

Chapter 3

Addressing Social Determinants of Oral Health Among Adolescents from MENA



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3.1 Introduction

Broadly, people's lifestyle is a reflection of the sociocultural circumstances which configure their behaviors and personal decisions (Green and Kreuter 1990). In the same manner, adolescents' behaviors are shaped by the various environmental contexts in which they live, including family households, neighborhood, and school which, in the long run, impact their health outcomes and quality of life (Institute of Medicine and National Research Council 2011). Some of those determinants such as adequate housing, economic stability, food security, and strong social relationships are defined as positive health factors as they significantly contribute to maintenance of good health status (Szaflarski 2005). Risk factors, on the other hand, are potentially preventable exposures with specific environmental- or lifestyle-related health hazards such as smoking, which are associated with a broad array of health risks. Those factors may have different impacts at different ages during adolescence. Though adolescence is a critical transitional period in an individual's life course, in general, research on broader determinants of health during this decade of life is quite limited (Viner et al. 2012).

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In the same manner, oral diseases are commonly an outcome of a myriad of an interplaying set of determinants including psychosocial, economic, cultural, and political factors, which substantially impact individuals' care-seeking behaviors and level of commitment to preventive oral hygiene practices. However, in general, conceptions and observations on social determinants of oral health are not adequately explored.

3.2 Methodology

A comprehensive literature review was conducted on the following concepts: (i) potential risk factors associated with oral diseases among adolescence and (ii) health policies and approaches for the prevention of oral diseases in this age group. Two electronic databases, i.e., *Web of Science* and *Embase*, were searched, and only English articles were included. The search was not limited by country; however, literature from MENA countries was prioritized. Editorials and commentaries were excluded.

The search strategy utilized both controlled vocabulary and keywords: [Adolescen*OR teen*OR preteen* OR “high school students” OR Underage] AND [“Oral health” OR “dental health” OR “dental disease” OR “oral disease” OR “dental fear” OR “dental avoidance” OR “dental anxiety” OR “dental checkups” OR “dental appointments” OR “dental treatment” OR “dental care” OR “dental services” OR “oral examinations” OR “oral screenings” OR “dental prevention” OR “atraumatic restorative treatment” OR “dental sealants” OR “dental education” OR “dental awareness” OR “dental neglect” OR “dental needs” OR “dental pain” OR “oral pain” OR “sugary diet” OR “cariogenic diet” OR “sugary drinks” OR “carbonated drinks”].

All the references were imported to EndNote, where duplicates were identified and subsequently removed. Titles and abstracts of all entries were analyzed by two reviewers, and only full texts of relevant references were retrieved and reevaluated.

Additionally, the Global Burden of Disease (GBD) 2017 dataset was used to generate epidemiologic data related to smoking among adolescents and youth in the MENA region, using the online tool Tobacco Visualization (Tobacco Viz). In order to acquire data relevant to adolescence and teenage, only the 10–14 and 15–19 age groups were selected.

3.3 Findings

Since decades, the Dahlgren-Whitehead “rainbow model” has been used for conceptualization and visual presentation of the relationship between individuals, the surrounding environment, and their health status (Dahlgren and Whitehead 1991). In Fig. 3.1, we adopted this model to envisage the potential determinants of oral

