The differences in CHD risk factors and lifestyle parameters Between Arab and Malaysian adolescents in Kuala Lumpur

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ABSTRACT

Studying Arab and Malaysian students at international schools appears new to the research field, as there is little in the way of data or literature review that has been obtained to date. The purpose of this study is to compare lifestyle parameters (physical activity, body composition, fitness level and Coronary Heart Disease (CHD) risk factors) of Arab and Malaysian adolescents. Method: a total of 190 adolescents students, 96 Malaysian and 94 Arab, both male and female aged 14-16 years old, participated in this research. A questionnaire was used to obtain details of physical activity levels (PAL) in Metabolic Equivalents. A 20m shuttle-run test was used to estimate the fitness level (VO$_{\text{2 max}}$). A finger prick sample of fasting blood was obtained to measure high-density (HDL) lipoprotein, low-density lipoprotein (LDL), total cholesterol (TC), glucose (GLU) and triglycerides (TRG) in mmol and identify CHD risk factors, by using the Cholestch LDX analyzer. BMI and %fat used for the body compositions. Conclusion: males were more physically active than females. Arab students had lower BMI, GLU, and TC and participated more in physical activities, and their fitness level was higher than Malaysian students at international schools. Malaysian adolescents had higher triglycerides levels than Arab adolescents.

Keywords: Arab adolescents; Malaysian adolescents; lifestyle; CHD risk factors; physical activity; body composition; and fitness level.

Academic Discipline and sub-disciplines: Sport Science, Physical Activity and health related
1. INTRODUCTION:

Cultural norms and values may influence individuals' behaviour in terms of dietary habits and active lifestyles, as well as their insights of health and personal weight. Cultural norms and values strongly influence individuals' behaviour in terms of dietary habits and active life styles, as well as their perceptions of health and person al weight. Emigration has found to impact greatly on an individuals dietary and lifestyle habits. The like li hood of being overweight or obese increases with time from the very start that a person emigrates, indicating that PA levels may reduce, as immigrants be come cul tured (Tremblay et al., 2006).

There is a significant variation in PA levels among ethnic groups, which is further complicated by any indication of change in their cultural behavior, to that of the society in which they are now part of. Canada, for instance, has a diverse and ever- grows in immigrant population. It seems that PA behaviours change as they adapt to their new Can adian lives, with a decrease in PA among those under goings socioeconomic and cultural transitions towards developed country standards. Fisch bachelor et al. (2004) identified some ethnic groups living in the United Kingdom as having lower levels of physical fitness and PA compared to that of the populace of the country or those considered Europeans. These Indian, Pakistani, and Bangladeshi ethnic groups were found to be at greater risk of CHD mortality as a consequence of obesity and insulin resistance, with physical in activity and reduced fitness being the most likely cause.

How ever, it is difficult to allow for comparisons between the findings of these studies, because discrepancies exist in the methodology and instru ments used to determine the level of PA (Al-Hazzaa et al., 2011). This further emphasizes the need for this study, to research individuals who have immigrated to Malaysia, with a particular focus being on the adolescent population, of which no previous data has been obtained a direct relations hip exists between rising living standards and weight-gain/health-related problems, which have become wide spread, amounting to serious nutritional problems with in Malaysia. Kuala Lumpur is a good example of this, where rapid increases in socio economic development and changes in life style, related to mental, physical, and behavior al health, have become common place. In addition, Musaiger (2002) reported on major health and nutritional changes in Arab Middle Eastern countries, as a consequence of significant developments in demographic and socioeconomic situations throughout recent decades. Dietary habits have change das have life style, consider ably affecting the nutrition al status of the population. As a result, an increase has occurred in health problems including CHD, diabetes, and hypertension. Musaiger (2002) further report deadlock of much needed data surrounding this population, given the knowledge that diet-related chronic disease such as CHD is on the rise in most Arab Middle East countries, especially those with high and middle in comes. Statistics gathered from Gulf regions, Iraq and Jordan owed that CHD holds sign if i can’t mortality figures, accounting or 18–40/softotaldeaths.

Clearly, a need exists for further research and studies that incorporate a wider population with specific focus on diet analysis and genetic implications. Follow –up studies would be beneficial in further understanding the development of CHD risk factors with age.

