

## Original Article

# Investing in the health of the 41-60 year old: Reaping the return in the 60+ population?

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## Abstract

**Introduction:** Ageing brings an increased burden on healthcare systems. In Malta cardiovascular disease is the main cause of morbidity and mortality accounting for approximately 40% of all deaths. It is assumed that effective prevention strategies targeted at the middle-aged population would translate in better health outcomes in our elderly population.

**Aim:** To investigate how lack of awareness of conditions such as high blood pressure and high blood glucose level in the 41-60-year age group could influence the health status of future generations of elderly in our population.

**Methodology:** Two risk factors for cardiovascular disease namely raised blood pressure and raised blood glucose were identified for analysis: (i) The comparison of perception and measurement of the selected risk factors assessed in 2 cohorts aged 41-60 years at two different time points: (a) 1981/4 and (b) 2008/2010; (ii) The analysis of any changes in perception and measurement of these risk factors over time between the 1981/4 sample and a follow-up sample drawn from the first cohort 30 years later, now 60 plus years of age.

**Results:** Awareness for hypertension has increased in the 41-60-year olds over the 30-year period. However, awareness for diabetes has decreased in the same cohorts. Awareness for both hypertension and diabetes has increased as the 41-60-year olds reach 60+.

**Conclusion:** Improved perception for hypertension and diabetes in the 60+ group is not matched with better control of the condition. Medical intervention in the 41-60-age group in the 2008/2010 sample has resulted in better control of blood pressure, but not of blood glucose. These results highlight the need for stepping up awareness and screening for these conditions especially in the 41-60 group coupled with better control.

## Keywords

Perception, awareness, awareness index, hypertension, diabetes

## Introduction

Demographic changes are affecting Europe and Malta is no exception. Locally individuals aged 65 years and over are projected to increase from 15.16% in 2010 to 31.7% by 2060. In fact, the population of persons aged 65 years and over is projected to reach 111,700 – an increase of 72% when compared to this segment of the population in 2010.<sup>1</sup> An ageing population presents challenges for our societies, economies and healthcare systems. The importance of healthy and active ageing cannot be over emphasized.

In this study the focus shall be on hypertension and diabetes, two contributory risk factors for diseases of the circulatory system which accounted for 46.7% of all deaths in Malta in 2012.<sup>2</sup> Of these diseases, ischaemic heart disease was responsible for 27.5% of deaths from all causes and was the most important cause of premature mortality, in those less than 65 years of age.<sup>2</sup> Although these figures may indicate the size of the problem, they do not reflect the impact of the actual burden of disease in middle age and beyond, both on the

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individual and on the healthcare services. This necessitates the need to embark on increasing awareness, effective prevention strategies, opportunistic screening and lifestyle changes particularly targeted to delay the onset of diseases of the circulatory system.

A literature review was conducted of similar studies to be able to compare our findings. Awareness and actual presence of these conditions will be analysed in comparative local studies of 2 cohorts aged 41-60 years at two different time points (1981/84 and 2008/2010). A subgroup of the surveyed population, 41-60 year 1981/84 cohort was followed as it reached 60 plus age group. Evaluation of the public health strategies issued from time to time and their influence on health behaviour and outcomes on the population will be explored. Also, the paper will focus on areas of possible failure of health promotion in halting the rising prevalence of hypertension and diabetes through increased awareness and the introduction of healthy lifestyles from a young age thus reducing the associated morbidity and mortality from circulatory diseases.

## Method

The study set out to measure the awareness index which is the proportion of percentage of individuals with perceived disease and the actual percentage of individuals with the condition. (Awareness Index = % perceived disease / % measured disease or ratio expressed as a proportion of perceived to measured disease). An awareness index of zero (0) is equivalent to no awareness, whereas an awareness index of one (1) denotes full awareness.

Data on self-reported perception and actual measurement of raised blood pressure and raised blood glucose was available from studies performed in Malta. These include the Diabetes survey performed in 1981, the Multinational MONitoring of Trends and Determinants in Cardiovascular Disease (MONICA Project) in 1984, the European Health Information Survey (EHIS)<sup>3</sup> in 2008 and the European Health Examination Survey (EHES) done in 2010.<sup>4</sup>

Each of these surveys was a separate cross sectional study based on a representative sample of the population. No attempt has been made to

actively resample any of the previous studies' population.

