Optometric Support to Pacific Angel—Nepal 2012

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ABSTRACT In September 2012, Pacific Angel (PACANGEL)—Nepal 2012 was conducted in Kaski District, Nepal. Health services were provided in optometry, family medicine, pediatrics, physical therapy, midwifery, dentistry, and pharmacy. This report is on optometric care provided. 995 patients were examined. Mean age was 41.34 (median 43). Mean entering distance visual acuity was 20/57 in the right eye, 20/60 in the left. Mean spherical error was +0.08D in the right eye, +0.09D in the left. For those patients with astigmatism, mean cylindrical error was −0.74D in the right eye, −0.54D in the left. A near addition was prescribed for 51.8% of the patients. Cataract was diagnosed in 24.17% of the patients. Other prevalent nonrefractive diagnoses were dry eye (18.17%), conjunctivitis (12.0%), and pterygium (5.17%). Eye and vision care is lacking in Nepal. Sporadic episodes of care have considerable impact on those patients receiving treatment. However, to substantially treat the greatest worldwide cause of visual impairment, local sustainable resources are imperative. Provision of care by local, linguistically competent practitioners would better suit the needs of those in need of care. Those involved in humanitarian missions could be a significant source of training such caregivers.

INTRODUCTION

Health Opportunities for People Everywhere, "Project HOPE," is an international, nonprofit health capacity education nongovernmental organization based in Virginia. Since 1958, it has worked to make health care available for people around the globe. It is committed to long-term sustainable health care. Its work includes educating health professionals and community health workers, strengthening health facilities, fighting chronic and noncommunicable diseases such as tuberculosis, human immunodeficiency virus/acquired immunodeficiency syndrome, and diabetes, and providing humanitarian assistance and disaster relief through donated medicines, medical supplies, and volunteer health providers. Since 2005, Project HOPE has uniquely supported Combatant Commander's annual Humanitarian and Civic Assistance medical/engineer projects in Southern Command (SOUTHCOM), Africa Command (AFRICOM), and Pacific Command (PACOM) areas of operation. PACOM's U.S. Air Force component annual Humanitarian and Civic Assistance operation is called "Pacific Angel" (PACANGEL).

In September 2012, PACANGEL—Nepal 2012 was conducted in Kaski District, outside Pokhara, Nepal. It was a joint operation between the U.S. Air Force, Australian Air Force, Mongolian Army, Nepalese Army, and Project HOPE. Health services were provided in optometry, family medicine, pediatrics, physical therapy, midwifery, dentistry, and pharmacy. This article will report on the optometric care provided. The optometric staff credentialed by Project HOPE consisted of two U.S. Air Force optometrists and two Project HOPE optometrists; one local Nepalese optometrist also participated. They were assisted by several local first and second year medical students who served as interpreters.

As is the case in the rest of the developing world, uncorrected refractive error is a significant problem in Nepal. This was the primary focus of this mission. In 2004, it was estimated that 153 million people were visually impaired from uncorrected refractive error, of which 9 million were blind. Three hundred fourteen million people were visually impaired from all causes.

Health policy makers usually categorize visual impairment and blindness as defined by a person's best corrected visual acuity. According to the World Health Organization, moderate visual impairment is defined as worse than 6/18 (20/60) in the better eye but better than or equal to 6/60 (20/200). Severe vision impairment is defined as worse than 6/60 (20/200) but equal to or better than 3/60 (20/400). Blindness is defined as worse than 3/60 (20/400). When considering the impact of vision problems throughout the world, it may be more useful to categorize visual impairment and blindness based on presenting visual acuity. This perspective allows for the realization of the burden of uncorrected refractive error in developing countries, where the capacity to treat the conditions is very limited.

