

Adolescent mental and physical health in the English-speaking Caribbean

Nanlesta A. Pilgrim¹ and Robert W. Blum¹

Suggested citation

Pilgrim NA, Blum RW. Adolescent mental and physical health in the English-speaking Caribbean. *Rev Panam Salud Publica*. 2012;32(1):62–9.

ABSTRACT

Objective. Bronfenbrenner's ecological systems theory, a multisystem framework, was used to identify risk and protective factors associated with adolescent mental and physical health (AMPH) in the English-speaking Caribbean.

Methods. A structured literature review, using the online databases of Medline, PsychInfo, and Scopus, was conducted to identify peer-reviewed studies published between January 1998 and July 2011 focused on adolescents ages 10–19 years.

Results. Sixty-eight articles were examined: 40 on adolescent mental health (AMH), 27 on adolescent physical health (APH), and 1 on both topics. Key individual factors included gender and age. Religiosity and engagement in other risk behaviors were associated with AMH, while the presence of other chronic illnesses affected APH. Significant determinants of AMH in the microsystem included family and school connectedness, family structure, and socioeconomic status. Maternal obesity, parental education, and school environment influenced APH. Studies that investigated macrosystem factors reported few consistent findings related to AMPH. A history of family mental health problems and physical and sexual abuse was significantly associated with AMH in the chronosystem, while a family history of diabetes and low birth weight were associated with APH. Studies did not examine the exosystem or the mesosystem.

Conclusions. AMPH in the English-speaking Caribbean is affected by a variety of factors in developing adolescents and their surroundings. Gender, family, and early exposure to negative environments are salient factors influencing AMPH and present potential avenues for prevention and intervention. A fuller understanding of AMPH in this region, however, requires scientifically rigorous studies that incorporate a multisystem approach.

Key words

Adolescent health; mental health; exercise; body weight; risk factors; Caribbean region.

Mental and physical health conditions are projected to become the leading causes of disease burden and mortality, respectively, in the world by 2030 (1, 2). Adolescence is a unique developmental period marked by processes such as increased cognitive abilities and physical changes. During this period, adolescents may be vulnerable to mental and physi-

cal health conditions. Adolescents in the English-speaking Caribbean may be particularly vulnerable given reported prevalences of 50% being depressed, 15% to 18% experiencing suicidal ideation, 13% to 27% being overweight, and 6% to 13% being obese (3–9). Considering that the risk of coronary heart disease, ischemic stroke, type 2 diabetes, and disability increases as a result of the aforementioned conditions, curbing their growing prevalence in Caribbean adolescents is necessary (1).

To date, however, the sole comprehensive overview of adolescent health in the English-speaking Caribbean came from the 1997–1998 Caribbean Youth Health Survey, composed of 15 000 adolescents in 9 of the 19 Caribbean countries that make up the region's economic community (3). Since then, only one other published review addressed adolescent mental and physical health (AMPH) (10). Therefore, an understanding of the factors that place youth at high risk or protect them from poor mental and physical health is warranted.

¹ Johns Hopkins Bloomberg School of Public Health, Population, Family and Reproductive Health, Baltimore, Maryland, United States of America. Send correspondence to: Robert Blum, rblum@jhsph.edu

This paper presents a structured review of the scientific AMPH literature in the English-speaking Caribbean from 1998, when the Caribbean Youth Health Survey was completed, to July 2011.

THEORETICAL PERSPECTIVE

Bronfenbrenner's ecological systems framework was chosen to guide the search for studies and to systematically identify the risk and protective factors that influence AMPH. Understanding AMPH in the Caribbean requires moving beyond focusing solely on adolescents and their behaviors. It requires understanding that adolescents develop within various social environments, which may interact with each other to differentially affect AMPH (11). Bronfenbrenner's ecological system theory, a multisystem perspective, helps to achieve such an understanding because at its core is that development is contextual and the individual is nested in five interlocking systems (11). The microsystem looks at the complex relationship between adolescents and their immediate environment (e.g., parental abuse), while the mesosystem considers the interrelations in major settings where the adolescent exists (e.g., family–church interactions). Exosystems do not contain the adolescent but include immediate settings that may affect an adolescent's growth—parental work pressure, for example. Macrosystems refer to the overarching culture or subculture where the young person develops (e.g., how cultural beliefs influence eating behavior), and chronosystems are made up of changes or consistencies over time as seen in the adolescent and in the adolescent's environment.

METHODS

Search strategy

Online databases Medline, PsycINFO, and Scopus were searched for articles published between January 1998 and July 2011. The key words “adolescent, adolescence, and youth” were used in conjunction with the key words “Caribbean” and country-specific names² to

² Anguilla, Antigua and Barbuda, Aruba, the Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Maarten, Saint Vincent and the Grenadines, Trinidad and Tobago, and Turks and Caicos.

conduct the search. We intentionally applied broad search terms to be far-reaching when identifying articles. This method resulted in 2 893 articles whose titles and abstracts were scanned to determine whether they met the review's objective. On the basis of this preliminary review, a total of 243 publications received a comprehensive review (e.g., consistent with inclusion criteria and methodologic quality).

Criteria for inclusion

The review was restricted to studies that investigated AMPH outcomes or behaviors; contained an English-speaking Caribbean population; concentrated on adolescents 10–19 years of age (or mean age within this range); gave a clear description of methods and results (e.g., sample selection, study design); used a sample size of 100 or more, allowing smaller sizes if the population or outcome assessed was rare; and was published in a peer-reviewed, English language journal between 1998 and July 2011. For studies with wide age ranges (e.g., 6–18 years) resulting in a mean age outside the inclusion criteria, those in which the adolescent age range was analyzed separately were included. The sample size requirement was chosen to ensure that reviewed studies had sufficient statistical power.

Studies that did not provide original data (such as editorials, review articles, and letters to the editor, with the exception of study briefs), studies that evaluated an instrument or technology, and studies in which age could not be determined were excluded.

Study appraisal and data extraction

The merit of the studies was assessed with a modified quality criteria rating scale (12). The scale ranked studies as excellent, satisfactory, or unsatisfactory on the following criteria: aptness of the study design for analysis, how representative the study population was, appropriateness of the survey instruments used, adjustment for confounders, and comprehensiveness in exploring the research question. For the last measure, the distinction between an excellent and a satisfactory rating depended on whether the study thoroughly addressed all quality criteria. Both authors reviewed studies that came under question for

inclusion. In the end, the review was restricted to studies that received a rating of satisfactory or better.

Data were extracted from articles using a standardized abstraction form. Data extracted included authorship, publication year, location, variables used, sample size and description, study design, measures used, analytic methods, and findings. When studies reported both unadjusted and adjusted analyses, only findings from statistically adjusted analyses were reported. Moreover, one study could contribute multiple findings to the review if it assessed several AMPH outcomes.

Next, findings were organized according to the ecological framework, and the following adolescent mental health (AMH) outcomes were assessed: suicide, depression, rage, psychosocial well-being, body image and satisfaction, eating disorders, weight-loss methods, violence, and substance abuse. For adolescent physical health (APH) outcomes, weight-related outcomes, physical activity, chronic and cardiovascular illnesses, asthma, and oral hygiene were assessed.

Sixty-eight studies, representing 16 English-speaking Caribbean countries, were included in the review (Figure 1). Forty studies assessed AMH, 27 assessed APH, and 1 assessed both. Tables 1 and 2, with detailed information on the reviewed AMH and APH studies, respectively, are available as a [supplementary file](#).

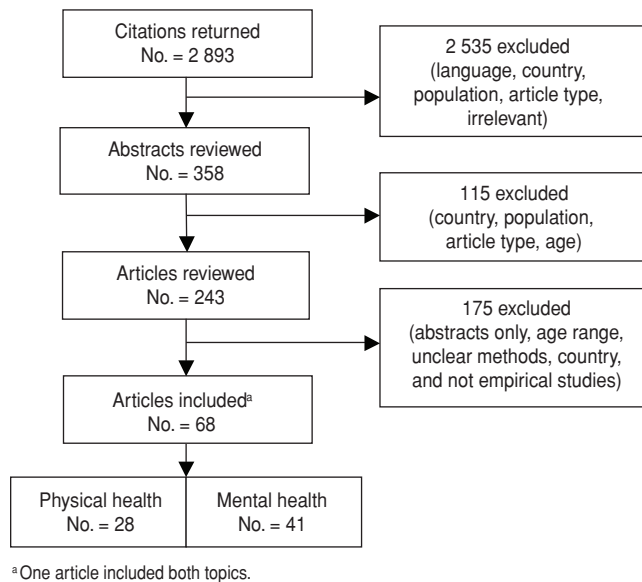
RESULTS: MENTAL HEALTH

Individual

Gender. Eleven studies reported that females were more likely than males to have depressive symptoms, to have attempted suicide, and to have experienced suicidal ideation (3, 4, 13–21). Four studies did not report a gender association with these outcomes (22–25). Females were less satisfied with their bodies and weight than males (8, 13, 26). Yet, females were more likely to use dieting or exercise as weight loss methods while males were more likely to use laxatives, diuretics, or vomiting (13, 26). Gender was not associated with anorexia nervosa (27).

With the exception of sexual assault, all studies found that males were more likely than females to witness, perpetrate, and experience violence; to experience rage; and to be involved in gangs

FIGURE 1. Flowchart showing identification and selection of studies on mental and physical health of adolescents in the English-speaking Caribbean, 1998–2011



(3, 13, 28–32). Males were also more likely than females to use or sell drugs and to use alcohol (33–37).

Age. The relationship between age and AMH was unclear. Five studies reported that older adolescents were more likely than younger adolescents to have depressive symptoms, to use drugs, to witness violence, and to experience rage (13, 18, 29, 37, 38). In contrast, four studies reported that younger adolescents were more likely to have experienced the former two outcomes, to have attempted suicide, and to be victims of violence (13, 24, 25, 35). Yet, one study reported a U-shaped age relationship for depression in adolescents while another did not find an association (16, 22). Younger adolescents were more satisfied with their bodies but were more likely to use vomiting or laxatives as weight loss methods (13).

Ethnicity. The majority of studies reported that ethnicity was not associated with AMPH (14, 18, 27, 39–41).

Correlation of behaviors. Being depressed and having other mental health problems were associated with suicidal ideation and suicide attempts (4, 23). Experiencing rage was associated with alcohol use, suicidal behaviors, and perpetrating violence (3, 13, 42).

Youth who engaged in other risk behaviors, such as substance use, were more likely to be depressed, to antici-

pate using alcohol and drugs, to engage in dangerous dietary behaviors, and to perpetrate violence (19, 26, 27, 36, 38, 42). One study reported that youth who suffered from attention problems were more likely to be depressed (25).

Those with discrepancies between who they actually are and their perceived ideal selves were more likely to be depressed and to have low self-esteem (43). Factors such as having fewer social skills and lower commitment to school were associated with gang involvement (32).

Religiosity. Religiosity was protective against violence, suicidal outcomes, depression, and alcohol use (14, 18, 23, 42, 44, 45).

Civic engagement. A study from Jamaica assessed factors influencing adolescents' cooperation with the police in preventing crimes (46). Judging the police favorably in terms of procedural justice increased cooperation. Gender, believing the police to be proper and just, and distribution of police services were not associated.

Microsystem

Family. A positive family environment was protective against poor AMH. Family connectedness was associated with reduced likelihood of suicidal behaviors, rage, tobacco use, and violence (3, 42). A better parent–adolescent relationship,

as evidenced by high parent–adolescent communication, parental monitoring, and parental attachment and having understanding parents, was associated with reduced likelihood of perpetrating violence, using substances, having depressive symptoms, and attempting suicide and with increased likelihood of having higher social functioning, self-confidence, vocational attitudes, and ethnic identity (3, 4, 14, 18, 20, 34, 36, 42, 47, 48).

Conversely, a poor parent–adolescent relationship—perceived lack of maternal affection and support, being afraid of parents, presence of maternal depression, and being injured by parents—increased the likelihood of depression (15, 19, 24, 25). Adolescents who perceived their parents to have favorable attitudes toward antisocial behavior were more likely to be involved in gangs (32).

