

Eye-care health disparities: International and Rural United States Comparison

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Abstract

Eye care health disparities have been the subject of many debates and deliberations both locally and nationally in organizations such as National Eye Health Education Program (NEHEP). The need of a greater number of ocular health care providers is undeniable. The issue has gained interest and has started to be addressed in third world countries such as India. The National Eye Institute (NEI) concentrated on expanding vision research in the above mentioned country with support of its 2005 established foreign component which endows seven grants for investigations. However, further need of ocular research in many of the other impoverished countries is necessary.

The purpose of the proposed research is to investigate the status of eye health care provided in former communist –and currently developing— countries and economically developed ones, as well as to relate these primary health care systems. Use of educational and instructive pedagogy provided an opportunity for exploring the basis of health disparities among subjects in Romania, Europe, and an academic area in rural Pitt County, USA. Pilot data was collected in US in the rural community among children with noted economic and health disparities. The preliminary information was presented at the Third Annual Jean Mills Symposium and ECU Undergraduate Honors Research Symposium, spring 2007.

Goals included eye safety, preventative care, and internalization of knowledge presented. The participants received comprehensive individual eye-screening and educational interventions. Since many individuals lacked availability for eye care, my intention was to raise awareness about precautionary eye-care versus costly treatment, to serve the targeted age group, and to petition for implementation of positive changes. Ocular health influential factors such as the economic and social status, as well as cultural background, have been identified as key factors for the current health disparities mainly affecting their personal overall ocular health. Final evaluations of educational outcomes showed retention and application of information. As a result of the educational presentations and interventions, subjects with affected vision were strongly encouraged to visit optometrists.

Literature Review

Global vision health disparities:

Health disparities are differences in health care within a population due to economic, geographical, or societal variations. According to the CDC, the top goal for Healthy People 2010 is to reduce health disparities (Eliminating Disparities 2008). Furthermore, they state that *"The future health of the nation will be determined to a large*

extent by how effectively we work with communities to reduce and eliminate health disparities between non-minority and minority populations experiencing disproportionate burdens of disease, disability, and premature death (Eliminating Disparities 2008). ”

National Eye Institute recognized that the issue of increasing eye disease is lately becoming a major public health problem in USA (National Plan 2008). Consequently, millions of people experience considerable suffering, disability, loss of productivity, and diminished quality of life (National Plan 2008). In hopes to address the situation, the National Eye Health Education Program (NEHEP) has been created. As one of its branches, the NEHEP Planning Committee is directly responsible for recommending program priorities, advising on activities, and facilitating cooperation among the NEHEP Partnership (National Plan 2008). Other direct goals of NEHEP include the motion to increase awareness of low vision in high-risk targeted US audiences, to increase awareness of the important role played by preventive care and early detection of ocular health problems, to increase the health care providers’ awareness of the need for regular, comprehensive eye examinations and case-based needed referrals, and to increase the individualistic initiative in taking appropriate actions (National Plan 2008).

Addressing health disparities

Ocular health care system experiences large gaps that are just starting to be nationally addressed. In order to see any impacting change towards better, however, the initiatives towards problem identification and resolution must be addressed in local communities (Global Vision 1-7). Through regular and numerous vision screenings, high-risk groups can be identified. The addition of preventive educational interventions can promote a healthier community, and with wide implementation of this practice, the nation’s overall well being can be ultimately improved.

There is a worldwide movement towards community networking, striving to alleviate the current situation. As a major proponent of this plan, the NEI developed strategies for communicating with the American Indian and Alaska Native population. It is viewed as crucial to have a diverse representation of ethnic populations in the NEHEP Partnership (National Plan 2008).

- A prime example: India

A prime case example relative to visual health disparity is the ongoing research in India. Research teams have traveled to the countries, gathering data and making it nationally known, in the hopes that these international collaborations will potentially provide cost-effective opportunities for multi-center clinical trials (Jain et. al. 69-70). In addition to the sixty-two US grants, NEI itself has established in 2005 a foreign component with seven grants for investigations to help build capacity by training researchers and clinicians (Global Vision 1-7). Internationally, NEI has concentrated on expanding vision research in India (Global Vision 1-7). India has the largest number of blind children in the world and Madhya Pradesh alone was estimated to have 19,200 blind children according to the National Blindness Survey of 2002 (Jain et. al. 69-70).

A similar community movement is needed in other economically disadvantaged countries that have long since been ignored in the process of health promotion. It is

widely acknowledged that building such research capacity in low and middle income countries is very challenging, but the process must ultimately take place, so it is encouraged to start it sooner than later. The NEI did recognize the issue, and in its first attempt towards the betterment of the situation was the establishment of training programs (Global Vision 1-7). “Fogarty grant programs— Fogarty International Research Collaboration Awards (FIRCAs) and Global Health Research Initiative Program for New Foreign Investigators (GRIPs)—also help to build capacity by training researchers and clinicians and then sending them back to home country with NIH grant support to collaborate with NIH grantees (Global Vision 1-7).” However, accessibility to such grants is limited, so change must come from any and many individual researchers.

