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NONCOMMUNICABLE DISEASES AMONG RELIGIOUS LEADERS IN JAMAICA

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Introduction: The World Health Organization indicated that 71 per cent of all deaths globally (41 million people) and 80 per cent of mortality in low-to-middle-income nations are accounted for by noncommunicable diseases (NCDs). However, there is sparse information on the prevalence of NCDs among religious leaders.
Objectives: To evaluate the nature of NCDs among religious SDA leaders in Central Jamaica, 2) determine the extent of NCDs among religious SDA leaders in Central Jamaica, 3) assess the healthcare-seeking behaviour and prevalence of ill-health experienced among religious SDA leaders who reported having a NCDs, and 4) determine the per cent of religious SDA leaders who reported having hypertension and diabetes mellitus.
Methods and materials: The current study employed a correlational cross-sectional design. The population for this research was leaders who serve in the Seventh-day Adventist churches in Central Jamaica (n=350). A standardized questionnaire was developed to collect data and evaluate the research objectives.
Findings: The most prevalent NCDs were hypertension (28.9 per cent), high cholesterol and arthritis (18.6 per cent, each), chronic respiratory (8.8 per cent), and diabetes (8.5 per cent). Seventy-two and two tenths per cent of those who reported having an NCD sought medical care compared to 84.5 per cent of those who did not report an NCD (χ^2(df=1)=4.231, P = 0.042). Leaders with NCDs were less likely to report good health than those who did not report NCDs (χ^2(df=1)=25.048, P < 0.0001, ϕ= -0.352).
Conclusion: NCDs among religious SDA leaders are showing worrying signs and these must be affecting their decision-making capabilities.
Keywords: Diabetes mellitus, good health status, noncommunicable diseases (NCDs), religious leaders, healthcare-seeking behaviour, hypertension, self-reported health status

Introduction

Life expectancy in the human population has always been influenced by pathogens which cause morbidity or mortality (Sender, Fuchs, & Milo, 2016; Balloux, & van Dorp, 2017). The advancements in technology, medicine and pathogens, as well as stem cell research, continue to play a significant role in the existence or nonexistence of humans as well as other animals (WHO, 2017; Alberts, Bray, Lewis, Raff, Roberts, & Watson, 2002). The epidemiologic transition has seen the shifting of high deaths away from infants and children to degenerative and man-made conditions (Omran, 1971, 2005; Armelagos, Brown, & Turner, 2005; McKeown, 2009; Fray-Aiken, 2014). With the shifting of diseases from infectious to degenerative conditions in humans, because of the shifting of the population from young to older age, noncommunicable conditions have become the leading cause of mortality (Omran, 1971; Rogers, & Hackenberg, 1987; McKeown, 2009; Hospedales, Samuels, Cummings, Gollop, & Greene, 2011; Kabudula, Houle, Collinson, et al., 2017).

The World Health Organization (WHO) indicated that 71 per cent of all deaths globally (41 million people) and 80 per cent of mortality in low-to-middle-income nations are accounted for by noncommunicable diseases (NCDs) or chronic conditions, which result from environmental, genetic, physiological and behavioural factors (WHO, 2013, 2018a, 2018b; Kim & Oh, 2013; Bigna, & Noubiap, 2019; Prüss-Ustün, van Deventer, Mudu, et al., 2019). Pan American Health Organization (PAHO, 2019) reviewing statistics on noncommunicable conditions in the Americas found that "The Region of the Americas has an NCD mortality rate of 436.5 per 100,000 population, which ranges from a high in Guyana to 831.4 deaths per 100,000, to a low in Canada of 291.5 deaths per 100,000 population". NCDs are, therefore, at a pandemic stage, which requires urgent attention from scholars, and this extends to the Caribbean region.

An examination of the literature revealed no empirical study on the prevalence of noncommunicable diseases among Seventh-day Adventist religious leaders across the globe, particularly the Caribbean. Although the Seventh-day Adventist (SDA) message is one of healthy lifestyle, there is no evidence that this is widespread among members, whether noncommunicable diseases patterns are different for SDA compared to the general population,

and more so among the leadership. The objectives of this study are to 1) evaluate the nature of NCDs among religious SDA leaders in Central Jamaica (St. Catherine, Clarendon, and Manchester), 2) determine the extent of NCDs among religious SDA leaders in Central Jamaica, 3) assess the healthcare-seeking behaviour and prevalence of ill-health experienced among religious SDA leaders who reported having a noncommunicable disease, and 4) determine the percentage of religious SDA leaders who reported having hypertension and diabetes mellitus.

Literature Review

The epidemiologic transition that has been taking place across the globe is no different in the Caribbean, especially Jamaica (Lim, Vos, Flaxman, et al., 2012; Mozaffarian, Fahimi, Singh, et al., 2014; WHO, 2013, 2018a, 2018b; Razzaghi, Martin, Quesnel-Crooks, et al., 2019). The Pan American Health Organization & World Health Organization (ud), in reviewing data for the Caribbean, indicated that 78 per cent of all deaths in 2010 were caused by four major noncommunicable diseases (Cancers, Chronic respiratory failure or disease, Cardiovascular diseases, and diabetes), and that 76 per cent of premature mortality among those 30 to 69 years old were owing to NCDs. The Caribbean is experiencing an epidemic in NCD as well as the other developing nations (Reddy and Yusuf, 1998; Miranda, Kinra, Casas, Davey Smith, & Ebrahim, 2008; Omoleke, 2013; Yamada, Chen, Chiu, & Rizvi, 2013; Bourne, Francis, Sharpe-Pryce, Hudson-Davis, Solan, & Watson-Coleman, 2014; Bourne, Francis, Sharpe-Pryce, Hudson-Davis, Solan, Watson-Coleman, & Rhule, 2014;) compared to the rest of the world as Matthew (2013) indicated that 70 per cent of all mortality is NCD compared to 60 per cent across the world (See also, Bloom, Cafiero, Jané-Llopis, et al., 2011). One author referred to the prevalence of chronic noncommunicable diseases as the neglected epidemic of chronic diseases (Horton, 2005). On disaggregating NCDs by English-speaking and non-English-speaking Caribbean nations, Matthew (2013) found that the rates were 71 and 83 per cent respectively. A group of scholars, examining NCD data for the Caribbean from 1999 to 2014 (10-year period), found that they accounted for between 39 and 67 per cent of all mortality in 22 nations (Razzaghi, Martin, Quesnel-Crooks, et al., 2019). A detailed presentation of the rates of the four major NCDs (cancer, heart disease, cerebrovascular diseases, and diabetes) in 21 Caribbean nations is shown in Table 1, below.

