

Objective: The objective of this study is to investigate the association between oral health practices and similar practices adopted by parents, close friends and classmates in a group of Saudi male teenagers.

Material and methods: A cross-sectional study was conducted in Dammam, Saudi Arabia, in 2016 including 12–14-year-old intermediate school students ($n = 478$). A questionnaire assessed socioeconomic background, whether participants, their parents, close friends and classmates brushed twice daily, used tobacco, snacked on sugary foods or sugary drinks and perceiving a supportive classroom environment. Univariate and multivariate logistic regression models assessed the association of parents', close friends', classmates' practices and classroom support with participants' four practices, controlling for socioeconomic factors.

Results: The response rate was 93.9%. In multivariate regression, close friends' practices had a strong significant association with teenagers' tooth brushing (OR = 4.45; 95%CI = 1.09, 18.12), tobacco use (OR = 5.63; 95%CI = 3.44, 7.88), snacking on sugary foods (OR = 14.42; 95%CI = 7.89, 21.89) and sugary drinks (OR = 7.05; 95%CI = 5.97, 9.20). The percentages of classmates perceived to brush their teeth and use tobacco were significantly associated with the respective practices in teenagers (OR = 1.03 and 1.02). Fathers' snacking on sugary drinks was significantly associated with that of the teenagers (OR = 4.04; 95%CI = 1.03, 15.85).

Conclusions: In early adolescence, four oral health practices of Saudi males were associated with those perceived to be adopted by their close friends. Fathers' use of sugary drinks was also significantly associated with that of teenagers.

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Introduction

From infancy through childhood, children grow with a strong attachment to their parents.[1] Parents act as role models for their children to adopt daily routine and lifestyle. They influence their children's food choices, engagement in physical activities, and can have great effects on the child's future personality and behaviours.[2,3] Lack of parent monitoring affects children's future including dietary habits, alcohol consumption, tobacco use and arrests. Establishing healthy behaviours at this age is essential in forming children's habits and practices later in life.[4]

Adolescence is a crucial period in a child's life, defined by unique physiological and psychological changes. As early as 10 years of age, teenagers' social development has a profound effect on their behaviours.[5] During adolescence, children start to separate from their parents, show independence, build identity, and start paying greater attention to how others perceive them. Friends, school and community can have a great impact on adolescents' beliefs, perception and behaviour. They become more prone to external influences from their peers and friends in addition to what they

have learnt from their parents during early childhood.[5] Separation from parents at this age does not mean that adolescents lose attachment to their parents. The parents-adolescent relationship continues to have pronounced influence on adolescents' avoidance of risky behaviours such as suicides, violence, tobacco and substance use.[6] However, the social ties they form with friends and peers may have increasing influence on their health choices and lifestyle than family.[7]

Oral health is also affected during adolescence; individuals may avoid seeking oral care, have poor dietary habits, or engage in risky behaviours, such as tobacco abuse.[6,8,9] On one hand, adolescents-peer relationship was reported to have significant impact on adolescents' tooth brushing frequency.[10] Peer-led strategies were found to be more effective than teacher-led strategies in improving oral health behaviours.[11] On the other hand, investigators reported that parents' oral health practices affected their children tooth brushing habits.[12] A prospective cohort found that mothers' oral hygiene and sugar intake and father's smoking habits were the strongest influential factors on adolescents' respective practices.[13]

Oral health practices were reported to be consistent over time so that past practices could predict future practices.[13] On this basis, promoting healthy behaviours in adolescents may ensure their sustainability during adulthood.[13] Evidence shows that groups of health behaviours tend to co-occur in adolescents.[14] For example, a study assessed the simultaneous impact of parents' practices (oral hygiene, sugar intake and smoking) on their children's practices as they proceeded to adolescence.[13] Such investigation may provide answers to whether shared factors are associated with these practices and if these influences also co-occur. Considering these health practices simultaneously improves our understanding of them and takes into account the complexity of influences acting together on the individual.

