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Mortality among young Nicaraguan immigrants to Costa Rica: deaths from disease versus injury

Roger Bonilla y Juan Chavarría

Mortality among young Nicaraguan immigrants to Costa Rica: deaths from disease versus injury

Mortalidad de inmigrantes nicaragüenses jóvenes en Costa Rica. Enfermedades versus causas externas

Roger E. Bonilla [1] y Juan B. Chavarría[2]

— **ABSTRACT:** The aim of this research was to investigate mortality among young Nicaraguan immigrants to Costa Rica (disease versus injury deaths) and compare it with the young native population. The study focused on persons aged 15 to 34 years, due to the relative importance of the injury deaths in this age group. Deaths (*numerators*) and population data (*denominators*), which were obtained from the 10th Population and Housing Census 2000, were used to calculate the mortality rates per 100,000 inhabitants. The relative risk (*RR*) results from dividing each set of causal standardized mortality rates. Approximately 66% of deaths among Nicaraguan immigrants are injury deaths versus 57% for the native population. Immigrants have higher relative risks (*RR*) of mortality than natives for injury deaths (homicides *RR*=2.00, other accidents *RR*=1.70, and vehicular accidents *RR*=1.17). We emphasize that Nicaraguan immigrants have twice the risk of dying from homicide than the native population.

— **Keywords:** Mortality, injury deaths, disease deaths, immigrants, Costa Rica.

— **RESUMEN:** El objetivo de este estudio fue investigar la mortalidad por causas externas y por enfermedades entre inmigrantes nicaragüenses jóvenes en Costa Rica y compararla con la respectiva población de jóvenes costarricenses. El estudio se enfocó en personas con edades de 15 a 35 años, debido a la importancia relativa de las muertes por causas externas en ese grupo de edad. Las defunciones (*numeradores*) y la población (*denominadores*), que fueron obtenidas del *X Censo de Población y Vivienda 2000,* se utilizaron para calcular las tasas de mortalidad por 100,000 habitantes. El riesgo relativo (*RR*) resulta de dividir las tasas de mortalidad estandarizadas de las dos poblaciones. Se encontró que alrededor del 66% de las defunciones de inmigrantes nicaragüenses son por causas externas, versus el 57% de su contraparte costarricense. Los inmigrantes tienen riesgos relativos (*RR*) mayores de mortalidad por causas externas que su correspondiente costarricense (homicidios *RR*=2.00, otros accidentes *RR*=1.70 y accidentes vehiculares *RR*=1.17). En particular, se destaca que los inmigrantes nicaragüenses tienen el doble de riesgo de morir a causa de homicidios que su contraparte costarricense.

— **Palabras Clave:** Mortalidad, muertes por causas externas, muertes por enfermedades, inmigrantes, Costa Rica.

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1. Introduction

In recent decades, migration of Nicaraguans to Costa Rica was the highest in the history of the country (International Office for Migration [IOM], 2001; Marquette, 2006). The 10th Population and Housing Census 2000 shows that more than half of these immigrants are young people, between 15 to 34 years old (Instituto Nacional de Estadística y Censos [INEC], 2000).

Due to the selectivity of migration phenomena, Nicaraguan immigrants have similar characteristics to those seen in other immigrant minorities: low mortality and morbidity disease deaths and high mortality rates from injury deaths (particularly accidents and homicides) (Herring & Bonilla, 2009; Herring, Bonilla, Borland & Hill,2008; Singh & Miller 2004; Sorenson & Shen, 1999;Trovato 1992; Sharma, Michalowski & Verma,1990).

Immigration to Costa Rica has brought changes to the needs and responsibilities of all productive sectors (Herring *et al.*, 2008). In industrialized countries, research on mortality differentials between immigrants and local populations has focused on the "South to North" migration context. In general, these studies have found a mortality rate benefit in favor of immigrants versus the local population, in spite of the fact that the former have a lower socioeconomic status (Kestenbaum, 1986, Sharma *et al.*, 1990; Sorlie, Backlund, Johnson & Rogot, 1993; Uitenbroek & Verhoeff, 2002). In the context of migration to the United States, there is a so-called *Hispanic paradox*, where paradoxically Hispanic migrants in that country have health levels that are substantially better than the mean for the local population, in spite of the migrants' disadvantaged socio-economic indicators (Franzini, Ribble & Keddie, *et* 2000).

