

Should the health information glaucoma be hospital based or community based?

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ABSTRACT

الأهداف: مقارنة معدلات الانتشار والإصابة بمرض الجلوكوما في عام 2005م بين سكان عُمان اللذين تجاوزوا الثلاثون عاماً من العمر.

الطريقة: أجريت مراجعة ذات أثر رجعي لدراسة البيانات الصحية في عام 2007م. تم توقع معدل انتشار مرض الجلوكوما خلال دراسة مجتمعية من النوع العنقودي. كما تم توقع معدل الإصابة من نظام المعلومات والإدارة الصحية. استخدمنا الصيغة لحساب معدل الانتشار من معدلات الحدوث بمرض مزمن لمقارنة هذه التوقعات.

النتائج: تم فحص 3324 شخص تجاوزوا الـ30 عاماً من العمر. بلغ معدل الانتشار 4.75% (95% CI إلى 4.02-5.47)، بتوقع وجود 20700 حالة جلوكوما في عُمان. أبلغ أطباء العيون عن 1290 حالة جديدة من الجلوكوما في نفس المجموعة العمرية بمعدل إصابة 0.30%. معدلات الانتشار محسوبة من معدل الإصابة 2005 بين سكان عُمان اللذين تجاوزوا الـ30 عاماً من العمر خلال عام 2005م ستكون $0.30 \times 16.1 = 4.8\%$.

خاتمة: بالرغم أن نتائج المسح موثوقة أكثر لوضع السياسات، إلى أن نظام البيانات الصحية للمستشفيات يمكن أن يولد أيضاً معلومات موثوقة، ودورية، وأقل تكلفة عن مرض الجلوكوما، والتي يمكن أن تساعد في توقع معدلات الانتشار ومراقبة برنامج للسيطرة على مرض الجلوكوما.

Objective: To compare the prevalence and incidence of glaucoma in 2005 of ≥ 30 years-old Omani population.

Method: This was a retrospective review of health data type of study conducted in 2007. The study was conducted in the Eye & Ear Health Care Section, Department of Non-Communicable Disease Control, Ministry of Health, The prevalence of glaucoma was estimated through community based modified cluster type of survey. Incidence was estimated from Health Information and Management System (HIMS) Formula to calculate the prevalence from incidence of a chronic disease to compare these 2 estimates.

Result: We examined 3,324 persons of >30 years of age. The prevalence was 4.75% (95% confidence intervals 4.02-5.47) with an estimated 20,700 glaucoma cases in Oman. Ophthalmologists reported 1,290 new cases of glaucoma in the same age group. The incidence was 0.30%. The prevalence if calculated from the incidence rates among the population ≥ 30 years of age would be $0.30 \times 16.1 = 4.8\%$.

Conclusions: The survey results are more reliable for policy making. However, HIMS could also generate reliable, periodic, low cost information on glaucoma that could help in estimating the prevalence, and monitoring the program approach to control glaucoma.

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Glaucoma is now a priority disease in the 'Vision 2020' initiative to address avoidable blindness.¹ In chronic diseases with less symptoms such as glaucoma cases in their early stages often remain undiagnosed. However, those in advanced stages with compromised eyesight frequently visit different ophthalmologists. Hence community based information provides reliable estimates to formulate policies of a comprehensive public health approach.² Unfortunately, using skilled manpower and high cost does not permit nations to under take such exercise. Prevention of blindness programs will be benefited if alternatives for glaucoma surveys are found. Oman conducted a national prevalence survey for glaucoma in 2005.³ The Health Information and

Management System (HIMS) in Oman provides annual data on glaucoma since 1998. The authors compared the data on glaucoma in Oman generated during 2005 through community base surveys, and HIMS from the Eye Departments of the Ministry of Health (MOH).

Methods. This is a retrospective data analysis type of study. The consent of the National Eye Health Care Committee was obtained to use the survey and hospital based information. The study was conducted between June 2007 and November 2007. The community based prevalence survey was conducted in 2 phases, Phase one was in-houses of selected clusters. Phase II was in eye units of regional hospitals. In Phase one, ophthalmologists examined randomly selected ≥ 30 years-old Omani residents. Omani people of ≥ 30 years of age, residing in the houses of the selected clusters and consenting to participate were included in the study. Those refusing to participate of the same age groups and non-Omani persons were excluded from the study. The history of glaucoma, and treatment of glaucoma (both medical and surgical) was obtained. Ocular pressure was measured by tonopen (Medtronics®). Optic disc, and retina were examined through undilated pupil using direct ophthalmoscope. Changes suggestive of glaucoma were noted. Senior ophthalmologists re-examined glaucoma suspects in eye clinics. A person was defined as glaucoma suspects if any one of the following was present; (1) cup disc ratio of ≥ 0.5 , (2) other glaucomatous changes in optic disc, and surrounding retina, (3) person with past history of glaucoma, or treatment for glaucoma, (4) ocular pressure of more than 22 mm of Hg, (5) glaucomatous field changes

