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Associated Factors of Healthy Lifestyle in The Bahamas¹

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Abstract

The Bahamas faces critical challenges due to an increase in chronic diseases (CDs). Overweight and obesity are on the rise among all age groups. In addition, the prevalence of raised blood glucose is 13% and that of high blood pressure is 31%. CDs are responsible for 45% of deaths in the country. The Ministry of Health has been implementing programs and interventions to slow the growth of CDs. These programs focus on tackling risk factors and developing both the National Dietary Guidelines and the nutrition interventions implemented in primary care facilities and in the community. This study is justifiable as it will help gain an in-depth understanding of the current patterns of healthy lifestyle among the Bahamian population to inform national efforts to address the growing problem of CDs. The objective of this study was to analyse and identify the determinants associated with healthy lifestyle in The Bahamas. The study was a secondary analysis of the 2013 Household Expenditure Survey (BHES-2013). The survey covered 2,123 households that were randomly selected throughout the country. The healthy lifestyle module registered data about eating habits and leisure time activities, such as exercising or watching television. The dependent variable selected for this study was the healthy lifestyle index (HLI), composed of four domains: healthy nutrition, healthy screen time, regular physical activity, and non-secondhand smoke. We find that a significant proportion of Bahamian children and adults require additional actions to facilitate improvement of their healthy lifestyle. Less than 8% eat fruits and vegetables three times per day, only one-third watch TV or play computer video games less than two hours per day, and only 30% practice regular physical activity. Teenagers tend to be sedentary. Lower-income level groups were less sedentary and had less screen time than upper-income level groups. Also, a child living in an extended family (two or more siblings) had a greater probability of living a healthy lifestyle. Similarly, being an adult (age 20 to 64 years) and being married or having a partner were associated with a greater likelihood of leading a healthy way of life.

Keywords: human nutrition, overweight, obesity, lifestyle, survey households

JEL Code: I1, I10, I12M, I18, N36

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Abbreviations and Acronyms

BHES	Bahamas Household Expenditure Survey
CD	chronic diseases
ED	enumeration district
HLI	healthy life index
MoH	Ministry of Health
PSU	primary sampling unit
USU	ultimate sampling unit
WHO	World Health Organization
WHO FCTC	World Health Organization Framework Convention on Tobacco Control
YLL	years of life lost

Background

The Bahamas currently faces critical challenges due to an increase in chronic diseases (CD). Epidemiological figures illustrate the magnitude of the problem. The prevalence of overweight and obesity is high in all age groups: 13% of school children; 45% and 21% of adolescents; 72% and 43% of women; and 66% and 27% of men, respectively (Global Nutrition Report, 2014). Several factors contribute to this epidemic, including poor dietary practices constituted by irregular feeding patterns and high caloric intake due to the consumption of food with high caloric density and low nutritional value, which is widely available and more expensive in comparison with local food (Henry F, Caines D, 2016). Furthermore, sedentary behaviour is generalised, with 72% of adults ages 24 to 64 reporting that they do not engage in physical activity.

The risk factors (high body mass index and dietary risks) have powered the increase of CDs, disability, and premature deaths. In Latin America and the Caribbean (LAC), overweight has increased 0.31% per year in LAC (Popkin BM, Slining MM, 2013). In The Bahamas, the average prevalence of raised blood glucose (age 25+) is 13.1% and that of high blood pressure (age 25+) is 31%. CDs account for 45% of all deaths in the country (WHO, 2012; WHO, 2016).

The demographic and economic consequences of CDs represent a complex problem for the Bahamian government. Currently, The Bahamas has approximately 367,000 inhabitants. In 2013, life expectancy at birth was 69.6 for men and 75.5 for women. The top three leading causes of years of life lost (YLL) due to premature deaths—*ischaemic heart disease, cerebrovascular disease, and diabetes*—are related to CDs, and these three causes of YLL have been steadily growing over the past 20 years (IHME, 2016). Though life expectancy has been consistently increasing, if the prevalence of CDs continues to rise, it will reduce these gains in the short run. The probability of dying from a CD between the ages of 30 and 70 is 18% in non-Latin Caribbean countries, the highest in the Americas. The lowest probability is in the Andean area, at 11.4% (PAHO, 2016). Additionally, the economic impact of CDs has been estimated at up to 8% of GDP among Caribbean countries.

The national healthcare system has been implementing operational policies and strategies to respond to this challenging scenario. The goals are promoting a healthy lifestyle and slowing the rapid increase of CDs (WHO, 2014). The Ministry of Health (MoH) of The Bahamas defines healthy lifestyle as *a way of life that promotes and protects health and well-being. A healthy lifestyle includes practices such as eating nutrient-rich foods that are moderate in calories and fat, exercising on most days, avoiding tobacco, drug, and alcohol abuse, and proper stress management.* The MoH has been increasingly providing nutrition advice and ramping up screening for hypertension and diabetes, although the development of evidence-based national guidelines to manage chronic non-communicable diseases using a primary care approach is still pending. The MoH also has two flagship programs: The Healthy Lifestyle Programme - The Healthy Dozen Club, and The Healthy Lifestyles Passport. The ongoing Healthy Lifestyles Initiative has six objectives: (i) to reduce the prevalence of smoking, physical inactivity, and unhealthy eating; (ii) to carry out health promotion and education around the aforementioned; (iii) to lobby for the institutionalisation of healthy lifestyle practices in work and organisational settings; (iv) to implement monitoring and evaluation of healthy lifestyle programming nationally; (v) to support research on behaviour modification in health; and (vi) to provide policy at the

governmental and ministerial level that supports healthy lifestyles nationally (MoH, The Bahamas, 2014). Furthermore, the Nutrition Unit of the Department of Public Health has led the drafting of the National Food and Nutrition Security Policy, along with key stakeholders, including agriculture and other sectors and ministries. The Nutrition Unit is also responsible for the development of the National Dietary Guidelines for The Bahamas, a key strategy for improving healthy eating practices. The guidelines include 10 recommendations for healthy eating. The unit also provides ongoing nutrition interventions in primary care settings and in the community.