Numerous studies have explored mortality among young adults. Patton *et al.* (2009) have shown that among the world's youth, vehicular accidents constitute the cause that provoked 14% of male deaths and 5% of female deaths. The same study indicates that suicide was the cause of 6% of all deaths, and homicide is the reason of 12% of them among young males. In the European case, Morrison, Phil & Stone *et* (1993) found that, between 1984 and 1993, two-thirds of the deaths reported in youths were from injury causes, distributed among accidents (76%), suicides (17%) and homicides (7%). Yunes & Rajs (1994) explored the Latin American case and concluded that mortality due to injury causes (vehicular accidents, homicides and suicides) was concentrated among adolescents and young people. Other authors such as Goldsmith & Cwikel (1993) have effected international comparisons and concluded that traffic accidents are the predominant injury cause of mortality among young persons. The Latin American case has particular characteristics. Although there are large-scale interchanges in the region's population, the mortality differentials among immigrants and natives in the "South-South" migration context generally continue without having been studied (Herring *et al.* 2008). In Costa Rica, to date, only the

Herring *et al.* (2008) study and more recently that of Herring & Bonilla (2009) have researched Nicaraguan immigrant mortality in general. Chamizo-García (2013) carried out a study of violent deaths in Costa Rica, and states that the age group 15-34 years is the most affected by violent deaths (Herring *et al.* 2008).

The researchers found similar results to those found in other countries: high injury cause mortality (accidents and homicides) in immigrants versus low disease-related mortality. Due to the age groups studied, homicides and accidents are the main causes of death among both immigrants and Costa Ricans. Mortality among young immigrants, who constitute a good part of the Nicaraguan immigration to Costa Rica, continues without having been studied. In the Costa Rican case, although there are few studies on immigrant mortality, it is possible to find associations similar to those found in the case of the Hispanic immigrants to the United States.

This study was carried out to investigate mortality from injury causes and diseases among young Nicaraguan immigrants in Costa Rica and compare this with the young Costa Rican population. Why is it important to study the mortality among young Nicaraguan immigrants to Costa Rica? Injury deaths in this age group accounts for 60 % of deaths reported among Nicaraguans (INEC 2000). The overview of mortality in young immigrants is marked by injury deaths. Although the studies of Herring *et al.* (2008) and Herring & Bonilla (2009) researched immigrant mortality in general, the studies did not compare between deaths from disease versus deaths from injury among young Nicaraguan immigrants.

The study of mortality among young Nicaraguan immigrants in Costa Rica is important in both social and economic dimensions. On the one hand, it is important to identify the main injury mortality causes of deaths and shape policies to reduce them, eg. occupational health or preventive policies. In the other hand, young Nicaraguan immigrants are part of what is known as the "demographic dividend". Under certain assumptions, Costa Rica will experience positive economic changes due to a change in the population pyramid.The research objective was not to identify the causes of death, but to determine whether Nicaraguan immigrants have a greater or lesser mortality risk due to injury causes and disease than their Costa Rican counterparts.

2. Materials and Methods

The population studied consisted of young Nicaraguan immigrants and Costa Ricans that died during an eleven-year period, between January 1st, 1998 and December 31st, 2008. The Costa Rican Vital Statistics database on deaths for the years 1998-2008 was used as the source for the data; it is available at the Instituto Nacional de Estadística y Censos (National Statistics and Census Institute, INEC) (Centro Centroamericano de Población [CCP], 2009). The analysis focused on deaths among

youths between 15 and 34 years of age *(n* = 13,105; Costa Ricans: n_1 = 11,636; Nicaraguan immigrants: n_2 = 1,469), due to the fact that youths have the highest risk for death from injury causes. Furthermore, as adolescents and young adults, they are joining the productive sectors and form part of the demographic dividend, so that a study of this population segment takes on particular interest. The database contains the variable *country of birth*, which was used to indicate whether the deceased was a Nicaraguan immigrant or a Costa Rican.