Snacking, tobacco use and tooth brushing are health practices that are affected by cultural background and, hence, differ among societies.[15–17] In conservative societies, such as Saudi Arabia, which are more likely to have collectivist cultures, as opposed to Western societies, which tend to be more individualistic, teenagers may be more receptive of parental control of their behaviour and may more readily interpret it to be in their best interest and thus, act on it.[18] The extent to which this may affect oral health practices differently than in other societies is not known. The influence of family and peers on teenagers' oral health practices has implications for health education interventions targeting this age group possibly by role modelling and including the influencers in interventions to induce desired health behaviours. The aim of this study was to simultaneously investigate the association between four oral health practices adopted by teenagers and the perceived practices of their parents, close friends and classmates. The hypothesis to be tested is that teenagers' practices are associated with those of their close friends and classmates more than their parents.

Materials and methods

The present cross-sectional study was conducted in Dammam, Saudi Arabia, in 2016 after obtaining the approval of the Institutional Review Board, University of Dammam (IRB-2015-02-190). The target group was 12–14 years old intermediate schoolchildren. Only male students in public schools were included according to the permission given by the Directorate of Education. Subjects were included in the study if they fit the following criteria: (1) enrolled in public schools (since these were supervised by the Directorate of Education and the granted approval would be the only one needed to access the schools), (2) parents consented to their participation and (3) the teenager was free from medical conditions that might affect his ability to respond to the questionnaire based on school records.

Sample size was estimated using the following assumptions: minimum odds ratio for the association between teenager's and peers' oral health practices = 2, percentage of teenagers with unfavourable oral health practices who have peers with favourable practices = 20%, study power = 80% and alpha error = 5%. The minimum required sample size was calculated to be between 344 and 350. The number of

participants was increased to 478 because the questionnaire was distributed to all students in all classes of three intermediate randomly selected schools.

Data were collected using a questionnaire based on previous studies.[10,13,19] A pilot study of 30 students was conducted to assess clarity of the questions. Those 30 students were excluded from the final analysis. Based on this pilot, the questions were clear and no modifications were needed. The questionnaire included four sections of close-ended questions with the exception of two questions in the first section and the questions of the third section. The first section collected personal and socioeconomic information including date of birth, father's and mother's education (university education or not), mother's occupation (housewife or works outside home), type of residence (owned or rented), number of bedrooms and number of family members in the household (open-ended questions where the respondent added the numbers. The ratio of person per bedroom was then calculated). The second section assessed on a yes/no basis whether the respondent, his father, mother and close friend used tobacco currently, brushed twice daily using fluoridated toothpaste, snacked daily on sugary foods (chocolate, candies, biscuits) and sugary drinks (soft drinks, sweetened juices). The third section asked the respondent to indicate the percentage of classmates he thinks are engaged in each of the previous four practices (current use of tobacco, brushing twice daily using fluoridated toothpaste, snacking daily on sugary foods and sugary drinks). For all respondents, the mean percentage of classmates perceived to be adopting each practice was calculated and used in further analysis. The method used in our study where information about parents', close friends' and classmates' practices was based on teenagers' own reports was followed by other researchers assessing peer influence on adolescents' smoking.[20] In the fourth section, the respondent was asked to agree on a three points Likert scale (agree, neutral, disagree) with five statements assessing his perception of supportive classroom environment. These statements included respondent's perception of whether classmates (1) helped each other, (2) solved problems together, (3) if he could rely on his classmates, (4) if he felt close to his classmates and (5) if he felt he belonged to the class in general. These items were based on two factors of the Student Perceptions of School Cohesion Scale [19] after modifications to suit the study purpose.

Descriptive statistics were calculated including the percentage of teenagers, fathers, mothers, close friends and classmates adopting each of the four practices. The percentage of respondents agreeing with each of the five statements assessing classroom support was also calculated. Internal consistency of the five statements was checked (Cronbach alpha = 0.76). For each respondent, a score was calculated by counting the number of statements he agreed to. This score (ranging from 0 to 5) was then dichotomized into supportive (≥ 2.5) and non-supportive (score < 2.5) classroom environment. Univariate logistic regression models were used to assess the association of each of the four outcomes (tooth brushing, tobacco use, snacking on sugary foods and sugary drinks) with socioeconomic factors, fathers', mothers', close

friends' and classmates' practices and to perception of supportive classroom environment. Multivariate logistic regression models were developed for each of the four practices. Independent variables were parents', close friends' and classmates' respective practices and perception of classroom support. Each multivariate model was adjusted for the confounding effect of socioeconomic factors. Odds ratios and 95% CIs were calculated. Analysis was performed using SPSS version 20.0. The level of significance was set at or below 5%.

