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Sociodemographic Factors, Culture, and Suicide in Guyana

Kay Shako
Walden University

Walden University

College of Health Sciences

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Kay Shako

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Abstract

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Suicide in younger populations is a major public health concern and it significantly impacts third world countries like Guyana. Some challenges related to suicide are poor recording of suicide risk factors and customized prevention programs to address this significant issue. The purpose of this study was to examine which sociodemographic factors (age, gender, occupation, method of suicide, and region) are associated with suicide and method of suicide among people aged ≥ 15 years in Guyana. Also, because studies show that culture plays a pivotal role in suicide, this study investigated if there is a link between culture (ethnicity/race and religion) and suicide cases in this population in Guyana. The socioecological model provided the framework for this quantitative study which used the 2015 cross sectional secondary data from the Guyana Ministry of Public Health. Bivariate analysis revealed that sociodemographic and cultural factors were significantly associated with suicide cases in Guyana, with men, aged 23-48 years old, employed individuals, East Indian and Hindu having the higher suicide proportions. In addition, regression analysis indicated that men were 3.1 times more likely to commit suicide by hanging instead of drinking poison compared to females (*OR*: 3.1, 95%*CI*: 1.5-6.7, $p < 0.004$). The positive social change implications include the identification of socioeconomic and cultural factors that are associated with suicide. These factors can be used to provide counselling sessions for the persons who have suicidal behaviors and to adopt a collaborative approach by World Health Organization, governmental, nongovernmental organizations and civil society to reduce the prevalence of suicide in Guyana.

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At this point in time, I want to recognize the Ministry of Public Health and the reviewers of the two institutional boards that accepted my proposal and allowed me to collect the relevant data on suicide to complete this capstone. Special thanks to the staff of the statistical department of the MOPH who worked hard to provide the requested data in a timely manner.

Finally, I would like to extend special thanks to my family, who understood my doctoral journey and thus allowed me the space, time and support needed so that, I can write, read, review and edit this capstone.

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Section 1: Foundation of the Study and Literature Review

Introduction

Suicide is a major public health concern and it may be identified under varying categories namely: suicide ideation, suicide attempts or suicide (World Health Organization [WHO], 2014). Suicidal ideation refers to thoughts of suicide and it precedes suicidal attempts, with more than a third of adolescents in the United States, in the latter category (suicidal attempts), eventually committing suicide. (Nock et al., 2013). Further, young people who commit suicide are 16 times more likely to have made a previous attempt than persons who never commit suicide. (Beautrais, Joyce, & Mulder, 1996). Next, according to Henry (2016), in her article, *An Examination of Murder Suicide in Guyana*, murder-suicide findings are not different from suicide findings which show that suicide in Guyana was mostly committed by young people, being the leading cause of mortality between 15-24 years old and the leading cause of death for persons in the 25-44 years age group. (Pan American Health Organization [PAHO]/WHO, 2012).

In this study I investigate which sociodemographic and cultural factors are associated with suicide in the ≥ 15 years in Guyana. In my study I utilized 2015 data from the Ministry of Public Health (Ministry of Public Health, 2017), in Brickdam, Georgetown, investigating the link between the sociodemographic factors (age, gender, region, method of suicide, and occupation), and suicide in ≥ 15 years old in Guyana. Also, I explored the role of culture (as measured by race/ethnicity, religion) in committing suicide in young people in Guyana. Further, there is an urgency to conduct this study because suicide in the 23-48 years old population is a global public health

concern, and many young people who are depressed can have psychological therapy which will help them to realize that they do not have to kill themselves, but, to channel that negative focus into developing life skills, (Depression in Young People, 2017; Depression in Teens, 2018) that will help them find their purpose, so that they can contribute to society.

This section comprises of the foundation of the study and literature review as well as several subsections namely: (a) introduction, (b) problem statement, (c) purpose of study, (d) research questions (RQ) and hypotheses, (e) theoretical foundation for study and nature of study, (f) literature search strategy, (g) literature review related to key variables and/ or concepts, (h) definitions, (i) assumptions, (j) scope and delimitations, (k) significance, (l) summary and conclusion of this section.

Problem Statement

Suicide in the young, as well as the older population, is a global public health concern. According to the Jenkins (2002), there are several reasons contributing to this: (a) it is the 10th leading cause of deaths in the world; (b) it is as common as deaths from road traffic accidents; (c) not all suicides that occur from country to country are officially recorded and the number is very great; (d) suicide causes loss of life; (e) long lasting psychological trauma for children, friends, and relatives; (f) and finally loss of economic productivity (para, 1). Next, low to middle income countries are more severely impacted (WHO, 2017). Further, 78% of global suicide occurred in low to middle income countries in 2015 and suicide was the second leading cause of death among the 15-25 years old in these countries (WHO, 2017). Additionally, according to the World Population Review

(2019), which used data provided by the WHO in 2018, Guyana had the third highest rate of suicides (29.2 per100k), after Lithuania (31.9 per 100k) and Russia (31 per 100k) (Suicide Rate by Country, 2019). According to WHO (2017), this high rate is a scourge which gravely concerns the government of Guyana, while this rate significantly affects Guyana's population psychological and emotional wellbeing. WHO has indicated that there is paucity of studies regarding this significant public health issue and it suggests that mental health services provided in this country should be improved, and the government has been working closely with the PAHO and WHO to achieve this goal. Furthermore, in Guyana, according to the Guardian News (2018), there are various methods used to commit suicide of which ingestion of pesticide is the most frequent. The main reason for this is that many people are in the farming occupation, and pesticides are readily available, thus, this contributes to the high rate of suicide. (Guardian News, 2018). The article cited other lethal means of suicide and claimed that restricting access to firearms, ropes, and poisons is necessary in the prevention of suicide. (para, 7). The predominant method of suicide was ingestion of poison known as pesticides which are easily accessible across the 10 regions in Guyana and there is little control over procurement of this poison (Henry, 2015).

Researchers have suggested that the increased use of specific methods for suicide, such as hanging, is reflected in the increased suicide rates in the Korean and the U.S. populations (Park et al., 2014.) Therefore, method of suicide is considered as a strong risk factor for the completion of suicide and thus needs to be investigated.

Worrel (2014) suggested that culture can be and is used interchangeably with racial and ethnic identity and these identities are shown to be related to cultural outcomes and dependent on culture. Therefore, race and ethnicity can be used as a surrogate for culture when needed (Jenkins, 2014; Worrel, 2014). Further, Beyers (2017) supported that religion can be used as a cultural identity marker and Edara (2017) described religion as a cultural system of symbols, while it is also supported that religion is one of the ethnic descriptors that may be observed to identify ethnicity (Jenkins, 2014). Additionally, studies support that ethnic/racial religious characteristics protect people against suicide or increase persons' vulnerability to suicide and suicide ideation (Lawrence et al., 2016; Snarr, Heyman, & Slep, 2010). Consequently, investigating the impact of the cultural factors of ethnicity/race and religion on suicide rates in Guyana, can contribute to the successful management of this significant public health issue.

Purpose of the Study

The aim of this quantitative study of secondary data was to determine whether there is an association between the sociodemographic factors (age, gender, occupation, method of suicide, and region) and the suicide cases in young people in Guyana. Also, because culture has been shown to play a pivotal role in suicide, it would be interesting to note if there is any link between culture (ethnicity/race and religion) and suicide cases in $\geq$ 15 years population in Guyana, because there is lack of studies investigating this topic in this country. Additionally, to investigate how sociodemographic factors and culture are associated with the method of suicide. Finally, this study can be used as a baseline for future studies. The independent variables will be sociodemographic (age, gender,

occupation, method of suicide and region) and cultural factors (race/ethnicity and religion) and the dependent variable is suicide cases in the ≥ 15 years in Guyana.

Research Question (s) and Hypotheses

Research Question 1: Is there an association between sociodemographic factors (age, gender, occupation, method of suicide, and region) and suicide cases in the ≥15 years population in Guyana?

$H_1$1: There is an association between the sociodemographic factors and suicide cases in the ≥ 15 years population in Guyana.

$H_0$1: There is no association between the socio-demographic factors and suicide cases in the ≥ 15 years population in Guyana.

Research Question 2: Is there a relationship between culture (assessed by race/ethnicity and religion) and suicide cases in the ≥15 years population in Guyana?

H_a2: There is a relationship between culture and suicide cases in ≥15 years population in Guyana

$H_0$2: There is no relationship between culture and suicide cases in ≥15 years population in Guyana.

Research Question 3: Is there an association between the socio-demographic factors (age, gender, occupation, and region) and culture, and the method of suicide in the ≥15 years population in Guyana?

H_a3: the socio-demographic factors (age, gender, occupation, and region) and culture are not associated with the method of suicide in ≥15 years population in Guyana.

H_a1: the sociodemographic factors (age, gender, occupation, and region) and culture are associated with the method of suicide in the ≥15 years population in Guyana.

Theoretical Foundations for the Study

The socioecological model (SEM) guides this study. This theory was first used by Bronfenbrenner (1979), was modified by Baral, Logie, Grosso, Wirtz, and Beyner (2013), and suggested by the Centers of Disease Control and Prevention (CDC; 2015) to explain several public health issues. The SEM examines various factors or levels of influences such as individual, interpersonal, organizational, community and policy which either put people at risk or protect them from perpetrating violence (CDC, 2018). The latter was applied to violence because in order to prevent violence you must act across multiple levels at the same time to sustain and prevent efforts overtime than any single level. (para, 2).

The variables used in this study, such as age, gender, ethnicity/race, occupation, method of suicide, region and religion can be considered as individual and societal factors that affect suicide prevalence according to this theory. The theory is important to the study because it identifies structures at each level that can help in the mitigation of suicidal behaviors in the young population.

According to a study by Miner and De Leo (2010), low income countries are impacted more by suicide. Further, the authors noted that, in high income countries suicide in males is predominant, however, suicide is significantly higher in females, in low income countries such as China, India, and Pacific countries. In terms of age, young people are at greater risk in India and the Pacific countries, and in Asia this is a growing

concern for the elderly. (Miner & De Leo, 2010). At this point in time, based on the SEM, it is important to note that 75% of suicide occur in low- to middle-income countries and the rates of poverty are high in these areas (Bantjes et al., 2016). Researchers have suggested that there is a relationship between economic variables and suicidal behavior (Bantjes et al., 2016). Further, in low- to middle-income countries (LMICs), it is important to understand the relationship between poverty and suicidal behaviors and how to mediate this relationship to plan effective suicide prevention methods in LMICs (Bantjes et. al, 2016) Thus, if there is better understanding of the socioeconomic determinants of suicidal behaviors, this could assist governments and policy makers in developing interventions at the population level (Bantjes et al., 2016). Next, hanging is the most common method of suicide in high income countries, but in Asia and the Pacific a large number of deaths occur through ingestion of agricultural pesticide and inhalation of burning charcoal fumes (Miner & De Leo, 2010).

