

Updated prevalence and future projections of persons with dementia in the Maltese Islands with a focus on regionality, citizenship and costs

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Background

The global dementia prevalence is expected to double every twenty years. Previous local estimates of persons with dementia were based upon projections that did not account for the current population growth. Moreover, the prevalence of such individuals who are non-Maltese citizens, as well as the economic cost were never estimated. The main objective of this study was to provide updated figures on local prevalence rates of persons with dementia living in the Maltese Islands.

Methods

To estimate the dementia prevalence rates, the World Health Organisation's prevalence figures for the European region based on sex and age were used to determine the Maltese adult dementia population for each age/sex group according to data obtained from the 2021 Census. The same method was adopted to calculate the prevalence of persons with dementia who are non-Maltese citizens and for each local district. The estimates for the years 2025 to 2060 were calculated using the Eurostat population projections database.

Results

The number of persons with dementia in Malta for the year 2021 was found to be 7,988 (1.54% of the total Maltese population), with 5.3% being non-Maltese citizens and 29% living in the Northern Harbour district. This figure is expected to increase to 21,523 persons by the year 2060. The cost of dementia in the Maltese Islands in 2021 was estimated to range between €220-€260 million.

Conclusion

The projected increase in dementia prevalence in the Maltese Islands is being driven by population ageing and population growth with the latter becoming a significantly important contributor. Local policy makers need to increase capacity of high-quality health and social care provision and reduce the incidence of dementia by targeting modifiable risk factors.

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Dementia or major neurocognitive disorder is a syndrome associated with cognitive decline characterised by impairment in memory, thinking, behaviour and communication severe enough to interfere with the ability to carry out activities of daily living independently.¹ Over the past two decades, there has been an increased global interest in this syndrome, so much so, that the World Health Organisation (WHO) has classified dementia as a public health priority.² The need for such awareness has been raised partly in view of the global increase in the prevalence of dementia, which is expected to double every 20 years as a result of population ageing. According to WHO, in 2019, there were 55.2 million persons with dementia (PWD), a figure that is expected to increase to 78 million by 2030 and to 139 million by 2050.³ In recognition of this, in 2017, the WHO published the first global action plan on the public health response to dementia for the years 2017-2025,⁴ aimed at reducing the incidence of dementia and improving the quality of life and care of PWD and their family members.

Over the past years, the Maltese population has experienced a demographic transition and population ageing. According to the Maltese Census of the Population and Housing (2021),⁵ 128,930 persons, or 24.8% of the Maltese population, were persons over the age of 60 years. Moreover, there was an shift in the age-dependency ratio increasing from 23.7 in 2011 to 27.6 in 2021, indicating population ageing.⁵ Nevertheless, the age-dependency ratio is lower than the European average (32.5), this being partly due to the recent influx of younger non-Maltese migrants. Local data show that of a total population of 519,562 persons in 2021, 115,449 or 22.2% were non-Maltese citizens - a fivefold increase since 2011.⁵

The first⁶ and second⁷ dementia prevalence studies conducted locally clearly indicated how the number of PWD will increase over the course of the first half

of this century, primarily as a result of population ageing. The most recent of these two studies⁷ estimated that number of PWD over 60 years of age in the Maltese Islands in 2010 was 5,198 with a projection for 2030 lying close to 10,000 persons or 2.3% of the total Maltese population. This study has been published more than a decade ago, during which time the composition of the Maltese population has changed significantly and unexpectedly. Consequently, it was considered timely to update these estimates and projections. Besides providing new dementia prevalence estimates and projections, a secondary objective of this study was to measure the percentage of PWD who have early onset dementia (40-59 years of age) and who are non-Maltese citizens, as well as an estimation of the economic cost. Finally, the geographical distribution of PWD across the Maltese Islands divided into separate districts was estimated in order to provide new data to support policy makers and service providers on the current state of the local dementia population.

