

Original Article

Life expectancy, mortality and elections: their association during elections in Malta

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Abstract

Introduction: While life expectancy has increased over the past thirty years, such increases have not been constant around election times in Malta. This study seeks to explore the relationship between the time of elections in Malta and specific mortality rates.

Aim: To determine if there is an association between mortality and elections in Malta.

Method: Yearly age specific death rates for all-cause mortality, mortality from ischaemic heart disease, cerebrovascular disease, other heart diseases and all circulatory diseases as well as suicides were calculated from the Malta National Mortality Register for the period between 1985 and 2013. Years when elections and referenda were held between 1985 and 2013 were obtained from the Electoral Commission.¹ The years 1985 – 2013 were coded using dummy variables to categorise them into pre-election, post-election, election year or any other year. Data was analysed using Poisson's regression technique in STATA with Mortality Rate Ratio (MRR) presented as the outcome measure.

Results: A significant increase in overall mortality during election years resulted for circulatory disease MRR 1.058 ($p<0.001$; 95% CI 1.029-1.087), cerebrovascular disease MRR 1.09 ($p=0.002$; 95% CI 1.032-1.155) and other heart diseases MRR 1.36 ($p<0.001$; 95% CI 1.276-1.449). A significant increase was also noted during pre-election years in circulatory disease MRR 1.046 ($p=0.002$; 95% CI 1.017-1.075) and other heart diseases MRR 1.33 ($p<0.001$; 95% CI 1.248-1.422) and post-election years for cerebrovascular disease MRR 1.08 ($p=0.009$; 95% CI 1.020-1.150) and other heart diseases MRR 1.19 ($p<0.001$; 95% CI 1.108-1.273) relative to the other years.

Conclusion: This ecological study provides an indication that mortality patterns may be associated with the electoral cycle in Malta. Further research on individual physical and psychological responses to political events, particularly around election time is warranted.

Keywords

cerebrovascular disorders, heart diseases, life expectancy, Malta, suicide

Introduction

Malta is a democratic republic country where the general public aged 18 years and over who are eligible to vote for their preferred Members of Parliament in a first past the post system every five years.¹ The elected party has a five year mandate to govern. Voting turnout in Malta is very high and during the seven general elections held between 1985 and 2013 there was a voting turnout of around 95%.¹

Between 1985 and 2013, seven general elections and two national referenda were held in Malta. Graphs showing life expectancy (statistical measure of the average time an individual is expected to live) evolution since 1970 indicate that there is a stagnation of life expectancy during election time (Fig. 1).

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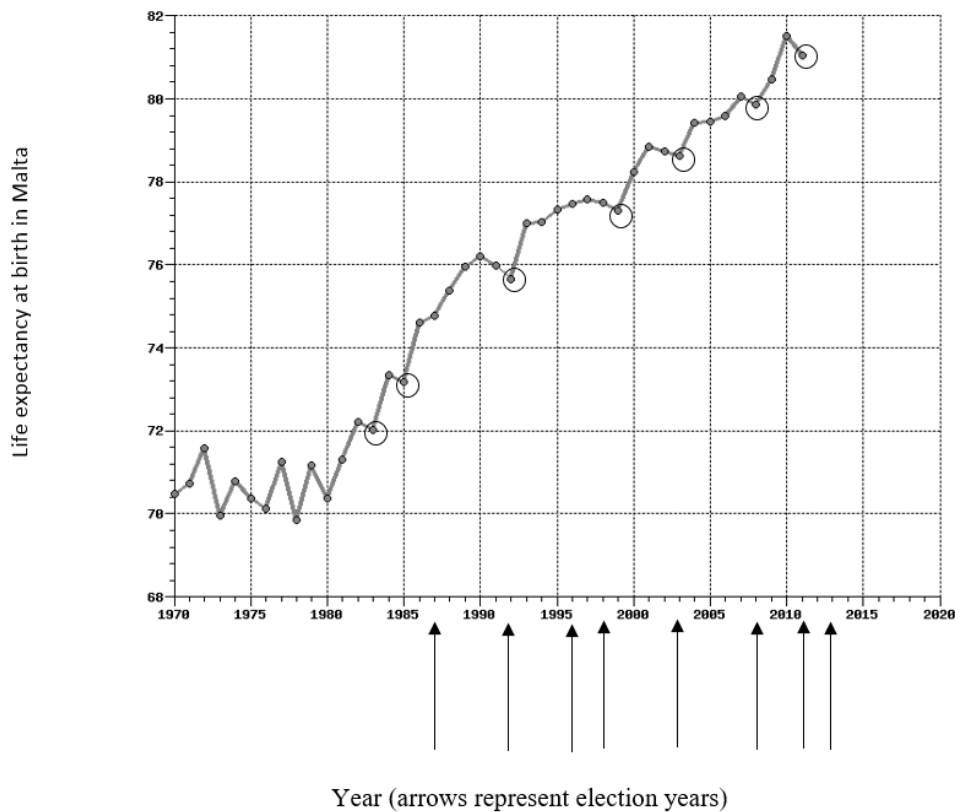
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Figure 1: Life Expectancy at Birth in Malta (circled dates represent election years)