Refractive error is the largest cause of visual impairment and second only to cataract as a source of blindness. Uncorrected refractive error is the greatest cause of blindness in children. Vision impairment and blindness result in lost education and employment opportunities, lost economic gain for individuals, families, and societies, and overall reduction in quality of life. This is particularly troubling because correction of refractive error is a simple and cost-effective intervention. Because over 60% of those in the world who are visually impaired from uncorrected refractive error are over 50 years of age, this represents a significant diminution of the experienced workforce in developing countries.[1,2]

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METHODS

A self-selected group of the general population was evaluated with visual acuity testing using a paper Snellen chart under daylight conditions, both autorefraction and retinoscopy under manifest conditions, and undilated direct ophthalmoscopy. Additional testing was provided on an as-needed basis. Equipment and supplies were provided by the U.S. Air Force and included retinoscopes, retinoscopy lenses, ophthalmoscopes, portable autorefractors, handheld slit lamp biomicroscopes, phoropters, tonopens, diagnostic and therapeutic drugs, and prefabricated spherical spectacles. The local optometrist was proficient in the use of most of the supplied equipment. The medical students were taught basic ophthalmoscopy.

During the operation, refractive corrections were provided with new premanufactured spherical spectacles in a large range of powers including aphakic correction. Those with small amounts of astigmatism were treated with equivalent sphere lenses. Patients presenting with the need for high cylindrical correction were referred to the local eye hospital. Near add power for presbyopic patients was determined by plus build-up. Also, treatment was provided for ocular disease and trauma. Those needing continued medical therapy or surgery were referred to the local eye hospital. The optometric staff also served as consultants for the primary care physicians.

RESULTS

During PACANGEL—Nepal 2012, 995 patients were examined from the rural community. The mean age was 41.34 years with a standard deviation of 22.80. The median age was 43 and the range was from 1 to 96 years. The percentages seen by age are given in Figure 1. Forty-nine percent of those seen were female. The mean entering distance visual acuity in the right eye was 20/57 and in the left eye was 20/60 with a median acuity in either eye of 20/20. Acuity in each eye ranged from 20/20 to 20/400. There were two patients who had one eye enucleated. None of the patients presented wearing previously prescribed spectacles.

The mean spherical error in the right eye was +0.08D (±1.35) with a range from +11.00 to −15.00D. The mean spherical error for the left eye was +0.09D (±1.35), but the errors ranged from +12.00 to −16.00D.

An astigmatic (cylindrical) error was found in 775 right eyes and 802 left eyes. The mean cylinder error was −0.74D (±2.74) in the right eye, with a range to −4.00. The axes of orientation in the right eye were 32.8% with the rule, 48.6% against the rule, and 18.6% oblique. The mean cylinder error was −0.54 (±4.72) in the left eye, with a range to −10.00. The median cylinder error was −0.50 in each eye. The axes of orientation in the left eye were 32.4% with the rule, 49.4% against the rule, and 18.3% oblique.

A near addition, determined by the plus build-up method, was prescribed for 51.8% of the patients (515 of 995). The mean add power was +2.20D (±0.62) with a median add of +2.50D and a range of add powers from +1.00 to +5.00D.

Cataracts were diagnosed in 24.17% of the patients seen, though specific type of cataract was not recorded. A small number of aphakic and pseudophakic patients was examined, so the true prevalence of cataract is somewhat higher than our diagnosed percentage. Ophthalmologists at the local eye hospital agreed to provide cataract extraction in cases where best visual acuity was worse than 20/200. Other nonrefractive diagnoses that were highly prevalent were dry eye (18.17%),