METHODS

The methodology used to estimate the number of PWD in the Maltese Islands was similar to previous studies^{6,7} except that for the current study, the updated WHO age and sex specific prevalence rates for the European Region were used (Table 1).³ These global and regional prevalence rates have been obtained based on the WHO's Global Health estimates and the Global Burden of Disease study (2019) carried out by the Institute for Health Metrics and Evaluation (IHME).⁸ The use of such methodological approach was necessary since data on the number of PWD derived from other local sources, including medical registers, have been found not to be reliable. A study conducted by Grant Thornton in 2018,⁹ that used existing records of

Table 1 European Region Dementia prevalence estimates (%) by sex and age-group (WHO, 2021)

Age Group (years)	40-59	60-64	65-69	70-74	75-79	80-84	85-89	90+
Male	0.19%	0.86%	1.65%	3.27%	6.55%	12.20%	19.07%	29.07%
Female	0.22%	0.99%	2.02%	4.19%	8.45%	15.64%	24.98%	39.05%
Total	0.21%	0.93%	1.85%	3.79%	7.67%	14.35%	22.96%	36.32%

persons diagnosed with dementia as obtained from key stakeholders in Malta, found that there were 4,293 known PWD in Malta in 2018 with 61.0 % diagnosis rate.

Data of the Maltese adult population by sex for each age group (five-year age bands) was extracted from the 2021 Maltese Census of the Population and Housing (Final Report).⁵ To calculate the number of PWD in 2021, the prevalence rates of each age group were multiplied by the total age and sex-specific adult Maltese population for 2021. The same methodology was used to estimate the number of PWD who are non-Maltese citizens. Moreover, the age and sex specific total Maltese dementia population was calculated according to six separate districts that compose the Maltese archipelago – the Northern Harbour, Southern Harbour, Southern Eastern, Western, Northern and Gozo/Comino regions using the Census data (Figure 1).

The number dementia cases in the Maltese Islands for the years 2025 to 2060 were also estimated. Age and sex specific Maltese population for the years 2025, 2030, 2040, 2050 and 2060 were extracted from the latest Eurostat population projections database (EUROPOP23).¹⁰ This database uses data for population on the 1st of January of 2022 as a starting point to estimate the baseline population projections for every European country from 2022 to 2100. These projections are based on a set of assumptions for future levels of fertility, mortality, and migration. For

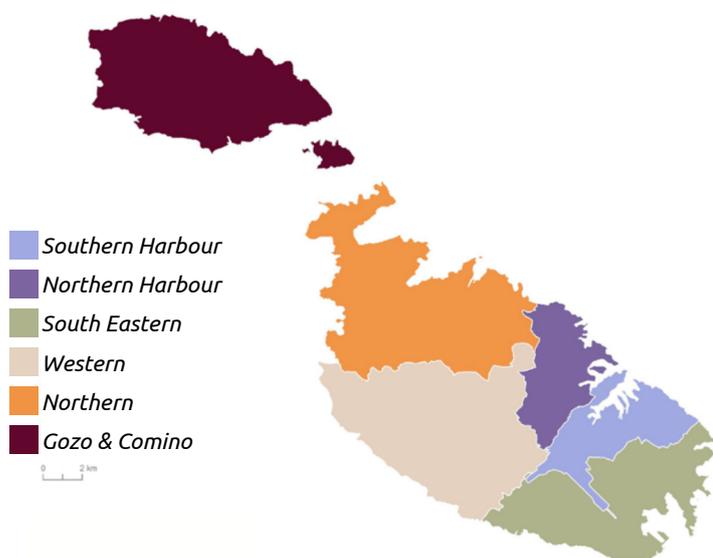


Figure 1 Geographical distribution of Malta by district (Source- Census of Population and Housing, 2021)

the assumptions of fertility, the age-specific total fertility rates (ASFR) were calculated for 2022 and the further ASFRs values extrapolated. Secondly, mortality patterns were estimated based on the assumption that the mortality rates would return to the pre-pandemic state by 2024. The age-specific mortality rates are assumed as from 2024 to partially converge towards a common sex specific life table. The assumption for migration was modelled on a number of push and pull factors such as country specific economic situation, regional wars and the impact of climate change. Trends derived from past data were also used to estimate the overall migration flows. Immigration projections were drawn from past immigration data, a working-age feedback mechanism where shrinkages in the working age population are assumed to result in additional migration and war refugees. Emigration estimates were obtained from country trends of past migration. The final projected population was then estimated using these assumptions using the steps as described in https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Population_projections_in_the_EU_-_methodology#Assumptions.