The *International Classification of Diseases,* 10th Revision, ICD-10 (World Health Organization [WHO], 1992) was used to classify deaths from diseases and injury causes, specifically codes for deaths from disease: J00-J42, A17-B19, B25-B99 (infectious diseases), C15-C26, C30-C39, C53-C55, C50, C61, C00-14, C40-9, C51-2, C56-60, C62-D48 (cancer), J43-J99 (chronic respiratory diseases), I00-I99 (cardiovascular diseases), E10-E14 (diabetes), F10, K70-K76 (alcoholism), A00-A09, A15, A16, D50-D53, E40-E46, O00-O99, P00-P96, Q00-Q99, B20-B24, R54, R95-99 and the rest (other causes); and injury causes: V01-V89 (vehicular accidents), X60-X84 (suicides), X91-Y34 (homicides) y W00-X59 (other accidents). Deaths are the *numerators*.

Population data (*denominators*) were used to calculate the mortality rates per 100,000 inhabitants and were obtained from the 10th Population and Housing Census 2000 (*X Censo de Población y Vivienda 2000*, INEC, 2000). Denominators were defined in this way due to the lack of population estimates for Nicaraguan immigrant population for each year of the period 1998-2008. To control the possible effect of age and sex, mortality rates were standardized to the population of the United States in 2000.

2.1. Statistical Analysis

Frequency distributions were tabulated to compare the relative importance of deaths from disease and injury causes among the young Nicaraguan immigrants (15 to 34 years of age) and their Costa Rican counterparts. Mortality rates by cause of death (deaths per 100,000 inhabitants) were calculated for both populations as follows: for each population, deaths (numerator) were divided by the population (denominator) and then multiplied by 100,000 inhabitants. Later, mortality rates by cause of deaths were direct standardized to the population of the United States in 2000. The relative risk (*RR*) was calculated by cause of death for the young Nicaraguan immigrants (*numerator*) with respect to the Costa Ricans (*denominator*), the RR results from dividing each set of causal standardized mortality rates (Moya 2009). RR greater than one means that young Nicaraguan immigrants have greater mortality risk in a specific cause of death than their Costa Rican counterparts. RR is used to make a simple comparison between two populations. A 95% confidence interval was calculated for the relative risks (RR) assuming that standardized mortality rates are distributed as Poisson distribution. The data were processed with the statistical package STATA (StataCorp, 2005).

3. Results

Table 1 presents the information on deaths to young Nicaraguan immigrants and Costa Ricans by causes of mortality. Approximately 66% of the deaths to Nicaraguan immigrants were due to injury causes (vehicular accidents, suicides, homicides, and other accidents), versus 57% among their Costa Rican counterparts. Particularly it is noteworthy that 22% of the deaths to Nicaraguan immigrants are related to homicides, versus 14% for their Costa Rican counterpart. In this sense, homicides are the first cause of death among the Nicaraguan immigrants; however, among the Costa Ricans, this place is occupied by vehicular accidents.

Table 1

Deaths among Young Nicaraguan Immigrants and Costa Ricans by Cause of Death, (Reclassification of the Codes from ICD-10[1]. Costa Rica 1998-2008)

Cause of death	Costa Ricans		Nicaraguan Immigrants	
	Deaths	%	Deaths	%
Total Deaths	*11,636*	*100.0*	*1,469*	*100.0*
Diseases				
Infectious Diseases	251	2.2	35	2.4
Cancer	1,564	13.4	125	8.5
Chronic Respiratory Dis.	212	1.8	20	1.4
Cardiovascular Dis.	726	6.2	86	5.9
Diabetes	77	0.6	6	0.3
Alcoholism	232	2.0	25	1.7
Others	2,009	17.3	205	14.0
Injury Causes				
Vehicular Accidents	2,575	22.1	311	21.2
Suicides	1,265	10.9	137	9.3
Homicides	1,578	13.6	325	22.1
Other Accidents	1,147	9.9	194	13.2

[1] The *International Classification of Diseases,* 10th Revision, ICD-10 (WHO 1992).
Source: Centro Centroamericano de Población (2009).