Table 1: Cumulative 10-year proportions of death (per 100 000) from four noncommunicable diseases (NCDs) in Puerto Rico, the U.S. Virgin Islands, and 20 other English- or Dutch-speaking Caribbean countries or territories, 1999-2014

Country/Territory	Cancer	Heart disease	Cerebrovascular disease	Diabetes	Cumulative proportions of death due to these four NCDs
Caribbean					
Anguilla (2005-2014)	23.36	17.29	7.17	9.97	57.79
Antigua and Barbuda (2005-2014)	18.43	20.90	7.39	8.91	55.63
Aruba (2005-2014)	23.79	20.11	8.22	6.05	58.16
Bahamas (2004-2013)	17.91	20.70	7.11	5.16	50.88
Barbados (2004-2013)	21.16	16.53	8.44	9.07	55.20
Belize (2005-2014)	11.58	13.04	5.63	8.87	39.11
Bermuda (2005-2014)	26.64	23.46	7.70	5.17	62.97
British Virgin Islands (1999-2004; 2006; 2008-2010)	19.88	13.93	1.43	5.23	40.47
Cayman Islands (2004-2013)	25.19	17.88	3.97	3.90	50.94
Dominica (2005-2014)	19.67	19.53	10.61	7.87	57.68
Grenada (2005-2014)	19.33	20.28	10.40	10.08	60.09
Guyana (2004-2013)	8.29	21.02	10.93	8.11	48.35
Jamaica (2002-2011)	18.05	14.02	12.27	11.05	55.39
Montserrat (2005-2014)	13.41	25.05	7.03	21.10	66.59
Saint Kitts and Nevis (2004-2013)	16.80	17.10	13.47	9.01	56.37
Saint Lucia (2005-2014)	17.18	16.41	10.42	9.03	53.03
Saint Vincent and the Grenadines (2005-2014)	15.29	21.15	10.59	9.49	56.51
Suriname (2005-2014)	12.46	14.48	12.28	6.32	45.54
Trinidad and Tobago (2001-2010)	13.77	22.29	9.26	13.89	59.21
Turks and Caicos Islands (2000-2009)	11.89	21.99	2.49	5.81	42.19
The U.S.					
Puerto Rico (2005-2014)	17.50	18.37	5.05	10.05	50.97
U.S. Virgin Islands (2003-2012)	18.39	26.77	5.98	6.31	57.46

Source: Razzaghi, Martin, Quesnel-Crooks, et al. (2019, p. 3).

Table 1 shows that 55.39 per cent of Jamaicans died from four major NCDs (cancers, heart disease, cerebrovascular diseases, and diabetes mellitus), which has significantly increased to 70 per cent in 2015 as published by the Jamaican Ministry of Health & Wellness (2019). The World Health Organization (2018c) noted that 65 per cent of deaths in Jamaica (in 2017) were caused by cancers (20 per cent); chronic respiratory (3 per cent); diabetes mellitus (12 per cent); and cardiovascular diseases (30 per cent). NCDs have therefore reached a pandemic state in Jamaica, and according to Razavi, Hambleton, Samuels, et al. (2019), these are a feminized phenomenon—1.46 times more women than men die from NCDs. However, Rivera-Andrade & Luna (2014) and Yisahak, Beagley, Hambleton, & Narayan (2014) opined that mortality is greater for males than females in cancer and heart disease, with NCDs having a greater health burden than other causes of mortality. Furthermore, a national probability sampling cross-sectional survey of some 2,848 Jamaicans ages 15-74 years old over a four-month period in 2008 by Wilks, Younger, Tulloch-Reid, McFarlane., & Francis (2008) found that 1) hypertension and diabetes mellitus were the most prevalent self-reported noncommunicable diseases, 2) particular noncommunicable conditions were a feminized phenomenon (diabetes mellitus, hypertension, arthritis, chronic respiratory, high cholesterol, cancer, kidney disease), 3) heart disease was greater among males than females, and 4) 51.7 per cent of Jamaicans ages 15-74 years old reported at least one noncommunicable disease. With these realities across the globe, there should be no surprise that the World Health Organization and Pan American Health Organization have called for a leadership agenda to address the NCD pandemic (WHO, 2017a, 2017b; PAHO, 2019). Galaviz, Venkat Narayan, Manders et al. (2019) opined that the burden caused by NCDs in low-to-middle income nations is challenging leadership as it relates to implementing a comprehensive intervention programme to address the epidemic (see also, Pan American Health Organisation & World Health Organisation, 2011; Muhimpundu, Husain, Uwinkindi, F. et al., 2018).

In the discourse on intervention programmes to combat NCDs in low-to-middle income developing nations, Galaviz, Venkat Narayan, Manders et al. (2019), Pan American Health Organisation & World Health Organisation (2011), WHO (2018), Kako, Hsu, Kinman, Mcgarry, et al. (2016), Miranda, Kinra, Casas, Davey Smith, & Ebrahim, 2008) and Bourne, et al. (2014) did not examine the burden of NCDs on the leaders. However, Catoe, Jarvis, Gupta, Ginsburg, & de Lima Lopes, (2018) opined that "Leaders of CARICOM, a group of 20 countries within the United Nations (UN) system, raised their concerns about diabetes and other NCDs at the UN, setting the stage for the UN High-level Meeting to take place in 2011." (p. 29). Undoubtedly, there is no denying that leadership is needed to address the NCDs crisis in the world as well as the Caribbean region; but, a crucial unanswered question is 'How is the health status of leaders, particularly religious leaders as it relates to NCDs?' The rationale for the importance of this question is within the context that if leadership is needed to address this crisis, the discourse must first begin with ascertaining whether the leaders are experiencing this challenge and therefore pose a challenge to addressing the pandemic.