Cardiovascular disease is the main cause of death in developed and developing countries, including Malaysia and Arabic nations (Al-Hazzaa et al., 2011). Unfortunately, the Indicators of CHD can be seen in youngsters, with recent reports showing that in fact many CHD risk factors can be seen in children as young as ten years of age (National Heart, Lung, and Blood Institute [NHLBI], 2012). It is increasingly common of in many children to be overweight, and participate in little PA, but it seems that any agenda to tackle the risk factors effecting young people are mostly restricted to developed countries, despite a need for immediate action around the globe. Consequently, it has shown that many individuals from low/middle in come backgrounds die at a young age, an data crucial stage in their lives (NHLBI, 2012).

Evidently, researchers have conducted many studies surrounding the area of PA, obesity, and the effect increasing levels have on the economy and health of the nation. However, each country, it would seem, has an interest in its own population, and comparative studies have yet to be completed with the aim to learn and improve from one another. Besides, what is known regarding obesity, PA levels, fitness, and CHD risk factors among young people who have moved to a developing country such as Malaysia is limited.

Similar to Malaysia, Arab countries are developing and undergoing economic growth, the accelerated phase find us industrialization and urbanization has certainly changed the dietary habits and in active life styles of the Malaysian and Arab populations and has subsequently led to increased prevalence of o b e s i t y a n d chronic diseases (Al-Hazzaa, et al., 2011; Noor, 2002). It is therefore, the decreased PA is likely to occur among the Arab population as a result of swift urbanization, overcrowding, computer and technology advancements, and reduced demand so occupation/work (Al-Hazzaa et al. 2011).

It has been identified that sever al Malaysian students study at Arabic schools, and as such it is interesting to determine the differences between these ethnic groups who live in the same city and attend the same school. In contrast, findings may also be made regarding students of different nationalities/culture/religion that are or are not from developed countries who are study in gin KL’s international schools.

Currently, there is insufficient epidemiological data available regarding associations surrounding lifestyle parameters (physical activity, fitness and body compositions) and primary CHD risk factors, with adolescents in Arab countries. Musaiger (2002) further reported a lack of much needed data surrounding this population, given the knowledge that diet-related chronic disease such as CHD is on the rise in most Arab Middle East countries, especially those with high and middle in comes. Statistics gathered from Gulf regions, Iraq, Jordan, and Syria showed that CHD holds significant mortality figures, accounting for 18–40% of total deaths (Musaiger, 2002).
Hatahet et al. (2002) conducted a study to determine the prevalence of cardiovascular disease risk factors in the Arab/American community. Following various analytical tests of BP; blood sugar; body fat; and complete lipid profiling by using a finger prick method for TC, HDL, LDL, TRG and GLU, they found a rise in incidences of obesity and likely association of cardiovascular-disease risk factors as a direct result of Arab communities adopting American life styles. This study can be the baseline for potential research in the future, in which to investigate Arab adolescents living in Malaysia and Malaysian adolescents studying within international schools in the same country. Comparing Malaysian school children with Arab students may provide insight as to differences in their lifestyle parameters (PA level, fitness, and body statures) and CHD risk factors compared to that of their peers from other nations.

2. MATERIEL AND METHOD

One hundred and ninety male and female Arab and Malaysian students age 14-16 years old studying at the international schools in Kuala Lumpur were selected as subjects in this study. UPM medical faculty ethical committee and the Malaysian Ministry of Education have approved the study. Parents/guardians, of the student, were asked to sign consent and complete a form to disclose any known family health history. Physical activity questionnaires in Arabic and Bahasa Melay were used to estimate PA levels and intensity in MET/week. This includes the total METs minutes per week resulting from each moderate- and vigorous-intensity PA. This is an equivalent of the sum of time spent in specific activity per week multiplied by the MET value of that activity.

The anthropometric measurement for height, weight, BMI (kg/m²) for age percentile, and percent body fat was obtained, by using the the Bio space Embody 230 (TANITA 507) machine. A finger prick sample (max 3 microlitre) of fasting blood was obtained to measure high-density lipoprotein (HDL), low-density lipoprotein (LDL), total cholesterol (TC), non-HDL and triglycerides (TRG) in mmol/l by using Cholestech LDX analyzer. The Aerobic fitness as maximal oxygen uptake (V̇O₂max) was measured by using the 20m shuttle-run tests.

Multivariate analysis of variance (MANOVA), and examination of the individual (ANOVA)s was conducted to assess if there were differences in physical activity level, CHD risk factors, body composition, and fitness level between Arab and Malaysian adolescents related to gender (male vs. female).

