PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (see an example) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below. Some articles will have been accepted based in part or entirely on reviews undertaken for other BMJ Group journals. These will be reproduced where possible.

ARTICLE DETAILS

| TITLE (PROVISIONAL) | A Cross-Sectional Study of Jamaican Adolescents’ Risk for Type 2 Diabetes and Cardiovascular Diseases |
|---------------------|--------------------------------------------------------------------------------------------------|
| AUTHORS             | Barrett, Sheila; Huffman, Fatma; Johnson, Paulette; Campa, Adriana; Magnus, Marcia; Ragoobirsingh, Dalip |

VERSION 1 - REVIEW

| REVIEWER | Melissa Burroughs Pena, MD  
|          | Fellow in Cardiovascular Medicine  
|          | Duke University, USA |
| REVIEW RETURNED | 13-Mar-2013 |

THE STUDY

It is unclear how the students were selected. Was there a randomization process? Was there a set number of male and female students per grade that were selected? This process needs to be clarified.

Also, describe the sample size calculation more clearly. Did you base the calculation on the prevalence of CVD risk factors from another study? If so, please describe.

The research objectives are too broad and not clearly defined. I would prefer specific and concrete objectives that are measurable.

RESULTS & CONCLUSIONS

Table 3 should be revised. The data presented are very interesting but is should be presented more clearly. The reference groups are not clearly stated.

The message is also unclear. Is the message about children vs parents, overweight vs underweight, or female vs male? There should be a more cohesive thought process throughout the paper by which the data are presented and discussed.

I am confused about the acanthosis nigricans data. Why do 22% of underweight children have AN? Was there a problem with the clinical assessment that was made in the study?

REPORTING & ETHICS

What was the consent process for the students? Did the parents give consent? Were students allowed to opt-out?

GENERAL COMMENTS

The topic of cardiovascular risk factors in adolescents living in the Caribbean is very relevant to the global discussion of cardiovascular disease prevention in low- and middle-income countries. This line of research is useful and necessary in planning country and regional strategies. I recommend revising this paper so that a more clear message is delivered in order to clearly inform future research and prevention efforts.

| REVIEWER | Subrata Debnath, MB.BS., MPH, PH.D. |
The research questions are not clearly defined. It is difficult to tease out the type 2 diabetes and CVD from each other in a relatively small sample size like the authors presented. Diabetes is a CHD equivalent. Authors did not acknowledge this fact. Perhaps it makes sense to present data/findings of diabetes in the population studied. Moreover, CVD/CHD is relatively uncommon in the population studied. There was no clear justification to study both conditions in a small population.

References are outdated, incomplete, and non-working URLs. For example, references 3, 12, 14. Clinical Practice Recommendation (ref #18) is updated each year. Ref 20 is used to cite HbAc1 cut off level. This is a poor non-scholarly choice. Citations of several recent, appropriate, peer-reviewed articles are lacking to present scholarly acumen.

Lack of consistency: BMI class, categories, status in figures. Figure 3 is confusing. Not clear how physical activity was assessed, measured, or defined. Is dietary intake of nutrients an environment variable? There is no mention of diet or nutrition.

Authors claimed, "Our findings on the anthropometric measures and family history of disease identified more subjects at risk for T2D and CVD than did the more expensive biomarkers." However, sensitivity and specificity data are missing.

In Introduction the authors state that "Due to travel and exposure to media..." may increase the risk of T2D and CVD. It seems something is missing — perhaps it is more about open market economy in Jamaica.

Although children and adolescents are used interchangeably, it is better to select one and use throughout the manuscript for consistency.

Reviewer One
Thank you for pointing out the missing information. In the corrected copy we included the information requested.

I think the study should be described in the title as a cross-sectional study, rather than an 'epidemiological' study, to be more precise.

Title changed to “A Cross-Sectional Study of Jamaican Adolescents’ Risk for Type 2 Diabetes and Cardiovascular Diseases” to reflect the suggestion.

There is no detail on the random selection procedures - of the schools, or the participants. Please include these in the

Information on random selection has been addressed on (page 5) as follows: Five of the 14 parishes on the island were selected, and from these, 300 Jamaican adolescents age 14-19 years from grades 9-12 were randomly selected from ten high schools. Two schools per parish were
It is unclear how the students were selected. Was there a randomization process? Were there a set number of male and female students per grade that were selected? This process needs to be clarified.

The following sentence has been added:

The basis of choice for desired power value was based on studies addressing obesity among youth and risk factors for both T2D and CVD. ¹, ⁵

The research objectives are too broad and not clearly defined. I would prefer specific and concrete objectives that are measurable.

The research objectives have been modified as follows:

The objectives of this study were to (1) screen Jamaican adolescents for risk of T2D and CVDs, (2) compare risk factors for both T2D and CVD by BMI categories, and 3) determine relationships among risk factors for T2D and CVD based on demographic and environmental variables.

Table 3 should be revised. The

A note has been added to table 3 referring the reader to table 1.
Data presented are very interesting but is should be presented more clearly. The reference groups are not clearly stated.

