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Use of green spaces, self-satisfaction and social contacts in adolescents: A population-based CASPIAN-V study

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ABSTRACT

Background: A growing body of evidence has associated contact with green spaces with improved mental health and wellbeing in adults. Social contacts has been postulated as a potential mechanism underlying such effects. However, the available evidence on the association between green spaces and self-satisfaction and also the mediatory role of social contacts in health benefits of green spaces in adolescents is still very scarce. We aimed to evaluate the association of time spent in different types of green spaces with self-satisfaction and social contacts in adolescents. We also investigated the mediatory role of social contacts in the association of green space use and self-satisfaction.

Methods: This cross-sectional study was based on a population-representative sample of 10,856 adolescents (10–18 years old) living in urban and rural districts across 30 provinces of Iran (2015). Data on the time spent in green spaces (separately for parks, forests and private gardens), self-satisfaction, social contacts (number of friends and time spent with friends), and socio-demographic characteristics were obtained through questionnaires from parents and children. Logistic mixed effects models with recruitment centre as the random effect were developed to estimate associations adjusted for relevant covariates.

Results: More time spent in green spaces was associated with improved self-satisfaction and social contacts. While for the self-satisfaction, there was no indication for effect modification by sex, socioeconomic status (SES), and urbanity, we observed stronger associations for older adolescents (> 14 years old). For social contacts, we found indications for stronger associations for boys, older adolescents, those residing in rural areas, and those from lowest and highest SES groups. Social contacts could explain more than half of the association between green spaces use and self-satisfaction.

Conclusions: Our observed enhanced self-satisfaction and social contacts associated with more time spent in green spaces could provide policymakers with measures to improve mental wellbeing of adolescents. Further studies are required to replicate our findings in other populations with different climates, cultures and lifestyles.

1. Introduction

During the past few decades, there has been an increased number of people residing in urban areas (UN Department of Economic and Social Affairs, 2015). By 2050, it is projected that urban population will grow by 2.5 billion people, increasing the proportion of population living in cities to two-third of global population (UN Department of Economic and Social Affairs, 2015). Such a large-scale urbanization is continuing to increase the number of children and adolescents living in urban areas where residents often have limited access to natural environments.

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Green spaces have been associated with improved mental health and wellbeing in adults (Gascon et al., 2015). A limited but emerging body of evidence is also suggestive for such an association in children (Amoly et al., 2014; Markevych et al., 2014; McCormick, 2017; Richardson et al., 2017). For this age group, contact with green spaces has been associated with improved cognitive development (Dadvand et al., 2015, 2017), reduced risk of behavioural and emotional problems (Aggio et al., 2015; Amoly et al., 2014; Feng and Astell-Burt, 2017; Markevych et al., 2018, 2014; Younan et al., 2017; Zach et al., 2016), and improved self-discipline (Taylor et al., 2002) as well as academic performance (Hodson and Sander, 2017; Sivarajah et al., 2018; Wu et al., 2014). Stress reduction, attention restoration, increased social cohesion and physical activity and reduced exposure to environmental hazards such as air pollution, heat, and noise have been suggested to underlie such health benefits (Markevych et al., 2017). Although, through some of these mechanisms, green spaces could also influence self-satisfaction, to our knowledge, there is no available evidence on such an influence in children. Self-satisfaction, which is a function of accord between actual and ideal self, has been associated with reduced risk of depression and improved mental health (Higgins, 1987, 1989; Marsella et al., 1973), hence can have an important role in mental wellbeing.

A limited body of evidence is suggestive for an association between green spaces and social cohesion/contact (Dadvand et al., 2016b; De Vries et al., 2013; Dzhambov et al., 2018a; Maas et al., 2009b; Sugiyama et al., 2008), which in turn is associated with improved physical and mental health (Leigh-Hunt et al., 2017) in adults. Accordingly, social contacts has been suggested as a potential mechanism underlying the health benefits of green spaces (Markevych et al., 2017; Weinstein et al., 2015). In children, social contacts during outdoor play may be beneficial to socio-emotional development and can help to establish stronger social cohesion which feeds into perception of safety in the neighbourhood (Markevych et al., 2017). However, to date, the available evidence on the association of social contacts with green spaces or the mediatory role of social contacts in health effects of green spaces in children and adolescents remains very scarce (Dzhambov et al., 2018b).