The Seventh-day Adventist movement is well known for its healthy lifestyle message, and the fact that those who adhere to this lifestyle have been healthier than other people, particularly because of the association between nutritional intake and mortality as well as morbidity (Tonstad, Bulter & Fraser, 2009; Lin, Hwang, Liu & Lin, 2012; Wright, 2019). Tonstad, Bulter & Fraser (2009) who conducted a study of 60,903 North American Adventists established that diabetes mellitus was 2.9 per cent among vegetarians compared to 7.6 per cent among non-vegetarians. Rizzo, et al's study (2011) found a vegetarian lifestyle was associated with lower metabolic risk factors and reporting type 2 diabetes. Besides the association between a vegetarian lifestyle and good health status—the associated with lower risk factors of diseases and dietary intake—there is evidence on the statistical association between dietary intake and noncommunicable diseases; but, it was also related to greater life expectancy and lower noncommunicable diseases (rates of coronary heart disease, and cancers) as emerged in a study by Fraser (2009). However, with no study on the religious SDA leaders' health, there is no empirical evidence on validating some the aforementioned matter of this cohort of people. The current study used a cross-sectional correlation design by way of a standardized instrument to collect data from all religious SDA leaders in Central Jamaica.

Material and methods

Design and Methods

The current study employed objectivist epistemology by way of a correlational cross-sectional design (Babbie, 2010; Crotty, 2005; Leedy and Osmond, 2016; Neuman, 2014). The study was conducted via a survey research methodology, and a positivist theoretical framework was used to evaluate the various objective research questions (Babbie, 2010; Crotty, 2005; Neuman, 2014). The survey research methodology allowed for 1) measurement and conceptualization, 2) sampling, 3) questionnaire design and 4) statistical analyses (Babbie, 2010; Blalock, 1982; Fowler, 2009; Neuman, 2014; Rea and Parker, 2014; EMC Education Services, 2015) and offers a wide coverage of information on particular issues, which lends itself to 1)

numerical description and 2) generalizability of information from collecting data from a sample of the population (Blalock and Blalock, 1968; Fowler, 2009), which forms the basis for this study.

Bastick and Matalon (2007) postulated that association research is quantitative and allows for investigative research that measures the characteristics of a sample or population on pre-specified variables. This study fits this design because it typically sought to ascertain respondents' perspectives on 1) emotional well-being, 2) fatigue, 3) general well-being, 4) being diagnosed with a noncommunicable conditions, 5) healthcare seeking behaviour, and 5) self-reported major depression by using a standardized questionnaire or in a predetermined structured manner from a sample of leaders who serve in a certain denomination that is located in Central Jamaica (St. Catherine, Manchester, and Clarendon).

Population, Sampling Design, and Procedure

The population for this research was leaders who serve in certain religious denomination in Central Jamaica. Initially, the researchers chose a simple random probability sample of the number of pastors, associate pastors, and first elders in the various Churches in Central Jamaica. A sample size was calculated based on the number of pastors, associate pastors and first elders in Central Jamaica (approximately 240 people), a 95% confidence interval and a 5% margin of error. The result was a sample size of 148 leaders, which is smaller than the stipulated recommended number of people by different scholars for logistic regression analyses (Hsieh, 1989; Long, 1997; Bujang, Sa'at, Sidik, & Joo, 2018). Hence the researcher changed the sample design to one of total population-selection. For total-population selection, the researcher expanded the sample unit to all board members who serve in the churches in Central Jamaica. This decision was taken as it provided more leaders than initially sought, and this makes it generalizable to the population of leaders in the churches in Central Jamaica. Accordingly, all leaders serving in the churches in Central Jamaica were given a copy of the instrument. It was estimated that there are 350 board members. As such, an instrument was sent to all board members by way of their Pastors and/or First Elders to be completed and returned for data analysis. The response rate was approximately 60%.

Instrumentation

A standardized questionnaire was developed to evaluate the various research objectives. This was administered from September to December 2019. The general instrument consists of two major established questionnaires (The Multifactor Leadership Questionnaire (MLQ 5X) and Self-reported health status (SF-36), which were designed by Bass and Avolio (1989, 1995, 1997, 2000) and RAND Corporation respectively. In addition to those items, the researchers included items on healthcare-seeking behaviour, health conditions and demographic characteristics. The instrument consists of 6 sections comprising of 103 questions. Sections A & B dealt with items from the MLQ 5X (i.e., question 1-36); Section C detailed items from the SF-36 (i.e., questions 37-72), Section D was on healthcare-seeking behaviour (i.e., questions 73-77), Section E examined self-reported medical history/health conditions/illnesses (i.e., questions 78-94), and Section F addressed the demographic characteristics (i.e., questions, 95-103). The demographic issues were categorized based on 1) where the leader serves (higher education and religious or church), 2) gender, 3) age, 4) marital status, and 5) religiosity (frequency of monthly church attendance.

36-Item Short-Form Survey (or SF-36).

Ever since the World Health Organization (WHO) coined a definition for health which expanded from the traditional medical conceptualization, there has been a growing concern about the need for a single index to measure this new broad perspective forwarded by the WHO (Crisp, 2005). The WHO's definition of health has laid the mantle for an index that would measure the quality of life or general well-being and not simply illness or physical well-being. John Flanagan introduced the quantification of health that expanded on the earlier usage of life expectancy, mortality, and illness to the self-assessed health status of people or population.

RAND developed a 36-Item Short-Form Health Survey (SF-36) to assess the quality of life. Table 5 below comprises a set of questions on physical activities, social activities, role activities, bodily pain, mental health, fatigue, vitality, and general health perceptions. The 36-item scale that comprised 8 sub-scales is presented in this table (Ware, & Sherbourne, 1992; Ware, Kosinski, & Keller, 1994; McHorney, Ware, & Raczek, 1993). Another important property of the SF-36 is its scoring, which is detailed below in Table 6. Ware and Sherbourne (1992) opined that the SF-36 was developed to assess health status in Medical Outcome Study (McHorney, Ware, & Raczek, 1993; Roth, Perkins, Wadley, Temple, & Haley, 2009; Ware, Kosinski, & Keller, 1994).