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Table 2 presents the mortality rates by causes of mortality for young Nicaraguan immigrants and Costa Ricans. This table also provides the Relative Risks by causes of death for young Nicaraguan immigrants (*numerator*) with respect to the Costa Ricans (*denominator*), which result from dividing the rates. The table also provides a 95% confidence interval for these relative risks, where values above one indicate that the Nicaraguan immigrants have a greater risk for this cause of mortality with respect to the Costa Ricans. In addition, the table presents the relative risks among the cause specific standardized mortality rates for young Nicaraguan immigrants and Costa Ricans. The Nicaraguan immigrants have higher relative risks than the Costa Ricans in homicides, other accidents, infectious diseases and vehicular accidents (2.00, 1.71, 1.36 and 1.17 respectively). It is worth highlighting that the Nicaraguan immigrants have a two-fold risk of death from homicide against their Costa Rican counterparts. This is one of the most important results from this study; and, once again, it corroborates that homicide is the leading cause of death among Nicaraguan immigrants.

Table 2

Standardized Mortality Rates and Relative Risk for young Nicaraguan Immigrants and Costa Ricans, by Causes of Death. Costa Rica 1998-2008. (Rates per 100 thousand persons averaged by sex)

Causes of Death	Costa Ricans	Nicaraguan Immigrants	Relative Risk	95% Interval	
				L_i	L_s
Diseases					
Infectious Diseases	1.99	2.67	1.34	0.76	1.92
Cancer	12.49	9.78	0.78	0.62	0.94
Chronic Respiratory Dis.	1.70	1.54	0.91	0.39	1.43
Cardiovascular Dis.	5.94	6.81	1.15	0.86	1.44
Diabetes	0.66	0.48	0.73	0.01	1.67
Alcoholism	1.96	2.05	1.04	0.50	1.58
Others	15.95	16.21	1.02	0.86	1.18
Injury Causes					
Vehicular Accidents	20.12	23.57	1.17	1.02	1.32
Suicides	9.90	10.52	1.06	0.85	1.27
Homicides	12.46	24.82	1.99	1.74	2.24
Other Accidents	8.86	15.00	1.69	1.41	1.97

Source: Centro Centroamericano de Población (2009).

4. Discussion

The results of this study emphasize that young Nicaraguan immigrants have a greater risk of death from injury causes (homicide and other accidents) than their Costa Rican counterparts, particularly by homicide. Secondly, the risk of death from infectious diseases is greater among young Nicaraguan immigrants than their Costa Rican counterparts. These results show that among Nicaraguan immigrants, the injury deaths exceed the disease deaths.

How valid and reliable are these results? Elements that might reduce their validity have to do with (1) the under-registration of Nicaraguan immigrants and (2) the numerator effect. In the first case, it is possible that there is an un-quantifiable under-registration of Nicaraguan immigrants having less than six months to live in Costa Rica, due to the fact that census reported only residents those who have six months or more to live in the house (CCP 2013; Solano 2009). This situation changes the denominator of the mortality rates in the case of Nicaraguan immigrants. With regards to the numerator effect, the sample size is small. This paper used the sub-population of Nicaraguan immigrants over a specific period of time to guarantee a sufficient number of cases in the numerator for calculating the rates. It would have been ideal to use a longer period of time to guarantee a sufficient number of deaths in the numerators. Nevertheless, this was not possible, even though it would have resolved any numerator effect, a longer time lapse might possibly have added unwanted confounding factors into the analysis. However, the findings encountered are consistent with current literature, complementing the studies by Herring *et al.* (2008), Franzini *et al.* (2000), Kestenbaum (1986), Sharma *et al.* (1990), Sorlie *et al.* (1993), Uitenbroek & Verhoeff, (2002), and Chamizo-Garcia (2013).

The results from this paper contribute to present evidence for an appropriate design of public policies for health and safety that might benefit the young immigrants. They are also a basis for further research. For example, what socioeconomic factors among young Nicaraguan immigrants make the risk of death from homicide greater than their Costa Rican counterparts? Demographics, poverty and geography have influence on immigration and mortality by cause. Mortality from injury is particularly focused among males and young people. Poverty influence mortality by cause and increases the variability. Authors like Cutler, Deaton & Lleras-Muney (2006); Williams (1998); Kawachi & Kennedy (1997); and Lantz *et al.* (1998) say there is a relationship between poverty and mortality by cause. Other authors indicate that the poverty is localized in specific geographic regions; in this group it is possible to find the work of Kulldorff (1997); Kulldorff & Information Management Services Inc (2002); Kulldorff *et. al.* (1998), Kulldorff & Nagarwalla (1995), Massey (1998), Cressie & Chan (1989).

