Variation of Homicidal and Suicidal Behaviour within Trinidad and Tobago and the Associated Ecological Risk Factors

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ABSTRACT

Self destructive behaviour may not occur consistently across a population. Identification of variations in homicidal and suicidal behaviour within a country can enable specific prevention and public health strategies to be adopted. This is significant because morbidity and mortality associated with these behaviour patterns is preventable and the affected population is increasingly young adults with potentially productive lives. The author sought to identify some of the associated risk factors with the behaviours in Trinidad and Tobago, a developing island-state in the English-speaking Caribbean, by disaggregating the homicide and suicide data available from Police records for distinct geographical regions. Spearman rank correlation was used to determine whether any of the variations observed could be attributed to social or demographic factors. Homicide and suicide were inversely related in many areas of the country. They were both low in Tobago. Homicide was positively associated with high population density, low marriage rates, African ethnicity and showed a trend toward association with school drop-out rates.

For suicide, low population density, low income, East Indian ethnicity and alcohol consumption were significantly correlated. These findings underline the benefit of disaggregating national data and suggest specific interventions to diminish the occurrence of these harmful behaviour patterns in Trinidad and Tobago with possible extension to other similar developing countries.

Variación del Comportamiento Homicida y Suicida en Trinidad-Tobago, y Factores Ecológicos de Riesgo Asociados

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RESUMEN

Puede que los comportamientos auto-destructivos no ocurran de forma sistemáticamente en una población La identificación de variaciones en el comportamiento homicida y suicida dentro de un país puede hacer posible la adopción de estrategias específicas tanto con respecto a la prevención como en relación con la salud pública. Esto es significativo porque la morbosidad y la mortalidad asociadas con estos patrones de conducta son prevenibles y la población afectada consiste cada vez más de adultos jóvenes con vidas potencialmente productivas. Desagregando los datos sobre suicidios y homicidios a su disposición en los archivos de la policía en diferentes regiones geográficas, el autor se dio a la tarea de identificar algunos de los factores de riesgo asociados con los comportamientos en Trinidad-Tobago – una Isla-Estado en vías de desarrollo en el Caribe anglófono. A fin de determinar si alguna de las variables observadas podía atribuirse a factores sociales o demográficos, se recurrió al coeficiente de correlación por rangos de Spearman. El homicidio y el suicidio se hallaban en relación de proporcionalidad inversa en muchas áreas del país. En Tobago, ambos resultaron ser bajos. El homicidio estuvo positivamente asociado con una alta densidad de población, tasas de matrimonio, etnicidad africana y mostró una tendencia hacia la asociación con las tasas de deserción escolar. Por su parte, el suicidio presentó una correlación significativa con una baja densidad de población, ingresos bajos, etnicidad indo-oriental, y consumo de alcohol. Estos hallazgos destacan el

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beneficio de desagregar los datos nacionales, y sugieren intervenciones específicas con el fin de disminuir la manifestación de estos patrones de conducta negativos en Trinidad-Tobago, con la extensión posible en otros países similares en vías de desarrollo.

INTRODUCTION

The impact of violence on health and healthcare has become an increasing concern of medicine particularly with regard to young adults (1). It is therefore incumbent upon the medical profession to lend attention to these forms of morbidity and mortality as they contribute significantly to demands on health services, particularly in environments of limited resources. This is so because deaths due to violence are most likely among young adolescents and adults (2) and those of lower socio-economic status (3). The World Health Organization (WHO) estimates that violence is the sixth leading cause of disability among males aged 15–44 years and tenth overall for both genders (4). In 1990, an estimated 1 851 000 people in the world died from violence, giving a rate of 35.3/100 000. Since these deaths are preventable, understanding the distribution and determinants of this behaviour becomes an important domain of public health strategy (5). This is critical for developing countries because their development is primarily related to their human resources. Morbidity and mortality associated with violence has therefore become a major cause for concern among health planners and policy makers.

