Obesity Prevention Behaviors in Asian Indian Adolescent Girls: A Pilot Study

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ABSTRACT

Purpose: The purpose of this pilot study was to evaluate obesity prevention behaviors of Asian Indian adolescent females and determine the relationship of these behaviors to cardiovascular risk factors.

Design and Methods: A purposive sample of twenty females, 14–18 years of age, was enrolled. Body mass index, percent body fat, waist circumference, and blood pressure were measured to assess cardiovascular risk. Measures of obesity prevention behaviors were physical activity, dietary and sleeping behaviors. To quantify engagement in physical activity, participants wore an accelerometer. The dietary intake was assessed using the web based SuperTracker. Pittsburgh Sleep Quality Index was used to assess sleep behaviors. For data analysis, descriptive statistics was used for demographic characteristics. Correlations were calculated to evaluate the relationship between cardiovascular risk factors and obesity prevention behaviors.

Results: The majority of the adolescents did not meet recommended physical activity levels. Most reported unhealthy eating behaviors with higher saturated fat intake correlating with higher percent body fat. The cardiovascular risk measures fell below normative values. However, more time spent in sedentary behaviors was related to higher systolic blood pressure, while poor sleep quality was associated with higher diastolic blood pressure and greater BMI.

Conclusions: The findings support the unhealthy patterns of physical activity, dietary and sleep behaviors in Asian Adolescent girls and the need for promoting healthy behaviors in this at risk population.

Practice Implications: The study findings provide a basis for education on healthy behaviors and development of culturally appropriate interventions to prevent obesity.

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Introduction

Asian Indians, residing within the United States (U.S.), have a high rate of obesity-related disease, e.g. type 2 diabetes, hypertension, and heart disease (Ardeshna et al., 2018; Nag & Ghosh, 2013; Savadatti et al., 2018). This health disparity is a major public health concern, as Asian Indians are the second largest and fastest growing subgroup of Asians within the U.S. (U.S. Census Bureau, 2016). Yet, the risk factors and behaviors that contribute to the burden of obesity-related diseases among Asian Indians remain unclear. This is due, in part, to the aggregation of data for the various American Asian subgroups, which neglects key factors that underlie heterogeneity for obesity-related disease among Asians within the U.S. (Hales, Carroll, Fryar, & Ogden, 2017; Staimez, Weber, Narayan, & Oza-Frank, 2013). Moreover, there is inconsistency in criteria used to define overweight and obesity in Asian Indians, and few studies consider sex and age differences in this Asian

subgroup (Staimez et al., 2013). Because obesity and signs of obesity-related disease emerge in childhood and adolescence (Umer et al., 2017), it is important to understand behavioral factors that contribute to overweight and obesity in young Asian Indians within the U. S. Only then can evidence-based and culturally appropriate strategies be developed to curtail the unacceptable morbidity and mortality due to cardio-metabolic disease among Asian Indians.

Childhood obesity within the U.S. has more than tripled since the 1970s (Fryar, Carroll, & Ogden, 2014). The National Health and Nutrition Examination Survey (NHANES), 2015–2016, found obesity prevalence among youth 6–11 years to be 18.4% and among adolescents 12–19 years to be 20.6% (Hales et al., 2017). Further, obesity in girls progressively increased from preschool to adolescence, with rates differing by race; however, no data for girls with Asian Indian ethnicity was reported in the NHANES survey. This is remiss, as the standard of being overweight and obese is recognized to differ among subgroups of Asian Americans (Jih et al., 2014; Nam, 2013). Importantly, Asian Indians often develop obesity-related disease at lower body mass index (BMI) cut points (Jih et al., 2014). Further, Asian Indians exhibit an obesity

phenotype, characterized by central adiposity (marked by higher waist to hip ratio), increased subcutaneous and intra-abdominal fat, and increased deposition of fat in ectopic areas (e.g., liver, muscle); often without high BMI (Misra et al., 2009). The adolescent period may be a pivotal time to promote obesity-prevention behaviors. For girls, adolescence is a critical developmental period in which physiological and behavioral changes can set in motion a trajectory for unhealthy weight gain and adiposity, which may be compounded by childbearing and persist over a lifetime (Alberga, Sigal, Goldfield, Prud'homme, & Kenny, 2012; Chang et al., 2017).

A number of obesity-related behaviors change during adolescence, including eating behaviors, physical activity, and sleep patterns. Unhealthy changes in these behaviors in concert with the hormonal and metabolic transitions of adolescence can result in energy imbalance and unhealthy weight gain (Todd, Street, Ziviani, Byrne, & Hills, 2015). There is a complex interaction between nutrition and adolescent development. During adolescence physiological changes related to growth and development spur an increase in appetite, and adolescent eating patterns and behaviors expand beyond parental modeling, as peers, mass media, and greater food availability increasingly influence choices. Notably, adolescents eat away from home more often, and tend to eat more fast foods and snacks (Das et al., 2017).