This study is justifiable as it will help stakeholders to gain an in-depth understanding of the current patterns of healthy lifestyle among the Bahamian population to inform national efforts to tackle the growing problem of CDs. To date, little has been published regarding the prevalence of healthy lifestyle in this country. The objective of this report is to analyse and identify the determinants associated with a healthy lifestyle in The Bahamas. This additional evidence can inform policymakers about new opportunities for interventions and help them to improve current programs aimed at encouraging people to improve healthy behaviours.

Method

We conducted a secondary analysis of the 2013 Household Expenditure Survey (BHES-2013). The BHES-2013 had the objective of gathering information on the level and patterns of household expenditures on goods and services, including food and non-food items. The survey collected data on demographic characteristics, income, access to healthcare and social programs.

Survey coverage: The survey covered 2,123 households that were randomly selected throughout the country. Previously trained supervisors and enumerators conducted face-to-face interviews with the heads of household. The survey included all residents of The Bahamas who had lived in selected households for six months or more.

Survey design and sampling strategy: The frame for the survey design was based on data from the 2010 census. The sampling frame provided information on the number of households in the country at the enumeration district (ED) level, conditions of the dwelling units, and basic population characteristics (e.g., age, sex, education, and economic activity). The ED was the smallest area used in the collection of census data and was a key component of survey design. The survey was conducted on the islands of New Providence, Grand Bahama, Abaco, Andros, and Eleuthera, as well as Harbour Island, Spanish Wells, Exuma, Long Island, and the remaining Family Islands. Household groups or clusters were to be interviewed in the various EDs selected. The design consisted of a two-stage stratified selection: (1) primary sampling units (PSUs) and (2) ultimate sampling units (USUs) or the clusters of households to be interviewed. The PSUs (EDs) were selected with probability proportional to size; that is, the number of households in the ED at the time of the census. Ten percent was added to account for non-response and those groups for which poverty was expected to be higher based on data from The Bahamas Living Condition Survey (BHES, 2013).

Variables: Demographic characteristics included gender, age, and literacy of the head of household. For participants over the age of 15, the survey gathered information about their education, marital status, number of children, socioeconomic status (quintile levels, 1 being the poorest and 5 the richest), and the island where they lived. For the subgroup of children ages 3 to 14, data about the mother's education level and occupation were collected.

Healthy lifestyle questions: As part of a joint Inter-American Development Bank-Government of The Bahamas initiative to better understand the source of the health problems described earlier, the BHES-2013 included a healthy lifestyle module. The module contained questions about eating habits and use of leisure time for activities such as exercising or watching television. For the present study, questions were categorised after reviewing the current literature on lifestyle and environmental determinants (risk factors and protective factors) of CDs related to nutrition, physical activity, technology-induced pathology, and smoking (Egger G, Dixon J, 2014). We then adapted the responses to the case of The Bahamas.

Dependent variable: To construct the HLI, we selected four domains: healthy nutrition, healthy screen time, regular physical activity, and non-secondhand smoke. Thresholds for each domain were applied in line with international recommendations from the American Heart Association (HEARTORG, 2016), the National Heart, Lung and Blood Institute (NIH, 2017), the World Health Organization (WHO, 2010), and the Centers for Disease Control and Prevention.

Healthy nutrition was evaluated at the individual level based on two questions about the daily consumption of fruits and vegetables. One point (+1) was assigned to this domain when the respondent reported the consumption of fruits and vegetables three or more times a day. Although the suggested number of servings from each food group is between three and five servings a day, the survey only had information about the number of times a day these types of food were consumed. Due to this limitation, respondents were considered to have healthy nutrition whenever they consumed fruits and vegetables three or more times per day.

Healthy screen time was evaluated at the individual level by two questions about weekday and weekend time spent watching TV and playing video and/or computer games. A weighted average based on weekday and weekend hours spent was used to calculate the average hours of TV watching. We performed the same procedure for video and computer games. Then, both results were added to calculate average screen time. A positive score (+1) was given when the average screen time was two hours or less per day.

Regular physical activity was assessed at the individual level based on the question about the frequency of physically active days—defined as at least 30 minutes of physical activity per day—during the week. Respondents ages 3 to 19 received a positive score (+1) when they performed daily physical activity. Respondents over the age of 19 received a positive score (+1) when they performed physical activity at least five days per week.

Non-secondhand smoke was evaluated at the household level. The proxy used for the construction of this variable was the purchase of tobacco products by any member of the household in the past 30 days. In this study, a household that reported zero purchases of these products was considered to have no exposure to secondhand tobacco at home. A positive score (+1) was given to all members of the household when there was no exposure.

Following the methodology of Paulik et al. (2010), the HLI was constructed by adding the scores for each domain: healthy nutrition, healthy screen time, regular physical activity, and non-secondhand smoke. An HLI for adults (age 15 and over) and an HLI for children (ages 3 to 14) were constructed to differentiate between these age groups. The HLI has a range of zero to four. Three strata were defined: poor (zero to one activity with a positive score), average (two activities with positive score), and good (three to four activities with positive score). Table 1 shows the scoring criteria for each of the four activities used to construct the lifestyle index.

Table 1. Healthy lifestyle index

VARIABLE	Age group	Positive = 1	Negative= 0
Healthy nutrition	All	Consumption of fruits and vegetables 3 or more times a day	< 3 times a day
Healthy screen time ^a	All	2 hours or less a day	> 2 hours a day
Regular physical exercise	3–19	Daily	< 7 days a week
	>19	At least 5 days a week	< 5 days a week
Tobacco exposure ^b	All	No exposure	Exposure

^a To estimate healthy screen time, a weighted average based on weekday and weekend hours spent was used to calculate the average hours of TV watching. The same procedure was done for video and computer games. Then, both results were added to calculate average screen time.

^b Exposure to secondhand tobacco at home

Statistical Analysis

First, we used descriptive statistics to ascertain the frequencies of the sociodemographic characteristics of participants. We also applied survey weights to expand the sample to reach national representativeness. Second, we determined the frequencies of the individuals that scored positively in each healthy lifestyle domain of the HLI. Third, chi-square tests served to establish the relationships between healthy lifestyle and participants' sociodemographic and household characteristics; a p-value of ≤ 0.05 was set as statistically significant. Fourth, to examine the potential association between the individual and sociodemographic features of the age group 3 to 14 years and the age group 15 to 64 years and healthy lifestyle (outcome variable of interest), we performed separate univariate logistic regression and multivariate regression analyses with a forward stepwise procedure and calculated the odds ratios and confidence intervals. We used STATA version 13 to perform the analysis.