Youth living in nonintact families, such as reconstituted families, and those with family problems, such as alcohol abuse in the family, were at higher risk of suicidal behaviors, drug and alcohol use, depression, and eating disorders (4, 14, 18, 19, 26, 27, 35, 37, 42).

Socioeconomic status. Low socioeconomic status (SES) was associated with higher scores on internalizing and externalizing problem behaviors and experiencing violence (20, 29, 30). Specifically, low SES and high SES were associated with experiencing neighborhood and school violence, respectively (30). Studies did not find an association between social class and being a victim of violence or weapon usage (28, 30). Greater residential mobility, however, was associated with gang involvement (32).

Youth whose parents were professionals were more likely to use drugs and alcohol than those whose parents were not professionals (35). Low maternal education was associated with higher ethnic identity but high maternal education, in most studies, was protective against depression (16, 21, 48).

One study reported no association between social class and bulimia, while another reported that adolescents whose parents had manual jobs scored higher on the eating disorder scales than those whose parents had nonmanual jobs or were unemployed (27, 41).

School. School connectedness was protective against alcohol and tobacco use

and violence, while skipping school was a risk factor for these outcomes (42). Being on a higher academic track in school and attending traditional high schools were associated with lower depressive symptoms than being on a lower academic track and attending nontraditional high schools (21, 22).

Peers. Being bullied was associated with increased suicidal ideation, while having close friends was protective against it (4, 14). Cannabis use and alcohol use were positively correlated with their use among the peer group (37). Having peers who were antisocial and used drugs and alcohol was associated with gang involvement (32).

Residence. Not cooperating with police to prevent crimes was associated with having an influential area *don*, a local leader who protects the community (46). Youth living in urban areas were more likely to use drugs and to use weapons in violent acts than those living in rural areas (35). Furthermore, the availability of handguns in the community was associated with adolescents' gang involvement (32).

Macrosystem

One study looked at depression among adolescents in three Caribbean countries: Jamaica, Saint Vincent, and Saint Kitts and Nevis (21). Jamaican adolescents had greater depressive symptoms than adolescents from the other countries. Saint Vincent and Saint Kitts and Nevis did not differ in depressive symptoms.

Two studies reported on cultural differences in psychopathology comparing youth in Jamaica and the United States of America (20, 49). One study reported no significant differences in problem score between the two countries (20). However, Jamaican adolescents reported higher somatic complaints and internalizing behaviors while African American adolescents reported higher attention problems. In another study, Jamaican Americans had higher levels of distress than African Americans and Jamaicans (49). Exposure to community violence was not associated with manifesting psychological distress in any of the groups (49).

Chronosystem

A history of physical and sexual abuse and of family mental health problems

was associated with attempting suicide, having eating disorders, and experiencing rage (3, 13, 26, 27). A history of physical and sexual abuse was also associated with perpetrating violence (42). A longitudinal study reported that early malnutrition at 6 months of age was positively associated with depression and attention problems (24, 25). Early onset of cannabis use was associated with psychotic symptoms (50).

RESULTS: PHYSICAL HEALTH

Individual

Gender. A majority of the studies assessing gender reported that females had higher body mass index (BMI), waist circumference, and percent body fat and lower physical activity levels than males (5–7, 9, 51–63). In none of the studies, however, did the authors suggest that the higher BMI, weight circumference, and body fat of adolescent females was a consequence of lower physical activity levels. Two additional studies reported that females had increased risk of being overweight or obese, while another study found no differences by gender (5, 6, 56). Females were more likely than males to have type 2 than type 1 diabetes (52, 64). One study reported that males had higher systolic and diastolic blood pressure readings, but two studies did not find gender differences for blood pressure or metabolic syndrome (59, 60, 65).

Few studies assessed the association between gender and other physical health outcomes. One study reported that females were more likely than males to have asthma (66). Four of five studies found that gender was not associated with dental caries (67–72).

Age. Blood pressure increased with age as did type 2 diabetes (52, 59, 64). One study reported that younger adolescents were more likely to be physically active than older adolescents, but another study reported the opposite (13, 53). Age was not associated with being overweight (5, 62). Three studies reported that healthy periodontal conditions decreased with age (68, 70, 71).

Chronic illnesses. Adolescents with type 2 diabetes had higher mean BMI, mean waist circumference, and mean systolic blood pressure and lower mean

high density lipoprotein cholesterol; they were more likely to be overweight or obese than those with type 1 diabetes (58, 64). Adolescents who were insulin resistant had higher systolic blood pressure, waist circumference, BMI, fasting glucose, and triglycerides and lower high density lipoprotein cholesterol than those who were not insulin resistant (73). In a sample of Jamaican adolescents with sickle cell disease, youth with greater knowledge about sickle cell disease had better health beliefs about their illness (74).

Other factors. Ethnicity was not associated with BMI (62). Other risk factors for being overweight and having high BMI and waist circumference included experiencing internalized racism and consuming sweetened beverages, respectively (6, 52).

Microsystem

Family and SES. Maternal obesity was positively associated with being overweight among adolescents while paternal obesity was not (5). Adolescent males who lived in crowded households were more likely to be underweight (7). Adolescents who were food insecure were less likely to be physically inactive, overweight, or obese (9, 75). Two studies did not find an association between SES and BMI or metabolic syndrome, while one study found that higher SES was associated with being overweight or obese (62, 65, 75). Adolescent obesity increased with decreasing skill level of parental occupation and with decreasing level of parental education (65).

Only two studies assessed the relationship between family environment and oral health (70, 72). Youth of university-educated parents were less likely to have caries than those with high-school-educated mothers or fathers with vocational training (70). However, those with university-educated parents required the most oral health treatment.

School. Youth who engaged in physical education in school and those who were in primary school were more likely to be physically active than those who did not engage in physical education and were in secondary school (53).

Residence. Three studies looked at geographic differences in oral health (68, 69,

71). One did not find an association (69). While urban youth were more likely to have caries than rural youth, rural youth required more oral health treatment than urban youth (69, 71). Urban or rural residence was not associated with BMI (62).

Macrosystem

Studies in the macrosystem focused on geographic and cross-cultural comparisons. A cross-national study reported that Tobagonian adolescents had higher absolute weight than U.S. adolescents but there were no differences in absolute BMI between the two groups (57). Adolescents in Quebec, Canada, were more overweight than those in Jamaica (75).

Younger Tobagonian adolescents had lower mean systolic blood pressure but older adolescents had higher systolic blood pressure than their U.S. counterparts (60). Tobagonian adolescents had higher diastolic blood pressure and lower systolic blood pressure than Jamaican and British adolescents. Students from Tobago were more likely to experience asthma symptoms, wheezing attacks, sleep disturbance from wheezing, and speech limitation than those from Trinidad (66).

Chronosystem

A family history of diabetes was not associated with physical activity (51). Two of three studies reported an association between adolescents' birth weight and physical health (7, 51, 61). Among low-birth-weight adolescents, girls with a family history of diabetes had higher fasting glucose and insulin resistance than those without a history (51). Low-birth-weight boys compared with normal-birth-weight boys had significantly smaller waist circumference among those without a family history of diabetes (51). Among girls, low birth weight was negatively associated with being overweight (7). A longitudinal study reported that maternal weight and BMI during pregnancy were positively associated with physical activity in adolescence; bigger mothers had more active adolescents (61).

One study in Jamaica assessed the effects of salt fluoridation. The data reflected a major improvement from 1984 to 1995 in the mean score for decayed, missing, and filled teeth. In 1984, the

score was 6.72 at age 12 years and 9.60 at age 15 years. By 1995, the scores were 1.08 and 3.02, respectively (67).

DISCUSSION

This review's objective was to identify the risk and protective factors associated with AMPH in the English-speaking Caribbean. At the individual level, gender and age were key factors associated with AMPH. Religiosity and engagement in risk behaviors emerged as important factors associated with AMH and, not surprisingly, the presence of chronic illnesses influenced APH. Within the microsystem, family factors were important influences on AMPH. Within the macrosystem, studies focused on cross-cultural comparisons but did not show consistent findings. Within the chronosystem, a history of physical and sexual abuse and family mental health problems influenced AMH, while a family history of diabetes and low birth weight influenced APH. Studies did not assess the exosystem or the mesosystem.

Gender was a salient factor in determining AMPH. As reported elsewhere, male adolescents exhibited externalizing behaviors, while female adolescents exhibited internalizing behaviors (76, 77). Female adolescents were at greatest risk for poor mental health, worse weight outcomes, less physical activity, and poor cardiovascular conditions. Male adolescents, however, were at greatest risk for substance abuse and perpetrating, experiencing, and witnessing violence. As such, programs and policies that address these outcomes must be cognizant of the influence of gender and be prepared to develop different initiatives for male and female adolescents. Programs that offer things such as skills training for emotional regulation, coping skills for managing stress and depression, and healthy dietary behaviors might foster better AMPH, especially for females (77). Policies advocating for reduced youth access to alcohol, drugs, and weapons and programs focused on conflict resolution skills at the individual and community levels might promote better AMPH, especially for males.

This review highlights the importance of the family environment in AMPH. A positive family environment, such as feeling connected to parents, reduced the likelihood of negative AMPH. Other

aspects, such as residing in a family with substance abuse problems, increased the likelihood of experiencing poor AMPH. These findings are consistent with research from other parts of the world that has shown that the family context is vital to adolescent health outcomes (76, 78). Research is needed that investigates family dynamics and how to address concurrent family and AMPH. When initiating preventive measures, programs must incorporate and address the needs of the entire family, not solely the adolescent, in order to succeed. Enhancing the protective aspects of the family environment can prevent AMPH and minimize the threat of other risk factors for these conditions (77).

This review also pinpoints the need to incorporate a multisystem and a health-across-the-lifespan approach in AMPH research. Factors such as low birth weight were important to AMPH outcomes. However, the lack of longitudinal studies precluded the ability to draw any causal inferences from these findings. Moreover, the studies that looked at the larger macrosystem focused primarily on cross-national comparisons rather than on the macrosystem within countries that may affect AMPH, such as government policies on mental and physical health. Furthermore, the correlation among behaviors, such as youth who engage in risk behaviors being more likely to have depressive symptoms, suggests that there may be a highly vulnerable subset of adolescents in the region who require immediate mental and physical health services.

This review has three notable limitations. First, the search strategies may have overlooked some studies if they were not indexed in the databases examined. Second, the study focused only on the peer-reviewed literature, excluding dissertations, conference abstracts, and other gray literature, which often do not receive rigorous review or are inaccessible. Third, assessment of the studies' methodologic quality was based on a rating scale that has not been tested for validity.

Despite limitations, this review offers important insights into the mental and physical health of Caribbean adolescents and highlights new avenues for research. Although not an objective of this review, it is noticeable that methodologically rigorous research on AMPH

in the Caribbean is lacking. All but two studies were cross-sectional. Research in the Caribbean would benefit from: theory-driven research; advanced study designs (e.g., longitudinal and qualitative designs) and statistical analyses; critical assessment of the validity

and reliability of the data obtained, especially with regard to instruments used; a multisystem approach to research; and intervention research aimed at improving AMPH outcomes. While there is a significant volume of research on AMPH in the Caribbean, there is a long way

to go until there is a knowledge base upon which to build evidence-based interventions.

Acknowledgment. The authors thank Jayne Blanchard for assisting in editing the final version of this paper.