A panel of 3 senior ophthalmologists independently evaluated field charts, sketches of retina, and optic discs and all other corroborative evidences to label each person. They grouped them as cases of glaucoma, glaucoma suspect or normal. A detailed methodology is provided in our earlier publication.^{4,5} Glaucoma means a person has optic disc, and retinal changes, and field of vision changes typical of glaucoma or person was treated, operated for glaucoma in either eye. No glaucoma means no field changes, no retinal changes, and ocular pressure normal. Glaucoma suspect means a person has one of the following: (1) disc and retinal changes suggestive of glaucoma, (2) field of vision changes typical of glaucoma, or (3) increased intraocular pressure (>25 mm Hg) in one of the eyes. In the Phase II of the prevalence survey, ophthalmologists diagnose glaucoma at 24 eye units of MOH in Oman. They use bio-microscope, indirect ophthalmoscope, gonioscope, automated humphry's perimeter and if required Optical Coherent Tomography for this purpose.⁶ Although ocular pressure is measured using applanation tonometer, it was not included in case definition of glaucoma. An ophthalmologists reported new cases of glaucoma in

the age groups of ≤ 12 and ≥ 13 in HIMS in the year 2005.⁷ The computerized case records utilize Oracle based Al Shifa Software prepared for HIMS in Ministry of Health, Oman. The diagnosis of glaucoma is based on detailed fundus examination through dilated pupils, ocular pressure measurement by applanation tonometry and field of vision tests by automated perimetry. Gonioscopy is performed to define type of glaucoma. International Classification of Diseases (ICD) 10 code, were used for H40.1 open angle glaucoma, H40.2 angle closure glaucoma, H40.3-40.6 secondary glaucoma, and 'other in H40' in non specified cases of glaucoma. The computerized case records in 3 hospitals namely Rustaq, Ibra, and Nizwa were reviewed to determine the proportion of new glaucoma cases reported in age groups '12-29', and ' ≥ 30 years.' This proportion was applied to all new cases of glaucoma reported in a year in Oman. Thus, we estimated the number of glaucoma cases aged 30 years and more as diagnosed and reported for the first time by ophthalmologist.

We calculated the prevalence of glaucoma through the national survey and the annual incidence of glaucoma from the hospital data. For both purpose we used mid 2005 Omani population of ≥ 30 years of age that was estimated on the basis of 2003 census data. The glaucoma prevalence in ≥ 30 years of aged Omani population was also calculated by using the formula: prevalence = incidence x duration.²

For calculation of frequencies, percentage proportions and their 95% confidence intervals (CI), we used parametric method of univariate analysis. Statistical Package for Social Studies (SPSS 11) was used for this purpose. We used Microsoft XL for calculating the age gender adjusted rates of glaucoma. The study outcomes were discussed with the health authorities and regional program managers in a national conference. The health information and management system were further strengthened as per the recommendations. All patients identified in the survey as well as those visiting hospital were given free from cost treatment.

Results. In the survey, 3,324 (81.3%) persons were examined. One hundred and eighty had glaucoma. The national prevalence of glaucoma in ≥ 30 years-old Omani population was 4.75% (95% CI 4.02 to 5.47) with an estimated 20,700 glaucoma cases in Oman. Only 9% of them were of '30 to 39 years'. In 2005, ophthalmologists of 26 eye clinics and MOH hospitals reported 4,025 cases of glaucoma among Omanis of >12 years of age. Of them, 1,328(33%) cases were detected for the first time and rest were cases reported as old cases visiting clinic for the follow up. The ratio of '12-29' years and '30 years and more' was 3:97. Thus in 2005, 1,290 were projected to be new cases of glaucoma in 433,770 Omani population of ≥ 30 years of age. The annual incidence of glaucoma therefore

was 0.30% (95% CI 0.29-0.31) in this age group. The life expectancy of Omani population is 74.3 years (SD 12.1 years).⁵ The mean age of patients diagnosed with glaucoma in the survey was 58.2 years. Thus, a case of glaucoma after diagnosis for the first time will continue to suffer from and will need glaucoma treatment for another 16.1 years. If the prevalence is calculated from the incidence rates among the population ≥ 30 years of age, it would be $0.30 \times 16.1 = 4.8\%$.

