



PREVALENCE STUDY OF GLAUCOMA IN MALTA AND GOZO

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ABSTRACT

A glaucoma survey was carried out in Malta and Gozo. Using non-contact pulseair tonometer, 2245 participants selected on a random basis, aged 40 years and above, were examined and 3.29% were found to have glaucoma. Among them 1.69% were newly detected glaucoma cases. The main risk factors were diabetes mellitus in the personal past history and glaucoma in the family history. Age was confirmed to be a risk factor, but arterial hypertension and myopia could not be proved as risk factors. About 4000 glaucoma cases were estimated to be present in Malta and Gozo at the time of the survey. Some other ocular conditions were also found in relatively high percentages: cataract - 3.3%, myopic maculopathy - 2.9% and diabetic retinopathy - 1.5%.

INTRODUCTION

Glaucoma in many countries is one of the most prominent causes of visual impairment and even blindness. For this reason the early detection of glaucoma is very important for the prevention of visual invalidity. The screening of total populations cannot be realistically achieved but the screening of selected groups represents an alternative method for active and early detection of glaucoma and can single out some risk factors, which may be important for the onset of disease.

In many countries glaucoma surveys were carried out and it was proved that the prevalence of glaucoma in populations is around 1 to 2%^{1,2,3,4,5,8}. Since the Maltese population has some inherent 'risk factors' for glaucoma (eg. high prevalence of diabetes and

arterial hypertension) and since the Maltese population is rapidly aging (29% are aged 35 - 60 years, and 13% are over 60 years), it was felt justified to undertake a survey to assess prevalence.

ORGANISATION AND METHODOLOGY

Between 10th April and 17th June 1989, an EYE DISEASE SURVEY was carried out in Malta and Gozo. This survey was organised by the Department of Health, Malta, with the cooperation of the World Health Organization (W.H.O.) and International Initiative Against Avoidable Disablement (I.M.P.A.C.T.).

The objectives of the survey were as follows:-

- a) to estimate the prevalence of glaucoma in the population selected on a random sample basis, among those aged 40 years and above.
- b) to analyse the relation existing between the presence of primary glaucoma and 'risk factors', such as diabetes mellitus, arterial hypertension, myopia and familial predisposition for glaucoma.
- c) to evaluate the reliability and practicability of non-contact pulseair tonometer (PULSAIR - KEELER) in mass screening for glaucoma, and
- d) to design a control programme for glaucoma, incorporating active detection, prophylaxis and treatment.

Before beginning, the survey the following preparations had to be done:-

- a) a modified version of W.H.O./P.B.L. Eye examination protocol was adapted for the objectives of the survey.
- b) a computer data base to accept the data collected in the questionnaire was designed.
- c) a training course for the survey staff on the use of the non-contact tonometer.
- d) 3212 participants from Malta and 282 from Gozo, totalling 3494 participants, representing about 3% of the population aged 40 years and above were selected at random from the electoral register.

The examination of the participants was performed in Malta between 10 April and 10 June, 1989 and in Gozo from 12 to 17 June, 1989. It included:-

- a) Personal and family medical history of the main risk factors related to glaucoma, namely diabetes mellitus, glaucoma and arterial hypertension.
- b) Visual Activity: participants were invited to use either unaided eyes or if they had spectacles to wear them during the examination. Improvement vision using the pinhole technique was also recorded.
- c) Fundoscopy. Cupping of over 0.5 was taken as pathological. Other fundal changes like optic atrophy not having glaucomatous origin; macular, myopic or senile degeneration and dia-

betic retinopathy were also recorded.

RESULTS AND DISCUSSION

From 3494 selected persons, 64% responded to the survey. Among the respondents there was no significant difference between males (46.9%) and females (53.1%). The prevalence of females was more evident after the age of 70 years, reflecting national life expectancy trends thus validating the representativeness of the surveyed sample. As regards visual acuity, 52.4% of the participants did not need corrective spectacles, 39.2% had correct spectacles and only 8.4% were deemed to need refractive correction on their visual acuity improved after using the pinhole.

Visual acuity was better than 6/60 in 97.4% but in 2.6% it was reduced to 3/60 or below and was interfering with normal activity. 0.16% of the participants were blind (amaurotic).

The following ocular pathology was also detected: Lens opacities prevent-

ing fundal view (3.3%), myopic maculopathy (2.9%), diabetic retinopathy (1.5%), senile macular degeneration (0.4%), corneal opacities (0.4%), vitreous opacities (0.17%), optic atrophy (0.13%), and phthisis (0.13%).