3. RESULTS

The main effect of gender was significant, F(13, 173) = 21.70, p < .001, partial η² = .62, indicating large differences on the dependent variables by gender. Examination of the individual ANOVAs showed differences on percent fat, TC, HDL, TRG, TC-HDL, moderate and high intensity METS, and V̇O₂max. Females (M = 22.43) had significantly higher percent fat than males (M = 21.80). Females (M = 3.82) had significantly higher TC measurements than males (M = 3.16). Females (M = 1.17) had significantly smaller TRG levels than males (M = 0.98). Females (M = 2.12) had significantly lower LDL measurements than males (M = 2.31). Females (M = 3.47) had significantly lower TC-HDL measurements than males (M = 3.94). Females (M = 608.50) had significantly lower moderate intensity MET minutes than males (M = 861.69). Females (M = 1337.95) had significantly lower high intensity MET minutes than males (M = 2826.78). Females (M = 29.98) had significantly lower V̇O₂ max than males (M = 35.66).

The main effect of group (Malaysian adolescents vs. Arab adolescents) was significant, F(13, 173) = 5.59, p < .001, partial η² = .30, indicating medium differences on the dependent variables by group. ANOVAs showed differences BMI, TC, TRG, HDL, GLU, low and moderate intensity METS. Arab students at international schools (M = 21.64) had significantly lower BMI than Malaysian students (M = 22.56). Arab students (M = 3.36) had significantly higher TC levels than Malaysian students (M = 3.61). Arab students (M = 0.72) had significantly higher TRG than Malaysian students at international schools (M = 0.80).

Arab students (M = 2.07) had lower higher LDL than Malaysian students (M = 2.36). Arab students (M = 5.13) had significantly higher HDL than Malaysian students (M = 4.91). Arab students (M = 726.37) had significantly lower high intensity METS than Malaysian students (M = 506.15). Arab students (M = 879.03) had significantly higher moderate intensity METS than Malaysian students (M = 600.12). The interaction effect of gender and group was significant, F(13, 173) = 16.18, p < .001, partial η² = .55, indicating large differences on the dependent variables by the interaction of gender and group. Examination of the individual ANOVAs indicated there were differences on TC, LDL, non-HDL, and V̇O₂ max. For Arab students, males (M = 2.47) had significantly lower TC than females (M = 4.23). And for Malaysian students, males (M = 3.79) had significantly higher TC scores than females (M = 3.44).

For Arab students, males (M = 2.22) had significantly lower HDL than females (M = 2.49). And for Malaysian students, males (M = 2.38) had significantly higher LDL scores than females (M = 1.76). For Arab students, males (M = 2.54) had significantly lower non-HDL than females (M = 2.86). And for Malaysian students, males (M = 3.02) had significantly higher non-HDL than females (M = 2.54). For Arab students, males (M = 34.56) had significantly higher V̇O₂ max than females (M = 30.35). And for Malaysian students, males (M = 36.67) had significantly higher high intensity METS than females (M = 27.69). Table (1) illustrates the Means and Standard Deviations for the Variables of Interest by Gender

4. DISCUSSIONS AND CONCLUSION

The result suggests that the variables of interest are simultaneously significantly different by gender and ethnicity. Of the variables of interest, they were of the variables of interest; females showed to be doing statistically less of high intensity physical activities than males for Arab and Malaysian adolescents. The anthropometrics measurements showed that females had significantly higher percent body fat than males and moderately higher BMI than males. As a consequence, females had significantly lower V̇O₂ max than males. As is also shown in Table (1) Arab females were significantly
higher in CHD risk factors than males, females had significantly higher total cholesterol measurements than males, females had significantly lower LDL levels than males, females had significantly higher LDL and non-HDL measurements than males, and females also had significantly higher non-HDL than males.

It seems that girls have less opportunity to exercise than their male counterparts, but given they are in fact more active in terms of doing more low intensity activities on a daily basis than boys, they may well become fitter than boys if they had equal opportunity to exercise (Aman et al., 2007). There is overall recognition that boys are more physically than girls. Thorough investigation, however, does not clearly identify why this is the case and indeed, what changes might be made to improve this statistic for girls especially Arab.

Arab men are more active than Arab women and it is worth noting that the dress code might be another limitation for Muslim females participating less in outdoor sports activities Aman et al. (2007). Recently Jekal et al. (2010a) explained that females, high school is often the last opportunity to participate in PA and promote physical fitness, whilst most males proceed into the mandatory military service, thus having further opportunity to increase physical-fitness levels. Nevertheless, The associations between the level of youth obesity and the level of adult risk factors of metabolic disease were observed as different according to gender; a significant association existed in females but not in males (Jekal et al. 2010b).