The study of regional variation of violent deaths within a country is useful in the determination of specific risk factors that can be addressed by preventive measures in specific populations.

These include urban rural differences, population density, ethnicity, social and economic status, crime rates, drug consumption and mental illness (6). Other demographics such as employment levels, income equality and education are also likely to affect these behaviours (7). In addition to the demands placed on health and other social services, the wider societal impact on productivity, family disruption and community perceptions make this form of injury very significant in any society. It can also serve to provide fairly accurate representations of community vulnerability.

Trinidad and Tobago is an English-speaking Caribbean country at the southernmost tip of the Caribbean chain. Paradoxically, while being the home and host of the now pan-Caribbean images of calypso, steel band and carnival (8) it also has the highest suicide rates per capita in the English-speaking region (9). There is also increasing concern about its homicide rate as well which has increased dramatically during the decade of the nineties. It is a multi-ethnic country, with approximately equal proportions of people of African descent 39%, and those of Indian origin (40%). The remaining 21% of the population are of mixed ethnicity, European (15%), Asian and Middle Eastern, approximately 2% each (10).

Since homicide, suicide and other deaths by violence are likely to arise out of social pathology, even when distilled through the presence of psychopathology, it is important to analyze them in the context of the societies where they occur.

This analysis provides the basis of addressing the problem and can then be applied to other countries where similar social forces may be operating. In addition, morbidity and mortality due to violence ranks very highly in the young adult age-group with worldwide trends of increasing rates of both homicide and suicide (11).

Suicide in Trinidad and Tobago exhibited a 300% increase between 1978 and 1994 and perhaps this was attributable to the economic recession which succeeded the economic boom arising out of the world oil crisis of the seventies (10). Trinidad and Tobago is also somewhat unique in the Caribbean as its main economic activity revolves around the oil and gas industry although Tobago's economy is primarily derived from tourism (10). The use of national statistics to follow these trends is therefore very useful but can be made even moreso by deconstructing the national statistics into regional or other smaller units. This can have the benefit of identifying specific aetiological factors that would have been hitherto hidden in the broader national reporting (5). This becomes even more significant in the planning and implementation of public policy (12).

Understanding the pattern of violent deaths may therefore also resonate with mental health service provision. This also applies to suicide rates, which have been shown to be sensitive to better and more sensitive detection of mental health problems such as depression. Homicide and accidents may both be related to the problem of substance abuse, and increasingly to the presence of depression (13). The study of homicide is relevant as it is also a reflection of criminal behaviour which in turn is associated with crime rates and the general sense of order or disorder and chaos in a society. These rates have been increasing in the Americas over the past two decades and have been suggested to be due to a general social decline in this part of the world (14). Early research suggested that there might be an inverse relationship between homicide and suicide as well as the social forces that influence these harmful behaviours. Homicide has been postulated to be associated with low external restraint and low socio-economic status while suicide is thought to vary with these variables in the opposite direction. These postulates were derived from work in the United States of America (USA) and may reflect specific realities in that country, particularly with regard to the racial inequalities that exist between Caucasian and African-Americans (15). These relationships may be additionally confounded by issues such

as inner city overcrowding, employment and perceptions of inequality (16). Urban – rural comparisons have yielded contradictory findings but clearly underline the need to assess intra – country variations in order to better understand the behaviour, particularly where they may be ethnic or racial differences. Access to the means of suicide and homicide has also been implicated, particularly where there are preferred methods for the commission of these acts in a given country (17).

Other reasons postulated for the inverse relationship between homicide and suicide suggest that it occurs as a result of a population's tendency to either internalize or externalize violence (18). This is however not consistently seen, and in some countries this inverse relationship is not seen at all and in this context, homicidal and suicidal behaviour are thought to perpetuate each other.

We therefore sought to test the hypothesis that suicide and homicide are inversely related within a country, even as high rates are reported for both behaviours nationally, and to seek explanations using the demographic data available in Trinidad and Tobago.

