Original Research Article

Sex-Ratio and Average Age of Deceased Persons in the Town of Kananga, Commune of Ndesha

Shamashanga Mingashanga[1], Kadiata Bukasa Augustin[2*], Mangbala Ekibe Didier[2], Mukandu Basua Babintu Leika[2]

[1]Section of Nursing Sciences, Higher Institute of Medical Techniques of Kananga, Democratic Republic of Congo
[2]Section of Nursing Sciences, Higher Institute of Medical Techniques of Kinshasa, Democratic Republic of Congo

*Corresponding author: Kadiata Bukasa Augustin
Section of Nursing Sciences, Higher Institute of Medical Techniques of Kinshasa, Democratic Republic of Congo

Abstract

Introduction: This study aimed to determine the sex ratio and the average age of deceased persons in the town of Kananga, commune of Ndesha. ***Method:*** This is a cross- sectional descriptive type study, we used the documentary analysis method to collect the data and had a sample of 269 deaths notified to the Civil Registry between 2018 and 2020. ***Results:*** The crude mortality rate (CBR) in the commune of Ndesha is estimated at 0.044% or 4.4 deaths per 10,000 inhabitants between 2018 and 2020. This rate has decreased very slightly over time, from 3.5 per 10,000 in 2018 to 4.8 per ten thousand in 2020. The age group 0-14 is the most affected, with 108 cases or 34.2%; those from Demba (with 30.9%) and Dibaya (with 26.4% of cases) are the most represented. The male gender represents 64.3% of cases against 35.7% of female subjects; the sex ratio is 1.8 men who die for every 1 woman. The average age of the deceased subjects is 38.7 years, with a standard deviation of 27.8: it is therefore dispersed between 10.9 and 66.5 years. ***Conclusion:*** The inhabitants of the commune of Ndesha do not register their deaths with the civil status service of the commune. For this, we recommend to the municipal authorities to impose on the population the death certificate when a family member is dead to allow the country to have a mortality statistics.
Keywords: Sex-ratio, average age of death, Ndesha commune.

INTRODUCTION

According to the World Health Organization (WHO, 2001), the mortality rate is an excellent indicator of the state of health of a population and more particularly of the quality of care.

These indicators obtained from mortality rates give a good idea of the general state of health of populations. They include infant and child mortality (probability of dying before the age of 1 and before 5, respectively), adult mortality (probability of dying between the ages of 15 and 60) and life expectancy at birth (WHO, 2009).

Mortality estimates are based on death registration data reported to it. For countries where these records are unavailable or of poor quality, survey or census data is analyzed and used to generate life tables for each country. Countries with low life expectancies invariably have high child mortality rates. For example, life expectancy at birth in the WHO African Region was estimated at 52 years in 2007, compared to 76 years in the WHO Region of the Americas. Child mortality is 145 per 1000 live births in the first region and 19 per 1000 in the second (WHO, 2009).

In the Democratic Republic of Congo (DRC), the crude mortality rate (TBM) is 8.37‰ in 2020 against 13.62 in 2000, i.e. a decrease of 5.25‰ or 52.5% in 21 years (CIA World Factbook - 2020 version).

The available data also show that in the DRC, the male/female sex ratio in 2018 is 1, for a total population (i.e. 100 men/100 women). But it is 1.03 at birth, 1.01 from 0-14 years, to drop to 0.74 men/women at 65 years and over (National Program for Reproductive Health or PNSR -RDC, 2020).

According to Index Mundi (2020), the infant mortality rate in the DRC is 66.7 deaths per 1000

normal births in 2018, with 70.1‰ in men and 63.1‰ in women.

For its part, the WHO (2020) notes that there is an essential decrease in mortality after 65 years, with the average age of 85 years for women compared to 78.9 years for men. This organization concludes that, despite the efforts made, the mortality rate remains a global problem.

According to the Report of the United Nations Program for Human Development (UNDP, 2015), life expectancy in the DRC is 51 years for men and 54 years for women. Indeed, the progress observed since 2011 shows that the Democratic Republic of Congo gains an average of 4 months in life expectancy each year, i.e. one year every three years. At the same time, the crude mortality rate fell from 15.96 per 10,000 inhabitants in 2011 to 15.16 in 2014. This proportion of the death rate remains advocated by a sickly state of health due to poor quality of care health and malnutrition (PNDS, 2020).

In Kasai Central in general, particularly in the city of Kananga, the sex ratio and the average age of death are not known: the burial of the deceased is often done without obtaining a death certificate, which raises problem of identifying these very important parameters.