A. TONOMETRY

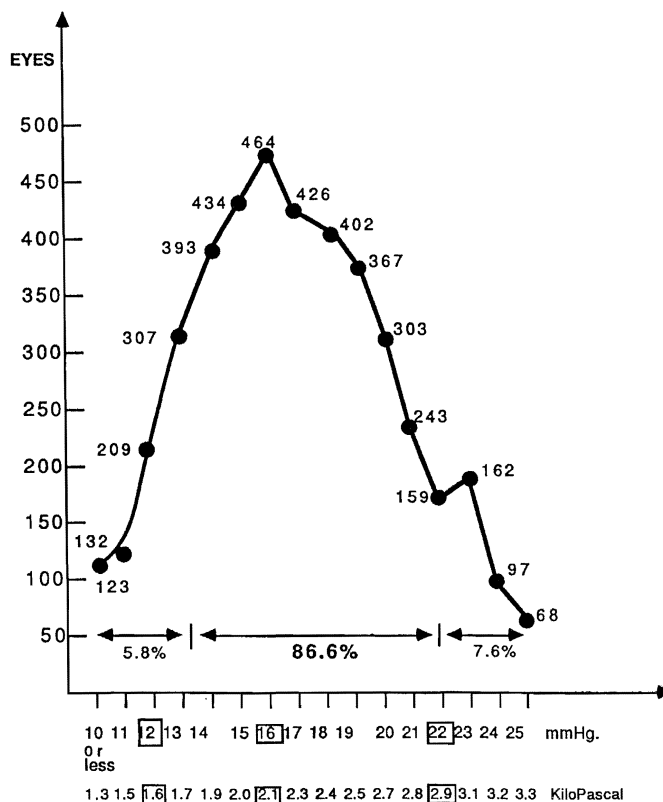
The main objective of this survey was to detect increase in I.O.P. as an important sign of glaucoma. It was therefore necessary to have practical and reliable tonometry. The non-contact tonometer has the following advantages: no need for anaesthetic drops, no fluorescein staining, no danger of infection and the measurement can be done quickly by appropriately trained paramedical staff ^{7,8}.

This tonometer was tested prior to the survey. In some cases dispersal of the readings from which mean IOP is calculated was noted to be 7mm Hg or above. It was concluded that the dispersal of IOP measurements for four consecutive readings in the same eye

GLAUCOMA SURVEY - MALTA 1989

DISTRIBUTION OF IOP

4.289 EYES



should not be higher than 6mm Hg. As a result of this pilot study, in cases showing such high dispersal of IOP measurement, a fresh set of four measurements was performed during the survey, discarding the first result.

The distribution of IOP taken in 4289 eyes is represented in graph I. 86.6% had IOP ranging from 12 - 22mm Hg with the highest peak situated at 16mm Hg. In 7.6%, IOP was above 22mm

Hg. These eyes could not be considered as normotensive and were referred for further investigations for glaucoma.

Mean I.O.P. for the right eye was found to be 16.38mm Hg (SD +/- 3.60) and for the left eye 17.06mm Hg (SD +/- 3.55).

The difference of I.O.P. between fellow eyes in the same persons was from 0 - 5mm Hg in 90.9%, and from 0 - 6mm Hg in 95.1%. All persons having

a difference in mean I.O.P. between fellow eyes higher than 6mm Hg were also deemed to need further investigation.

B.THE RISK FACTORS

The occurrence of diabetes mellitus, arterial, hypertension, and glaucoma as risk factors was analysed in the past history of the participants, their parents and their siblings. It seems that a known family history is rather low for glaucoma (2.1% only), higher for arterial hypertension (31.6%) and much higher for diabetes mellitus (44.1%). (Table 1).

In persons affected by glaucoma (74 persons), two major risks factors could be determined:-

- a) positive family history for glaucoma (15.5% versus 2.1% in general population) and
- b) positive personal history for diabetes (24.4% versus 14% in general population) (Table 2).

Aging was found to be a risk factor for glaucoma, diabetes and arterial hypertension (Table 3).