Ethical aspects: The government of The Bahamas approved the original survey. All participants were de-identified in this secondary data analysis; thus, there were no ethical issues involved.

Results

From the total planned questionnaires, 1,599 were analysed, with a non-response rate of 23.7% for dwellings identified from the listing exercise.

Table 2 shows the main characteristics of study participants. Slightly more women than men completed the interview, and most participants were between the ages of 20 and 64. **The education of most heads of household and participants age 15 and over was high school or above.** The characteristics of the **mothers** also indicate a high level of schooling, and up to **69% responded that they had formal employment**, with only 14% reported to be homemakers. More than half of participants were single (never married, widowed, or divorced), and there were no children in 55% of households. The population was evenly distributed across income quintiles. Also, the distribution of the population per island is similar to that reported for The Bahamas, with New Providence and Grand Bahama representing 87% of the sample.

Table 2. Characteristics of the participants

Characteristics	n	%	Characteristics	n	%
Gender			Marital status if age ≥15		
Men	147,928	46.43	Married	85,095	33.85
Women	170,626	53.56	Common-law	18,789	7.47
Age group			Divorced/separated	16,746	3.66
3–6	23,231	7.29	Widowed	12,266	4.88
7–10	21,526	6.75	Never married	118,281	47.05
11–14	22,458	7.04	Number of children (ages 0–14) by household		
15–19	30,067	9.48	0	55,222	55.15
20–44	127,629	40.22	1	21,333	21.31
45–64	66,150	20.85	2	14,501	14.48
65+	26,229	8.27	3	6,068	6.06
Head of household education			4 or more	3007	2.93
No schooling	4,837	1.52	Quintiles		
Preschool/kindergarten	434	0.14	1	62,434	19.6
Primary school	41,643	13.09	2	62,979	19.77
High school	168,001	52.8	3	63,680	19.99
College/university	63,928	20.09	4	64,052	20.1
Technical/vocational	35,191	11.06	5	65,449	20.54
Other	1,984	0.62	Island		
Not stated	2,187	0.69	New Providence	232,151	72.87
Education if age ≥15			Grand Bahama	45,965	14.43
No schooling	3,325	1.32	Abaco	15,299	4.8
Preschool/kindergarten	124	0.05	Acklins	348	0.11
Primary school	20,203	8.04	Andros	5,648	1.77
High school	150,052	59.72	Berry Islands	1,261	0.4
College/university	54,838	21.83	Bimini	2,654	0.83
Technical/vocational	20,880	8.31	Eleuthera	6,811	2.14

Other	861	0.34	Exuma, Cays, Long Island, and Mayaguana	8,458	2.6
Not stated	968	0.39			

Table 3 analyses the relationship between the sociodemographic and family characteristics of children ages 3 to 14 within the four healthy lifestyle domains: healthy nutrition, healthy screen time, regular physical activity, and non-secondhand smoke. Data from **the healthy nutrition domain reveal that less than 8% of children ate fruits and vegetables three times per day, with similar percentages across the three age groups.** Regarding the relationship of healthy nutrition to family characteristics, the highest percentages were found when the education of the head of household or the mother was none or primary school (10.4% and 10.2%, respectively), and when the mother was at home (10.8%). As for socioeconomic status, children in quintile 1 had the highest percentage (9.8%) as compared to other quintiles. There was no difference in the percentages of children eating fruits and vegetables living on islands other than New Providence and Grand Bahama.

Less than 32% of children fulfilled the criteria for healthy screen time (less than two hours of screen time per day). The range varied from 17.7% in children ages 11 to 14 to 23.4% in children ages 3 to 6. Regarding the education of the head of household, those with high school or above showed higher percentages (up to 23.4%) in comparison to those with no schooling (3.4%). As for the mother’s education, the highest percentages were observed among mothers with technical/vocational education (24.3%) and mothers that were at home (23.3%). Families with four or more children similarly reported higher percentages of healthy screen time (32.5%) than smaller families. As for socioeconomic status, those in quintile 1 showed the highest percentage with 27.6%, while those in quintile 5 had the lowest (14.1%). The percentages were higher on New Providence and Grand Bahama than on smaller islands (20.4% and 17.6%, respectively).

Only one-third of boys and girls practiced regular physical activity. Boys practiced physical activity slightly more often (33.1%) than girls (30.1%). In addition, young children ages 3 to 6 were more physically active (34.5%) than adolescents (29.6%). The relationship between the head of household’s schooling and exercise ranged from 41.8% among those with no schooling or primary school to 31.3% in those with a college/university degree. With regard to the mother’s schooling, the range with regular physical activity went from 35.1% (no schooling/primary school) to 27.7% (college). The relationship between the mother’s occupation and regular physical activity was stronger among those mothers who were looking for work (46.3%) or were at home (30.9%) than those who were at school/retired or other (23.0%).

Table 3. Characteristics of healthy lifestyle of children ages 3–14

Characteristics		N	Healthy nutrition %	Healthy screen time %	Regular physical activity %	Non-secondhand smoke %
Gender	Boys	29,158	7.4	19.3	33.1	93.9
	Girls	33,106	6.2	20.7	30.1	92.5
Age groups	3–6 years	21,494	7.1	22.4	34.5	91.2
	7–10 years	20,142	6.8	19.4	30.3	94.8
	11–14 years	20,628	6.3	18.3	29.6	93.5
Head of household education	No schooling/primary school	5,205	10.4	3.5	41.8	89.2
	High school	37,446	6.4	20.1	29.2	94.2
	Technical/vocational	6,637	8.2	23.9	35.0	92.4
	College/university	12,640	5.7	18.5	31.3	93.9
Mother's education	No schooling/primary school	5,293	10.2	20.1	35.2	89.5
	High school	35,584	7.2	19.2	32.4	94.6
	Technical/vocational	5,212	9.7	24.3	33.1	92.4
	College/university	16,176	3.7	20.5	27.8	91.4
Mother's occupation	Work	43,410	6.2	20.0	30.1	93.9
	Looking for work	5,884	8.0	21.4	46.3	95.8
	At home	8,561	10.8	23.4	30.9	93.2
	At School/retired/other	3,966	3.1	14.2	23.0	86.3
Number of children (ages 0–14) per household	1	15,834	1.5	15.8	20.5	91.5
	2	22,384	5.4	16.3	30.7	90.3
	3	14,620	8.5	22.6	37.3	96.0
	4 and more	9,433	16.1	32.1	42.9	98.3
Quintiles	1	17,795	9.9	27.6	31.5	97.3
	2	13,941	8.5	14.2	39.4	94.1
	3	11,450	5.2	20.0	24.2	89.8
	4	10,280	5.0	19.9	31.1	93.4
	5	8,792	1.8	14.2	29.1	87.2
Island	New Providence and Grand Bahama	55,509	6.4	20.4	31.5	93.4
	Other Islands	6,755	9.7	17.6	31.4	91.2