It has been shown that despite the various studies on the validity of knowledge of the mortality rate, the average age of death remains a prior public health problem affecting the summit of a nation (Mukala Erick, 2020).

In addition, the adult mortality rate is a key indicator of the health status of a population and an indicator of development (Coulibaly DS, 2017).

This is why we initiated this study to determine the sex ratio and the average age of the deceased in the town of Kananga, commune of Ndesha. This will contribute to improving the health situation of local populations through knowledge of these crucial health indicators.

2. METHODS AND MATERIALS
2.1: Study Environment and Research Specifications

The study was conducted in the province of Kasaï, city of Kananga, and more precisely in the commune of Ndesha.

The estimate of this work calls for a quantitative study of the transverse descriptive type with a retrospective aim which is part of the field of public health.

2.2. Study Population and Sample

For this present study, the target population consists of all people who died in the commune of Ndesha from 2018 to 2020, regardless of their gender and age.

In order to collect reliable data related to the study, we used non-probability convenience sampling, given that we only considered the data notified in the civil status archives.

Thus, we recorded a sample size of 235 people who were recorded as deceased in the archives made available to us. These subjects met the following inclusion criteria:
- ✓ Living in the commune of Ndesha.
- ✓ Have been registered in the Civil Registry of the municipality as having died.
- ✓ Have been well notified in these archives.

2.3 Data Collection

We used the documentary analysis method. This consisted of collecting the necessary data in the civil status registers, therefore using the secondary data as notified in the sections of the registers of 2018, 2019 and 2020.

To do this, we used, as a measuring instrument, a survey sheet made on the basis of the headings of the registers of the municipality.

2.4 Data Analysis

The data collected were analyzed and processed, then entered into Ms Word, and analyzed on Ms Excel 2010 to determine the average age of death, SPSS 20 software for descriptive analyses. The results are presented in the tables and interpreted in the discussion.

3. RESULTS

Table 1: Annual prevalence of mortality from 2018 to 2020

Year	Total population	Number of registered deaths	%	out of 10000
2018	235540	82	0.035	3.5
2019	184207	93	0.050	5.0
2020	195192	94	0.048	4.8
Total	**604939**	**269**	**0.044**	**4.4**

It appears from this table 1 that the estimated overall mortality rate in the municipality of Ndesha from 2018 to 2020 is 0.044% or 4.4 deaths per 10,000 inhabitants.

This rate has increased over time, from 3.5 per 10,000 in 2018 to 4.8 per ten thousand in 2020.

Table 2: Socio-demographic characteristics of people who died in the past 3 years (n=269)

Variables	Categories	Frequency	%
Age	0 – 14 years old	92	34.2
	15 – 29 years old	21	7.8
	30 – 44 years old	40	14.9
	45 – 59 years old	31	11.5
	60 – 74 years old	50	18.6
	75 – 89 years old	35	13.0
Average age	**38.7 ± 27.8 years**		
Territory of origin	Demba	83	30.9
	Dibaya	71	26.4
	Dimbelenge	21	7.8
	Kazumba	44	16.4
	Luiza	7	2.6
	Kananga	25	9.3
	Others	18	6.7
Sex	Male	173	64.3
	Feminine	96	35.7
Sex ratio	**M/F**	**173/96**	**1.8**

This table shows that: The age group 0-14 is the most affected, with 83 cases or 34.2%, but the average age of the deceased is 38.7 ± 27.8 years : it is therefore dispersed between 10.9 and 66.5 years. People from Demba (with 30.9%) and Dibaya (with 26.4% of cases) are the most represented; the male sex represents 173 cases or 64.3% against 35.7% of the female subjects; the sex ratio is 1.8: individuals of the male sex are 1.8 times more affected than those of the female sex.

Table 3: Association between sex and other characteristics (territory of origin, age and year of study)

Variables	Categories	Sex of subjects						Statistical parameters		
		Male		Feminine		Total				
		not	%	NOT	%	not	%	x^2	dl	p
Territory of origin	Demba	55	66.3	28	33.7	83	30.9	13.7907	6	0.0321 S
	Dibaya	49	69.0	22	31.0	71	26.4			
	Dimbelenge	12	57.1	9	42.9	21	7.8			
	Kazumba	21	47.7	23	52.3	44	16.4			
	Luiza	6	85.7	1	14.3	7	2.6			
	Kananga	21	84.0	4	16.0	25	9.3			
	Other	9	50.0	9	50.0	18	6.7			
Age (years)	0 – 14	49	53.3	43	46.7	92	34.2	9.9303	5	0.0772 NS
	15 – 29	14	66.7	7	33.3	21	7.8			
	30 – 44	29	72.5	11	27.5	40	14.9			
	45 – 59	20	64.5	11	35.5	31	11.5			
	60 – 74	33	66.0	17	34.0	50	18.6			
	75 – 89	28	80.0	7	20.0	35	13.0			
Year of study	2018	50	61.0	32	39.0	82	30.5	1.0115	2	0.6031 NS
	2019	59	63.4	34	36.6	93	34.6			
	2020	64	68.1	30	31.9	94	34.9			

