Suicide and attempted suicide in Suriname: the case of Nickerie

Epidemiology and intent

T. Graafsma*, K. Westra** and A. Kerkhof**
*Institute for Graduate Studies and Research (IGSR), *De Bascule, Academic center for Child and Youth Psychiatry Amsterdam, **Department of Clinical Psychology, Vrije Universiteit Amsterdam

Abstract

Background: In the past 15 years, the suicide rate for Suriname almost doubled. The more agricultural districts show the higher rates. Research in the district Nickerie concerning the years 2000-2004 revealed the highest rates of suicide and attempted suicide.

Aims: To present a general overview of suicide prevalence data for Suriname, as well as to provide more detailed follow-up data on suicide rates and characteristics of suicidal behaviour in Nickerie, covering the years 2000-2012.

Method: Descriptive exploratory and epidemiological research on national data, specified for Nickerie. As in 2000-2004, from 2004 to 2012 Nickerie police and hospital registries were studied (suicide: N=161, attempted suicide: N=646). In addition, a sample (N=348) of patients was interviewed about their motives for attempted suicide, using the Suicide Intent Scale (SIS).

Results: The national suicide rate doubled since 2000, far beyond the world average and seems to flatten towards a rate of 27. The suicide rate in Nickerie was high (47/100 000). Unlike the increasing national rate, the Nickerie prevalence rate was fairly stable. For suicide, men were particularly at risk. The male:female ratio was 3:1. Most vulnerable was the East-Asian community. Admissions to the two Emergency Wards in Suriname confirm the overrepresentation of the East Asians in attempted suicide. Pesticide intoxication accounts for more than half of all suicidal behaviours. Data from Nickerie show that most suicide attempts are impulsive actions. Suicidal intent is low to medium. Women attempting suicide score higher on suicidal intent than men.

Conclusions: Compared to the results from previous research, both suicide and attempted suicide rates remain on a very high level. The implications of the study for policy and intervention are discussed.

Key words: suicide, suicide attempt, suicidal behaviour, pesticides, Suriname

Introduction

Worldwide, every year more than 800 000 people die due to suicide. In May 2013, the 66th World Health Assembly adopted the first ever Mental Health Action Plan of the World Health Organization (WHO). Suicide prevention is an integral part of the plan, with the goal of reducing the suicide rate by 10% between 2015 and 2020 (WHO, 2014). In most Western countries, the male-female suicide ratio is 3 to 1, in the low- and middle-income countries the male-female ratio is lower at around 1.5 to 1. For every suicide there are many more people who attempt suicide without death as a result. It is generally assumed that for every suicide at least 10 to 20 non-fatal suicide attempts take place. Stigma attached to mental disorders and suicide, and the fact that in some countries suicide is illegal may influence registration and result in underreporting (WHO, 2014).
Also in Suriname, a low-middle income country, suicide is a serious mental and public health problem. As happened in many countries, over the past 50 years the country faced increasing rates of suicides. Whereas currently the world average is estimated at 12/100,000 (Varnik, 2012), in Suriname, between 2000 and 2012 the suicide rate almost doubled to more than 26/100,000 (Mohan and Punwasi, 2013), putting Suriname in the ten countries (reporting suicide data) with the highest suicide rates (see also Table 1). The male-female ratio is stable at 3:1.

Table 1
Suicide year-prevalence in Suriname

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>6.2</td>
</tr>
<tr>
<td>1976</td>
<td>11</td>
</tr>
<tr>
<td>1981</td>
<td>17.2</td>
</tr>
<tr>
<td>2000</td>
<td>14</td>
</tr>
<tr>
<td>2005</td>
<td>22.5</td>
</tr>
<tr>
<td>2012</td>
<td>26.7</td>
</tr>
</tbody>
</table>

Note: rates per 100,000 inhabitants. Source: Mohan and Punwasi, 2013

The suicide rate in Suriname approximates the suicide rate of neighbour country Guyana, which according to Värnik (2012) is 26, the highest on the South American continent. Recent data from the Guyana National Suicide Prevention Plan 2015 - 2020 show even higher rates: for the year 2012 the suicide rate was 44.2 (Guyana Ministry of Public Health, 2014).

For the Caribbean region, these figures are rather exceptional because in the majority of countries in the region suicide rates are low. For the year 2012 for example Jamaica reports a rate of 1.2. Barbados reports a rate of 2.3 and Haiti reports a rate of 2.8 (PAHO/WHO, 2014). Trinidad and Tobago and Cuba come closer to the world average with suicide rates of 13 and 11.4 respectively (Matthies et al., 2008; WHO, 2014). Interestingly, self-directed violence may be relatively high in Suriname, interpersonal violence in terms of the homicide rate is not. The rate is 5/100,000; the average in the region however is very high: 30/100,000 (see also Matthies et al., 2008; Balraadjsing, 2012; Emmanuel and Campbell, 2012). Jamaica scores highest with a rate of 50 (UNDP, 2012).

Hickling (in Matthies et al., 2008) suggested that the low suicide rates in the Caribbean might be the result of a general tendency among persons in the region to express their anger outwardly (in the form of violence towards others) rather than inwardly (resulting in suicide). Findings by Hutchinson confirmed this for Trinidad but not for Tobago, where both suicide and homicide rates were low (Hutchinson, 2005). Another form of interpersonal violence is violence against an intimate partner - a very common phenomenon in the Caribbean region - as is violence against children (Krug et al., 2002; Pinheiro, 2006; Matthies et al., 2008; Van der Kooij et al., 2015; Mason and Satchell, 2016). Homicides followed by suicides almost always involve conflicts with intimate partners, often in the context of a woman ending a relationship (Roma, 2012; Emmanuel and Campbell, 2012). We think that the relation between homicide and suicide and homicide followed by suicide in the Caribbean region is not well researched and deserves more attention.

For long and as everywhere in the world (see for an overview Pompili, 2010), due to a variety of reasons Suriname did not address the problem of suicide. Some reasons are not specific for Suriname. Many consider suicide an enigma. Suicide attempts were and often still are felt as incomprehensible. Although (following Dutch law) attempting and dying by suicide is not considered a criminal act in Suriname, assisting or encouraging someone to take his or her own life is a criminal act. For most people in a moral and religious sense suicide is prohibited: deciding over life and death is thought to rest in the hands of God. For those who are left behind, the suicide of a beloved person may mean they failed in taking care as a containing environment with intense guilt as a result. For many of those left behind, the burning question that may pre-occupy their mind for years to come is: why? Suicides and suicide attempts also bring about angry reactions. In particular when the attempt is interpreted as a lack of courage as well as desertion. Sometimes however suicide attempts receive respect and even sympathy, for example when they are understood as acts of loyalty or as rescue operations aimed at avoiding traumatizing circumstances like torture, rape or slavery.