Although studies demonstrate adolescents residing in India have poor dietary choices (Rathi, Riddell, & Worsley, 2017), little is known about dietary choices of Asian Indian adolescent girls living in the U.S. Along with dietary changes, physical activity decreases during adolescence. Data from the 2015 U.S. Youth Risk Behavior Surveillance demonstrated 14.3% of high school students to have <60 min of physical activity at a level that increased heart and respiratory rate for at least 1 day in a 7-day period. Compared to boys, adolescent girls had lower levels of physical activity. Although, the Youth Risk Behavior Surveillance provided data for some racial/ethnic groups, no data were provided for Asian Indians (Kann et al., 2016). There is evidence that immigrant children and adolescents within the U.S. have high levels of sedentary behavior (Daniel, Wilbur, Marquez, & Farran, 2013; Williams, Li, Haynie, & Simons-Morton, 2018), but no studies specifically examined Asian Indian children and adolescents within the U.S. Lastly, adolescence is characterized by insufficient and/or an altered sleep patterns (Barclay & Gregory, 2014). Poor sleep is associated with the development of insulin resistance, a sedentary life style, unhealthy dietary patterns (Felső, Lohner, Hollódy, Erhardt, & Molnár, 2017) and altered body fat distribution (St-Onge & Shechter, 2014). Emerging evidence links short sleep duration to childhood overweight or obesity (Schmid, Hallschmid, & Schultes, 2015). Adolescent girls may be particularly susceptible to obesity consequent to sleep insufficiency, as shorter sleep duration in 16–18 years females (but not males) predicted greater increases in BMI in young adulthood (Ames, Holfeld, & Leadbeater, 2016). However, few, if any studies have evaluated sleep and obesity risk in Asian Indian adolescents.

Given that Asian Indians are at high risk for cardio-metabolic disease (Savadatti et al., 2018), there is a need to understand behaviors linked to overweight and obesity during critical developmental periods, such as adolescence (Todd et al., 2015). As noted above, adolescent girls may be particularly at risk for behavioral changes that predispose to unhealthy weight gain and adiposity. Thus, the aim of this pilot study was to evaluate obesity prevention behaviors in Asian Indian adolescent girls within the U.S. and the association of those behaviors with cardiovascular disease (CVD) risk. In this study, engagement in physical activity, patterns of dietary intake, and sleep behaviors were measured as indices of obesity prevention behaviors; while BMI, percent body fat, waist circumference, and blood pressure were measured to assess CVD risk. An understanding of behaviors that predispose to unhealthy weight gain and fat deposition will ultimately inform risk assessment and guide future development of culturally appropriate strategies to promote obesity prevention behaviors in this vulnerable population.

Methods

Design and Sample

This pilot study used a cross sectional, descriptive design to evaluate the engagement in obesity-prevention behaviors (diet and physical activity, sleeping duration and quality), and to determine the relationship between these behaviors and CVD risk factors (BMI, percent body fat, waist circumference, and blood pressure) in Asian Indian adolescents. The internet-based Supertracker and an accelerometer were used to assess food intake and physical activity, respectively, over a 7-day period.

Purposive sampling was used to recruit Asian Indian adolescent girls (14–18 years of age). Inclusion criteria were (a) Asian Indian ethnicity as reported by subject and parent and (b) ability to read, speak and write English. The exclusion criteria included history of acute illness, cardiovascular disease, juvenile diabetes, recent surgery and pregnancy. The majority ($N = 18$) of participants were recruited from a contemporary Asian Indian affiliated church located in west suburban DuPage County, Illinois. The remaining two subjects were recruited using fliers distributed through an Asian Indian organization. The Asian Indian church was chosen for recruitment as it provided a convenient and easily assessable population of Asian Indian adolescents. For church recruitment, flyers describing the study purpose and requirements for participation were distributed by the investigator after Sunday services and church events. The church Vicar gave permission for recruitment, and the use of a private room to obtain informed consent/assent and to collect data.

Ethical Considerations

This study was approved by the University's Institutional Review Board. Potential subjects expressing interest in the study were given a letter describing the study and asked to share the letter with their parents. Given that all willing subjects were below 18 years, parents signed the informed consent and subjects provided assent. Prior to obtaining written consent and assent, potential subjects were given verbal and written explanations about the purpose of the study and details of the procedure, including what was required from them if they participated.

Data Collection Measures

Self Reported Background Measures

A questionnaire was used to collect the subject's age, dietary habits, health history, parents' weight and height, parent's immigration history, parents' occupation(s), family income, parents' levels of education, leisure time activities, and time spent in sedentary hours.

Cardiovascular Risk Measures

The measures included were body mass index (BMI), waist circumference (WC), percent body fat (percent body fat) and blood pressure. To measure BMI, subjects were weighed using a portable Tanita BC-533 Inner Scan Body Composition scale. Height was measured using a portable Stadiometer. The cut off value for BMI was adopted from the Centers for Disease Control and Prevention (CDC) definitions for overweight and obesity for children and adolescents (aged 2–19 years) (CDC, 2016). Waist circumference was measured to the nearest 0.1 cm in triplicate. The cut off value for obesity based on WC was ≥85 percentile (CDC, 2012). The Tanita BC-533 Inner Scan Body Composition scale provided measures of % body fat. The cut off percentiles for body fat composition was adopted from the CDC's National Health Statistics Report (Ogden, Li, Freedman, Borrud, & Flegal, 2011). Blood pressure was measured using a mercury sphygmomanometer with a cuff size appropriate for children. The cut off percentiles were derived from established blood norms for children and adolescents per the National Heart, Blood and Lung Institute (2012).