Further, according to Vijayakumar (2004), in developing countries, the highest rate of suicide is found among people younger than 30 years and the male/female ratio (India 1.4:1, China 1:1.3). The author also claimed that 90% of persons in developed countries die from suicides while 60-90% of deaths from suicide occur in developing countries (Vijayakumar, 2004). According to WHO, 30% of suicide globally occur in India and China, and the Eastern Mediterranean region and Central Asia have the lowest rates of suicide (Befrienders Worldwide, 2012 -2018). In terms of age globally, the 15-44 years age group accounts for 50% and in the 45 years and over age group 45% and over was recorded.

Nature of the Study

I have conducted a quantitative study (using data that were collected applying a cross-sectional method) to investigate whether there is an association between the sociodemographic factors (age, gender, occupation, method of suicide, and region) and the suicide cases in young people in Guyana. The independent variables which were measured are age, gender, occupation, method of suicide, region and ethnicity/race and religion. The dependent variable was the number of reported suicides. Data were obtained from the Guyana Ministry of Public Health (MOPH). The time period under study was January 2015 to December 2015. The type of data for this study took into consideration: the geographic region in which it was taken, the specified time period, and the population of interest for the researcher. The population under study were the ≥ 15 years, who committed suicide during the study period under review.

Literature Search Strategy

Two databases (PubMed and Medline), libraries **(**Walden University, University of Surrey), as well as Google Scholar were accessed to review journal articles that relevant to the topic. Additionally, local news media as found on Google Scholar and in newspaper articles were used. All information accessed between 2013 and 2018. Key words were used to ensure that the relevant literature were sought and found. Google Scholar was utilized further to find sources used in other databases. Some of the key words used in this study include *age, sex, region, method of suicide, region, occupation, race/ ethnicity, religion, young people, Guyana, sociodemographic factors, culture, suicide, socioecological model, acculturation* . Suicide is a major public health concern

in the ≥15 population in Guyana and there were concerns expressed by our health care partner, PAHO/WHO, as to the reason why suicide in Guyana is so high.

Literature Review Related to Key Variables and/or Concepts

The areas covered in this literature review include suicide in the young population, poor communication in the homes of youths who commit suicide, methods used to commit suicide in the young as well as the older population, culture and its relevance to suicide. Additionally, the covariates were reviewed namely: age, gender, region, method of suicide, occupation, race/ethnicity, religion). Finally, the gaps that contributed to suicide in Guyana will be discussed.

Suicide in the Adolescents and Young Population in Low- and Middle-Income Countries and Guyana

Suicide is a major public health concern, especially in developing or middle-income countries. According to Behmanehsh Poor, Tabatabaei, and, Bakhshani (2014), 369 suicide cases were investigated in a study conducted in Sistan and Balouchestan Province, Southeast of Iran, and this was done to assess the epidemiology and sociodemographic factors associated with suicide. Behmanehsh et al. showed that (65%) were females, more likely to be young (43.5% between the ages of 16 to 25 years), and they were low educational achievers (20.9% and 48.8%, respectively). (Behmanehsh et al., 2014). Next, self-employed individuals as well as housewives were significant in the medium and low-income category that committed suicide (Behmanehsh Poor et al., 2014).

However, in another study done in Ecuador, Chachamovich et al., (2013), found suicide affects persons from different backgrounds, socioeconomic status, and educational attainment (para, 5). The authors also postulated that men were three times more likely to die from suicide (5.3 in women, 13.3 in males), with the mean of suicide by hanging (51.1%), self-poisoning followed (35.2%), and firearms (7.6%). Further, according to the Worldatlas (2017), which used data provided by the WHO in 2015, Sri Lanka and Guyana had the highest rates of suicides (WHO, Suicide rates by country, 2017).

According to the National Suicide Prevention Plan 2015-2020 (2014), published in December 2014, Guyana was ranked at the top worldwide with an estimated suicide rate of 44.2/100,000. In Guyana, suicide was the leading cause of death among young people aged 15-24 years, and the 3rd leading cause of death among persons aged 25-44 years. (National Suicide Prevention Plan 2015-2020, 2014). The most affected age group was 20-49 years (50%) followed by individuals 13-19 years (16.6%) and greater than 50 years of age (16.6%). (National Suicide Prevention Plan 2015-2020, 2014). Males committed suicides more frequently, with a proportion of 4:1 and most commonly used pesticides or herbicides (> 65% of case) followed by hanging (> 20%). Next, Guyana has 10 regions and four out of the 10 are considered hinterland regions (Region 1, Barima-Waini, Region 7, Cuyuni- Mazaruni, Region 8 Potaro-Siparuni, and Region 9 Upper Takutu-Upper Essequibo) (Regions of Guyana, 2015). The other regions which are coastland include region 2 Pomeroon- Supenaam, Region 3 Essequibo islands-West Demerara, Region 4 Demerara-Mahaica (which houses the city), Region 5 Mahaica-

Berbice, Region 6 East Berbice-Corentyne, and Region 10 Upper Demerara-Upper Berbice) (Regions of Guyana, 2015). East Indians accounted for > 80% of cases and most of these cases were concentrated in Regions 2, 6, 3, 4, 5. (National Suicide Prevention Plan 2015-2020, 2014). The highest suicide rate was in Region 2 (52.7/100,000) followed by Region (50.8%) and Region 3 (37.3). (National Suicide Prevention Plan 2015-2020, 2014). Therefore, because suicide is a major public health concern globally and in Guyana, I decided to conduct a study to explore the role of the sociodemographic factors and culture in committing suicide in the young population in Guyana.

Culture and its Relevance to Suicide

It is important to understand that when someone commits suicide this can be related to a certain culture. According to Henry (2016), suicidal methods may be related to culture, and this calls for research on a global level to determine how culture may impact suicide, and this can help to address the rising rate of suicide, since culture in itself can provide coping mechanisms for suicide (para, 2). Further, the author stressed, due to advancement in civilization, coping mechanisms are lost, exposing genetic predisposition to vulnerable groups, thus, “a system of therapeutic re-culturation is needed with an emphasis on relevant culture based therapies” (Henry, 2016, para, 2). Guyana is made up of six racially and ethnically heterogenous group with a population of 784, 948 people. (Guyana population, 2019). East Indians is the largest ethnic group (44%), Afro-Guyanese (30%), Mixed Heritage (17%), Indigenous Amerindians (9%). (Guyana Population, 2019). It is reasonable for someone to ask the question whether there are elements within the Indo-Guyanese subsystem that make them unique in

comparison to the other ethnic groups which influences suicidal behavior among them. In terms of sexual freedom a higher level of "mechanical solidarity" exists among the Indo-Guyanese than other ethnic groups (Edwards, 2016). For example, the Afro-Guyanese have a high level of sexual freedom, because of high levels of "organic solidarity" which exists within the group. (Edwards, 2016). To this effect, the author claimed that members within the African group are more opened in their relationships when cheated upon by their spouses. In fact, this group claimed that in life a man must expect to have "blow and goadie" meaning that he must expect his partner to cheat on him, and further he has to have hydrocele. The aforementioned prepares them for acts of infidelity and minimizes suicidogenic tendencies (Edwards, 2019). The above cultural factors are not present in the Indo-Guyanese who marry at a younger age and do not have those cultural values which make them less able to cope with sexual freedom and infidelity in their marriage (Edwards, 2016). Thus, according to the author, the cultural factors combined influence high rates of egotistic suicides among Indo-Guyanese (Edwards, 2016). Suffice to say that, acculturation has greatly impacted the East Indian population and made them more vulnerable to committing suicide.

Although, culture may play a role in suicide, according to the article, *Advancing Suicide Prevention Research With Rural American Indian and Alaska Native Populations,* there are studies that document the co-occurrence of alcohol and drug use combined with suicidal behavior among American Indian and Alaska Native and more than half of them that exhibited suicidal behavior were under the influence of alcohol at the time. (Wexler et al., 2015). There is evidence consuming alcohol and drugs due to

culture which play an important role in suicidal actions. Thus, according to Pompili et al. (2010) in a meta-analysis done in the United States, both alcohol and drug use disorders were strongly associated with suicide. Persons who consume alcohol had a five-fold risk in committing suicide than social drinkers.

Further, according to Edwards (2016), suicide is linked to culture when he cited the East Indian ethnic group and compared same to the other groups, he claimed that Indo-Guyanese subscribes to values and norms that are different to the larger social system. Next, Edwards claimed that the reasons were two-fold: first he linked their lack of openness in their relationship which may be considered a closed system. To continue, Edwards, compared Afro-Guyanese with Indo-Guyanese and claimed they were more "hostile and repressive" in their relationship on the plantation and they moved away from the system to be incorporated in the colonial system, while the Indo-Guyanese remained and developed communities within the structures that were already there.

In addition, acculturation is implied as a causal factor for suicide; however, there is paucity of research in this field. Nevertheless Caetano et al. (2013), claimed that suicide is multidimensional attributing several factors among Inuit such as "social and cultural changes, poverty, geographical isolation, cultural suppression and political disempowerment" for increase rates of suicide. (Caetano, et al., 2013, para, 7). Acculturation is the bringing together or a combination of cultural values and practices between a culture that is dominant and one that is original (Schwartz et al., 2010). Ethnic identity plays a pivotal role in acculturation because a particular ethnic group finds it difficult to give up their own traditional culture and become acclimatized in another

group's culture which is dominant. According to the authors, this period can result in stress and the particular ethnic group feels negative towards their traditional culture, experience social marginalization and this brings conflict between the individual and his family's cultural expectations (Ahmad, 2018).

Next, there are many researchers who discuss whether religious characteristics protect people against suicide or increase persons' vulnerability to suicide and suicide ideation. Thus, according to Lawrence et al. (2016), among Asian Indian adolescents' suicide ideation and attempts were higher among Hindus and other religions. Similarly, in Malaysia suicide ideation was higher in Hindus than Christians (Maniam, Chinna, & Mariapun, 2013). The authors highlighted this issue in the United States Air Force Army and claimed suicide ideation was more common among non-Christian religion and lower in evangelical Christians and Roman Catholic females and male "Other Protestants" (Lawrence et al. 2016; Snarr, Heyman, & Slep, 2010).

Common Methods of Suicide in the Adolescents and Young Population

Behmanehsh Poor et al. (2014) claimed that the most common method of suicide was by burning (53.4%), then ingestion (23.8%). Next, the authors cited the case fatality rate to be 49.6% and this was associated with low income, followed by summer time suicide, and the common method which was burning. However, according to a study done in Asia, there are recent trends in suicide which reflect the sociocultural, economic and religious situations in countries and as such the method may not be equal for all sex and age subgroups.(Wu, Cheng, & Yip, 2012). According to the authors "charcoal burning, pesticide poisoning, native plant poisoning, self-immolation, and jumping" are

common methods of suicide (Wu et al., 2012, Para, 1). They further suggested that it may be cost effective to design safety into technology as a way of suicide prevention. Of significance, in Guyana, according to the Guardian News (2018), there are various methods used to commit suicide of which ingestion of pesticide is the most frequent. The main reason for this is that many people are in the farming occupation, and pesticides are readily available, thus, this contributes to the high rate of suicide. (Guardian News, 2018). The article cited other lethal means of suicide and claimed that restricting access to firearms, ropes and poisons is necessary in the prevention of suicide (para, 7).

