



**GARO MEGHRIGIAN INSTITUTE FOR PREVENTIVE OPHTHALMOLOGY  
CENTER FOR HEALTH SERVICES RESEARCH AND DEVELOPMENT  
COLLEGE OF HEALTH SCIENCES  
AMERICAN UNIVERSITY OF ARMENIA**

# **Garo Meghriqian Institute for Preventive Ophthalmology**

**2012 Annual Report**



***Prevent Avoidable Blindness in Armenia***

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## Executive Summary

The Garo Meghrigian Institute for preventive Ophthalmology (Meghrigian Institute) is part of the Center for Health Services Research and Development (CHSR) of the College of Health Sciences of the American University of Armenia (AUA). **Meghrigian Institute's mission is to prevent avoidable blindness in Armenia.**

This Annual Report highlights the main activities and accomplishments of the Meghrigian Institute in 2012.

In 2012, the Meghrigian Institute implemented the project aimed at reducing the incidence of blindness and visual impairment due to diabetic retinopathy in Gegharkunik marz of Armenia. The study described the prevalence of diabetic retinopathy and explored risk factors associated with diabetic retinopathy in diabetic patients in Gegharkunik marz. Overall, 625 patients participated in interviews and eye screenings. All patients received educational brochures developed by the Meghrigian Institute to increase patients' awareness about diabetes management and prevention of diabetic retinopathy; those patients with eye pathologies received free ophthalmic consultations, eye frames and when needed referrals.

In 2012, Meghrigian Institute, in collaboration with an MPH student Greta Harutyunyan, completed a study of risk factors associated with refractive errors (RE) among 6-18 years old schoolchildren in Yerevan and Gegharkunik. Overall 1,092 children participated in the study. The screened children received free ophthalmologic consultation, and when needed prescription of medications and eye glasses.

In August 2012, Meghrigian Institute launched a project aimed at reducing the incidence of avoidable blindness and visual impairment among socio-economically disadvantaged population in Kashatagh province of Artsakh. Overall, 161 patients underwent eye screenings in Kashatagh. All patients diagnosed with eye pathologies received free ophthalmic consultation about their diagnosis and further treatment. Those who had refractive errors or presbyopia (106 people) received prescriptions for eye glasses and free eye frames from the Meghrigian Institute.

Meghrigian Institute extended its program to elderly population living in retirement homes in Yerevan to celebrate World Sight Day (WSD) 2012. In October 2012, the staff of the Meghrigian Institute launched ophthalmic screenings among residents of "Number 1" and "Nork" retirement homes, and the elderly people from the "Center of social services for single elderly and disabled people". The Meghrigian Institute screened 340 elderly people and distributed 377 eyeglasses to them. Some patients received two eyeglasses to see both near and distant objects. Besides providing screening services, the research team of the Meghrigian Institute conducted a study to assess the prevalence of visual impairment, and the association between visual impairment and depression among socially vulnerable elderly in Yerevan, Armenia.

Meghrigian Institute continued its annual eye screening program among socially vulnerable children. The staff of Meghrigian Institute conducted screening of 81 children in the Achapnyak Social Care Center, 66 children in Mary Ismirlyan Orphanage, and 174 children in Kharberd Specialized Orphanage. The Meghrigian Institute prescribed and distributed eye glasses to 60 children.

Meghrigian Institute continued its collaboration with the Lions Regional Ophthalmic Unit (ROU) in Sevan in organizing outreach visits to the poorest and most remote villages of Gegharkunik marz. These visits helped to detect eye pathologies among those who have low access to ophthalmic services. Overall, 206 patients underwent free ophthalmic examinations by the Meghrigian Institute. They received free eye frames and ophthalmic consultation; those who needed more advanced care were referred to the ROU.

In August – October, 2012, Meghrigian Institute implemented the assessment of equipment needs of ophthalmic offices in Sevan, Gavar, Martuni, Vardenis and Chambarak regions of Gegharkunik marz. Need assessment was done based on the list of essential ophthalmic equipment of the Ministry of Health of Armenia. Most ophthalmic offices were found to miss basic ophthalmic equipment for providing appropriate primary ophthalmic care to patients.

