Primary prevention: Why focus on children & young adolescents?

Mano S. Selvan & Anura V. Kurpad*

Department of Biostatistics & Applied Mathematics, The University of Texas M. D. Anderson Cancer Center, Houston, TX, USA & *Institute of Population Health & Clinical Research, St John's National Academy of Health Sciences, Bangalore, India

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A focus on children and young adolescents in the primary prevention of health risks and disorders such as cancer, hypertension and other cardiovascular diseases, HIV/AIDS, and obesity has been suggested in many reports published throughout the world. Such a focus is important in India as it has a huge adolescents and children population along with the existing economic, social, and health inequalities among the general population. We propose a systematic elucidation of the rationale for such a focus in primary prevention research. We have reviewed studies describing risk factors, the association between risk factors and disease outcomes in affected patients, exposed populations, adolescent samples, as well as reports from studies conducted in India, and the quantitative and qualitative statistical aspects of research. The literature indicates that a lengthy time interval occurs between exposure to high risk factors and the development of disease, and that many such high risk exposures begin in young adolescence. These findings underline the value of targeting children and adolescents for primary prevention efforts in health care and health education for the attainment of overall healthy population in any country including a country like India.

Key words Adolescents - lifestyle - peer pressure - primary prevention - risk behaviour

Primary prevention among adolescents is a particularly important issue in India, due to high population numbers and wide economic, social, and health disparities among its population. In 2000, approximately 30 per cent of India’s population was aged 10 to 24 yr, that increased to 53 per cent when children younger than 10 were included1. The population’s economic, social, cultural, and geographic disparities contribute to wide variations in nutritional and reproductive health, sexually transmitted disease infection, smoking behaviours, and problems related to mental and physical stress. For example, with respect to acquired immuno deficiency syndrome (AIDS), Bhat and Dhoundiyal2 have reported on the increasing prevalence of high risk social and sexual behaviour among Indian adolescents, and the importance of primary prevention programmes among that segment of the population.

The importance of focusing on children and young adolescents in primary prevention and intervention trials has been suggested in different studies3-5. The Nurses Health Study3 supported this view when a mathematical model of the etiology of breast cancer showed that the cancer causing exposures began early in life. This study also revealed that most (about 85%)
of the study participants did not have genetic risk factors, and thus the investigators recommended the implementation of population-based primary prevention and intervention programmes targeting children and young adolescents for breast cancer prevention.

Focusing primary prevention efforts on children and young adolescents in order to improve the overall public health in the near and distant future can be justified for several interrelated reasons. One is that various risk behaviours, such as smoking, risky sexual behaviours, consuming a high fat diet, and alcohol and drug use, are often adopted in young adolescence. At the same time, it may be easier to inculcate healthy behaviours at a young age rather than to modify behaviours at later ages or after the onset of a disease. Most importantly, risky behaviours such as smoking, consuming high fat diets, sedentary lifestyle, and engaging in unprotected sex can result in disease outcomes such as cancer, obesity, hypertension and other cardiovascular diseases, type II diabetes, and HIV infection, which are among the leading causes of death in both developed and developing countries. We report the views of health behaviour researchers and epidemiologists on young adolescents’ health risk behaviours, future risk behaviours, and exposures related to possible genetic mutations and disease outcomes. We also examined the literature on the influence of peer group pressure on the adoption of such behaviour patterns, especially during the transition from childhood to young adolescence.

**Views of health behaviour researchers and epidemiologists**

Behaviours that significantly contribute to preventable mortality, morbidity, and disability among young adults are often established during youth, and extend into adulthood. The Youth Risk Behaviour Surveillance System monitors a few categories of priority health risk behaviours among adolescents and young adults, including tobacco use, alcohol and other drug use, sexual behaviours, unhealthy dietary behaviours, and physical inactivity. Smoking is an established risk factor for lung, bladder, and pancreatic cancer, as well as cardiovascular disease; risky sexual behaviour can lead to human immuno deficiency virus (HIV) infection or other sexually transmitted diseases, and sex-related cancers (i.e., cervical cancer); and high fat diets and a lack of physical activity are related to obesity, which in turn is associated with cardiovascular disease, diabetes, and other disorders, including cancer.

The epidemiological research model on the causal association of smoking and lung cancer has highlighted the importance of focusing primary prevention on children and adolescents in order to succeed in cancer control. The primary prevention of high risk sexual behaviour should start in childhood, and programmes for adolescents should comprise education in abstinence and safer sexual behaviour. A common thread to all the theoretical models of risk behaviours in adolescents is that adolescent risk behaviours are related to their friends’ behaviours.