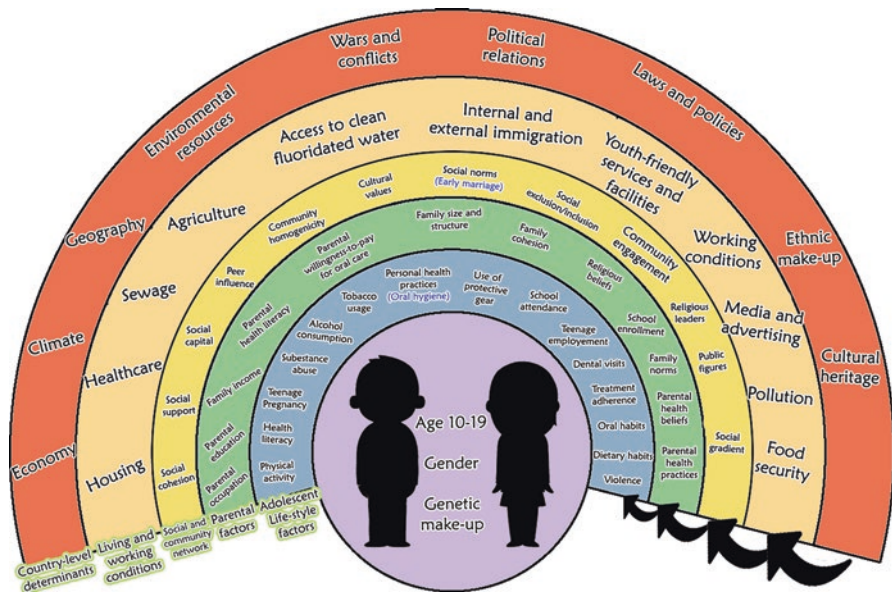


Fig. 3.1 Social determinants of oral health among adolescents. (Adapted from Dahlgren and Whitehead’s model)

health outcomes in youth and adolescence. At the center lie the 10–19-year-olds and the fixed non-modifiable characteristics which influence their health and well-being, such as gender and genetic makeup.

Within the other layers of the model are broader social and economic determinants, which are theoretically modifiable by laws and policies. Given that various family-related factors are strong predictors of adolescents’ health outcomes including oral health, the “rainbow model” was modified to include an additional layer representing relevant parental factors, such as family size and structure, parental health beliefs and practices, level of health literacy, and strength of parents-youth relationships. Social media, relationships with school staff, and peer influence were included in the third layer as integral components of social and community networks influencing adolescents’ health status and healthcare-seeking behaviors. The fourth layer of the model illustrates different living and working conditions which can directly or indirectly affect access to protective factors such as fluoridated water, healthy and nutritious foods, as well as access to oral health services either in school premises or health facilities. Enforcing high taxation on tobacco products, alcohols, sugar-rich foods, and sweetened beverages; restricting advertisements on those products; enacting laws pertinent to the mandatory use of seatbelts, helmets, or mouth guards; as well as community and school water fluoridation are among the national policies and laws that should be reinforced to promote adolescents’ oral health at community rather than individual level.

3.3.1 *Unpacking Determinants*

Socioeconomic Status

There is strong evidence that parental socioeconomic position is viewed as the initial indicator of children and adolescents' risk to suffer from dental diseases. Household income, maternal level of education, and parental perceptions of the importance of oral health play a major role in determining adolescents' oral care-seeking behavior and the quality of service they receive (Jacob et al. 2017). Adolescents from households with low income, large family size, or those whose mothers have low level of education are particularly prone to have tooth decay as they are less likely to adhere to routine oral hygiene practices or seek dental care than those from affluent households (Nóbrega et al. 2017). Based on Safiri et al.'s study, on a nationally representative sample of 13,486 school students aged 6–18 years, it was found that socioeconomic inequalities exist in relation to oral hygiene practices of Iranian children and adolescents (Safiri et al. 2016).

It has also been reported that avoidance of dental care is more prevalent among adolescents who were forced to work early in life and those who have a single parent (Gustafsson et al. 2010). Moreover, some health risk behaviors, such as tobacco and substance use, are known to be more common among people of low socioeconomic level (Petersen 2003).

Tobacco and Substance Use

Smoking, alcohol drinking, and substance abuse are harmful behaviors that are primarily initiated during adolescence and up until the late 20s (Johnson et al. 2004). It is strongly established that tobacco consumption has various negative effects on oral health. Tobacco is a strong risk factor for precancerous lesions and oropharyngeal cancers and causes staining of teeth and restorations by nicotine, oral candidiasis due to reduced salivary flow, and periodontal problems (Petersen 2003). Among youth, there are various determinants of tobacco consumption, including access to tobacco products, national tobacco control policies, as well as cultural and societal norms. Cigarette advertising and marketing efforts of the tobacco industry highly encourage youth and adolescents to initiate this behavior (Hanewinkel et al. 2010).

It is also worth mentioning that exposure to secondhand smoke whether in households or schools can increase adolescents' risk for defective enamel formation and accordingly caries experience (González-Valero et al. 2018). As per the GBD dataset, in the MENA region, up to 2015, about 4.6 million adolescents aged 10–19 smoke daily, of which 3.8 million are males and 790 thousand are females (Table 3.1). Based on the datasets from the global school-based student health survey (GSHS) in five countries in the MENA region, Fig. 3.2 shows the percentage of 13–17-year-olds who reported exposure to secondhand smoking for one or more days 1 week before the survey (WHO and CDC. GSHS.).

