

Puerto Rican Retrospective Elderly Suicide Prevalence Rates: An Epidemiological Study during the 1980-2015 Period

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Abstract This retrospective epidemiology study presents the suicide prevalence rates in Puerto Rico (PR) during 1980-2015 period. The investigation present suicides comparisons rates between two groups, 65 years or older, and 64 years and younger, in addition to odds ratio (OR) and mean indexes. Results indicates substantial differences in the suicide prevalence rates among groups. It is concluded that the elderly population has had, in average, a double suicide risk (OR=2.15, non-significant OR's indexes were excluded) than younger Puerto Rican population. Effective public policy to diminish suicide rates in PR, with emphasis in the elderly, was suggest.

Keywords Puerto Rico Suicide rates, Elderly suicide, Epidemiology

1. Introduction

During the last 35 years, elderly suicide has been a serious problem in the Caribbean island of Puerto Rico (PR). Early research demonstrates major prevalence rates of suicide in elderly persons (65 years and older) as compare to younger population suicide rates [1-3]. PR has been suffering from extremely adverse socio-economic and health conditions approximately during the last 40 years that negatively affected the entire population. For instance, increases in, crime rates, scholar desertion, unemployment rates, substantial professional younger adults' migration to the United States, cases of severe contagious diseases that affect tourism (i.e., ZIKA and Dengue Haemorrhagic Fever), severe governmental debt that bring the island to bankruptcy and affect enormously all types of health services, has adverse influence the elderly mental and physical health. As demonstrated by gerontological researcher's this population suffer from many serious physical and mental health conditions that affect prominently their wellbeing including elderly marginalization and abuse [4, 5]. Specific factors that affect the Puerto Rican elderly population include, but are not limited to, high poverty levels, health disparities, mental and physical higher prevalence's rates diseases (i.e.,

diabetes, cancer, cardiovascular conditions) and social marginalization. With all these issues, is not surprising that Puerto Rican elderly may be at elevated risk to suicide, as compare to other subpopulations in the island of PR.

2. Methodology

Public Health Data from the Health Department of Puerto Rico from 1980 to 2015 was identify to determine the numbers of suicides during the previous period. Age groups where stratify in two main groups (10- 64 years old and 65 or older) to proceeded with the rates mortality analyses according to the interest of the researchers and the report of suicide rates of the Puerto Rico Health Department Statistics. Odds ratios (OR) were also calculated to determine the risk probability of suicide in the two groups. OR is a risk analysis of specific factors that impinge in the elderly suicide rates. Odds ratio have turn out to be increasingly important in health, specific in epidemiological research and decision-making. The OR evaluates whether the odds of a specific incident is the same for two groups. Specifically, the OR measures the ratio of the odds that an incident or outcome will occur to the odds of the event not happening. Usually, the researcher measures the ratio of the odds of a disease or a death from a specific injury, illness or phenomenon, happening to the odds of the death not occurring [6]. After calculations of mortality rates and OD's ratios between both age groups comparison within them where performed.

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3. Results

After analyzed the mortality rates of both age groups, in addition to compared OR mean within the groups, we found that the older group (65 or older) continue to present the highest suicide prevalence rate (See Table 1). Furthermore, mean OR index is 2.15, meaning the elderly group have

twice the probability to attain suicide than the younger group (See Table 2). In addition, mean suicide rate for the whole island of PR during the last 35 years is 152.99 as compare to the elderly mean suicide rate population (65 or older) that is 59.17.