Next, there seems to be a gender paradox when it comes to suicidal behavior, for example, males are more likely to complete suicide, while females attempt suicide and have suicide ideation more (Cash & Bridge, 2009; Freeman et al, 2017). Methods of suicide vary from country to country, firearms were the leading method of suicide among youths, followed by hanging/ suffocation and self-poisoning (Cash & Bridge, 2009). Further, according to Shah and Buckley (2011), there are clear differences in the methods of suicide between the younger and older population, as well as between age and sex, because knowing this will help a country to develop different strategies in terms of these cohorts gaining access to the various methods. For example, the authors in their study postulated that, hanging, strangulation and suffocation were noted in males, 40.2% and females 20.1%, drowning and submersion, males 8.2% and females 11.4 %, (Shah & Buckley, 2011). Finally, other, unspecified drugs and medicaments and biological substances, males 8% and females 20.4%. (Shah & Buckley, 2011).

Further, Jiang, Mitran, Miniño, and Ni (2015), in their study on racial and gender disparities using combined data in 2009 and 2013 postulated that firearms was the most common method followed by suffocation in the non-Hispanic black and non-Hispanic white adults who committed suicide. Next, the most common method used was suffocation followed by firearms in the Hispanic, Asian or Pacific Islander and American Indian or Alaska native (Jiang et al., 2015). For the Asian or Pacific Islander who committed suicide poisoning and falls were the most common methods, than other race and ethnicity groups (12.6% and 8.1% of suicide deaths, respectively). (Jiang et al., 2015). To continue, occupation play an important role in method of suicide.

Thus, according to Milner, Witt, Maheen, & LaMontagne (2017), occupations whereby people have access to lethal methods need to be controlled. For example, persons in some occupations that have access to medicines or drugs, firearms and carbon monoxide are the persons who commit suicide more than those who do not have access to them (Milner et al., 2017). Additionally, in terms of females who hold such occupations, they were 3.02 times greater (95% CI 2.60 to 3.50, $p < 0.001$), than those whose occupation do not provide such access. (Milner et al., 2017). Likewise males with access were 1.24 times greater than those without access (95% CI 1.16 to 1.33, $p < 0.0001$). Based on the above, it is important for a study to be done on suicide with emphasis on the young population to examine the common method(s) of suicide.

Poor Communication Affecting Suicide in Young Population.

It is important to mention that although not the primary focus of this study, there seems to be an issue with communication in the homes of youths who commit suicide as

noted by the United Nations Children's Fund. In Guyana, based on focus group conducted by the United Nations Children's Fund, gaps in communication in the homes and schools were cited as factors that drive suicide in youths (Lack of Communication Contributes to Suicide in Guyana, 2016). The article stressed that, the youths who commit suicide are under psychological stress in a "social context" and cited isolation from partners, family members and friends and these youths were compared to others who have close relationships as having a sense of purpose, security and connectedness (Lack of Communication Contributes to Suicide in Guyana, 2016).

However, according to CDC (2017), suicide affects all youths, but some are of higher risks than others namely: those with a family history of suicide, mental health problems, those exposed to alcohol and drug abuse, and seeing another person commit suicide (para, 3). Additionally, CDC emphasized that having risk factors for suicide does not mean that the person will commit suicide (CDC, 2017). Further, according to Quarshie, Osafo, Akotia, Preprah (2015), mass media coverage of adolescent suicide is a true reflection of the situation. The authors also claimed that the precursors within the microsystem (family, school), also contributes to young people committing suicide. As noted previously, there are many factors contributing to suicide in the young population, future studies need to be done to assess the role of communication in suicide in the young population. Further, it is important for us to understand that suicide is multidimensional.

Gender and Suicide

Suicide in the young population is global, and varies across different countries, and in developed countries that have a good data system, the rates are two to three times

higher in boys than girls (Rhodes et al., 2014). The authors claimed that in some countries, the rates increased for girls and decreased for boys, but it is now reversing (para, 3). However, Roh, Jung, and Hong (2018), referred to same as gender paradox, adding that suicidal ideation and attempts are higher in females than in males. Thus, it is important for this study to explore gender differences in suicide, so that interventions can be tailored and appropriated to meet the needs of both males and females.

According to Suicide Awareness Voices Education (2018), which used data from the CDC, male deaths occur four times higher than females and represent 79% of all suicide deaths in the United States. Further, according to Freeman et. al (2017), their findings supported the previous research that suicide appears to be a male phenomena occurring four to five times higher in males across European countries. Although rates of suicide are usually higher in males than females one exception noted was China with higher rates of suicides in females (Vijayakumar, 2004). The reason being there is a lack of regard for suicidal behavior in women since they were viewed as manipulative and not serious compared to men in which suicidal behavior is dominated by male deaths in all countries except China (Vijayakumar, 2004). The author also emphasized that women attempt suicide more than men, but men complete suicide more than women. Due to the aforementioned there is an under regard for mortality in which women predominate. (Vijayakumar, 2004). Nevertheless, a significant reason was noted by Varnik (2012), who claimed that cultural factors and regional differences in socioeconomic status played major roles. However, the author emphasized that changes will occur as cultural norms shift and different countries take their own developmental pathways.

Further, according to Wasserman, Cheng and Ziang (2005), female suicide rate was also seemingly higher in other countries such as Cuba, Ecuador, El Salvador and Sri Lanka, (para, 1).Further, global suicide rate in young people 15-19 years specifically for females, between 1979 and 1996, rose to a lesser extent for this cohort in the 18 to 30 countries studied, mainly due to loss of social cohesion, a breakdown in family tradition, economic instability and unemployment, and an increase in depressive disorder (Wasserman, Cheng, & Ziang 2005).

Race/Ethnicity and Suicide. Dating back from the 1960s Guyana is a highly diverse nation with racial discord and violence between the Afro-Guyanese and Indo-Guyanese (Lacey, Powell Sears, Crawford, Matusko, & Jackson, 2016). Of significance, China and India were regarded as the major contributors to suicide in the world and these countries were responsible in 2004 for 54% of suicide in the world. (Varnik, 2012). There were a few reasons which accounted for this namely: China does not have a comprehensive reporting system, and the figures on suicide data range are wide. (Varnik, 2012). Secondly, for India their deaths distribution from the nationally representative sample, were taken from detailed reporting on death studies and "adjusted to the 2008 all cause envelope" (Varnik, 2012). The author claimed the accuracy of suicide numbers cannot be ascertained by WHO for both China and India. Further, official figures presented to WHO are based on 10% of the population and urban along with rural areas are calculated separately. (Varnik, 2012).

Indo-Guyanese and Suicide. According to the data from the Ministry of Public Health in Guyana on suicide in 2016, predominantly among the East Indian population in the

rural community of East Berbice Corentyne, 175 persons died by suicide, 73% of these persons were of East Indian descent, were either unemployed or in the low to middle income jobs, and 70 (40%) were youths between the ages of 12 and 29 years old (Ministry of Public Health, 2017). According to Lacey, Powell Sears, Crawford, Matusko, and Jackson (2016), a study was done in Guyana which show that depressive disorders were higher for Indo-Guyanese than any other ethnic groups, which may explain this high prevalence of suicide in this population group.

Afro-Guyanese and suicide. According to a study, mood and anxiety disorders were more predominant in persons of African American descent and Caribbean Blacks (Lacey, Powell Sears, Crawford, Matusko, & Jackson, 2016). On the contrary, Edwards (2016), suggested that because the Africans are more "hostile and repressed", also much more open in conversation (based on history), they are less likely to commit suicide in comparison to other ethnic groups. These contradictory results indicate the need of further research on the impact of race/ethnicity on suicide in Guyana.

Age groups and suicide. According to Quinlan-Davidson et al. (2014), in their study *Suicide Among Young People in the Americas,* countries with the highest total mortality rates among young people (10-24 years) were Guyana, Suriname, Nicaragua, El Salvador, Chile, and Ecuador. This was followed by countries with the lowest mortality rates Mexico, Venezuela, Cuba, Brazil, and the U.S. territory of Puerto Rico (Quinlan-Davidson et.al, 2014). Further, according to Behmanehsh Poor, Tabatabaei, & Bakhshani, (2014), in a total of 369 suicide cases investigated, the age range mostly affected was young persons (43.5% between the ages of 16 to 25 years). They were

either illiterate or just received a primary school education (20.9% and 48.8%, respectively). (Behmanehsh Poor, Tabatabaei, & Bakhshani, 2014).

Young adults and suicide. Alcohol may be a contributory factor for suicide in young people in Guyana. Thus, according to a World Health Organization report in 2010, almost 80% of adolescent population had their first drink before 14 and some even try alcohol before elementary school (Rawlins & bishop, 2018). Further, although alcohol use in adolescent suicide is not widely researched, studies have shown that excessive alcohol use in young people is a contributor to suicidal ideation and attempts (para, 17). Next, it is important to understand that suicide in the young is mostly attributed to ingestion of poison (Guardian News, 2015). Thus, according to Henry (2015), this is so because of the easy access to pesticides since there is no control to procurement of this poison.

Older adults and suicide. Suicide in older adults (especially 65 years and older) is also a major public health concern and it is mostly due to depression which is very prevalent in this age group (Karlin, 2014). The author claimed that older adults with depression and mental disorders receive treatment at low rates and cited a national study which found 1 in 10 older Americans who received treatment. In Guyana, one of the reasons for suicide in the elderly is when they feel lonely and abandoned and have no one to turn to for guidance or companionship thus there is likelihood of increase depression resulting in suicide. (Guyana Chronicle, 2014). A striking similarity was found between cause for suicide in the older adults in Guyana and the United States. Thus, according to Karlin (2014), there is social isolation and limited social support in the older population.

Paraquat Poisoning and Suicide According to Stabroek News (2018), Guyana imports 155 tons of paraquat annually, which is a pesticide used by farmers in Guyana and worldwide. This is affordable and effective and farmers cannot find an alternative to this product for their plants (Stabroek News, 2018). To this effect, out of the 150-200 suicide deaths in Guyana, 70% die by ingestion of paraquat poisoning since many persons in this type of occupation utilize this. Between 2009-2015, another author claimed more than 36% of all deaths was by poisoning, however, there was an increasing trend of suicide for all categories, and deaths by poisoning decreased. (Henry, 2015). Hanging accounted for 41% of deaths by suicide in 2014. The author continued that methods used were poisoning, hanging, shooting and stabbing.

Further, according to WHO 30% of global suicides are due to pesticides self poisoning (systematic review of world data 1990-2007), and these occurred mostly in low to middle income countries, making it one of the most used method for suicide globally (Lee, Roser, & Ortiz-Ospina, 2018). In China, barbecue charcoal was used to produce carbon monoxide as a means of suicide and it became the most common method in eight years. (Lee, Roser, & Ortiz-Ospina, 2018).

"Regions and Religion Dual Role in Suicide Guyana" study has 10 regions and according to data from Ministry of Public Health (2017), regions two and six have the highest rates of suicide. In region 6 (East Berbice Corentyne), there are many people of Hindu of Indian descent and suicide is usually portrayed in Guyana as largely as a phenomenon of Hindu (Fox News World, 2014). The article also claimed suicide tend to be higher in rural than urban area (Fox News World, 2014). According to Chabrol

(2016), suicide attempts were also high in Christians, Hindus and Muslims. Thus, it can be inferred that suicide is not only high in East Indians who are Hindus, but also in other race/ethnicities, so this is important for a study to be conducted to understand the role of culture or the association of culture (race/ethnicity and religion) on suicide in young people.

