Mortality in Women of Reproductive Age: A Comparative Study Between Two Periods

Mortalidade de Mulheres em Idade Reprodutiva: Estudo Comparativo Entre dois Períodos

La Mortalidad en las Mujeres en Edad Reproductiva: Un Estudio Comparativo Entre los dos Períodos

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ABSTRACT

Objective: The purpose has been to identify socio-demographic factors associated with mortality in women of reproductive age in the *Paraná* State from 1996 to 2012. **Methods:** It is a descriptive and cross-sectional study with an ecological approach. Data were collected through the mortality information system and processed by the Chi-square test for association. **Results:** There was a reduction in the prevalence of deaths in women of reproductive age over the period considered, from 17% to 13.2%, respectively. The leading causes of death for both periods occurred from preventable causes being the main underlying causes external ones, such as cancer, heart disease and circulatory system. **Conclusions:** The results supported that deaths in women of reproductive age are preventable with the introduction of social actions, as well as early diagnosis and treatment. The mortality pattern in the *Paraná* State is similar to the country, which points to the need of implementing actions towards all three government levels focused on the female population health.

Descriptors: Women's Health, Death Causes, Mortality, Public Health.

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RESUMO

Objetivo: Identificar os fatores sociodemográficos associados com a mortalidade de mulheres em idade fértil do Paraná nos períodos de 1996 e 2014. **Método:** Trata-se de um estudo ecológico transversal descritivo com dados coletados por meio do Sistema de Informação de Mortalidade e processados pelo teste de associação qui-quadrado. **Resultados:** Houve uma redução na prevalência de óbitos das mulheres em idade fértil nos períodos, de 17% para 13,2%, respectivamente. As principais causas de morte para ambos os períodos ocorreram por causas evitáveis sendo as principais causas básicas as causas externas, neoplasias, doenças cardíacas e do aparelho circulatório. **Conclusões:** Os resultados contribuíram para mostrar que as mortes de MIF são evitáveis a partir da introdução de medidas sociais e de diagnóstico e tratamento precoce. O padrão de mortalidade do estado é semelhante ao do país apontando necessidade de implementar ações nas três esferas de governo voltadas para a saúde da população feminina.

Descritores: Saúde da Mulher, Causas de Morte, Mortalidade, Saúde Pública.

RESUMEN

Objetivo: Identificar los factores sociodemográficos asociados a la mortalidad de las mujeres en edad fértil de Paraná entre 1996 y 2012. **Método:** Estudio ecológico descriptivo transversal, con los datos recogidos a través del Sistema de Información sobre Mortalidad y procesados por la prueba asociación Chi-cuadrado. **Resultados:** Hubo reducción en la prevalencia de las muertes de mujeres en edad fértil en el período, del 17% al 13,2%, respectivamente. Las principales causas de muerte para ambos períodos se produjo por causas prevenibles siendo principal causa subyacente causas externas, cáncer, enfermedades del corazón y el sistema circulatorio. **Conclusiones:** Las muertes del MIF son prevenibles con la introducción de medidas de carácter social y el diagnóstico y tratamiento tempranos. El estado del patrón de mortalidad es similar a la de la nation que señalan la necesidad de implementar acciones en los tres niveles de gobierno se centraron en la salud de la población femenina.

Descriptores: Salud de la mujer, Causas de muerte, Mortalidad, Salud Pública.

INTRODUCTION

Deaths in women of reproductive age account for 24% of global deaths in the population segment of women who are exposed to the risks associated with both sexual and reproductive life.[1] The age group between 10 and 49 years of age represents 16% of all deaths women in Brazil, which corresponds to 67,006 deaths in the last year, suggesting weaknesses in the health care of women, as they result from avoidable deaths that can be resolved.[2] It is noted that the number of women of reproductive age represents 65% of the total female population, an important social segment for the elaboration of public health policies.[3]

Nowadays, deaths in Women of Reproductive Age (WRA) occur in developing countries, reflecting the fertility rate and life expectancy of these regions, indicating that these women are at greater risk of becoming ill and dying than women, in the same age group, living in developed countries.[1] Moreover, the investigation of WRA deaths translates into a commitment to reduce inequality and improve human development in the world through the fifth Millennium Development Goal (MDG).