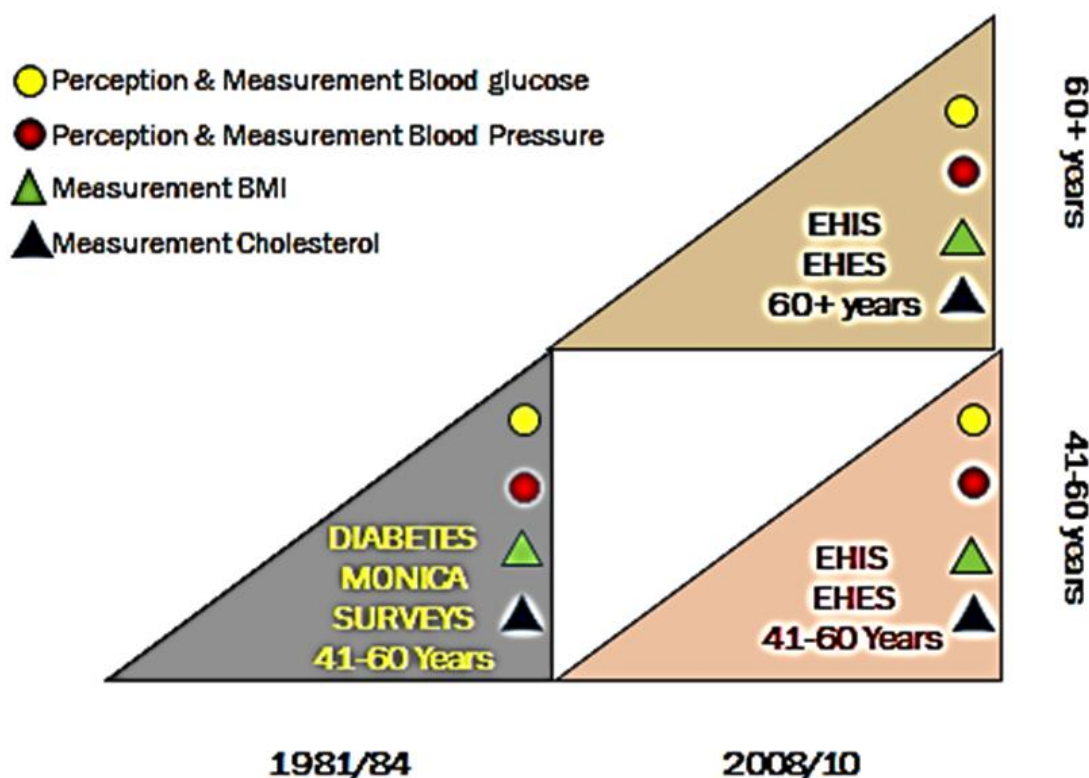
A problem in health surveys that use only questionnaires is that the individual's perception of having a disease may be different to whether that person is actually suffering from the condition or not. In medical surveys, there is a tendency of underreporting of the condition which may lead to serious bias in estimates of disease prevalence. This limitation is usually overcome by combining a questionnaire with a health examination. This has been the case in the Diabetes and MONICA surveys and the EHES whilst the European Health Information Survey (EHIS) only consisted of a questionnaire (Fig. 1).

A person was considered to be hypertensive or diabetic if a raised blood pressure or raised blood glucose (fasting or random) was found upon examination or if the individual was known to be hypertensive or diabetic but was found to have a normal blood pressure or a normal blood glucose on examination. Normal blood pressure was assumed to be when systolic blood pressure was <140mmHg and diastolic blood pressure was <90mmHg. Normal blood glucose level was taken to be  $\leq 7.1$ mmol/l after fasting for 8 hours and  $\leq 11.1$ mmol/l for a random sample of blood glucose.

In the Diabetes survey, a representative sample of 1,100 households was contacted out of which 1,098 agreed to participate. All members of the household 15 years and older participated; giving a total sample of 2,945 individuals. Individuals interviewed were asked a variety of questions including whether they had been ever diagnosed as diabetic. The purpose of this question was to avoid giving a glucose tolerance test to known diabetics because of the deleterious effect such a high dose of glucose can have on them. Unfortunately, the survey does not identify non-diabetics who said that they had been diagnosed with diabetes as the latter were not given a glucose challenge as this could have had a deleterious effect on the perceived condition.<sup>5</sup>

The MONICA survey assessed risk factors for heart disease through a questionnaire with linkage to results of the physical examination for 2,067 individuals.