Again, the whole concept of community leaders and local movement towards vision health promotion and research is to be encouraged. Additionally, a similar dedication, interest, and duty must be taken overseas, where access to health care and ocular education, if present, is limited. It is extremely important to develop scientists that express high critical thinking skills and scientific inquiry at all potential training levels. “There is a general need to expand scientist/student exchange programs and long-distance educational programs for graduate students and clinician scientists. Collaborative international research should be fostered with pilot projects, support for international travel to meetings, and funding of sandwich programs for scientists and clinician scientists (Global Vision 1-7).”

Barriers to healthy vision

There are barriers preventing pediatric eye care, but with ORBIS support, the Childhood Blindness Project was established. This included knowledge assessments, trainings, preventive and curative measurements towards the child eye disease prevention (Jain et. al. 69-70). Additionally, school teachers were trained to identify vision problems, parents were educated on prevention and seek for medical aid, and community leaders were educated on how to reach and inform families of the importance ocular health. “The community participation strategy increased outpatients’ flow by 26% and pediatric surgeries doubled in volume, thereby showing improved health-seeking behavior (Jain et. al. 69-70).” Overall, not only were vision problems identified, but the individual attitude toward the subject was increased and finely tuned. Such an effective approach could also be implemented in targeting other groups of people as well.

Current movements to decrease vision health disparities

Seventy to ninety percent of global blindness can be avoided, but there are country- and region-specific factors affecting eye care delivery (Global Vision 1-7). Thus, operational research is needed to understand the barriers to knowledge implementation and to the availability of eye care. Researchers and scientists with research backgrounds in developing countries should be supported in their individual investigations or be offered the support of larger research teams to efficiently conduct such operations (Global Vision 1-7).

“NEI should encourage, where possible, the training of young researchers from all over the world at leading ophthalmic research centers, in developed as well as developing

countries. NEI could fund the organization of international/regional meetings, symposia and seminars to provide opportunities for collaboration and cross-fertilization of ideas among researchers working on similar goals. Enlargement of participation in scientific exchange through NEI merit-fellowships and travel award programs would be of value. [...] Adequately trained manpower is required if the unique advantages offered by international vision research collaborations are to be realized. Workshop participants recognized that a host of additional resources are needed to leverage existing efforts to reduce global blindness (Global Vision 1-7).” In the process, organizations such as NEI will be encouraged to pay attention to local research movements and advances, as well as to take advantage of those researchers who embody a great potential for international success.

The whole process of vision health promotion and research i.e. identification of countries whose population is in most need of intervention, there is also a need for economical analyses (Global Vision 1-7). “There is a need for epidemiological data on the prevalence of blinding diseases especially in countries and regions where reliable data are not available. Economic and manpower analyses, relevant to influencing country expenditures for health, will become an important part of operational research. Global health economic assessments of the financial cost and quality of life burden of visual impairment are needed to support advocacy, and prioritization of eye care services in resource poor settings. There is a need for cost of illness and cost of failure to treat studies from a macroeconomic perspective, in contrast to studies at the household level (Global Vision 1-7).”

I. Vision health disparities in Romania:

International collaborations are symbolic of the linking elements between developed and developing countries. They emphasize the accessible high-quality care as being the main challenge to be overcome. NEI, in its support for international research, has cooperated during a history of over twenty-five years with populations-based visual impairment surveys in Nepal, China, Chile, India, South Africa, Malaysia, and Brazil (Global Vision 1-7). However, many more European developing countries such as Romania remain in the dark when it comes to diminishing the visual health disparities. The need of research and promotion of proper health care in such places is critical.

Romania serves as another case example to review visual health disparity. For example, based on the October 2006 poll there are a total of 40 Romanian national ophthalmology residences divided between the main municipal cities—and concomitantly main medical centers—such as Oradea, Arad, Iasi, Timisoara, and Bucharest. It must also be taken in consideration that the 2740 total national residency seats in the medical field include but are not limited to ENT, family practitioners, radiologists, urologists, dentists, pharmacists, even legal medicine practitioners (Numarul de locuri 2006). These numbers further reflect the deficits in the ophthalmologic care. Additionally aggravating the situation is the fact that the critical population that does require the vision care is geographically isolated in villages throughout the country. They lack transportation and none of the practicing ophthalmologists engage in house calls. It must also be noted that there is no notion of optometrists in most European countries

such as Romania (In Romania 2002). Thus, the research and educational interventions that would be most beneficial for these individuals must be brought to them.

Vision health disparities in rural Pitt County, USA:

There are obvious health disparities manifested in Pitt County, and despite the presence of Brody School of Medicine and Pitt County Memorial Hospital, certain segments of the population are not receiving healthcare up to par with middle class society. "Segments of the population" broadly refers to socioeconomic groups, religions, cultural backgrounds, education levels, and geographical locations. The Belvoir community certainly feels the effects of the health disparities. Their diminished access to healthcare services is paramount. The high poverty level in the area could imply less health insurance, lack of funds for medications, and lack of education pertaining to healthy lifestyles.