More specifically, in Suriname, before the year 2000 research in the area of suicide and suicide prevention was almost non-existent. Only gradually some research could be developed into the prevalence and background of suicidality.
In part this probably is due the general factors described above, but in part also to the fact that in Suriname most people who die by suicide have an East-Asian, Hindustani background.

Such happens in the majority of cases of suicide (East-Asians comprise of 27% of the Surinamese population). This contributed to a silence about the subject, for the Surinamese government traditionally is very careful in avoiding the risk of stigmatizing groups of citizens, in particular ethnic groups. The worsening of the problem over the years however was such that denial could not longer be maintained.

Interestingly, one study reports that in the community of East-Asians already upon arriving in Suriname as indenture labourers (in the period between 1873 and 1917) already then many individuals attempted suicide (Prönk, 1962). Within the East-Asian group, the male-female ratio was very skewed: men were overrepresented (m-f ratio was 4:1). Interpreting the data Prönk reported, at that time the suicide rate within the community probably was at least 32/100 000.

Recent studies (see Hassankhan et al., 2016) describe in depth the adjustment problems and intense suffering brought about by migrating out of the motherland.

### Facts on suicide and suicide attempts in Suriname

**Suicide**

Suriname is with some 541 000 inhabitants (census 2012) the smallest independent country on the continent of South America. The largest ethnic groups in the country are the Creoles/Maroons with historical roots in Africa; the East-Asians with roots in (formerly British) India, mostly from the states of Utr Pradesh, Bihar and surrounding regions; and the Javanese with roots in Java, Indonesia. The original population is almost absent: only three per cent of the population has an indigenous (Amerindian: Arowak, Trio and Cariben) origin. The census 2012 showed the following (see table 2):

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Population Suriname according to ethnicity, in percentages, 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creole/Maroon</td>
<td>East-Asian</td>
</tr>
<tr>
<td>38</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: Menke and Sno, 2016

In the period 2000 - 2013 the number of suicides in Suriname increased steadily and doubled, both for men and women, see Figure 1. The male-female ratio roughly stayed at 3 - 1.

![Figure 1. Suicides in Suriname, absolute numbers, 2000 – 2013.](image)

Source: Mortality data BOG, 2013; Jubithana, 2016

Concerning the division by ethnic groups: most vulnerable is the East-Asian group with a percentage of 62%. A small decrease might be taking place, as well as an increase among Maroons: suicide in the Creole/Maroon group is increasing to almost 27% of the total number in 2013. The male-female ratios (2012 and 2013) within the main two ethnic groups (Creoles/Maroons and East-Asians) show no significant differences from the general trend.

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Suicides in Suriname, main ethnic groups, percentages, 2012 and 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creole/Maroon</td>
<td>East-Asian</td>
</tr>
<tr>
<td>2012</td>
<td>23</td>
</tr>
<tr>
<td>2013</td>
<td>27</td>
</tr>
<tr>
<td>Mean</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: Mortality data BOG, 2013; Jubithana, 2016

When looking at the 10 districts of Suriname: most vulnerable are the more agricultural districts: Nickerie (63% East-Asian), Saramacca (51% East-Asian) and Commewijne (34% East-Asian). Figure 2 shows the district-rates between 2005 and 2009.
In terms of methods: Punwasi (2012) and Jubitana (2016) report for the period 2005-2013 that the methods most used are ingestion of a pesticide or some other chemical (70% of cases), followed by hanging (20% of cases). Pesticides are widely available and accessed easily, in particular of course in the agricultural areas where they are used frequently. Every year Suriname imports tons of pesticides, in particular herbicides like paraquat and glyphosate. Imports of these herbicides are rising. The most lethal of the two, paraquat is used most as a method of ending one’s own life.

In terms of age groups: the number of suicides increases in adolescence and young adulthood, peaks around 37, decreases after people enter their fifties and increases again slowly in seniority (with a male-female ratio changing from 3 - 1 to 4 - 1). Noteworthy here might be that in Suriname euthanasia is prohibited. The situation in Suriname roughly corresponds to what is noticed worldwide: suicide is one of the leading causes of deaths among those in the economically most productive age groups. The low and middle-income countries bear the larger part of the suicide burden. However, they are less well equipped to prevent suicide due to inadequacies in infrastructure and in economic and human resources. Stigma related to suicidal behaviour and suicide remains a major obstacle to suicide prevention and intervention efforts (WHO, 2012).

**Attempted suicide**

Many, and maybe even most suicide attempts do not come to our professional awareness. It is estimated that for every suicide, at least 10 to 20 times - or even more - as much suicide attempts take place, not resulting in death.

Estimations differ - for example because of the definition issue. Does reckless behaviour with a serious chance of dying need to be included? Should self-harm with a serious risk of dying be included?

Or should we include only acts of killing oneself intentionally? We might decide in favour of the latter, but then other questions arise that may be of influence in deciding about in- or exclusion of some behaviour. For example: what is that “intent”? To be dead for example, or to stop thinking or stop mental pain (see in this regard f.e. Shneidman, 1985; Joiner, 2007; Kerkhof and Van Spijker, 2012)? These considerations must warn us that we interpret data on suicide and attempted suicide as well with care (see for other aspects also Shea, 1998).

Neighbour country Guyana reports an estimated ratio of 20 - 25 cases for every suicide death (MOH Guyana, 2014). Suicide attempts causing physical damage and suffering often are presented at an Emergency Department (ED) of a hospital. In general ED’s keep record of such cases. Our data on suicide attempts thus mainly come from the two Emergency Departments in the country. Attempts that do not result in admission to one of the ED’s stay outside formal registration. Poese (2014) reports for the ED of the Paramaribo Academic Hospital for the period 2008-2013 a steady admission of some 630 attempters yearly with a male-female ratio of 1:1.5. About Nickerie and for the same period Graafsma (2014) reported a mean yearly admission of 71 attempters, with a male-female ratio of 1:1.10. Calculating an attempted suicide rate out of these data for the Paramaribo area is difficult because except for the Nickerie district, the ED is the only in the country and in principle services all but one districts. For many emergency cases however, the Paramaribo ED cannot be reached within one hour. Poese (2014) reports that most attempters come from the districts Paramaribo and Wanica. Departing from the number of inhabitants in these two districts (according to the census 2012: 359 000) an attempted suicide rate can be calculated of 176. The actual rate will be higher of course. For Nickerie the attempted suicide rate for the period 2008 - 2013 is 219. For both Nickerie and Paramaribo, the male-female ratios are rather remarkable. They do not conform to the ratio that is generally reported for Western countries on attempted suicide, which is 1 - 3. But they do conform to the ratios for developing countries, which show more equality between both genders.
The case of Nickerie

East-Asians constitute the largest ethnic group in the most western and agricultural district in Suriname, Nickerie. Previous epidemiological research (Graafsma et al., 2006) revealed high suicide rates in this district in the years 2000 - 2004. The suicide rate for this five-year period was 49 per 100,000. Pesticide self-poisoning and hanging were the two methods most used. The Nickerie district is close to the most eastern Guyanese district of East Berbice-Corentyne (region 6), known for its high suicide rate, estimated at 50.8 per 100,000, like Nickerie close to twice the national rate (data MOPH Guyana, 2015).