Results

The questionnaire was returned by 449 students (response rate = 93.9%). The mean (SD) age was 13.9 (1.0) years. More than half of the fathers (55.7%) and 48.7% of mothers had a university education (Table 1). The majority of mothers were housewives (67.7%) and most respondents (64.7%) reported

that they lived in owned houses. The mean (SD) number of family members per room was 1.55 (0.87).

Tobacco use, tooth brushing, snacking on sugary foods and drinks were reported by 9.2%, 42.5%, 68.3% and 68.7% of teenagers, respectively (Figure 1). About one quarter and 1.4% of participants reported having fathers and mothers who used tobacco. The perceived percentage of close friends using tobacco was greater than that of classmates (16.4% and 14.6%). The majority of participants reported that their fathers (85%) and mothers (92%) brushed their teeth twice daily using fluoride toothpaste. A greater percentage of close friends was perceived to brush twice daily than that of classmates (68.8% and 45.5%, respectively). Snacking on sugary foods was perceived to be more prevalent among close friends (86%) and classmates (69.8%) than fathers (23.6%) and mothers (34.6%). Snacking on sugary drinks showed similar results and was perceived to be more prevalent among close friends (83.3%) and classmates (72.9%) than fathers (39.2%) and mothers (35.6%).

About two-thirds of the teenagers agreed that their classmates helped them, that they solved problems together, felt close to each other and were loyal to their classmates (Figure 2). A lower percentage agreed that they can rely on their friends in case of trouble (55.8%). The mean (SD) of supportive class environment score (which potentially ranged from 1 to 5) was 1.51 (0.53), with 6.1% having a perception of supportive class environment.

In univariate regression, teenagers' unfavourable practices had a stronger association with fathers' than mothers' practices (OR for snacking on sugary foods = 6.88 and 6.04, for snacking on sugary drinks = 7.83 and 6.09). Tobacco use was associated with fathers' similar practice (OR = 2.70) while tooth brushing was associated with mothers' brushing (OR = 3.33). Close friends' practices showed the strongest

Table 1. Socioeconomic background of teenagers participating in the study (n = 449).

Variable	Frequency (%)
Father education	
• No university education	194(44.3)
• University education	244 (55.7)
Mother education	
• No university education	220 (51.6)
• University education	209 (48.7)
Mother occupation	
• Working outside home	145 (32.3)
• Housewife	304 (67.7)
Type of residency ^a	
• Owned	279(64.7)
• Rented	152 (35.3)
Number of family members/bedroom: mean (SD)	1.55 (0.87)

^aSum of categories does not add up to total due to item non-response.