A strong correlation exists between poverty level and lower health status which is observed in subsidized medical insurance and healthcare. According to the Pitt County Voices: A Pitt County, North Carolina Health and Human Services Needs Assessment 2006, a large proportion of Pitt County's population does not have the opportunity to have insurance or buy necessary medicines for conditions like diabetes and high blood pressure, which are prevalent within the county (Pitt County Voices 26). People in the rural areas of Pitt County have difficulty accessing clinics and hospitals. Even after the medical facility has been accessed, the necessary medications and follow-up tests to confirm a diagnosis or treat a condition are difficult to obtain due to cost and time (Pitt County Voices 46-48).

According to the after-school coordinator, a 5 day a week, readily accessible school nurse is not available in the elementary school in case students or parents have quick questions and need immediate attention (Lambert 2008). Lack of school nurse availability is prevalent around eastern NC, the current student to nurse ratio is 1: 1641 although NC has legislated a phased in approach to improving the ratio of student to nurse to 1:750 by 2012 to be consistent with the national average (General Assembly of North Carolina 2007). Often diverse populations may find the healthcare system is not able to adequately address multicultural needs and concerns in a relevant manner based on the lack of cultural sensitivity; thus, there is a renewed focus for the healthcare in the US to increase health professional cultural sensitivity to various ethnic groups (Hall 2001).

In the after-school federally-funded program, approximately fifty students in grades three, four, and five, who financially qualify for the program remain after school until approximately five o'clock. Students are provided with a snack and transportation to return home in the evenings. The racial make-up of the after school program adequately reflects the racial proportions of the student body as mainly African-Americans, Hispanics, and some Caucasians were participants. Students remain in groups according to their grade level and participate in 3 blocks (Lambert 2008). In the fall of 2007 these were: physical activity, homework study, and ocular health care instruction.

Methodology

The plan of action focused on research, data collection and analysis, and conduction of comprehensive eye-screenings (check for color blindness and vision acuity), along with an interview to assess knowledge of the meaning of these screenings and potential health implications.

Screening: history and its role in the research

Interestingly, with cancer being a major cause of death, the concept of screening has actually bloomed in westernized countries in a direct correlation. The term itself leaves quite some room for uncertainty, with mass screening, opportunistic screening, case finding, screening camps and screening tests are some of the examples of this increasing vagueness. The definition most widely accepted and used, as it is the case in this particular research, is that screening constitutes public health intervention intended to improve a particular and precisely defined targeted population (Wormald 29-30). The population is chosen based on several qualitative factors which include the number of individuals at risk to the effects of a specifically investigated condition, and whether the condition itself poses a major health concern. Since the procedure differentiates between those who are disease free and those who are affected, screening is one of the most important elements of the research, and it should not be taken lightly. Close observation, evaluation, and reflection should be implemented from the beginning.

In the case of the proposed research, with UMCIRB having granted approval for the data collection at the Romanian and NC sites, the research was supervised by the family practitioner, Dr. Aurelia Marti, M.D. and by Dr. Tom Irons M.D., Associate Vice Chancellor for Regional Health Services at Brody School of Medicine. The effectiveness of eye screening, revealing the program's success in decreasing the disability, morbidity, or mortality from the targeted health condition, is ultimately crucial. When relating this to ocular health, this ideal is reflected in a greater number of sight years saved, and in a number of less costly procedures that promote ocular health (Wormald 29-30).

Through eye screenings such as color blindness tests and checks for vision acuity, students were informed about their vision status. At risk children were instructed about the need of eyesight correction. They were encouraged to talk to their parents about taking them to an optometrist for a complete eye exam and glasses.

Educational seminars

Eye health concepts were presented to forty-five third, fourth, and fifth graders at rural elementary school in Pitt County, United States, and a hundred fifty-four Romanian subjects. Goals included eye safety, preventative care, and internalization of knowledge presented. Students received comprehensive individual eye-screening and educational interventions via the use of PowerPoint slides and images. The colorful and informative slides kept the students engaged and interested. Games, puzzles, coloring sheets, and worksheets were also provided as they helped reinforce previously learned concepts such as two eyes are better than one, the concept of perception of depth, and exercises for the eye (i.e. 3D images). Other concepts included in the presentations were:

- Why do we have eyes—purpose?
- Why do we need blinking, eyelashes, eyelids, and tears?
- What are glasses and contacts for?
- How do we use eyes in our daily life?
- What are good ways to protect our eyes? (i.e. nutrition, eye exercises, avoiding bright lights, no sharing of glasses, makeup, etc.)
- Eye structure and communication with the brain

Post-seminar questionnaire and interview

Qualitative and quantitative data collection methods were used to assess the needs for eye care education. A series of questions were asked of the participants. Additionally, a visual handout was made available and scored for percentage of correct answers.

Qualitative data

Qualitative questions that were asked included:

- “What are proper ways to protect the eyes”
- “Why do we need to take care of our vision”
- “How do glasses work to correct vision”

Some of the qualitative responses included:

- “We need to eat loads of carrots”
- “We need to protect our eyes from the sun and wear sunglasses. We have only two eyes and must take care of them. Once they are gone they are gone forever”
- “Glasses focus the image on the retina better”

Quantitative data

The subjects were also given a worksheet with images such as a girl doing homework staring at a bright light, a kid wearing sunglasses, carrots, a bottle of sun cream, etc. They were asked to circle only the images that portrayed proper eye care. For example they would not have to circle the girl working next to the bright light or the sun cream (this is protective for skin, not eyes). However, they would have to circle the boy wearing the sunglasses. The number that they circled right out of the total number of right questions quantified the data into a percent value. The percent value was reflective of how much the subjects learned from the seminars. There were a total number of seven correct images to be circled.