Specifically for the Maltese Islands, these projections did not consider the population density as a limiting factor of the projected population size.

Whilst these projections are hypothetical, the data take into consideration key indicators that may contribute to the current change in the Maltese demographic population and structure, such the net migration, low mortality, and fertility rates. A similar approach of using the Eurostat database to estimate future local projections, was used in a study to estimate the health care system demands in the Maltese Islands.¹¹ The baseline projections of age and sex specific population of PWD for each of these years was determined based on the WHO prevalence rates, as already described.

Finally, the estimated economic cost of dementia in the Maltese Islands for the year 2021 was calculated based on the average estimated cost per person with dementia in the European Region which, according to the WHO report,³ accounts to \$31,144 (€28,394) per year. Moreover, the direct medical costs (direct health expenditures or costs incurred by the medical

care system, such as hospital care, medicines, diagnostic tests and visits to clinics), direct social nonmedical costs (services provided outside the medical care system such as community-based services to assist with activities of daily living and long-term institutional care) and informal care costs (the time required by family members or informal carers to provide support and assistance with basic and instrumental activities of daily living) were calculated based on the percentage of the total costs for the European Region (direct medical costs: 11.6%; direct social nonmedical costs: 42.2%; informal care costs: 46.2%). These estimates were obtained using data available from the Global Dementia Observatory using the methodology described by the WHO (<https://www.who.int/publications/i/item/9789240033245>).

RESULTS

Supplementary Table 1 shows that the estimated number of PWD in the Maltese Islands by sex and age groups for the year 2021 consisted of 7,988 (1.54% of the total population). 275 persons (3.45% of the estimated total number of PWD were between 40 and 59 years, an age group where individuals are classified as having early-onset dementia. Moreover, more than one third of the local PWD population (2,750 persons; 34.4%) were 85 years or over. As expected, significantly more women were found to be living with dementia compared to men, with a male to female ratio of 1:1.8. Additionally, in 2021, 422 persons (5.3%) of the total estimated number of PWD were non-Maltese citizens (**Supplementary Table 2**).

In line with the regional differences in population ageing, most of the PWD in 2021 lived in the Northern Harbour district (29.0%). However, the district with the highest number of PWD as a percentage of the total regional population was the Southern Harbour district (1.93% of the total Southern Harbour population), followed by Gozo/Comino district (1.79% of the total Gozitan population) (**Supplementary Table 3**).

As indicated in **Supplementary Table 4**, the number of PWD in the Maltese Islands is expected to almost triple in the next 40 years, reaching 21,523 individuals by the year 2060. However, the number of PWD as a

percentage of the total population will increase only marginally from 1.67% in 2025 to 2.73% of the total Maltese population in 2060. This is mainly due to population growth which is expected to increase significantly from 553,623 inhabitants in 2025 to 788,211 inhabitants in 2060.⁹

The total estimated cost of dementia in the Maltese Islands in 2021 was calculated to be \$248,778,262, (€226,388,227). Direct medical costs accounted to €26,261,034, whereas social nonmedical and informal costs accounted to €95,535,832 and €104,591,361 respectively.

DISCUSSION

This study sought to update the estimated prevalence of PWD in the Maltese Islands with particular focus on indicators that were not previously reported in local studies, including the number of non-Maltese citizens with dementia, the geographic distribution, and the economic costs. The prevalence of PWD in 2021 was found to be higher than previous estimates in absolute terms (2020 estimate: 7,175 PWD;⁷2021 estimate: 7,988 PWD). However, when comparing the number of PWD as a percentage of the total population, the 2021 estimate (1.54%) was found to be lower than the previous report⁷ (1.73% for the year 2020). This could be due to population growth and the net migration over the past years which diluted the increase in the number of PWD with respect to the total population.