The use of pesticides in suicide and attempted suicide is a well-known phenomenon in developing agricultural and tropical countries (Gunnel & Eddleston, 2003; Gunnel, Eddleston, Phillips, & Konradse, 2007; WHO, 2009). Easy access to and a wide availability of highly lethal pesticides like paraquat are understood to be major risk factors. The WHO estimates that 370,000 people die of pesticide intoxication yearly, more than one third of total worldwide suicide deaths (Gunnel et al., 2007; WHO, 2009). Pesticides appear to be predominantly associated with impulsive acts of self-harm (WHO, 2009). Data from Graafsma et al. (2006) and later from Van Spijker, Graafsma, Dullaart & Kerkhof (2009) confirmed this for the Nickerie district: most (some 80%) acts of attempted suicide in the Nickerie district were characterized by attempters themselves as impulsive events. We will return to the question of impulsivity in a moment.

We wondered whether the increasing national rate was reflected in the gradient of the Nickerie suicide rate. This and the severity of the suicide problem prompted us to continue the research, accompanied by some tailored forms of intervention: 1) providing psychosocial help to suicide attempters and their families and 2) influencing the attitudes (encouraging stricter legislation included) towards selling, use, storage and disposal of pesticides - both strategies considered to be forms of “good practice” in suicide prevention (see for example Beautrais et al., 2007). The epidemiological study thus aimed to provide follow up data on suicidal behaviour in the district of Nickerie from 2004 to 2012, like before by studying police and hospital registries. In order to offer a long-term overview of suicidal behaviour in Nickerie, some of the findings of the previous study of Graafsma et al. (2006) have been integrated into this report.

Since 2004 additional data has been collected through semi-structured interviews conducted with individuals seen in the Emergency Department of the Nickerie district hospital because of attempted suicide. This data on characteristics, socio-demographic information and motives in attempted suicide might help to identify trends and risk factors. The interviews contained a suicide intent scale to assess the intent (goal, seriousness) of the suicide attempt. The underlying factors of this scale were analysed to gain more insight into the components of suicidal intent within the research sample.

Method

Design

This study was an exploratory epidemiological study, using death registries, police registries and hospital registries to acquire data about the number of suicides, and hospital registries combined with interviews of patients after attempted suicide. All data from the registries were acquired from the Nickerie police department and the Nickerie District Hospital.

Epidemiological data related to suicide and attempted suicide.

In order to determine suicide rates, police registries and hospital records collected from 2004 to 2012 were combined with municipal administration registries. For this period 161 cases of suicide in the Nickerie district were registered. In this report, data from Graafsma et al. (2006) were added, concerning 68 suicides from the four earlier years (2000 to 2003).

In order to determine attempted suicide rates the hospital registry from 2004 to 2012 was used. In this period 646 patients entered the Emergency Department (ED) because of attempted suicide. The data concerning the years 2002 and 2003 have been adopted from Graafsma et al. (2006)\textsuperscript{3}. The total number of suicide attempts from 2002 to 2012 was 796. The data gathered contained information on age, gender, ethnicity and method.

Psychological data retrieved from semi-structured interview

A subsample of 348 ED-patients agreed to be interviewed after attempted suicide, which was almost 50% of all patients entering the ED because of a suicide attempt. This resulted in an extensive dataset collected about characteristics of individuals with non-fatal suicidal behaviour during that timeframe. The patients not interviewed either were sent home before contact with the interviewers was established (often due
to ED work-pressure, frequent changes in ED-staff, unavailability of beds) or refused to disclose their situation and motives, sometimes on advice from family members. Speaking about a suicide attempt still is very much taboo in the community, in particular since family secrets and insurance - or religious problems may emerge. Some selection bias thus cannot not be ruled out. The semi-structured interview contained questions regarding suicidal intent, method, preparations, employment and income, previous suicidal behaviour, family and living conditions, health-care utilization and alcohol and drug usage.

These topics were adapted from the WHO/EURO Multicentre Study on Suicidal Behaviour EPSIS interview (Schmidtke, Bille-Brahe, De Leo & Kerkhof, 2004).

**Suicide Intent Scale (SIS)**

In the interview, eleven items from the Suicide Intent Scale (Beck, Schuyler & Herman, 1974) were asked orally, since many patients were illiterate so that the self-report version was useless. These items were separately analysed using factor analysis as to gain insight into the suicidal intent of patients interviewed. The original scale contained 15 items. Only the interview rated items were used (rated by students who conducted the interview within the hospital setting). The 11 items used in this study were scored with zero, one or two. Higher total scores were interpreted as reflecting a higher suicidal intent. Incomplete cases were left out (list wise deleted). The total number of cases analysed was 166.

**Results**

In the period studied, in Nickerie each year on average 17 individuals died from suicide and 72 individuals consulted the ED because of attempted suicide (see table 4).

**Epidemiological study**

**Table 4**

**Absolute numbers and rates suicides and attempted suicides in Nickerie 2000 - 2012**

<table>
<thead>
<tr>
<th>Year</th>
<th>Suicide Abs</th>
<th>Rate/ 100.000</th>
<th>Att. Suicide Abs</th>
<th>Rate/ 100.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000*</td>
<td>24</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001*</td>
<td>19</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002*</td>
<td>13</td>
<td>35</td>
<td>72</td>
<td>191** based on 37618 inhabitants in the district</td>
</tr>
<tr>
<td>2003*</td>
<td>12</td>
<td>32</td>
<td>78</td>
<td>207**</td>
</tr>
<tr>
<td>2004</td>
<td>20</td>
<td>56</td>
<td>84</td>
<td>233</td>
</tr>
<tr>
<td>2005</td>
<td>24</td>
<td>67</td>
<td>65</td>
<td>180</td>
</tr>
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<td>2006</td>
<td>19</td>
<td>53</td>
<td>76</td>
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<td>2007</td>
<td>13</td>
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<td>2008</td>
<td>13</td>
<td>36</td>
<td>66</td>
<td>183</td>
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<td>2009</td>
<td>24</td>
<td>67</td>
<td>60</td>
<td>167</td>
</tr>
<tr>
<td>2010</td>
<td>18</td>
<td>50</td>
<td>78</td>
<td>217</td>
</tr>
<tr>
<td>2011</td>
<td>17</td>
<td>47</td>
<td>83</td>
<td>230</td>
</tr>
<tr>
<td>2012</td>
<td>13</td>
<td>36</td>
<td>70</td>
<td>194</td>
</tr>
<tr>
<td>Average</td>
<td>17</td>
<td>47</td>
<td>72</td>
<td>199</td>
</tr>
</tbody>
</table>