Table 3.1 MENA countries with highest smoking rates among adolescents

MENA countries with highest no. of daily smokers ^a	Males		Females	
	10–14 years	15–19 years	10–14 years	11–15 years
#1	Turkey (130k)	Turkey (800k)	Turkey (60k)	Turkey (350k)
#2	Afghanistan (41k)	Egypt (390k)	Afghanistan (27k)	Afghanistan (95k)
#3	Egypt (35k)	Afghanistan (160k)	Sudan (11k)	Yemen (33k)

^aData was generated from the GBD dataset using Tobacco Visualization (Tobacco Viz) up to 2015 available at <https://vizhub.healthdata.org/tobacco/>

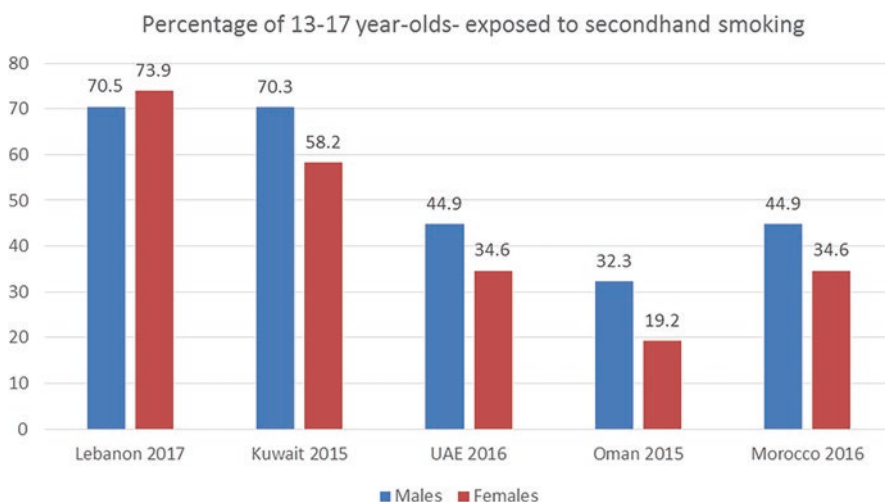


Fig. 3.2 Exposure to secondhand smoking among adolescents aged 13–17 years. (Source: Global school-based student health survey, (GSHS), WHO in collaboration with CDC <https://www.who.int/ncds/surveillance/gshs/en/>)

Added to that, lately, the use of smokeless tobacco (ST) has been notably increasing among youth and adolescents. This has been strongly linked to widely spread misconceptions that chewing tobacco or using moist snuff is far less harmful than cigarette smoking (Chaffee et al. 2019). However, ST contains 20-fold more nicotine than a cigarette, which renders users highly prone to oral mucosal lesions, periodontal problems, oral cancers, and premalignant lesions (Percy 2008). Different forms of ST, such as Toombak, Shammah, Qat (*also known as Khat*), and Nashooq, are commonly used in the Middle East, especially in the Kingdom of Saudi Arabia, Yemen, and Sudan (Alrashidi et al. 2018). Recently, Othman M. et al. conducted the Global Youth Tobacco survey among a representative sample of school-attending adolescents in Khartoum state of Sudan to study the prevalence of smokeless tobacco use. 7.6% of participants reported using smokeless tobacco at least once in their lifetime where male gender, peer influence, exposure to

second-hand smoke at home, having single parent and low self-efficacy were strongly associated with this harmful practice. (Othman 2021)

On the other hand, data on substance use was available from the GSHS of only two countries in the MENA region, where 76.7% and 70% of 13–17-year-old drug users in Lebanon and Morocco reported starting before the age of 14. On the other hand, in Lebanon, 13.4% of adolescents in the same age group admitted being fully drunk one or more times in their life.

Psychosocial Factors

It has been well recognized, from the outset, that psychosocial factors largely affect adolescents' oral health status. During this period, due to various psychological changes, the emerging sense of independence, and peer influence, adolescents are highly vulnerable to harmful behaviors including oral health-related behaviors (Baker et al. 2010). Health-compromising behaviors in adolescence such as smoking, drug abuse, and eating an unhealthy diet are strongly linked to social influence per se, and in various adolescent and adult populations, the combined effects of lack of social support and low numbers of social networks on oral health outcomes, such as dental caries and traumatic oral injuries, have been well-reported (Baxevanos et al. 2017; Fontanini et al. 2015).