**Risk behaviours and peer group pressure**

Individuals undergo a major life transition when moving from childhood to adolescence. As adolescents, they face the many physiologic changes of puberty, while also experiencing many psychological transitions. As adolescents begin spending more time with their friends and less time under their parents’ supervision, their greatest source of influence can change from that of family to that of their peer group. Teenagers’ peer group culture is believed to play a significant role in the onset of lifestyle risk behaviours, and empirical observations have reported that having friends who practice health risk behaviours is a strong predictor of teenagers also adopting such behaviours. Strong associations between adolescents’ peer group affiliations and their adoption of smoking, drinking alcohol, or both smoking and drinking alcohol have been reported. Indeed, almost four out of five adolescents have reported that they were around peers and acquaintances when they first experimented with smoking. Likewise, sun exposure has been explained by peer group attitudes and influence.

Behaviour is also influenced by how much one values a final outcome (perceived goal) and one’s level of motivation to reach that goal. Such value expectancy and motivations will result in actions that contribute to success in achieving such goals.
Adolescents who value good health and longevity and are sufficiently motivated toward those goals may make healthy lifestyle choices and avoid health risk behaviours. And although the concept of peer pressure is often regarded as a negative influence, the pressure could also positively influence a young person not to engage in health risk behaviours.

**Smoking and the use of tobacco products**

Smoking is a health risk behaviour often learned during the adolescent and school years. Researchers have indicated that a decision to take up smoking is associated with many factors: peer smoking, peer attitudes and norms, stress, health concerns, risk behaviours, parental smoking status, personal income, parental attitudes, sibling smoking, attachment to family and friends, depression, and self-esteem. Because these influences start early in life, Rugkasa et al. have highlighted the importance of smoking prevention programmes that target children and adolescents. It has been found that the smoking behaviours of best friends and peers have a weighty influence on adolescent smoking habits. In India, peer influence was found to be the strongest predictor of adolescent smoking. A perception of high stress among adolescents in India was also associated with smoking and alcohol and substance abuse. Siddiqui et al. revealed from a regression model that the relationship between peer approval and adolescent smoking is stronger among males than females. In an analysis of historical corporate documents from British American Tobacco and RJ Reynolds, Pollay found that the impact of company advertisements was another significant predictor of smoking initiation, and also reinforces the desire of current smokers to continue smoking. Cigarette advertisement campaigns specifically targeting adolescents in highly populated countries such as India and China have also been discussed.

A further concern is the association between an early age onset of smoking and an elevated cancer risk. This underscores the importance of preventing smoking initiation and encouraging cessation among adolescents who already smoke. Interventions targeting the young are the main focus of epidemiologists’ and health behaviour scientists’ efforts, rather than advising patients to quit smoking after the onset of a smoking related illness.

**Risky sexual behaviour, alcohol and substance use**

As with tobacco use, alcohol use shows a monotonic increase during adolescence and young adulthood, particularly during the transition out of high school. However, alcohol consumption decreases as young adults reach their mid-twenties. The major concern is that alcohol consumption is associated with certain other behaviours and long-range consequences. For example, alcohol use is directly associated with smoking, and risky sexual behaviour. There is also a risk of excessive alcohol consumption, which can lead to life-long problems and chronic diseases. In addition, although a moderate intake of alcohol use is beneficial in lowering the risk of cardiovascular diseases, excessive drinking is not.

Levels of sexual activity increase as a person moves from adolescence to adulthood. For example, a survey among high school students in the United States showed that the prevalence of sexual activity increased from 38 per cent in the ninth grade to 68 per cent in the twelfth grade, and the frequency of sexual activities increased for both males and females during the transition out of high school. Risky sexual behaviour is also associated with substance use, psychosocial distress, and alcohol use. Although the HIV was introduced into India much later than in many other countries, HIV infections are rapidly increasing among its populace; and without a cure for HIV/AIDS, prevention of its rapid transmission relies upon the practice of safe sex behaviours. Safe sexual behaviours can also lower the high incidence of cervical cancer resulting from human papillomavirus infection.

**Diet and physical activity**

Obesity is a rapidly escalating problem of the developed countries, especially in the U.S., Australia, Canada and Europe, and developing countries were showing this trend. In a study in India on 13 to 18 yr old children, age adjusted prevalence of overnutrion was 17.8 per cent for boys and 15.8 per cent for girls. The World Health Organization has reported that a sedentary lifestyle is among the top ten leading causes of death and disability in the world, and has urged all governments, the mass media, non-governmental
organizations, schools, hospitals, and communities to motivate the public to engage in more physical activity. In India, a nutritional and lifestyle transition resulting in high fat intakes\(^{50}\), linked to the consumption of refined foods, and foods of animal origin with an increased fat content\(^{61}\), coupled with a low physical activity\(^{52}\) would result in an increased total body fat mass and obesity which is linked to lowered insulin sensitivity\(^{53,54}\) and the risk of heart disease\(^{55,56}\). It is very probable that these nutritional and behavioural transitions are operational in Indian children and adolescents, who in turn, are most likely to be influenced by peer pressure and advertising. In a family study conducted among youth in Quebec, both physical fitness and the level of habitual physical activity were strong predictors of risk factors for coronary heart disease\(^{57}\). In addition, among other factors, low physical activity has also been associated with an increased risk of cancer\(^{58}\).