This table 3 shows that male subjects die more than female subjects in all the territories, except in the territory of Kazumba and those of other provinces where there is almost equality between them. With regard to age brackets and years of study, men are more affected than women in all categories of these variables.

DISCUSSION

Our results show that the estimated overall mortality rate in the municipality of Ndesha from 2018 to 2020 is 0.044%, or 4.4 deaths per 10,000 inhabitants. This rate has increased over time, although up and down, going from 3.5 per 10,000 in 2018 to 5 per ten thousand in 2019, to drop to 4.8 per ten thousand in 2020. So mortality in the municipality of Ndesha, at least for the codified data, increases over time.

Compared to other studies, this crude mortality rate (CDR) is very low: it therefore does not reflect reality given that most people do not declare the death of their loved ones to the Civil Registry, hence the need to carry out such a study differently, for example by going to cemeteries and considering an entity much larger than a municipality. Indeed, according to the World Bank (quoted by Perspective Monde on

September 16, 2021), the crude death rate (CDR) in the United States of America was 8.7 per thousand (8.7‰) in 2019.

In 2019, the TBM was 10.4‰ in the European Union area, including 11.3 in Germany, 9.5 in Belgium, 9.1 in France and 6.3 in Ireland (Institut National d'Etudes Démographiques, INED-2020).

Table 2 of our study shows that 64.3% of the deceased are male, compared to 35.7% of the female subjects. With a sex ratio M/F of 1.8. This indicates that in our study environment, men die more than women: for a woman who dies, there are 1.8 men. This report, with regard to mortality, corroborates all the studies on this subject.

As an indication, a study carried out in a sample of cemeteries in Central and Northern Europe, where out of 2161 adult individuals buried in 29 cemeteries dated from the 6th to the 15th century, the number of men significantly exceeded that of women, with an average sex ratio of 169 men for 100 women. Whereas we are at 180 men for 100 women.

The fact that male subjects are more likely to die than female subjects can be explained by an appropriate study.

Compared to the average age of the deceased, the age group from 0 to 14 is the most affected, with 83 cases or 34.2% of deaths. Children are therefore more vulnerable to the causes of mortality than young people and adults. This is because diseases such as malaria, typhoid fever and other diarrheal diseases, acute respiratory infections and neglected tropical diseases kill children more than adults, since the immune status of children is not still mature and solicited like that of young people and adults.

The mortality rate decreases significantly from 34.2% in subjects aged 0 – 14 years, to 7.8% in young people aged 15 – 29 years. Then, it increases to 14.9% at 30 – 44 years old, drops to 11.5% in subjects aged 45 – 59 years old, to increase to 18.6% at 60 – 74 years old to decrease to 13% in old people 75 – 89 years old. So between ages 15 and 89, the mortality rate evolved in a zig-zag, or jagged direction, not approaching that of the modal class (0 – 14 years). But table 3 indicates that the mortality of the subjects according to their sex is not related to their age: therefore, in almost all the age groups the men are more numerous than the women: $X^2 = 9.9303$, dl= 5 and p=0.0772.

On the other hand, Table 4 shows that the average age of deceased persons is 38.7 ± 27.8 years: it is therefore dispersed between 10.9 and 66.5 years. This dispersion means that in all sexes mortality is highest between 11 and 67 years, with an average of about 39 years.

Therefore, the mortality rate essentially decreases from the age of 67. This corroborates the estimate of the WHO (2020) which had found that there is an essential decrease in mortality after 65 years.

But for the WHO (2020), the average age is 85 years for women compared to 78.9 years for men. While in our study, the average age of deceased male subjects is 41.8 ± 28.0 years (dispersed between 13.8 and 69.8 years), against 32.7 ± 27.1 years (dispersed between 5,6 and 59.8 years) in female subjects. This means that, in our study environment, women die earlier (32.7 years) than men (41.8 years). This can be explained by the fact that women who are of childbearing age have additional causes of mortality than men, especially causes related to maternity function.