Gaps that Contributed to Suicide in Guyana

Due to the research gap that exists, the government of Guyana recognized the need for crafted plans to mitigate suicide in Guyana in both, the young and elderly population. This research gap is the main reason why a research in Guyana is critical in order for us to mitigate the effects of suicide.

Next, according to the Department of Public Information (2017), the Mental Health Action Plan 2015-2020, focuses on community mental health care changing from institutionalized mental health care to community mental health care. Additionally, many non-specialist doctors are continuously trained in mental health to combat the major mental health issues people are experiencing (para, 4). According to the article Decriminalize Suicide (2017), Junior Minister of Public Health, Dr. Karen Cummings said the advent of the above unit saw Guyana dropped from its world rated position as the country with the highest suicidal in the world. In support of the aforementioned, crude data from the World Health Organization in 2015 show , Sri Lanka had the highest rate 35.3 per 100,000 inhabitants, followed by Lithuania 32.7 per 100, 000, Democratic People's Republic of Korea third with 32.0 and, Guyana fourth with 29.0. (WHO, 2017).Despite the above, suicide still remains a public health concern in Guyana

especially in our young population. Thus, there is still need for this research to be done because as noted earlier in the Socioecological Model, there are various levels of influences such as individual, interpersonal, organizational, community and policy which either put people at risk or protect them from perpetrating violence (CDC, 2018)

Definitions

Acculturation: This occurs when someone adopts the cultural practices and beliefs of another culture, but still retains his/her own culture. (What is acculturation? 2018)

Culture: The behavior, practices, and values of a defined group of people, including music and arts that make them unique to another group (Zimmerman, 2017)

Ethnicity: People who live within a certain location that have their own culture (Bhopal, 2004). This is relevant to the study in the use of Afro-Guyanese or Indo-Guyanese.

Vulnerable groups: According to WHO (2002). Vulnerability is the degree to which a population, individual or organization is unable to anticipate, cope with, resist and recover from the impacts of disasters". (WHO, 2002).Vulnerable groups include Children, pregnant women, elderly people, malnourished people, and people who are ill or immunocompromised. (para, 2).

Hostile and repressive: The people were openly resistant (Merriman Webster, 2018), based on the government's confinement of their political and civil freedom. (Davenport, 1999: 92)

Therapeutic re-culturation: This occur when adoptees reclaimed their culture which became mixed with other cultures that were different from their birth and races. (Baden, Treweeke, & Ahluwalia.2012).

Assumptions

One of the main assumptions of this study is that the SEM provides a framework in order for one to understand that suicide prevention and reduction involves an interplay of factors at various levels namely: individual, interpersonal, organizational, community and policy (CDC, 2018). Data were cross sectional and collected from all 10 regions in Guyana, through the records department of each region. It is uncertain to what extent, this may affect the validity and reliability. Data were validated through the statistical department of the Ministry of Public Health (2017), therefore I assume that this validation was sufficient. Also, I assume the responses to the questions were accurate and correct.

Scope and Delimitations

This is a secondary data analysis using data that were collected using a cross-sectional method focused on the subpopulation (adolescents and youth people) residing in Guyana, surveyed between the period January to December 2015. The SEM was chosen because it provides multiple levels of influences that can help address the issue of suicide in ≥ 15 years population from a broader perspective extending right up to the policy level.

Significance

Guyana's suicide rate is troubling and no one factor can be regarded as the cause for suicide, but a combination of several factors. Thus, according to Aljajeera (2016), the University of Guyana, discovered issues such as those related to relationship, political instability, escalating crime rate and poverty. An area that is missing in Guyana, is to understand that there is an interplay of factors that cut across various levels and are responsible for suicide, namely individual, relationship, community and societal factors CDC, 2015). In Guyana, there seemed to be some similarities in the socio demographic factors that exist in the study by Behmanehsh Poor, Tabatabaei, and Bakhshani (2014) in South East Iran. For example, the people who committed suicide, according to the data from Ministry of Public Health in Brickdam, Guyana, were mostly young people from the low to medium income group, and can be considered low educational achievers (Ministry of Public Health, 2017). The common method of ingestion in the MOPH data was ingestion of poison, compared to the common method of suicide which was burning in the data from South East Iran (Behmanehsh Poor, Tabatabaei, & Bakhshani, 2014).

For this research to be unique, we looked to see if there is any association between suicide prevalence and culture and the socio-demographic factors namely: age, gender, occupation, method of suicide, region and ethnicity. This is important because there may be some distinctive features or characteristics that exist among the various cultures that drive suicide in one culture in comparison to another. This significance can be examined from the Guyana perspective. Thus, the research outcomes can guide the researcher to inform policy makers on the need to establish mechanisms to monitor

persons from various cultures who commit suicide and it can also be used for planning and preventive measures. (Behmanehsh Poor, Tabatabaei, & Bakhshani, 2014).

In terms of this research contributing to positive social change people may respond differently to mental health and suicide based on the society and culture from which they originate. Secondly, with this study I aim to identify potential socioeconomic and cultural factors that are associated with suicide in adolescent and youth population in Guyana; these factors can be used to provide counselling sessions for the persons who have suicidal behaviours, training youths in life learning skills so that they can find jobs, and finally there needs to be a collaborative approach by WHO, governmental, non-governmental organizations and civil society to reduce the prevalence of suicide in this population group in Guyana. In this way, a multidisciplinary approach to management of suicide can be developed based on the results of this study, including alleviating the social determinants of health which may play a major role, since the issue at hand is suicide impacting middle to low income countries more than high income countries (WHO, 2017).

Summary

In 2015, Guyana recorded the second highest rate of suicide in the world. (WHO, Suicide rates by country, 2017). The socio-demographic factors may play a critical role in suicide in the young and older population in Guyana. The people who commit suicides, included young people, were from the low to medium income group, can be considered low educational achievers, and the common method of suicide was by ingestion of poison. Suicide management needs a multidisciplinary approach and as such

the government of Guyana cannot manage this dilemma alone, so it is important that this research be done so that evidence based strategies can be crafted to assist Guyana to mitigate the suicide rate in youths as well as the elderly population.

Section 2: Research Design and Data Collection

The aim of this quantitative study of secondary data was to determine whether there is an association between the sociodemographic factors (age, gender, occupation, method of suicide, and region) and the prevalence of suicide in young people and the older population in Guyana. Also, because culture was shown to play a pivotal role in suicide, it would be interesting to investigate if there is any link between culture (ethnicity/race and religion) and suicide prevalence in the ≥ 15 years population in Guyana because there is paucity of studies in this area. Additionally, to investigate how socio-demographic factors and culture are associated with the method of suicide. In the previous section, I examined the literature on the association of sociodemographic factors on the prevalence of suicide in the ≥ 15 years Guyana. Section 2 includes research design and rationale, methodology which includes population, sampling and sampling procedures, instrumentation and operationalization, data analysis, threats to validity, ethical procedures and summary.

Research Design and Rationale

This is a secondary data analysis using data that were collected implementing a cross-sectional method to determine the association of the sociodemographic factors on suicide in the young and older population in Guyana. I examined how suicide may differ according to the key independent variables mentioned above, also how culture may play a role in occurrence of suicide in the ≥ 15 years population. My data were based on routine state specific purposes and as such there was no time restriction on the design and data collection. Further, the research choice is consistent with the research design because the

evidence obtain (secondary data) will enable me, to address the research question as effectively and unambiguously as possible (Tefry, 2018).

Methodology

This study used the quantitative cross sectional design in order to quantify the problem of suicide in the ≥ 15 years population in Guyana and transform it into usable statistics (De Franzo, 2011). To this effect, it can be used to quantify opinions, behaviors, attitudes, and other defined variables. Quantitative research uses measurable data so that facts can be formulated and patterns in research can be uncovered. (para 2, De Franzo, 2011). I did not use qualitative data because my study investigated the association between sociodemographic and cultural factors and the prevalence of suicide, based on secondary quantitative data. Further, since this research utilized secondary data without any intervention, there was no need for an experimental design where subjects are randomly assigned between the test and control group. (Blakstad, 2018).

Population

The population included adolescents and young people aged ≥ 15 years who committed suicide under the period of study, January 2015 to December 2015. Data were collected from all 10 regions in 2015 and acquired by Ministry of Public Health (MOPH) in 2015 for those persons who were surveyed.

Sampling and Sampling Procedures

The MOPH surveillance data included persons who were surveyed nationally and the subset consisted of the ≥15 years population who resided in Guyana in 2015. No sampling was done for data, but an established procedure exists at MOPH for data

collection. Thus, according to the MOPH, Health Statistics Unit (2017) standard operating procedure manual for deaths, data were collected from all 10 administrative regions namely health posts, health centers, hospitals by a Senior Health Visitor (SHV) who is attached to each region. Further, he/she is also responsible for ensuring that forms were correctly and accurately filled by public health personnel attached to the facilities in his/her region. Next, the SHV submitted signed forms to the regional level via the Regional Health Officer/Regional Executive Officer, and then to the MOPH, through Regional Health Services. Further, data were sent to the Statistical Department for data entry.

Additionally, two epidemiological nurses from MOPH, visited the health centres, private hospitals and clinics on a routine basis to collect reports and simultaneously collect surveillance reports via phone from the hinterland regions (Dey, Lewis, Mack, Haynes, & Elcock, 2017). When all reports were submitted to the stats unit, the supervisor assigns each report to the relevant staff (data entry or statistical clerk). The reports were sorted, filed, batch or coded where necessary, and entered on a health information table, where cleaning, validation are done. Thereafter, statistical tables and reports were generated.

Data on suicide deaths were collected from death notification forms; the notification of death form is a standard public health tool for capturing deaths. Every time someone dies whether be it home or at the hospital the death has to be notified using the death notification form. (Dey et al., 2017) In addition, similar data on death are being captured by collecting the death registration forms from General Registry's Office

(GRO). However, the main tool for capturing deaths is the death registration forms which are collected electronically from GRO. This is because there is a high number of under reporting on the death notification form due to health facilities mainly (hospitals) failing to notify the deaths (Health Statistics Unit, 2017). Further, after cleaning data, same were exported to Microsoft excel and sent to the Caribbean Public Health Agency (CARPHA) via the Chief Medical Officer for validation. Further, the manual stated clearly if there are errors on the registration forms, they are flagged by CARPHA and resent to the MOPH Statistical unit and the Chief Statistician makes the corrections and the information is submitted to the CMO to CARPHA. (Health Statistics Unit, 2017). To continue, CARPHA reviews the corrected data, conducts and processes information for global analysis. Next, dataset returns from CARPHA free of errors and are stored and processed. Subsequently, data were used for reporting by categories for example, sex, region, age, ethnicity etc.). Finally, the senior statistician and other statisticians further analyzed and prepared bulletin for decision making purposes for stakeholders and policy makers to use (Health Statistics Unit, 2017).