Noncommunicable diseases

Section E deals with seventeen health conditions. These are noncommunicable diseases and respondents were asked to provide information on their medical history. The items range from heart disease, diabetes, high blood pressure (hypertension), high cholesterol, stroke, kidney disease, weight, circulation problems, enlarged prostate, rheumatic fever, sickle cell disease, sickle cell traits, arthritis, asthma, epilepsy, major depression to bronchitis.

The respondents were asked to select whether they were diagnosed with the condition (Yes=1) or otherwise (No=2).

Administrative Procedure

The researcher printed five hundred copies of the 'Leadership and Health Questionnaire' for distribution. The instruments were given to pastors to be forwarded to their first elders. In some cases, the first elders and other board members were contacted, and copies given to them for distribution. There were instances when the researcher contacted the pastor who agreed to conduct the study at church. The total population of board members is estimated to be 30 people. This study is a part of larger research (i.e., doctoral dissertation) thus, the researcher extracted this topic therefrom. The return rate was moderate and slow up to this point; but, the numbers (n=202 or 58 per cent) were able to carry out a binary logistic regression that assesses whether leadership styles (transformational, transactional, and laissez-faire) were potential factors along with selected demographic variables of self-reported health status.

The instrument was administered by 1) having those who were literate read and self-complete and return the instrument at their convenience, and 2) those who were non-readers, would have a member of the research team read the items for them, which they would then complete. The instrument was given to 1) Pastors, 2) First Elder, and 3) other Board members to issue to all Board executives of each church in the parishes of St. Catherine, Clarendon, and Manchester. Before issuing the questionnaires, the researcher and or designated team member informed prospective participants of their rights and responsibilities. If a participant consented to the research, he/she was issued with an instrument. In addition to the aforementioned issues, participants were informed of their right to withdraw at any point during the process as well as omit any item that they so desired. The administrative procedure in completing the questionnaires was also explained at the beginning of the instrument, and this was read to non-readers.

Method of Analysis

To accommodate the analysis of the large volume of data, the Statistical Packages for the Social Sciences (SPSS) for Windows Version 25.0 (SPSS Inc; Chicago, IL, USA) was used. Data were analyzed by way of descriptive statistics, percentage and frequency distributions (include percentages and frequency counts), and multivariate analysis (EMC Education Services, 2015). Descriptive statistics allowed the researcher to meaningfully describe the many pieces of data collected that provide for background information on the study (Gay, Mills, & Airasian, 2009; EMC Education Services, 2015). Statistical significance was determined using a p-value less than or equal to five percentage points (≤ 0.05)– two-tailed test. Bivariate analysis was conducted by way of 1) independent sample t-test and 2) cross-tabulation. Furthermore, binary regression was used to model factors that influence noncommunicable conditions among religious leaders in Central Jamaica. The predictive power of the model is examined by way of 'Omnibus test of model', and Hosmer and Lemeshow's technique is used to assess the goodness of fit of the model (Hosmer and Lemeshow, 2000).

Definition of terms:

Health is defined as a self-reported assessment of health by way of employing RAND's corporation SF-36 items. This research therefore extrapolated pain, fatigue and emotional well-being from the general SF-36 index as aspects of well-being to assess the psychosocial state of leaders' well-being. Furthermore, good health status for this study means self-reported excellent and very good health status (1=Yes, and 0=Otherwise).

Leadership style is assessed based on the Multifactor Leadership Questionnaire (MLQ) developed by Bass and Avolio (1989, 1995, 1997, 2000), and Bass and Bass (2008). MLQ measures self-reported leadership style for transformational, transactional and laissez-faire leadership styles.

Age cohort. According to Bourne, Francis, Sharpe-Pryce, Hudson Davis, & Solan (2014), "**Children** are individuals ages 0 to 15 years old; **young adults**, 16-30 years; **other aged adults**, 31-59 years old; **young old**, 60-74 years old; **old old**, 75-84 years old, and **oldest old**, 85+ years old" (p. 3), which is used for this research.

Healthcare seeking behaviour is self-reported sought traditional medical assistance (1=Yes, and 0=Otherwise)

Findings

Of the respondents, the majority were females (61 per cent) and married (66.1 per cent), with the average age being 52.1 years. Furthermore, 56.9 per cent of the leaders self-reported at least one noncommunicable disease (Table 1).

Table 2: Demographic characteristics of sampled respondents, n=206

Details	N (%)
Leadership entity	
SDA Church in Central Jamaica	206
Gender	
Male	76 (39.4)
Female	117 (60.6)
Marital Status	
None/Single	38 (20.1)
Married	125 (66.1)
Common-Law	6 (3.2)
Widowed	6 (3.2)
Divorced	11 (5.8)
Separated	1 (0.5)
Visiting	2 (1.1)
Non-communicable diseases	

No	88 (43.1)
Yes	116 (56.9)
Healthcare seeking behaviour	
No	44 (22.6)
Yes	154 (77.4)
Religiosity	4 times (range = 15 days)
Age cohort	
Children (Less than 16 years)	3 (1.6)
Young adults (16-30 years)	39 (20.7)
Older adults (30-64 years)	108 (57.5)
Young old (65-74 years)	23 (12.2)
Old-old (75-84 years	14 (7.5)
Oldest-old (85+ years)	1 (0.5)
Age	49.6 years±16.6 years, 95%CI: 47.1-52.1 years

Table 2 presents specifically noncommunicable diseases as reported by religious SDA leaders in Central Jamaica (St. Catherine, Clarendon, and Manchester). The most prevalent noncommunicable diseases reported by the respondents were hypertension (28.9 per cent), high cholesterol and arthritis (18.6 per cent, respectively), chronic respiratory disease or failure (8.8 per cent), and diabetes (8.5 per cent).

