Differences in Physical Activity Levels Between White and South Asian Children in the United Kingdom

Michael J. Duncan, Lorayne Woodfield, Yahya Al-Nakeeb, and Alan M. Nevill

The purpose of this study was to compare physical activity levels between white and South Asian children in the UK. The data were obtained from 606, 11–14 year old schoolchildren (397 white; 209 Asian). Physical activity was assessed using the ‘four by one day’ recall questionnaire from which the time spent in moderate and vigorous physical activity was calculated. Boys were significantly more active than girls ($p = .0001$), and white children reported significantly greater physical activity than south Asian children ($p = .001$). Mean ± SD of time spent in moderate and vigorous activity was 90.2 ± 65.4 mins and 68.2 ± 49.3 mins for white and south Asian children and 103.5 ± 63.4 mins and 65.6 ± 53.5 mins for boys and girls respectively. These findings indicate that south Asian children are significantly less active than their white peers and there may be a need for specific interventions to target South Asian children particularly.

Physical inactivity is a major independent risk factor for chronic disease, and considerable evidence has highlighted that people from racial or ethnic minority groups share a disproportionate burden of sedentary lifestyle and engage in lower levels of physical activity than their white counterparts (21). Although a range of studies have examined ethnic differences in physical activity, these have tended to be based on American populations and have not focused on the range of ethnic minority groups that reside in Europe (16). In the United Kingdom, ethnic minority groups from the South Asia (India, Pakistan and Bangladesh) have been particularly highlighted as a population that are under researched (16,20). An investigation into the physical activity levels of South Asians may be important as this population has substantially higher mortality from coronary heart disease (CHD), stroke, greater prevalence of diabetes and central obesity compared with the general population (3,4,11). Furthermore, regular physical activity has been shown to reduce the risk of a number of diseases including CHD, diabetes, obesity, and stroke (18,25–27).

Recently, Fischbacher et al. (16) reviewed all previously published studies on this topic and reported that south Asians had lower levels of physical activity than their white counterparts. They concluded that further research is needed about the determinants and barriers to activity among south Asians in the United Kingdom.

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to accurately design and target interventions aimed at improving physical activity behavior. In addition, few studies in this review had examined the physical activity levels of children. This issue is particularly important as higher levels of body fatness or obesity and increased cardiovascular disease risk have been reported for South Asian children compared with their white or black counterparts (3,14,24) and physical activity habits developed in childhood might track into adult life (19). Thus, the need to promote and establish physical activity habits in childhood might be of importance to children’s future health.

British-based research by Woodfield et al. (28) examined children’s levels of physical activity according to ethnicity and found that white children reported significantly higher levels of average daily energy expenditure than black or Asian children. This has been supported by more recent research by Khunti et al. (20) that reported that white European children were more likely to walk to and from school compared with South Asian children but that low levels of physical activity were prevalent in both ethnic groups they examined. However, the questionnaire used in this study was created using several elements from different physical activity self-report questionnaires. Although the authors stress that these were taken from validated instruments, the reliability and validity of their overall measure was not presented.

Despite this, the majority of studies that have measured children’s levels of physical activity have concluded that children are inactive. Prior studies have concluded that at least 50% of children and adolescents are insufficiently active for health, girls are less active than boys and there is an age-related decline in physical activity (2,5,23). However, Fox (17) comments that a simplistic view of children as a homogeneous group is not particularly helpful in terms of physical activity behavior and further research is required on this topic.

Despite this, it appears that little research has examined physical activity in South Asian individuals compared with white Europeans in general and children in particular. The research that is available has not achieved a consensus regarding activity levels of South Asian children and few studies have considered day-to-day variability in physical activity of children from different ethnic groups. Furthermore, in some cases the methods used to assess physical activity are questionable in terms of validity and reliability. Therefore, the aim of this study was to compare the physical activity levels of South Asian and White European secondary school children in the United Kingdom.

**Methods**

**Participants**

Six hundred and six children (266 male and 340 female) took part in the study. Participants were from school years 7 (n = 190), 8 (n = 213) and 9 (n = 203; ages 11–14; mean age ± SD years = 12.4 ± 0.9 years). Children were from white (n = 397, 190 boys, 191 girls) or South Asian (n = 209, 76 boys, 149 girls) ethnic groups. Data regarding ethnicity were obtained from school records. From this children were categorized into two broad ethnic groups (white and Asian) based
upon the ethnic categories used by the Department for Education and Skills (13). In this instance the term “Asian” refers to individuals from Indian, Pakistani and Bangladeshi backgrounds. Children were selected from a number of schools (n = 8) within the City of Birmingham Local Education Authority using cluster sampling. This age range was selected as children in these age have been identified as a population where further data on differences between white and South Asians is required to substantiate prior research on this topic (20, 28). Schools were selected in collaboration with the Local Education Authority to be representative of schools and children within the city in terms of ethnic background. The study was approved by institutional ethics committee. Informed consent was gained from parents/guardians and the children themselves was gained before data collection. Individual participants within schools were selected randomly from school timetables (every 6th class). Data collection took place over winter, spring and summer terms with equal numbers of children completing data collection during each term.