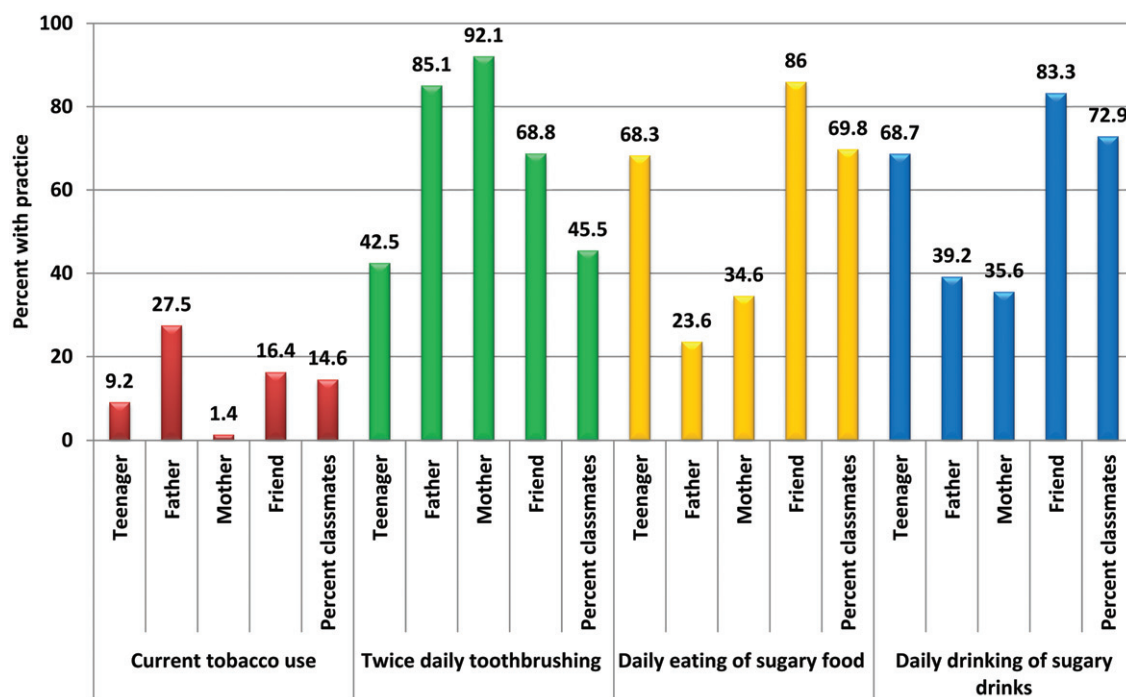


Figure 1. Teenagers' oral health practices and perceived parents', close friends' and classmates' practices.

association with teenagers' four practices. Their tooth brushing, tobacco use, snacking on sugary foods and sugary drinks were associated with higher odds that the teenagers would adopt these same practices (ORs = 4, 8.18, 12.75 and 8.40). Association with classmates' practices was significant for all four practices although weak. There were higher odds of teenagers' tooth brushing, tobacco use, snacking on sugary foods and sugary drinks for an increase of 1% of classmates perceived to be adopting these practices (OR = 1.03, 1.03, 1.02 and 1.02, respectively) (Table 2).

Table 3 presents the multivariate regression for the association of parents', close friends' and classmates' practice with teenagers' practices. Significant association with father's practices was observed only in snacking on sugary drinks (OR = 4.04) whereas none of the mother's practices were significantly associated with those of teenagers. All four close

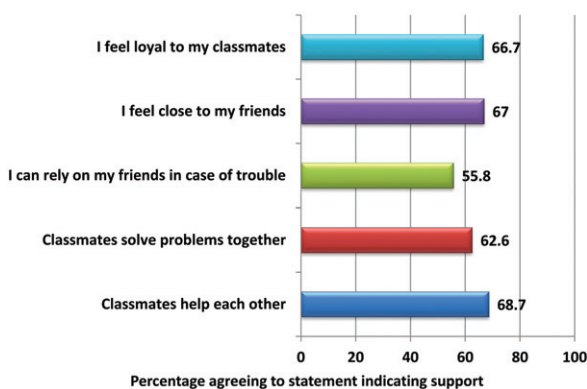


Figure 2. Percentages (%) of teenagers agreeing to the statements indicating supportive class environment.

friends' practices were significantly associated with higher odds of teenagers' practices (OR = 4.45, 5.63, 14.42 and 7.05). One percent increase in classmates who brushed their teeth or used tobacco was significantly associated with higher odds of teenagers' being involved in these practices (OR = 1.03 and 1.02). There was no significant association between teenagers' practices and their perception of supportive class environment.

Discussion

Our study shows that the teenagers' four oral health practices were significantly associated with the practices of their close friends' and that this association was independent of the effect of parents' and classmates' practices which were included in the same model and are thus controlled for. Thus, it can be suggested that health education interventions targeting male teenagers that include surrounding significant influences such as those of close friends have better chances of inducing changes in behaviour.

In the present study, 9.2% of teenagers reported using tobacco. This is lower than the level reported in the 2006 Eastern Mediterranean global youth tobacco survey for 13–15 years old boys (19%) [21] and lower than the percentage of middle school adolescents (mean age 14.3 years) reported to smoke in Jeddah, Saudi Arabia (12%). [22] Our estimate may thus reflect under reporting of tobacco use. Tooth brushing twice daily was reported by 42.5% in our study. This percentage is higher than that reported in two neighbouring countries; United Arab Emirates and Oman (36% and 34.1%). [23]

Table 2. Association between teenagers' oral health practices and socioeconomic background, perceived parents', close friends and classmates' practices.