Most boys and girls were not exposed to tobacco. Non-exposure to tobacco was similar among age groups. Children whose parents were less educated had more exposure to tobacco than those with higher education. Also, children from extended families had less exposure (98.3%) than smaller families (91.5%). Socioeconomic status indicated that children from wealthier families had more exposure (87.2%) than those in Q1 (97.3%).

Table 4 depicts the characteristics of the healthy lifestyle domains among people over the age of 15.

The healthy nutrition domain had the lowest percentages of all the components of the healthy lifestyle index. The comparison by gender shows that only 14.3% of men and 12.3% of women ate healthily. The distribution by age also reveals differences, with teenagers eating fewer fruits and vegetables than other age groups (6.8% vs. 14.6%). The heads of household with less education had lower percentages (13.0%) as compared to those with technical or a college education (14.8%). In terms of the educational level of respondents, those with technical/vocational training displayed the highest percentage (16.7%), whereas the lowest percentage was recorded among those with a high school education (12.1%). Socioeconomic level indicates that those in Q1 consumed fewer fruits and vegetables (11.9%) than those in Q4 (14.1%).

One-third of people over the age of 15 watched TV or played computer/video games for less than two hours a day. The adolescent group presented the lowest percentage of healthy screen time of all the age groups (25.3% vs. 37.4% of older adults). We did not observe wide differences related to the head of household's education, with percentages ranging from 30.0% with high school to 33.8% with primary school or less. The participant's education level had a wider range, from 29.8% with high school to 39.4% with primary school or less.

Men were more physically active than women (44.3% vs. 36.9%, respectively). People ages 22 to 44 years were more physically active (44.6%) than adolescents ages 15 to 19 years (24.3%). With regard to the head of household's schooling, the percentage of people physically active ranged from 39.1% (college/university) to 44.4% (technical). In terms of the interviewee's education level, those with technical/vocational education exercised more often (43.2%) than those with other levels of education; the group primary school or less was the least active (33.6%). Those single or without a partner (divorced, separated; widowed) exercised less often than the married/common-law group (36.6% vs. 43.5%). The distribution of regular physical activity per income quintile ranged from 37.4% (Q4) to 45.9% (Q2). Participants from the smaller islands were more active than those from New Providence and Grand Bahama (50.1% vs. 38.9%).

Non-secondhand smoke was more frequent among women than men (92.3% vs. 89.6%). The distribution according to age group had small variation as did the head of household variable (neither was significant). The participant's education level is somewhat related, as those respondents with less education had greater exposure to tobacco (88.3%) than those with a university/college degree (92.8%). With regard to income quintiles, the highest proportion was observed in Q4 (94.1%) and the lowest in Q2 (88.9%).

Table 4. Characteristics of healthy lifestyle of people age 15 and over

Characteristic		N	Healthy nutrition %	Health screen time %	Regular physical activity %	Non-secondhand smoke %
Gender	Male	111,171	14.4	31.3	44.3	89.6
	Female	129,981	12.3	32.0	36.9	92.3
Age groups	15–19	27,781	6.8	25.3	24.3	92.6
	20–44	122,963	14.6	31.7	44.6	91.7
	45–64	64,677	13.8	32.1	41.4	89.0
	65+	25,731	12.3	37.4	34.3	91.5
Head of household education	Primary school or less	43,021	13.0	33.8	44.4	89.8
	High school	125,640	12.2	30.0	40.4	90.8
	Technical/vocational	27,636	15.6	30.9	43.2	91.4
	College/university	47,796	14.8	33.4	39.1	93.6
Education	Primary school or less	23,271	13.0	39.4	33.6	88.3
	High school	145,921	12.4	29.8	41.5	90.6
	Technical/vocational	20,160	16.7	32.6	44.1	92.8
	College/university	51,799	14.3	33.2	38.4	92.8
Marital status	Married, common-law	100,946	15.7	34.1	43.5	90.7
	Divorced, separated, widowed	28,191	12.2	32.6	36.6	91.3
	Never married	112,015	11.2	29.3	38.3	91.3
Quintiles	1	40,875	11.9	32.4	39.7	91.3
	2	45,361	12.5	31.0	45.9	88.9
	3	50,039	14.2	34.5	40.4	90.5
	4	51,293	14.1	31.7	37.4	94.1
	5	53,608	13.1	29.1	38.7	90.3
Island	New Providence/Grand Bahama	209,103	13.0	31.3	38.9	91.8
	Other islands	34,895	16.1	35.4	50.1	86.5
Bold typeface indicates p-value ≤0.05 X ² Pearson test						

Table 5 shows the results of the X² test of the weighted proportions of the HLI (children ages 3 to 14 who scored three to four points), and the univariate and multivariate models of the associated factors with healthy lifestyle. **The multivariate model indicates that a family with two to three children (odds ratio [OR] 4.26, 95% confidence interval [CI] 1.39–13.08) or four or more children (OR 11.46, 95% CI 3.43–38.27) has a greater probability of leading a healthy lifestyle. Also, living on a small island—Exuma and Cays (OR 5.93, 95% CI 1.42–24.73)—was associated with healthy lifestyle.**