Among the deceased, 30.9% are from Demba, 26.4% from Dibaya, 16.4% from Kazumba, 9.3% from Kananga, 7.8% from Dimbelenge, 2.6% from Luiza and 6.7% subjects are from other provinces of the DR Congo. We believe that this distribution is linked to the distribution of the natives of these places in the commune of Ndesha. Another study can look for the correlation between the mortality rate and the ethnic origin of the subjects.

In addition, there is a significant association between the mortality rate according to the sex of the subjects and the territory of origin: male subjects dying more than female ones in almost all territories (X2= 13.7907, dl = 6 and p = 0.0321).

CONCLUSION
In Ndesha commune, Kananga town, the crude mortality rate (CDR) in Ndesha commune is estimated at 0.044 % or 4.4 deaths per 10,000 inhabitants between 2018 and 2020, and the sex ratio is 1 .8 men who die for every 1 woman.

We believe that this study showed a weakness insofar as it did not consider the data from the cemeteries given that not all the inhabitants have their dead registered at the civil status service of the municipality. For this, we recommend to the municipal authorities to impose on the population the death certificate when a family member is dead to allow the country to have a mortality statistics.

REFERENCES
- CIA World - Factbook , Cited by Index Mundi (2020). Historical charts of mortality: Data year by year. Available at www.inexmundi.com//g/g.asp ...
- Coulibaly, D. S., Kodio, S., Samake, D., Konaté, I., Sangare, D., Cissé, L., Coulibaly, K., Diallo, M. S., Camara, B. D., Sissoko, M., Traoré, D., Diallo, M., Dao, S., & Fongoro, S. (2020). Causes of Death of Patients Hospitalized in the General Medicine

Department of Nianankoro Hospital Fomba de Ségou from 2016 to 2017. *Health Sciences and Diseases*, 21(5). Retrieved from https://www.hsd-fmsb.org/index.php/hsd/article/view/1965

- GuilmotoChristoph, Z. (2009). The Sex-Ratio Transition in Asia. *Population and development Review,* 35, 3, 519-549. www.geoconfluences.ens-lyon.fr .

- Index Mundi. (2020). Democratic Republic of the Congo: Population Profile. On www.indexmundi.com/fr/republique_democratique_du_congo/population_profil.html

- INSEE first. (2011). Demographic balance sheet. The French population reaches 65 million inhabitants. No. 1332-January 2011.

- National Institute for Demographic Studies (INED-2020). Birth rate, mortality and infant mortality. Information letter. www.ined.fr/fr/tout-savoir-population/figures/europe-pays*developpes/natalite ...

- Irene, Barbiera (2012). Sex ratio and female mortality in the Middle Ages in Italy. 124-2 |2012: Mediterranean rural elites in the Middle Ages Varia - Crossed perspectives. https://doi.org/10.4000/mefrm.733 .

- Montell Christian and Isabelle Robert- Bobee . INSEE Première, N° 1025. Social differences in mortality: increasing among men, stable among women 2005.

- Mrabet, M. (2021). Measurements in epidemiology. Unpublished. Morocco.

- WHO (2001). Introduction to basic epidemiology and statistical principles for tropical disease control. Part I: Trainee's Guide. Communicable Diseases Division. Geneva, June 2001.

- WHO (2015). World health statistics. Unpublished, Geneva.

- WHO (2017). Causes of death around the world . Press release. Unpublished, Geneva. https://www.who.int/en/news/item/17-05-2017-almost-half-of-all-deaths-now-have-a-recorded-cause-who-data-show

- WHO (2020). Leading causes of death and disability worldwide: 2000-2019. 9 Press release of the month December 2020. https://www.who.int/fr/news/item/09-12-2020-who-reveals-leading-causes-of-death-and-disability-worldwide-2000 -2019

- Ouédraogo, S. M., Djibril, M. A., Kyélem, C. G., Ouily, S., Ouédraogo, M., & Millogo, A. (2015). Pathologies in internal medicine: Case of Burkina Faso. In *Mali Med*, 30(2), 11-12.

- World Perspective (2021). Crude death rate per 1000 population – United States. www.usherbrooke.ca_B ...

- PNDS (National Health Development Plan DRC, 2020). Towards universal health coverage. Unpublished, Kinshasa.

- PNSR-DRC (2020). Family planning in the DRC. Available at www.planification-familiale-rdc.net

- Rasamoelina. (2009). Factors of mortality by digestive emergencies in the intensive care unit of the CHU of Fianarantsoa Madagascar. *Review of Anesthesia-Resuscitation and Emergency Medicine 2010 (March-April),* 2(2), 10-11.