In 2012, 2,745 patients in Armenia and Artsakh, mostly from socially vulnerable groups, received ophthalmic services from the Meghrigian Institute. Those in needs received 437 free eye glasses and 164 free eye frames from the Meghrigian Institute.

## Introduction

The Garo Meghrigian Institute for preventive Ophthalmology (Meghrigian Institute) is part of the Center for Health Services Research and Development (CHSR) of the College of Health Sciences of the American University of Armenia (AUA). **Meghrigian Institute's mission is to prevent avoidable blindness in Armenia.**

*The main objectives of the Meghrigian Institute are:*

- Conduct scientific investigations of ophthalmic epidemiology to increase understanding of eye disease in the community;
- Link ophthalmologic services with expertise in organizing, financing and delivery of services to increase the utilization of ophthalmologic care in Armenia;
- Educate eye care providers and the general public on scientific advances in detecting, preventing, and treating eye disease and in translating these advances into nationwide clinical practice;
- Establish an ophthalmic care and prevention network to expand service delivery to underserved populations in need of affordable, accessible, and high quality eye care services for prevention and treatment of blindness at all levels;
- Develop partnerships with organizations that are interested in blindness prevention and are capable of furthering the achievements of Meghrigian Institute's goal;
- Train the future professionals for blindness prevention activities in Armenia;
- Establish a regional blindness prevention network for the Caucasus, emphasizing underserved areas and minority populations.

This report highlights the main activities and accomplishments of the Meghrigian Institute in 2012.

## Activities and accomplishments

### 1. Prevention of Blindness and Visual Impairment in Gegharkunik marz, Armenia

In 2012, the Meghrigian Institute implemented a project aimed at reducing the incidence of blindness and visual impairment due to diabetic retinopathy in Gegharkunik marz of Armenia.

The first stage of the project included training primary health care providers on the importance of early detection of diabetic retinopathy and the need for regular ophthalmic examination of diabetic patients. Fourteen primary health care physicians and 29 nurses were trained by the Meghrigian Institute at the Lions Regional Ophthalmic Unit (ROU) in Sevan in September/October 2011. The second stage of the project included free ophthalmic examinations and a survey of diabetes patients living in Gegharkunik marz. The Meghrigian Institute invited diabetes patients to the regional centers and village health centers of Gegharkunik marz for the eye screenings. A total of 625 patients participated in the interviews and eye screenings out of

1329 diabetes patients registered in Gegharkunik. All patients received two educational brochures developed by the Meghriyan Institute to increase patients' awareness about diabetes management and prevention of diabetic retinopathy; those diagnosed with diabetic retinopathy received free ophthalmic consultations and referral to the ROU in Sevan. Educational brochures on diabetes and diabetic retinopathy were developed based on the educational materials developed by the AUA Center for Health Services Research and Development for the Armenian Social Transition Program (ASTP) and approved by the Ministry of Health of Armenia. The brochure on diabetes included information about types of diabetes, signs and symptoms of diabetes, risk factors for developing diabetes, physical activity, diet and prevention of complications. The brochure on diabetic retinopathy included information about symptoms, early detection, prevention and treatment of diabetic retinopathy.

The methodology and the results of the study on prevalence and risk factors for diabetic retinopathy in Gegharkunik marz are described below.



## **1.1 Study of Prevalence and Major Risk factors for Diabetic Retinopathy in Gegharkunik marz, Armenia**

### *Introduction*

Diabetic retinopathy (DR) is a well-recognized complication of diabetes mellitus that occurs as a result of long-term accumulated damage to the small blood vessels in the retina. Few studies have explored the prevalence and risk factors for eye pathologies in Armenian population. This study describes the prevalence of diabetic retinopathy and risk factors associated with diabetic retinopathy in diabetic patients in Gegharkunik marz, Armenia.