The number of PWD who are non-Maltese citizens was found to account to approximately 5% (422 individuals) of the total estimated number of PWD in 2021. This figure was close to 322 individuals (for the year 2017) as reported in a study aimed at investigating the number of dementia cases amongst migrants in the European countries, including Malta.¹⁰ These figures are expected to increase over the coming years as the number of non-Maltese citizen approaches old age. This is similar to what is happening across Europe, where around 23.8 million or 5.3% of the persons living in the European Union were reported to be non-EU citizens in 2022.¹¹ Moreover, population prevalence studies across Europe indicate that the number of PWD from minority ethnic groups are predicted to significantly rise over the coming years.^{12,13} Besides, a meta-analysis of epidemiological studies of dementia

among migrant groups in Europe suggest that persons from minority ethnic groups have a higher odds of developing dementia when compared to the reference population.¹⁴ As a result, health/social care services targeting older persons and PWD should become inter-cultural by developing effective medical¹⁵ and social support¹⁶ systems that cater for the needs of such individuals and their caregivers.

In line with the geographical distribution of older persons, where 29.0% of total number of older persons aged 60+ years live in the Northern Harbour district, 30% of the PWD were found to reside in the Northern Harbour district. However, the district with the highest percentage of PWD in relation to its population size was found to be the Southern Harbour district (1.93%), followed by Gozo (1.79%). This is congruent what has been reported by the National Statistics Office Regional Statistics (2023),¹⁷ which found that the Southern Harbour district had the highest old-age dependency ratio in 2021 (35.3%), closely followed by Gozo and Comino (33.5%). These findings acknowledge the need to develop dementia care services targeting the specific needs of each district.

The projected number of PWD in this study was found to be significantly higher than previously reported.⁷ In particular, the presented data show that in 2060 there will be 21,523 PWD, a 1.5 factor increase compared to the 2012 study.⁷ Whilst these differences could be attributed to different prevalence rates used in both studies, the higher number of PWD in the current projected estimates could have been driven by population ageing as well as by population growth. In fact, previous local⁷ and international^{18,19} studies have relied on population forecasts that did not take into consideration the recent unexpected expansion in the local population, and as a result, the previous estimates are significantly lower than the ones this study is forecasting. A report published by Alzheimer Europe¹⁸ estimated that in 2050 there will be 14,117 PWD for a total Maltese population of 426,793 individuals. Similarly, the Global Burden of Diseases Dementia Forecasting Collaborators,¹⁹ estimated that there will be 11,674 PWD in 2050, with the latter being based on a total Maltese population of around 414,370 persons.²⁰ Both estimates are significantly lower than the current Eurostat total Maltese

population projection⁹ for 2050 of 744,353 individuals; a figure that provides a more realistic scenario based on the current population growth.

According to the Maltese Census,⁵ half of the current non-Maltese citizens are between the age of 30 and 50 years. On the assumption that such individuals continue living in Malta, they will start experiencing old age in thirty years' time, making them more susceptible to developing neurodegenerative age-related conditions such as dementia. This could pose substantial challenges to the current health and social care services who are already experiencing an increase in demand. If the current population expansion remains as is, long-term and dementia care services may not be able to cope, leading to unmet medical and social care needs due to inadequate or unavailable services. Since such current population trends are not expected to change in the forthcoming future, local authorities need to invest more in public health measures that raise awareness about brain health and address potentially modifiable dementia risk factors across the lifespan that include low education at early life, hearing loss, traumatic brain injury, hypertension, excessive alcohol consumption, obesity, smoking, depression, social isolation, physical inactivity, air pollution and diabetes. If these risk factors are significantly addressed, the prevalence of dementia could potentially be reduced by 40%.²¹