For a presentation of the reference standards for each variable. Due to limitation of space in table 3, an already landscaped table, the reference values for each variable were omitted; however, they were all identified previously in table 1.

The message is also unclear. Is the message about children vs parents, overweight vs underweight, or female vs male? There should be a more cohesive thought process throughout the paper by which the data are presented and discussed.

We hope that message is now clearer for the readers with the additional information and clarifications. Table 3 compares adolescents’ risk for T2D and CVD by gender, ethnicity, place of residence, and household income. The paper presents all risk factors and classifies subjects as at risk versus no risk (Table 1). Analyses were performed based on subjects’ BMI (Table 2). Table 3 compares adolescents’ risk for T2D and CVD by gender, ethnicity, place of residence, and household income. A count of all risk factors was done and represented in figure 3 based on BMI categories.

I am confused about the acanthosis nigricans data. Why do 22% of underweight children have AN? Was there a problem with the clinical assessment that was made in the study?

The presence of AN was determined by the dark line around the neck, and was coded as grades 1-4 depending on the width of the line. A grade 1 line around the neck was considered a risk for the presence of AN. The data are accurately presented. The 22% represents 41/185 subjects who classified within the underweight and normal weight category. It is likely that normal weight (rather than the underweight) subjects had a grade 1 line around the neck. Of the 91 combined overweight/obese category, 81 subjects (89%) had AN on the neck region.

What was the consent process for the students? Did the parents give consent? Were students allowed to opt-out?

Consent issues were addressed and the section on exclusion criteria was also modified as follows:

Parental written consent and students’ assent were obtained. The assent document offered the option to opt-out. Subjects were screened to determine whether they were on medications known to alter blood pressure, glucose or lipid metabolism, and whether they had known eating disorders. No students fit these criteria.

The topic of cardiovascular risk factors in adolescents living in the Caribbean is very relevant to the global discussion of cardiovascular disease prevention in low- and middle-income countries. This line of research is useful and necessary in planning country and regional strategies. I recommend revising this paper so that a clearer message is delivered in order to clearly inform future research and prevention.

Revisions have been done as suggested. The paper encompasses the risk factors for T2D as well. Both T2D and CVD are major health issues for adults in the Caribbean. References 12 and 13 show the magnitude.
Reviewers comments:

Reviewer Three

Thank you for your thoughtful comments. We believe the changes and clarifications you have requested have strengthened the manuscript.

The research questions are not clearly defined. It is difficult to tease out the type 2 diabetes and CVD from each other in a relatively small sample size like the authors presented. Diabetes is a CHD equivalent. Authors did not acknowledge this fact. Perhaps it makes sense to present data/findings of diabetes in the population studied. Moreover, CVD/CHD is relatively uncommon in the population studied. There was no clear justification to study both conditions in a small population.

Research questions were added (see page 5 highlight). The authors agree that it is difficult to tease out risk for CVD as separate from T2D since they are intertwined. The data were analyzed and discussed as individual risk factors. Only three of the 276 subjects had blood glucose levels over 126 mg/dL, a level representative of T2D. However, this was a one-time evaluation of blood glucose, and therefore we did not consider this result to be conclusive for the presence/diagnosis of type 2 diabetes. Despite this small number, the study subjects were at risk for T2D based on other measures in the study (family history, overweight, etc.). In the current study the authors hypothesized that Jamaican adolescents’ risk for these chronic diseases would be similar to other adolescents based on the dietary and other lifestyle factors which pattern after that of adolescents in the developed world. References 12 and 13 address the severity of the risk for T2D and CVD among adults in the Caribbean. The study was warranted even though there are no prior data to show the prevalence of CVD among the younger population, for it is evident that it occurs among adults in the Caribbean. Hyperlipidemia was found in adolescents in other studies (refs 4 and 5). It was predicted we would find similar results among our population studied.

References are outdated, incomplete, and non-working URLs. For example, references 3, 12, 14. Clinical Practice Recommendations (ref #18) is updated each year. Ref 20 is used to cite HbA1c Cut off level. This is a poor scholarly choice. Citations of several recent appropriate, peer reviewed articles are lacking to present scholarly acumen.

The IDF cutoffs for HbA1c was selected for this population over the ADA cut-offs since this was not a USA population. Another reference has replaced reference number 20. References 3 and 12 were updated with current URLs.

Reference 14 has been updated.

Lack of consistency: BMI class, categories, status in figures. Figure 3 is confusing.

Figure 3 legend included BMI values whereas the other figures did not include these values. These have been subsequently removed to allow for consistency in the figure legend indicating BMI categories. A note has been added to figure 3 legend to improve clarity as follows: “A count of all risk factors was made, and the number of risk factors was compared with BMI levels. All subjects in all BMI categories reported some risk factors. Underweight subjects reported family history of obesity, T2D, and CVD which are risk factors for the development of chronic diseases. Overweight and obese subjects had greater numbers...”
Not clear how physical activity was assessed, measured or defined.