Sampling frame. The sampling frame included (a) young people and the older population surveyed in MOPH, (b) youth aged ≥ 15 years, (c) Guyanese primary or secondary residence (d) survey year 2015, (e) all reported races or ethnicities. The population sample included the number of young persons who committed suicide during the period under study.

Procedure and permission for access to data set. I requested and received permission from the Chief Medical Officer to gain access to the data set on suicide. You

can only gain access to the data through the Institutional Review Board (for research purposes), or the Chief Medical Officer who facilitated the process. In my written request, I provided a brief outline and purpose of my study to the Institutional Review Board, which forms part of the MOPH, requesting access to data on suicide. This required a data user agreement with the IRB and an affiliated State University for 2015 report and this information will be provided in the ethics section.

Power analysis. While I used secondary data, my sample size was all the valid cases in the dataset provided by the MOPH. Since there were no similar studies in this population, a medium effect size of .5 (Laerd Statistics, 2016) and logistic regression was used to determine the needed sample size to have adequate statistical power ≥ .8 (G*Power Calculator; Faul, Erdfelder, Buchner, & Lang, 2007). Using an alpha of .05 and a satisfactory power of .8, a sample size of at least 400 participants was required. However, the final received sample size was 220 which can result in a less satisfactory statistical power.

Instrumentation

I conducted a quantitative analysis of secondary data set collected from all 10 regions and MOPH for routine state specific reasons in 2015 to determine whether there is an association between the sociodemographic and cultural factors and the cases of suicide in the ≥15 years population in Guyana. Next, permission was requested from the Chief Medical Officer who advised the IRB about the release of data on suicide.

Operationalization of variables. The types of variables used in this research are nominal and continuous and they include: age, sex, race/ethnicity, region, method of

suicide, culture (as measured by race/ethnicity, religion), and occupation. According to Stat Trek (n. d), nominal variables have no numerical values in terms of magnitude. Thus, method of suicide, religion, occupation, sex, ethnicity, religion was used to measure by using nominal variables. Age is continuous variable because it can take on any value in some range of value and cases of committed suicide is a discrete variable (Types of Variable, 2018).

Research Questions and Data Analysis Plan

The software that was used to perform all data analysis is version 25 which was made available for free to Walden Students. It is the Statistical Package for Social Sciences (SPSS). The suicide survey data obtained by MOPH national database, were imported into SPSS.

Research Questions and Hypotheses

Research Question 1: Is there an association between sociodemographic factors (age, gender, occupation, method of suicide, and region) and suicide cases in the ≥15 years population in Guyana?

$H_1$1: There is an association between the sociodemographic factors and suicide cases in the ≥ 15 years population in Guyana.

$H_0$1: There is no association between the socio-demographic factors and suicide cases in the ≥ 15 years population in Guyana.

Research Question 2: Is there a relationship between culture (assessed by race/ethnicity and religion) and suicide cases in the ≥15 years population in Guyana?

H_a2: There is a relationship between culture and suicide cases in ≥15 years population in Guyana

H_02: There is no relationship between culture and suicide cases in ≥15 years population in Guyana.

Research Question 3: Is there an association between the socio-demographic factors (age, gender, occupation, and region) and culture, and the method of suicide in the ≥15 years population in Guyana?

H_a3: the socio-demographic factors (age, gender, occupation, and region) and culture are not associated with the method of suicide in ≥15 years population in Guyana.

H_a1: the sociodemographic factors (age, gender, occupation, and region) and culture are associated with the method of suicide in the ≥15 years population in Guyana.

Analysis Techniques

The analysis of the data was consisted of three phases. First, descriptive statistics (frequencies for nominal variables and mean and standard deviations for continuous variables) were provided for all the variables of the study. Second, bivariate analysis was conducted. For RQs 1 and 2, since the dependent variable is a discrete one (suicide cases), I performed 2-sample *z*-test to compare two sample proportions of committed suicide cases in young people in Guyana by each socio-demographic factor (age, gender, occupation, method of suicide, and region) for RQ1, and by race/ethnicity and religion for RQ2. For RQ3, binomial logistic regression was conducted having as predictors the socio-demographic factors (age, gender, occupation, and region) and

culture (race/ethnicity and religion) and as outcome variable was method of suicide (nominal variable).

External Validity

External validity regards generalizability, representativeness of the sample, setting and procedures (External and Internal Validity, n. d). According to Dey et al., 2017), the Senior Health Visitor should ensure that all reports are signed off in the region before being submitted to MOPH. However, this does not always happen, and information can flow straight to MOPH. Secondly reports are supposed to be submitted to the Regional Health Services Department first, then to the Statistical Department in the MOPH, however, data are sent RHS, Surveillance, MCH, CMO office and Stats unit directly (Dey, Lewis, Marks, Haynes & Elcock, 2017). Next, the authors claimed that, the main tool used for capturing deaths is the death registration forms which are collected electronically from the General Registry's Office due to the high number of under reporting from the various health facilities. Nevertheless, since the study sample was collected from several sites and regions of the country, the results of this study can be generalizable to the young and older population in Guyana.

Internal Validity

Internal validity is the degree to which the results are related to the independent variable and no other competing explanation (External and Internal Validity, n. d). Since this a secondary data analysis using a cross sectional data collection design, the main concern is that no causal relationships can be confirmed and only associations can be reported. Therefore, potential causal inferences should be done with caution.

Additionally, internal validity can be confirmed with the use of multivariable analysis to control confounding as much as possible.

Ethical Procedures

This study is a Walden doctoral project and required a letter of cooperation and a data use agreement from the MOPH statistical department for a section of the data needed for the study. Walden IRB approval was also required and received to conduct the study. The approval number was 04-18-19-0533532. The MOPH IRB was partnered with another state university and this required an electronic IRB process as per 2017 report. Permission was sought from the CMO of the MOPH by way of a standardized form for access to use data. He also instructed the Statistical Department to release data. s

Ethical Concerns

In Guyana, the populations of people recorded with attempts to suicide are not protected under the laws of Guyana. In fact, the law is antiquated because it does not take into account that when someone attempts to commit suicide or commits the act, the reasons are multifactorial. Thus, according the laws of Guyana section 8:01 97, "Everyone who attempts to commit suicide shall be guilty of a misdeamour and liable to imprisonment for two years". (Chapter 8:01 Criminal Law (offences) Act Arrangement, p 53, 1998,). Next, all death registration forms are collected from the General Registry Office electronically in scanned copies, sent to MOPH Statistical Unit and they are printed and coded according to the International Classification of Disease Standard (ICD 10 _10 th edition) to ascertain the final cause of death (Health Statistics Unit, 2017).

They are then sent to the Caribbean Publication Agency through the Mort Base System provided by that agency (Health Statistics Unit, 2017). This process governs all deaths.

All study plans were approved by MOPH IRB on ethical issues after which Walden approved same. There is no conflict of interest to prevent me from using MOPH data, since I have never analyzed same to do research on suicide in young people and the older population in Guyana. I am employed by MOPH which has an IRB and this project was done as part of my Walden University doctoral study, my employer has no involvement in it, Walden IRB reviewed and approved the project and a data use agreement by the MOPH.

Treatment of Data

All secondary data from MOPH, Guyana used in this research were examined without personal identifiers so as to avoid the ethical issue involving breach. Of significance, anyone requesting data from MOPH has to follow the rules of data release, and that is to make a formal request through the Chief Medical Officer which will inform the IRB, even, the staff at MOPH. Thus, there was no conflict of interest with me accessing data for my doctoral study from MOPH, Guyana. Next, any breach of data will be resolved by MOPH, Guyana. When someone commits suicide, it is a stigmatized condition and vulnerable populations can be negatively impacted. All data used in this research were saved on two flash drives and encrypted. To avoid security breaches and protect data, suicide data analyses was performed on a computer that has disk encryption with no personal identifiers. Next, according to Walden policies, all raw data will be kept for five years after completion of study.

Summary

In Section 2, I discussed the research design and data collection. Areas included in that section were research design and rationale, methodology, population, sampling and sampling procedures to collect secondary data, instrumentation and operationalization of constructs, data analysis plan, and threats to validity. Additionally, ethical concerns and breach were highlighted and what steps I will take to address them. Section two presents the methodology used in my doctoral study and the next section will reveal the findings of the research study relative to my three research questions.

Section 3: Presentation of the Results and Findings

The purpose of this study was to examine the sociodemographic factors (age, gender, method of suicide, occupation and region) associated with suicide in the ≥ 15 years population in Guyana. Further, since research shows that culture play a pivotal role in suicide (Lawrence et al., 2016; Snarr, Heyman & Slep, 2010), I examined if there was a link between culture (race/ethnicity, religion) and suicide cases in ≥15 years population in Guyana. Additionally, I explored how sociodemographic factors and culture were associated with the method of suicide in this population. Section 3 includes the results of statistical analysis (univariate, bivariate, binominal logistic regression) on data collected from Ministry of Public Health in Guyana. I provided a brief description on the time frame for data collection, any discrepancies in the use of secondary data, and statistical analysis per RQ. I concluded with a summary of results for the three RQs.

Data collection of Secondary Data Set

Data were collected from the 10 administrative regions from health facilities namely health posts, health centers, district hospitals and regional hospitals and were submitted the Guyana Ministry of Public Health (Health Statistics Unit, 2017)). A Senior Health Visitor was assigned to each region and he/she was responsible for forms correctly and accurately filled by the health care workers in each region. Signed forms were submitted to the head of every region, then to the MOPH through Regional Health Services. Thereafter, data were sent to the statistical department.

Data were collected based on routine state specific purposes and as such there was no time restriction for data collection. Secondary data from the Guyana MOPH were

collected from January 1, 2015 to December 31 2015. The total combined sample size of the data were 220 in 2015 (Health Statistics Unit, 2017).

Discrepancies in Data Set

Originally, I planned to use 2017 data from the MOPH through the Statistical Department. However, this was not possible, since the only data available at that point in time was 2015. Thus, the study was modified for data form January 1, 2015 to December 31, 2015. A discrepancy in the originally received data was the inclusion of some missing data and the omission of religion variable. So I requested and received this information from the Regional Health Officers from the 10 administrative regions, for religion and any other missing data which are available to be submitted to the MOPH through Regional Health Services department.

Representativeness of the Sample

The study sample was collected from several sites and regions of Guyana, thus, the results of this study can be generalizable to the young and older population of Guyana.

Descriptive Statistics

Results show that in 2015, there were *N* = 220 suicide cases in Guyana. Table 1 below shows the following cases per variable: *N* = 220, Race/Ethnicity *N* = 220, Age *N* = 220, Occupation *N* = 168 with 52 missing cases. Religion *N* = 101 and 119 missing cases, method of suicide *N* = 211 and 9 missing cases, and region 219 and 1 missing case.

Table 1

Univariate Characteristics of Sociodemographic Factors Associated with Suicide in Guyana, 2015

		Gender	Occupation	Race/Ethnicity	age	Region	Suicide method	Religion
N	Valid	220	168	220	220	219	211	101
	Missing	0	52	0	0	1	9	119

From a total of *N* =220 cases, 72.3 % (N= 159) were males and 27.7% (N=61) were females. There were no missing cases. Table 2 below shows suicide cases by gender.