On the other hand, social connectedness through listening, appreciating, and expressing love has been proposed as an efficient protective factor for health and well-being. According to (Viner et al. 2012), having safe and supportive families, connectedness with schools, and positive peer influence are among the strongest determinants for the development of adolescents and attainment of best health outcomes in the transition to adulthood. In the same manner, strong social ties and family cohesion can yield significant oral health benefits among adolescents by favoring engagement in health-promoting lifestyle behaviors and regular dental attendance (Camara et al. 2017; Sisson 2007). One study revealed that children from poorly functioning families are more likely to experience dental caries being less likely to engage in oral health-related behaviors or seek dental care (Duijster et al. 2014).

In one study in Saudi Arabia, oral health-related practices, including smoking, tooth brushing, and snacking on sugary foods and drinks, were found to be strongly associated with close friends' rather than parents' or distant peers' practices (El Tantawi et al. 2017). According to the GSHS dataset, a varying percentage of adolescents (ranging from 3.4% to 11.2%) in different MENA countries reported not having any close friends (Fig. 3.3), a finding which according to (Gomes et al. 2020) might adversely affect their oral health-related quality of life due to low self-esteem, lack of sense of belonging and care, as well as erroneous oral health beliefs.

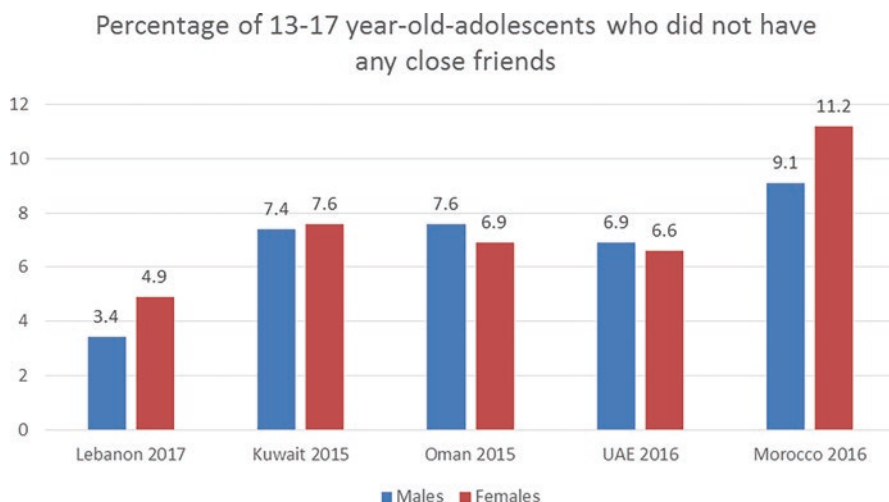


Fig. 3.3 Absence of close friends among 13–17-year-olds. (Source: Global school-based student health survey, (GSHS), WHO in collaboration with CDC <https://www.who.int/ncds/surveillance/gshs/en/>)

3.4 Discussion

Most research, in the MENA region, is still focused on studying the association between adolescents' lifestyle behaviors and their oral health status and related quality of life. On the other hand, the complex relationships between demographic characteristics, socioeconomic level, and the possible role of social ties and living conditions on the distribution of oral diseases among adolescents have not been well-elucidated.

Adolescence offers a unique opportunity for prevention acknowledging that individuals' risks to suffer from oral disease and other common chronic conditions later in life are heightened if specific risky behaviors start in early adolescence (Gore et al. 2011). In line, the World Health Organization (WHO) has recommended three age groups (12, 15, and 15–19) during this period for conducting oral health surveys. At the age of 12, almost all permanent teeth, except the third molars, would have erupted, and thus a reliable sample could be easily obtained for surveillance of disease trends before children leave primary schools. Measuring caries prevalence at 15 years is also warranted since, by this age, permanent teeth would have been exposed to the oral environment for 3–9 years, while the 15–19 years age group provides a chance for reliable assessment of periodontal health status among adolescents (World Health Organization 2013). Despite that, to date, only few youth-focused oral health programs targeting both salient common risk and protective factors are being implemented in the MENA countries.

3.4.1 Tackling Social Determinants

Modifying School Environments

It is well known that the living environment is a fundamental factor in shaping adolescents' development and schools are the ideal setting for tackling most common health issues including oral diseases. Schools provide excellent outreach opportunities where an unprecedented number of adolescents could benefit from health interventions delivered on its premises. According to the *Lancet Commission on Adolescent Health and Wellbeing* (Patton et al. 2016), health interventions could be delivered across six interdependent platforms including health services, schools, communities, m-health, media and social marketing, as well as structural actions. Though schools cannot replace health facilities for the delivery of health services, clinical care including both preventive and curative oral health services can be delivered in either school-based or mobile dental clinics (Patton et al. 2016). On the other side, there is strong evidence that m-health, which comprises the use of mobile and wireless devices such as mobile phones for tracking and promoting people's health (World Health Organization 2011), can adjunctively improve oral health-related knowledge and practices among people in different age groups (Toniazzo et al. 2019).