Given this framework, the country adopted a series of measures through the National Pact for the Reduction of Maternal and Neonatal Mortality, with the purpose of improving the quality of attention to women's health and the maternal death register that emphasizes as a fundamental strategy the surveillance of death maternal mortality cross-sectional investigation of WRA deaths.[4] The maternal mortality rate represents a sensitive evaluation tool for the expression of human social development, of population living conditions, generally associated with the inefficiency of health services where low rates may be related to underreporting of maternal deaths, but also to the low proportion of WRA deaths.[5,6] Therefore, delimiting the numerator of the calculation of this rate subsidizes reliability in the most used impact indicator in the monitoring of women's health.

Despite the improvements and perceived advances in reducing maternal mortality rates, the proposals for women's health policies remain with gaps in the other strategic areas. The change in lifestyle and new habits adopted by women over the last decades have made them increasingly exposed to new risks of becoming ill and dying, which makes the investigation of their deaths a necessary strategy for directing policy actions in identifying the factors that could be improved in this area, it is intended to contribute to professionals inserting new behaviors and routines in the care of this specific female population.

An important part of health information in the country derives from Health Information Systems (HIS) as important and widely used sources for the production of knowledge about the health situation, besides subsidizing the planning, organization, operation, and evaluation of actions, services, programs and policies.[8] In the last decades, great advances can be observed in the process of implementation of HIS in Brazil, with the expansion of coverage, access and use of national databases, mainly on deaths.[9]

Because there is no specific coefficient to measure the mortality of women of reproductive age, studies that address reproductive mortality are of great relevance, since in this period the risk factors common to all age groups and factors related to pregnancy, childbirth, and the puerperium period.[11] In view of the lack of attention paid to this group outside the puerperal pregnancy period by services, the objective was to analyze the prevalence of female deaths between 10 and 49 years old, identifying the sociodemographic factors associated with possible causes between two periods, based on the assumption that social determinants can influence the death incidence.

METHODS

It is a cross-sectional ecological study conducted with secondary data from the Mortality Information System (MIS), corresponding to data from the Death Certificates

(DC) of women between 10 and 49 years old in *Paraná* State, in 1996 and 2014. A choice of the age group from 10 to 49 years old was due to the Brazilian definition of reproductive age related to menarche and menopause, a stage in which women are exposed to risks specifically associated with sexual and reproductive life.[12]

We analyzed 7,275 death records of women of reproductive age by downloading the DC, made available via Internet, by the Department of Information Technology of *Sistema Único de Saúde (SUS)* [Brazilian Unified Health System] called *DATASUS*, through the TabWin program, from January 2016 to May 2016, by accessing the services, file transferring and downloading.[13]

All the reported deaths of women of reproductive age were included. The dependent variable was the occurrence of WRA deaths and the independent variables were those with a sociodemographic aspect such as: age group (10 to 14, 15 to 19, 20 to 29, 30 to 39 and 40 to 49 years old), race/skin color (single, married, widow, divorced), years of study (none, 1 to 3, 4 to 7, 8 to 11 and 12 and more years of studying), and also the underlying cause of death.

Initially, the Tenth Revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) was defined as "the disease or injury that started the chain of pathological events that led directly to death or the circumstances of the accident or violence that produced the fatal injury." Furthermore, in order to classify avoidance of death, the list of causes of deaths avoidable by an intervention of the *SUS* was used.[14] Subsequently, the causes of death were grouped by age group of women, allowing the knowledge of the percentage distribution of groups of specific causes. The 1996 period was selected because it is the first year available in the system and 2014, the last year.

Population data for the periods were obtained from the annual estimates made by the Information System for Live Births and the *Instituto Brasileiro de Geografia e Estatística (IBGE)* [Brazilian Institute of Geography and Statistics], available on *DATASUS*. The specific mortality coefficients of WRA were calculated by dividing the number of deaths by certain causes by the total number of deaths in women aged from 10 to 49 years old in the same period, multiplying by 100,000.

The data were analyzed by the SPSS program (Statistical Package for the Social Sciences) for Windows version 20.0. The Chi-square test was used to verify the difference in the proportion between the variables studied and the main causes, and thus, the association between the dependent variable and the independent variables, only for the period of 2014, due to the absence of ignored fields. The quality of fit was assessed by the Hosmer-Lemeshow test. For all inferential statistical tests, a pre-established level of significance was used at $p < 0.05$. The research protocol was not submitted to the Ethics Committee due to the public and administrative nature of the data, which did not include identification of the worker or company, however the information was strictly treated with confidentiality, respecting the criteria of beneficence and non-maleficence of production according to the ethical precepts established by the National Research Ethics Council.