Table 5. Associated factors with healthy lifestyle in children ages 3–14

Characteristics	Healthy lifestyle index Good (3 or 4 points out of 5)		Univariate (Unweighted n=936)			Multivariate (Unweighted n=936)		
	No, Unweighted n=868 Weighted n=58030 Weighted %	Yes, Unweighted n=68 Weighted n=4234 Weighted %	Odds ratio	95% CI	p-value	Odds ratio	95% CI	p-value
Gender								
Male	46.5	51.4	Ref.					
Female	53.5	48.6	0.82	0.49–1.37	NS	0.80	0.46–1.39	NS
Age groups								
3–5	26.8	25.6	Ref.					
6–8	22.6	27.7	1.28	0.62–2.62	NS	1.27	0.58–2.78	NS
9–11	24.5	26.1	1.11	0.54–2.26	NS	1.19	0.55–2.54	NS
12–14	26.1	20.6	0.82	0.38–1.78	NS	0.82	0.36–1.87	NS
Mother's education								
Primary school or less	8.2	12.9	Ref.					
High school	56.9	61.0	0.68	0.34–2.61	NS	0.84	0.34–2.08	NS
Technical/vocational	8.1	12.0	0.94	0.31–1.48	NS	1.71	0.55–5.26	NS
College/university	26.8	14.1	0.33	0.13–0.86	0.024	0.78	0.21–2.96	NS
Mother's occupation								
Work/looking for work	81.1	75.0	Ref.					
At home or retired	18.9	25.0	1.43	0.81–2.56	NS	1.20	0.60–2.40	NS
Number of children (ages 0–14)								
1	26.9	5.6***	Ref.					
2–3	59.5	58.3	4.70	1.61–13.76	0.005	4.26	1.4–13.08	0.011
4+	13.6	36.1	12.75	4.21–38.63	0.000	11.46	3.4–38.2	0.000
Quintiles								
1	27.6	41.9*	Ref.					
2	22.0	28.1	0.84	0.45–1.57		1.27	0.64–2.50	NS
3	18.7	14.2	0.50	0.23–1.09	NS	0.98	0.47–2.07	NS
4	16.8	12.1	0.47	0.19–1.21	NS	0.81	0.27–2.41	NS
5	14.9	3.7	0.16	0.4–0.70	0.014	0.33	0.07–1.63	NS
Island								
New Providence	72.8	78.6*	Ref.					

Characteristics	Healthy lifestyle index Good (3 or 4 points out of 5)		Univariate (Unweighted n=936)			Multivariate (Unweighted n=936)		
	No, Unweighted n=868 Weighted n=58030	Yes, Unweighted n=68 Weighted n=4234	Odds ratio	95% CI	p-value	Odds ratio	95% CI	p- value
	Weighted %	Weighted %						
Grand Bahama	16.7	6.0	0.33	0.12–0.95	0.039	0.37	0.14–0.99	0.047
Abaco	4.3	5.2	1.12	0.43–2.97	NS	1.07	0.38–3.02	***
Eleuthera	1.3	0	***					
Andros	1.7	1.4	0.77	0.17–3.43	NS	1.13	0.23–5.39	NS
Exuma and Cays	1.2	5.4	4.27	1.12–16.3	0.034	5.93	1.4–24.7	0.015
Rest of the islands	2.0	3.4	1.60	0.58–4.40	NS	1.90	0.57–6.28	NS

Table 6 describes the associated factors with healthy lifestyle in the group of participants over age 15. The table displays the X^2 test of the weighted proportions of the HLI (people that scored three or four points) within each of the independent variables, the univariate analysis, and the multivariate analysis. **The multivariate model indicates that the following covariates were associated with healthy lifestyle: (i) belonging to the age group 20 to 44 years (OR 2.07, 95% CI 1.33–3.22); (ii) belonging to the age group 45 to 64 years (OR 1.87, 95% CI 1.10–3.02); and (iii) being married or in a common-law relationship (OR 1.26, 95% CI 1.01–1.58).** In contrast, living in Grand Bahama represented a risk for healthy lifestyle (OR 0.48, 95% CI 0.34-0.69).

Table 6. Factors associated with healthy lifestyles in people over age 15

Characteristics	Healthy lifestyle index Good (3 or 4 points out of 5)		Univariate (Unweighted n=3701 Weighted n=241 151)			Multivariate (Unweighted n=3701 Weighted n=241 151)		
	No Unweighted n=3211 Weighted n=209223 Weighted %	Yes Unweighted n=490 Weighted n=31928 Weighted %	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value
Gender								
Male	45.5	50.0	Ref.		7	Ref.		
Female	54.5	50.0	0.84	0.68–1.02	NS	0.84	0.68–1.04	NS
Age groups								
15–19	12.4	5.9***	Ref.			Ref.		
20–44	50.2	56.3	2.33	1.52–3.57	0.00	2.07	1.33–3.22	0.001
45–64	26.6	27.9	2.18	1.39–3.39	0.001	1.87	1.10–3.02	0.010
65+	10.8	9.9	1.90	1.13–3.20	0.015	1.81	0.99–3.33	0.056
Education								
Primary school or less	9.7	9.5	Ref.			Ref.		
High school	61.1	56.7	0.94	0.67–1.34	NS	0.93	0.63–1.38	NS
Technical/vocational	8.0	10.5	1.33	0.85–2.09	NS	1.21	0.75–1.95	NS
College/university	21.2	23.3	1.12	0.76–1.64	NS	0.98	0.86–1.53	0.05
Marital status								
Married/common-law	40.7	49.8	1.41	1.15–1.73	0.001	1.26	1.01–1.58	0.039
Widowed	5.2	3.3***	0.72	0.41–1.27	NS	0.70	0.38–1.29	NS
Divorced, separated, single	54.1	46.9	Ref.			Ref.		
Quintiles								
1	17.2	15.3	Ref.			Ref.		
2	19.0	17.8	1.06	0.75–1.48	NS	1.02	0.72–1.44	NS
3	20.5	22.3	1.22	0.88–1.69	NS	1.20	0.85–1.68	NS
4	21.1	22.6	1.21	0.87–1.68	NS	1.11	0.79–1.56	NS
5	22.3	22.0	1.11	0.80–1.53	NS	1.02	0.71–1.45	NS
Island								
New Providence	71.8	76.9	Ref.			Ref.		
Grand Bahama	15.2	8.1	0.50	0.35–0.71	0.0	0.48	0.34–0.69	0.00
Abaco	5.1	5.1	0.92	0.64–1.32	NS	0.90	0.62–1.30	NS
Eleuthera	2.4	1.5	0.58	0.30–1.12	NS	0.56	0.28–1.09	NS
Andros	1.8	2.2	1.14	0.60–2.19	NS	1.16	0.59–2.25	NS
Exuma and Cays	1.4	2.4	1.53	0.76–3.09	NS	1.57	0.78–3.13	NS
Rest of the islands	2.3	3.8	1.56	1.06–2.28	0.024	1.56	1.05–2.31	0.026