No description or details were given in the manuscript but readers were referred to three articles which addressed the instruments for measuring AN, PA and family history of obesity, in the interest of space and word count:

“All instruments were pilot-tested in a high school that was similar to, but not part of the sample schools. Instruments for measuring physical activity and family history of obesity and AN were used, and reliability was determined in previous studies.”

A description was added for PA as suggested and reads as follows:

“The self-administered Physical Activity Questionnaire for Children (PAQ-C) assessed general physical activity levels during the school year.” The instrument consisted of 9 items that assessed activity levels at different times of the day including school and out of school activities. Items were scored on a scale of 1-5 where 1 = inactive (non-participation in that particular activity); 2 = low activity level (activity is performed 1-2 times), 3= moderately active (activity is performed 3-4 times); 4= active (activity is performed 5-6 times); 5 = very active (activity is performed > 7 times) in the past week. The 9 items were summed then averaged to determine the weekly activity level of adolescents. For the current study, physical activity levels were classified as 0 = low (activity performed 0-2 times/week); 1 = physically active (activity performed >2 times/week).

Two sentences were added for the measurement of AN and family history of obesity as follows:

Family history of obesity was determined by students’ selections from nine body silhouettes which they considered matched their parents. Presence of Acanthosis Nigricans was determined by the detection of a dark line around the neck.

Is dietary intake of nutrients an environmental variable? There is no mention of diet or nutrition.

Dietary intakes were analyzed in this population; in the interest of space and word count, they were not reported here. (Dietary intake has been analyzed and discussed in detail in a separate manuscript currently in progress). The current manuscript discusses 12 of 13 risk factors.

Authors claimed, “Our findings on the anthropometrics measures of risk factors.”

Sensitivity and specificity issues were not addressed or identified in this manuscript since the authors were mainly examining
and family history of diseases identified more subjects at risk for T2D and CVD than did the more expensive biomarkers." However, sensitivity and specificity data are missing.

Jamaican adolescents’ risk for chronic diseases. The objective of the study was not to determine which measure of the various risk factors were more accurate in identifying these risks. The use of anthropometrics and family history of diseases identified higher numbers of subjects at risk when compared to those identified by the biomarkers. Family history of diseases, high BMI, WC and WHR are known measures of the risk factors of T2D and CVD. The wording of the original statement has been clarified as follows: “Family history of disease and anthropometric measures identified more subjects at risk than did the blood measures.”

In Introduction the authors state that “Due to travel and exposure to media...” may increase the risk of T2D and CVD. It seems something is missing- perhaps it is more about the open market economy in Jamaica.

This wording has been clarified as follows:

“Due to travel, exposure to media, and the open market economy, Jamaican adolescents are exposed to different foods and lifestyle factors. Jamaican adolescents, then, are expected to share similarities in T2D and CVD risk factors with adolescents in the developed countries.”

Although children and adolescents are used interchangeably, it is better to select one and use throughout the manuscript for consistency.

With the exception of specific referenced works which refer only to children, the term, “adolescents,” has been substituted for “children” throughout the manuscript.

**VERSION 2 – REVIEW**

**REVIEWER**  
Melissa Burroughs Pena, MD  
Fellow in Cardiovascular Medicine  
Duke University Medical Center  
USA  
I have no competing interests.

**REVIEW RETURNED**  
10-Apr-2013

**THE STUDY**  
Can you please explain how many minutes were between the two blood pressure measurements?

**RESULTS & CONCLUSIONS**  
Please revise table 1 so that the value is on the same row as the label.

The format of table 3 is still confusing and unclear. Is the odds ratio presented for men with women as the reference group or women with men as the reference group.

The discussion is more focused but still not well organized. It might be better to organize the results and discussion by the objectives set in the introduction.
## VERSION 2 – AUTHOR RESPONSE

| Reviewer’s Comments                                                                 | Authors’ Responses                                                                                                                                 |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| I have no competing interests                                                      | The issue of conflict of interest has already been stated on page 23 of the document.                                                                |
| Can you please explain how many minutes were between the two blood pressure         | Lines 171-172 addressed this issue as follows;                                                                                                       |
| measurements?                                                                       | "Blood pressure (BP) was measured twice for each subject; subjects rested for five minutes prior to each measurement."                                  |
| Please revise table 1 so that the value is on the same row as the label             | We have corrected formatting in table 1.                                                                                                            |
|                                                                                     | Corrections are highlighted in red on page 11.                                                                                                       |
| The format of table 3 is still confusing and unclear. Is the odds ratio presented    | We have added a note to table 3 indicating the reference group for each variable. Male versus female for gender; urban versus rural for location;     |
| for men with women as the reference group or women with men as the reference group? | Non-Blacks versus Blacks for ethnicity; and Low versus High for household income.                                                                   |
| The discussion is more focused but still not well organized. It might be better to   | The objectives were replaced by research questions and the results are presented in order of these research questions. The discussion has been modified |
| organize the results and discussion by the objectives set in the introduction.       | to align with the research questions. Sub-titles were added for clarity. All changes are indicated in red. References were re-numbered as text was copied and pasted to make for easier flow. References have been re-numbered in the bibliography as well. |