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5. Conclusions

There are five conclusions that must be pointed out. First, homicides are the first cause of death among the young Nicaraguan immigrants; however, among the Costa Ricans, this place is occupied by vehicular accidents. Further research into the causes of homicide mortality among Nicaraguan immigrants is necessary.

Second, young Nicaraguan immigrants have higher relative risks than the Costa Ricans in homicides, other accidents, infectious diseases and vehicular accidents (2.00, 1.70, 1.34 and 1.17 respectively). Injury deaths dominate the health of Nicaraguan immigrants. Third, among young Nicaraguan immigrants, the injury deaths exceed the disease deaths. The hypothesis that Nicaraguan immigrants have higher mortality from injury deaths than diseases deaths than the Costa Rican counterpart is accepted. Four, the findings encountered in this study are consistent with current literature. However, the causes of the greater mortality of injury deaths among Nicaraguan immigrants are still unknown. Last but not least, the results of this study are basis for further research, in order to help shape public policies on security, health and migration.

6. References

Centro Centroamericano de Población [CCP]. (2013). *Evaluación demográfica del X Censo Nacional de Población de Costa Rica 2011 y de otras fuentes de información*. San José, Costa Rica: Universidad de Costa Rica.

Centro Centroamericano de Población [CCP]. (2009). *Estadísticas Vitales de Mortalidad, Costa Rica 1998-2008*. Retrieved fromhttp://censos.ccp.ucr.ac.cr

Chamizo-Garcia, H. (2013). Las muertes violentas en Costa Rica y sus inequidades geográficas. Población y Salud en Mesoamérica. *Población y Salud en Mesoamérica*, *11*(1).

Cressie, N. & Chan, N.H.. (1989). Spatial modeling of regional variables. *Journal of the American Statistical Association*, *84*, 393-401.

Cutler, D., Deaton, A. & Lleras-Muney, A. (2006).*The Determinants of Mortality*. Massachusetts, USA: National Bureau of Economic Research.

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Franzini L., Ribble, J. C. &. Keddie, A. M. (2000). Understanding the Hispanic paradox. *Ethnicity and Disease*, *11*(3), 496-518.

Goldsmith, J. & Cwikel, M. (1993). Mortalidad de los jóvenes adultos: Comparaciones Internacionales. *Salud Pública Méx.*, *35*(2), 132-147.

Herring, A. & Bonilla, R. (2009). Inmigrantes Nicaragüenses en Costa Rica: Estado y Utilización de Servicios de Salud.*Población y Salud en Mesoamérica*, *7*(1).

Herring, A., Bonilla, R., Borland, R. & Hill, K. (2008). Patrones diferenciales de mortalidad entre inmigrantes nicaragüenses y residentes nativos de Costa Rica. *Población y Salud en Mesoamérica*, *6*(1).

Instituto Nacional de Estadística y Censos [INEC]. (2000). *Censo Nacional de Población y Vivienda, Costa Rica 2000*. Retrieved from http://censos.ccp.ucr.ac.cr

International Office for Migration [IOM]. (2001). *Binational Study: The State of Migration Flows between Costa Rica and Nicaragua – Analysis of the Economic and Social Implications for Both Countries*. San José, Costa Rica: Author.

Kawachi, I. & Kennedy, B. P. (1997). Socioeconomic determinants of health: Health and social cohesion: ¿why care about income inequality?. *British Medical Journal, 314*.

Kestenbaum, B. (1986). Mortality by nativity. *Demography, 23*(1), 87-90.

Kulldorff, M. & Information Management Services Inc. (2002). *SaTScan v. 3.0.5: Software for the Spatial and Space-Time Scan Statistics*. Bethesda, Maryland: National Cancer Institute.