	OR (95% CI)			
	Tooth brushing	Tobacco use	Snacking on sugary foods	Snacking on sugary drinks
University educated father	1.10 (0.66, 1.83)	0.66 (0.29, 1.50)	1.21 (0.70, 2.06)	0.67 (0.38, 1.17)
University educated mother	1.06 (0.65, 1.74)	0.74 (0.33, 1.68)	0.67 (0.39, 1.16)	0.86 (0.50, 1.46)
Working mother	0.96 (0.59, 1.55)	0.69 (0.29, 1.65)	0.99 (0.59, 1.64)	1.02 (0.61, 1.70)
Living in an owned house	1.09 (0.59, 2.02)	0.52 (0.20, 1.32)	1.17 (0.62, 2.21)	0.92 (0.47, 1.78)
Number of persons per bedroom	0.62 (0.41, 0.94)*	0.82 (0.41, 1.64)	0.93 (0.60, 1.43)	1.12 (0.73, 1.71)
Father's practice	1.54 (0.72, 3.27)	2.70 (1.17, 6.21)*	6.88 (2.60, 18.18)*	7.83 (3.77, 16.24)*
Mother's practice	3.33 (1.07, 10.36)*	0 (0, 0)	6.04 (2.81, 12.98)*	6.09 (2.93, 12.66)*
Friend's practice	4.00 (1.60, 9.99)*	8.18 (4.41, 12.50)*	12.75 (8.22, 16.92)*	8.40 (4.66, 11.99)*
Percent of classmates with practice	1.03 (1.02, 1.03)*	1.03 (1.01, 1.04)*	1.02 (1.01, 1.03)*	1.02 (1.01, 1.03)*
Supportive class environment	1.38 (0.53, 3.58)	0 (0, -)	0.72 (0.27, 1.91)	1.20 (0.41, 3.46)

OR: Univariate logistic regression odds ratio; CI: confidence interval. Similar practices of fathers, mothers, close friends and classmates were compared to teenagers' respective practices.

*Statistically significant at $p \leq 0.5$.

Table 3. Relationship between teenagers' oral health practices and influence of parents, close friends and classmates in multivariate regression analysis (adjusted for socioeconomic factors).

	OR (95% CI)			
	Tooth brushing	Tobacco use	Snacking on sugary foods	Snacking on sugary drinks
Father's practice	3.59 (0.52, 24.96)	0.99 (0.28, 3.54)	2.37 (0.44, 12.75)	4.04 (1.03, 15.85)*
Mother's practice	2.00 (0.17, 23.58)	0 (0, -)	0.86 (0.20, 3.73)	0.79 (0.20, 3.10)
Friend's practice	4.45 (1.09, 18.12)*	5.63 (3.44, 7.88)*	14.42 (7.89, 21.89)*	7.05 (5.97, 9.20)*
Perceived percent of classmates engaged in practice	1.03 (1.01, 1.05)*	1.02 (1.004, 1.04)*	1.01 (0.99, 1.03)	1.01 (0.99, 1.03)
Supportive class environment	0.84 (0.10, 7.11)	0 (0, 0)	1.79 (0.26, 12.33)	1.14 (0.14, 9.45)

OR: odds ratio; CI: confidence interval. Multivariate logistic regression models for each practice adjusted for socioeconomic factors (university educated father, university educated mother, working mother, living in an owned house and family members per bedroom). Similar practices of fathers, mothers, close friends and classmates were compared to teenagers' respective practices.

*Statistically significant at $p \leq 0.05$.

These figures, however, were based on secondary analysis of data collected in 2003-10; so different levels may exist now. A study of Kuwaiti 11-13-year-olds reported that 59% of them brushed twice-a-day. This is higher than in the present study possibly because of the younger age of the Kuwaiti sample, although the data was older (2002/2003).[24] Younger adolescents were reported to brush more frequently than older ones in a more recent report and there is a possibility that this might partly be due to less influence of peers in this younger age.[25] Most of our participants reported snacking on sugary foods or drinks (68.3% and 68.7%). This is higher than the level of sugary drinks consumption reported among teenagers in New South Wales, Australia (39-47%) [26] and among European teenagers 11-13 years old (39-41%).[27] The snacking level in the present study agrees with the percentage of Kuwaiti 11-13-year-olds snacking on sugary products (67% for cakes/pastries, 65% for sweets and 69% for soft drinks).[28] The situation raises concern about use of sugar in Saudi teenagers and its related effects on general and oral health.

In the present study, significant association was observed between teenagers' practices and those of their parents in univariate regression. Similarly, English adolescents were found to continue adopting the habits previously instilled in them by their parents and to consider these practices the acceptable social norm.[29] Nigerian mothers' practices were found to have stronger association with 8-12 years old children's practices (tooth brushing twice daily, use of fluoridated toothpaste, using sugary snacks and not smoking) compared with the association between fathers' practices and their children's practices.[30] Of all four practices in our study, only snacking on sugary drinks was strongly associated with father's practice in multivariate regression. Similarly, an earlier study conducted in Norway [13] found that there was a greater association between a female adolescent's sugar intake and that of her mother's than between a male teenager's and his mother's.