REFERENCES

- World Health Organization. Global health risks: mortality and burden of disease attributable to selected major risks. Geneva: WHO; 2009. Available from: http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf Accessed 28 May 2010.
- World Health Organization. The global burden of disease: 2004 update. Geneva: WHO; 2008. Available from: http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf Accessed 28 May 2010.
- Blum RW, Halcón L, Beuhring T, Pate E, Campell-Forrester S, Venema A. Adolescent health in the Caribbean: risk and protective factors. *Am J Public Health*. 2003;93(3):456–60.
- Rudatsikira E, Muula AS, Siziya S. Prevalence and associated factors of suicidal ideation among school-going adolescents in Guyana: results from a cross sectional study. *Clin Pract Epidemiol Ment Health*. 2007;3:13.
- Gaskin PS, Broome H, Alert C, Fraser H. Misperceptions, inactivity and maternal factors may drive obesity among Barbadian adolescents. *Public Health Nutr*. 2008;11(1):41–8.
- Francis DK, Van den Broeck J, Younger N, McFarlane S, Rudder K, Gordon-Strachan G, et al. Fast-food and sweetened beverage consumption: association with overweight and high waist circumference in adolescents. *Public Health Nutr*. 2009;12(8):1106–14.
- Jackson M, Samms-Vaughan M, Ashley D. Nutritional status of 11-12-year-old Jamaican children: coexistence of under- and overnutrition in early adolescence. *Public Health Nutr*. 2002;5(2):281–8.
- Simeon DT, Rattan RD, Panchoo K, Kungeesingh KV, Ali AC, Abdool PS. Body image of adolescents in a multi-ethnic Caribbean population. *Eur J Clin Nutr*. 2003;57(1):157–62.
- Gulliford MC, Nunes C, Roche B. Food insecurity, weight control practices and body mass index in adolescents. *Public Health Nutr*. 2006;9(5):570–4.
- Maharaj RG, Nunes P, Renwick S. Health risk behaviours among adolescents in the English-speaking Caribbean: a review. *Child Adolesc Psychiatry Ment Health*. 2009;3(1):10.
- Bronfenbrenner U, Morris PA. The ecology of developmental processes. In: Lerner RM, ed. *Handbook of child psychology*. 5th ed. Vol. 1: Theoretical models of human development. New York: Wiley; 1998. Pp. 993–1028.
- Charles VE, Polis CB, Sridhara SK, Blum RW. Abortion and long-term mental health outcomes: a systematic review of the evidence. *Contraception*. 2008;78(6):436–50.
- Halcón L, Blum RW, Beuhring T, Pate E, Campbell-Forrester S, Venema A. Adolescent health in the Caribbean: a regional portrait. *Am J Public Health*. 2003;93(11):1851–7.
- Ali A, Maharajh HD. Social predictors of suicidal behaviour in adolescents in Trinidad and Tobago. *Soc Psychiatry Psychiatr Epidemiol*. 2005;40(3):186–91.
- Ekundayo OJ, Dodson-Stallworth J, Roofe M, Aban IB, Kempf MC, Ehiri JE, et al. Prevalence and correlates of depressive symptoms among high school students in Hanover, Jamaica. *ScientificWorldJournal*. 2007;7:567–76.
- Lowe GA, Lipps G, Halliday S, Morris A, Clarke N, Wilson RN. Depressive symptoms among fourth form students in St. Kitts and Nevis high schools. *ScientificWorldJournal*. 2009;9:149–57.
- Maharajh HD, Neuro D, Ali A. Adolescent depression in Tobago. *Int J Adolesc Med Health*. 2004;16(4):337–42.
- Maharajh HD, Ali A, Konings M. Adolescent depression in Trinidad and Tobago. *Eur Child Adolesc Psychiatry*. 2006;15(1):30–7.
- Maharaj RG, Alli F, Cumberbatch K, Laloo P, Mohammed S, Ramesar A, et al. Depression among adolescents, aged 13-19 years, attending secondary schools in Trinidad: prevalence and associated factors. *West Indian Med J*. 2008;57(4):352–9.
- Lambert MC, Lyubansky M, Achenbach TM. Behavioral and emotional problems among adolescents of Jamaica and the United States: parent, teacher, and self-reports for ages 12 to 18. *J Emot Behav Disord*. 1998;6(3):180–7.
- Lipps GE, Lowe GA, Halliday S, Morris-Patterson A, Clarke N, Wilson RN. The association of academic tracking to depressive symptoms among adolescents in three Caribbean countries. *Child Adolesc Psychiatry Ment Health*. 2010;4:16.
- Lipps G, Lowe GA, Halliday S, Morris-Patterson A, Clarke N, Wilson RN. A brief report on the association of academic tracking with depressive symptoms in high school students in Jamaica. *J Black Psychol*. 2010;36(3):369–80.
- Kukoyi OY, Shuaib FM, Campbell-Forrester S, Crossman L, Jolly PE. Suicidal ideation and suicide attempt among adolescents in western Jamaica: a preliminary study. *Crisis*. 2010;31(6):317–27.
- Galler JR, Bryce CP, Waber D, Hock RS, Exner N, Eaglesfield D, et al. Early childhood malnutrition predicts depressive symptoms at ages 11–17. *J Child Psychol Psychiatry*. 2010;51(7):789–98.
- Waber DP, Eaglesfield D, Fitzmaurice GM, Bryce C, Harrison RH, Galler JR. Cognitive impairment as a mediator in the developmental pathway from infant malnutrition to adolescent depressive symptoms in Barbadian youth. *J Dev Behav Pediatr*. 2011;32(3):225–32.
- McGuire MT, Story M, Neumark-Sztainer D, Halcón L, Campbell-Forrester S, Blum RW. Prevalence and correlates of weight-control behaviors among Caribbean adolescent students. *J Adolesc Health*. 2002;31(2):208–11.
- Marlowe K. A preliminary study of eat and bite scores for one school year in Bermuda: increased early anorexic measures related to socio-economic factors. *Int J Soc Psychiatry*. 2005;51(1):5–12.
- Soyibo K, Lee MG. Domestic and school violence among high school students in Jamaica. *West Indian Med J*. 2000;49(3):232–6.
- Gardner JM, Powell CA, Thomas JA, Millard D. Perceptions and experiences of violence among secondary school students in urban Jamaica. *Rev Panam Salud Publica*. 2003;14(2):97–103.
- Samms-Vaughan ME, Jackson MA, Ashley DE. Urban Jamaican children's exposure to community violence. *West Indian Med J*. 2005;54(1):14–21.
- Liu H, Yu S, Cottrell L, Lunn S, Deveaux L, Brathwaite NV, et al. Personal values and involvement in problem behaviors among Bahamian early adolescents: a cross-sectional study. *BMC Public Health*. 2007;7:135.
- Katz CM, Fox AM. Risk and protective factors associated with gang-involved youth in Trinidad and Tobago. *Rev Panam Salud Publica*. 2010;27(3):187–202.
- Cole M, Stanton B, Deveaux L, Harris L, Cottrell L, Clemens R, et al. Latent class analysis of risk behaviors among Bahamian young adolescents: relationship between values prioritization and latent class. *Soc Behav Pers*. 2007;35(8):1061–76.
- Cottrell L, Yu S, Liu H, Deveaux L, Lunn S, Bain RM, et al. Gender-based model comparisons of maternal values, monitoring, communication, and early adolescent risk behavior. *J Adolesc Health*. 2007;41(4):371–9.
- Soyibo K, Lee MG. Use of illicit drugs among high-school students in Jamaica. *Bull World Health Organ*. 1999;77(3):258–62.
- Yu S, Deveaux L, Lunn S, Liu H, Brathwaite N, Li X, et al. At greatest risk: pre- and early adolescent Bahamian youth experiencing anal intercourse. *Int J STD AIDS*. 2007;18(6):396–401.
- Konings M, Maharajh HD. Substance abuse in different school systems in Trinidad and

- Tobago: a controlled study of children with disabilities and their drug use. *Int J Disabil Hum Dev.* 2007;6(1):29–37.
38. Yu S, Clemens R, Yang H, Li X, Stanton B, Deveaux L, et al. Youth and parental perceptions of parental monitoring and parent-adolescent communication, youth depression, and youth risk behaviors. *Soc Behav Pers.* 2006;34(10):1297–310.
 39. Rambaran K, Austin M, Nichols S. Ethnicity, body image perception and weight-related behaviour among adolescent females attending secondary school in Trinidad. *West Indian Med J.* 2006;55(6):388–93.
 40. Simeon DT, Abdool PS, Ali AC, Kungeesingh KV, Panchoo K, Rattan RD. 'Slim is not in' among adolescents in Trinidad. *J Adolesc Health.* 2001;28(5):370–1.
 41. Bhugra D, Mastrogianni A, Maharajh H, Harvey S. Prevalence of bulimic behaviours and eating attitudes in schoolgirls from Trinidad and Barbados. *Transcult Psychiatry.* 2003;40(3):409–28.
 42. Blum RW, Ireland M. Reducing risk, increasing protective factors: findings from the Caribbean Youth Health Survey. *J Adolesc Health.* 2004;35(6):493–500.
 43. Ferguson GM, Hafen CA, Laursen B. Adolescent psychological and academic adjustment as a function of discrepancies between actual and ideal self-perceptions. *J Youth Adolesc.* 2010;39(12):1485–97.
 44. Rollocks SC, Dass N, Seepersad R, Mohammed L. The role of religiosity in influencing adolescent and adult alcohol use in Trinidad. *J Drug Educ.* 2008;38(4):367–76.
 45. Rollocks S, Dass N. Influence of religious affiliation in alcohol use among adolescents in Trinidad, Tobago, and St. Lucia: a follow-up study. *Am J Drug Alcohol Abuse.* 2007;33(1):185–9.
 46. Reisig MD, Lloyd C. Procedural justice, police legitimacy, and helping the police fight crime: results from a survey of Jamaican adolescents. *Police Q.* 2009;12(1):42–62.
 47. McBride DC, Freier MC, Hopkins GL, Babikian T, Richardson L, Helm H, et al. Quality of parent-child relationship and adolescent HIV risk behaviour in St. Maarten. *AIDS Care.* 2005;17(Suppl 1):S45–54.
 48. Kenny ME, Griffiths J, Grossman J. Self-image and parental attachment among late adolescents in Belize. *J Adolesc.* 2005;28(5):649–64.
 49. Rosenthal BS, Wilson WC. Adolescents' psychological response to the experience of community interpersonal violence: a cross-national and a cross-cultural comparison. *Adolescence.* 2006;41(163):417–33.
 50. Konings M, Henquet C, Maharajh HD, Hutchinson G, Van Os J. Early exposure to cannabis and risk for psychosis in young adolescents in Trinidad. *Acta Psychiatr Scand.* 2008;118(3):209–13.
 51. Chambers EC, Tull ES, Fraser H, Mutunhu NR, Sobers NP, Niles E. A family history of diabetes is related to abnormal insulin sensitivity in African-Caribbean girls of low birth weight: is catch-up weight important? *Ethn Dis.* 2005;15(3):424–8.
 52. Chambers EC, Tull ES, Fraser HS, Mutunhu NR, Sobers N, Niles E. The relationship of internalized racism to body fat distribution and insulin resistance among African adolescent youth. *J Natl Med Assoc.* 2004;96(12):1594–8.
 53. Prochaska JJ, Sallis JF, Griffith B, Douglas J. Physical activity levels of Barbadian youth and comparison to a U.S. sample. *Int J Behav Med.* 2002;9(4):360–72.
 54. Thame MM, Jackson MD, Manswell IP, Osmond C, Antoine MG. Weight retention within the puerperium in adolescents: a risk factor for obesity? *Public Health Nutr.* 2010;13(2):283–8.
 55. Gulliford MC, Mahabir D, Nunes C, Roche B. Self-administration of a food security scale by adolescents: item functioning, socio-economic position and food intakes. *Public Health Nutr.* 2005;8(7):853–60.
 56. Nichols SD, Cadogan F. BMI-based obesity cutoffs and excess adiposity in a Caribbean adolescent population of African origin. *Eur J Clin Nutr.* 2009;63(2):253–8.
 57. Nichols SD, Cadogan FI. Anthropometric reference values in an Afro-Caribbean adolescent population. *Am J Hum Biol.* 2008;20(1):51–8.
 58. Tulloch-Reid MK, Walker SP. Quality of life in Caribbean youth with diabetes. *West Indian Med J.* 2009;58(3):250–6.
 59. Wilks RJ, McFarlane-Anderson N, Bennett FI, Reid M, Forrester TE. Blood pressure in Jamaican children: relationship to body size and composition. *West Indian Med J.* 1999;48(2):61–8.
 60. Nichols S, Cadogan F. Blood pressure and its correlates in Tobagonian adolescents. *West Indian Med J.* 2006;55(5):305–12.
 61. Campbell CP, Barnett AT, Boyne MS, Soares-Wynter S, Osmond C, Fraser RA, et al. Predictors of physical activity energy expenditure in Afro-Caribbean children. *Eur J Clin Nutr.* 2010;64(10):1093–100.
 62. Barrett SC, Huffman FG. Comparison of self-perceived weight and desired weight versus actual body mass index among adolescents in Jamaica. *Rev Panam Salud Publica.* 2011;29(4):267–76.
 63. Wilson WM, Bulkan J, Piperata BA, Hicks K, Ehlers P. Nutritional status of Makushi Amerindian children and adolescents of Guyana. *Ann Hum Biol.* 2011;38(5):615–29.
 64. Tulloch-Reid MK, Boyne MS, Smikle MF, Choo-Kang EG, Parkes RH, Wright-Pascoe RA, et al. Cardiovascular risk profile in Caribbean youth with diabetes mellitus. *West Indian Med J.* 2009;58(3):219–26.
 65. Ferguson TS, Tulloch-Reid MK, Younger NOM, Knight-Madden JM, Samms-Vaughan M, Ashley D, et al. Prevalence of the metabolic syndrome and its components in relation to socioeconomic status among Jamaican young adults: a cross-sectional study. *BMC Public Health.* 2010;10:307.
 66. Monteil MA, Joseph G, Changkit C, Wheeler G, Antoine RM. Comparison of prevalence and severity of asthma among adolescents in the Caribbean islands of Trinidad and Tobago: results of a nationwide cross-sectional survey. *BMC Public Health.* 2005;5:96.
 67. Estupiñán-Day SR, Baez R, Horowitz H, Warpeha R, Sutherland B, Thamer M. Salt fluoridation and dental caries in Jamaica. *Community Dent Oral Epidemiol.* 2001;29(4):247–52.
 68. Alonge OK, Narendran S. Periodontal health status of school children in St. Vincent and the Grenadines. *Odontostomatol Trop.* 1999;22(88):18–22.
 69. Alonge OK, Narendran S. Dental caries experience among school children in St. Vincent and The Grenadines: report of the first national oral health survey. *Community Dent Health.* 1999;16(1):45–9.
 70. Adewakun AA, Percival TM, Barclay SR, Amaechi BT. Caries status of children in eastern Trinidad, West Indies. *Oral Health Prev Dent.* 2005;3(4):249–61.
 71. Naidu R, Prevatt I, Simeon D. The oral health and treatment needs of schoolchildren in Trinidad and Tobago: findings of a national survey. *Int J Paediatr Dent.* 2006;16(6):412–8.
 72. Fergus CE. Caries prevalence and experience of 12-year old children in Montserrat. *West Indian Med J.* 2010;59(5):573–7.
 73. Tulloch-Reid MK, Ferguson TS, Younger NO, Van den Broeck J, Boyne MS, Knight-Madden JM, et al. Appropriate waist circumference cut points for identifying insulin resistance in black youth: a cross sectional analysis of the 1986 Jamaica birth cohort. *Diabetol Metab Syndr.* 2010;2(1):68.
 74. Bhatt K, Reid ME, Lewis NA, Asnani MR. Knowledge and health beliefs of Jamaican adolescents with sickle cell disease. *Pediatr Blood Cancer.* 2011;75(6):1044–8.
 75. Dubois L, Francis D, Burnier D, Tatone-Tokuda F, Girard M, Gordon-Strachan G, et al. Household food insecurity and childhood overweight in Jamaica and Québec: a gender-based analysis. *BMC Public Health.* 2011;11:199.
 76. Kirkcaldy BD, Siefen GR, Urkin J, Merrick J. Risk factors for suicidal behavior in adolescents. *Minerva Pediatr.* 2006;58(5):443–50.
 77. Wang RH, Lai HJ, Hsu HY, Hsu MT. Risk and protective factors for suicidal ideation among Taiwanese adolescents. *Nurs Res.* 2011;60(6):413–21.
 78. Resnick MD, Bearman PS, Blum RW, Bauman KE, Harris KM, Jones J, et al. Protecting adolescents from harm: findings from the National Longitudinal Study on Adolescent Health. *JAMA.* 1997;278(10):823–32.