*Figure 1: Timeline of studies; type of data obtained and age groups of cohorts*



A random sample of 5,124 individuals was selected to participate in the EHIS, out of which 3,680 participated given a response rate of 72%. Awareness for hypertension or diabetes was assessed according to self-reported data on the hypertensive and diabetic status of the participants in response to the question: ‘Have you had the disease/ condition-(hypertension/diabetes) in the past 12 months?’<sup>3</sup>

In order to obtain more robust information about the health of the population, DG SANCO has embarked on a European Health Examination Survey (EHES) in 2014-2015; a pilot examination survey collecting information on both diabetes and hypertension was performed in 2010. Although, this pilot study had a small sample size of 221 individuals which may limit its validity, the sample was representative of the population. Information obtained from the EHIS and EHES (pilot study) has been amalgamated to give a more robust picture of the perception and actual presence of diabetes and hypertension in the population.

## Results

Results (Table 1) show that the awareness index for hypertension 41-60 age-group has

increased over the thirty-year period; today’s 41-60-year olds are more aware of their condition than they were 30 years ago. Awareness for hypertension increases with age in that the original cohort of 41-60 year olds became more aware of hypertension as they grew older. However, no difference has been found in awareness in today’s 41-60 year olds when compared to those who are 60+ years of age.

Results showed that whilst the prevalence of high blood glucose has remained the same, there was a dramatic decrease in awareness index from 0.73 to 0.57 in 41-60-year olds over a period of 30 years. However, as the 1981 41-60-year cohort reach 60+, awareness for raised blood glucose approached maximum level from 0.73 to 0.96, which is a positive finding.

Results show that the awareness index for both conditions has increased over a thirty-year period as the 41-60-year old reached 60+. In fact, 55% of those having a raised blood pressure were aware of the condition and 96% of those found to have elevated blood glucose were cognisant of the condition. This finding contrasts to what was found in the two 41-60 year-age cohorts i.e. the 1984 and 2008/2010 cohorts, when although awareness for hypertension increased that for diabetes decreased.

**Table 1: Awareness Index for Blood Pressure and Blood Glucose**

Age Group	Study & date	Cohort No.	Blood Pressure (BP)			Blood Glucose (BG)		
			Perceived	Measured	Awareness Index	Perceived (%)	Measured (%)	Awareness Index
41-60 yrs	Diabetes <sup>1</sup> 1981	BG n=949	27(%)	67(%)	<b>0.40</b>	9(%)	12(%)	<b>0.73</b>
	MONICA <sup>2</sup> 1984	BPn=917						
	EHIS <sup>3</sup> 2008	BGn=1278 BPn=1283	25(%)	46(%)	<b>0.55</b>	7(%)	12(%)	<b>0.57</b>
	EHES <sup>3</sup> 2010	BG n=125 BP n=115						
60+ yrs	EHIS <sup>3</sup> 2008	BG n=923 BP n=921	47(%)	86(%)	<b>0.55</b>	21(%)	22(%)	<b>0.96</b>
	EHES <sup>3</sup> 2010	BG n=76 BP n=83						

<sup>1</sup> Diabetes Survey: Perception and measurement of of blood glucose

<sup>2</sup> MONICA SURVEY: Perception and measurement of blood pressure

<sup>3</sup> EHIS: Perception of blood glucose and blood pressure

<sup>4</sup> EHES: Measurement of blood glucose and blood pressure using a weighted sample; weights were applied against EHIS because of small study. Information obtained from EHIS and EHES has been amalgamated to give a more robust picture of the perception and actual presence of diabetes and hypertension<sup>2</sup>

## Discussion

When interpreting the results one must be cognisant of the fact that the cohorts studied, in particular the 41-60-year old cohort, are heterogeneous with the consequence that the age of onset or age of diagnosis of hypertension or diabetes differs. This heterogeneity is likely to impact on both prognosis and awareness. Awareness for a condition may lead an individual to undergo a medical check-up which could in turn lead to early diagnosis of the condition. On the other hand being diagnosed with a condition does not necessarily result in good control of the condition. Improvement in awareness for hypertension from 40% to 55% was noted among Maltese persons aged 41-60-years in 1981/84 upon reaching age 60+ years in 2008/2010. This is supported by findings from the Eurobarometer 2007,<sup>6</sup> NHANES<sup>7</sup> and from the Canadian Health Measures survey.<sup>8</sup> However, current awareness levels at 55% are less than satisfactory given the wider availability of health promotion and educational material and the relative ease of access to care. One has to question whether the message is reaching our population and having the desired effect. The European Health Literacy Survey

revealed that nearly half of the Europeans have inadequate or problematic ability to understand, assimilate and act on health messages received. This is associated with riskier behaviour, poorer health, less self-management and higher hospitalization and health costs.<sup>9</sup>