Kulldorff M., Athas, W., Feuer, E., Miller, B. & Key, C. (1998). Evaluating Cluster Alarms: A Space-Time Scan Statistics and Brain Cancer in Los Alamos, New Mexico. *American Journal of Public Health, 88*, 1377-1380.

Kulldorff, M. (1997). A spatial scan statistic. *Communications in Statistics: Theory and Methods, 26*, 1481-1496.

Kulldorff, M. & Nagarwalla, N. (1995). Spatial disease clusters: Detection and inference. *Statistics in Medicine, 14*, 799-810.

Lantz, P., House, J., Lepkowski, J., Williams, D., Mero, R. & Chen, J. (1998). Socioeconomic Factors, Health Behaviors, and Mortality. Results From a Nationally Representative Prospective Study of US Adults. *Journal of the American Medical Association*, *279*, 1703-1708.

Bonilla y Chavarría

Marquette, C. (2006). Nicaraguan Migrants in Costa Rica. *Población y Salud en Mesoamérica, 4*(1).

Massey, D. S. (1998). *Worlds in Motion Understanding International Migration at the End of the Millenium*. Oxford: Clarendon Press.

Morrison, M. A., Phil, M. & Stone, D. (1993). Trends in injury mortality among young people in the European Union: a report from the EURORISC working group. *Journal of Adolescent Health, 27*(2), 130-135.

Moya, L. (2009). *Introducción a la Estadística de Salud.*San José, Costa Rica: EUCR.

Patton, G.C., Coffey, C., Sawyer, S.M., Viner, R.M., Haller, D.M., Bose, K., Vos, T. & Mathers, C.D. (2009). Global patterns of mortality in young people: a systematic analysis of population health data. *The Lancet, 374*(9693), 881-892.

Sharma R. D., Michalowski, M. & Verma, R. B. (1990). Mortality differentials among immigrant populations in Canada. *Int Migr, 28*(4), 443-450.

Singh G. K. & Miller, B. A. (2004). Health, life expectancy and mortality patterns among immigrant populations in the United States. *Can J Public Health, 95*(3), I14-21.

Solano, E. (2009). *Evaluación Censal con Métodos Indirectos. Experiencia de Costa Rica*. Paper presented at the Statistical Conference of the Americas, Economic Commission for Latin America and the Caribbean, Santiago, Chile.

Sorenson, S. & Shen, H. (1999). Mortality Among Young Immigrants to California: Injury Compared to Disease Deaths. *Journal of Immigrant Health*, *1*(1).

Sorlie P. D, Backlund, E., Johnson, N. J & Rogot, E. (1993). Mortality by Hispanic status in the United States. *JAMA*, *270*(20):2464-8.

StataCorp. (2005). *Stata Statistical Software: Release 9*. College Station, Texas: StataCorp LP.

Trovato, F. (1992). Violent and accidental mortality among four immigrant groups in Canada, 1970-1972. *Soc Biol*, *39*(1-2):82-101.

Uitenbroek D. G. & Verhoeff, A. P. (2002). Life expectancy and mortality differences between migrant groups living in Amsterdam, The Netherlands. *Soc Sci Med, 54*(9), 1379-88.

Williams, R. B. (1998). Lower Socioeconomic Status and Increased Mortality. Early Childhood Roots and the Potential for Successful Interventions. *The Journal of the American Medical Association, 279*, 1745-1746.

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World Health Organization [WHO]. (1992). *International Statistical Classification of Diseases, 10th Revision (ICD-10)*. Geneva, Switzerland: World Health Organization.

Yunes, J & Rajs, D. (1994). Tendencia de la mortalidad por causas violentas en la población general y entre los adolescentes y jóvenes de la región de las Américas. *Cad. Saúde Pública, 10*(1).
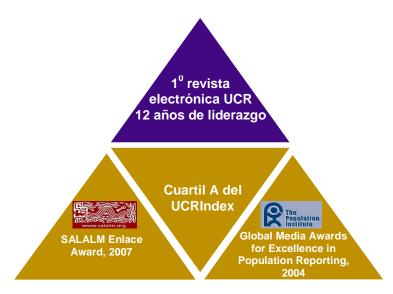
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