* From Graafsma et al. (2006)  
** From Graafsma et al (2006), corrected

Different from the national increasing trend in Suriname (100% in 12 years), no rise or fall in suicidal behaviour in Nickerie was observed. The rates per 100 000 inhabitants are 47 for suicide and 199 for attempted suicide respectively (2002 - 2012). The suicide rates for men are four times higher than for women (81 and 20 respectively during the 2004-2012 period). Differences between genders in attempted suicide rates are smaller, with a rate of 192 for men and 207 for women. The male-female ratio here is rather stable around 1:1. The sharp increase in suicides in the year 2009 looks similar to developments described in Europe and elsewhere (see Stuckler, Basu, Suhrcke, Coutts & McKee, 2011; Barr, Taylor-Robinson, Scott-Samuels, McKee &
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Suickler, 2012). However, Suriname at large was not hit by the economic crisis in 2008 that affected so many countries. The economic growth was stable around 4%, mainly due to an increased production of oil and gold. The rice sector (concentrated in Nickerie) showed an overall rise in annual production, also about 4%, but could not compete on the international market and in 2008 got a “negative price” for its products. At that time, Nickerian farmers did face an economic crisis and needed governmental support for survival (Derlagen et al., 2013).

In general, several conclusions can be drawn: a) The suicide rate in the Nickerie district is more than twice the national rate and high; b) compared to the national trend, the rates for suicide and suicide attempts in Nickerie are stable; c) compared to European data (Schmidtke et al. (1996) the rates for suicide attempts in Suriname are not elevated.

**Suicide**

In Nickerie, in the period 2004 - 2012, 161 individuals died because of suicide. On average, 80% of all suicides involved males. In 22% of the suicides the victim was between 16 and 25 years of age. A vast majority (91%) of the suicides involved persons of East-Asian descent. The prevalent methods were pesticide intoxication (51%) and hanging (44%). The mean age of individuals who died due to suicide in Nickerie was 35. Hanging was the most deadly method chosen with a case fatality rate of 1:1.2 (completed suicides (CS): attempted suicide (AS)). The second most lethal method used was pesticide intoxication with 1:4.8 (CS:AS).

**Attempted suicide**

In the period 2004 - 2012 a total of 646 persons was registered as attempting suicide. On average, this equates to 72 attempts each year. Slightly more than half (54%) were females. Similar to the cases of suicide, people who attempted suicide in Nickerie generally belonged to the East-Asian community (85%). Most cases of attempted suicide fell into the 16-25 age category (39%). An average of 8% of the suicide attempts were 15 or younger and 72% were younger than 35 years of age. The method most used was autointoxication by ingestion of a pesticide (mostly paraquat). This accounted for 50% of attempted suicides (321 cases). In a total of 93% of suicide attempts a toxic substance of some sort was used. On average, individuals attempting suicide but surviving were 6 years younger (29 years of age) than individuals whose attempts were fatal (35 years of age).

**Suicide: trends**

We already reported that for this period of time suicide rates in Nickerie were high. In comparison to the other nine districts in Suriname, they were the highest in the country (Algoe and Punwasi, 2013) and fluctuated around a mean of 47, almost twice the current country rate. The suicide male-female ratio tended to be 4:1. No change could be seen in the suicide rate for women, but for men, after the sudden peak in 2009, a decline could be noticed. Whether this will result in a truly downward trend remains to be seen. No significant changes were detected in methods used.

**Suicide attempts: trends**

Rates for attempted suicide fluctuated around a mean of 199, not very unusual and quite stable for both males and females. The male-female ratio resembles the ratios often noted in developing countries. Where for Western countries one would expect a 1:3 ratio, we saw a stable 1:1.5. No essential changes were visible in methods used. The use of pesticides as a method for attempting suicide increased over the past years, the use of hanging decreased (Mohan and Punwasi, 2013).

**Interviews**

*Characteristics of attempters and their suicidal behaviour*

More women (63 %) than men (37 %) could be interviewed. Almost half of them were not married at the time of the suicide attempt. The women interviewed were significantly (t = 2.6118; p<0.01) younger than the men with an average of respectively 25.7 and 29.2 years of age. Both men and women were predominantly from East-Asian descent (around 86 %). For both genders, the most common method in attempted suicide was the ingestion of a pesticide. However the prevalence of pesticide intoxication was significantly higher in men as compared to women, $\chi^2 (1, N= 343) = 25.05, p <.001$. Different from the men (10.2 %), many women (38.4 %) used an overdose of medication in their attempt, $\chi^2 (1, N=343) = 31.53, p <.001$. Female attempters remained in school longer (Mdn = 186.35) than male attempters (Mdn = 149.13), and so they were significantly higher educated, $U = 10832, p = .001$. Of the interviewees, 95 % did not receive any previous help from psychologists or psychiatrists.
Almost half of the interviewed suicide attempters thought their suicidal behaviour in some way could have been prevented. That did not mean however they looked for psychosocial or medical help: many respondents said they would be hesitant to accept such help because of shame. That applied more to the men: only 37% of them would accept available mental health care such as provided by a counsellor, a psychiatrist or a psychologist. Among the interviewed women however, 50% told us that they would have accepted mental help if available.

Around 85% of the suicide attempters stated that they did not plan their suicide attempt, and 82% (both women and men) stated that they acted on impulse. This is similar to what was earlier reported by Graafsma et al. (2006). Differences could be seen in the attitude towards life and death. Almost 40% of women (Mdn = 182.40) reported they had a wish to be dead (expressing a stronger intention of dying), whereas men (Mdn = 151.79) more often did not want to be dead, U = 11149, p = .002. Almost 40% of male attempters ingested some alcohol before attempting suicide; most (95%) women did not. About one quarter of all interviewed suicide attempters (24%) had one or more suicide attempts in their history, but only 5% reported having had contact with a mental health professional. More than half (56%) of people attempting suicide knew someone who had attempted or died by suicide. For an overview of interview results see table 5.