RESULTS AND DISCUSSION

The population of WRA deaths in the *Paraná* State in 1996 was 3,767 deaths, which corresponded to 17.0% of total deaths for that year, whereas in 2014 there were 3,508 deaths (13.2% of all deaths) (Table 1). It should be noted that the information recorded as either ignored or missing was found only in the 1996 period for the variables schooling (75.6%) and race/skin color (99.9%).

Table I - Percentage distribution of the socio-demographic characteristics of WRA deaths in 1996 and 2014. *Paraná* State, Brazil. 2016.

Variable	1996		2014	
	n	%	n	%
Age group				
10 to 14 years old	183	4.8	101	2.8
15 to 19 years old	281	7.4	228	6.4
20 to 29 years old	684	18.1	556	15.8
30 to 39 years old	1,008	26.7	917	26.1
40 to 49 years old	1,611	42.7	1,706	48.6
Schooling				
None	591	15.6	223	6.3
1 to 3 years	-*	-*	614	17.5
4 to 7 years	-*	-*	1,002	28.5
8 to 11 years	209	5.5	1,009	28.7
12 or more	118	3.1	383	10.9
Missing*	2,849	75.6	277	7.8
Marital status				
Single	1,362	36.1	1,673	47.6
Married	1,872	49.6	1,164	33.1
Widow	224	5.9	107	3
Divorced	109	2.8	227	6.4
Other	72	1.9	244	6.9
Missing *	128	3.3	93	2.6
Race/skin color				
White	4	0.1	2,625	74.8
Black	-*	-*	163	4.6
Brown	-*	-*	600	17.1
Yellow	1	0	10	0.2
Indian	-*	-*	9	0.2
Missing*	3,762	99.9	101	2.8
TOTAL	3,767		3,508	

* Data either not completed or ignored in the DC. For the other variables were considered the valid percentages.

Source: DATASUS. Mortality Information System (MIS).

Table 2 displays the distribution of deaths of WRA per year of death according to chapter ICD-10, used to define the basic cause of death. In 1996, external causes were the most frequent, with a specific mortality coefficient of 23.3 per 100,000 women, followed by diseases of the circulatory system (21.0) and neoplasms (17.6). For the period of 2014,

neoplasms were the causes of more prevalent deaths (25.4), followed by external causes (22.6) and diseases of the circulatory system (15.7).

Table 2 - Distribution of WRA deaths by specific coefficient of mortality and per year of death according to chapter ICD-10. *Paraná* State, Brazil. 2016.

Chapter ICD-10	1996 Total	1996 Specific Coefficient of Mortality	2014 Total	2014 Specific Coefficient of Mortality
I. Some infectious and parasitic diseases	256	6.7	231	6.5
II. Neoplasms (tumors)	665	17.6	892	25.4
III. Blood and hematopoietic organ diseases and some immune disorders	28	0.7	14	0.3
IV. Nutritional and Metabolic Endocrine Diseases	116	3	185	5.2
V. Mental and behavioral disorders	27	0.7	38	1.0
VI. Diseases of the nervous system	97	2.5	112	3.1
VIII. Diseases of the ear and the mastoid process	1	0	0	0.0
IX. Diseases of the circulatory system	794	21	552	15.7
X. Diseases of the respiratory system	200	5.3	180	5.1
XI. Diseases of the digestive system	169	4.4	179	5.1
XII. Skin and subcutaneous tissue disorders	7	0.1	6	0.1
XIII. Systemic musculoskeletal and connective tissue diseases	55	1.4	60	1.7
XIV. Diseases of the genitourinary system	70	1.8	72	2.0
XV. Pregnancy, birth and puerperium period	112	2.9	75	2.1
XVII. Congenital malformation deformity and chromosomal abnormalities	20	0.5	22	0.6
XVIII. Symptoms, signs and abnormal findings of clinical and laboratory examination	269	7.1	95	2.7
XX. External causes of morbidity and mortality	881	23.3	795	22.6
TOTAL	3,767		3,508	

By analyzing the proportions of the specific causes of WRA deaths according to ICD-10 category and age group, car accidents (71%) among women aged from 20 to 29 years old and deaths due to Acute Myocardial Infarction (AMI) in 30.2% of women between the ages of 40 and 49 years old, all during 1996. In the period of 2014, the most frequent deaths were those due to assault and firearm shooting among women aged from 20 to 29 years old (56%) and malignant neoplasm of the breast (29.4%) in the age range from 40 to 49 years old (**Figure 1**).