This study also sheds light on the current economic cost of dementia in the Maltese Islands which, in 2021, was calculated to fall in the region of €220 million. It is expected that this figure would be higher since the WHO average annual cost per PWD was calculated for the year 2019. In fact, a recent review and meta-analysis published in 2023,²² which estimated the cost of dementia in Europe, determined that the annual mean cost per PWD in the Southern European Region to be slightly higher than the one obtained in the current study (€35,866 or a total annual cost of €260 million using the current prevalence estimate of PWD for 2021). Compared to other countries, the reported cost estimate is significantly lower than in the UK (€73,712 per PWD per year) and the Nordic region (€43,767 per PWD per year).²² Nevertheless, in view of these updated projections, the cost is expected to increase considerably, especially informal care costs, which constitute a significant percentage of the total costs in all countries, including Malta. Consequently, local policy makers need to provide

additional investment in community support programmes aimed at family members of PWD to reduce caregiver burden and ensure that PWD remain in their communities for as long as possible.

CONCLUSION

The following study was based on a number of assumptions. The baseline Eurostat population projections used to calculate the age and gender specific total population assume that fertility, mortality, and migration rates remain constant over the years. Whilst the fertility and mortality rates in the Maltese Islands are expected to remain constant, the net migration rate is more volatile and is subject to economic and political decisions. For example, a change in the economic model by the Maltese authorities with regards to working permit restrictions for non-Maltese citizens, especially non-EU citizens, can significantly influence these projections. Moreover, a number of the non-EU citizens would move back to their country of origin and be replaced by other young working migrants. However, some of the migrants may seek to relocate their family members including older persons, thereby increasing the prevalence of this age group in the migrated country.

These projections are also based on the assumption that there will be no new breakthroughs in disease-modifying therapies. Whilst over the past few years, A β removing antibody-based immunotherapies have shown some clinical benefits²³ by reducing amyloid beta in the brain, they are still not considered safe enough.²⁴ Consequently, it is expected that these drugs, at least for the time being, will not significantly alter these estimates. Additionally, these projections assume that the age-specific prevalence rates over the coming decades will not change. Increased awareness about dementia risk and protective factors could also alter prevalence estimates. However, when projected trends in exposure to known dementia risk factors were computed in the Global Burden of Diseases 2019 dementia forecasting study¹⁸, the strongest effect of dementia prevalence remained population ageing and population growth. The estimated cost of dementia in the Maltese Islands is based on the average estimated cost per person per year in the European region. Although this estimate has been found to be close to similar ones,²⁴ it needs to be acknowledged that there are significant differences in estimated costs between countries.

SUMMARY BOX

What is already known about this subject?

- Dementia is a public health priority, posing significant public health challenges.
- The global and local prevalence of PWD is expected to rise in the next thirty years due to population ageing.
- This will invariably put greater demands on the local health and social care services resulting in considerable socio-economic consequences.

What are the new findings?

- The prevalence of PWD in the Maltese Islands in 2021, was 7,988 or 1.5% of the total Maltese population and is expected to almost triple in the next 40 years, reaching 21,523 PWD by the year 2060.
- 422 persons or 5.3% of the total estimated number of PWD in 2021, were non-Maltese citizens.
- Whilst, in 2021, 29.0% of total number of PWD lived in the Northern Harbour district, the highest number of PWD as a percentage of the total district population resided in the Southern Harbour district.
- The total cost of dementia in the Maltese Islands was estimated to range between €220-260 million in 2021.

This study sought to update of the prevalence of PWD in the Maltese Islands and determine how many of these individuals are non-Maltese citizens. Moreover, a tentative picture of the geographical distribution of PWD was also provided. Besides, a more realistic forecast of projected estimates was calculated, based on the current local demographic scenario. Finally, the economic cost was measured and discussed. These findings will provide stakeholders with more realistic estimates to support current and future developments in the local dementia field. They continue to highlight the need of ensuring that services for PWD become more inter-cultural and diverse, in view of the possible increase of PWD from migrant communities, especially non-European migrants.

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