Table 2
Distribution of Suicide Cases by Gender

		Frequency	Percent	Valid Percent
Valid	Male	159	72.3	72.3
	Female	61	27.7	27.7
	Total	220	100.0	100.0

Results show that occupation was recorded for *N* = 168 persons who committed suicide in 2015. Of that number, 75% (*N* = 126) were employed and 25% (*N* = 42) were

unemployed. Missing cases represented 23.6% (*N* = 52). Table 3 shows the number of suicide cases by occupation.

Table 3

Distribution of Suicide Cases by Occupation

		Frequency	Percent	Valid Percent
Valid	Unemployed	42	19.1	25.0
	Employed	126	57.3	75.0
	Total	168	76.4	100.0
Missing		52	23.6	
Total		220	100.0	

As far race/ethnicity is concerned, the Indo-Guyanese accounted for the highest percentage of suicide cases 81.4 % (*N*= 179). This was followed by other race/ethnicities 10% (*N*=22) and Afro-Guyanese 8.6 (*N*=19). Table 4 shows suicide cases by race/ethnicity

Table 4

Distribution of Suicide cases by Race/Ethnicity

		Frequency	Percent	Valid Percent
Valid	East Indian	179	81.4	81.4
	African	19	8.6	8.6
	Other	22	10.0	10.0
	Total	220	100.0	100.0

Regarding religion, the Hindu religion was most predominant for suicide cases in 2015, and accounted for 49.5 % (*N*=50), followed by the Christians 35.6 % (*N*= 36), Muslim 8.9 % (*N*= 9), and 5.9 % of cases had no religion. There 54.1% (*N*=119) suicide cases missing. Table 5 shows the number of suicide cases by religion.

Table 5

Distribution of suicide Cases by Religion

		Frequency	Percent	Valid Percent
Valid	Christian	36	16.4	35.6
	Muslim	9	4.1	8.9
	Hindu	50	22.7	49.5
	No religion	6	2.7	5.9
	Total	101	45.9	100.0
Missing		119	54.1	
Total		220	100.0	

Further, The total number of suicide cases *N*= 220, and the 23-48 years old age group, 50% (*N*= 110) represented the highest amount, followed by the 0-22 years old 26.4% (*N*=58) and the > 48 years old 23.6% (*N*=52). Table 6 shows suicide cases by age group.

Table 6

Distribution of Suicide Cases by Age

		Frequency	Percent	Valid Percent
Valid	0-22 years	58	26.4	26.4
	23-48 years	110	50.0	50.0
	>48 years	52	23.6	23.6
	Total	220	100.0	100.0

Drank poison was the most common method of suicide 64.5 % (*N*=136), followed by hang self 32.7% (*N*=69), and other 2.8% (*N*= 6). Table 7 shows suicide cases by the method of suicide.

Table 7

Distribution of Suicide Cases by Method of Suicide

		Frequency	Percent	Valid Percent
Valid	Drank poison	136	61.8	64.5
	Hang self	69	31.4	32.7
	Other	6	2.7	2.8
	Total	211	95.9	100.0
Missing		9	4.1	
	Total	220	100.0	

Regarding region, of the *N*= 219 recorded suicide cases by region, 40.6% (*N*= 89) was the highest for region 6 (East Berbice/Corentyne), followed by region 4 (Demerara-Mahaica), 23.7% (*N*= 52), region 3 (Essequibo Islands-West Demerara), 17.4% (*N*=38) region 2 (Pomeroon-Supenaam) 13.2% (*N*= 29), region 5 Mahaica-Berbice 2.3 % (*N* =5) region 7 (Cuyuni Mazaruni 1.4% (*N* =3) and region 9 (Upper Takutu-Upper Essequibo), .5% (*N* =1) recorded the lowest. Table 8 shows number of suicide cases by region.

Table 8

Distribution of Suicide Cases by Region

		Frequency	Percent	Valid Percent
Valid	Pomeroon-Supenaam	29	13.2	13.2
	Essequibo Islands-West Demerara	38	17.3	17.4
	Demerara-Mahaica	52	23.6	23.7
	Mahaica-Berbice	5	2.3	2.3
	East Berbice-Corentyne	89	40.5	40.6
	Cuyuni-Mazaruni	3	1.4	1.4
	Upper Takutu-Upper-Essequibo	1	.5	.5

Upper Demerara-Upper Berbice	2	.9	.9
Total	219	99.5	100.0
Missing	1	.5	
Total	220	100.0	

Results Per Research Question

Research Question 1

The first research question asked the following: Is there an association between the socio-demographic factors (age, gender, occupation, method of suicide and region) and suicide cases in ≥15 years population in Guyana? Using the two-sample *z*-test, there was a statistically significant ($p < 0.05$) association between all the variables above and suicide cases (Table 9).

More specifically, the result for gender was statistically significant ($z = 9.35$, $p < .00001$) with suicide cases being higher in males than females as noted in Table 9.

For occupation the result show that this was statistically significant ($z = -9.16$, $p < .00001$, two tailed), with the number of suicide cases being higher in the employed than the unemployed.

The result was statistically significant for age group 0-22 vs 23-48 ($z = -5.09$, $p < .00001$), and this recorded highest number of suicides, followed by the 23-48 vs > 48 ($z = 5.74$, $p < .00001$) in 2015. However, this was not statistically significant for the 0-22 vs >48, ($z = 6.78$, $p < .496$) which recorded the least number of suicide cases. (Table 9)

For method of suicide, the result was statistically significant for drank poison vs.

hang self (z =6.53, p <.00001) and this recorded the highest, followed by drank poison vs other (z =.13.41, p <.00001). The least number of suicide cases occurred in the pair group hang self vs other (z=8.03, p<.00001) as displayed in Table 9.

The results for regions revealed that there was statistical significance for four regions namely: regions four (Demerara-Mahaica), five (Mahaica- Berbice), (z = 6.66, p <.00001, two tailed), with regions six (East Berbice- Corentyne), and seven (Cuyuni-Mazaruni) (z =9.88, p < .00001), recording the highest number of suicide cases in 2015. Regions four (Demerara- Mahaica), and five (Mahaica-Berbice), although significant, was marginal in comparison to the other pairs mentioned previously (Table 9).

The regions that were not statistically significant included regions two and three (Pomeroon-Supenaam and Essequibo Islands-West Demerara) (z = -1.22, p< .222, two tailed), and regions nine and 10 (Upper Takutu-Upper Essequibo and Upper Demerara-Upper Berbice) (z = 1.05, p <.29, two tailed). In pairwise comparisons, the least number of suicide cases occurred in regions nine (Upper Takutu-Upper Essequibo) and 10 (Upper Demerara-Upper Berbice). This was followed by regions two (Pomeroon- Supenaam) and three (Essequibo Islands-West Demerara). (Table 9).

Answer to Research Question 1. According to the results above, the null hypothesis was rejected since the socio-demographic factors of age, gender, occupation, method of suicide and region were significantly associated with suicide in ≥15 years population in Guyana.

Table 9

Comparison of Suicide Case Proportions by Gender, Age, Occupation, Method of Suicide and Region in Guyana (n = 220).

Suicide Cases Proportion	Sample Proportion (SP)	Pairwise Multiple Comparisons	*z* value	*p* value
Gender				
Male	0.723	Males vs females	9.35	<.00001
Female	0.277			
Age				
0-22	0.264	0-22 vs. 23-48	-5.09	<.00001
23-48	0.5	0-22 vs. >48	0.678	.496
>48	0.236	23-48 vs. >48	5.74	<.00001
Occupation				
Unemployed	0.25	Unemployed vs	-9.16	<.00001
Employed	0.75	employed		
Method of Suicide		Drank poison vs	6.53	<.00001
Drank poison	0.645	hang self		
		Drank poison vs	13.41	<.00001
Hang self	0.327	Other		
		Hang self vs.	8.03	<.00001
Other	0.028	other		
Regions				
Pomeroon-Supenaam (2)	0.132			
Essequibo Islands-West		Region 2 vs region 3	-1.22	.22
Demerara (3)	0.174			
Demerara-Mahaica (4)				
Mahaica-Berbice (5)	0.237	Region 4 vs region 5	6.66	<.00001
East Berbice-Corentyne (6)	0.023			
Cuyuni-Mazaruni (7)	0.406	Region 6 vs region 7	9.88	<.00001
Upper (Takutu-Upper-Essequibo (9)	0.014			
Upper Demerara-Upper Berbice10)	0.005 0.009	Region 9 vs region 10	1.05	.29

Research Question 2

Is there a relationship between culture (assessed by race/ethnicity and religion) and suicide cases in the ≥15 years population in Guyana? Using the two-sample *z*-test, there was a statistically significant ($p < .05$) association between race/ethnicity and religion and suicide cases (Table 10). The pairwise comparisons that were statistically significant and recorded the highest number of suicide cases were East Indians vs Africans ($z = 15.35$, $p < .00001$) and Hindu vs no religion ($z = 6.923$, $p < .00001$) for race/ethnicity and religion, respectively.

Next, East Indian vs other ($z = 15.03$, $p < .00001$) recorded the second highest number of suicide cases for race/ ethnicity, similarly Christian vs no religion ($z = 5.20$, $p < .00001$) recorded the second highest number of suicide cases for the pairwise comparisons for religion. Of significance, the race/ethnicity group, with the pairwise comparisons, East Indians vs Africans ($z = 15.35$, $p < .00001$) and East Indian vs other ($z = 15.03$, $p < .00001$) were more than three times higher than Christian vs no religion ($z = 5.50$, $p < .00001$) and Christian vs Muslim ($z = 4.561$, $p < .00001$). Further, the pairwise comparisons that were statistically significant, but recorded the least number of suicide cases in 2015, were Christian vs Hindu ($z = -1.99$, p .045) and Muslim vs Hindu ($z = -6.34$, $p < .00001$) as noted in Table 10.

Answer to Research Question 2. There was a significant relationship between culture (race/ethnicity, religion) and suicide cases in young people as well as the older population in Guyana. Therefore, the null hypothesis for RQ2 was rejected.

Table 10

Comparison of Suicide Case Proportions by Culture (Race/Ethnicity and Religion) in Guyana (n=220).

Suicide Cases Proportion	Sample Proportion (SP)	Pairwise Multiple Comparisons	*z* value	*p* value
Race/ethnicity				
East Indian	0.814	E. Indian vs. African	15.35	<.00001
African	0.086	E. Indian vs. Other	15.03	<.00001
Other	0.10	African vs. Other	-0.51	<.61006
Religion				
Christian	0.356	Christian vs. Muslim	4.561	<.00001
Muslim	0.089	Christian vs. Hindu	-1.99	.045
Hindu	0.495	Christian vs. No Rel.	5.20	<.00001
No religion	0.059	Muslim vs. Hindu	-6.34	<.00001
		Muslim vs. No Rel.	0.814	.417
		Hindu vs. No Rel.	6.923	<.00001

Research Question 3

Is there an association between the socio-demographic factors (age, gender, occupation, and region) and culture, and the method of suicide in the ≥15 years population in Guyana?