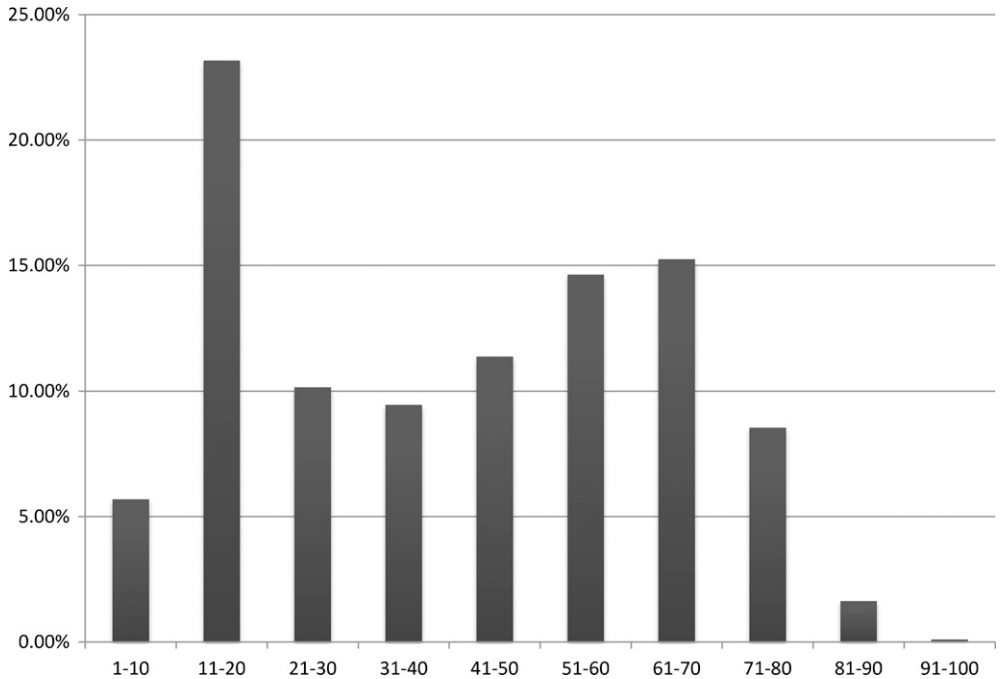

FIGURE 1. Frequency of Age of Patients, PACANGEL-Nepal 2012.

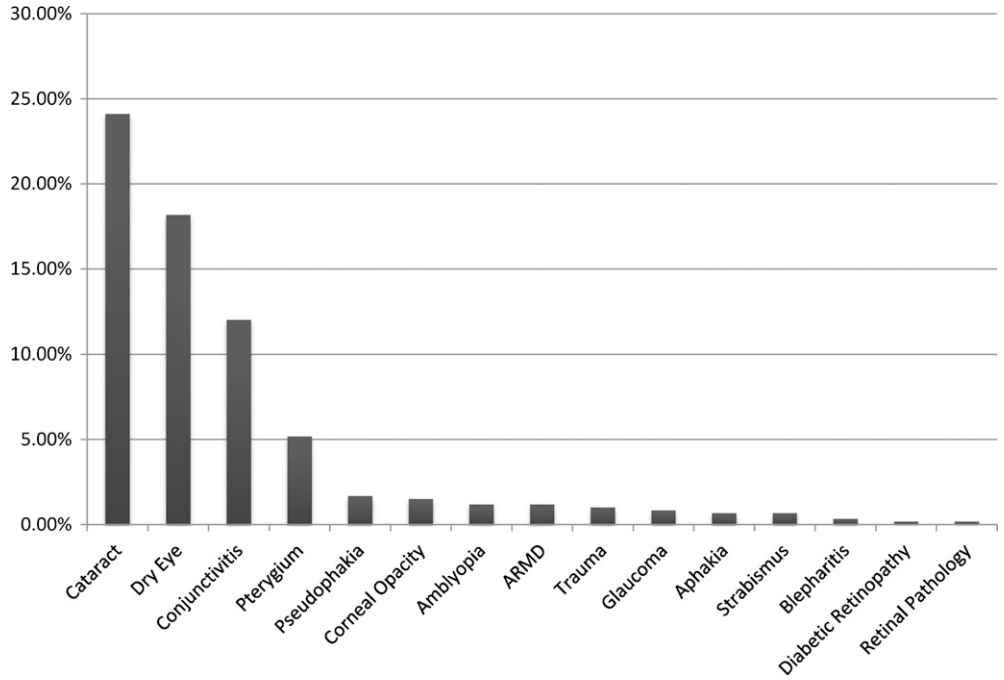

FIGURE 2. Frequency of Non-Refractive Diagnoses, PACANGEL-Nepal 2012.

conjunctivitis (12.0%), and pterygium (5.17%). A complete listing is shown in Figure 2.

