Abstract

With the increase of life expectancy in the world and also in Suriname the existence of centenarians is not so rare like in the past. Suriname with a population of about 575000 inhabitants in 2015 presents in that year 36 registered centenarians, whereby 2 were super centenarians. In the same year the death registration of 8 death centenarians occurred. This study focuses on the determination of the probability of dying of centenarians in the period 2000-2015, based on the civil registration of the alive and death centenarians. The methodology that will be used to determine the death probability of centenarians in the last years is the poisson distribution. The correction factor of the General Growth Balance is applied to correct the registration of Centenarians. Descriptive data on the alive and death centenarians will also be presented. As in all societies more female death of centenarians occurs.

Keywords: Centenarians, death of centenarians, Suriname
Introduction

In Suriname the population of the eldest of the elderlies is increasing and thus meaning that the centenarian population also increase. The male and female population of P95+/P70+ increased from Census 2004 to Census 2012 respectively, by 28.88% and 5%. However, in Census 2012 there were 10 female of 95+ in one hundred female of 70+, while there were 6 male of 95+ in one hundred of male of 70+.

The ageing index of the population in Suriname can be considered moderated (UNFPA (World population prospects, 2015)). According to the General Bureau of Statistics in Suriname the ageing index $^{1}$ and the old age dependency ratio were 0.28 and 0.12, respectively in 2014. The population of 60 years and older was 11.09% in 2014.

Male and female population of 80 years and older increased from 2000 to 2015, respectively with about 41 % and 59 %. There were 22 registered centenarians with a Surinamese nationality in the year 2000. In 2015 there was an increase of 68.18% of registered centenarians (37) with a Surinamese Nationality. Regarding the centenarian death count data there was an increase from 4 deaths in 2000 to 12 deaths in 2015. In the period 2012-2015 there were on average 2 registered super centenarians.

Scholars as Coale and Kisker1986, Kannisto 1998, Preston, Elo, and Stewart 1999, Thatcher, Kannisto, and Andrew 2002, argue that in many populations data at older ages may have some problems. Therefore, it is important to stress that the quality of registered centenarians and registered death count data of centenarians in Suriname is not tested on the validity of the presence of centenarians.

Completeness of death registration for the period 2004-2012 may be considered as an indicator that there may exist registered centenarians and death of centenarians which were not a centenarian. Completeness of death registration for Suriname was

\[ \text{Ageing Index} = \frac{\text{Pop}_{65+}}{\text{Pop}_{0-14}} \]

$^{1}$
in the range $0.8780 – 1.2139$ for male and $0.9283 – 1.1821$ for female population, depending on the applied Death Distribution method, considering age segments including and excluding peak migration (Jubithana, 2016). The objective of this study is to determine probability of dying of centenarians for male and female population in the period 2000-2015.

**Data**

Registered death count data of centenarians and data of the alive centenarians is from the Bureau of Citizen Issues of the Ministry Internal Affairs of Suriname. Population data of census 2004 and 2012 is from the General Bureau of Statistics (GBS)

**Methodology**

The fact that, the event “the presence of Centenarians” can be considered to be an occurrence over a specified interval of time or space the Poisson distribution will used to analyse the occurrence of death for male and female centenarians for the period of 2000-2015. In order to apply the Poisson distribution (Bowerman and Connell, 2003) two assumptions need to be made:

1. The probability of the events occurrence is the same for any two intervals of equal length
2. Whether the event occurs in any interval is independent of whether the event occurs in any other no overlapping interval

The probability that the event will occur \( x \) times in a specified interval is:

\[
P(x) = \frac{e^{-\mu} \mu^x}{x!} \quad (I)
\]

The assumption is that the average number of death for male and female population is the average of the registered number of deaths of centenarians in 1000 Centenarians for the period 2000-2016, by sex. In other words, the calculation of the average number of death is a age group specific death rate of centenarians (ASDC) for the period 2000-2015.
The value of ASDC is divided by 16 in order to determine the average or expected deaths $\mu$ per year. In this study the interval is every year. Based on the Poisson distribution the yearly probabilities of dying of centenarians for the period 2000-2015 will be calculated.

For each year the probabilities of the event “The death of a Centenarian” will be calculated for male and female population for Suriname and its main regions. The distribution of the number of deaths for male and female population will used to calculate the probabilities of dying of centenarians in the different central regions of the country. In order to provide more unbiased data on centenarians, the registered data of centenarians will be estimated by using the factor of relative completeness between Census 2004 and 2012 after the application of the General Growth Balance method. Death count data on centenarians will not be corrected, considering the fact that: 1) the centenarian data will already be corrected; 2) the civil registration system is reasonable to good. The description of the death count data of centenarians will be done with the use of demographic methods and descriptive statistics.

**Preliminary Results**

Preliminary results on registered death of centenarians show that as expected more female than male deaths occurred for the period 2000-2015 (see figure 1). In some years the registered centenarians deaths are two to three times more for female than male (2001, 2002, 2006, 2007 and 2010).

Figure 2 shows the sex ratio’s and average sex ratio of registered centenarian’s death. The data shows that for the period 2000-2015 on average in two female centenarians one male centenarian died.
A relevant finding on the data of registered centenarians is that in some districts for the period 2000-2016 no death of a centenarian was registered. It is remarkable that in district Sipaliwini (rural interior) with a population of about 37065 habitants the second highest number of registered centenarians were observed for period 2000-2015. The capital district Paramaribo with about 240924 habitants in Census 2012 has the highest number of registered centenarians.