Table 5 Overview of interview results 2004 to July 2013 in percentages of males and females

<table>
<thead>
<tr>
<th>Percentage (%)2004-2013</th>
<th>Male %</th>
<th>Female %</th>
<th>Mean M/F (%)</th>
<th>Percentage (%)2004-2013</th>
<th>Male %</th>
<th>Female %</th>
<th>Mean M/F (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>gender</td>
<td></td>
<td></td>
<td></td>
<td>child below the age of 16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>absolute number</td>
<td>419</td>
<td>216</td>
<td></td>
<td>none</td>
<td>68.2</td>
<td>58.5</td>
<td>63.4</td>
</tr>
<tr>
<td>percentage</td>
<td>37.3</td>
<td>62.7</td>
<td></td>
<td>one or two</td>
<td>15.3</td>
<td>24.0</td>
<td>20.2</td>
</tr>
<tr>
<td>age</td>
<td></td>
<td></td>
<td></td>
<td>more than two</td>
<td>15.5</td>
<td>17.5</td>
<td>16.5</td>
</tr>
<tr>
<td>15 and under</td>
<td>5.3</td>
<td>8.4</td>
<td>11.9</td>
<td>U = 11149, p = .002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:25</td>
<td>39.8</td>
<td>43.2</td>
<td>41.5</td>
<td>religious</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26:35</td>
<td>27.4</td>
<td>19.9</td>
<td>23.2</td>
<td>protestant</td>
<td>7.1</td>
<td>6.0</td>
<td>6.6</td>
</tr>
<tr>
<td>36:45</td>
<td>20.4</td>
<td>13.7</td>
<td>17.0</td>
<td>catholic</td>
<td>4.0</td>
<td>7.0</td>
<td>5.5</td>
</tr>
<tr>
<td>46:55</td>
<td>5.3</td>
<td>4.2</td>
<td>4.8</td>
<td>laotie</td>
<td>12.7</td>
<td>8.8</td>
<td>10.8</td>
</tr>
<tr>
<td>&gt;55</td>
<td>1.8</td>
<td>1.6</td>
<td>1.7</td>
<td>hindu</td>
<td>68.3</td>
<td>66.5</td>
<td>67.4</td>
</tr>
<tr>
<td>average age in years</td>
<td>25.2</td>
<td>25.7</td>
<td>27.5</td>
<td>other</td>
<td>7.9</td>
<td>11.6</td>
<td>9.8</td>
</tr>
<tr>
<td>ethnicity</td>
<td></td>
<td></td>
<td></td>
<td>religious person?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hindustani</td>
<td>88.0</td>
<td>84.0</td>
<td>86.0</td>
<td>yes</td>
<td>82.8</td>
<td>85.6</td>
<td>84.2</td>
</tr>
<tr>
<td>Javanese</td>
<td>4.0</td>
<td>0.0</td>
<td>2.0</td>
<td>preparation suicides attempt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creole</td>
<td>2.4</td>
<td>5.2</td>
<td>3.6</td>
<td>no</td>
<td>87.6</td>
<td>82.8</td>
<td>85.3</td>
</tr>
<tr>
<td>Mix</td>
<td>4.8</td>
<td>9.9</td>
<td>7.4</td>
<td>feelings life and death</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indian</td>
<td>0.8</td>
<td>0.9</td>
<td>0.9</td>
<td>did not really want to die</td>
<td>52.8</td>
<td>36.4</td>
<td>44.6</td>
</tr>
<tr>
<td>method</td>
<td></td>
<td></td>
<td></td>
<td>I did not care</td>
<td>10.2</td>
<td>10.3</td>
<td>10.3</td>
</tr>
<tr>
<td>pesticide / insecticide</td>
<td>70.1</td>
<td>42.1</td>
<td>56.1</td>
<td>I really wanted to die</td>
<td>37.0</td>
<td>33.1</td>
<td>35.2</td>
</tr>
<tr>
<td>overdose medication</td>
<td>10.2</td>
<td>38.4</td>
<td>24.3</td>
<td>Intention of suicide attempt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>alcohol / drugs</td>
<td>0.8</td>
<td>1.4</td>
<td>1.1</td>
<td>I wanted to achieve something from others</td>
<td>31.8</td>
<td>22.0</td>
<td>26.9</td>
</tr>
<tr>
<td>non pesticide into (vaginal / poison)</td>
<td>11.0</td>
<td>13.9</td>
<td>12.5</td>
<td>I wanted temporary esc</td>
<td>12.4</td>
<td>18.1</td>
<td>15.3</td>
</tr>
<tr>
<td>hanging/strangling</td>
<td>0.3</td>
<td>0.5</td>
<td>0.4</td>
<td>I really wanted to die</td>
<td>24.8</td>
<td>39.3</td>
<td>32.1</td>
</tr>
<tr>
<td>drowning</td>
<td>0.0</td>
<td>0.5</td>
<td>0.3</td>
<td>something else</td>
<td>31.0</td>
<td>20.6</td>
<td>25.8</td>
</tr>
<tr>
<td>knife / gun</td>
<td>1.6</td>
<td>0.9</td>
<td>1.3</td>
<td>alcohol / drugs before attempt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>different</td>
<td>0.0</td>
<td>0.9</td>
<td>0.5</td>
<td>no</td>
<td>35.9</td>
<td>94.9</td>
<td>74.4</td>
</tr>
<tr>
<td>danger to life</td>
<td></td>
<td></td>
<td></td>
<td>a little</td>
<td>41.4</td>
<td>2.8</td>
<td>22.1</td>
</tr>
<tr>
<td>non significant</td>
<td>27.4</td>
<td>32.9</td>
<td>30.2</td>
<td>impulsive attempt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>not life threatening but in need of treatment</td>
<td>62.9</td>
<td>60.5</td>
<td>61.7</td>
<td>yes, to make attempt easier</td>
<td>4.7</td>
<td>2.3</td>
<td>3.5</td>
</tr>
<tr>
<td>life threatening</td>
<td>9.7</td>
<td>6.7</td>
<td>8.2</td>
<td>predelus attempts?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>education</td>
<td></td>
<td></td>
<td></td>
<td>yes</td>
<td>84.3</td>
<td>78.7</td>
<td>81.5</td>
</tr>
<tr>
<td>did not finish primary school</td>
<td>46.6</td>
<td>22.7</td>
<td>31.7</td>
<td>predelus attempts?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>finished primary school</td>
<td>21.1</td>
<td>20.4</td>
<td>20.8</td>
<td>yes</td>
<td>21.3</td>
<td>27.3</td>
<td>24.3</td>
</tr>
<tr>
<td>max 3 years of secondary school</td>
<td>21.7</td>
<td>24.1</td>
<td>23.4</td>
<td>knew someone that did attempt?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>more than 3 years of secondary school</td>
<td>15.6</td>
<td>26.9</td>
<td>21.3</td>
<td>yes</td>
<td>61.1</td>
<td>50.7</td>
<td>55.9</td>
</tr>
<tr>
<td>marital status</td>
<td></td>
<td></td>
<td></td>
<td>psychological problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>married</td>
<td>25.6</td>
<td>31.5</td>
<td>28.6</td>
<td>yes</td>
<td>35.7</td>
<td>59.0</td>
<td>47.4</td>
</tr>
<tr>
<td>unmarried</td>
<td>55.8</td>
<td>43.5</td>
<td>49.7</td>
<td>predelus help from psychiatrist?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>divorced</td>
<td>5.4</td>
<td>5.1</td>
<td>5.3</td>
<td>no</td>
<td>95.3</td>
<td>94.9</td>
<td>95.1</td>
</tr>
<tr>
<td>widow</td>
<td>0.8</td>
<td>0.9</td>
<td>0.9</td>
<td>predelus help from psychologist?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>living together</td>
<td>12.4</td>
<td>19.0</td>
<td>15.7</td>
<td>no</td>
<td>98.9</td>
<td>92.2</td>
<td>94.6</td>
</tr>
</tbody>
</table>
Suicidal Intent
The average score on the SIS items in this sample was 7.2 (SD = 4.1). Women scored significantly higher than men (women 7.8; men 6.0; t = 2.8425; p < 0.01). There were no norms available for an incomplete sample of SIS items, but when scores were converted to match the original SIS (corrected for different scoring and number of items) they indicated a low level of suicidal intent for men and a medium level of suicidal intent for women. Of course, these levels are only indicative because of methodological issues. Not only suicidal intent but also motives for the suicidal behaviour were different for men and women. Unlike the women, most men (32 %) wanted to gain something with the suicidal act, suggesting that for a considerable number of men the suicidal behaviour was a form of interpersonal communication and bargaining. Women primarily indicated they wanted to die (39 %), suggesting that following Beck (1976, 1967) - their suicidal behaviour first of all was motivated by a feeling of hopelessness.