Post eye-care presentation evaluation			
Number correct	% Correct	Number of US subjects	% US Subjects
1/7	14.3	1	2.2
2/7	28.6	1	2.2
3/7	42.9	3	6.6
4/7	57.1	11	24.4
5/7	71.4	11	24.4
6/7	85.7	18	40
7/7	100.0	6	13.3

Figure 1: Qualitative portrayal of the correctly circled items on the assessment worksheet in US subjects. The quantitative number is also expressed as a percentage.

The data for the US subjects (number correct circled divided by total number of correct answers) is additionally represented in *Figure 4*.

Interview

A short interview was given to the participant subjects. Questions included:

1. Have you ever been told that you have an eye problem or an eye disease? If yes, what were you told and what was the date?
2. Do any of your family members (parents, grandparents) have any eye problems or eye diseases? If yes, what?
3. Have you had any eye surgeries or special care provided to your eyes? Describe the eye surgery or eye care.
4. Do you have a family eye doctor? If not, who takes care of any eye problems?
5. How often do you get an eye exam? Describe what they do in your eye exam.
6. Do you wear glasses and/or contacts? Since when? How often do you have your glasses and/or contacts checked to make sure they help you see well? When was the last time your glasses and/or contacts were changed?
7. Do any of your family members (parents, grandparents, children) wear glasses and/or contacts? If so, who in your family has to wear glasses and/or contacts?
8. Do any of your family members (parents, grandparents, children) have insurance that helps to pay for your eye care? Does their insurance pay for your eye care? (If adult: Do you have insurance that helps to pay for your eye care?)
9. Do you have a family medical provider/practitioner? How many times per year do you visit the family medical provider/practitioner? How often does your medical provider/practitioner check your eyes when you go for visits?

The answers showed some of the following trends:

- 33 out of 45 (73.33%) US subjects have family history of eye problems.
- 86 out of 154 (55.84%) Romanian subjects have family history of eye problems.

Frequency of Eye Exams	% of US Subjects
never before in their whole life	35.6
one time in their whole life	51.1
one time per year	13.3

Figure 2: Upon interviewing US subjects, their frequency visit for eye exams was categorized in three groups based on the spectrum of answers. The percentage of subjects particular to each is subsequent to the type of eye exam frequency.

Frequency of eye exams	% of Romanian subjects affected
never	50
once before	19.5
twice before	5.5
three times before	2.6
four times before	0.65
once per year	10.4
twice per year	3.3
once every five years	0.65
once every four years	0.65
once every two years	3.9
once every three year	1.3

Figure 3: Upon interviewing Romanian subjects, their frequency visit for eye exams was categorized in three groups based on the spectrum of answers. The percentage of subjects particular to each is subsequent to the type of eye exam frequency. *Note:* the Romanian focal group had a wider array of personal answers in terms of frequency of eye exams than US subjects.

Vision Status	Number of US subjects	% of US participants
20/20	14	31.1
20/25	5	11.1
20/30	12	26.6
20/40	5	11.1
20/50	4	8.9
20/60	1	2.2
20/70	1	2.2
20/100	3	6.6

Figure 4: Following visual acuity examinations, US participants were categorized in particular vision status groups which exemplify the degree of ocular vision. The quantitative numbers of participants are further expressed in percentages based on total number of participants examined.

Vision Status	% Romanian Subjects affected
20/20	45.4
20/30	32.5
20/40	7.8
20/50	3.2
20/70	2.6
20/100	2.6
20/100+	2.6

Figure 5: Following visual acuity examinations, Romanian participants were categorized in particular vision status groups which exemplify the degree of ocular vision. The quantitative numbers of participants are expressed in percentages based on total number of participants examined.

Data Analysis:

Examinations results:

Results for Romanian subjects examined in Oradea, Romania:

With UCMIRB approval for both research sites, the data in Romania was gathered during the summer of 2007, and the subjects in the Pitt County rural community were tested in the fall of 2007. The interviews and vision acuity examinations reflected the following statistics in Oradea, Romania. 1.948% of the subjects reported that they have had some sort of eye surgery (most commonly for strabismus), and 86 out of 154 (55.84%) stated that there was a family history of ocular health problems; 36 out of 154 (23.38%) subjects were on the brink of vision correction as their test indicated 20/25 in one or both eyes; 49 out of 154 (31.82%) needed vision correction i.e. glasses prescription, but did not have any glasses or contacts at the date of examination, while only 29 out of 154 (18.83%) subjects actually had glasses at the time of the examination. Unfortunately, out of these individuals, 8 had the wrong eye glasses prescription i.e. 8 out of 154 (5.195%) successively reflecting the currently poor ocular health. None of the subjects who were tested had color-blindness. Overall, 85 out of 154 (55.19%) subjects had eye problems. Low vision acuity, need of correction glasses, etc. were classified as eye problems that need to be attended.