Discussion

The major findings of this study indicate that a significant proportion of Bahamian children and adults need to improve their lifestyle. Less than 8% of children and 13.5% of adults eat fruits and vegetables three times per day, only one-third watch TV or play computer/video games less than two hours per day, and only 30% practice regular physical activity. Teenagers tend to be sedentary. Lower-income level groups were less sedentary and had less screen time than upper-income level groups. Also, a child living in an extended family (two or more siblings) had a higher probability of living a healthy lifestyle. Similarly, being an adult (age 20 to 64 years) and being married or having a partner were associated with a greater likelihood of leading a healthy way of life.

Strengthening efforts to promote a healthy lifestyle among all age groups should be feasible given the country's favourable socioeconomic conditions for conducting behavioural interventions and social marketing activities. The Bahamas has the third highest per capita GDP in the Americas and satisfactory social indicators—its poverty rate is 12.5% and more than 50% of the population age 15 and over has completed high school. (The Bahamas, Dept. of Statistics, 2013) (World Bank, 2016). The results of the present study are consistent with the figures mentioned above. Most of the interviewees were young (70% under 44 years of age) with high levels of education (high school or above) and employment.

Healthy nutrition, physical activities, and screen time among Bahamian children and adolescents are important challenges to tackle. Adequate intake of fruits and vegetables was found to be lower in The Bahamas ($\leq 8\%$) than in other countries in the region: Mexico, 30% (Ramirez Silva, 2009); Puerto Rico, 40% (Torres R, 2014); and Bonaire, 49% (Schwebbe L, 2011). The prevalence of insufficient physical activity among adolescents was similar to that of other neighbouring countries (US, 72.6%; Dominica, 83%; and Belize, 78.9%) (WHO, 2016) (CDC, 2014). Furthermore, the prevalence of screen time was comparable to the findings of international studies that have reported that two-thirds of youth exceed the recommended two hours per day (Atkin AJ, 2014).

Healthy nutrition and physical exercise are critical during childhood and adolescence because these are periods of significant physical and psychological development. Nutritional disorders and sedentary behaviour at an early age take their toll beginning in childhood. Overweight has immediate adverse consequences on children's health, including metabolic, cardiovascular, gastrointestinal, respiratory, and orthopaedic disorders (Pulgarón ER, 2013), and long-term effects extend into adulthood (Moreno LA, 2104), since both overweight and sedentary behaviour are well-known risk factors of CDs (Moreno LA, 2017; Driscoll DA, 2003). Recreational, sedentary screen time for more than two hours per day is associated with overweight and obesity and metabolic and cardiovascular disease biomarkers. In addition, it decreases fitness and academic achievement (Tremblay MS, 2011). Interventions in the Caribbean that have managed to improve nutritional conditions, promote a healthy lifestyle, and reduce screen time in children and adolescents have reported the following: substantial improvement in their awareness of the importance of nutrition (IDRC, 2014), changes in their dietary preferences, and improved health status and school performance.

Healthy nutrition, physical activity, and screen time among the adult population mirror the situation in Latin America and the Caribbean (LAC) countries. A low proportion of adults ate

the recommended amounts of fruits and vegetables (less than 13.5%). This figure was lower than that found in other reports in LAC, where dietary patterns have changed in the past decade, shifting rapidly from indigenous food and freshly prepared meals to the consumption of ultra-processed foods with high energy content but little nutritional value. Up to 57% of energy intake comes from the consumption of ultra-processed foods, which, in most cases, are a meal replacement (Nielsen C, 2014). There are several drivers responsible for this shift: urbanisation; increased income and market deregulation; a busy lifestyle that encourages quick meals; and the vast extent to which such food is available, thereby favouring its consumption, given that it is accessible, palatable, heavily marketed, and habit-forming (PAHO, 2015). Though this was a secondary analysis, it seems that upper-income groups have a less healthy lifestyle than low-income groups, an assumption that should be tested in further studies.

The prevalence of physical exercise among adults in The Bahamas was similar to that of other countries in the region. In the Dominican Republic, Jamaica, and the US, 31.5%, 23.9% and 25% of adults, respectively, meet the recommended target for physical activity. Adults who are not physically active have up to a 30% increased risk of all-cause mortality in comparison to those who practice at least 150 minutes of moderate-intensity physical activity a week; they are also at increased risk of CDs and premature death. In contrast, regular physical activity helps promote longevity, maintain muscle, respiratory and cardiovascular fitness (Reimers C, 2012), and sustain weight loss once achieved (American Heart Association, 2010). It is also associated with a good health-related quality of life (OR: 1.99; 95% CI: 1.54–2.56) (Hart PD, 2016).

Secondhand tobacco smoke should be on the public health agenda as part of tobacco control activities. Secondhand smoke is a risk factor for ear infections, coughs and colds, and respiratory illnesses such as bronchitis and pneumonia; it is also related to poor lung development and other respiratory and cardiovascular problems (Jarvie JA, 2008). In 2009, the country became a party to the World Health Organization Framework Convention on Tobacco Control (WHO FCTC). The 2015 WHO report on the status of the WHO FCTC notes the situation of The Bahamas. The current prevalence of tobacco smoking is well known, standing at 13.7% among youth and 16.7% among adults. Still, it is necessary to increase the country's efforts to promote smoke-free policies, cessation programs, health warnings, and advertising bans (WHO, 2015).

