ABSTRACT

Visual impairment (VI) is loss of vision in eye or eyes or the vision system and is a common condition among elderly population. VI has a profound impact on daily functioning and quality of Life. Glaucoma is the second leading cause of preventable blindness in the world and early detection of glaucoma may prevent progression of the disease, but because of its silent nature, is difficult to diagnose unless the patient undergoes an eye examination. Even though increased emphasis has been focused on VI around the world, limited information is available on the prevalence of VI among elders and little or no published data is available on risk factors for glaucoma in the Sri Lankan population.

The study was carried out in the Kalutara District of Western Sri Lanka in two stages. Stage one estimated the prevalence of VI in the district of Kalutara and determined main conditions for VI and comparedQuality of life (QoL) of VI with those with normal vision. The stage 2 of the study identified risk factors for glaucoma and developed a risk factor model (GRAFT) to predict risk of developing glaucoma.

Stage one was a community based study among 1038 elders ≥ 60 years. Primary sampling unit was the Grama Niladari (GN) division. A cluster of 20 study participants were selected from each GN division. A study unit was the elderly personaged ≥ 60 years and data collection was done at home setting and at the field eye clinic. Validated pretested Interviewer administered questionnaires: visual acuity(VA) recording forms and referral forms were used as study instruments.

Assessment of VA using Snellen's chart enabled categorization of the elders as having normal vision (VA 6/6, 6/9), mild visual defect {(MVD) VA 6/12} and VI (VA ≤ 6/18). VI group was further classified after pin-hole test as those with refractive error (RE) without correction and others as low vision (LV) and blind.

Considering the presenting VA among the elderly population ≥ 60 years in the Kalutara district, the prevalence of VI was 43.5% (95% CI 41.8 - 44.6), prevalence of MVD 9.2% (95% CI 8.30 – 10.1) and prevalence of normal vision 47.3% (95% CI 45.76 – 48.84).

Among the elderly with VI the prevalence of uncorrected RE was 66.7% (95 CI: 64.2 – 68.6), LV 32.3% (95% CI: %30.3 – 34.7) and blindness 1.1% (95% CI: 0.61 – 1.59).

Among the VI, a higher proportion of elders (62.8%) were aged < 70 years. A majority were females (55.5%), married (84.3%, Sinhalese (77.4%) and Buddhists (77%). A higher proportion resided in the rural areas (55.3%) with 21.0% and and23.7%. from urban and estate sectors respectively.

Demographic and socioeconomic factors associated with VI were; age ($p<0.0001$), gender ($p<0.005$) and average monthly income ($p<0.0005$).

Among the elders with uncorrected RE 62.8 % (n= 123) were< 70 years. A majority with RE were females (56.1%). Sinhalese and Buddhist with uncorrected RE were 87.7% and 87.0% respectively. Proportion married was 85.5% and highest proportion resided in the rural areas (55.5%) with 21.6% from urban and 22.9% from estate sector.

Among the LV: elders; those aged <70 years was64.4%, 54.7% were females, 57.5%. Sinhalese, 57.5%.Buddhists and 85.5% were married. A higher proportion resided in the rural areas (54.8%) with 19.9% in urban and 25.3% in the estate sector

Co morbid conditions present among elderly with VI were: diabetes mellitus 20.1% (n=91), hypertension 29.2% (n=132), both diabetes and hypertension 11.5% (n=52), asthma 18% (n=82), ischemic heart disease 11.9% (n= 54) and hyper lipidaemia 11.3% (n=51). Significant associations were not found between VI and each of the co morbid condition ($p>0.05$)

Co morbid conditions present among uncorrected RE were; diabetes mellitus 32.2% (n=34), hypertension 26% (n=38), diabetes and hypertension 5.5% (n=8), asthma 26% (n=38), ischemic heart disease 16.4% (n= 24) and hyperlipidaemia 23.3% (n=34).

Elderly with LV (n=146) were examined by specialists in ophthalmology with slit lamp examination and funduscopy. Among the LV elders the main causes identified for VI were Cataract 66.4%(n= 97), diabetic retinopathy 11.6%(n= 17), glaucoma 9.7%(n= 14), Age Related Macular Degeneration (ARMD) 2.7%(n=4), corneal opacities 2.7%(n=4), retinal detachment 2.1%(n= 3).

Among the 5 blind elders, 2 had diabetic retinopathy and glaucoma; ARMD and RD were main cause for blindness in other three.

QoL was compared in an unmatched randomly selected sample of 101 visually impaired elders and 101 non visual impaired using IVI – S questionnaire. The comparison of mean domain scores of the two groups showed a significant difference between the mean scores of VI and non-VI in each of the five domains($p<0.001$).The

total mean QoL score of VI elders was 41.1 (SD+/-12.9) and in the comparative elders without VI was 67.8 (SD+/- 11.2). This difference in the total mean QoL score was statistically significant ($p<0.001$).

Stage 2 component 1 was a Case Control study to identify risk factors of glaucoma. The cases (patients diagnosed with glaucoma, n=45) and control (patients who had no glaucoma but having other eye conditions need treatment n= 135) according to inclusion and exclusion criteria were selected from the Eye clinics of the hospitals of Kalutara District.

Bivariate analysis identified the following factors as having a significant association with glaucoma. Age (OR2.5; 95% CI: 1.2-5.0; $p<0.007$), family history of glaucoma (OR4.4; 95% CI: 1.9-9.9; $p< 0.000$), hypertension (OR3.3; 95% CI: 1.7-6.8; $p<0.000$), ischemic heart disease (OR 5.7; 95% CI: 2.7-12.5; $p<0.000$), hypertension $\geq$ 10 years (OR 2.7; 95% CI: 1.3-5.8; $p <0.04$), asthma (OR3.1; 95% CI: 1.5-4.8; $p<0.001$), asthma $\geq$ 10 years (OR 5.2; 95 CI 2.2-12.3; $p< .00001$), Myopia (OR3.0; 95% CI: 1.3-6.9; $p<0.007$) and reading glasses (OR 2.8; CI: 1.2-6.3; $p< 0.03$)were shown significant association with glaucoma.

Component 2 of stage 2 of the study developed a risk prediction model. GRFAT having five factors, age> 60 years, family history of glaucoma, history of IHD, duration of asthma $\geq$ 10 years, presence of myopia.

Early detection and treatment of glaucoma is a lifelong cost effective strategy as prevention of permanent blindness and development of simple and low cost risk prediction model can be used in this regard.

Early identification of conditions causing LV among elders such as cataract and diabetic retinopathy through screening programs and referral of such patients for management will improve the QoL of elders.

Periodically subject elders for refraction would reduce the VI caused by RE and it will improve the QoL as well.

Key words: Impaired vision, low vision, blindness, prevalence, cause, condition, glaucoma, risk factors, model to assess risk factors