Manuscript received on 30 September 2011. Revised version accepted for publication on 23 February 2012.

RESUMEN
**Salud mental y física
de los adolescentes en el
Caribe de habla inglesa**

Objetivo. Se empleó la teoría de sistemas ecológicos de Bronfenbrenner, un marco conceptual multisistémico, para identificar los factores de riesgo y de protección asociados con la salud mental y física de los adolescentes en el Caribe de habla inglesa.

Métodos. Se llevó a cabo una revisión bibliográfica estructurada usando las bases de datos en línea MEDLINE, PsychInfo y Scopus, para identificar estudios con revisión externa publicados entre enero de 1998 y julio del 2011 centrados en adolescentes de 10 a 19 años.

Resultado. Se examinaron 68 artículos: 40 sobre salud mental en adolescentes, 27 sobre salud física en adolescentes y 1 sobre ambos temas. Los factores individuales clave incluyeron el sexo y la edad. La religiosidad y la participación en otros comportamientos de riesgo se asociaron con la salud mental, mientras que la presencia de otras enfermedades crónicas afectó a la salud física. Los determinantes significativos de la salud mental en el microsistema incluyeron la vinculación con la familia y la escuela, la estructura familiar y la situación socioeconómica. La obesidad materna, la educación parental y el ambiente escolar influyeron en la salud física. Los estudios que investigaron los factores del macrosistema informaron pocos resultados consistentes relacionados con la salud mental y física en los adolescentes. Los antecedentes familiares de problemas de salud mental, y el maltrato físico y el abuso sexual presentaron una asociación significativa con la salud mental en el cronosistema, mientras que los antecedentes familiares de diabetes y peso bajo al nacer se asociaron con la salud física. Los estudios no examinaron el exosistema o el mesosistema.

Conclusiones. La salud mental y física de los adolescentes en el Caribe de habla inglesa está afectada por varios factores de su desarrollo y su entorno. El género, la familia y la exposición temprana a un entorno negativo son factores destacados que influyen en la salud mental y física de los adolescentes y representan posibles caminos para la prevención y la intervención. No obstante, para alcanzar una comprensión más integral de la salud mental y física de los adolescentes en esta región se requieren estudios científicamente rigurosos que incorporen un enfoque multisistémico.

Palabras clave Salud del adolescente; salud mental; ejercicio; peso corporal; región del Caribe.

MATERIAL SUPLEMENTARIO / SUPPLEMENTARY MATERIAL

Review article:
(Author's submitted version)

Pilgrim NA, Blum RW. Adolescent mental and physical health in the English-speaking Caribbean. Rev Panam Salud Publica. 2012;32(1):62-9.

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Rudatsikira(4)	2007	Guyana	Suicidal ideation	Mental health, bully status, gender, family and peer relationships	1 197 51% female	Suicide Cross sectional Random, national, school-based	Guyana Global School-Based Health Survey (GSHS) 2004	Factors negatively associated with suicidal ideation in the last 12 months included being male, having close friends and having understanding parents. Factors positively associated with suicidal ideation include being bullied and being depressed in the past year.
Kukoyi(23)	2010	Jamaica	Suicide attempt, suicidal ideation	Gender, age, depression, mental and emotional health; violence and violent tendencies; difficulty managing anger; history of sexual and physical abuse; substance abuse; familial and social connectedness; religious affiliation	332 Age: 10-19 57.5% female	Cross sectional Non-random, non-national, school-based	Questionnaire based on Caribbean Youth Health Survey	24.6% of the participants reported having attempted suicide and 38% reported having suicide ideations. In adjusted analyses, a history of having violent thoughts toward others, having mental health problems other than depression, a history of self-violence and a history of sexual abuse was significantly associated with suicidal attempt. Having emotional/mental health issues, trying to hurt oneself in the past, feeling one can easily obtain means to kill themselves and having a family or individual history of sexual abuse was significantly associated with suicidal ideation.
Ali(14)	2005	Trinidad & Tobago	Suicidal behaviors	Demographics, family structure, religious practices, alcohol abuse	1 845 Age: 14-20 60% female	Cross sectional Random, national, school-based	Suicidal Ideation Questionnaire (SIQ)	Gender, a history of physical abuse, substance use, school performance, religious affiliation, free time, and difficulty managing anger were not associated with suicidal attempt or ideation. In comparison to males, females had significantly higher rates of suicidal ideation and suicide attempts. There were no significant differences for suicidal ideation and attempts by ethnicity. Adolescents who attended religious institutions and prayed with their families were significantly less likely to have suicidal attempts and ideation. Adolescents from reconstituted families had the greatest suicidal ideation. Those from single step-parent had the highest suicide attempt followed by reconstituted family, one-parent, relatives and intact family. Suicide ideation and attempts were higher in the presence of alcohol abuse.
Blum(3)	2003	Multi-country ^c	Ever attempted suicide	Parent and family connectedness, physical and sexual abuse, parental mental health, how hard the tries at schoolwork,	15 695 Age: 10-19 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey; Parent and family connectedness scale	Girls were more likely to have attempted suicide. The main factor associated with attempted suicide was history of suicide among family or friends while parental connectedness was protective against it.

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Halcon(13)	2003	Multi-country ^c	Ever attempted suicide	Gender, age	15 695 Age: 10-18 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey	Females were more likely to have attempted suicide and know a family member or friend who attempted suicide. Younger adolescents (<12 years) were less likely to have attempted suicide or know someone who attempted suicide.
Yu(38)	2006	Bahamas	Risk involvement (e.g. drugs), depression	Depression, age, parent-youth communication	752 Age: 9-14 54% female 647 parents.	Depression Cross sectional Random, non-national, school-based	Bahamian Youth Health Risk Behavioral Inventory; McCubbin's Parent-Adolescent Communication Scale ; Kovac's Children's Depression Inventory Short Form; Silverberg and Small's Parent Monitoring Scale	Older youth, youth with past histories of risk behaviors and those reporting higher levels of impaired parent-youth communication were more likely to be depressed. Depressed youth were significantly more likely to anticipate risk involvement over the next six months, except intentions to use condoms and drinking alcohol. They also perceived significantly lower levels of parental monitoring and were more likely to disagree that communication with their parents was open. Depressed parent-youth dyads were more likely to report problem communication.
Galler(24)	2010	Barbados	Depressive symptoms	Moderate-severe malnutrition in first year of life, family standard of living, maternal depressive symptoms, age	168 Age: 11-17	Longitudinal Non-random, national, community-based	Minnesota General Adjustment and Morale Scale and Zung Depression and Anxiety Scales validated for use in Barbados; Socioeconomic Status and Ecology Questionnaire	Youth who are depressed, those with past risk behavior, those with perceived higher levels of impaired parent-youth communication and those with lower parental monitoring were associated with anticipated risk behavior of young people during the next 6 months. Longitudinally, malnutrition and maternal depression predicted higher youth depression scores. Younger adolescents reported more depressive symptoms than older youth. Sex and family standard of living was not associated with depressive symptoms.
Waber(25)	2011	Barbados	Depressive symptoms	Early malnutrition, intelligence quotient (IQ) and teacher rated attention problems at age 5-11, Common Entrance Examination	123 Age: 11-17	Longitudinal Non-random, national, community-based	Wechsler Intelligence Scale for Children, teacher behavior questionnaire (school functioning scale), Barbados ecology	Maternal depression was not a mediator or moderator of the association between early malnutrition and youth depressive symptoms. In adjusted models, early malnutrition significantly predicted cognitive variables (lower IQ, more attention problems and lower CEE scores), and adolescent depressive symptoms. Standard of living predicted IQ and CEE scores but not depressive symptoms.