Strengths and weaknesses of the present study. A strength of the study is the development of a conceptual lifestyle index that allowed us to explore this composite measure as a dependent variable in two different age groups (3 to age 14 and age 15 and over). It is also worth mentioning that the survey had national and sub-national representativeness. The study has several weaknesses. It is a secondary data analysis of a cross-sectional household expenditure survey; therefore, it was not designed as a health survey aimed at ascertaining in depth the risk factors for healthy lifestyle, nor did it collect information on the actual nutritional status of interviewees. Furthermore, the study did not collect information on upstream policies or the social determinants of unhealthy lifestyle within the Bahamian context. The analysis was performed with the database of participants' responses.

Conclusions and Recommendations

Promotion of healthy lifestyle should remain on the national health agenda. A healthy lifestyle has multiple drivers outside the health sector. The findings of this study inform the current prevalence of healthy eating, physical exercise and recreational screen time on the different age groups, and explore some of the possible associated risk factors using a household perspective. The results of this study should be useful for setting target behaviours when developing programs to improve lifestyle. These targets could be the following: (i) increasing consumption of fruits and vegetables, (ii) increasing physical activity, (iii) decreasing consumption of sugar-sweetened beverages, (iv) decreasing consumption of high-energy-dense foods, and (v) decreasing screen time.

It is evident that there is a need to reinforce current policies aimed at increasing the proportion of people, particularly children, who lead a healthy lifestyle. A higher priority should be placed on the prevention of overweight and obesity, through sound leadership, accountability, and innovative strategies. To implement wide-ranging policies aimed at modifying the health-related behaviour of individuals, it is useful to understand its determinants, which vary from personal decisions to social circumstances. Most risk factors for unhealthy lifestyles are modifiable through sound interventions that promote behavioural change; however, support for this change should not focus on the individual, as several studies have emphasised that healthy behaviour is not entirely up to the individual. It is misleading to consider healthy lifestyle to be solely a personal decision, as there are social, economic and environmental determinants of lifestyle and disease that go beyond the control of any one person. There are other factors beyond individual behaviour that influence healthy lifestyles, such as health literacy, socioeconomic status, availability and price of food, education, and interpersonal relationships (Lichtenstein A, 2006).

There is evidence of the success of a wide range of policy actions to improve lifestyle and, consequently, decrease the prevalence of overweight/obesity. For example, social marketing campaigns help individuals and families to make healthier decisions about food and physical exercise (Crocker H, 2012). Action policies that support breastfeeding to reduce the risk of obesity (Armstrong J, 2002), raise nutritional standards in schools (Haroun D, 2011), limit the marketing of foods with high caloric content, reduce advertising to children during prime-time television shows, encourage sports participation among students (Jebb SA, 2013), and increase taxes on sugar-sweetened beverages (Colchero A, 2017) have proven effective. Nevertheless, we should accept that further evidence is necessary, as these interventions cannot be simply extrapolated from one country to another.

Promotion of healthy lifestyle should remain on the national health agenda. It is important to emphasise the need to strengthen population-wide policies and specific behavioural interventions to tackle the overweight/obesity problem of the Bahamian population, but such interventions should be evaluated rigorously from their inception, and always with consideration for the local context.

References

- American Heart Association.
http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyDietGoals/Suggested-Servings-from-Each-Food-Group_UCM_318186_Article.jsp
- American Heart Association. 2010 dietary guidelines. www.americanheart.org
- Armstrong J, Reilly J, the Child Health Information Team. Breastfeeding and lowering the risk of childhood obesity. *The Lancet*. 2002; 359 (9322): 2003–2004
- Atkin AJ, Sharp SJ, Corder K, Van Sluijs EM; International Children’s Accelerometry Database (ICAD) Collaborators. Prevalence and correlates of screen time in youth: an international perspective. *Am J Prev Med*. 2014 Dec;47(6):803-7. doi: 10.1016/j.amepre.2014.07.043.
- BHES-2013 Bahamas Ministry of Health Household Expenditure Survey Technical appendix
Healthy Life Style Initiative. 2013
<http://www.bahamas.gov.bs/wps/portal/public/Health%20Initiatives/Health%20Lifestyles/>
- Centers for Disease Control. Division of Nutrition, Physical Activity and Obesity. Overweight and obesity Policy resources. Early Care and Education Policy Review. 2016
<https://www.cdc.gov/nccdphp/dnpao/division-information/policy/obesity.htm>.
- Center for Disease Control. 2014 Facts about physical activity.
<https://www.cdc.gov/physicalactivity/data/facts.htm>
- Croker H, Lucas R, Wardle J. Cluster-randomised trial to evaluate the ‘Change for Life’ mass media/ social marketing campaign in the UK. *BMC Public Health* 2012;12: 404.
- Colchero A, Rivera-Dommarco J, Popkin B, Ng S. In Mexico, Evidence of Sustained Consumer Response Two Years After Implementing A Sugar-Sweetened Beverage Tax. *Health Aff* 2017 10.1377/hlthaff.2016.1231. doi: 10.1377/hlthaff.2016.1231.
- Department of Statistics. The Bahamas in Figures 2013.
<http://statistics.bahamas.gov.bs/download/098797200.pdf>
- Driscoll DA. Polycystic ovary syndrome in adolescence. *Ann N Y Acad Sci*. 2003 Nov;997:49-55
- Egger G, Dixon J. Beyond Obesity and Lifestyle: A Review of 21st Century Chronic Disease Determinants. *BioMed Research International*. 2014;2014:731685.
doi:10.1155/2014/731685.
- Global Nutrition Report. 2014 Nutrition Country Profile. Bahamas.
http://globalnutritionreport.org/files/2014/11/gnr14_cp_bahamas.pdf
- Haroun D, Harper C, Wood L, Nelson M. The impact of the food-based and nutrient-based standards on lunchtime food and drink provision and consumption in primary schools in England. *Public Health Nutr* 2011; 14: 209–218.
- Hart PD. Meeting Recommended Levels of Physical Activity and Health-Related Quality of Life in Rural Adults. *Journal of Lifestyle Medicine*. 2016;6(1):1-6.
doi:10.15280/jlm.2016.6.1.1.
- Health effects of secondhand smoke.
http://www.cdc.gov/tobacco/data_statistics/fact_sheets/secondhand_smoke/health_effects/

