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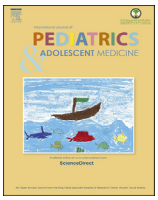

Original research article

Psychosocial determinants of clustering health-compromising behaviors among Saudi male adolescents

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ABSTRACT

Objective: To assess whether the clustering of six specific health-compromising behaviors, namely, low fruit consumption, high sweet consumption, infrequent tooth brushing, physical inactivity, fighting and smoking, varied by different psychosocial determinants such as life satisfaction, peer relationships, self-confidence, and future orientation among male adolescents in Saudi Arabia.

Methods: A representative stratified cluster random sample of 1335 Saudi Arabian male adolescents living in the city of Riyadh answered a questionnaire on health-related behaviors. Poisson regression models were constructed separately for younger (13-14-years-old) and older (17-19-years-old) adolescents to assess variations between explanatory psychosocial variables and the clustering of six health-compromising behaviors, adjusting for father's education.

Results: Older adolescents who perceived high levels of life satisfaction had a lower rate of clustering of multiple health-compromising behaviors compared to those reporting lower levels (RR: 1.22; 95%CI: 1.09−1.37), and the respective difference between those with high and those with middle levels of satisfaction was marginally non-significant (RR: 1.08; 95%CI: 0.98−1.19). Younger adolescents who reported that they felt "less than always" self-confident were more likely to have high clustering of health compromising behaviors compared to those who were always confident (RR: 1.08; 95%CI: 1.01−1.21). The clustering of multiple health-compromising behaviors was marginally associated with the frequency of evening meetings among older adolescents (RR: 1.03; 95%CI: 1.01−1.04 for each extra meeting), while the respective association among younger adolescents was marginally non-significant (RR: 1.02; 95%CI: 0.99−1.05). The association between clustering of health-compromising behaviors and future orientation was non-significant among both younger and older adolescents.

Conclusions: Clustering of health-compromising behaviors was found to be associated with perceived life satisfaction and peer relationships among older male Saudi adolescents and with self-confidence among younger male Saudi adolescents in Riyadh.

1. Introduction

Adolescents engage in multiple health-compromising behaviors [1–3], and those behaviors adopted in adolescence tend to track into adulthood [4]. Health-related behaviors tend to cluster in different patterns [5–11]. The clustering of health-related behaviors is not random, and there are common underlying detrimental factors [12,13]. The Problem Behavior Theory argues that health-compromising behaviors may be due to a common underlying construct of unconventionality related to a number of personality and environmental factors [14–16]. Moreover, Jessor [16] extended the problem behaviors theory and suggested a psychosocial model that involves interactions between risk factors and protective factors within the domains of social environment and personality traits. Psychosocial models provide a broader conceptual explanation of how individuals' feelings relate to social risk factors and thereby put them at greater risk of undertaking health-compromising behaviors [17]. For example, the fact that nicotine can maintain a constant mood in stressful situations might

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predispose people towards smoking cigarettes [18].

Health-related behaviors such as smoking, unhealthy diet, physical inactivity, alcohol consumption and violence are responsible for most chronic diseases, disabilities and deaths [19–22]. Clustering of multiple risk factors is usually associated with increased risk of cancer and cardiovascular disease [11]. The risk of chronic diseases increases with an increasing number of clustering health-compromising behaviors [23]. For example, the co-occurrence of four health–compromising behaviors (smoking, alcohol intake, physical inactivity and fruit and vegetable intake) predicts a four-fold difference in mortality [24] and more than a two-fold difference in the incidence of stroke in adults [25].

Most Saudi children and adolescents did not meet the minimal weekly requirements of moderate to vigorous physical activity necessary for cardiovascular health [26,27], and their diets were rich in sugars and deficient in fiber [28]. The frequency of tooth brushing twice or more per day was 36% among Saudi students in public school and 59% for those in private schools [29]. Consistent findings across studies showed that the overall prevalence of cigarette smoking among Saudi male adolescents was high (approximately 20–30%) [30–35]. To our knowledge, very few studies on behavioral clustering have been conducted in developing nations. Such studies may provide useful insights into understanding the clustering of multiple health-related behaviors and their determinants among adolescents in a developing country.