For decades, it has been estimated that, annually, over 51 million school hours are lost due to some dental problem (Gift et al. 1993), and thus good oral health status has been viewed as an essential input required for adequate learning. In consideration of the strong link between health and education, in 2002, the FRESH (Focusing Resources on Effective School Health) framework was developed by experts in the United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Children's Fund (UNICEF), WHO, World Bank, and Education International to assist governments worldwide and implement school-based health programs in efficient, effective, and results-oriented manners at the national level. The program includes four main components: *health-related school policies, provision of safe water and sanitation, skills-based health education, and school-based health and nutrition services*, which can be used collectively to identify common health issues in school students and suggest potentially effective interventions for addressing those issues. In addition, the framework proposes other supporting activities that can substantially contribute to successful implementation and sustainability of school-based programs, such as effective partnerships between health and education sectors and community and youth participation (Joerger et al. 2002). Table 3.2 illustrates essential strategies and activities that could be adopted for setting up oral health programs in schools using the FRESH framework.

Table 3.2 Adopting the FRESH framework for promoting adolescent oral health in schools

FRESH core components	Action	
Core component # 1: Health-related school policies	Enforce policies banning tobacco/alcohol consumption on school premises Enforce policies banning sugary foods and drinks on school premises Safe playgrounds and sports fields Enforce effective disciplinary measures against abuse and bullying Affordable fluoride toothpaste	
Core component #2: Provision of safe water	Regular access to drinking-water fountains throughout the school School water fluoridation	
Core component #3: Skills-based health education	Compulsory cooking classes for both genders Daily supervised tooth brushing Training on sanitation-related behaviors such as hand-washing, and food washing Mandated physical education Peer modeling Role playing	
Core component #4: School-based health and nutrition services	Nutrition services	Oral health services
	Healthy school meals Frequent diet history analysis and height and weight screening Healthy food choices in canteens and vending machines	Oral health education integration in school curricula Regular oral screening Technology application in oral health promotion (e.g. using Mobile apps to address unhealthy diets and tobacco and alcohol use) Topical fluoride administration, e.g., school-based fluoride rinsing/varnish program School-based sealant program for permanent molars and premolars Curative care, e.g., restorative treatment using atraumatic restorative treatment (ART) approach
Supporting activities	Counseling on STIs; HIV/AIDS; Pregnancy; Tobacco, alcohol, and drug use; Bullying and physical and sexual abuse Psychosocial support Involvement of parents in health education Training for school staff Youth-friendly services	

Source: Authors

Examples of Youth-Focused Oral Health-Related Initiatives in the MENA Countries

Intervention 1: Telegram – Online Social Media Platform Program, Iran (Scheerman et al. 2020)

Program Overview A theory-based program using an online social media platform (Telegram); an open-access platform available for smartphones which allows users to send messages and receive photographs, videos, and audios. The program consisted of two components: oral health education + behavioral coaching component comprising sending text messages about the potential positive outcomes of dental cleaning and disseminating volitional sheets on oral health behaviors. Mothers were instructed on Telegram channel to coach and monitor their child’s oral hygiene practices on daily basis.

Target Population and Setting: Adolescents aged 12–17 years recruited from 30 out of 73 high schools in Qazvin City, Iran, and their mothers who had access to Telegram via a smartphone.

Outcome(s)

- Significant increase in adolescents’ tooth-brushing practices at the 1- and 6-month follow-ups.
- Involving mothers in an intervention conferred additional benefits for adolescent oral health.

Intervention 2: School Oral Health Program (SOHP) – A National Program, Kuwait (Alsumait et al. 2019; Ariga et al. 2014)

Program Overview: SOHP is a nationwide program which started in 1983 as a joint venture between the Ministry of Health in Kuwait and Forsyth Institute, Cambridge, Mass., USA. The multicomponent intervention consisted of the following:

At least two oral health education sessions with supervised tooth brushing during every school year; + oral health education session to parents and expectant mothers + twice-a-year application of fluoride varnish + (if eligible) fissure sealants in newly erupted permanent molars and premolars + restorative treatment of permanent molars when indicated. Delivery of care was performed by almost 207 dentists, 335 nurses, and 25 dental hygienists.