- Henry F, Caines D, Eyre S. Promoting Caribbean Agriculture to Promote Health: Beyond Dietary Guidelines. *Nutr Food Technol* 2016; 2(1): doi <http://dx.doi.org/10.16966/2470-6086.111>
- Hospedales CJ, Samuels TA, Cummings R, Gollop G, Greene E. Raising the priority of chronic noncommunicable diseases in the Caribbean. *Rev Panam Salud Publica*. 2011;30(4):393–400.
- Institute for Health Metrics and Evaluation. The Bahamas. <http://www.healthdata.org/bahamas> Pan American Health Organization. United States of America, University of Washington. Economic Dimensions of Non-Communicable Disease in Latin America and the Caribbean. Disease Control Priorities. 3. ed. Companion Volume. Washington, DC: PAHO, 2016.
- IDRC. From Farm to Fork: Improving Nutrition in the Caribbean. 2014. <https://www.idrc.ca/sites/default/files/sp/Documents%20EN/106525-CARICOM.pdf>.
- Jarvie JA, Malone RE. Children’s Secondhand Smoke Exposure in Private Homes and Cars: An Ethical Analysis. *American Journal of Public Health*. 2008;98(12):2140-2145. doi:10.2105/AJPH.2007.130856.
- Jebb SA, Aveyard PN, Hawkes C. The evolution of Policy and actions to tackle obesity in England. *obesity reviews* 2013;14 (Suppl. 2): 42–59.
- Lichtenstein A, Appel I, Brands M, Carnethon M, Daniels S, Franch H, Franklin B, Kris-Etherton P, Harris W, Howard B, Karanja N, Lefevre M, Rudel L, Sacks F, Van Horn L, Winston M, Wylie-Rosett W. Diet and Lifestyle Recommendations revision 2006: A Scientific Statement from the American Heart Association Nutrition Committee. *Circulation* 2006;114:82-96
- Moreno LA, Gottrand F, Huybrechts I, Ruiz JR, González-Gross M, DeHenauw S; HELENA Study Group. Nutrition and lifestyle in european adolescents: the HELENA (Healthy Lifestyle in Europe by Nutrition in Adolescence) study. *Adv Nutr*. 2014 Sep;5(5):615S-623S.
- Moreno LA, Rodríguez G. Dietary risk factors for development of childhood obesity. *Curr Opin Clin Nutr Metab Care* 2007;10:336–41.
- National Heart, Lung, and Blood Institute. 2017 <http://www.nhlbi.nih.gov/health/educational/wecan/reduce-screen-time/index.htm>
- Nielsen Company. 2014. Snack Attack: What consumers are reaching for around the World. Nielsen Company. <http://www.nielsen.com/us/en/insights/reports/2014/snack-attack-what-consumers-are-reachingfor-around-the-world.html>.
- Pan American Health Organization. United States of America, University of Washington. Economic Dimensions of Non-Communicable Disease in Latin America and the Caribbean. Disease Control Priorities. 3. ed. Companion Volume. Washington, DC: PAHO, 2016.
- Pan American Health Organization. Ultra-processed food and drink products in Latin America: Trends, impact on obesity, policy implications. Washington, DC: PAHO, 2015.
- Paulik E, Boka F, Kertesz A, Balogh S, Nagymajtenyi L. Determinants of health-promoting lifestyle behavior in the rural areas of Hungary. *Health Promotion International*, 2010; 25(3). <https://www.ncbi.nlm.nih.gov/pubmed/20413403>.

- Popkin BM, Slining MM. New dynamics in global obesity facing low- and middle-income countries. *Obes Rev.* 2013 Nov;14 Suppl 2:11-20. doi: 10.1111/obr.12102.
- Pulgarón ER. Childhood obesity: a review of increased risk for physical and psychological comorbidities. *Clin Ther* 2013;35:A18-A32.
- Ramírez-Silva I, Rivera JA, Ponce X, Hernández-Ávila M. Fruit and vegetable intake in the Mexican population: results from the Mexican National Health and Nutrition Survey 2006. *Salud Publica Mex* 2009;51:S574-S585.
- Reimers C, Knapp G, Reimers A. Does physical activity increase life expectancy? A review of the literature. *J Aging Res.* 2012;2012 doi: 10.1155/2012/243958
- Schwiebbe L, van Rest J, Verhagen E, Visser RWM, Kist-van Holthe J, Hirasing RA. Childhood obesity in the Caribbean. *West Indian Med J* 2011; 60 (4): 442
- Torres R, Santos E, Orraca L, Elias A, Palacios C. Diet quality, social determinants and weight status in 12-year-old Puerto Rican children. *Journal of the Academy of Nutrition and Dietetics.* 2014;114(8):1230-1235. doi:10.1016/j.jand.2014.01.011.
- Tremblay MS, Leblanc AG, Kho ME, Saunders TJ, Larouche R, Colley RC, Gorber S. Systematic review of sedentary behaviour and health indicators in school-aged children and youth. *The International Journal of Behavioral Nutrition and Physical Activity.* 2011; 8:98. <http://dx.doi.org/10.1186/1479-5868-8-98>.
- World Health Organization. Bahamas: WHO statistical profile. 2012
<http://www.who.int/gho/countries/bhs.pdf?ua=1>
- World Health Organization. Country cooperation strategy. Bahamas at a glance.
http://who.int/countryfocus/cooperation_strategy/ccsbrief_bah_en.pdf
- World Health Organization – Bahamas. Non-communicable Diseases (NCD) Country Profiles, 2014. http://www.who.int/nmh/countries/bhs_en.pdf?ua=1
- WHO Fast Facts, Fact Sheets. Health effects of secondhand smoke. 2017
http://www.cdc.gov/tobacco/data_statistics/fact_sheets/secondhand_smoke/health_effects/
- WHO. Global recommendations on physical activity for health. 2010 Geneva.
http://www.who.int/dietphysicalactivity/factsheet_recommendations/en/
- World Data Bank. World Development Indicators. The Bahamas. The World Bank.
<http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators>
- World Health Organization. Global Health Observatory Data. Prevalence of Insufficient physical activity by country. 2016 http://www.who.int/gho/ncd/risk_factors/physical_activity/en/
- World Health Organization. WHO Report on the Global Tobacco Epidemic, 2015. Country profile Bahamas. http://www.who.int/tobacco/surveillance/policy/country_profile/bhs.pdf