The group of girls (below the age of 16) with suicidal behaviour deserves special attention. These girls seemed quite serious in their suicide attempts. They scored equal to women (mean 7.7; SD = 4.2) on the items of the SIS and 28 % of girls even reported previous suicide attempts. They were not yet on the radar of health care professionals in Nickerie: only 1 out of 35 girls who attempted suicide ever received psychological assistance and none of them previously consulted a psychiatrist.

Factor analysis of the Suicide Intent Scale
The structure underlying the 11 items of the SIS was analysed using exploratory factor analysis. The goal was to determine major components among the 11 items. The total number of cases analysed was 166. The reliability of the total scale proved to be sufficient (Cronbach’s α = 0.662; M = 7.2, SD = 4.08; ). Three (unrelated) components were identified: 1) Wish to die, 2) Chance of intervention/help and 3) Amount of preparation/planning. These 3 factors together explained 50.3% of the variance (see table 6).

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feelings regarding life and death</td>
<td>0.974</td>
<td>0.078</td>
<td>0.069</td>
</tr>
<tr>
<td>Intended purpose of attempted suicide</td>
<td>0.694</td>
<td>0.153</td>
<td>-0.050</td>
</tr>
<tr>
<td>Perceived chance of dying</td>
<td>0.517</td>
<td>0.109</td>
<td>0.330</td>
</tr>
<tr>
<td>Presence of person during attempted suicide</td>
<td>0.134</td>
<td>0.669</td>
<td>0.084</td>
</tr>
<tr>
<td>Timing regarding possible intervention</td>
<td>0.166</td>
<td>0.567</td>
<td>0.311</td>
</tr>
<tr>
<td>Contact with helper</td>
<td>0.027</td>
<td>0.421</td>
<td>-0.018</td>
</tr>
<tr>
<td>Measures regarding possible intervention</td>
<td>0.074</td>
<td>0.192</td>
<td>0.470</td>
</tr>
<tr>
<td>Suicide note</td>
<td>0.006</td>
<td>0.039</td>
<td>0.468</td>
</tr>
<tr>
<td>Possible prior plans regarding attempted suicide</td>
<td>0.008</td>
<td>0.203</td>
<td>0.433</td>
</tr>
<tr>
<td>Told plan to others</td>
<td>0.036</td>
<td>-0.058</td>
<td>0.251</td>
</tr>
<tr>
<td>Preparation Attempted suicide</td>
<td>0.176</td>
<td>0.027</td>
<td>0.219</td>
</tr>
</tbody>
</table>
When the scales underlying the 3 factors were analysed, it showed that the reliability for factor 1 was good (Cronbach’s α = .753) and for factor 2 and 3 the internal reliability was reasonable (α = .497 and α = .402 respectively). This implies that conclusions using the items of factor 2 and 3 should be drawn with some care. The scores were the highest on factor 1 (Wish to die; M = 3.47; SD = 2.24) and factor 2 (Chance of intervention/help; M = 2.44; SD = 1.85). Scores on factor 3 proved to be remarkably low (Amount of preparation/planning; M = 1.10; SD = 1.49) which is congruent with the impulsive nature of suicidal behaviour we reported earlier.

We wanted to know how these factors related to other items of the interview conducted in this study. The SIS total score correlated with previous suicide attempts (r = 0.316; sign. <0.01). For the separate SIS-factors, correlations with other aspects of the interview were found. However, these correlations in general were not strong. See Table 7 for details.

### Table 7
**Correlations of SIS-factors with interview variables**

<table>
<thead>
<tr>
<th></th>
<th>SUM factor 1</th>
<th>SUM factor 2</th>
<th>SUM factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wish to die</td>
<td>Chance of help</td>
<td>Preparation</td>
</tr>
<tr>
<td>Needed healthcare after AS</td>
<td>Pearson’s r = 0.008</td>
<td>Pearson’s r = 0.173**</td>
<td>Pearson’s r = 0.016</td>
</tr>
<tr>
<td>Danger to life</td>
<td>Pearson’s r = 0.156*</td>
<td>Pearson’s r = 0.027</td>
<td>Pearson’s r = -0.130*</td>
</tr>
<tr>
<td>Gender</td>
<td>Pearson’s r = 0.012</td>
<td>Pearson’s r = 0.054</td>
<td>Pearson’s r = 0.216**</td>
</tr>
<tr>
<td>Previous attempts</td>
<td>Pearson’s r = 0.172**</td>
<td>Pearson’s r = 0.000</td>
<td>Pearson’s r = 0.321**</td>
</tr>
<tr>
<td>Impulsive AS</td>
<td>Pearson’s r = -0.088</td>
<td>Pearson’s r = -0.025</td>
<td>Pearson’s r = -0.369**</td>
</tr>
</tbody>
</table>

* = sign.<.05 (two-tailed); **= sign.<.01 (two-tailed)

As can be seen in the table, factor 3 (preparation) produced the strongest correlations. It is no surprise that the factor amount of planning/preparation correlated negatively with impulsivity of the attempt. More interesting is the positive correlation between amount of preparation/planning and previous attempts. This suggests more effort in planning in persons who had repeated a suicide attempt. Danger to life is weakly correlated to feelings of life and death, opposite to the total SIS scale, which has no such correlation. The reason for this can probably be found in table 7 as well; the amount of preparation/planning has a striking negative correlation with danger to life found in the interview sample.