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Ekundayo(15)	2007	Jamaica	Depressive symptoms	(CEE), a standard achievement test at age 11, standard of living at age 5-11 and currently	748 Age: 14-19	Cross sectional Non-random, non-national, school-based	questionnaire (standard of living scale), youth and maternal mood scale An abbreviated form of the Beck's Depression Inventory II (BDI-II).	Maternal depressive symptoms significantly predicted adolescent depressive symptoms but did not act as a mediator between malnutrition and depressive symptoms. Sex was not associated with depressive symptoms or cognitive variables. Age predicted depressive symptoms (increasing age associated with decreasing depressive symptoms). IQ, attention, and CEE significantly mediated the relationship between early malnutrition and depressive symptoms. The direct effect from early malnutrition to adolescent depression is attenuated by approximately two thirds when IQ, attention and CEE are accounted for in the model. The prevalence of depressive symptoms was higher in females than males. Perceived lack of maternal affection and support was associated with depressive symptoms. Being sexually experienced was marginally associated with depressive symptoms.
Ferguson(43).	2010	Jamaica	Depressive symptoms, self esteem, and school grades	Demographics, family structure, parental presence and supervision, perception of parental affection and support Actual-ideal discrepancies	212 Age: 11- 18 59% female	Cross sectional Non-random, non-national, school-based	The Identity Pie;; The Rosenberg Global Self-Esteem Scale; The Center for Epidemiological Studies Depressive symptoms Scale (CES-D) BDI-II	Discrepancies between actual and ideal scores were associated with lower self-esteem, higher depressive symptoms and lower school grade in domains of friendship, dating and school work. Effects were stronger among older adolescents.
Lipps(22).	2010	Jamaica	Depressive symptoms	Age, gender, maternal education, type of school (traditional or non-traditional)	278 Age: 14-16 52% female	Cross sectional Non-random, non-national, school-based	71.9% of adolescents reported mild to severe symptoms of depression, with 27.7% reported moderate to severe symptoms, and 12.9% reported severe symptoms.	In adjusted models, attendance in a traditional high school was associated with significantly lower BDI-II scores. Maternal education, age and gender were not associated with BDI-II scores.
Lipps(21).	2010	Jamaica, St. Vincent	Depressive symptoms	Age, gender, maternal education, academic	1738 Age: 12-19	Cross sectional	BDI-II	The interaction of gender and type of school attended was significantly associated with depressive symptoms. Male students who attended non-traditional high schools reported significantly higher BDI-II scores than male students attending traditional high schools and female students attending either type of school. 53% of adolescents reported mild to severe symptoms of depression, with 19.2% reported moderate symptoms and

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
		and St. Kitts and Nevis		track	52% females Jamaica 278 Age: 14-16 52% female	Non-random, non-national, school-based		10.7% reported severe symptoms. In Jamaica, 23.4% reported mild symptoms, 26.3% moderate symptoms, and 14.4% severe symptoms. In St. Kitts and Nevis, the proportions were 21.6%, 14% and 10.7%, respectively. In St. Vincent, they were 24.4%, 21.8%, and 9.2%, respectively.
		St. Kitts and Nevis			St. Kitts and Nevis 737 Age: 12-19 51% female			Jamaican adolescents reported higher depression scores than adolescents in the other two countries. Adolescents from St. Vincent and St. Kitts and Nevis did not significantly differ on depression scores. Males in Jamaica reported significantly higher scores than males in the other two countries. Countries did not differ on depression scores by maternal education and academic.
		St. Vincent			St. Vincent 716 Age: 13-19 54% female			Higher academic track students had significantly lower depression scores than lower academic track students. Female adolescents across the three countries reported significantly higher depressive symptoms than males. Adolescents whose mothers had a post-secondary education had significantly lower depression scores than those with mothers who graduated from or had not completed secondary school.
Lowe (16)	2009	St. Kitts & Nevis	Depressive symptoms	Gender, age, maternal education	744 Age: 13-19	Cross sectional Census non-random, national, school-based	BDI-11	In comparison to males, females were more likely to report some level of depression symptoms as well as reporting more moderate to severe or severe symptoms. Those younger and older than expected for their grade reported higher depression score. Students whose mothers had higher education levels reported lower mean depression scores than student whose mother had a secondary education only.
Maharajh(17)	2004	Trinidad & Tobago	Depressive symptoms, major depressive disorder and dysthymia	Gender	198 Age: 14-18 60% female	Cross sectional Random, non-national, school-based	Reynolds Adolescent Depression Scale (RADS); Patient Health Questionnaire (PHQ-9)	Females were more likely to have depression and major depressive disorder than males.
Maharajh(18)	2006	Trinidad & Tobago	Depression symptoms	Demographics, family structure, religious behaviors, alcohol abuse in family, type of school, location	1 845 Age: 14-20 60% female	Cross sectional Random, national, school based	Reynolds' Adolescent Depression Scale (RADS)	Depression was double in females than males. Those age 16 had the highest score. Adolescents from reconstituted families and those living with relatives had significantly higher mean depression scores than individuals from intact families. Adolescents who attended a religious institution more than seven times and those who prayed with their family had significantly

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Maharajh(19)	2008	Trinidad & Tobago	Depression	Gender, family structure, alcohol and drug use, being afraid of parents or being injured by parents	1 290 Age: 13-19 58% female	Cross sectional Random, national, school-based	Pretested Beck Depression Inventory (BDI)	lower mean depression score than those adolescents who did not. Adolescents with alcohol abuse present in the family were more likely to be depressed than those without abuse present.
Kenny(48)	2005	Belize	Self image: ethnic identity, self-confidence, social functioning and vocational attitudes.	Parental education, ethnicity, gender and parental attachment	Psychosocial Well-being 285 Mean age: 17.8 (SD: 1.4) 56% female	Cross sectional	The Offer Self-Image Questionnaire, Revised (OSIQ-R), Multigroup Ethnic Identity Measure (MEIM); the Parental Attachment Questionnaire (PAQ)	Trinidad had significantly higher depression rates than Tobago. There were no significant differences by ethnicity. Females, those not living with both parents, those reporting being afraid of their parents, those reporting being injured by their parents and those using cigarettes or alcohol were more likely to be depressed. Student ratings of self-image were unrelated to paternal education and student ethnicity. Female students reported more positive self-images than males in vocational attitudes and social functioning Maternal education was negatively associated with MEIM; ethnic identity was higher for students whose mothers were high school graduates than for those whose mothers had completed college or a graduate degree. Higher paternal attachment was associated higher social functioning while higher maternal attachment was associated with self-confidence and vocational attitudes. Maternal attachment was a significant predictor of MEIM.
Lambert(20)	1998	Jamaica & the United States	Psychopathology (e.g. anxiety, delinquency)	Location, gender, reporter (parent, teacher or adolescent)	730 Age: 12-18, their parents and teachers; 365 Jamaican adolescents	Cross sectional Random, non-national, school-based	Jamaican versions of: Child Behavior Checklist; Teacher's Report Form; Youth Self-Report.	No significant differences in problem score were found between the two samples. Adolescents in both countries reported more problems than their parents or teachers. Jamaican adolescents reported higher withdrawn and somatic complaints and internalizing behaviors while US adolescent reported higher attention problems. Boys reported higher score on attention problems, delinquent behaviors and externalizing problems while girls reported higher somatic complaints, internalizing problems, and anxious depressed syndromes. Jamaican adolescents have statistically significant higher levels of psychological distress than Jamaican American and African American adolescents.
Rosenthal (49)	2006	Jamaica; United States	Psychological distress in past two months	National and cultural setting	617 Age: 16 -20; 301 Jamaicans, 137	Cross sectional Non-random, non-national, university-	Adaptation of the Survey of Exposure to Community Violence; Trauma Symptom Inventory	There were no significant differences between exposure

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Konings(50)	2008	Trinidad & Tobago	Psychotic symptoms	Lifetime cannabis use	Jamaican American, 179 African American Age: 12-23 55% female	Cross sectional Random, non-national, school-based	Community Assessment of Psychic Experiences (CAPE).	to community violence and manifesting psychological distress. Cannabis use was not associated with increased levels of psychotic symptoms. Early onset of cannabis use (before age 14) was associated with a greater risk of developing psychotic symptoms. This association did not hold for those who started using after the age of 14 years.
Blum(3)	2003	Multi-country ^c	Age	Parent and family connectedness, physical and sexual abuse, parental mental health, how hard the tries at schoolwork, attendance at religious services, thinking about hurting or killing someone, having family members or friends who had attempted suicide	15 695 Age: 10-19; 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey; Parent and family connectedness scale	Males were more likely to experience rage. History of suicide among family or friend and experiencing physical or sexual abuse were associated with rage while parental connectedness was protective.
Halcon(13)	2003	Multi-country ^c	Health related behaviors	Gender, age	15 695 Age: 10-18 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey	Females were less likely to experience rage. Younger adolescents (<12 years) were less likely to experience rage.
Bhugra(41)	2003	Barbados Trinidad & Tobago	Bulimic symptoms	Ethnicity, social class, dietary behaviors, health seeking behaviors	362 Age: 13-19 100% female	Cross sectional Random, non-national, school-based	Bulimia Investigatory Test, Edinburgh (BITE); DSM-III-R Bulimia Diagnostic Interview; Body measurements.	Origin and social class did not affect the distribution of BITE score. Consulting a professional for eating advice, vomiting, using laxatives and exercising to control weight was associated with higher BITE scores.
Marlowe(27)	2005	Bermuda	BITE and EAT scores	Ethnicity, family structure, family mental health, family SES, risk behavior (e.g. drug and alcohol use)	836 Age: 10-15 52.5% female	Cross sectional Non-random, national, school-based	Bulimic Investigatory Test, Edinburgh (BITE); Eating Attitudes Test (EAT); Demographic data sheet	Girls of African origin had higher BMI, believed food dominates their lives, worried they couldn't control what they eat and would go to great lengths to satisfy the urge to binge. Girls of Indian descent practiced fasting more. Factors significantly associated with increased BITE score included black ethnicity, alcohol or other drug use, having a chronic physical illness, currently unmarried both parents with manual jobs, currently unmarried parents, and families with mental health problems.

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Ramberan(39)	2006	Trinidad & Tobago	Body image perception, weight control behaviors	Ethnicity	251 Mean age: 16.3 (SD:1.4) 100% female	Cross sectional Random, national, school-based	Eating Attitudes Test (EAT-26); Body Shape Questionnaire (BSQ16); Rosenberg Self-Esteem Scale; Eating Disorder Inventory-2.	Manual maternal job status and physical illness were significantly associated with being an EAT case in multivariate models. There were no gender or ethnic differences. There were no significant differences by ethnicity on perceived body weight, desired body weight, BSQ16 score, EAT-26 score, and Rosenberg Self-Esteem scale. Indo-Trinidadians had significantly greater body dissatisfaction than Indo-Afro-mixed Trinidadians but not more than Afro-Trinidadians. A significantly higher proportion of Indo-Trinidadians engaged in binge eating behavior compared to the other ethnic groups while Afro-Trinidadians were more likely to use vomiting as a mean of weight control compared to the other groups. There were significant gender differences in desired body size, with a lower proportion of girls compared to boys wanting to be overweight. There were no ethnic differences in desired body weight.
Simeon(40)	2001	Trinidad & Tobago	Desired body size	Gender, ethnicity	1 090 Age:14-17 53% females	Cross sectional Random, national, school-based	Questionnaire; Body silhouettes	There were more thin adolescents of South Asian descent than of African or mixed ethnicity. More South Asians over-estimated their size than the other ethnicities.
Simeon(8)	2003	Trinidad & Tobago	Body perceptions	Ethnicity, gender	1 090 Age:14-17 53% females	Cross sectional Random, national, school-based	Body measurements; Body silhouettes.	More girls than boys thought that the overweight size was the most attractive. Majority were satisfied with their size. More females wanted to lose weight while more males wanted to gain weight.
Halcon(13)	2003	Multi-country ^c	Body perceptions, weight control behavior	Gender, age	15 695 Age:10-18 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey	Majority of the sample chose the normal female body size as the healthiest, the overweight or obese male silhouettes as the wealthiest and the normal silhouette as the happiest. Females were less likely to be satisfied with their body and to use laxatives or vomiting as weight loss methods. Younger adolescents (<12 years) were more likely to use laxatives or vomiting as methods of weight loss and to be satisfied with their bodies.
McGuire(26)	2002	Multi-country ^c	Dieting behaviors (e.g. exercise, vomit)	Psychosocial factors (e.g. suicide attempts), demographic, gender	15 695 Age:10-19 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey	More girls than boys were dissatisfied with their weight and bodies. A higher percentage of girls than boys reported that they dieted or exercised as a method to lose weight. More boys reported they had taken laxative, diuretics or had vomited.