### *Methods*

#### Study population and sampling

The study population included all the diabetes patients registered in primary care facilities of Gegharkunik marz. Diabetic patients registered in the polyclinics of Gegharkunik marz were invited for free ophthalmic examination with a focus on detection of diabetic retinopathy. The research team worked closely with polyclinic endocrinologists, who had access to names and contacts of diabetic patients. They contacted patients by phone, informed them about the study and invited them for the free eye examinations. The patients from the main five cities (Sevan, Gavar, Martuni, Vardenis and Chambarak) were invited to the polyclinics, patients from villages where there were health posts were screened at the health posts, the patients from those villages that did not have a healthcare facility were invited to their nearest health post for the screening.

#### Questionnaire

A structured questionnaire was developed for face to face interviews with diabetic patients. The first part of the questionnaire included questions about demographic data, disease history, knowledge, practice and attitude towards diabetes and diabetic retinopathy, presence of other non-communicable conditions, family history of diabetes, healthy lifestyle and medication adherence. The second part of the instrument was intended for recording eye examination results. The last page of the questionnaire contained information about diagnosis and further treatment and was provided to the patients upon completion of the screening.

### *Results*

A total of 625 patients participated in the interviews and eye screenings. The mean age of participants was 61 ranging from 15 to 88 years. Female participants comprised 64.3% of the sample. Approximately 43.2% of the sample was from urban areas and 56.8% was from rural. The overall prevalence of DR in the sample was 36.2%; with non-proliferative diabetic retinopathy (NRDP), and proliferative diabetic retinopathy (PDR) detected in 32.6% and 3.6% of respondents, respectively. Diabetic angiopathy was prevalent in 18.4% of diabetic patients. Eleven percent of diabetic patients had macular degeneration.

About 45.5% of participants never or seldom visited an ophthalmologist after being diagnosed with diabetes, the quarter (25.4%) of screened population visited an ophthalmologist once a year, and 27.8% visited an ophthalmologist several times a year and for 1.3% of participants this question was not applicable, as they were newly diagnosed cases. Nearly forty three percent of patients reported that their doctor never examined their feet during their regular visits. Nearly half of the patients (47.3%) reported that the glucometer was available at their homes, and most of them (74.2 %) did measure their glucose level weekly.

Patients reported several barriers to getting eye examinations. Among those patients, who never or rarely (less than once a year) visited an ophthalmologist, 41.0% did not believe anything was wrong with their eyes, while 33.2% did not know that annual eye exam was necessary and 31.8% reported lack of finances as a barrier to getting regular eye care.

Only 13.2% of participants correctly answered four knowledge questions about diabetes control and management and only 7.0% of patients were able to answer correctly two questions related to knowledge about diabetic retinopathy.

All patients who had knowledge about DR and related vision problems have shown good attitude towards regular eye examination as compared to people with low/no knowledge of DR ( $p=0.016$ ). About 48% of patients who had poor knowledge of DR had never or rarely visited ophthalmologists versus 24.4% of those who had good knowledge of DR ( $p=0.005$ ). In the adjusted analysis age, diabetes duration, being overweight and being under insulin treatment were strongly associated with having diabetic retinopathy. The effects of other factors such as fluctuation of glucose level, current blood glucose level, having hypertension and heart disease dissipated in the adjusted model.

### *Conclusion*

This study found high prevalence of DR among Armenian diabetic patients compared to other studies. Increasing knowledge of diabetic retinopathy and its eye-related complications might stimulate individuals with diabetes to visit ophthalmologists more frequently, which will help to prevent diabetes related eye complications. The capacity of ophthalmic care system to screen and treat people with diabetic retinopathy should be enhanced in Gegharkunik marz.

## **1.2 Study of risk factors for developing refractive errors among 6-18 years old schoolchildren in Yerevan and Gegharkunik marz**

In 2012, Meghriyan Institute, in collaboration with an MPH student Greta Harutyunyan, completed a study of risk factors associated with refractive errors (RE) among 6-18 years old schoolchildren in Yerevan and Gegharkunik marz.