Regarding the prevention of death, all identified causes observed in **Figure 1** were classified as avoidable deaths, in other words, causes reducible by appropriate health promotion actions, prevention and attention to external causes, control and attention to diseases of infectious causes, non-communicable diseases.[12]

Figure 1 – Proportion of the specific causes of WRA deaths according to ICD-10 category and age group for the period of 1996 and 2014. *Paraná* State, Brazil. 2016.
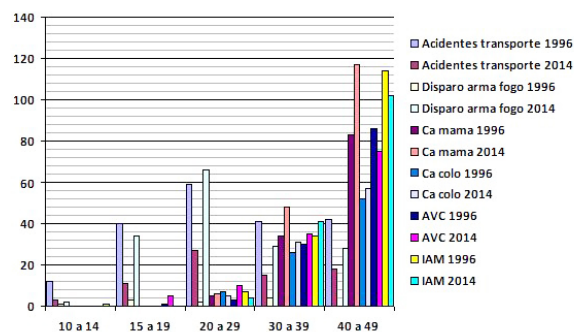
Source: DATASUS. Mortality Information System (MIS). **Original data in Portuguese language.**

Table 3 shows the relationship between the bivariate analyzes of the variables studied (basic cause of death) and the main socio-demographic factors for the period of 2014. There was a significant association for the group of external causes deaths for women between the ages of 15 19 years old, with 8 to 11 years of schooling and single, whereas for the group of deaths due to diseases of the circulatory system the significance was between women aged from 40 to 49 years old and with 4 to 7 years of study. For the group of deaths due to neoplasms, the association occurred in the same age group and among those with high schooling (**Table 3**).

Table 3 – Frequency of basic cause of WRA death according to socio-demographic characteristics over the period of 2014. *Paraná* State, Brazil. 2016.

Variable	External Causes (n=795) %	p-value	Circulatory System (n=552) %	p-value	Neoplasms (n=892) %	p-value
Age group						
10 to 14 years old	4.5		0.7		2.5	
15 to 19 years old	14.5		1.2		2.1	
20 to 29 years old	31.1	<0.01	7.4		6.6	
30 to 39 years old	26.4		21.9		27.3	
40 to 49 years old	23.1		68.6	<0.01	61.3	<0.01
Schooling						
None	1.8		5.9		3.2	
1 to 3 years	11		21.5		18.6	
4 to 7 years	33.8		31.7	<0.01	24.8	
8 to 11 years	35.9	<0.01	23.3		30.3	
12 or more	13.4		8.1		15.1	<0.01
Marital status						
Single	63.1	<0.01	34.2		35	
Married	20		39.4		47.3	<0.01
Widow	1.7		5.4		2.1	
Divorced	6		7.9		7.7	
Other	7		9		6	
Race/skin color						
White	81.5		69.3		79.8	
Black	2.5		5.7		2.7	

Brown	14.7	20.6	13
Yellow	-	0.5	0.2
Indian	2.2	0.3	0.2
Missing	1	3.2	3.6

*Significant difference between the causes of deaths for p<0.05 (Chi-square with Yates' correction).

No statistical significance was observed when the basic causes of death were associated with the race/skin color characteristic (p>0.05).

From the analysis of the deaths of women of reproductive age in the *Paraná* State, it was possible to observe that all the deaths that were frequently evidenced belonged to the group of deaths avoidable by *SUS* interventions, increasing proportionally according to the age group when comparing the periods of 1996 and 2014. The main causes of deaths identified in this study could be avoidable from the introduction of social measures, prevention and control, and diagnosis and early treatment. The frequency of higher mortality in the age group between 40 and 49 years old may suggest that there is a better health condition of the population of younger women when compared to their congeners at more advanced ages.[15]

The main causes of WRA deaths reported in this study, such as those from the group of deaths due to external causes, neoplasm, and cardiovascular diseases, were also the same causes as other studies.[3,11] It is possible that the different death scenarios of WRA in the periods of 1996 and 2014 analyzed are related to the cultural, socioeconomic and quality characteristics of the health services offered to the distinct population in the two periods. In recent decades, deaths due to cardiovascular diseases, neoplasms, auto accidents and violence, known as Diseases from the Industrialization, have dominated the adult mortality profile in developed countries.[16]

In the context of external causes, there has been an increasing importance of traffic accidents and gun violence among the public health problems of greater magnitude and transcendence due to the strong impact on the population mortality, particularly, in the young people.[17] This situation is not peculiar to the Brazil. External causes mortality in women has been a matter of concern because of its negative repercussion on quality and life expectancy at birth and economic stability in the Americas.[7] As in other studies, it was possible to observe that the highest number of women victims of violence are inserted in the third decade of life reaching an economically active youth population.[11,18]

Urban violence reaffirms the complex and multi-causal dynamics in which livelihoods play a decisive and conditioning role in the situation of social violence, given the multiple causalities of violent practices against women.[19,20] This impact on health requires a re-adaptation of the traditional organization of the health services placing new problems for preventive or curative medical care, establishing priorities in actions to prevent violence and accidents, through surveillance, promotion, and health prevention.