Results for US subjects examined in rural Pitt County:

The students tested at the elementary school were enrolled in the After-School Program, designed preferentially but not exclusively for students with economic difficulties. When analyzing the post eye-care presentation evaluations, the majority of the subjects were positively influenced, indicating a high retention rate in regards to eye care overview notions. For example, 89% of the students had a 50% or better retention of the materials presented.

The data collected during the elementary school's After-School Program shows that out of the 45 tested students, none had eye surgery. Additionally, none of those examined tested positive for color-blindness. Vision acuity examination reflected that 4

out of 45 (8.89%) students had a 20/25 acuity in one or both eyes, which means that their vision was neither perfect, nor in need of correction. Glasses or contacts are prescribed for individuals with a 20/30 vision or higher. It was alarming to find 18 out of 45 (40%) subjects were in need of glasses but did not have them. Only 9 out of 45 (20%) students who needed glasses had them, but out of that number, two had the wrong prescription glasses (4.44% of the total subjects examined). When interviewing the children, 33 out of 45 (73.33%) indicated that there was a family history of ocular problems. Overall, 31 out of 45 (68.90%) had visual deficiency such as poor visual acuity, that needed to be attended to. Out of the 68.9%, 33% alone had 20/40 or higher in each or both eyes, underlining the emergency of providing proper eye care and health education in rural areas, including in developed countries such as United States.

Limitations:

Shared research limitations for both research sites:

A primary concern is the fact that there was a considerate restriction on the research-conduction time-frame, particularly with trying to organize the travel in Romania. Having two focal research locations further pressed the time issue. The limitation in the number of subjects was also problematic. Because there was little time, fewer people were reached than the number originally intended. Trying to obtain UMCIRB approval for these two sites was time demanding and constraining. Since there were no other principal or secondary investigators, it was considerably harder to examine and to educate a larger subject pool. This reveals the need for constant research and for support toward current researchers who are gathering information to be made available as future references and implementations towards the betterment of societies. Partnerships with more schools in both Romania and United States would have also furthered the current studies, expanding the subjects' possible personal influential factors such as socioeconomic factors, culture, educational level, etc.

Research limitations specific to Romania:

A significant limitation in the hope of improving the visual status of Romanians is the health care system which lacks the needed working force. Currently, the national combined number of practicing ophthalmologists and residents is approximately 1000 (Numarul de locuri 2006). Additionally, Romania became part of the European Nation in 2007. Consequently, the number of the young people leaving the country to seek better employment increased considerably. Availability of needed technology in the field is also a huge limitation. As Dr. Benone Cârstocea stated, there are locations where machines as old as one hundred years are being used as ocular diagnostic tools (In Romania 2007).

The cost of any ophthalmologic intervention is quite overwhelming and tends to lead people to not seek any treatment. For example, the cost of a cataract surgery in Romania is approximately 12 million lei (with \$1=23000lei, the cost is approximately \$522 dollars), and the insurance does not cover more than 2.4 million lei (approximately \$104) (40.000 de cazuri 2005). It must also be noted that the average monthly income for a middle aged worker is \$270.

Research limitations specific to US:

The need of new technology is echoed in the United States as well, as Dr. Sean P. Donahue indicated in the Vision in Preschoolers Study (VIP) (Groves 24-25). It is recognized that a vast majority of the children are at risk of ocular diseases and there are several negative factors promoting the situation. Current technologies work well but they are not actually checking visual acuity. Additionally, without a federal mandate promoting a universal test for preschool screening, the children are not organized as a whole prior to kindergarten years, which indirectly reinforces the high number of people with affected vision (Groves 24-25).

Conclusions

I. Discussion: relations between the two research sites

The research conducted both in Romania and United States has shown a great success in regards to the educational interventions. There was a significant rate of information retention as evidenced from final assessments. The vision status, though revealing major gaps, was comparable and similar in the two settings (55.19% and 68.90% of the subjects examined in the United States and Romania respectively showed a certain degree of visual impairment as previously described in the *Data Analysis: Results* section). Final evaluations of educational outcomes showed retention and application of the presented information; children with affected vision were strongly encouraged to be checked by optometrists.

Oradea, Romania as a focal research location

Oradea is considered one of the main metropolitan cities within Romania, thus one would have predicted a lower percentage of people with various degrees of visual impairment. However, a 55.19% visual disparity was observed. This high number is for a main city's population, where there is no geographical limitation and where (private practice) ophthalmologists can be found. Thus, a further step of the research would be to evaluate subjects in neighboring villages—individuals of old age, without transportation, and without financial support. The numbers of those affected in such a setting are hypothesized to be as high if not higher due to influential factors previously stated.

With Romania just entering in the EU, the working force middle class population is leaving the country in greater numbers, in hopes of finding better paying jobs in neighboring European countries. In the process, they leave behind those who need most medical attention. These people are the ones who *need to be reached*, and the sooner the better. Of course, since over one half of the tested subjects in Oradea pertain to the “need of ophthalmologic attention” category, there is an obvious outcry for further research, for implementation of efficient educational interventions promoting preventive care, and for assistance to individuals with a need of immediate medical attention.