Target Population and Setting: Children and adolescents aged 6–16 years in school-based centers in all six governorates in Kuwait.

Outcome(s)

- Overall, children and adolescents enrolled in SOHP had better dental health and lower caries experience.
- There has been a significant reduction in the number of composite fillings performed as part of the SOHP.
- Significant increase in the number of preventive procedures; sealants placement and fluoride applications performed.

3.5 Key Recommendations and Future Implications

- Development of adolescent-specific *Oral Health Surveillance plan* including the following:
 - (i) Conducting oral health needs assessment for adolescents, at regular basis, to capture information about their health status, unmet dental needs, and patterns of oral care-seeking behavior using standardized survey tools
 - (ii) Conducting longitudinal studies to understand the unique causal factors of oral diseases among adolescents and explore the synergetic effects of different oral health determinants with particular emphasis on the social environment in which adolescents are embedded
 - (iii) Developing locally driven, culturally appropriate interventions addressing broader health determinants with particular emphasis on factors that are protective across various health outcomes
- Controlling oral diseases in adolescence by adopting “the life course approach” to health through the following:
 - (i) Reorienting oral health services with a focus on preventive interventions early in childhood is a key strategy for halting processes that increase the risk of poor oral health in adolescence and later on.
 - (ii) Incorporating adolescents’ oral health into pregnancy, neonatal, and children health issues and interventions.
 - (iii) Pregnant adolescent girls should, also, be entitled to receive all medically necessary dental services as part of basic package of essential services acknowledging that “pregnancy-related” oral care comprises also services for “other conditions which might complicate the pregnancy.”
 - (iv) Advocating for using a “whole-school approach” to oral health promotion and adapting the FRESH framework to fit the local context to ensure appropriateness of delivered school health services.
- Integrating youth-specific interventions at school, family, as well as community levels to avoid exclusion of out-of-school adolescents
- Building capacities of dental practitioners to deliver oral care to individuals with special health care needs aided by interprofessional teams including nutrition-

Table 3.3 Suggested oral health indicators in adolescence and teenage

1	Number of school hours lost among adolescents due to oral diseases/year
2	Number of working hours lost to seek oral care for adolescents/year
3	Proportion of 10–14-year-old school students with dental sealants on at least one permanent molar tooth
4	Proportion of adolescents aged 10–14 years with untreated dental decay in their permanent teeth
5	Proportion of adolescents aged 15–19 years with untreated dental decay in their permanent teeth
6	Proportion of adolescents aged 10–19 who received dental treatment in the past year
7	Proportion of adolescents with special health care needs who sought dental care in the past year
8	Proportion of adolescents who have regular access to a toothbrush and fluoridated toothpaste
9	Proportion of adolescents who never visited a dentist
10	Number of adolescents with access to school water fluoridation programs

Source: Authors

ists, social workers, and other non-dental health professionals to optimize the quality of care

- Adopting the “Health in All Policies” approach to advocate for the inclusion of oral health within the mandate of other sectors, such as educational, social, and industrial sectors
- Building strong partnerships with key stakeholders such as civil society, local authorities, community leaders, school districts, academic institutions, and local dental health practitioners to plan for policy priorities pertinent to adolescents’ oral health
- Researching the role of non-dental health professionals such as school nurses, midwives, and community health workers in delivering educational and preventive oral health services to adolescents inside and beyond educational settings
- Developing a set of reliable and age-appropriate oral health indicators and including them in regular disease surveillance for rigorously monitoring and evaluating the impact of various social and behavioral interventions on oral health outcomes in this age group (Table 3.3).

3.6 Conclusions

National health policies of MENA countries should be reoriented to integrate oral health research into general health research programs and adopt the common risk factor approach for implementing holistic interventions that promote the oral and general health of adolescents as well as other population groups. To achieve that, health interventions should be directed toward disease prevention and should be culturally relevant and match adolescents’ unique health needs.

Reflection Questions

- Among youth and adolescents, what are the key sources of tobacco? And how can we prevent or delay the onset of their tobacco and substance use?
- In what way(s) can peers and families influence oral health of adolescents?
- How can social media impact adolescents' oral health practices?
- Why are schools excellent venue for promoting oral health of school-aged children and adolescents?
- How are governments entitled to ensure equitable access to oral care among adolescents living in disadvantaged communities?

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