**Measures of Physical Activity**

Children’s level of physical activity was measured by means of the ‘four by one day’ physical activity recall questionnaire (10). The ‘four by one day’ recall questionnaire is interviewer administered to aid children’s recall and has previously been used to assess British children’s physical activity levels (15, 28). This questionnaire is specifically designed for children of the ages of those taking part in this study and examines physical activity across four different days during any one week (2 × weekday and 2 × weekend) and evaluates physical activity sequentially to minimize cognitive related error that can be associated with self-report questionnaires in children (10). Children are required to provide activity information for the previous day only thus reducing the problems associated with memory decay, but as details from one day cannot be said to be representative information from four days of the week are collected. Reliability and validity of this measure have been previously documented (11). Cale (11) has reported significant relationships between energy expenditure from the four by one day questionnaire and physical activity assessed by both heart rate monitoring and by direct observation. More recently, Argiropoulou et al. (1) have reported that the four by one day recall questionnaire evidences good reliability (ICC = 0.7) and agreement (95% limits of agreement = 7.9%) using a two week test-retest method. In addition, energy expenditure calculated using the ‘four by one day’ recall questionnaire was significantly related to energy expenditure determined using accelerometry (r = .62). Intraclass correlations for estimates of two week, weekday average daily energy expenditure in the current study also indicated appropriate reliability (R = .76, p < .01).

Once completed, average daily energy expenditure (kcal Kg⁻¹ day⁻¹) expressed in METs (ratio of work metabolic rate to resting metabolic rate) can be calculated based on the average values quoted for the 7-day recall (7). Alternatively, the time spent in moderate and vigorous physical activity can also be calculated using this measure. As the accuracy of self-report instruments can be questioned, particularly for the quantification of energy expenditure (18), children’s physical activity was expressed as the daily time each child engaged in moderate and vigorous physical activity (MVPA) in accordance with protocols outlined by Cale (11).
Statistical Analysis

A 2 (gender) by 2 (ethnicity) ways analysis of variance (ANOVA) was used to examine any differences in children’s physical activity between white and south Asian children and between boys and girls. However, a test of normality was positively skewed and hence, not normal, so the Kruskal-Wallis test for independent samples was also used to be confident that our findings were real and valid. The statistical package for social sciences (SPSS) version 13.0 was used to analyze the data.

Results

Results revealed a significant gender main effect $F(1, 603) = 54.96, p = .0001$ and a significant ethnicity main effect $F(1, 603) = 10.84, p = .001$ were also evident. No significant gender by ethnicity interaction was evident ($p < .05$). Boys reported significantly greater time spent in MVPA compared with girls and white children reported significantly greater time spent in MVPA than south Asian children. The Kruskall-Wallis test for independent samples confirmed these results for gender ($X^2 = 65.6, p = .0001$) and ethnicity ($X^2 = 14.7, p = .0001$). Mean $\pm SD$ of time spent in moderate and vigorous activity, between white and south Asian children and boys and girls is presented in Table 1.

Discussion

Evidence from the current study reveals that, consistent with past research boys were significantly more active than girls (5,8,17,28). Results also indicated that, with reference to ethnic groups, that white children reported significantly greater time spent in moderate and vigorous physical activity than South Asian children. Furthermore, this study also found a significant days by ethnicity interaction. Mean values for the average daily time spent in moderate and vigorous physical activity indicate that white children reported participation in over 20 minutes more MVPA than their south Asian peers. These findings support previous research that has also reported differences between white and South Asian children (8,20). Furthermore, the trends identified in this study support research by Woodfield et al. (28) that also reported lower physical activity levels in south Asian children from Britain.

Furthermore, the findings of this study mirror results of other studies that have compared physical activity of white and South Asian populations in adult samples

<table>
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<th>Table 1 Mean $\pm SD$ of Average Daily Time Spent in MVPA (Mins) Across Ethnic and Gender Groups</th>
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<td><strong>Average Daily Time Spent in MVPA (mins)</strong></td>
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Members of South Asian communities have been found to place leisure time physical activity as low priority after other responsibilities and religious activities identifying cost, location, opening hours, dress code, mixed-sex facilities and the cultural environment as barriers to participation. It has been previously suggested that Asian parents living in Britain do not actively encourage their children to become involved in sport as success in academic subjects is perceived to be very important. Clearly further research is needed to examine these issues.

This study adds information on the physical activity patterns of white and South Asian children living in the United Kingdom. There has been limited study of the physical activity levels of South Asian children and as this population may be at greater risk from a range of activity/inactivity related diseases this information might be important in physical activity promotion and awareness.

Although this study provides information regarding the physical activity patterns of white and South Asian children in the UK there are some aspects of this topic that need development to take this issue further. Use of more objective measures of physical activity (e.g., pedometry, accelerometry) would have been useful as would inclusion of an indicator of weight status. Finally, although the method of ethnically grouping the children in this study could be deemed as crude, this data were readily available and based on standard protocols used to classify ethnic groups in schools. In a multicultural city such as Birmingham where a large number of ethnic subgroups exist, faith and culture intermix. Therefore, the task of disentangling these subgroups is a cumbersome one that would require a far larger sample size than employed in the current study.

**Conclusions**

Physical activity is lower in south Asian children and girls compared with white children and boys respectively. While there is a need for more cohesive policies that aim to target and modify children’s physical activity levels in general, specific interventions that target South Asian children might be needed to address the inequalities in physical activity levels found in this study.

**References**