Rural Pitt County as a focal research location

Many of the vision-threatening conditions can be detected through simple examinations that make use of the Snellen visual acuity testing or color blindness examinations. It is crucial to start the ophthalmologic examinations early in the childhood years, since vision problems affect between 5 and 10 percent of young children (Broderick 716-730). Of these children, as many as 40 percent subsequently develop amblyopia (Broderick 716-730). This ocular malady is related to the disease of the visual pathways (Broderick 716-730). Pediatric vision screening is a major source of reducing occurrences of vision loss. It should be noted that visual impairment affects children in far greater ways than limited quality-of-life standards. Some of these issues include psychological difficulties. Studies show that primary care physicians do not consistently conduct pediatric vision screening during clinical visits (Broderick 716-730). This is a fact that reinforces the importance of promoting proper eye care through educational seminars, of volunteer screening by qualified individuals in schools or other such settings, and of additional and continuing research studies which include screening of subjects and referral for those affected. The vision status of students enrolled in one of rural Pitt County's elementary schools reflects a need for further investigations, as well as continued educational interventions.

Critical current research advances to be noted

Previous research in the area of ophthalmology, particularly pediatric ophthalmology, has been done but not to the needed extent. A multicenter, cross-sectional study was done in several preschools enrolled in Head Start, where a sample of 2588 children were screened by licensed optometrists for vision problems and ophthalmologists who employed approximately eleven methods (The Vision in Preschoolers Study Group 637-650). Several conclusions were reached as a result of the study. It was proven that there is a need for consistent methods to be used in vision screening, particularly the use of visual acuity screenings (The Vision in Preschoolers Study Group 637-650).

Dr. George R. Beauchamp from University of Texas stated that "the 'mere' identification of a problem does not ensure that it will be optimally treated. In short, there is a significant health systems problem to deliver a continuous cycle of advocacy, education, identification, access to care, follow-up, and evaluation of outcomes that must be delivered in a culture that does not always respond "rationally" to the needs of affected children (The Vision in Preschoolers Study Group 637-650)." This study thus also show that there is a lot more work to be done in the field, and that every input makes a difference that is much needed (The Vision in Preschoolers Study Group 637-650). It thus gives a strong sense of relevance to this research and to the contributions that are brought to the table in terms of promoting eye care.

Population-based cross-sectional studies in the Latino community living in Los Angeles, CA, have begun in hope of promoting better ophthalmologic care for the targeted group. Over six thousand individuals have been assessed via a detailed interview and eye examination which included vision acuity, color blindness, intraocular pressure, and visual fields assessment (Varma et. al. 1121-1131). Having the necessary

professional qualifications, the researchers were able to perform the two additional examinations. Due to a lack in professional training, these methods were not conducted during the data collection for this research. The examined cohort provided information about the prevalence of ocular disease in the largest and fastest growing minority in the United States. With the estimation that by 2050, the Latinos will comprise approximately 25% of the US population, there is an underlining need of comparable ophthalmologic studies among the Hispanic population (Varma et. al. 1121-1131).

There are few studies conducted and even fewer published. As Dr. James P. Ganley MD from Gibson Island indicated, it is important to publish methodologic studies because they provide details that can be replicated in the future by subsequent investigators, creating a uniformity and basis of comparison (Varma et. al. 1121-1131). “Thus, the prevalence, and eventually the incidence, of visual impairment and blindness, cataract, macular degeneration, diabetic retinopathy, and glaucoma of Los Angeles Latinos may be reliably compared with similar findings among African Americans in Baltimore, Wisconsin whites in Beaver Dam, patients with diabetes in southern Wisconsin, Caribbean Africans in Barbados, Australians in the Blue Mountains and Melbourne, Europeans in Rotterdam, and others (Varma et.al. 1121-1131).” Additionally, vision screening during childhood age is a very crucial element for the early child-examinations. The detection of vision-threatening ocular conditions at such an early stage provides a tremendous opportunity to prevent significant disability (Broderick 716-730).

NEI’s important message in relation to ocular health care

“The National Eye Institute will continue to protect and improve the visual health of the Nation through the support and performance of the highest quality laboratory and clinical research aimed at increasing our understanding of the eye and visual system in health and disease and developing the most appropriate and effective means of prevention, treatment, and rehabilitation, and through the timely dissemination of research findings and information that will promote visual health (Vision Statement 2008).”

Indeed, in 2004, NEI has recognized the need of conducting and supporting research, training, and promotion of ocular preventive care, and it has made it its overall vision statement (Vision Statement 2008). An additional mission was the improvement of the prevention strategies, diagnosis, and treatments (Vision Statement 2008). My goal as a researcher is to contribute to the ongoing investigations as well as to promote a healthier vision-status. This is implemented in economically underprivileged countries such as Romania, where access to care and information is limited, as well as in the rural areas of economically developed countries such as United States, where disadvantaged population subgroups encounter various limiting factors that contributed to a less than standard ocular health.