There is very little information about pattern of mortality rates during election times in Malta. A study carried out by Sammut³ suggested that the incidence of both non-fatal, as well as fatal, acute cardiac coronary events was increased during the election period compared with other control periods. In light of the above data, it is of interest to explore whether there is a population level phenomenon associating mortality with the electoral cycle.

Literature Review

Democracy, is the most important system of government. It is a system in which the citizens of a country rule by the majority vote. The United Nations describes democracy as “a universally recognized ideal”.⁴ Nowadays approximately 60% of the world’s nations are democracies. The most important aspect of democracy is that every adult person has equal political rights irrespective of race, gender or religious belief. Citizens living in a democratic country are protected from oppression by laws and limits on governmental power.⁵

Elections bring a certain amount of stress. Waisel –Manor et al.⁶ concluded that elections are exciting but very stressful events. The Oxford Dictionary¹⁰ defines stress as ‘a state of mental or

emotional strain or tension resulting from adverse or demanding circumstances’. Stress is associated with an increased risk of mortality from several major causes including death from all causes, cardiovascular diseases including cerebrovascular disease, all cancers and deaths from external causes.⁷

The ‘House of Representatives’ consists of 65 members who are elected for a five-year term unless an election needs to be called beforehand due to problems in government.¹ Since 1985 Malta had seven general elections in 1987, 1992, 1996, 1998, 2003, 2008 and in 2013. Two referenda in important policy issues were held in 2003 (EU Referendum) and in 2011 (Divorce Referendum).¹

Two studies were conducted in Malta regarding body responses (the behaviour of the individual that results from an external or internal stimulus) during election times. A study carried out by Sammut³ on the Maltese population showed that the incidence of both non-fatal and fatal acute cardiac coronary events increased during the election period and this was compared to other control periods. It is possible that this difference can be explained by the effects of heightened acute mental stress levels that are generated among the Maltese population in general by public events such

as general elections.

A study by Grech⁸ concluded that stress leading up to elections in Malta caused a reduction in the male-to-female birth ratio. Previous studies did conclude that population level socio-economic scarcity such as when a country passes through economic depressions may lead to a reduction in the ratio of males to females at livebirth.⁹ Other studies conducted in different populations during or after stressful events confirmed the physiological and psychological responses these events brought about.¹¹⁻¹³ Several studies showed an increase in cardiac complications after the September attacks on the Twin Towers in New York in 2001. Feng et al.¹¹ found a significant increase in tachyarrhythmia, acute myocardial infarction and a smaller increase in unstable angina after the September attacks. The difference did not appear to have taken place due to temporal variation but was more likely to be related to stress.

Wilbert-Lampen et al.¹² showed that viewing important football matches like the World Cup more than doubles the risk of an acute cardiovascular event, particularly in men with already known coronary heart disease.

There is a strong correlation between committing suicide or attempting suicide and stressful life events.¹³ Individuals who committed suicide would have experienced more undesirable events when compared to controls. On the other hand Patterson and Pegg¹⁴ concluded that people are committing more and more suicides because of increased boredom. People with a fulfilling social life and those that keep themselves busy have a decreased risk of committing suicide or attempting deliberate self-harm. Even though elections bring about with them stress, for some people elections bring about with them a sense of hope and something to look forward to in life.

Method

The exact dates of the elections and referenda taking place in Malta during the period between 1985 and 2013 were obtained from the Electoral Commission.¹ Data for all-cause mortality and mortality from all circulatory diseases, ischaemic heart disease, other heart diseases, cerebrovascular disease and suicides for all ages, for each year since 1985 was obtained from the Malta Mortality Register (Malta National Mortality Register, Directorate for Health Information & Research).