METHODS
Homicide and suicide data are routinely recorded by the police and broken down into geographic regions of the country as defined by the location of police divisions. These cases reported are those which are confirmed after Coroner's Inquests. Inquests take variable lengths of time depending on the circumstances of the suicide and the ease with which supporting evidence can be obtained, however an average of two to three months is usual. There are no dedicated courts or magistrates for this process and they can be handled by any magistrate in the various divisions.

Trinidad and Tobago has an estimated population of 1.3 million people who inhabit a land space of approximately 5128 square kilometers with a population density of 255 per square kilometer. The annual per capita income is approximately US$9 000 and 21% of the population are thought to be living below the poverty line with an annual per capita income of less than US$1000. There are two major cities, Port-of-Spain and San Fernando, in and around which 40% of the population live (19).

There are nine police divisions. The Port-of-Spain Division covers the capital city, Port-of-Spain, and is predominantly urban with inner city residents and a smaller number of peri-urban high income residents. The Western division is predominantly suburban and residential, populated largely by middle to upper income residents. The Northern division is also suburban but here the residents are of middle to lower income. The North Eastern division extends toward the Eastern tip of the country and is semi-urban rather than suburban as in the Northern region with a large business community engaged in manufacturing and engineering-based industries and with residents of lower to middle income. In the four aforementioned divisions, the predominant ethnicity

is African (60%). The Eastern division is rural, with more agricultural activity and greater mix of ethnicity. The South Western and Southern regions are a mix of industrial and agricultural activity as it is here the oil and gas industries are mainly located, there is also marked agricultural activity and the population is largely of Indian ethnicity (63%). There is also a predominantly urban area in the Southern division which is the second major city in the country, San Fernando. The other division in Trinidad is Central which is the division with the largest Indian population (74%) and engages primarily in agricultural activity with sugar cane harvesting as its mainstay. There are also pockets of urban areas and suburban residents of middle to upper income but the majority of residents are of lower income. The Tobago division covers the island of Tobago which has a population of 50 000 that is predominantly of African origin (87%) and rural with tourism as its main source of economic activity (19).

Records were obtained from the police and tabulated, by region, the number of deaths accorded to homicide and suicide over a ten-year period (1991–2000) were tabulated by region. These were then compared statistically to test for significance to determine the differences between the regions. These were then broken down into age specific rates per 100 000 population to determine any age trends within the regions. Then, using data from the Central Statistical Office, the mean suicide rate over the ten year period for the regions was calculated and then compared with variables such as population density, ethnicity, religion, income, school drop-outs and alcohol consumption. Income was used as a measure of socio-economic status. The regions were ranked by percentage of individuals earning less than US$1000 per month as low income.

Spearman's Rank Correlation was used to establish the significant correlations. While homicide rates are likely to be relatively accurate from police statistics, the suicide rates may be somewhat less so as the police would record those cases reported to them and confirmed after a Coroner's inquest.

This might exclude those victims who either died in hospital of the medical complications of their suicidal attempt and those who may have died long after the attempt and were not reported.

RESULTS
Over the ten-year period, there were a total of 1093 homicides with an annual mean (standard deviation) 109.3 (7.1). The mean for suicide was 113.3 (1.2) arising from 1 133 suicides for the period.

Gender ratio:
Homicide: Male to Female 3.2:1
Suicide: Male to Female 3.8:1
Ethnicity (as recorded in Police files)

Total Homicide and Ethnicity African: Trinidadians = 68.2%, p = 0.003
Total Suicide and Ethnicity Indian: Trinidadians = 79.2%, p = 0.0007

Methods Used (Percentage Distribution)

Homicide: Firearm 60.5%; Chops/Stabs 38.2%; Other 1.3%
Suicide: Poisoning 64.2%; Hanging 30.3%, Other – including jumping from heights, self-wounding, firearms 4.5%.

Table 1 shows that there is an inverse relationship between homicide and suicide particularly in the Central and Port-of-Spain divisions.