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Figures and Tables

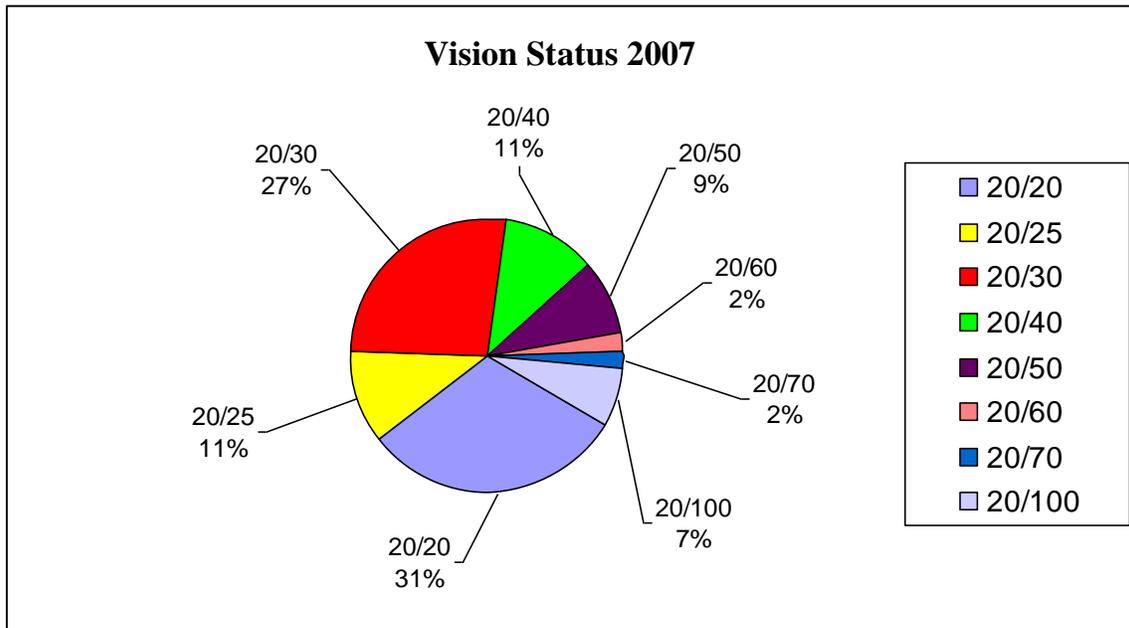


Figure 6: US subjects vision status in 2007

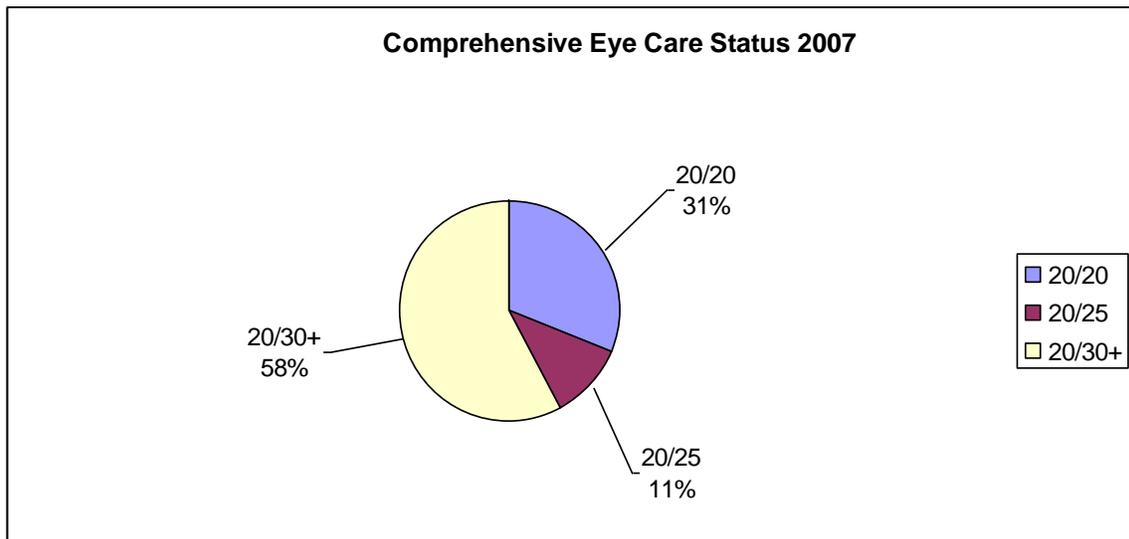


Figure 7: US subjects overall eye care status