As noted earlier in this study, women scored significantly higher on suicidal intent than men. This conclusion matches with the results of the factor analysis. Table 8 shows the means for women and men. The table shows the more deadly intent and greater amount of preparation of women in the sample. The difference between genders on the factor chance of intervention/help is smaller.

### Table 8
**Mean scores of men and women on separate factors of the Suicide Intent Scale**

<table>
<thead>
<tr>
<th></th>
<th>Factor 1 (Wish to die)</th>
<th>Factor 2 (chance intervention/help)</th>
<th>Factor 3 (planning/preparation)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3.10</td>
<td>2.31</td>
<td>0.68</td>
</tr>
<tr>
<td>SD</td>
<td>2.27</td>
<td>1.75</td>
<td>1.12</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3.67</td>
<td>2.51</td>
<td>1.35</td>
</tr>
<tr>
<td>SD</td>
<td>2.22</td>
<td>1.91</td>
<td>1.63</td>
</tr>
</tbody>
</table>
Trends retrieved from the interview
All data available from the interview was searched for changes during the years studied. In general, numbers turned out to be quite stable from 2004 -2012. The interview data shows that the mean age in the sample for both men and woman is stable. However, the underlying distribution among the different age categories in women seems to change. The category under 16 years old is increasing in recent years while the category of women aged 16-25 is decreasing (equal to findings from the hospital records above).

The willingness to talk to a mental health care professional or a counsellor (“if this service would be available”) decreased from around 60% of the patients who were willing to use mental care “when available” in 2004, to only 30% in 2012. This is remarkable, because the availability of mental health care increased during this years, suggesting that the taboo on asking for mental health care is still high. A stable 5% of the interviewed patients received mental health care previous to their current suicide attempt.

Conclusions
Suicidal behaviour is a major problem in Suriname. National data show that the suicide rate increased steadily and momentarily suicide is one of the leading causes of death. Far beyond the world suicide rate, the national suicide rate in Suriname is 26.7 per 100 000 inhabitants (2012). More men than women die by suicide (ratio 3:1). East-Asians, living in the more agricultural areas of the country, are most vulnerable. Although 27% of Suriname’s population is East-Asian, 62% of suicides happen in their communities. Creole and Maroon inhabitants together amount to 38% of Suriname’s population, 25% of suicides take place among them. The main method used (70%) was ingestion of a pesticide, primarily paraquat.

Slightly more women than men attempted suicide: the Emergency Department of the Academic Hospital Paramaribo reports a male-female ratio 1:1.5. Recent impressions suggested that suicide attempts among the Maroons were increasing, among East-Asians decreasing. The main method used was ingestion of a pesticide (38%), followed by ingestion of overdoses medicine (27%) and chemicals, other than pesticides (25%).

Data from the Nickerie district show that suicide is an urgent problem, affecting the community for decades. The 10 years mean suicide rate was 47 with a male-female ratio of 4:1. Again East-Asians were the most vulnerable.

The method most used was autointoxication with a pesticide (primarily the herbicide paraquat; almost 50% of cases). Hanging was the second most used method (44%), followed by ingesting some other substance.

In Nickerie also, more women than men attempt suicide but the ratio is 1:1.10. Ingestion of a pesticide was the method used most (51% of cases), followed by ingesting of another chemical (37%).

Data collected from interviewed suicide attempters should not be taken as representative for those who actually died by suicide. It is widely supposed that the biopsychosocial characteristics of people who die by suicide may be different from those who attempt suicide and survive the attempt. Support for that hypothesis comes from the SIS-results in this study: these showed a low (men) to medium (women) suicidal intent. So our conclusions may be considered applicable to people attempting suicide and surviving that attempt.

To learn more about characteristics and causes of suicide, we need more research using autopsy-information (see Van Spijker et al., 2009).

For attempters, characteristic was the impulsivity as said by most of them and as can be seen from the lack of preparation (see table 5). The question then is of course: was the attempt “irresistible” or did one allow him- or herself to lose control?

The question, although not easy to answer, is important for policy and treatment. In the first case one feels “overwhelmed” (like in a traumatic situation), in the second case indulges in what might be a desire with a specific aim: for example to convince a leaving partner not to do so by threatening to take one’s life. Almost 40% of men took (“some”) alcohol before the attempt, most women did not. In comparison with abstinence, alcohol intoxication increases suicide risk up to 90 times, in particular in combination with impulsivity (see Hufford, 2001). When intoxicated, people are more likely to attempt suicide by using easy to access means that have a very low probability of survival. Suicide prevention among men thus may need a policy directed at restricting access to and use of alcohol.

The ease of access to very lethal pesticides provides every person in pain and despair wishing to end that situation with a powerful tool to do so. In a sense, pesticides are ultimate painkillers - unfortunately they may kill the person also. And as can be seen from the national and the district-data: they are used widely.
Together with its impulsive character and eventually reinforced by ingestion of some alcohol (as to overcome the disgusting smell for example), we find a combination of some very risky conditions. In general, the characteristics uncovered by the interviews do not differ from what we know from other (developing or low-income) countries: many attempters experience extreme poverty; they are involved in family conflicts, socially isolated and low-level educated (sometimes hardly able to read and write), adolescent or young adults. Attempts peak in adolescence and young adulthood, suicides peak some ten years later.

As could be inferred from the interviews, stigma on suicide and eventually on looking for help is still very strong. Suicide is considered a solution (in particular attractive to people who like to be self-reliant); suicidal ideation is not yet considered a warning sign that one has to consult a professional. 