Comparing the two 41-60 year-age group cohorts i.e. the 1981/4 and 2008/2010, shows that over a 30-year period, there was improved awareness for hypertension but decreased awareness for diabetes. Less awareness for diabetes is very surprising since diabetes is usually symptomatic and tends to be diagnosed early. This finding may be attributed to the small numbers studied. Although the study showed that there seems to be no increase in prevalence in diabetes in the two 41-60-age cohorts (1981/4 and 2008/10), there is a possibility that the number of diabetics was inflated in the Diabetes survey due to the fact that the survey did not identify non-diabetics who said that they had been diagnosed with diabetes. Deep lack of awareness in the 41-60-age group cannot but be the harbinger of more diabetic complications once this cohort reaches old age and is cause for concern as diabetes tends to contribute heavily towards morbidity, hospital stays and

mortality in Malta and calls for deeper exploration.

As the population gets older, awareness improves considerably with awareness for elevated blood glucose in the 60+ years age group being noticeably higher (96%) than for high blood pressure (55%). This may be due to the fact that elevated blood glucose is more symptomatic and individuals tend to seek medical advice earlier on. Increased awareness may be attributed to several factors including; (i) more visits to the family doctor, (ii) increased registration of patients with a specific family doctor, (iii) increased access of family doctors through E Health portal to previous blood glucose results and thus closer monitoring of the patient, (iv) improved access to health promotion campaigns through the conventional channels but also through the social media, (v)

increased availability of home monitoring devices among family and friends that encourage people to check for hypertension or diabetes and (vi) increased availability of these tests in community pharmacies. More awareness enhances the checking of blood pressure and blood glucose with possible earlier diagnosis of the condition.

Whilst the above trends in awareness and measurements have not been reported previously, this discussion would be incomplete if certain changes in underlying contributory factors, already reported elsewhere in the literature, are not considered. These include a significant increase in the percentage of persons with a normal BMI within the 41-60 age-group and an increase in percentage of persons having a desirable serum cholesterol level in both age groups in 2010 (Table 2).

**Table 2:** BMI and cholesterol measures in the populations under study

Age Group	BMI%			Total Cholesterol %		
	Normal	Overweight	Obese	Desirable	Borderline	High
41-60 (1981) <i>n</i> =930	20.9	42	37.1	n.a.**	n.a.**	n.a.**
41-60 (1984) BMI <i>n</i> =838 CHOL <i>n</i> =566	23.4	39.4	37.2	14.1	25.1	60.8
41-60 (2010) BMI <i>n</i> =104* CHOL <i>n</i> =120*	35.6	28.8	35.6	26.7	46.7	26.7
60+ (2010) BMI <i>n</i> =87* CHOL <i>n</i> =77*	24.1	41.4	34.5	27.3	41.6	31.2

\*weighted count, weights applied to the sample against EHIS because of very small study

\*\*Cholesterol measurements were not taken in the diabetes study

When the persons aged 41-60 years in 1981/1984 reached the 60+ years in 2010, the improvement in their BMI is negligible but the percentage of individuals with a desirable serum cholesterol level has doubled. This may be due to multiple confounding variables; increased receptiveness to health promotion messages stressing the need to monitor serum cholesterol, the availability of better and free cholesterol lowering drugs on the Schedule V Government Formulary and the interest of the pharmaceutical industry.