Table 1:   Mean homicide and suicide (1991–2000) by region per 100 000 population and population density (1995 mid-period estimate, Central Statistical Office, 2000)

Region	Mean Homicide (sd)	Density	Mean Suicide (sd)
South Western	5.2 (1.3)	222	11.8 (1.6)
Central	5.9 (1.1)	324	12.2 (2.4)
Eastern	8.6 (1.8)	38	12.0 (2.1)
North Eastern	14.3 (2.4)	1001	3.7 (0.6)
Tobago	6.0 (1.7)	67	4.8 (0.7)
Western	8.2 (1.6)	1446	3.4 (2.1)
Northern	8.6 (2.2)	888	7.1 (0.5)
Port of Spain	22.0 (2.9)	2317	5.0 (1.8)
Southern	6.8 (1.6)	814	12.4 (2.5)

For homicide, the 35 to 44-year age group was significantly represented for both homicide and suicide. ($p = 0.003$). Suicide is more likely in 55^+ age group ($p = 0.04$).

Table 2:   Illustrates that high population density, low marriage rates and African ethnicity are associated with homicide while alcohol consumption, low income and East Indian ethnicity are associated with suicide

Spearman Rank		Spearman Rank
Homicide	Population Variable	Suicide
R = 0.61	*High Population Density	R = -0.60
R = -0.62	Low Population Density*	R = 0.60
R = -0.50	% Low Income**	R = 0.84
R = 0.40	#School Dropouts	R = 0.15
R = -0.40	Alcohol Consumption*	R = 0.43
R = -0.16	Divorce Rates	
R = -0.74	**Marriage Rates	R = 0.06
R = -0.33	% East Indian**	R = 0.72
*$p < 0.05$		
**$p < 0.02$		
# $p = 0.08$		

In younger age groups (0–24 years), homicide is significantly more common than suicide (p = 0.03) (Table 3).

DISCUSSION

An inverse relationship has been reported between homicide and suicide in Germany and this was attributed to cultural differences in mediating aggression (20), however in

Table 3:   Age Group Adjusted rates per 100 000 population (using Population mid-period estimate) (Central Statistical Office, 1995)

	0–14	15–24	25–34	35–44	45–54	55+
Suicide	2.8	108.1	147.5	224.8	164.2	138.7
Homicide	12.5	124.8	154.5	205.7	133.7	84.7

Trinidad and Tobago, there are relatively high rates of both homicide and suicide. However, there tend to be inverse relationships when the country is divided regionally so where there are high rates of homicide, there tend to be low rates of suicide and *vice versa*. The inverse relationship is particularly striking for the South Western and Central regions where the suicide rates are twice that of the homicide rate and in the North East and Port-of-Spain where the homicide rates are three and four times respectively that of the suicide rates.

This is interesting because this relationship is reflected in many of the social variables that affect these behaviours. It also illustrates the importance of regionalizing data because national reporting would overlook this phenomenon. The variables which significantly show this inverse relationship are population density and alcohol consumption. Therefore, it appears that there are two distinct patterns occurring in the country with different determinants. Within this relatively small population (19), there are two concurrent but opposing models of coping with aggressive impulses and presumably difficult situations.

The correlations for suicide include low population density, poverty as measured by low income, alcohol consumption and East Indian ethnicity. For homicide, high population density and lower marriage rates seem to be associated with higher rates. There is also a trend for school drop-outs to be more strongly associated with homicide rates supporting the notion that education may well be a crucial deterrent to this form of violence (11).

The inverse relationship demonstrated for variables such as alcohol consumption and population density suggests that the variation within the country of homicide and suicide is likely to be mediated by socio-cultural factors. This has been demonstrated in Britain using population density (17) but this is the first study that can point to this divergence in multiple cultural domains. Alcohol being associated with suicide rather than homicide is also somewhat inconsistent with previous reports (21). However, it has been shown that a history of violent behaviour increases the risk of suicide in the context of alcohol use (22).