Discussion. Although glaucoma is a priority disease, the guidelines for public health approach are yet to be recommended to member countries of WHO.¹ For comprehensive program approach, evidence base information of glaucoma is crucial. In a chronic disease such as glaucoma, the importance of community base data over hospital base information is undisputed.² However, prior to promoting national glaucoma surveys, feasible and more practical approach of reviewing hospital based information should be explored. Our study comparing the outcomes of the community based prevalence of glaucoma, and annual incidence rates from the hospitals data therefore, will be useful to all involved in combating blindness due to glaucoma. We found that prevalence rates calculated through a community base survey nearly matched to the prevalence calculated from the annual incidence of glaucoma generated in Oman through HIMS. Hence, HIMS could be useful tool in glaucoma control planning. But it is important to ensure about their accuracy and representativeness before interpreting them. Qualified ophthalmologists reported new cases of glaucoma and used ICD 10 codes to report them in Oman. The HIMS is operational since 1998. It is monitored at institution, wilayat, regional, and national levels. Hence, the data of 2005 are mature enough to interpret. The eye units of the MOH institutes are located in all regions of Oman. A system to refer eye cases from Primary Health Centers to the ophthalmologists is operational since 1995.⁸ Hence, cases with defective vision or other eye symptoms due to glaucoma are less likely to be missed by ophthalmologists. Only 5% of the total eye care is rendered by ophthalmologists in other organizations of other ministries, and hospitals of private sector in Oman. Health services to Omani citizen are affordable and accessible in MOH institutions. The drug for treating glaucoma is available free from cost to Omani population at these institutions. Hence, cases reported are likely to be representative of most of the incident glaucoma cases in Oman.

The prevalence study in Oman had many limitations. The investigators had used 0.5 optic cup, and optic disc ratio to define glaucoma suspects. They examined fundus through undilated pupil and used direct ophthalmoscope. They did not include field of

vision as a screening test in the Phase one of the survey. Therefore, they might have missed few early cases of glaucoma. Those suspected to suffer from glaucoma were re-examined in hospitals and hence, false negative cases are unlikely. Therefore the prevalence of glaucoma could be higher than 4.75%. Senior ophthalmologists diagnosed glaucoma both in the survey and in the hospitals. They used similar and reliable equipment, and criteria to define glaucoma. Hence, we can conclude that the annual incidence of glaucoma in hospitals during 2005 and the estimated prevalence of glaucoma in the community had similar methodology. If reliable and standardized HIMS is established, the health planners can use epidemiologically acceptable formula to estimate the prevalence of glaucoma in the community. This will be more useful to the countries where the prevalence studies cannot be conducted due to the complexity and high cost of such survey. Community based data of glaucoma suggested that health services of Oman should be strengthened to identify and manage nearly 20,700 persons with glaucoma projected in ≥ 30 years old population. Such surveys could be jointly carried out with surveys for other blinding and aging eye conditions, perhaps, once every ten years. But estimates calculated through HIMS are also helpful in monitoring eye care services, and the situation of glaucoma in community. Hospital based HIMS can show the distribution of glaucoma by gender, age group, and geographic location. This will help us in identifying the barriers to eye care services and the coverage of glaucoma surgeries. World Health Organization promotes member countries to revise, introduce the internationally recommended HIMS, and also provide technical support to the member countries for such purposes.⁹ Periodic evaluation of hospital base data should be compared to the community based data of chronic, and age related diseases. The program managers and scientists should undertake operational research to identify the gaps between community-based, and hospital based health information, identify the barriers to early detection and improve the compliance for the life long management of such conditions. The survey results are reliable for policy making. However HIMS could generate reliable, periodic, low cost information on glaucoma that could help in estimating the prevalence.

In addition, HIMS of glaucoma give trends more frequently and therefore, it could be a better monitoring tool for the program.

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Ethical Consent

All manuscripts reporting the results of experimental investigations involving human subjects should include a statement confirming that informed consent was obtained from each subject or subject's guardian, after receiving approval of the experimental protocol by a local human ethics committee, or institutional review board. When reporting experiments on animals, authors should indicate whether the institutional and national guide for the care and use of laboratory animals was followed.