The degree to which adolescents are influenced by peers depends partly on the type of relation they have with best friend's influence being the most important.[31] This may explain why in our study there was a stronger association with close friends' than with classmates' practices. Our results show that the association between close friends and teenagers was stronger in unfavourable practices (tobacco use, snacking on sugary foods and sugary drinks) than in tooth brushing. However, a study from Iran showed that teenagers with strong relationship with their friends were more likely to brush twice or more per day.[10] The association between teenagers' and peers' practices depends on whether the behaviour is deviant, neutral or prosocial. For example, initiation of smoking may be more prone to peer pressure than other behaviours.[31] Similarly, the use of sweetened beverages among teenagers was significantly associated with that of their best friends'.[32] The association between teenagers' and close friends' practices can have several explanations including [33] homophily (also known as peer selection [34]); where subjects associate with others with similar behaviours to their own, confounding; where subjects may have underlying characteristics that increase the odds that they adopt the

same practices as their peers and induction (also known as peer influence or pressure [34]); where subjects influence their associates to adopt their own practices. Peer selection needs to be addressed in health education programs by so that teenagers are empowered to help their friends adopt healthier behaviours.

In our study, teenagers overestimated the percentage of close friends and classmates engaged in practices compared with their own involvement. Overestimation of behaviour prevalence, 'the majority illusion' may lead individuals to perceive those in their immediate social network to engage in specific practices. Because of this, these practices are more likely to be adopted and to be considered as norms.[35] Examples include smoking initiation due to overestimated perceived prevalence among peers.[36] Perception of norms was significantly associated with teenagers' adoption of practices in our study and this agrees with the theory of reasoned behaviour.[37] That is why correcting misconceptions about the extent of peers' involvement with health practices should be part of health education interventions.[31]

In the present study, there was a significant association between the percentage of classmates who brushed or used tobacco and teenagers' practices but not with snacking. Tipping towards certain behaviours occurs when teenagers perceive that an increasing number of their peers engages in this behaviour, the so-called 'activation threshold'.[35] As practices became widespread (such as in the case of the two dietary practices in our study), the number of classmates adopting these practices made no further difference.

In our study, a generally low perception of supportive class environment was observed in comparison with that reported in a study of Salvadoran high-school students.[19] This may be attributed to the older age of participants in the latter study and the possible stronger ties used to support each other. Further investigation in more/other schools is needed to ascertain the generalizability of this finding. The perception of supportive class environment was associated with lower odds of tooth brushing and higher odds of snacking on sugary foods and drinks although this association was not significant. This paradoxical association may be explained by peers' support making teenagers feel accepted so that they did not care to adopt practices that might increase their popularity. Robinson et al. [38] commented that individuals who are not strongly concerned with how others perceive them and who feel accepted by peers are less susceptible to others influence in their dietary choices. Conversely, Dorri et al. [10] reported that the quality of peers' social network was a significant predictor of frequent tooth brushing. The effect of social support on health behaviours is complex. Support may sometimes produce adverse health effect if it interferes with self-efficacy and autonomy.[39]

The present study simultaneously investigated four co-existing oral health practices and the co-existing influences of parents and peers with relative strength attributed to each. We assessed the differences between the effect of close friends and that of distant peers (classmates) and whether support played a role in it. This allows a holistic understanding of the complex interaction between practices and influences. Our study is limited by its cross sectional design and

cannot support causality. Future longitudinal studies may explain whether the significant and strong association in our results is due to peer influence or peer selection. We included only male teenagers from public schools which limits our conclusions to similar subgroups. Future studies with female subjects and/or students from private schools would add to our understanding of peer effect on teenagers in general. The effect of social desirability [40] on over reporting tooth brushing and perception of cultural norms on underreporting tobacco use needs also to be taken into consideration. Similarly, the study used teenagers' reports of their parents', close friends' and classmates' practices. This may introduce some bias although the method was used previously to assess influences on teenagers' health behaviours.[20] Nevertheless, future studies assessing the association with practices as reported by the respective influencers would reduce the risk of this bias.

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