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Cole(33)	2007	Bahamas	Drug-related risk behaviors, delinquency, intentions of future risk behavior	Relationship values (Benevolence, Universalism, Self-direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity and Tradition)	Adolescents, ages 9-14 56% female Random, school-based	Cross sectional (baseline info from RCT) Ron-random, school-based	Bahamian Youth Health Risk Behavioral Inventory, Portrait Values Questionnaire	Several psychosocial factors were related to extreme dieting behaviors: report of familial problems, being a below average student, a history of physical and sexual abuse, suicide attempts and health compromising behaviors such as substance use. Males were more likely than female to engage in risk and delinquent behavior. Males were two times more likely to be in the drugs class than females. Younger adolescents were more likely to be in sex and drugs classes The odds for intention or expectation to engage in drug risk behaviors decrease as adolescents endorsed Security, Tradition and Universalism and increase with Power. Those who endorse Stimulation and Tradition have increased odds of intending to use cocaine and to push drugs.
Cottrell(34)	2007	Bahamas	Risk involvement (e.g. substance use, violence)	Maternal values (openness-to-change, conservatism, self-transcendence And self-enhancement), monitoring knowledge, parent-adolescent communication	647 Mother-adolescent dyads (ages 9-13)	Cross sectional (baseline info from RCT) Random, school-based	Bahamian Youth Health Risk Behavioral Inventory; Portrait Values Questionnaire; Parental Monitoring Scale; Parent-Adolescent Communication Scale.	Parental monitoring knowledge was inversely related to adolescent risk behavior; parent-adolescent communication was indirectly related to adolescent risk behavior through its association with parental monitoring knowledge.
Yu(36)	2007	Bahamas	Risk behaviors (e.g. alcohol and drug use, violence)	Anal and vaginal intercourse, parental monitoring, parent-adolescent communication	1 274 Age:9-14 53% female	Cross sectional (baseline info from RCT) Random, school-based	Bahamian Youth Health Risk Behavioral Inventory; McCubbin's Parent-Adolescent Communication Scale; Kovac's Children's Depression Inventory Short Form	Those who engage in anal intercourse reported the highest rate in all risk behaviors. Those who perceived lower levels of parental monitoring and with a past history of sexual risk behaviors had intentions of engaging in risk behaviors in the next six months. Sexually active youth perceived higher exposure to risk activities among peers, relatives and/or neighbors.
Soyibo(35)	1999	Jamaica	Drug use over a 4 week period (e.g. marijuana, cocaine), knowledge	Location (e.g. urban), gender, age, parental profession	2 417 Age:16-17 56% female	Cross sectional Random, national, school-based	Pilot tested questionnaire	Males were significantly more likely to use marijuana, cocaine, heroin and opium than females. 16 year-olds were more likely than 17 year-olds to use opium. Those living in urban areas were more likely to use marijuana and cocaine than those living in rural areas. Those whose guardians/parents were professionals were significantly more likely to use marijuana and cocaine

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DV ^a	IV ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Konings(37)	2007	Trinidad & Tobago	Drug use	Age, peers-group, family structure, religion, gender, school type	472 Age: 12-23 54% female	Cross sectional Random, non-national, school-based	Survey	than those whose parents were nonprofessionals. Lifetime cannabis use was higher among students from schools catering to those with learning disabilities or psychiatric pathology (SVS) while lifetime alcohol use was higher among students from government assisted schools. Current use of cannabis was greater in SVS students than GAS's. There was no statistical difference in current alcohol use.
Rollocks(45)	2007	Trinidad & Tobago St. Lucia	First, regular alcohol use, attitudes toward alcohol use	Religious affiliation	835 Age:13-18; 55% female 20.6% from St. Lucia	Cross sectional Random, non-national, school-based	Adolescent Substance Subtle Screening Inventory (SASSI-A2)	Males were more likely than females to use both alcohol and cannabis in all types of schools. The age of onset of alcohol and cannabis use was lower among GAS students. Cannabis and alcohol use were positively correlated with peer group use, increased age and non-intact family. Regular use of alcohol is higher among Hindus than the other religious groups. Religion was not related to first and current use of alcohol or attitudes towards alcohol use.
Rollocks(44)	2008	Trinidad & Tobago	First, current and regular use of alcohol	Religiosity (services attendance, affiliation, behavior)	369 Age:13-18 50% female	Cross sectional Random, non-national, school-based	Demographic the Adolescent Substance Subtle Screening Inventory (SASSI-A2)	Catholic adolescents had the highest tendency toward first and current alcohol use as compared to other religious denominations. Adolescents affiliated with other religions reported the highest regular use of alcohol. Adolescents who rarely attended religious services had the highest tendency toward alcohol use in comparison to those who frequently attended religious services.
McBride(47)	2005	St. Martin	Risk behaviors (e.g. alcohol and smoking)	Parent-child relationship (great mother only, father only, both parents)	1 078 Age:14-18 58.5% female	Cross sectional Census, non-random, national, school-based	Survey instrument derived from Youth Risk Behavior Survey and the National Adolescent Student Health Survey.	A great relationship with both parents was associated with greater odds of never smoking, never drinking and never having sex in comparison to a great relationship with mother or father only.
Blum(3)	2003	Multi-country ^c	Problems due to drugs or alcohol	Parent and family connectedness, physical and sexual abuse, parental mental health, how hard the tries at schoolwork, religiosity, thinking about hurting or killing someone, history of	15 695 Age:10-19 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey; Parent and family connectedness scale	Parental substance abuse and parental mental health problems were associated with increased adolescent substance use.

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Blum(42)	2004	Multi-country ^c	Tobacco and alcohol use,	suicide among family and friend Family, other adult and, school connectedness, religiosity, religious attendance, rage, abuse, parental mental health and drug use, rage, and skipping school	15 695 Age: 10-18 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey; Family and other adult connectedness scales	Rage, skipping school and history of abuse is strongly associated with substance use across all age groups and gender, except for alcohol use in those <12 years old. School and family connectedness and religiosity were protective against these behaviors across both genders. Family connectedness was protective against smoking across all age groups except smoking in 16-18 year olds. It was not associated with alcohol use in any age group. School connectedness was protective across all age groups for substance use. Religiosity was protective across all age groups and behaviors except smoking and alcohol use in those less than 12 years of age.
Liu(31)	2007	Bahamas	Problem behaviors (e.g. violence)	Parental and adolescent values (openness-to-change, conservatism, self-transcendence and self-enhancement), gender	785 Age: 9-14 52% female	Cross sectional Random, non-national, school based	Bahamian Youth Health Risk Behavioral Inventory; Portrait Values Questionnaire (PVQ)	More boys reported having one or more problem behaviors than girls. Boys with a higher level of self-enhancement and girls with a higher level of openness to change and a lower level of conservatism were more likely to report problem behaviors.
Gardner(29)	2003	Jamaica	Neighborhood violence, school violence, perceptions of acceptable behaviors, level of concern about violence, and general experiences and perceptions of violence	Type of high school (comprehensive, all age, secondary), gender, age, grade level, socioeconomic status	1710 Age: 9-17	Cross sectional Random, non-national, school based	Pre-tested questionnaire	Boys, older students, and those with poorer socioeconomic status reported higher neighborhood violence. Boys and those from higher socioeconomic status reported more school violence. Perceptions of acceptable behavior did not vary significantly by gender, age, grade, socioeconomic status, or school type.
Reisig(46)	2009	Jamaica	Willingness to cooperate with the police	Rating of police in procedural justice and services delivery, area dons' influence, gender	289 High school students	Cross sectional Random, non-national, school-based	Cooperation with Police scale; Procedural Justice scale; Police Legitimacy scale; and Distributive Fairness scale.	Girls, older children and those in higher grades were more likely to know victims of violence or to consider child abuse, insults, or self-defense as violence. Boys indicating that they worried more about violence than did girls. Adolescents who judge the police more favorably in terms of procedural justice expressed a greater willingness to help the police combat crime. Those who reported that an area don exerts influence in their community were less willing to cooperate with police officers. Distributive fairness, police legitimacy and gender were not associated with cooperation with police.

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DV ^s ^a	IV ^s ^b		Sample Size & Description	Study & Sample Design	Measures	Findings
				National and cultural setting	Gender, social class, school type				
Rosenthal(49)	2006	Jamaica; United States	Exposure to community violence in past three years	National and cultural setting	617 Age: 16 -20; 301 Jamaicans, 137 Jamaican American, 179 African American	Cross sectional Non-random, non-national, university-based	Adaptation of the Survey of Exposure to Community Violence; Trauma Symptom Inventory	Jamaican adolescents have statistically significant lower levels of exposure to community violence than Jamaican American and African American adolescents. There were no significant difference in terms of the relationship between exposure to community violence and manifesting psychological distress.	
Samms-Vaughn(30)	2004	Jamaica	Witnessing violence, being a victim of violence	Gender, social class, school type	1 674 Age: 11-12; 51% female youth who were part of the Jamaican Perinatal Mortality and Morbidity Study 1986-1987	Cross sectional Non-random, non-national, school-based	'Exposure to Violence' Questionnaire developed locally.	Boys reported a significantly higher lifetime prevalence of witnessing all exposures, excluding witnessing robbery, acid injury and sexual assault. Boys reported seeing more dead bodies, outside of a funeral, than girls. Significantly more boys than girls were victims of all forms of violence, excluding sexual assault, where girls reported more experiences as victims. Boys and primary school children were significantly more likely to witness violence and were victims of violence. Those residing in homes in which the head of the household was employed in a lower occupational category were more likely to witness violence but had no greater likelihood of being a victim.	
Soyibo(28)	2000	Jamaica	Witnessing and participating in violence, techniques and weapons used in violent acts and causes and ways of preventing violence	Gender, social class, age, location	3 123 Age: 16-17 53% female	Cross sectional Random, national, school-based	Pilot tested questionnaire	Boys were significantly more likely than girls to use kicks and punches, blunt objects, knives, ice picks, machetes, gun, razor blades, acids and alkalis than girls. Younger adolescents were significantly more likely to use hands or feet, nasty works, kicks and punches and blunt objects. Use of weapons did not differ by parent work class. Urban adolescents were significantly more likely to use hands or feet, nasty works, kicks and punches, blunt objects, knives, forks and alkalis than rural adolescents. 7.7% of youth reported being a gang associate, 6.8% being a former gang member, and 6.2%, a current gang member. Males were more likely than females to be gang associations, former gang members and current gang members. Former gang members were significantly older than current members, affiliates and those who were never in a gang.	
Katz(32).	2010	Trinidad & Tobago	Gang involvement	Risk and protective factors within community, school, family and peer-individual domains, gender, ethnicity, age	2 206 Age: 11-19 59.6% female	Cross sectional Non-random, non-national, school-based	Trinidad and Tobago Youth Survey	In the community domain, adolescents who	

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Blum(3)	2003	Multi-country ^c	Being violent	Parent and family connectedness, physical and sexual abuse, parental mental health, how hard the tries at schoolwork, attendance at religious services, thinking about hurting or killing someone, history of familial and friend suicide	15 695 Age: 10-19 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey; Parent and family connectedness scale	<p>reported residential mobility were more likely to be former gang members; and those who reported availability of handguns in their communities were more likely to be current gang members or former gang members. In the school domain, former gang members were less likely to report low commitment to school. In the family domain, youth who reported favorable parental attitudes toward antisocial behavior were more likely to be a gang associate.</p> <p>In the peer-individual domain, compared with non-gang members, gang associates were significantly more likely to report an elevated risk for antisocial peers, peer drug and alcohol use while former gang members were more likely to have initiated antisocial behavior and had intention to use drugs. Current gang members were more likely to have antisocial peers, peer drug use, early initiation of antisocial behavior, and intentions to use drugs. Current and former gang members reported fewer social skills. However, reporting rewards for prosocial was also associated with gang involvement.</p> <p>Those experiencing rage and male respondents were more likely to be violent while connectedness with parents was protective for younger teens (<16) and attendance at religious services was protective for older teens.</p>
Blum(42)	2004	Multi-country ^c	Being violent	Family, other adult and, school connectedness, religiosity, religious attendance, rage, abuse, parental mental health and drug use, rage, and skipping school	15 695 Age: 10-18 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey Family and other adult connectedness scales	<p>Rage, skipping school and history of abuse is strongly associated with being violent across all age groups and gender.</p> <p>Family connectedness was protective against violence across all age groups except violence in 13-18 year olds. School connectedness and religiosity were protective across all age groups for being violent.</p>

Table 1: Reviewed studies on mental health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Halcon(13)	2003	Multi-country ^c	Being violent	Gender, age	15 695 Age: 10-18 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey	In comparison to females, males were more likely to have experience physical abuse. Females were less likely to be engaged in interpersonal violence. Younger adolescents (<12 years) were less likely to worry about or have been physically or sexually abused and to engage in interpersonal violence.