Table 3: Selected noncommunicable diseases among sampled respondents, n=

Details	Gender		Total
	Male	Female	N (%)
	N (%)	N (%)	
Heart disease	2 (2.6)	6 (5.1)	10 (4.9)
Diabetes mellitus	3 (6.3)	8 (10.8)	11 (8.5)
Hypertension	20 (26.3)	37 (31.4)	59 (28.9)
High Cholesterol	14 (18.4)	24 (20.3)	38 (18.6)
Stroke	2 (2.6)	2 (1.7)	4 (2.0)
Kidney disease	0 (0.0)	3 (2.5)	4 (2.0)
Major depression	2 (2.6)	5 (4.2)	7 (3.4)
Enlarged Cancer	10 (13.0)	0 (0.0)	10 (4.9)
Chronic respiratory	7 (9.2)	10 (8.5)	18 (8.8)
Sickle Cell	1 (1.3)	4 (3.4)	5 (2.5)
Sickle Cell traits	5 (6.6)	5 (4.2)	10 (4.9)
Arthritis	10 (13.2)	27 (22.9)	38 (18.6)
All noncommunicable diseases*	45 (59.2)	69 (58.5)	116 (56.9)

*Excluded major depression

Table 3 shows a cross-tabulation between aggregate self-reported noncommunicable disease and health care seeking behaviour of religious SDA leaders who served in Central Jamaica. Seventy-two and two tenths per cent of those who reported having a noncommunicable disease sought medical care in the studied period compared to 84.5 per cent of those who did not report a noncommunicable condition (χ^2(df=1)=4.231, P = 0.042).

Table 4: Aggregate self-reported noncommunicable diseases by healthcare-seeking behaviour, n=199

Details	Noncommunicable		Total
	No	Yes	N (%)
	N (%)	N (%)	
Healthcare seeking behavior			
No	13 (15.5)	32 (27.8)	45 (22.6)
Yes	71 (84.5)	83 (72.2)	154 (77.4)
Total	84	115	199

On examining whether a statistical association between aggregate self-reported noncommunicable disease and reported being ill for the studied period existed, a weak relationship emerged (χ^2(df=1)=12.620, P < 0.0001, ϕ=0.251). Table 4 presents the disaggregation of the responses of the sampled respondents on the two aforementioned variables. Of those who self-reported having at least a noncommunicable disease, 59.1 per cent of them reported being ill/sick in the survey period compared to 33.7 per cent of those who did not report a noncommunicable disease (Table 4). Furthermore, 48.5 per cent of the sampled religious SDA leaders who serve in Central Jamaica reported being ill/sick in the studied period.

Table 5: Aggregate self-reported noncommunicable diseases by reported being ill, n=198

Details	Noncommunicable		Total
	No	Yes	N (%)
	N (%)	N (%)	
Reported being ill			
No	55 (66.3)	47 (40.9)	102 (51.5)
Yes	26 (33.7)	68 (59.1)	96 (48.5)
Total	83	115	198

The results of an examination of the age of those with or without noncommunicable diseases are depicted in the box-plot, below (Figure 1). By way of the box-plot, respondents who reported having a noncommunicable disease are older than those without it (with, 56.4 years old; without, 40.8 years old), with there being a statistical difference between the mean age (t_{171}= -7.3, P < 0.0001).

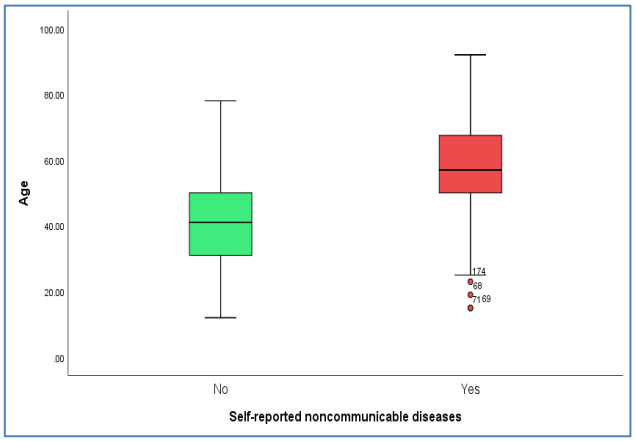

Figure 1: Box-plot of Self-reported noncommunicable disease and age of respondents

Using Independent sample-t-test of selected noncommunicable diseases and the age of respondents, the results are presented in Table 5. Based on the analyses, only particular noncommunicable diseases (sickle cell, sickle cell traits, chronic respiratory conditions, and major depression) were there no statistical difference in age for

those who self-reported and not reported cases of the illness (P > 0.05).

Table 6: Selected noncommunicable diseases among sampled respondents, n=

Details		Age in years (Mean±SD)	$t_{\text{-value}}$
Heart disease	Yes	70.3±16.0	t_{183}=-3.943, P<0.0001
	No	49.0±12.1	
Diabetes mellitus	Yes	60.9±10.3	t_{115}=-2.913, P=0.018
	No	49.1±16.0	
Hypertension	Yes	58.4±13.1	t_{125}=-5.213, P<0.0001
	No	46.0±16.5	
High Cholesterol	Yes	59.7±12.8	t_{186}=-4.076, P<0.0001
	No	47.7±16.4	
Stroke	Yes	62.0±6.1	t_{186}=-3.752, P=0.019
	No	49.8±16.5	
Kidney disease	Yes	30.4±7.0	t_{2}=4.419, P=0.035
	No	50.4±16.4	
Major depression	Yes	53.9±21.0	t_{6}=-0.496, P=0.637
	No	49.9±16.3	
Enlarged Cancer	Yes	67.1±8.4	t_{186}=-3.278, P=0.001
	No	49.2±16.3	
Chronic respiratory	Yes	52.1±19.5	t_{19}=-0.487, P=0.632
	No	49.8±16.1	
Sickle Cell	Yes	58.2±11.3	t_{4}=-1.620, P=0.173
	No	49.8±16.5	
Sickle Cell traits	Yes	51.1±14.8	t_{9}=-0.221, P=0.826
	No	50.0±16.6	
Arthritis	Yes	57.3±16.5	t_{53}=-3.0.14, P=0.004
	No	48.2±16.0	
All noncommunicable diseases*	Yes	56.4±15.0	t_{171}=-7.300, P<0.0001
	No	40.8±13.9	

*Excluded major depression

A cross-tabulation between self-reported hypertension and self-reported diabetes mellitus, found a significant statistical relationship (χ^2(df=1)=12.007, *P* = 0.001, ϕ=0.305). Twenty-two and two tenths per cent of those who reported having hypertension indicated having diabetes mellitus.