Healthy levels of physical activity in childhood could prevent childhood obesity, which in turn could prevent the occurrence of childhood morbidity. Childhood obesity or morbidity could track into adult obesity and morbidity, with the risk for developing chronic disease at that stage in life, and there is some evidence for these mechanisms at present\(^{59}\). Raitakari et al\(^{60}\) reported that children and young adolescents are more likely to adopt a sedentary lifestyle than an active lifestyle. Of further concern, Malina\(^{61}\) reported a decrease in physical activity during the transition from adolescence to adulthood. Nonetheless, although low to moderate levels of activity were noted during adolescent years, the tracking of various activity indicators suggested that sport activities during childhood and youth might form the foundation for future habits. Promoting substantial physical activity is therefore essential in childhood in preventing obesity and premature cardiovascular disease\(^{62}\). It has been suggested that childhood and adolescent physical activity patterns could influence adult physical activity patterns\(^{63}\). However, successful lifestyle interventions in children are not easy, since they ideally should involve the participation of home and family, school and community, and further, should be holistic, incorporating changes in lifestyle, diet and physical activity.

Rats fed a high fat diet have been shown to have a higher incidence of mammary tumours than rats fed low fat diets\(^{64}\), and this has led to interest in the effect of a high fat diet on the occurrence of breast cancer. Although a later case-control study\(^{65}\) failed to establish a relationship between diet and breast cancer, Rose et al\(^{66}\) showed that a greater per capita high fat consumption was directly associated with an increasing incidence of mortality from breast cancer in the population. Considering that the breasts grow rapidly during adolescence, dietary habits during that period could also conceivably affect breast growth and age at menarche\(^{67}\), which in turn could heighten the risk of breast cancer later in life\(^{68}\). Further, substantial epidemiologic research has shown a link between increased physical activity and reduced occurrence of cancers of the breast and colon\(^{69,70}\). Increased physical activity is also associated with longer survival among cancer patients\(^{71}\).

Qualitative, quantitative methods, and statistical applications

Qualitative methods in health research are becoming a common phenomenon\(^{72}\). The problem with the quality of qualitative research lies not in the methods but in the misguided separation of method from theory, and ambiguity in separating technique from the concept\(^{73}\). Qualitative research requires a great deal of theoretical expertise, qualifications, and training. Both quantitative and qualitative research hail from varied traditions that come from multiple disciplines and both have been employed to address a variety of research topics. In fact, increasingly in almost every applied health and social research combining both qualitative and quantitative methods is accepted and what is referred to as a mixed methods approach\(^{74}\). Quantitative data represented by numbers that are collected through structured interviews and checklists, and analysed using descriptive and inferential statistical methods. Qualitative data are represented by words and collected through semi-structured interviews and other observational methods and are analysed using coding to develop themes and categories. Choosing appropriate methods to answer questions based on research objectives is an integral part of good research. Therefore, collaboration and multidisciplinary research is necessary for a sound research for investigating, understanding, and improving health. Networking with experts in other disciplines and collaborating with statisticians should be recognized as an important way to conduct research.
and disseminate findings. This will enhance and enable the research community to communicate ways to reduce risk behaviour and increase healthy life style effectively and correctly to the general population.

Conclusion

Considerable empirical evidence has shown that risk behaviours adopted in childhood or in the adolescent years may elevate the likelihood of developing cancer, heart disease, hypertension, obesity, or other health complications in the adult years. Hence, it is essential to understand the latency period of disease onset, as well as its association with high risk behaviours and their patterns, frequency, and duration among a population’s youth. This will enable public health and behavioural epidemiologists to plan and target appropriate and effective primary prevention lifestyle techniques to young adolescents. Prevention programmes should have a multi-level focus, including the individual, the family, and other social institutions. It is also important to identify subgroups of adolescents and young adults with unique risk behaviours and psychological and behavioural problems so that prevention programmes may be developed to specifically target them.

Health behaviours and attitudes formed during youth lay a strong foundation for lifetime health related behaviour patterns. Sending health promoting messages through various organizations, such as the family, classroom, religious groups, hospitals and research institutions, mass media and governmental agencies, could prevent health risk behaviours during childhood and early adulthood. Imparting knowledge, inculcating preventive behaviour, and increasing youths’ value-expectancy towards a healthy lifestyle could ultimately aid in the prevention of cancer, heart disease, HIV infection, hypertension, obesity, and other health disorders.

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Reprint requests: Dr Anura V. Kurpad, Dean, Institute of Population Health & Clinical Research, St. John’s National Academy of Health Sciences, Sarjapur Road, Bangalore 560034, India
e-mail: a.kurpad@divnut.net