Table 1. Suicide prevalence rates in Puerto Rico: 1980-2015

Year	Total population			65 year or older population			64 year or younger population			Rate difference
	N	Number of suicide	Rate	N	Number of suicide	Rate	N	Number of suicide	Rate	
1980	3,196,520	292	9.13	252,569	42	16.62	2,943,951	250	8.49	8.13
1981	3,237,209	302	9.32	263,609	66	25.03	2,973,600	236	7.93	17.10
1982	3,269,761	300	9.17	272,440	51	18.71	2,997,321	249	8.30	10.11
1983	3,302,313	328	9.93	281,270	61	21.68	3,021,043	267	8.83	12.85
1984	3,334,865	300	8.99	290,102	59	19.99	3,044,763	241	7.94	12.05
1985	3,367,416	269	7.98	298,933	65	22.67	3,068,483	204	6.61	15.46
1986	3,399,968	310	9.11	307,766	74	24.04	3,092,202	236	7.29	16.75
1987	3,432,519	272	7.92	316,597	60	18.95	3,115,922	212	6.80	12.15
1988	3,465,072	314	9.06	325,430	68	20.89	3,139,642	246	7.83	13.06
1989	3,497,623	327	9.34	334,260	61	18.24	3,163,363	266	8.40	9.84
1990	3,522,037	371	10.50	340,884	79	23.17	3,181,153	292	9.17	14.00
1991	3,571,328	355	9.94	348,896	85	24.36	3,222,432	270	8.37	15.99
1992	3,603,755	311	8.71	355,868	60	16.80	3,247,887	254	7.82	9.04
1993	3,643,638	324	8.89	362,661	60	16.54	3,280,977	286	8.71	7.83
1994	3,687,158	355	9.62	369,481	71	19.22	3,317,677	284	8.56	10.66
1995	3,731,006	291	7.80	375,875	48	12.77	3,355,131	243	7.24	5.53
1996	3,782,862	331	8.75	382,118	70	18.31	3,400,744	261	7.67	10.64
1997	3,828,061	288	7.52	388,850	49	12.60	3,439,211	239	6.94	5.66
1998	3,860,091	321	8.39	394,511	70	17.74	3,465,580	254	7.32	10.42
1999	3,889,507	299	7.69	399,887	60	15.00	3,489,620	239	6.84	8.16
2000	3,915,798	315	8.04	407,101	50	12.28	3,508,697	265	7.55	4.73
2001	3,839,810	280	7.29	437,228	50	11.43	3,402,582	230	6.76	4.67
2002	3,858,806	248	6.43	449,176	46	10.24	3,406,630	202	5.93	4.31
2003	3,878,532	207	5.34	463,126	55	11.87	3,415,406	152	7.06	7.42
2004	3,894,855	321	8.24	476,198	66	13.86	3,418,557	255	7.46	6.40
2005	3,912,054	321	8.21	489,819	55	13.27	3,422,235	256	7.48	5.79
2006	3,947,759	285	7.21	494,274	51	10.31	3,453,185	234	6.77	3.54
2007	3,782,995	308	8.14	506,536	40	7.90	3,276,459	268	8.18	-0.28*
2008	3,760,866	340	9.04	520,163	64	12.30	3,240,703	276	8.52	3.79
2009	3,740,410	356	9.52	541,747	71	13.11	3,198,553	285	8.91	4.20
2010	3,725,789	353	9.47	541,998	63	11.62	3,183,791	290	9.11	2.52
2011	3,686,771	326	8.81	563,947	44	7.80	3,122,824	282	9.03	-1.23*
2012	3,642,281	314	8.62	582,545	51	8.75	3,059,735	263	8.60	0.16
2013	3,595,839	308	8.57	600,394	53	10.49	2,995,445	245	8.18	2.31
2014	3,518,397	231	6.51	617,007	55	8.91	2,931,390	176	6.00	2.91
2015	3,411,307	234	6.86	641,223	57	8.89	2,770,084	177	6.39	2.50

* Negative rates differences are the results of main prevalence suicides rates in younger cohorts

Table 2. OR's indexes between 0-64 years and 65 or older

Year	OR	p-value	Year	OR	p-value	Year	OR	p-value
1980	1.96	< 0.001	1992	2.16	< 0.001	2004	1.81	< 0.001
1981	3.16	< 0.001	1993	1.9	< 0.001	2005	1.77	0.006
1982	2.36	< 0.001	1994	2.25	< 0.001	2006	1.52	0.006
1983	2.45	< 0.001	1995	1.76	< 0.001	2007	0.97	> 0.05*
1984	2.57	< 0.001	1996	2.39	< 0.001	2008	1.44	0.008
1985	3.27	< 0.001	1997	1.81	< 0.001	2009	1.47	0.0034
1986	3.15	< 0.001	1998	2.42	< 0.001	2010	1.28	0.078*
1987	2.79	< 0.001	1999	2.19	< 0.001	2011	0.86	> 0.05*
1988	2.67	< 0.001	2000	1.63	< 0.001	2012	1.02	> 0.05*
1989	2.17	< 0.001	2001	1.69	< 0.001	2013	1.28	0.077*
1990	2.53	< 0.001	2002	1.47	< 0.001	2014	1.48	0.01
1991	2.91	< 0.001	2003	1.47	< 0.001	2015	1.39	0.029

*All OR indexes are statistically significant with the exception of 2007, 2010-13 years.

4. Conclusions

Puerto Rican elderly population has double the risk of suicide in the last 35 years. Currently precarious socio-economic conditions of PR make the elderly population at a higher risk than other subjects due to fragile conditions they experienced. It is expected that this phenomenon will not change in a near future unless interventional programs to prevent suicide be activated and effectively promoted [7]. It is imperative to foment sensitive crisis prevention programs and public policies in Puerto Rico with emphasis in the elderly population. Governmental and private agencies efforts need to put together strategies to prevent suicides in PR.

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