Table 7: Self-reported hypertension by reported diabetes mellitus, n=129

Details	Hypertension		Total
	No	Yes	N (%)
	N (%)	N (%)	
Diabetes mellitus			
No	90 (96.8)	28 (77.8)	102 (51.5)
Yes	3 (3.2)	8 (22.2)	96 (48.5)
Total	93	36	129

Table 7 presents a cross-tabulation between self-reported diabetes mellitus and self-reported hypertension and the results revealed a significant statistical relationship (χ^2(df=1)=12.007, *P* = 0.001, ϕ=0.305). Seventy-two and two tenths per cent of those who reported having diabetes mellitus had hypertension.

Table 8: Self-reported hypertension by reported diabetes mellitus, n=129

Details	Diabetes mellitus		Total
	No	Yes	N (%)
	N (%)	N (%)	
Hypertension			
No	90 (76.3)	28 (27.3)	93 (72.1)
Yes	28 (23.7)	8 (72.7)	96 (48.5)
Total	118	11	129

On examination, a cross-tabulation between self-reported noncommunicable diseases and self-reported good health status, an inverse statistical association emerged (χ^2(df=1)=25.048, *P* < 0.0001, ϕ= -0.352). Respondents who indicated that they had noncommunicable diseases were less likely to report good health; for example, 31.9 per cent of them mentioned that they have good health compared to 67.4 per cent who do not have a noncommunicable condition. It should be noted that only 47 per cent of the sampled respondents indicated having good health status.

Table 9: Self-reported noncommunicable diseases by reported good health status, n=202

Details	Noncommunicable		Total
	No	Yes	N (%)
	N (%)	N (%)	
Good health status			
No	28 (32.6)	79 (68.1)	107 (53.0)
Yes	58 (67.4)	37 (31.9)	95 (47.0)
Total	86	116	202

Table 9 presents a cross tabulation of age cohort by self-reported noncommunicable diseases of the sampled respondents. Of the five specified noncommunicable diseases presented in Table 9, the Other aged adults were the most prevalent age group to report the particular diseases with the exception of heart condition. Heart diseases were the most prevalent among young-old leaders (44.4%, n=4). In fact, 78% of those with heart condition were at least 65 years old compared to 36.4% with diabetes, 34.6% with hypertension, 25.0% with stroke, and 38.9% with high cholesterol. The onset of noncommunicable diseases starts at 16 years for the sampled leaders in Central Jamaica.

Table 10: Age cohort by selected self-reported noncommunicable diseases

Details	Diabetes	Hypertension	Stroke	Heart Condition	High Cholesterol	Kidney disease
	n (%)	n (%)	n (%)	n (%)	n (%)	
Age cohort						
Children (< 16 years)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Young adults (16-30 years)	3 (27.3)	11 (20.0)	1 (25.0)	1 (11.1)	6 (16.7)	1 (33.3)
Other aged adults (31-64)	4 (36.4)	25 (45.5)	2 (50.0)	1 (11.1)	16 (44.4)	2 (66.7)
Young-Old (65-74)	2 (18.2)	15 (27.3)	1 (25.0)	4 (44.4)	9 (25.0)	0 (0.0)
Old-Old	2 (18.2)	3 (5.5)	0 (0.0)	2 (22.2)	5 (13.9)	0 (0.0)
Oldest-Old	-	1 (1.8)	0 (0.0)	1 (11.1)	0 (0.0)	0 (0.0)
χ2	4.523	20.412	1.011	34.783	11.027	0.944
P value	0.340	0.001	0.962	<0.0001	0.051	0.967

Table 10 presents self-reported healthcare seeking behaviour and self-rated good health status by selected self-reported noncommunicable disease conditions. The majority of the sampled leaders who indicated having a particular noncommunicable disease sought medical care during the period of study with the exception of those who reported kidney disease (25%). However, those with selected noncommunicable diseases were less likely to reported good health status. In fact, none of those who indicated having been diagnosed with a stroke indicated having at least good health status, with one half of those with kidney disease stated that their health is at least good. Furthermore, the findings revealed that those who reported having been diagnosed with a particular noncommunicable condition were mostly sick during the studied period, with the exception of stroke patients.

Table 11: Self-reported healthcare seeking behaviour and self-rated good health status by selected self-reported noncommunicable diseases

Details	Diabetes	Hypertension	Stroke	Heart Condition	High Cholesterol	Kidney disease
	n (%)	n (%)	n (%)	n (%)	n (%)	
Healthcare seeking behaviour						
Yes	9 (81.8)	47 (79.7)	4 (100.0)	7 (70.0)	31 (83.8)	1 (25.0)**
Self-reported Good Health Status						
Yes (i.e., at least good health)	4 (36.4)	19 (32.2)**	0 (0.0)	2 (20.0)	12 (31.6)*	5 (50.0)
Reported being sick						
Yes	7 (70.0)	32 (55.2)	2 (50.0)	9 (90.0)**	25(65.8)*	4 (100.0)

***P value < 0.0001; **P < 0.01; *P < 0.05

Of the sampled respondents (206), 91.3% of them were used for the cross tabulation between age cohort and self-reported noncommunicable conditions (being diagnosed with at least one condition). Fifty-nine (n=111) per cent of the respondents reported having been diagnosed with at least one noncommunicable condition. Of those who reported having at least one noncommunicable condition (59%, n=111), 51% were of 31-64 years, 31.5% were at least 65 years old (elderly), 16.2% young adults, and 1.8% children (Table 11)

Table 12: Age cohort of respondents by self-reported noncommunicable conditions, n=188

Details	**Reported being diagnosed with at least one noncommunicable condition**	
	No	**Yes**
	n (%)	**n (%)**
Age cohort		
Children (< 16 years)	1 (1.3)	2 (1.8)
Young adults (16-30 years)	21 (27.3)	18 (16.2)
Other aged adults (31-64)	52 (67.5)	56 (50.5)
Young-Old (65-74)	1 (1.3)	22 (19.8)
Old-Old	2 (2.6)	12 (10.8)
Oldest-Old	0 (0.0)	1 (0.9)
Total	77	111
χ2	**22.650**	
P value	**<0.0001**	

Modeling factors that determine self-reported noncommunicable conditions

For this research, the model for testing is in expressed in the null hypothesis, below:

H_o: There is no predictive ability of pain, gender, healthcare seeking behaviour, role of limitation physical functioning index, social functioning index, fatigue index, and age on those who reported having at least one noncommunicable disease among religious leaders serving in SDA churches in Central Jamaica.