Interestingly, the current study found that the difference by gender was almost the same between male and female in Arab and Malaysian adolescents. Males are less fat, exercise more than females, and CHD risk factors appear to be fewer in males than females. Additionally, males engage in more PA, especially high-intensity activities. This may explain why Arab and Malaysian males are significantly fitter than females. According to (Krugeretal.2008). In recent reports the duration of exercise required for cardio respiratory fitness and improvement in VO2 varies inversely with the intensity (Krugeretal.,2008). The greater the intensity of exercises, the shorter the duration is necessary to achieve improvement in cardio respiratory fitness. Martins et al. (2010) also found that females presented with a significantly higher medium value for triglycerides, total cholesterol, and LDL cholesterol and lower values for completed dumpin the shuttle-run test than males. Accordingly, Eisenmann et al. (2005a) identified that regular aerobic activity has a positive effect on blood lipid levels for children as well as adults. Eisenmann et al. (2005b) also discovered that HDL-C levels in young athletes are particularly higher than in children who engage in little or no PA.

Some differences were also found between Malaysian and Arab adolescents, notably CHD risk factors (TC, TRG, LDL), BMI and participating in low- and moderate-intensity METS and VO2max. It is worth noticing that both groups are from the same international schools, which means they follow almost the same PA and PE curriculum at the school. However, Arab students at international schools had significantly higher moderate-intensity METS and showed higher total PA than Malaysian students at international schools.

During the data collection, the differences between students cultural were noticed, observing Malaysian students to be more on the periphery, appearing much more reserved and passive, and not as forceful as their Arab peers; participation may affect their readings as less participation is likely to result in poorer outcomes of fitness level. The fitness level for the whole group was surprisingly low, as they are exercising less than is recommended, which may lead to future problems of health-related disorders in adulthood. Generally, the Arab students had higher fitness/activity levels than Malaysian students at the same schools, which might be because they actively take part in school events whereas the Malaysian students are much more reserved and passive. Additionally, badminton (Malaysia’s national sport) was not played much at the international school, which may indicate an issue about personal interest.

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Clearly, a need exists to address the global problem of health as it has shown to have a marked implication on the economy with an increase in development of chronic conditions. It makes sense that with education, these conditions are preventable. Early intervention is the key, thus addressing the health status of young people is in failible.

The TRG figures from this study are still generally considered borderline for adolescents. Albeit borderline, the TRG levels for Malaysian adolescents are slightly higher than the Arab adolescents. The BMI for Malaysian adolescents is not considered overweight (remains under 23), it remained slightly higher than Arab adolescents, thus indicating body weight as a factor that may be responsible for this elevation. Distribution of body fat and body weight clearly affects the TRG levels. (Miller etal.,2011). Furthermore, TRG levels appeared to provide unique information as a biomarker of risk, especially when combined with low LDL and high LDL. The ratio of triglycerides to HDL-C served as a summary measure for either elevated TRG level, low HDL-C, or both (Miller et al., 2011). This further reinforces the importance for follow up research studies to take place. The Malaysian student’s results showed some elevation in TRG levels. Although considered mediocre, given their young age, this may be significant information in predicting their health as they mature.

The current study’s findings are consistent with Hatahet et al. (2002), who found serum TRG levels were, on average, below 200 mg/dl for all age Arab groups, except people ages 51–60 who had higher, but still at the borderline, fasting TRG levels and also low LDL. However, as the current results shows, the LDL was in a normal average range as recommended by the National heart, Lung, and Blood Institute. The LDL levels recorded for the Malaysian students, was higher than for Arabs students from the same schools. These moderate differences in the LDL levels cannot support the described findings a factor of increasing TRG levels, but it should be considered a possible factor for those who have
higher LDL and lower HDL levels.

Nevertheless, investigators should also keep in mind the genetic differences that may refer to some physiological and biological differences between the two groups, which may have a direct influence on the different TRG levels. Nonetheless, there can be no question that prevention of the markedly elevated TRG levels seen in those with triglyceride metabolism genetic syndromes is an important therapeutic goal. Evidence from epidemiological and controlled clinical trials has demonstrated that TRG levels are markedly affected by body weight status and body fat distribution. The link between TRG and heart disease is under clinical investigation. However, many children and adolescents with high TRG levels also have other risk factors such as high LDL levels or low HDL levels (Miller et al., 2011).