**Discussion**

**Limitations of this study**

Data on suicide and suicide attempts came from the hospital and police registries. Almost half of all persons coming to the Emergency Ward after attempting suicide were interviewed. For a variety of reasons, including that their physical condition did not necessitate it, not all persons attempting suicide came to the hospital. Of those who came, many were reluctant to be interviewed. Experience soon taught us that, when at home again, almost everyone refused to be interviewed. Repression of what happened set in very fast. Patients were therefore interviewed within the hospital setting. Many patients were not at ease with explaining their emotions and motives, although the interview could be conducted in their local language. Distrust of hospital staff in handling confidentiality certainly played a role here. Some selection bias thus cannot be ruled out. With regard to police suicide registration: every death must be registered by a physician and reported to the police. Also in all cases of suspected suicide, police has to be informed. Police registration thus is fairly reliable, although, for example because of stigma, it cannot be ruled out that some deaths by suicide actually are reported to have a different cause and thus are not included in the suicide statistics.

**Strengths of this study**

A strong aspect of this research is that it covers a rather large period. That warrants the conclusion that suicidal behaviour is a serious chronic health problem, in particular in the district of Nickerie. The suicide rate of 47 deaths per 100 000 individuals (Nickerie) is unacceptably high. Comparing the recent data with earlier data (Graafsma et al., 2006), it can be concluded that no indications can be seen of a clear decline in suicidal behaviour in the last decade. That situation makes the implementation of a National Strategy for Suicide Prevention most urgent. The data from this study clearly indicate that something also has to be done on regulation of access and use of the most lethal pesticides. The extent of the use of pesticides reported in this study is even slightly higher than was found earlier (Graafsma et al., 2006). Striking here is the fact that although suicidal intent is low to medium, very lethal pesticides are ingested, maybe exactly because they are so easy to access (this also was suggested elsewhere, for example by Denning, 2000). As stated earlier, the extensive use of pesticides in attempting suicide is consistent with findings in other studies (for example Gunnell et al., 2007; Cha, 2016) investigating suicide in agricultural areas in developing countries and, as in Nickerie, in particular among people from East-Asian, Hindustani descent.

Many questions remain of course. There is the question “why did she or he do it?” both on an individual level and at the level of the community. Are East-Asians, Hindustani more than other ethnic groups vulnerable for suicidality? Do biological, genetic factors exert some influence? Besides, could culture exert influence, for example through social learning and the mass media? Do we need an ecological model indeed to account for the interplay between many risk factors? And then there is the finding that impulsiveness in terms of a lack of plan and preparations characterizes so many suicide attempts. Does this refer to problems in self-regulation as Baumeister (1999) suggested? Or is this impulsiveness essentially related to rebellion, to liberation from the constraints of the family and all its intricacies and dependencies - like in the case of Mahatma Gandhi as a young man?

Gandhi reports suicidal ideation together with a friend because the:

“...lack of independence was intolerable. Even death was preferable. They decided to commit suicide, made a suicide pact, sealed it by a visit to the Kedarji Mandir, lighted a light to the deity to bless their enterprise, and proceeded to a lonely spot with the seeds of the poisonous dhatura (belladonna) in their pocket. They swallowed a
few seeds each. But then their courage deserted them” (Erikson, 1969, p. 134).

**Prevention**

The conclusions and the discussion of results point in several directions that may help reduce and prevent suicide.

Most urgent is the restriction on access to pesticides. Graafsma et al. (2006) already recommended the control/limit of access to pesticides. Yip, Caine, Yousuf, Chang, Chien-Chang Wu, and Chen (2012) showed this could be effective. Even when means substitution occurs, the outcome is often less lethal and in some cases suicidal behaviour is even completely prevented.

It is generally believed that suicidal impulses are often short lived. So if time can pass by making means of suicide less readily available a proportion of suicides could probably be prevented (Gunnell & Eddleston, 2003; Cha, 2016). Vijayakumar & Sateesh Babu (2009) performed a small-scale experiment in four villages in India with promising results. They reported a significant decrease of suicide deaths from fourteen to three after the villagers stopped using chemical pesticides.

Research elsewhere also shows that restriction of access to pesticides may reduce suicide substantially (see also Hutchinson et. al, 1999; Gunnell & Eddleston, 2003; Gunnell et al., 2007; Mishara, 2007; Cha et al, 2016). Cha et al. (2016) recommend that restriction of access is accompanied by legislation that can be controlled.

To conclude: banning the most lethal pesticides should be considered first. We have to remain aware of course, that such “technical” measure does not address the psychological causes of suicidality and the motives involved, nor does this alleviate the suffering of those who are left behind.

As a second preventive measure access to primary mental health care is to be promoted. The finding in Nickerie that almost no suicide attempter is using mental health care has to result in a public health campaign aimed at enhancing knowledge about mental health care and fighting stigma on mental health problems.

A third preventive measure is to involve large-scale participation of people through a public health approach and offering them educational programs, for example in pesticide control. Educating (primarily) young people in another matter: interpersonal conflict resolution, maintaining and safeguarding reciprocity and connectedness, might be a good investment in future family health.

Like in other developing and low-income countries many - if not most - suicide attempts in Nickerie follow crises in interpersonal relationships.

A fourth preventive measure was proposed by Gunnell et al. (2007) and also by Mishara (2007). They suggested that much can be gained in the area of suicide prevention with improved awareness in primary health care, for example by means of “gatekeeper” training activities for health care professionals like physicians, as the strongest factor associated with suicide is a history of attempted suicide (Hawton and Van Heeringen, 2009).

A fifth preventive measure could be directed to alcohol abuse and alcohol dependency. Restriction of access to alcohol might be a promising policy.

Recently, the Surinamese government adopted a National Suicide Prevention and Intervention Plan (June 2016). This is a major step forward, for example because it provides for coordination and monitoring of preventive actions. The Strategy contains valuable recommendations and uses suggestions from the WHO Preventing Suicide Plan (2014). Yet: many steps still have to be made.

**References**

Algemeen Bureau voor de Statistiek (General Bureau of Statistics), 2006/2012. Paramaribo: ABS.


Overcoming barriers: Human mobility and development. New York: UNDP.


1 For more on the relation between violence and suicidality see for example Van Dulmen et al. (2013).
2 On July 1, 1863, the Dutch abolished slavery in Suriname.
iii Where currently suicide rates are far lower than the India national average.
iv For a detailed discussion on the categories “Creole” and “Maroon”: see Menke and Sno (2016, p. 105 - 126).
v In Suriname, all deaths where suicide is suspected have to be reported to police. This obligation applies also to attempted suicide, although in practice that does not happen anymore.
vi No data on attempted suicide were available for the years 2000 and 2001, since registration of attempts started in 2002.
vv Notably, paraguay is loosely called a “medicine”.
vi Current, a public health program related to environmental and occupational health is conducted in a collaboration between the Tulane University School of Public Health and Tropical Medicine (New Orleans, US), the Regional Health Care center Nickerie (RGD), the Academic Hospital Paramaribo and the Anton de Kom University of Suriname. A part of the program promotes awareness, safe storage and safe use of pesticides through a tailored community based participatory intervention.