### *Introduction*

Childhood blindness is a significant problem worldwide, with an estimated 1.4 million blind children under fifteen years of age. Childhood visual impairment due to refractive errors is one of the most common problems in school children and the second leading cause of treatable blindness. Refractive errors can be easily diagnosed, measured and corrected with refractive corrections to attain normal vision. Visual impairment from uncorrected refractive errors can have immediate and long term consequences, such as lost educational and employment opportunities, lost economic gain, and impaired quality of life.

### *Methods*

#### Study population and sampling

The study utilized a cross-sectional study design. The multi-stage cluster sampling technique was used to generate the study sample. Five clusters were assigned to both Yerevan and Gegharkunik marz. Five urban sites (Sevan, Chambarak, Gavar, Martuni and Vardenis) were chosen in Gegharkunik marz, and Kentron, Arabkir, Nubarashen, Davitashen and Achapnyak communities were chosen in Yerevan as clusters. Simple random sampling technique was used to select the five communities in Yerevan. The sample size was estimated to be 630 for each target area (Yerevan and Gegharkunik).

One basic school and one high school were selected at random from each area. A total of 126 children from two schools (one basic and one high) were randomly selected from each community in Yerevan and from each main town in Gegharkunik marz. To get a representative sample in terms of children's age distribution, 42 children were randomly selected from each age group (primary (1-4 grades), middle (5-9 grades) and high (10-12 grades)). As the number of children in each class was around 20, two classes were selected randomly from each age group.

#### Questionnaire

The study used the Sydney Myopia Study Student Questionnaire for developing the structured questionnaire. The questionnaire covered demographics, interests and leisure activities (reading, writing, drawing, homework, playing on the computer and cell phone games), school achievement, and outdoor and physical activities. Information about weight and height at birth, gestation age, and heredity was collected from parents through a self-administered questionnaire.

## *Results*

Overall 1,092 children participated in the study. About 48% of children were from Yerevan. The mean age of children was 13 ranging from 6 to 19 years old. Female students comprised 53.4% of the sample. Parental myopia was observed among 10.3% of the study population. The prevalence of RE was 21.5% among children; 31.6% and 15.9% in Yerevan and Gegharkunik marz, respectively. The prevalence of myopia, hyperopia and astigmatism among the participants was 17.9%, 3.4%, and 3.2%, respectively. About 15% of children reported that they had “excellent” grades at school, 54.7% had “good” grades, and 30.2% had “satisfactory” grades. About 31.2% of the sample reported that they took additional classes out of school. The unadjusted logistic regression analysis showed that age, gender, region (Gegharqunik vs Yerevan), continuous reading (reading without break  $\geq 60$  minutes), additional studies (taking additional classes out of school), school achievement (satisfactory, good and excellent), lack of physical activity ( $\leq 18$  hours per week), lack of outdoor activity ( $\leq 7$  hours per week), and parental myopia (at least one parent with myopia) were strongly associated with myopia. In the adjusted analysis age, gender, region (Gegharqunik vs Yerevan), continuous reading, school achievement, lack of physical activity, lack of outdoor activity, and parental myopia were still strongly associated with myopia.

## *Conclusion*

The study showed that the prevalence of myopia was nearly two times higher among children living in Yerevan compared to those in Gegharkunik. Both genetic and behavioral factors were associated with myopia.