So far, studies of the health effects of green spaces have mainly used proximity to green spaces as a proxy for access, and hence the use of these spaces by the study participants. However, in real life, proximity to green spaces would not necessarily translate into use of these spaces. Such a disagreement between residential proximity to green spaces and use of these spaces can have important implications for studying the association between green spaces and health, particularly for those associations for which physical activity or social interaction are key mediators (Markevych et al., 2017). Therefore, studies of health effects of green spaces could benefit from information on the use of green spaces by study participants. Moreover, the vast majority of studies evaluating health effects of green spaces, to date, have been conducted in high-income countries. As ethnicity and lifestyle habits might influence such effects, the generalizability of studies in these countries to the rest of the world could be limited (Markevych et al., 2017). There is therefore a need for more evidence on these effects from low- and middle-income countries where much of urbanization is currently occurring (UN Department of Economic and Social Affairs, 2015).

Emotional problems in adolescence has been shown to be a predictor for early old age mental wellbeing (Nishida et al., 2016). Thus, Adolescence could be considered as a window of opportunity; as prevention and interventions for emotional stress during development could have a major role in person's future mental health (Nishida et al., 2016). This study aimed to test the hypothesis that more use of green spaces is associated with improved self-satisfaction and enhanced social interaction in adolescents. We also hypothesized that social contacts could act as a mediator for this association, if any. Towards this aim, this study disentangled the associations for different types of green spaces and the variation of these associations by age, socioeconomic status (SES), level of urbanity, and sex. It also investigated the mediator role of social contacts in the association between use of green spaces and self-satisfaction.

2. Methods

2.1. Study area

Iran is located in Middle East Region with a total land area of about 1,628,000 km^2, including 31 provinces (Supplementary Fig. S1). This country has a population of about 79.9 million people (2016 census); of whom about 74% are living in urban areas (Iran, 2018). The average annual precipitation of Iran is 228 mm and approximately 90% of the country is arid or semi-arid (FAO, 2008). Iran is covered by approximately 55% rangeland, 21% desert, 7.5% forest, 11% cropland, and 6% residential areas and infrastructure (Badripour, 2004).

2.2. Study setting

This nationwide study was conducted in the context of the fifth survey of the Childhood and Adolescence Surveillance and PreventIon of Adult Non-communicable disease study (CASPIAN-IV). CASPIAN surveys started in 2003 and have been repeated every two to three years (Kelishadi et al., 2013, 2012; Motlagh et al., 2009, 2017). The CASPIAN-V survey was conducted in 2015 in urban and rural areas of thirty provinces of Iran. It applied a multistage stratified cluster sampling method to recruit a population-based sample of 14,400 schoolchildren aged 7–18 years. Detailed description of CASPIAN-V sampling and data collection methods have been published elsewhere (Motlagh et al., 2017). Briefly, from each province, 480 students were recruited. Sampling within each province was conducted according to the student's place of residence (urban or rural) and the level of education (primary or secondary school) using the proportional to size method with equal sex ratio. Consequently, the ratio of participants in urban and rural areas and in each grade in each province was proportional to the number of schoolchildren studying in urban and rural areas and in each grade in that province. A cluster sampling method was then used to enrol the required sample size from rural and urban areas and each grade in each province. Clusters were determined at school levels with ten schoolchildren (and their parents) in each cluster, resulting in 48 clusters in each province. Since this study was aimed to evaluate the association between green spaces use and self-satisfaction and social contacts in adolescents, we limited our analyses to those participants aged 10 years old or more at the time of interview.

Study protocols were reviewed and approved by the Research and Ethics Council of Isfahan University of Medical Sciences approved the study (Project Number: 194049). After complete explanation of the study objectives and protocols, written informed consent and verbal consent were obtained from the parents/legal guardians and schoolchildren, respectively.

2.3. Questionnaire data

Two sets of questionnaires were implemented for schoolchildren and their parents through face-to-face interviews by trained fieldworkers. Data on use of green spaces, self-satisfaction, and social contacts were obtained through the schoolchildren's questionnaire, while data on covariates were obtained from parents. The description of questionnaires applied in CASPIAN-V and conditions under which the interviews were conducted have been detailed elsewhere (Motlagh et al., 2017).

2.3.1. Green spaces use

Schoolchildren were instructed to report the average hours per week they spent in green spaces during working and non-working days separately for each season (spring, summer, autumn, and winter) and each type of green spaces (parks, forests/other natural green spaces,