^a DV: dependent variable

^b IV: independent variable

^c Antigua, Bahamas, Barbados, British Virgin Islands, Dominica, Grenada, Guyana, Jamaica, and St. Lucia

Table 2: Reviewed studies on physical health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DV ^s	IV ^s ^b	Sample Size & Description		Study & Design	Measures		Findings
					Weight	Outcomes & Physical Activity		Physical Activity	Physical Activity	
Chambers(52)	2004	Barbados	Weight status, body fat distribution, physical activity	Internalized racism (INR) and hostility	172 Age: 14-16	Cross sectional	Racial and Stereotyping Scale (RASS); Cook-Medley Hostility Scale adapted for children, Modifiable Activity Questionnaire; Body mass index (BMI) calculated	Racial and Stereotyping Scale (RASS); Cook-Medley Hostility Scale adapted for children, Modifiable Activity Questionnaire; Body mass index (BMI) calculated	Girls had significantly greater mean BMI and waist circumference. Boys had significantly greater leisure time physical activity than girls. INR and hospitality were significantly associated with waist conference in girls but not in boys. INR was positively correlated with hostility in the entire sample. Those with high level of INR had significantly greater BMI and waist circumference. There were no statistically significant differences in physical activity and metabolic or anthropometric variables between those with and without a family history of diabetes. In comparison to their normal birth weight counterparts, low birth weight boys had significantly lower waist circumference among those with no family history of diabetes.	
Chambers(51)	2005	Barbados	Physical activity, body size, birth weight	Family history of diabetes	176 Age: 14-16 52.2% female	Cross sectional	Racial and Stereotyping Scale (RASS); Cook-Medley Hostility Scale adapted for children, Modifiable Activity Questionnaire; Insulin resistance and BMI calculated	Racial and Stereotyping Scale (RASS); Cook-Medley Hostility Scale adapted for children, Modifiable Activity Questionnaire; Insulin resistance and BMI calculated	27% of sample was overweight but there were no differences by sexes. 57% of boys and 61% of girls who were overweight misclassified themselves as normal weight. BMI was significantly higher among girls than boys.	
Gaskin(5)	2008	Barbados	Physical activity, perceptions of body size, health and diet quality	Weight status	400 Age: 11-16 59% female	Cross sectional	Questionnaire BMI calculated	Questionnaire BMI calculated	Maternal obesity increased the odds of being overweight. Age, father's weight, healthy diet, and exercise were not associated with weight status. Physical activity was inversely associated with weight status while recreational physical activity was not associated with weight status.	
Prochaska(53)	2002	Barbados	Physical activity levels	Gender, grade level, school level	1 579 Mean age: 12.1 54% female	Cross sectional	Self-Administered Physical Activity Checklist (SAPAC)	Self-Administered Physical Activity Checklist (SAPAC)	69% reported meeting the guideline of minutes per day of moderate-vigorous physical activity (MVPA). Boys and students in younger grades reported more physical activity.	
Wilson(63)	2011	Guyana	Nutritional status (height-for-age, weight-for-height and BMI)	Gender, relative isolation	792 Age: 0-20 (155 for age 13-20) 52% female in	Cross sectional Non-random, non-national, community-based	anthropometric measurements	anthropometric measurements	Primary school students were more likely to participate in physical education than secondary school students. Those who engaged in physical education were more likely to be physically active before and during school. Among those aged 13-20 years, the prevalence of height for age below the reference mean was lower for females than males. Relative isolation was not associated with outcomes in the age group.	

Table 2: Reviewed studies on physical health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DV ^a	IV ^s ^b	Sample Size & Description		Study & Sample Design	Measures		Findings
					13-20	13-20				
Barrett(62)	2011	Jamaica	Body mass index	self-perceived body size, desired body size, gender, ethnicity, age, place of residence, and SES	276 Age: 14-19 59.4% female	Cross sectional	The Professional Medical Beam Balance scale measured weight; questionnaire; BMI Calculated; pilot tested self-perceived and desired BMI measured using a scale developed by Bulik and colleagues	BMI values classified 24.6% of youth as underweight, 39.9% as normal, 14.5% as overweight, and 21% as obese. There were significant differences between actual and perceived BMI, actual and desired BMI, and perceived and desired BMI ($P < 0.01$).		
Campbell(61)	2010	Jamaica	Physical activity	Maternal weight and height during pregnancy; newborn weight; child anthropometry (e.g. weight, height and pubertal stage), child metabolic factors (e.g. fasting glucose)	284 Age: 11.5-14.9 56.3% female	Longitudinal Non-random, non-national, community-based	Four measures of physical activity: mean Actical count, percent counts >200, energy expenditure (kcal/kg/day) and energy expenditure (kcal/day); various assays were used to assess metabolic factors; questionnaire	Females had significantly higher actual mean BMI compared to males. Males reported significantly higher perceived BMI and desired higher BMI than females. There were no significant by age, SES, ethnicity, and living in rural versus urban locations actual, perceived or desired BMI. The mean Actical counts, the proportion of the day spent in levels of activity that produced 4200 counts/min and energy expenditure expressed in units of kcal/day per kg and kcal/day were higher in boys than girls. Maternal body weight was positively correlated with all four measures of physical activity. Maternal height and BMI was positively associated with physical activity; bigger mothers had more active children. Mother's weight was positively associated with fat free mass, fat mass and percentage fat in their children. In adjusted models, physical activity energy expenditure was negatively associated with fasting glucose but not with any other metabolic factors or anthropometry.		
Dubois(75)	2011	Jamaica Québec, Canada	Overweight/obese	Food insecurity, gender, SES, family structure	1 674 Jamaica 1 110 Québec Age: 10-11	Cross sectional Random, national in	Jamaica Youth Risk and Resiliency Behaviour Survey 2005, Québec	Higher proportions of children in Québec (26%) were overweight than children in Jamaica (11%). Nine percent of the children in Québec and 26% in Jamaica were food insecure. Jamaican children lived in lower		

Table 2: Reviewed studies on physical health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Design	Measures	Findings
Francis(6)	2008	Jamaica	Weight status and waist circumference	Fast-food consumption, dietary pattern, physical activity	1 317 Age: 15-19 54.6% female	Cross sectional Random, national, school-based	Longitudinal Study of Child Development data; food insecurity defined using the definitions of the Food and Agriculture Organization and the United States Department of Agriculture; Food Frequency Questionnaire	SES households, in single parent households, and consumed less fruits and vegetable than children in Québec. In Jamaica, the proportion of overweight/obese children was higher in high-SES households than in medium and low SES households. Children from food-secure household were significantly more likely to be overweight/ obese than those from food-insecure households. In comparison to boys and girls in low SES families, boys from high-SES families and girls from middle-SES families were more likely to be overweight/obese. BMI was significantly higher in females. Overall prevalence of overweight, obesity and high waist circumference were 15%, 6% and 10%, respectively. Male gender was significantly negatively associated with being overweight and high waist circumference. High consumption of sweetened beverages was associated with being overweight.
Jackson(7)	2002	Jamaica	Weight status	Socio-economic factors	1 698 Age: 11-12	Cross sectional Non-random, non-national, school-based	survey	Pastry consumption was negatively associated with overweight and high waist circumference. Absence of fruit consumption and high physical activity were significantly associated with high WC. Girls had higher mean BMI than boys. Living in crowded households decreased the risks of overweight and increased risk of being underweight among boys. Greater maternal parity was negatively associated with being underweight and overweight. Low birth weight was associated with being overweight in girls.
Wilks(59)	1999	Jamaica	anthropometric measurements (e.g. weight, height), BMI, lean body mass, percent body fat	Gender	2 332 Mean age: 11; 55% female	Cross sectional Non-random, non-national, school-based	Anthropometric, blood pressure and pulse rate measurements	In comparison to girls, boys had significantly lower mean age, weight, height, BMI, percent fat, triceps skin folds, subscapular skin folds and mid-upper arm, waist and hip circumferences. Mean weight, percent fat and lean body mass increased with age in both boys and girls. There was no significant difference in mean weight and mid-upper arm circumference between boys and girls, controlling for age. Younger girls were taller with higher lean body mass but lower BMI than boys and older girls

Table 2: Reviewed studies on physical health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Gulliford(9)	2006	Trinidad & Tobago	Weight perceptions and intentional, physical activity	Food insecurity	1 903 Age: 16	Cross sectional Random, national, school-based	6-item Food Security Scale; Questions from the Health Survey of England; Body measurements	<p>were shorter with lower lean body mass but higher BMI than boys.</p> <p>Food security did not vary by BMI. 'Trying to gain weight' and 'spending most free time in activities involving little physical effort' were each associated with lower BMI.</p> <p>Food insecure subjects had high odds of 'trying to gain' than food-secure subjects. Food-insecure subjects were more likely than food-secure subjects to report that most of their free time were spent doing things that involved little physical effort.</p> <p>Males had significantly higher blood pressure readings but lower BMI and percentage BF than their female counterparts.</p>
Nichols(60)	2006	Trinidad & Tobago	Weight	Age, gender, location	3 729 Age: 12-16 57% female	Cross sectional Census, non-random, national, hospital based	Systolic blood pressure (SBP), diastolic blood pressure (DBP), body fat (BF), weight and heights were measured using standardized procedures.	<p>Females 12-15 years old had significantly higher BMI than their male counterparts. There was a linear increasing in percent body fat with age among females, but not among males. Female had significantly higher %BF than their male counterparts in each age group.</p> <p>Tobagonian adolescents had higher absolute weights than their US counterparts in each age, with differences more pronounced in among females. Absolute BMI was similar between Tobagonian males and their US counterparts.</p>
Nichols(57)	2008	Trinidad & Tobago	Weight, height, BMI, body fat	Age, gender, location	3 479 Age: 12-18 61.4% female	Cross sectional Non-random, national, school-based	Body measurements (e.g. BMI), US standards	<p>The prevalence of obesity was higher in girls than boys. Females also had significantly higher BMI, total skinfold thickness, %BF but lower mean weight and height than males.</p> <p>Males were more likely to exercise hard weekly than females. Younger adolescents (<12 years) were more likely to report never exercising, in comparison to adolescent older than 12 years of age.</p>
Nichols(56)	2009	Trinidad & Tobago	Body fat, BMI	Centre for Disease Control (CDC) and International Obesity Task Force (IOTF) classification systems, gender	3 479 Age: 12-18 61% female	Cross sectional Non-random, school-based	Body measurements	<p>The prevalence of obesity was higher in girls than boys. Females also had significantly higher BMI, total skinfold thickness, %BF but lower mean weight and height than males.</p> <p>Males were more likely to exercise hard weekly than females. Younger adolescents (<12 years) were more likely to report never exercising, in comparison to adolescent older than 12 years of age.</p>
Halcom(13)	2003	Multi-country ^c	Exercise hard	Gender, age	15 695 Age: 10-18 61% female	Cross sectional Random, national, school-based	Pretested Caribbean Youth Health Survey	<p>Males were more likely to exercise hard weekly than females. Younger adolescents (<12 years) were more likely to report never exercising, in comparison to adolescent older than 12 years of age.</p>