Myopia was detected in 11.0% of all 2245 participants (Table 4) and in 10.8% of 74 glaucomatous participants. On the other hand, glaucoma was found in 3.29% of all 2245 participants and in 3.20% of 249 myopic participants. In this study there was no evidence that myopia represented a major risk factor for glaucoma. Meanwhile, due to low scleral rigidity and late appearance of disc cupping, there is a risk of overlooking the diagnosis of glaucoma especially in high myopia. High myopia cases should be accurately investigated for glaucoma. (Table 4)

C. PREVALENCE OF GLAUCOMA

The main objective of this survey was to estimate the prevalence of glaucoma. Glaucoma cases were defined as participants whose I.O.P. was over 25mm Hg, measured with pulse-air and confirmed by applanation tonometer. The diagnosis of low tension glaucoma was

History of Glaucoma, Diabetes Mellitus and Arterial Hypertension		
	IN PARTICIPANTS	IN PARENTS AND SIBS
GLAUCOMA	45 (2%)	49 (2.1%)
DIABETES MELLITUS	316 (14%)	991 (44.1%)
ARTERIAL HYPERTENSION	519 (23%)	710 (31.6%)

Table 1

Risk factors in the history of general population (2,245 persons) versus Glaucomatous persons (74 cases).				
	GENERAL POPULATION		GLAUCOMATOUS PERSONS	
	PARTICIPANTS	HIST. OF FAMILY	PARTICIPANTS	HIST. OF FAMILY
GLAUCOMA	2%	2.1%	100%	15.5%
DIABETES MELLITUS	14%	44.1%	24.4%	42.2%
ARTERIAL HYPERTENSION	23%	31.6%	28.8%	17.7%

Table 2

Positive past history in different age groups of the participants			
AGE OF PARTICIPANTS	GLAUCOMA %	DIABETES %	ARTERIAL HYPERTENSION %
40 - 49 years	0.4	3.7	15.5
50 - 59 years	0.8	11.6	25.3
60 - 69 years	2.7	20.5	27.8
70 - 79 years	5.6	27.2	25.6
Over 80 years	7.7	28.8	28.8
All ages	2.0	14.1	23.1

Table 3

Myopia and Glaucoma			
Disease	In 2245 participants	In 74 glaucomatous participants	In 249 myopic participants
Myopia	11.0%	10.8%	
Glaucoma	3.29%		3.20%

Table 4

confirmed by the appearance of optic disc (cupping) and visual field defects. We could record thirty six (1.60%) persons who were known and were already being treated for glaucoma and thirty eight (1.69%) new glaucoma cases were diagnosed and started on treatment. This means that for every case already known and treated for glaucoma, there was another new case of glaucoma which was not known prior to the survey. The prevalence of glaucoma in this survey was therefore at 3.29%. Twenty two persons or 0.97% were classified as suspicious cases requiring close follow up (Table 5). Extrapolation of this data to the whole population would imply that the number of persons affected by glaucoma in the population aged 40 years and above in Maltese Islands should be about 4000.

CONCLUSIONS

1. Glaucoma represents an important public health problem in the Maltese Islands. A prevalence rate of 3.29% is

definitely higher than experience in most countries where prevalence rates of 1 to 2% were detected. 7.6% of the population had I.O.P. between 23 and 25mm Hg. and these eyes require follow-up.

2. The non-contact tonometer was found to have many advantages, provided that the dispersal of the four readings for the determination of the mean I.O.P. and did not exceed 6mm Hg.

3. The most important risk factors were found to be a personal history of diabetes mellitus combined with a hereditary predisposition to glaucoma defined as the presence of glaucoma in parents or siblings.

4. Arterial hypertension and myopia were not proved to be risk factors for glaucoma in this study.

5. This survey has shown that for every case already known and treated for

glaucoma, there was another case of glaucoma which was previously unknown and was detected as a result of the glaucoma survey. The management of glaucoma from the public health aspect should include the active detection of glaucoma, medical treatment, operative procedures and organized follow-up. Medical treatment is expensive and provision of free medication for glaucoma should be considered.

6. There were other ocular conditions detected in relatively high prevalence: cataract preventing fundal view was present in 3.3%, myopic maculopathy in 2.9% and diabetic retinopathy in 1.5% of the surveyed population.

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Glaucoma Prevalence					
	Participants	Old Cases	New Cases	Total	Suspicious Glaucoma
Malta	2076	33	33	66	20
Gozo	169	3	5	8	2
Total Number	2245	36	38	74	22
Prevalence of Glaucoma		1.60%	1.69%	3.29%	0.97%

Table 5

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