For research question three, I conducted binomial/binary logistic regression having as predictors age, gender, occupation, region, race /ethnicity and religion and the outcome variable was method of suicide (nominal binary variable poison vs hanging). The following assumptions :(a) dependent variable must be dichotomous, (b) one or more independent variable which must be continuous or categorical, and (c) independence of observations (Lund Research, 2018) were met. After conducting several regression analyses using different combinations of the predictors, the best model to significantly

predict method of suicide was the one having as predictors gender and age. More specifically, there was no evidence for lack of fit for this model according to Hosmer and Lemeshow's test (p = .402) although it had a relatively poor predictive ability (Nagelkerke R^2 = .067)

According to the regression results (Table 11), males had 3.1 times the odds to commit suicide by hanging instead of drinking poison compared to females (*OR*: 3.1, 95%*CI*: 1.5-6.7, p <0.004). Therefore, the null hypothesis for RQ3 was rejected.

Table 11

Binomial Logistic Regression for Method of Suicide (Dependent variable) with Predictors Age and Gender.

								95% C.I.for OR	
		B	S.E.	Wald	df	p	Odds Ratio	Lower	Upper
Step 1[a]	Males vs. Females	1.135	.389	8.504	1	.004	3.112	1.451	6.676
	Age			1.749	2	.417			
	Constant	-1.516	.451	11.306	1	.001	.220		

a. Variable(s) entered on step 1: Gender, Age

Summary

In Section 3 the results and findings of my doctoral study are displayed. This research study collected data from the Guyana Ministry of Public Health, and examined the sociodemographic factors associated with suicide cases in the ≥15 years population in Guyana. The dependent variable was suicide cases and the independent variables included age, gender, occupation, region, method of suicide. It was also important to examine culture (race/ ethnicity, religion), since this is considered to play a significant role in suicide, according to the literature. According to the results of the study, the socio-

demographic factors of age, gender, occupation, method of suicide and region, as well as race/ethnicity and religion were significantly associated with suicide in the young and older population in Guyana. In addition, males had 3 times the odds to commit suicide by hanging instead of drinking poison compared to females (*OR:* 3.1, 95% *CI:* 1.5-6.7, *p* <.004).

A detailed analysis and interpretation of findings of this doctoral study is the topic of section 4. In the next section the areas presented are the purpose, key findings and interpretation, limitations, recommendations and conclusion which are relevant to the doctoral study.

Section 4: Application to Professional Practice and Implications for Social Change

The purpose of this quantitative cross sectional study was to investigate the association between the sociodemographic factors (age, gender, occupation, region, and method of suicide) and culture (race/ethnicity and religion) and suicide cases in the ≥15 years population in Guyana. Also, I explored the association between the factors above and methods of suicide in this population group.

The findings of the two sample *z* test revealed that there was a statistically significant relationship between sociodemographic factors as well as culture and suicide. Also, regarding method of suicide, males had 3.1 times the odds to commit suicide by hanging instead of drinking poison compared to females. Section 4 includes interpretation of findings, limitations of study, recommendations for further study, implications for professional practice and positive social change.

Interpretation of Findings

Findings to Literature

Findings suggested that the sociodemographic factors (age, gender, occupation, region, method of suicide) are associated with suicide. Also, culture (as measured by race /ethnicity and religion are associated with suicide. The following subsections present findings broken down by variables including age, gender, occupation, race/ethnicity, religion, method of suicide and region.

Age groups. The 0-22 years age group recorded the second highest number of cases (26.4%) that committed suicide in 2015 and the 23-48 years old (50%), recorded the highest number of suicide cases. The Guyana Ministry of Public Health data show

that the aforementioned age group, represented the working population who were employed in the low to middle income category, had more access to lethal methods of suicide (pesticide) because of the type of occupation (labourers, farmers) they were employed in (Ministry of Public Health Statistics Unit, 2015). Next, according to the director Mental Health, U. Richmond (personal communication, January 15, 2020) "the 23-48 years age group have poor coping skills, are involved in impulsive suicide, and they model previous examples of persons who commit suicide" . She also claimed that the East Indian race/ethnicity who are vulnerable to suicide, is predominant in this category. Globally, 78% of suicide occurred in low to middle income countries and suicide was the second leading cause of death among the 15-25 years old in these countries (WHO, 2017). Next, Guyana's National Suicide Prevention Plan 2015-2020 (2014) claimed suicide was the leading cause of death among young people aged 15-24 years. The most affected age group was 20-49 years (50%) followed by individuals 13-19 years (16.6%) and greater than 50 years of age (16.6%). (National Suicide Prevention Plan 2015-2020, 2014). Other studies which claimed that young people were greatly impacted by suicide included (Quinlan-Davidson, Sanhueza, Espinosa, Antonio, Cejudo-Escamilla, and Maddleno, 2014; Behmanehsh Poor, Tabatabaei, & Bakhshani, 2014).

Gender. The results of this study show that 72.3 % of males committed suicide in 2015. In Guyana, this occurs because men are more involved in the farming occupation and have access to pesticides, also they are involved in impulsive suicide. This was consistent with a research done by Rhodes, Boyle, Bridge, Sinyor, Links, Tonmyr, Szatmari, 2014), which claimed suicide rates are two to three times more in males than

females in countries with a good data system. Also, a study done in Ecuador revealed that men were three times more likely to die from suicide (5.3 in women, 13.3 in males). (Chachamovich, Haggarty, Cargo, Hicks, Kirmayer, and Turecki, 2013). Further research has shown that 79% of all male deaths in the US, were due to suicide (Suicide Awareness Voices Education, 2018). My research study was also supported by the findings of the National Suicide Prevention Plan 2015-2020, 2014), which postulated that males committed suicide more frequently 4:1.

Occupation. Results show that the employed accounted for 75% of suicide cases in 2015. My study was consistent with the findings of Behmanehsh Poor, Tabatabaei, & Bakhshani (2014) which claimed that suicide mostly occurred in the low to middle income groups which included the self-employed and housewives. However, this contrasted with the findings of Chachamovich, Haggarty, Cargo, Hicks, Kirmayer, and Turecki (2013). The authors claimed that suicide affect persons from different backgrounds, socio-economic status, and educational achievement. This is also consistent based on the literature review confirming that suicide is a major public health issue and it occurs in both the developed and developing countries, irrespective of socioeconomic status, colour, class, or creed. Chachamovich, Haggarty, Cargo, Hicks, Kirmayer, and Turecki, (2013 para, 5). Future research is necessary to understand the reasons for these discrepancies regarding the association between employment status and suicide.

Race/ethnicity. Results revealed that the East Indian population accounted for 81.4% of suicide cases in 2015, other race/ethnicities had less cases of suicide. This may be explained by the authors Lacey, Powell Sears, Crawford, Matusko, and Jackson

(2016), which claimed that among the various race/ethnicity groups in Guyana, depressive disorders were the highest amongst the East Indian population. However, Edwards (2016) claimed that the Afro-Guyanese are more "hostile and repressive", open in conversation and that may be suggestive of them committing suicide less than the East Indian race/ethnicity. These contradictory results indicate the need of further research on the impact of race/ethnicity on suicide in Guyana.

Religion and suicide. My study results show that 49.5% of suicide cases that occurred in 2015 were from the Hindu religion followed by the Christian religion with 35.6%. Firstly, it is important to note that the East Indian group predominantly contributed to the number of suicide cases in 2015, and in terms of religion the Hindu group contributed significantly to suicide in 2015. Therefore, there seems to be an inherent link of the East Indians into Hinduism. Thus, according to a research study done in Guyana, depressive disorder was more prevalent in the East Indian population than any other group (Lacey, Powell Sears, Crawford, Matusko, & Jackson, 2016). Further when slavery was abolished in 1838, plantation owners imported East Indians from the lowest castes of India as indentured servants, and they were relegated to the status lower than freed African slaves (Rawlins, 2018). There are studies which claimed that ethnic/racial religious characteristics protect people against suicide or increase persons' vulnerability to suicide and suicide ideation (Lawrence et. al 2016; Snarr, Heyman & Slep, 2010). Further analysis needs to be done to understand the reasons for this association. However, the results of the present study suggest that there is a link between culture and suicide.

Method of suicide. According to my results, ingestion of poison accounted for 64.5% being the most common method of suicide. This is in accordance to the findings of Henry (2015), who claimed that pesticides was the most common method of suicide due to the fact that they are easily accessible and there is no control to the purchase of this poison. On the other hand, regression analysis revealed males were 3.1 times more likely to commit suicide by hanging, instead of drinking poison compared to females. This was consistent with a study done in Asia by Wu, Cheng, and Yip, (2012), which claimed that recent trends in suicide reflect the sociocultural, economic and religious situations in countries and as such the method may not be equal for all sex and age subgroups. Additionally, research has shown that persons who have access to lethal methods of suicide based on their occupation commit suicide more than those who do not have access and as such, this should be controlled. (Milner, Witt, Maheen, & LaMontagne, 2017). Males in Guyana chose this specific pesticide because of their occupation involves more of farming, and they use pesticides regularly in the fields because it is easily accessible and there are no laws restricting the purchase of this product.

Region and suicide. The study results show that in 2015, 40.6% of the suicide cases occurred in region 6 (East Berbice, Corentyne), followed by region 4 (Demerara, Mahaica), and region 3 (Essequibo Islands, West Demerara). My study is consistent with the article which claimed that suicide tend to be higher in the rural areas than the urban (Fox News world, 2014). However, the study results did not share similar findings to that of the National Suicide Prevention Plan 2015-2020 (2014) which claimed that the highest suicide rate was in region # 2 (Pomeroon- Supenaam) (52.7/100,000) followed by region

#6 (East Berbice-corentyne) (50.8%) and region #3 (East Berbice-Corentyne)(37.3%). Further studies need to be done to establish why suicide is higher in certain regions when compared to others.

Findings to SEM Theoretical Framework

I applied the SEM framework as indicated by CDC (2015) to comprehensively address suicide which is a major public health concern. This research study addressed multi-levels namely: individual, interpersonal, organizational, community, and policy to account for the sociodemographic factors associated with suicide in adolescents and young people in Guyana.

Individual. Suicide tends to affect people from the low to middle income group, self-employed individuals as well as housewives, low educational achievers who are likely to be young people. (Behmanehsh Poor, Tabatabaei, & Bakhshani, 2014). Additionally, suicide affect persons from different backgrounds, socioeconomic status and educational attainment (Chachamovich, Haggarty, Cargo, Hicks, Kirmayer, and Turecki, 2013). This suggest the need for focused attention to screening of these individuals so that they can receive the appropriate care. However, the National Suicide Prevention Plan 2015-2020 (2014), claimed that equal attention need to be given to mental and physical health and this will help in the management of care for people who self-harm. The call was also made for 24-hour response for persons who have mental health issues. Future investigators need to develop individualized suicide plan for the various sociodemographic factors namely: age, sex, race/ethnicity religion, method of suicide and region. Additionally, individuals need to be taught educational and life

training skills divert their thinking and help them to understand their worth, as noted earlier in this research.