H_1: There is a predictive ability of pain, gender, healthcare seeking behaviour, role of limitation physical functioning index, social functioning index, fatigue index, and age on those who reported having at least one noncommunicable disease among religious leaders serving in SDA churches in Central Jamaica.

Overall, 75.7% of the data were correctly classified with 84.5% of those who reported having been diagnosed with a noncommunicable condition and 62.8% of those who did not report a case. Furthermore, the general model is a statistically significant one (-2LL=172.359, $\chi 2(df=7)=61.136$, $P < 0.0001$), and that it has a statistically significant predictor power (Hosmer and Lemeshow's goodness of fit ($\chi 2(df=8)=7.561$, $P=0.478$). With the Hosmer and Lemeshow Test having a significant value of 0.478, it can be interpreted as the sample size being adequate for the logistic regression model.

In addition, there are two predicators of self-reporting a noncommunicable condition (age of respondents, and pain index). Both factors account for 40.2% of reporting a noncommunicable condition. Age positively predicts (OR=1.071) those who reported having a noncommunicable diseases and reverse is true for pain (OR=0.950) (Table 13).

Table 13: Binary logistic regression of self-reported noncommunicable conditions by selected independent variable

	B	S.E.	Wald	df	Sig.	Odds ratio	CI:95%	
							Lower	Upper
Pain	-0.052	0.014	13.606	1	<0.0001	0.950	0.924	0.976
Gender (1=female)	0.086	0.389	0.048	1	0.826	1.089	0.508	2.337
Healthcare seeking behaviour	-0.243	0.448	0.294	1	0.588	0.784	0.326	1.888
Role limitation Physical Functioning Index	0.002	0.007	0.112	1	0.738	1.002	0.988	1.017
Social Functioning Index	0.018	0.011	2.940	1	0.086	1.019	0.997	1.040
Fatigue Index	-0.024	0.019	1.665	1	0.197	0.976	0.941	1.013
Age	0.069	0.014	22.961	1	<0.0001	1.071	1.042	1.102
Constant	0.867	1.675	0.268	1	0.605	2.381		

Discussion and conclusion

Globally, noncommunicable diseases have surpassed infectious condition as a result of both epidemiological and

demographic transitions (Lawson, 1971; Cowgill, 1983; Grell, 1987; McEniry et al. 2005; Palloni et al. 2005). Many scholars (Hospedales , et al., 2011; Kim, & Oh, 2013; Matthews, 2013; Bourne, Francis, Sharpe-Pryce, Hudson-Davis, et al., 2014; Kabudula, et al., 2017; Catoe, et al., 2018; Bigna, & Noubiap, 2019; Galaviz, et al., 2019), the World Health Organization (2011, 2017a, 2017b, 2018a, 2018b, 2018c) and Pan American Health Organisation (2012; 2019a, 2019b) have provided a comprehensive review and research on noncommunicable diseases (see also, Pan American Health Organization (PAHO). World Health Organization (2014) have indicated there noncommunicable conditions are at an epidemic stage across the globe and this is moreso a developing world phenomenon (Yach, Kellogg, & Voute, 2005; Powell, 2010;

Islam, Purnat, Phuong, Mwingira, Schacht, & Froschl, 2014; Engel, Devadasan, Horstman, & Criel, 2018), which means there is a need to urgently address them at a consorted leadership level and focus because of their burden on the society.

Like the rest of the globe (Lopez, Mathers, Ezzati, Jamison, and Murray, 2006; Mayosi, Flisher, Lalloo, Sitas, F., Tollman, et al., 2009; Bhandari et al, 2010; Lozano, Naghavi, Foreman, et al., 2012; Boerma and Mathers, 2015), the Latin America and Caribbean, and no less Jamaica is experiencing an epidemic of noncommunicable diseases and the focus has been on the population and subpopulations (Barreto, Miranda, Figueroa, et al., 2012; Bourne, Francis, Sharpe-Pryce, Davis, & Solan, 2014; Bourne, Francis, Sharpe-Pryce, Hudson-Davis, Solan, & Watson-Coleman, 2014; Samuels, Kirton, and Guebert, 2014; Razzaghi, et al. 2019). The high prevalence of noncommunicable diseases in the developing nations is aptly summarized by Tavernise (2014) in an article captioned 'Chronic diseases are killing more poorer countries' as well as 'Chronic diseases growing in developing nations: WHO' by Kelland (2012). Despite the efforts, leadership involvement and efforts of various stakeholders (Jha, 2019; Pan American Health Organization (PAHO) and World Health Organization, 2014), noncommunicable conditions have continued to rise in Jamaica like the rest of the world (WHO, 2006; Nugent, 2008; Abdulkadri, Cunningham-Myrie, & Forrester, 2009; Bourne, Francis, Sharpe-Pryce, Davis, & Solan, 2014; Bourne, Francis, Sharpe-Pryce, Hudson-Davis, Solan, & Watson-Coleman, 2014). This calls for more empirical studies on the matter, particularly on people and more so the religious leaders.

A study by Tonstad, Bulter & Fraser (2009) found that North American Adventists who practice a vegetarian lifestyle were heathier than non-vegetarians, which speaks to the direct statistical relationship between dietary intake and life expectancy as well as lower morbidities (see, Fraser, 2009; Rizzo, et al. 2011; Lin, Hwang, Liu & Lin, 2012; Wright, 2019). Embedded in this research is the difference between the ideals and the practice Seventh-day Adventists. This matter can be highlighted by the current study and that of others. Table 9 presents three different studies on Jamaica and noncommunicable diseases including the present one on the prevalence of selected noncommunicable diseases among religious SDA leaders in Central Jamaica. It can be deduced from the current findings (see Table 14) and those of other studies that because there is a similar prevalence of selected noncommunicable conditions among Jamaicans generally and SDA leaders in Central Jamaica , the Seventh-day Adventist philosophy is not creating an absolute or comparative advantage for its members with regard to substantially less reported noncommunicable diseases.