All the data was analysed for both males and females separately, on a yearly basis for the period between 1985 and 2013 and at 5 year age group intervals from birth onwards. The total population of Maltese residents for each age group for the period between 1985 and 2013 was obtained from the National Statistics Office (NSO) website.¹⁶

Each year was categorised and labelled as election year, pre-election year, post-election year, or any other year. The same was done for the referenda. These years were coded using dummy variables as follows with election year coded as 2, post-election year as 3, pre-election year as 4 and any other year as 1. Since in 1996 and in 1998 there was an election in each year, this created some difficulty for the classification of the year 1997. Since the 1998 election was unforeseen it was decided to designate 1997 as a post-election year.

Poisson's regression was carried out using STATA¹⁸ (Data Analysis and Statistical Software used mainly for data management, statistical analysis, graphics, simulations, regression and custom programming). STATA was chosen as this was the statistical software available to the analyst but the model could have been run in other packages such as SPSS, R or SAS. All data was adjusted for age and gender and the Mortality Rate Ratio (MRR) calculated. The MRR is a ratio quantifying the increase/decrease in mortality. Poisson's regression was chosen since it allows for the analysis of count data using linear trends while adjusting for multiple explanatory variables such as age group, gender and year. A *p*-value of <0.05 was taken as significant in the analysis.

Results

No difference was found in all-cause mortality risk between all the years (*p*=0.055; 95% CI 1.00 – 1.04). When looking at ischaemic heart disease, we found no difference in mortality risk when comparing pre-election (*p*-value of 0.90), election (*p*-value of 0.40) and post-election (*p*-value of 0.84) years to non-election years.

The likelihood of dying from circulatory diseases (including heart diseases, cerebrovascular diseases and diseases of arteries and veins) was significantly elevated during pre-election and election years compared to non-election years. The highest risk was during election years where the risk of death from circulatory diseases was found to be 1.058 times greater when compared to non-

election years ($p<0.001$; 95% CI 1.029 – 1.087). This increase in the likelihood of death from circulatory diseases was observed to be higher in pre-election years than in non-election years with an MRR of 1.046 ($p=0.002$; 95% CI 1.017 – 1.075) in pre-election years compared to non-election years. There was no association with post-election years.

For other heart diseases (including heart failure, pulmonary embolism, pericarditis, cardiac valve disorders and cardiomyopathies) we noted an increased probability of dying in all years associated with the election – pre, election and post year – when compared to non-election years. The highest likelihood of death was during the election year itself with death from other heart diseases being 1.36 times more likely during election years compared to non-election years ($p<0.001$; 95% CI 1.276 - 1.449). This risk was marginally lower during pre-election years with an MRR of 1.33 ($p<0.001$; 95% CI of 1.248 - 1.422). While the risk decreases during post-election years, the likelihood of dying from other heart diseases still remains significantly high when compared to non-election years with an MRR of 1.19 ($p<0.001$; 95% CI 1.108 - 1.273).

Similar to the previous causes of death the risk of death from Cerebrovascular diseases was significantly elevated during election years when compared to non-election years (MRR 1.09, $p=0.002$; 95% CI 1.032 - 1.155). In contrast with circulatory diseases however the elevated risk did not begin in the pre-election period but was carried into the post-election period with an MRR of 1.08 ($p=0.009$; 95% CI of 1.020 - 1.150) in post-election years compared to non-election years.

In contrast to the patterns exhibited by the previous causes of death, death by suicide exhibited an opposite pattern in relation to election cycles. During election years the risk of death due to suicides was found to be approximately 40% lower when compared to non-election years ($p<0.001$; 95% CI of 0.500 - 0.820). There was no association for the pre and post-election years.

Table 1 is a summary of the results including MRR, p value and CI.

Table 2 shows a graphical summary of the pattern of mortality risk for all-cause mortality and diagnosis specific causes of death when comparing election related years to non-election years.

Table 1: Summary of the results

Cause of Death	Year	p Value	MRR	95% CI
All cause mortality	Election year	$p=0.055$	1.018	1.00-1.04
	Pre-election year	$p=0.52$	1	0.98-1.01
	Post-election year	$p=0.6$	1.01	0.99-1.03
Ischaemic Heart disease	Election year	$p=0.4$	1.02	0.98-1.06
	Pre-election year	$p=0.9$	1.002	0.96-1.04
	Post-election year	$p=0.8$	1.004	0.96-1.05
Circulatory disease	Election year	<0.005	1.058	1.029-1.087
	Pre-election year	<0.005	1.046	1.017-1.075
	Post-election year	$p=0.2$	1.02	0.99-1.05
Other heart disease	Election year	<0.005	1.36	1.28-1.45
	Pre-election year	<0.005	1.33	1.25-1.42
	Post-election year	<0.005	1.19	1.11-1.27
Cerebrovascular disease	Election year	<0.005	1.09	1.03-1.15
	Pre-election year	$p=0.07$	1.05	0.99-1.12
	Post-election year	<0.05	1.08	1.02-1.15
Suicides	Election year	<0.005	0.64	0.497-0.82
	Pre-election year	$p=0.06$	0.8	0.62-1.01
	Post-election year	$p=0.7$	1.04	0.82-1.32

Table 2: Summary of mortality risk patterns by cause of death 1985 - 2013, reference group non-election year. An upward arrow indicates elevated risk, a downward arrow indicates lower risk while an equal sign indicates no difference between the year and reference group.