Interpersonal. In Guyana, some adolescents and youths do not feel comfortable to express their feelings or emotions to their parents or other family members. Research done on a focus group in Guyana show that some adolescents and youths commit suicide due to gaps in communication in the homes and beyond (Lack of communication contributes to suicide in Guyana, 2016). The article cited isolation from partners, families and friends, as contributory factors. A comparison was made with another group who had closer families ties and they were referred to as having a sense of purpose, security, and connectedness (Lack of communication contributes to suicide in Guyana, 2016). For example, there should be mentoring and peer programs geared towards reducing conflicts, training in problems solving skills and promoting healthy relationships. Future investigations need to be done to include marital status or spousal relationships in the sociodemographic factors associated with suicide.

Organizational. Based on this study, when suicide hit Guyana in 2015, it mostly affected persons who were employed in the lower income group, and those who had access to lethal methods of suicide such as poison. Ingestion of poison especially pesticides was the most common method in the farming occupation, because this is easily accessible across the 10 regions in Guyana and, there is little control over procurement of this poison (Henry, 2015). Restricting access to common methods of suicides including poisons is necessary in the prevention of suicide. (Guardian News, 2018). National Suicide Prevention Plan 2015-2020 (2014) claimed that suicide risk by occupation may

occur locally and as such organizations and local agencies need to tailor interventions appropriately for specific groups. Findings from this study suggest the need for local sectors and organizations to be alert and adapt suicide prevention intervention accordingly.

Community. When suicide occurred in Guyana in 2015, region 6 (East Berbice, Corentyne) was mostly affected according to the two sample z test. Guyana is divided into coastland (Pomeroon-Supenaam (region 2), Essequibo Islands-West Demerara (region 3), Demerara-Mahaica (region 4), Mahaica-Berbice (region 5), East Berbice-Corentyne (region 6), Upper Demerara- Upper Berbice (region 10), and hinterland (Barima-Waini (region 1), Cuyuni-Mazaruni (region 7), Potaro –Siparuni (region 8) and Upper Takutu-upper Essequibo (region 9) as noted earlier. Region 4 houses Georgetown, the city of Guyana. According to Fox News World (2014), suicide tends to occur more in the rural than urban areas. The aforementioned article also stated that in region 6 (East Berbice/Corentyne), that there are many Hindus who are of East Indian decent and as such suicide in Guyana is usually portrayed as a Phenomena of Hindu. (Fox New World, 2014). The National suicide Prevention Plan 2015-2020 (2014), stated in order to prevent copycat and cluster suicide, post-suicide community prevention level intervention, must be made available in schools, workplaces and health care settings. Future investigators need to examine the effects of community level interventions on suicide in Guyana.

Policy. The laws of Guyana governing suicide helps to create or encourage a climate for suicide. For example, according the laws of Guyana section 8:01 97, "Everyone who attempts to commit suicide shall be guilty of a misdeamour and liable to

imprisonment for two years". (Chapter 8:01 Criminal Law (offences) Act Arrangement, p 53, 1998,). This does not take into consideration that the factors contributing to suicide are multifactorial and there is no "one size fits all" policy here. There needs to be a better understanding of the socioeconomic determinants of suicidal behaviors, then this will assist government and policy makers in their decisions at population level. (Bantjes et. al, 2016). Thus, the approach to the management of suicide in Guyana must be multi-sectoral as mentioned earlier in this study. There must be partnerships with multiple public sectors namely: health, education, housing, judicial, employment, social as well as the private sector appropriate to the country situation (National Suicide Prevention Plan 2015-2020, 2014).

Limitations of the Study

There were some limitations with the Ministry of Public Health secondary data set used in this study. The secondary data collected did not contain all the needed variables, for example income or educational level. According to Cheng and Phillips (2014), it is inherent in secondary data analysis that, the available data collected were not intended to address the present research question and as such important third variables were not available for analysis. It is important to understand that data with cross sectional study design when multilevel information is included it can produce bias leading to ecological fallacy (Subramanian, Jones, Kaddour, & Krieger, 2009). The authors also noted that, though ecological fallacy may be reduced, population heterogeneity can lead to problems with interpretation (Subramanian et al., 2009)

The sample size was another challenge because it was smaller than the one estimated in priori statistical power (final study 220 instead of 400). Too small sample size can affect the extrapolation of the findings, and too large may affect the way one detect the differences which will produce statistical differences that are not clinically relevant (Faber & Fonseca, 2014). Therefore, it is suggested for future studies to include as many secondary data available as possible regarding this topic.

Next, this study did not include suicide ideation and suicide attempts. These are important because suicide ideation precedes suicide attempts and the latter eventually leads to suicide. As noted earlier, young people who commit suicide are sixteen times more likely to have made a previous attempt commit suicide than those who never committed suicide (Nock et. al, 2013).

Additionally, for the variables of occupation and religion there were a relatively high number of missing data. Osborne (2013) emphasized that missing data impact external validity, unless they are included in the analysis. Therefore, future research is recommended to include as many cases as possible regarding these variables in relation to suicide cases in Guyana.

Recommendations

There are several recommendations that would advance the findings for research on suicide in Guyana. First, increase the number of suicide awareness campaigns in every region and tailor information specifically to suit each age group. Second, regularly update data collection format to capture the evolving trends in suicide, so that adequate data are available to promote future research on suicide. Third, collaboration with all sectors in

Guyana (governmental, non-governmental, private, civil society and the community) for the management of suicide, since this needs a multilevel approach. Fourth, restrict access to lethal methods of suicide. For example, the establishment of a procurement and regulatory framework governing the use of pesticides. Fifth, actively monitor media reports for sensationalization of suicide. Sixth, increase the number of adolescents and young people in vulnerable communities being involved in life training skills in order to help them understand that they can divert their energy to more valuable resources in life. I recommend the need for further studies of multilevel approach to the management of suicide in adolescents and young people, as well as the older population. Seventh, the need for culturally sensitive programs geared towards educating young people and the entire population on cultural awareness. Eight, I suggest training programs that will allow the young people, as well as the older population to understand the need to be more open to issues that are confronting them. Further, since this study show that men were three times more likely to hang themselves than females, then I would suggest future comparative studies focusing on the choice of method of suicide between men and women.

The National Suicide Prevention Plan 2015-2020 (2014), advocated for the timely referral of women and children so that they can have appropriate care, as well as those who work with men to identify early signs of suicidal behavior and seek treatment for them. It is important to understand that the National Suicide Prevention Plan 2015-2020 (2014), was not enforced or fully rolled out across the country as yet, until post 2015. The aforementioned plan noted that children and young people are considered priority and a

vulnerable population for suicide (National Suicide Prevention Plan 2015-2020, 2014). To this effect, all areas such as schools, juvenile system and social care settings were advised to identify situations whereby bullying, poor body image and low self-esteem are noted in this cohort, so that steps can be taken to protect them reasons that would promote suicide in this cohort or protect them from committing suicide.

Implications for Professional Practice and Social Change

This section provides recommendations for professional practice and implications for positive social change relevant to suicide cases in Guyana. Suicide in 2015 has greatly impacted adolescents and young people in Guyana, and the National Suicide Prevention Plan 2015-2020 (2014) was not even rolled out as yet. This was a potential missed opportunity for adolescents and young people, and by extension the wider population, to receive the appropriate care and attention.

Professional Practice

Theoretical. I incorporated the SEM into my research study, in an attempt to model a cross sectional survey into a socio-ecological system which combines human-environment interaction from suicide cases. According to Cumming (2014), the majority of the socioecological systems (SES), answers most of the questions of our time, but suggested that same lacks an overarching theoretical framework. The author claimed that if this framework is developed, it will be more comprehensive and the benefits will include better generalization from individual case studies, help us to know the difference of important to less important results, and it will ultimately draw on the scientific method to influence managerial and policy intervention. (Cumming, 2014 .In this way, SES can

be strengthened and we do not have to use SEM alone. This implies that we need to use several diverse theories involving human interaction and incorporate them into professional practice

Empirical. I suggest an empirical implication to suicide in adolescents and young people so that we can find answers to the problems and there can be improvement in the sociodemographic factors associated with suicide. Bergerson (2014), posited that the social, economic and physiological factors contribute to suicide and the problems of suicide cannot be analyzed by using one dimension. The author proposed highlighting the issue to educate policy makers so that they can assess the current suicide prevention techniques and make informed decision about how to deal with the suicide phenomenon. (p 3). Next, it is important to highlight the effects of social media on the mental health of adolescents and young people. Empirical research exists to show how this cohort perceive social media and the knowledge resource they receive from the wider social media to express their view point. (O'Reilly, Dogra, Whiteman, & Huges, 2018). According to the authors social media is seen as a threat in several ways namely: mood and anxiety disorders, cyberbullying platform, and a framework for addiction. I suggest future research to target social media to promote mental health and well-being, as well as teaching them how to manage challenging situations in their lives.

Positive Social Change

The findings of this research study support Walden's mission for social change by understanding the significance of sociodemographic factors, combined with the role of culture on suicide in adolescents and young people in Guyana. The aim is to use the

results to create a high level of awareness and identify predisposing factors that can lead to suicide. Thus, at the individual level, there needs to be screening of individuals so that they can receive appropriate care relevant to age, sex, method of suicide, race/ethnicity, occupation, religion, and others. At the interpersonal level there is need for mentoring programs and peer groups geared towards resolving conflicts and improving relationships. Also training programs in life training skills to help adolescents and youths to find jobs so that, they can take care of themselves and feel worthy. At the organizational level, sectors and organizations based on evidence, need to be alert and adapt prevention intervention suicide programs. Although, not a focus of this study, but nevertheless must be highlighted, is the need to establish protocols in media reporting to prevent copycat suicide at the community level. Societal and policy level need effective guidelines and policies that reduce the socio-demographic factors of suicide across the 10 regions of Guyana, and I am advocating that adolescents and youths have a role in decision making. In this way, they can voice their opinions on appropriate programs for youths which can lead to greater involvement and ultimately their development.

Conclusion

I identified the association of the sociodemographic factors of suicide namely: age, gender, occupation, method of suicide, and region, and the role of culture (as measured by race/ethnicity and religion) on suicide in the young and older population in Guyana. The Guyana Ministry of Public Health 2015 data were used. Given the fact that in this study it was revealed a significant association between culture and suicide cases, it would be helpful to know the role of culture pre-suicide and post-suicide (for suicidal

attempts). If this information is known, then prevention intervention strategies can be tailored to suit this time period. There needs to be closer monitoring of suicide ideation and suicide attempts because these eventually lead to suicide. These may be related to depression and for many young people, there may be co-occurring condition as noted in depression and addiction. Thus, according to the article, Suicide in young adults: Depression, addiction, are primary contributors (2017), depression and alcohol form a deadly combination and many young people, as well as adults with severe depression turn to drugs, alcohol and other risky behaviors to drown their psychological, emotional or spiritual discomfort. Additionally, as it relates to culture, the East Indian race/ethnicity is inherent in Hinduism and, based on history, this group is more vulnerable to suicide because they found it hard to adapt to another culture (Henry, 2016). At this point, training programs transitioning people from their original to the new culture should be done, so that they will understand and learn how to appreciate other cultures. Finally, there should strict rules by policy makers and government, on restricting access to lethal methods of suicide in all work places, as well as persons who are self-employed. Nevertheless, in order to arrest and mitigate suicide in adolescents and young people, a call is made for systems thinking in public health, whereby governmental, non-governmental organizations and civil society will unite to fight this cancer of suicide and preserve our next generation.

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