Table 14: Prevalence of selected noncommunicable diseases of the current study and that of Jamaica Health and Lifestyle Survey II (JHLS 2007 and 2016-2017) and Country report for Jamaica (WHO, 2018)

Disease condition	JHLS* 2007	JHLS* 2016-2017	Razzaghi, et al.'s study (2011)	WHO 2016**	Current study
	%		%		%
Heart disease	1.7		14.02	30.0	4.9
Diabetes mellitus	7.6	12.0	11.05	12.0	8.5
Hypertension	20.2	33.8			28.9
High Cholesterol	3.8				18.6
Stroke	1.2				2.0
Kidney disease	0.6				2.0
Major depression	3.1	14.3			3.4
Enlarged Cancer	0.6				4.9
Chronic respiratory	7.0			3.0	8.8
Sickle Cell	0.7				2.5
Sickle Cell traits	2.1				4.9
Arthritis	5.0				18.6
All noncommunicable diseases*	**53.6**		**55.4**		**56.9**

***Wilks, et al., (2008, p. 37) **Country report on Jamaica for 2016 (WHO, 2018)**

The findings of the current study have provided empirical evidence that there are no obvious dissimilarities in noncommunicable diseases among Seventh-day Adventist leaders and non-Adventists in Jamaica. There is a gap between the philosophy of Adventism and the practice of Adventists in Jamaica. The inference that can be made from this research is that Adventist leaders in Central Jamaica are engaged in unhealthy lifestyle practices as the wider society, which explains the congruence in the prevalence of noncommunicable disease between the general society and current population. The explanation for the similarities in noncommunicable conditions between the two aforementioned cohorts are 1) age and 2) gender.

In evaluating data for Jamaica, the World Health Organization (2018c) found that selected

noncommunicable diseases are 1) feminized and 2) higher among aged people. For the current study, the average age of leaders was 50 years (±17 years) and offers a justification of the comparability between religious leaders in the Adventist churches across Central Jamaica and non-Adventist Jamaicans. A logical deduction that can be made from this study is that religious SDA leaders are not subscribing to the SDA healthy lifestyle mantra/philosophy. Simply put, these leaders are non-vegetarians (meat eaters et cetera) and as such this does not give them any comparative advantage over non-SDA religious leaders or the general population of Jamaicans. Clearly a vegetarian diet is not widespread among SDA leaders and years of unhealthy lifestyle practices cannot reverse the few years of present healthy practices of these religious leaders.

Another issue that emerged from the current and past works is the feminization of noncommunicable diseases. Therefore, the matter of noncommunicable conditions are genetically determined and this cannot be eliminated simply because of religious practices. In an attempt to support the feminization of noncommunicable conditions, a comparative table of selected noncommunicable diseases of the current study and that of Jamaica Health and Lifestyle Survey II (JHLS 2008) by gender of respondents (Table 15). Table 15 depicts the feminization of noncommunicable conditions among SDA religious leaders in Central Jamaica as well as Jamaicans, and there appears some similarities between the two groups.

Table 15: Prevalence of selected noncommunicable diseases of the current study and that of Jamaica Health and Lifestyle Survey II (JHLS 2008) by gender of respondents

Details	JHLS** 2008		Current study	
	Gender		Gender	
	Male	Female	Male	Female
	%	%	%	%
Heart disease	2.4	1.0	2.6	5.1
Diabetes mellitus	6.1	9.1	6.3	10.8
Hypertension	10.7	29.3	26.3	31.4
High Cholesterol	2.6	4.9	18.4	20.3
Stroke	1.1	1.3	2.6	1.7
Kidney disease	0.5	0.7	0.0	2.5
Major depression	2.4	3.7	2.6	4.2
Enlarged Cancer	1.1	NA	13.0	0.0
Chronic respiratory	5.7	6.3	9.2	8.5
Sickle Cell	0.3	1.0	1.3	3.4
Sickle Cell traits	0.8	3.2	6.6	4.2
Arthritis	2.1	7.9	13.2	22.9

****Wilks, et al., (2008, p. 37)**

The feminization and ageing of noncommunicable conditions are well established in the literature, which concurs with the current work. However; a critical disparity that emerged between the present work and the literature is the association of diabetes and hypertension. One of the Caribbean's well-known endocrinologists, Professor Errol Morrison, indicated that diabetes and hypertension are twin conditions (Morrison, 2000). The twin problem of diabetes and hypertension was also empirically established by Callender (2000) who found that 50% of those with diabetes had a history of hypertension, which is contradicted by the current work. This study found that 72.7 per cent of those with diabetes, self-reported having hypertension. On the other hand, 22.2 per cent of those who reported having hypertension had diabetes. Such findings require more examination as this disparity holds some deeper meaning that cannot be provided in this paper.

A crucial finding of this study is the poor health status of those with noncommunicable diseases, which is highly comparable to the Jamaican population (Bourne, Francis, Sharpe-Pryce, Davis, & Solan, 2014). Of those with noncommunicable conditions in this research, 32 per cent of them self-reported good health status and 59.1 per cent of indicated that they were ill for the studied period. With such a high percentage of ill religious leaders, this reality must have an inverse influence on their leadership effectiveness, which brings into focus the need for leadership replacement or transition among religious SDA leaders in Central Jamaica. In addition to the effectiveness of the leaders, the present findings highlight a cause for concern among the leaders and a matter that requires immediate social and medical intervention.

In concluding, noncommunicable diseases among religious SDA leaders in Jamaica are a source of concern and are undoubtedly affecting the cognitive and decision-making capabilities of these leaders. SDA leaders do not have an absolute or comparative health advantage over non-SDA leaders because the practice of both cohorts are almost similar, which accounts for the closeness in prevalence of NCDs of the groups. This reality is a cause for concerns as NCDs is retarding lifestyle expectancy of Jamaicans including SDA leaders, and increasing the economic burden on the society, which is no different from obtained in other societies (King, Aubert, & Herman, 1998; Wild, Roglic, Green, Sicree, & King, 2004; Thun, DeLancey, Center, Jemal, & Ward, 2010). Furthermore, this research provides the bedrock/ foundation for more inquiries to address the NCD epidemic among religious and non-religious Jamaicans.

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