There were no data to identify previous individual behaviour but this may be an interesting parallel investigation to consider. In Trinidad, it is apparent that people of East Indian origin have greater problems with alcohol use as evidenced by disproportionately high rates of admission for alcohol related psychiatric complaints among this group (23). Ethnicity may therefore be significant only because of its association with residence in low population density *ie* rural

environments and alcohol consumption. These findings warrant further exploration; low income in the context of a more rural lifestyle presumably with a more agricultural type economic activity seems to be more predictive of completed suicide among this population. On the other hand, homicide is associated with a more urban environment where there is less social cohesion and a greater propensity to not complete basic primary and secondary education.

The proliferation of suicide in more rural, agricultural communities and homicide in the urban areas would also invite specific means of intervention.

Poisoning as the main means of suicide might lend itself to the high rates because of easy availability and lax control and supervision in rural communities. More information on lethality of poisons, better economic opportunities and better conflict resolution skills would be useful preventive measures because most suicides occur because of relationship difficulties either between spouses or parents and children. On the other hand, better follow-up of children who are drop-outs from school, improved educational opportunities and diminished overcrowding should improve the homicide rates. Conflict resolution skills also need to be taught because altercations seem to be a major cause of homicidal behaviour suggesting a parallel for the two apparently disparate communities. Homicide and suicide are likely to be valid indices of risk as they reflect fundamental differences between communities yet are closely related because of their impact on mortality and morbidity (17). These have significance for the development policies that many nations engage in as increased urbanization would inevitably lead to high population densities and problems with control of young people. This is reflected in the higher homicide rates among the young. However for suicide, it is relevant for the older adult population which might have similar needs of social support and the need for improved services. Improved social cohesion is therefore indicated in both rural and urban communities.

On the other hand, social cohesion whose absence is manifested in statistics such as high school drop-out rates and low marriage rates may be the key factors for homicide in the areas where the most episodes of this behaviour occur.

The findings on the age-range largely reflect those of the international literature with men in young to middle-adult age group accounting for most of the homicide and the bimodal age distribution of suicide victims (5).

It would be interesting to find proxies to measure the drug use as this has been shown to be the highest risk predictor for death by homicide and suicide among the mentally ill (13). Alcohol consumption may also be a proxy for mental illness.

Ecological studies are always difficult to interpret and draw firm conclusions from because they rely on the reliability of the source data. The Police statistics are certainly the most reliable source available for homicide but the population data used to establish the correlations may not always reflect the reality of individual cases. A major handicap is the absence of mental health related statistics which would certainly be greatly contributory to an understanding of the differences in suicide and homicide as well as point to a role for mental health services in dealing with these problems.

The collected data do not distinguish among age groups greater than 55 years and therefore do not allow a consideration of the effects of older age on suicide.

The strength of the correlations observed suggest that notwithstanding the limitations, there are strong relationships between certain social characteristics and deaths due to homicide and suicide in a developing country that could be used to identify ways and means of intervention. This recalls Durkheim's hypothesis that measures of social cohesion and identity can influence suicide rates suggesting that the collective reality can determine mortality outcomes that might seem to arise solely from individual action (24). The need to regionalize and disaggregate data is important in clarifying these social and demographic associations as national reporting will hide these trends so that social policy can impact directly on mortality and health-related behaviour. Improved social cohesion, alcohol abuse prevention, better education and urban planning might be useful strategies in the efforts to reduce homicide and suicide which are both preventable sources of mortality particularly in the younger age groups for the former and the older age groups for the latter. The growing disparity between gender life expectancy might also be addressed through this means as this may be one factor that is contributing to a higher life expectancy for females worldwide. Social and economic disadvantage and relative inequality could be tackled through more equitable distribution of resources perhaps at the community level. There should also be careful development planning to avoid overcrowding in urban areas with concomitant provision of adequate housing. Social isolation in the more rural areas must also be addressed in community planning.

Interpretation of available statistics and accurate collection of data is also important in the process of development planning and should receive prioritization both in terms of resources and attention.

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