DISCUSSION

Eye and vision care is lacking in Nepal, because of having only 62 optometrists for its 27 million residents, and only one optometry school producing 6 optometrists annually.[3] This was evidenced by the paucity of patients who presented wearing spectacles. Sporadic episodes of care have a considerable impact on those patients receiving treatment. However, there is no continual or follow up care available. One means to address this limitation is to combine on-site training with the care provided. However, training provided to the medical students who served as interpreters on this mission was minimal. To address the needs of the Nepalese people, more schools of optometry could be developed, Nepalese citizens could be encouraged to study abroad, or immigration of foreign eye care professionals increased.

Even though the dispensed spectacles contained only spherical power, the fact that they were new made recipients perceive them as more advantageous than recycled prescriptions. Some humanitarian missions dilate/cycloplege all patients, which despite some inherent disadvantages, should improve accuracy of correction and allow more pathology diagnosis.

Often differences in refractive error are based on ethnicity, region, age, education level, occupation, socioeconomic status, genetics, and gender.[4] Some examples from studies performed in Asia will be noted. Generally speaking, more developed countries had a higher rate of myopia, and a correspondingly lower rate of hyperopia. Likewise, younger patients also often displayed a greater rate of myopia. When compared to Malay and Indian men, Chinese men had a higher rate of myopia, though the prevalence rate was high for all 3 groups. The rate of myopia for Chinese individuals was similar to the rate shown in studies from Taiwan and Hong Kong.[5–9] The rate of myopia was far more prevalent in Chinese residing in Singapore than of those of European extraction.[10]

In Oman, the rate of myopia in children from remote areas was lower than those from urbanized areas.[11] The prevalence of reduced vision requiring spectacle correction for children in Nepal was considerably less than for children in China and Chile.[12–14] The prevalence of myopia for Japanese adults was similar to other Asians but higher than for black and white populations.[15] The rate of myopia correction had increased considerably in Taiwan and was more prevalent in younger populations.[16] Rates of myopia in Sumatra were lower than other urbanized parts of Asia.[17] In China, myopia was more prevalent in younger subjects, those in urbanized environments, and with higher educational backgrounds.[18] Mongolians had a lower prevalence of myopia than other east Asians.[19] The earlier the myopia was treated, the further it progressed. Hyperopia had also been reported to be variable, ranging from 1.2% in children from Nepal, to 62.5% in adults in India.[20]

In our study, the refractive error findings are consistent based on ethnicity, region, age, education level, occupation, socioeconomic status, genetics, and gender. Most specifically, our study was consistent with expected findings of lower rates of myopia in rural Asian populations with lower educational backgrounds. Our study's finding of a need for near correction on over 50% of the population was not

consistent with an earlier study that found the prevalence of near vision impairment of less than 10% in the Kaski region.[21]

Planning for future missions with the intent of correcting refractive error could be enhanced by knowledge on area epidemiology of ametropia in those presenting for care.[22] An exhaustive study of all humanitarian missions could lead to that end. Though episodic missions from nongovernmental organizations and similar organizations may be helpful, they are not effective in meeting the overall need. To substantially treat the greatest worldwide cause of visual impairment, local sustainable resources are imperative.[23–26] Often language is a barrier to helping patients. The provision of care by local, linguistically competent practitioners would better suit the needs of those in need of care. Those involved in such missions could be a significant source of training such caregivers.

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