## 2. Meghrigian Institute in Kashatagh Province of Nagorno Karabakh

In August 2012, the Meghrigian Institute launched a project aimed at reducing the incidence of avoidable blindness and visual impairment among socio-economically disadvantaged population in Kashatagh province of Artsakh. Kashatagh is one of the eight provinces of Artsakh and the largest by area. The living conditions and the situation in the health sector in Kashatagh are among the harshest. Meghrigian Institute conducted free eye screenings for the residents of Berdzor and Kovsakan towns, as well as Msheni, Moshatagh, Aygehovit, Urekan, Mirik, Hochants, Qaregah, Getap, Martunashen, Yericvanq, Mijnavan, Alashkert, and Ishkhanadzor villages. Overall, 161 patients received eye screening in Kashatagh. Those who had diabetes received educational brochures developed by the Meghrigian Institute to increase their awareness about diabetes management and prevention of diabetic retinopathy. All patients diagnosed with eye pathologies received free ophthalmic consultation about their diagnosis and further treatment. Those who had refractive errors or presbyopia (106 people) received prescriptions for eye glasses and free eye frames from the Meghrigian Institute. The Meghrigian Institute will continue working in Kashatagh.



### 3. Celebration of World Sight Day (WSD) and Research on Visual Impairment and Depression among Elderly Population

Meghriagian Institute extended its program to elderly population living in retirement homes in Yerevan to celebrate the WSD 2012. In October 2012, the staff of the Meghriagian Institute launched the ophthalmic screenings among residents of “Number 1” and “Nork” retirement homes, and the elderly people from the “Center of social services for single elderly and disabled people”. A total of 340 elderly people were screened. All screened residents received free ophthalmic consultation from ophthalmologists. Patients diagnosed with presbyopia or refractive errors received eyeglasses from the Meghriagian Institute. The Meghriagian Institute distributed 117 eye glasses for 84 elders in N1 retirement home, 128 eye glasses for 90 patients in “Nork” retirement home and 132 eye glasses for 91 patients in the “Center of social services for single elderly and disabled people.”

The methodology and the results of the study of visual impairment and depression among socially vulnerable elderly population in Yerevan, Armenia are described below.



### **3.1 Study of Visual Impairment and Depression among Socially Vulnerable Elderly Population in Yerevan, Armenia**

#### *Introduction*

Visual impairment among the elderly is a major health problem and one of the most feared forms of medical disability. With age, the normal function of eye tissues decreases and the incidence of ocular pathology increases. Visual impairment in the elderly can interfere with daily activities of life and lead to dependency. Untreated and chronic visual impairment is associated with psychological morbidity such as irritability, anxiety, low self-esteem, social isolation, memory loss and depression. Depression is the most frequent cause of emotional suffering and decreased quality of life in older adults.

The aim of this study was to assess the prevalence of visual impairment and the association between visual impairment and depression among socially vulnerable elderly in Armenia.

#### *Methods*

##### Study population and sampling

All elderly residents in the N1 and Nork retirement homes, who were willing to participate, were included in the study. One hundred and seven people, who were identified as the most socially disadvantaged members of the Center of Social Services for Single Elderly and Disabled People by the Center administrators, participated in the survey and eye screenings. The overall number of study participants was 340.

##### Questionnaire

First part of the questionnaire included questions about socio-demographic characteristics, non-communicable conditions, previous and current eye disorders, family history of having eye disorders, physical activity, smoking, and the Center for Epidemiologic Studies Depression [CES-D] scale. The second part of the instrument was intended for recording the results of eye examination. The last page of the questionnaire included information about diagnosis and further treatment, and was provided to the patients upon completion of the eye screening.

#### *Results*

The mean age of participants was 75 years, ranging from 45 to 97. Female participants constituted the majority of the sample (66.1%). Nearly 45.3% of participants had university or higher level of education, 27.6% had incomplete secondary education, and 27.1% had complete secondary education. Almost 57% of the study population reported depression symptoms based on CES-D scale with 16 negatively formulated items.

The prevalence of visual impairment (moderate and severely low vision) according to the World Health Organization's (WHO) classification was 13.3% in the better eye with best possible correction in the screened population. The majority of participants (83.0%) had normal vision

(normal or near normal) and 3.7% of patients were blind. According to the US classification the prevalence of visual impairment was 26.3%, normal/near normal vision was 66.6% and blindness was 7.2% in the better eye with best possible correction.