Chronic Illnesses

Table 2: Reviewed studies on physical health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DV ^a	IVs ^b		Sample Size & Description	Study & Design	Measures	Findings
				Internalized racism (INR) and hostility	Family history of diabetes				
Chambers(52)	2004	Barbados	Insulin resistance	internalized racism (INR) and hostility	172 Age: 14-16	Cross sectional Non-random, non-national, hospital-based	Racial and Stereotyping Scale (RASS); Cook-Medley Hostility Scale adapted for children; Modifiable Activity Questionnaire; BMI calculated	Girls had significantly greater mean insulin level and insulin resistance. Girls with high INR had more than a three-fold increased risk of elevated insulin resistance than those with low INR. Those with high level of INR had significantly greater insulin resistance levels.	
Chambers(51)	2005	Barbados	Insulin resistance, fasting glucose	Family history of diabetes	176 Age: 14-16 52.2% female	Cross sectional Non-random, non-national, hospital-based	Racial and Stereotyping Scale (RASS); Cook-Medley Hostility Scale adapted for children; Modifiable Activity Questionnaire; Insulin resistance and BMI calculated	Among low birth weight adolescents, girls with a family history of diabetes had higher fasting glucose and insulin resistance than those without a family history of diabetes. No significant differences were found for boys or among adolescents with normal birth weight.	
Bhatt(74)	2011	Jamaica	Knowledge of sickle cell disease (SCD), health beliefs	Gender, educational level attained, genotypes, SCD severity	117 Age: 15-19 59% female Youth with SCD	Cross sectional, census, non-random, non-national, hospital-based	questionnaire SCD epidemiology, clinical knowledge, fecundity and biology as well as health beliefs	The mean knowledge score was 64% (range 88–29%). Over 70% knew such things as females with SCD could get pregnant, that they received gene from SCD from both parents, and that a blood test was needed to diagnosis SCD. A lower proportion, 19%, did not think their children were at risk of SCD.	
Ferguson(65)	2010	Jamaica	Metabolic syndrome	SES, physical activity levels, gender, anthropometry	839 Age: 18-20 54.9% female	Cross sectional Non-random, non-national, community-based	1986 Birth Cohort of the Jamaica Perinatal Mortality Survey population; blood pressure and anthropometry measurements	In adjusted models, females had a significantly higher knowledge score than males. Higher knowledge scores were positively associated with perceived benefits and inversely related to perceived barriers of testing and knowing of SCD status of their partners, families and children. There were no differences by gender, genotype and educational level on health beliefs. The prevalence of the metabolic syndrome was 1.2%. There were no statistically significant sex differences in the prevalence of the metabolic syndrome but females were more likely to have at least one or two criteria. There were no significant associations with the overall prevalence of the metabolic syndrome and the socioeconomic status measures used.	

There was a significant trend for higher prevalence of central obesity among those in the lower occupation and education groups. In adjusted models, central obesity was associated with occupation of the household head and parental education, while low HDL was associated with occupation of the household head only. There were no significant associations for elevated blood pressure, elevated glucose or

Table 2: Reviewed studies on physical health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Tulloch-Reid(64)	2009	Jamaica	Cardiovascular risk factors (e.g. weight, BMI, blood pressure)	Diabetes type (1 or 2)	58 youth with diabetes less than 6 years and less than age 25 63.8% female	Cross sectional Non-random, non-national, hospital-based	Fasting blood sample; medical history; anthropometric measurements.	triglycerides using the metabolic syndrome criteria. Increased odds of central obesity were found in participants with lower levels of occupation and education among women but not among men. Those with Type 2 were more likely to female and diagnosed at an older age than those with Type 1 Those with Type 2 had greater mean BMI, waist circumference, higher mean systolic blood pressure and lower mean HDL cholesterol than those with Type 1 diabetes. Those with Type 2 were more likely to be overweight or obese and to have a low HDL-cholesterol level than those with Type 1. Participants with diabetes for more than 6 months scored higher on the diabetes control. Older participants, those with diabetes less than 6 months, those diagnosed with diabetes after age 18, those with better glucose control and those not taking insulin scored higher on the anxiety and worry subscales. Age and not taking insulin were associated with anxiety and worry.
Tulloch-Reid(58)	2009	Jamaica	Health related quality of life (e.g. diabetes control and mental health)	Length of time with diabetes, age, insulin usage	57 Mean age: 19 63% female	Cross sectional Non-random, non-national, hospital-based	Diabetes-39 questionnaire	Males classified as insulin resistant had higher systolic blood pressure, waist circumference, BMI, fasting glucose, triglycerides and LDL cholesterol and lower HDL cholesterol than men who were not insulin resistant. The results were the same for women except there was no statistically significant difference in LDL cholesterol between women with and without insulin resistance. There were no significant differences in diastolic blood pressure in either sex by insulin resistance status. In comparison to girls, boys had significantly lower pulse rate. Among boys, the highest SBP and DBP were recorded at age 15. For girls, it was age 16. Blood pressure increased with age in both genders, with the increase being greater for systolic.
Tulloch-Reid(73)	2010	Jamaica	higher systolic blood pressure, waist circumference, fasting glucose, triglycerides, cholesterol BMI	Insulin resistance	707 Age: 18-20 55% female	Cross sectional Non-random, national, community-based	anthropometric and blood pressure measurements	Compared to standards set by the Second Task Force on BP control in children, the Jamaican sample had greater mean SBP except for 16 year old boys. Younger, female adolescents had higher SBP and DBP than their counterparts. Age and BMI explained a lot of the variances in SBP and DBP.
Wilks(59)	1999	Jamaica	Blood pressure, pulse rates,	Gender	2 332 Mean age: 11 55% female	Cross sectional Non-random, non-national, school-based	Anthropometric, blood pressure and pulse rate measurements	In comparison to their American counterparts, younger
Nichols(60)	2006	Trinidad & Tobago	Blood pressure	Age, gender, location	3 729 Age: 12-16 57% female	Cross sectional Census, non-random, national,	Systolic blood pressure (SBP), diastolic blood pressure (DBP), body fat (BF), weight and heights were measured using	

Table 2: Reviewed studies on physical health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Sample Size & Description	Study & Sample Design	Measures	Findings
Montiel(66)	2005	Trinidad & Tobago	Symptoms of asthma (e.g. wheezing)	Location, gender, ethnicity	4 988 Age: 11-19	<p>hospital based</p> <p>Asthma Cross sectional Random, national, school-based</p>	<p>standardized procedures.</p> <p>modified version of International Study of Asthma and Allergies in Childhood (ISAAC)</p>	<p>(ages 12-14) Tobagonian adolescents had lower mean SBP but older adolescents had higher SBP. Tobagonian adolescent were heavier and had higher DBP than Jamaican and UK adolescents. They had lower SBP.</p> <p>The prevalence of wheezing in the past 12 months, previous or present diagnosis of asthma and night cough did not differ by island.</p> <p>Students from Tobago were more likely to report 4 or more attacks of wheeze in the past 12 months, to have sleep disturbance from wheeze 1 or more times a week in the past year and to have a speech limitation in the past year than those from Trinidad.</p> <p>Girls reported more wheezing and a diagnosis of asthma that boys on both islands. Symptoms were significantly less commons among South Asian adolescents compared to African or Mixed students.</p>
Estupiñán-Day(67)	2001	Jamaica	DMFT	Salt fluoridation	2 233 Age: 6-8, 12 and 15	<p>Oral Health Cross sectional Random, non-national, school-based</p>	DMFT Index; Fluorosis was recorded following Dean's Criteria.	<p>In 1984, mean DMFT scores were 6.72 at age 12, and 9.60 at age 15. Decayed teeth constituted the great majority of total DMFT scores in each age group. In 1995, DMFT scores were 1.08 at age 12, and 3.02 at age 15. The mean percentage of sound permanent teeth for all age groups was 90% in 1995. 60% was caries-free in 1995 compared to 2.8% among 12 year olds, 0.3% in 15 year olds and 27.6% in 6 year olds in 1984.</p> <p>There was a significant decline in dental caries between 1995 and 1984.</p>
Fergus(72)	2010	Montserra t	Dental caries	Gender, socio-economic status.	32 ^d Age: 12 44% female	<p>Cross sectional Census, non-national, school-based</p>	<p>Caries experience examined based on British Association for the Study of Community Dentistry (BASCD) criteria</p>	<p>Mean DMFT was 1.91. Fifty-nine percent had experience decay in one or more teeth. Small sample size prevented significance tested but there did not appear to be any difference in overall caries experience between males and females but there is a trend towards greater caries experience in nonprofessional groups based on parents occupation.</p>
Alonge(68)	1999	St. Vincent & the Grenadines	Periodontal disease	Gender, location, age	1 646 Age: 7-19	<p>Cross sectional Random, national, school-based</p>	<p>Standardized WHO oral health assessment form.</p>	<p>The percentage of healthy periodontal conditions within this age group decreased with increasing age. Calculus increased with age. Those with all six healthy sextants decreased with age. No difference in prevalence of periodontal conditions existed by gender or location.</p>

Table 2: Reviewed studies on physical health and their methods, findings, and methodological quality indicators

Lead Author	Pub. Year	Location	DVs ^a	IVs ^b	Description	Sample Design	Measures	Findings
Alonge(69)	1999	St. Vincent & the Grenadines	Dental caries	Location, gender	1 646 Age: 7-19 47.8% female	Cross sectional Random, national, school-based	Standardized WHO oral health assessment form.	70% to 89% of males ages 10-19 had DMFT. The numbers ranges from 74% to 88% for females. The overall mean DMFT for the entire sample was 2.69. The decayed components constituted majority of the DMFT, with 71% of the sample needing one or more surface fillings. Urban areas had higher overall mean DMFT than rural areas. There was no gender differences for permanent dentition but boys had higher primary dentition Overall 30.4% of sample was caries free, with African students being more caries free than East Indians students and students with parents with a university education being more caries free than those with mother with a high school education or fathers with vocational/technical training. Males were significantly more likely to be caries-free than females in the 12 and 15 age groups.
Adewakun(70)	2005	Trinidad & Tobago	Dental caries	Ethnicity, gender, parental education,	711 Age: 6, 12 and 15 52.1% female	Cross sectional Random, national, school-based	WHO criteria.	The mean DMFT for permanent teeth was 2.18±2.49 and 2.66±3.0 among 12 and 15 years old students, respectively. Untreated caries was highest among 12 year-olds (99.5%). Those with university educated parents also required the most treatment. Similar proportions of East Indian and African children required no treatment. 66% of 12 year olds and 55% of the 15 year olds were caries free. The proportions of DMFT teeth were similar by gender. The south-west region had the greatest proportion of decayed teeth in these age groups while the north-west had the lowest among 15 year olds. The south-west region had significantly higher treatment needs.
Naidu(71)	2006	Trinidad & Tobago	Dental caries	Gender, region	1 604 Age: 6-8, 12, and 15 55% female	Cross sectional Random, national, school-based	WHO criteria: The Community Periodontal Index of Treatment Needs (CPITN)	In the permanent dentition, 12-year-olds had a lower caries than 15-year-olds. More 15-year-olds required treatment.

^a DV: dependent variable

^b IV: independent variable

^c Antigua, Bahamas, Barbados, British Virgin Islands, Dominica, Grenada, Guyana, Jamaica, and St. Lucia

^d This number represents the total number of 12 year olds living in Montserrat