However, the same cannot be said for messages advocating a change in lifestyle, as the BMI remained grossly unchanged. This implies selective uptake of health promotion messages. Furthermore,

lifestyle modifications are more difficult to instil in later life. The Diabetes Prevention Programme (DPP) demonstrated that lifestyle interventions involving a healthy, low calorie, low-fat diet and moderate physical activity, in individuals at risk of developing diabetes are cost-saving in individuals younger than 45 years of age and cost-effective in all age groups when compared to Metformin and placebo interventions. The lifestyle intervention was highly cost effective, costing \$1,100 per QALY when compared to the Metformin intervention costing approximately \$31,300 per QALY.<sup>10</sup> Cost-saving interventions present no difficulty with respect to policy implications and should be introduced earlier on in life especially in individuals

at high risk of developing diabetes. Cost-saving should also be factored in when devising guidelines. Guidelines should be effective in reducing morbidity and mortality but would provide added value if they are cost-effective. Evaluation of the 2014 guidelines for US adults was made using the Cardiovascular Disease Policy Model to simulate; (i) drug-treatment and monitoring of costs, (ii) costs averted for the treatment of cardiovascular disease and (iii) quality-adjusted life years (QALYs) gained by treating previously untreated adults between the ages of 35 and 74 years from 2014 through 2024. The implementation of these guidelines could potentially prevent about 56,000 cardiovascular events and 13,000 deaths annually. Treatment of stage 1 hypertension was found to be cost-effective for all men and for women between the ages of 45 and 74 years (defined as <\$50,000 per QALY) amongst other benefits.<sup>11</sup> Thus besides providing the optimal treatment for a condition, guidelines provide added value if they are cost-effective.

Strategies help us achieve our goals but they need to have realistic, measurable targets that are attainable within stipulated time frames. For instance, there is no available evidence that the key targets outlined in the Health Vision 2000 published in 1995 for blood pressure and blood glucose have been achieved. These stated that by 2005, the diastolic blood pressure distribution in the general population should be reduced by 10mmHg and that by 2000, the prevalence of non-insulin dependent diabetes mellitus among those aged 34 and older is to be reduced to 7.5% or less and Impaired Glucose Tolerance should be reduced to 9% or less. Although these targets may not have been achieved, a downward trend in the age-standardized mortality rate from diseases of the circulatory system is observed. Recent strategies have formulated three (3) targets for the reduction of risk factors for circulatory diseases include: (i) reducing the prevalence of self-reported hypertension in Maltese adults by 3%, (ii) limiting the prevalence of diabetes among persons aged 34 years and over to 10%,<sup>12</sup> (iii) curbing and reversing the trend of overweight and obesity in children and adults, thus diminishing the consequences of excess body weight on health, social and economic aspects.<sup>13</sup> Hopefully these strategies will have the desired outcomes.

This study has certain limitations as although the results are representative of the population it

was not possible to divide the population by gender as the EHES numbers were too small. The low power may limit the conclusions drawn from the observed potential decline in awareness index for diabetes in the 41-60 year olds from 1981/4 to 2010. The following assumptions were made that (i) the sample taken of the 60 plus age group (2008/2010) was representative of the original samples of the 41-60 age groups of the 1981/84 groups and (ii) there were no significant changes in the health profiles of these two groups.

### Conclusion

Life expectancy in Malta has increased and this presents the health service providers with new challenges. A sustainable healthcare system must be responsive to the changing needs of the population. The results illustrate that the formulation of strategies as standalone initiatives do not lead to the desired health outcomes. Notwithstanding their inherent validity, they need to be supported by new work practices and work processes. Also, one must keep in mind the importance of lifelong health promotion and education targeting all the population young and old, so that healthy habits are instilled early, thus delaying onset of disease.

In order for public health messages and initiatives to reach and be understood by the population, the cultural belief, patients' perspectives and health literacy levels need to be considered. Identifying gaps in awareness can help physicians and policymakers improve disease management and education programmes.

The introduction of cost-saving or cost effective interventions in individuals at high risk to develop diabetes or hypertension presents no difficulty with respect to policy implications and should be introduced earlier on in life.

The role of all health professionals and in particular family doctors cannot be overemphasized as the latter are usually the first point of contact of the patients. Family doctors are encouraged to perform opportunistic screening for hypertension and diabetes and to keep abreast with guidelines on weight management and developments in the treatment of hypertension and diabetes so that they can manage these conditions optimally.

Improved awareness for risk factors of circulatory disease, in particular for hypertension and diabetes, would empower persons to seek advice earlier from better informed health

professionals. In fact, the strategy entitled “A National Health Systems Strategy for Malta 2014-2020”<sup>14</sup> proposes leaps in health attainment by improving and increasing preventive, screening and health promotion services to ‘healthy’ citizens and by promoting and streamlining interactions between different services to ensure continuity of care. Improving access to healthcare and better synergy between primary and secondary care would translate in better health outcomes for the population at large.

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