In United States, visual impairment defined as visual acuity worse than 20/40 but better than 20/200 (legal blindness) in the better eye, even with corrective lenses. The World Health Organization defines visual impairment as visual acuity worse than 20/70 (moderate low vision) but better than 20/400 (legal blindness) in the better eye, even with corrective lenses. For this study WHO definition for visual impairment was used, as it has strict cut-off points for visual impairment and does not allow people with near normal vision be in visually impaired group.

In the unadjusted analysis both age and visual impairment were associated with depression. In the adjusted analysis, visual impairment was still significantly associated with higher odds of depression (OR = 2.91; 95% CI: 1.42 – 5.95). Age was also shown to be an independent risk factor for depression, although with marginal significance (OR = 1.03; 95% CI: 1.003 – 1.07).

### *Conclusion*

This study concluded that there was an association between visual impairment and depression among elderly population. People with visual impairment were more likely to have depression. Active screening for visual loss in the elderly population should be organized for early detection of visual impairment in order to prevent permanent visual loss and associated mental health problems. Good vision could minimize both physical and psychological complications such as falls, social isolation, and depression among the elderly population.

#### **4. Meghrigian Institute continues annual eye screenings among socially vulnerable children**

Meghrigian Institute continued its annual eye screening program among socially vulnerable children. The staff of Meghrigian Institute provides services to Achapnyak Social Care Center, which currently serves 100 school-aged children; Mary Ismirlyan Orphanage, which currently cares for 90 children; and Kharberd Specialized Orphanage,” which provides care to about



200 handicapped children. Comprehensive eye screening was conducted for 315 children in these institutions in 2012. Among them, 202 children were found to suffer from nearsightedness, farsightedness, astigmatism, and other eye pathologies. The Meghrigian Institute prescribed and distributed eye glasses to 60 children. More serious eye conditions such as infections, allergic conjunctivitis, dry eye syndrome, and uveitis were diagnosed in 79 children at the Achapnyak Center and Ismirlyan Orphanage and 77 in Kharberd Orphanage. All children with eye diseases received ophthalmic medication from the Meghrigian Institute.



#### **5. Need assessment of ophthalmic cabinets in Gegharkunik marz**

In August – October, 2012, the Meghrigian Institute assessed the equipment needs of ophthalmic offices in five polyclinics of Gegharkunik marz (Sevan, Gavar, Martuni, Vardenis and Tchambarak). The Needs Assessment was done based on the minimal equipment list of the Ministry of Health in Armenia. Most ophthalmic offices were found to miss basic ophthalmic equipment for providing appropriate primary ophthalmic care to patients. Currently, the Meghrigian Institute is working on obtaining the necessary basic equipment for the ophthalmic offices in Gegharkunik marz

## **6. Lions Regional Ophthalmic Unit and Outreach Visits**

The Meghriyan Institute continued its partnership with the Lions Regional Ophthalmic Unit in Sevan, established earlier through the joint efforts of the Meghriyan Institute and the Ararat Lions Club (ALC), and funded by the Lions Club International Foundation-LCIF. Since its establishment, this Unit has served around 21,800 people and performed 2,010 surgeries. CHSR is responsible for preparing annual reports to LCIF headquarters.

The Meghriyan Institute collaborated with the Lions Regional Ophthalmic Unit (ROU) in Sevan organizing outreach visits to the poorest and most remote villages of Gegharkunik marz. These visits helped to detect eye pathologies among those who have low access to ophthalmic services. In total, 206 patients underwent ophthalmic examinations. Various eye diseases were detected among screened population such as glaucoma, cataract, conjunctivitis (chronic & allergic), diabetic or hypertonic retinopathy, and eye tumor. All patients diagnosed with an eye disease received medical consultation and eye frames. In addition, the patients having diseases other than refractive error or presbyopia were referred to the ROU in Sevan for further diagnosis and treatment.

## **7. 2012 in numbers**

Meghriyan Institute provided eye screenings to 2,745 patients in Armenia and Artsakh, and distributed 473 free eye glasses and 164 eye frames to the population in need in 2012.