One cross-sectional survey that assessed clustering of health-related behaviors in Seychelles found that smoking, alcohol consumption and cannabis use clustered among adolescents [36]. Other studies have shown that clustering of health-compromising behaviors increases with the increasing age of adolescents [37,38], and that males showed increased clustering of risky behaviors compared with females [39]. Individuals from lower socioeconomic status (SES) tend to have more clustering of multiple health-compromising behaviors than those from higher SES [38,40]. A number of studies on adolescents have addressed the role of psychosocial factors on adopting risky behaviors. For example, low perceived life satisfaction was significantly associated with particular behaviors such as, smoking, marijuana use and alcohol consumption [41], as well as physical fighting, being injured and carrying weapons [42]. Adolescents with high self-esteem were less likely to have multiple behavioral risks [38]; those with more positive plans about their future were less likely to use drugs and drink alcohol [43], and brushed their teeth more frequently [44]. Adolescents' behaviors can also be influenced by their peers [45]. The frequency of evening meetings with friends was associated with smoking and alcohol consumption [46]. Moreover, adolescents whose peers smoked or drank alcohol had a higher probability of undertaking other risky behaviors, such as substance abuse [47]. On the other hand, supportive peer relationships can have beneficial effects [48].

Studying the psychosocial determinants of the clustering of health-compromising behaviors is important because of the cumulative and synergistic adverse effects of behaviors [25,49]. Moreover, exploring why risky behaviors cluster is critical for designing tailored health promotion programs because interventions that focus on multiple behaviors promise to have a greater impact on public health than interventions focusing on a single behavior [50–55]. Most of the research on clustering of health-related behaviors has taken place in developed nations such as Western Europe and North America. A relatively large number of these studies have examined the variations on clustering by demographic and socio-economic determinants, but only a few studies have explored the associations of clustering behaviors with different psychosocial factors. Moreover, most of the previously reported studies focused on the associations of psychosocial characteristics with single health-compromising behaviors, but not with the clustering of multiple health-compromising behaviors. Therefore, the objective of this study was to assess whether the clustering of six health-compromising behaviors, namely, low fruit consumption, high sweet consumption, infrequent tooth brushing, physical inactivity, fighting and smoking, varied by four different psychosocial determinants among male adolescents in Saudi Arabia.

2. Methods

2.1. Sample

The study population consisted of male students in schools in urban areas in Riyadh, the capital and largest city in the Kingdom of Saudi Arabia. The population of Riyadh is estimated to be approximately five million, and it has a fast rate of economic growth. Subjects included in the study were Saudi 8th grade (13-14-years-old) students in intermediate schools and 12th grade (17-19-years-old) students in secondary schools. The first of these age groups represents the onset of physical and emotional changes in early adolescence, and the second covers the period when they are about to choose their future careers in later adolescence [56]. The sampling frame was the list of all 515 schools in urban areas in Riyadh. It was divided into four strata (public intermediate schools, public secondary schools, private intermediate schools, and private secondary schools). Consistent with the international protocol of the Health Behavior in School-Aged Children (HBSC) study [57], the sample was selected by a stratified clustered random sampling method to produce a more precise and representative study population. All Grade 8 and 12 classes in the selected schools were recruited.

The sample size was calculated based on pilot study data for differences in the count of clustered health-related behaviors between the groups of exposure variables: life satisfaction, peer relationships, self-confidence, and future career orientation. Assuming a significant level at 5% and 80% power, the minimum sample size was 680 students. Considering a design factor of 1.2 for cluster sampling and 20% over-sampling for non-response, the required minimum sample size was 980 students. To have a representative sample of the related population in Riyadh, a self-weighting sample was used to select male adolescents from each stratum with the same proportion as in the general population in urban areas in Riyadh [58]. That resulted in an increase to a minimum sample size of 1100 boys. Twenty-two schools (11 public, 11 private) agreed to participate in the study. The total number of students in the sampled classes was 1660. There were 174 non-Saudi students and 45 older students in grade 8 (15–16 years old) who were excluded because they did not fulfill the inclusion criteria. Eighty-seven students were absent on the days that the data collection occurred. We invited 1354 eligible students to participate. There were no refusals by either the students or their parents. Only 19 questionnaires were excluded because they were not fully completed. The response rate was 98.5%. Therefore, the analytical sample was 1335 students.

A self-administered classroom-based questionnaire used in the WHO cross-national study Health Behavior in School-Aged Children (HBSC) was adapted for this study [57]. The overall goal of the HBSC survey was to gain new insights into and increase the understanding of health behaviors, lifestyles and their context in young people [57]. The HBSC questionnaire has two parts; one mandatory and one optional. The mandatory part comprises 74 questions, includes behavioral questions relevant to major health problems such as smoking, alcohol, eating habits, and physical activity, and it covers demographic characteristics, family structure,

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