5. CONCLUSION:
Male students participated in more sports and PA than girls of both nationalities. Arab students had lower LDL than Malaysian students at international schools. Arab students had significantly higher GLU than Malaysian students. Arab students are doing more high and moderate intensity physical activity than Malaysian students at the same schools. Al thought racking of individual risk factors occur, more important is that clusters or aggregation of multiple risk factors persist strongly from childhood to adult hood. This is especially true among individuals with increased body fatness, and it is unfortunate asecularr end of obesity has occurred across the nation. Finally, this research study suggests that in active life styles and low fitness level in adolescence might lead to problematic heart risk sin later life.

6. ACKNOWLEDGMENT
The present work benefited from the input of Professor. Aminuddin Yusof, Department of Sports Studies, Universiti Putra Malaysia and Professor Muhammad Nazrul Hakim Faculty of Medicine and Health Science, Universiti Putra Malaysia. Of. Who provided valuable comments and assistance to the writing/undertaking of the research summarized here.

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Table 1. Means and Standard Deviations for the Variables of Interest by Gender for Arabs and Malaysians students at International Schools
| Variables               | Schools    | Males | Females |
|-------------------------|------------|-------|---------|
|                         |            | M     | SD      | M     | SD      |
| Lowintensity            | Arab       | 640   | 559     | 812   | 423     |
|                         | Malaysian  | 476   | 430     | 536   | 459     |
| Moderateintensity       | Arab       | 1034  | 775     | 728   | 512     |
|                         | Malaysian  | 704   | 538     | 496   | 393     |
| Highintensity           | Arab       | 2674  | 1717    | 1567  | 1468    |
|                         | Malaysian  | 2967  | 1850    | 1123  | 524     |
| TC mmol/l               | Arab       | 2.47  | 0.55    | 4.23  | 0.67    |
|                         | Malaysian  | 3.79  | 0.57    | 3.44  | 0.54    |
| HDL mmol/l              | Arab       | 0.94  | 0.24    | 1.18  | 0.26    |
|                         | Malaysian  | 1.03  | 0.21    | 1.17  | 0.41    |
| TRG mmol/l              | Arab       | 0.69  | 0.25    | 0.76  | 0.22    |
|                         | Malaysian  | 0.75  | 0.67    | 0.86  | 0.27    |
| LDL mmol/l              | Arab       | 2.22  | 0.57    | 1.49  | 0.50    |
|                         | Malaysian  | 2.38  | 0.53    | 2.76  | 0.74    |
| Non-HDL mmol/l          | Arab       | 2.53  | 0.56    | 2.86  | 0.68    |
|                         | Malaysian  | 3.02  | 0.53    | 2.53  | 0.55    |
| TC-HDL mmol/l           | Arab       | 3.93  | 1.14    | 3.40  | 0.88    |
|                         | Malaysian  | 3.94  | 0.83    | 3.54  | 1.08    |
| GLU mmol/L mmol/l       | Arab       | 4.16  | 0.40    | 5.10  | 0.48    |
|                         | Malaysian  | 4.92  | 0.50    | 4.89  | 0.58    |
| VO2 max ml/kg/min       | Arab       | 36.67 | 5.04    | 30.35 | 7.45    |
|                         | Malaysian  | 34.56 | 7.45    | 27.69 | 5.04    |
| BMI                     | Arab       | 21.64 | 3.35    | 21.63 | 2.81    |
|                         | Malaysian  | 21.94 | 2.29    | 23.18 | 2.75    |
| %Bodyfat                | Arab       | 19.91 | 7.10    | 27.46 | 4.60    |
|                         | Malaysian  | 21.93 | 6.26    | 27.04 | 6.22    |
Table 2. MANOVA and ANOVAs to Assess Differences on Variables of Interest by Gender and Group (Malaysian Adolescents at International Schools vs. Arab Adolescents at International Schools).
EDUCATIONAL BACKGROUND

Dr. Doughman is a lecturer in Sports Science and Physical Education. He received his first Masters in Physical Education from Tripoli University in 1996. He later went on to obtain an MSc in Science by Research from The University of Edinburgh, United Kingdom. Thesis entitled "Physiological Responses During Moderate Exercise in Different Temperatures". Obtained PhD in Sport Science from Faculty of Educational Studies Universiti Putra Malaysia in 2013.