Cause of Death	YEAR		
	Pre-Election	Election	Post-Election
All Cause Mortality	=	=	=
Ischaemic Heart Disease	=	=	=
Mortality from circulatory Diseases	↑	↑	=
Other Heart Diseases	↑	↑	↑
Cerebrovascular diseases	=	↑	↑
Suicides	=	↓	=

Discussion

From the results obtained, when adjusted for the effect of age and gender, the most significant health impact of elections appears to be on the category 'Other heart diseases'. According to the International Statistical Classification of Diseases and Related Health Problems (ICD 10)¹⁷ 'Other heart diseases' includes conditions like heart failure, pulmonary embolism, pericarditis, cardiac valve disorders, conduction disorders and cardiomyopathies. In Malta the main condition captured under the heading 'Other heart diseases' is mortality from heart failure. The results show that in Malta the chances of dying from heart failure during election years compared to non-election years increased substantially. Similarly this is also seen in pre and post-election years. Individuals who are already diagnosed with heart problems and tend to take elections very seriously need to be more cautious during this period. This is very similar to what Wilbert-Lampen et al.¹² found with regards to stress during World Cup matches. They concluded that during this period men who already have a history of heart problems tend to experience a higher risk of mortality.

Dikavonic¹⁵ and Russ T C⁷ found a strong correlation between stress and cerebrovascular disease. A similar result was seen here with an

increased risk of mortality from cerebrovascular diseases during election and post-election years compared to non-election years.

Elections in Malta have a positive impact when it comes to suicide and people tend to commit less suicides during election years. Since Malta is such a small country, during election time people might feel more involved and have something additional to look forward to in life. Democratic elections, not just in Malta can bring with them a sense of hope for some people and as Patterson and Pegg¹⁴ concluded, boredom and lack of hope makes people think of committing suicide more often and if people are kept busy, this can prevent them from committing suicide or attempting deliberate self-harm.

The main limitation in this study is the small numbers of mortalities. Even though all deaths in residents were considered between the years 1985 and 2013, Malta being a small island with an average population of about 400,000 means that analysis is conducted on small numbers allowing for wider fluctuations in rates. The accuracy with which death certificates are completed varies and coding variability between different coders over time may also lead to discrepancies. This variation can be assumed constant since variations in coding discrepancies can be assumed to remain constant

throughout the years and over the years considered in this analysis and the completion and coding of death certificates should not vary during election years.

Conclusion

Sammut³ and Grech⁸ both discussed the impact Maltese elections have on our mental and general physical health. Together with this study they all highlight the paramount importance of anticipating when more medical complications can arise. This should translate into more health promotion and increasing awareness amongst health care workers during election times.

Democracy entails that there should be a general election every five years to allow the general public to vote for their preferred party in government. As happens every time a general election is approaching, from a year before the end of term of Government in Parliament, the Health Promotion and Disease Prevention Directorate should come up with an awareness campaign advising the public how they can recognise better and from an earlier stage cardiac symptoms. Individuals, especially those with a history of cardiac problems, should visit their GP/Health Centres in order to check their blood pressure and other cardiovascular parameters on a regular basis. Emphasis should also be placed on maintaining the mental health of individuals. There should be an education campaign in place advising the public on how to keep generally healthy, and how to avoid unnecessary stress especially during the election period.

Recommendations should also be placed on increasing the amount of physical activity and taking up more hobbies during the election period so as to avoid thinking continuously and worrying of what can happen during this period and after.

Family Doctors should be made aware of this situation and rate the opportunity to flag patients at risk according to their medical and social history. They should be the first line of doctors who are most likely to identify certain individuals at an increased risk from certain complications like heart failure, cerebrovascular disease and circulatory disease.

Further research in this area should be conducted. More research at an individual level (e.g. by conducting surveys and questionnaires on people admitted to hospital complaining of heart

problems, cerebrovascular diseases and circulatory diseases, especially those who already have a history of heart problems) would help us to clarify the results concluded in this study. Similar studies should also be conducted in other countries and the results compared to the local scenario.

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