Cardiovascular diseases were the second cause of WRA deaths in the 1990s in this study, with a 40% reduction in these causes in the period of 2014, prevailing in women between 40 and 49 years old, occupying the third largest cause of death today and following the trends in the deaths of women of reproductive age in Brazil.[11] These findings can be evidenced at the expense of new habits and lifestyle adopted by women in the last decades and by the improvement in the conditions of diagnosis and specialized therapy.[12] Even so, a prevalence of hypertension in women with low schooling and black skin color, became the third largest cause of deaths in the reproductive period in Brazil. Low schooling may be associated with non-adherence to treatment and/or assimilation of care received difficulty in accessing the means of disease prevention and the impossibility of regular periodic controls.[21,22] Yet, ethnicity per se is not a factor but the adverse social insertion of a racial/ethnic group is that it constitutes a characteristic of vulnerability.[15]

Neoplasms were the third leading cause of death in 1996, becoming the leading cause in 2014. Breast cancer is the leading cause of death in women aged from 40 to 49 years old in the *Paraná* State (29.4%), observing a certain degree of uniformity with the findings of other studies carried out in the South, in the Southeast and Central West region of the country.[23] The increase in the incidence of this cancer in the country has been accompanied by an increase in mortality with delayed diagnosis and in the early therapeutic institution in 60% of cases, the opposite observed internationally in developed countries such as the United States, Canada, the United Kingdom, the Netherlands, Denmark and Norway.[24]

The occurrence of deaths due to breast cancer remained high when associated with schooling in this study. It is known that high schooling is directly related to a better socioeconomic position, the increasing participation of women in the productive process, the process of urbanization of society and the consequent sickness of women exposed to greater stressors.[25]

It is noted that health services are not adequate for social changes that have altered the profile of women in the labor market and that the new reality of the role of women in society needs a new look at services are offered and agility in the resolution of preventive actions.[11]

In this sense, the profile and sensitivity of the nurse professional are important in the insertion of new behaviors and routines in the delivery of care in the primary health care area by dealing directly with the demands of these women jointly, in their totality, besides constructing a an evidence-based therapeutic plan focused on the real needs of women. The acquired scientific knowledge can permeate the introduction of differentiated measures for the practice.

CONCLUSIONS

The WRA mortality in the *Paraná* State of occurred mostly due to preventable causes related to urban development

and the new profile of independent women and exposed to the practices, habits and behaviors previously prevalent in the male population, such as smoking, drinking and greater sexual freedom, leaving exposed to stress and other risk factors associated with chronic noncommunicable diseases. The age group, schooling, and marital status, especially in the young and economically active follow-up of women, were associated with the basic causes of death.

Special attention is given to the problems emerging from chronic diseases while ensuring that women are free from complications in their reproductive cycle. Although the public health policies in the current scenario return their actions to improve the quality of life of the female population, in the practical context there is a gap in the form of care, in the articulation between services at the level of municipalities impacting on the control of problems more frequent in the State. During 18 years, the same causes of death of the female population of reproductive age in *Paraná* State have been evidenced, reinforcing the need for investments and the rethinking of social policies and allocations of financial resources. It also reveals a need for investment in actions aimed at reducing the inequality in women's access to basic care services and in actions to promote health, prevent diseases and diseases that guarantee quality and resolve at all levels of care.

Nonetheless, data records in national health information systems are questionable due to poor professional training or lack of awareness of reporting, resulting in poor quality, underreporting of deaths, and difficulty in the actual knowledge of both maternal mortality and mortality. WRA. However, even with these limitations, it was possible to observe that there was a reduction in the proportion of deaths in women between 10 and 49 years old when comparing the periods of 1996 and 2014.

Briefly, mortality studies can support planning for the adoption of measures aimed at contributing to the knowledge of health problems that most affect specific groups, with possible implications of proposals for the improvement of health conditions in this population.

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