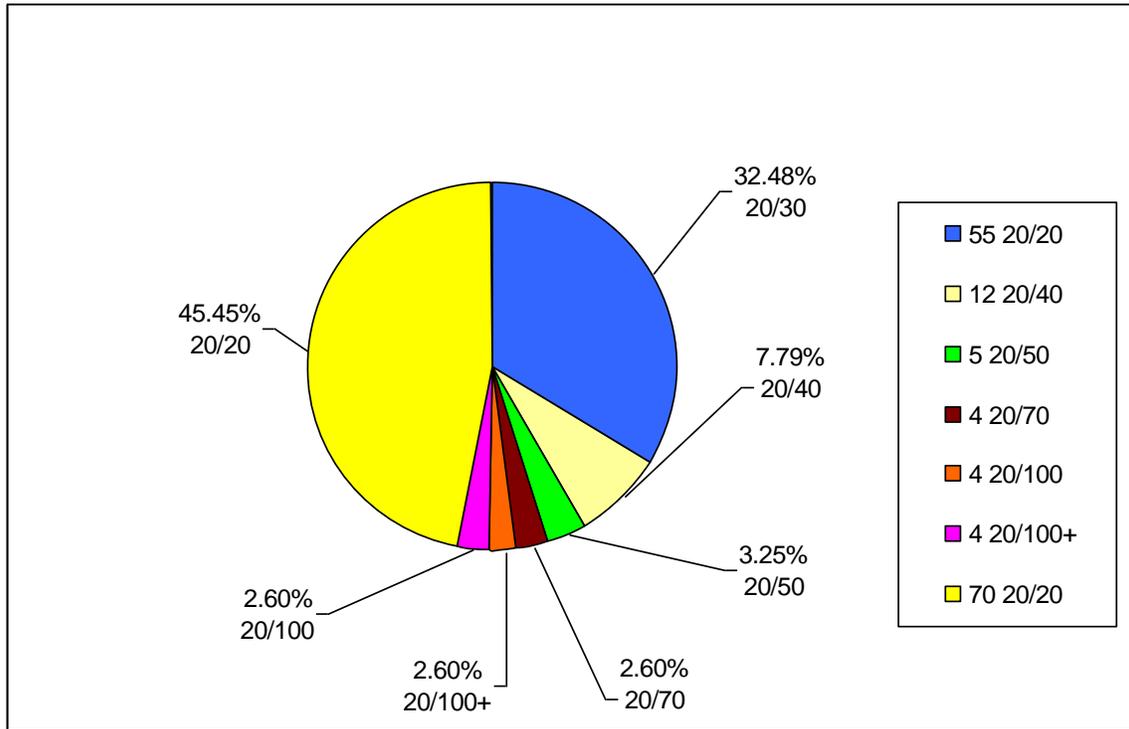


Figure 8: Romanian subjects vision status in 2007

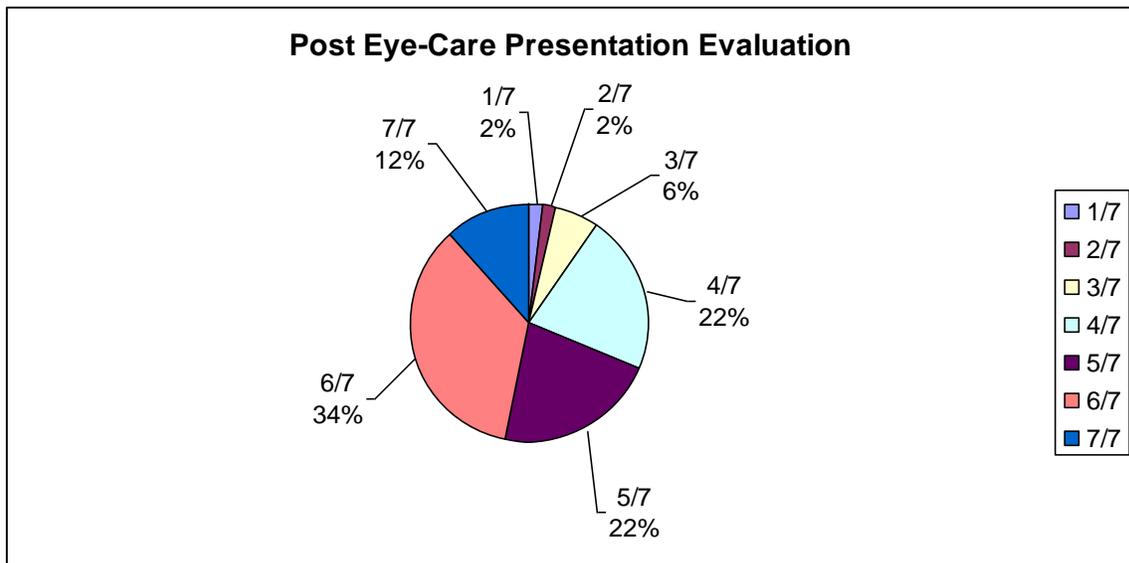


Figure 9: Effectiveness of educational seminars in US subjects, 2007.

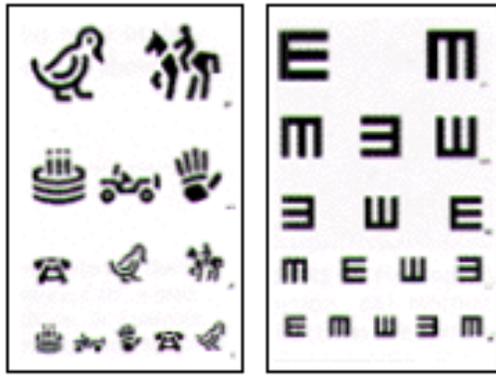


Figure 10: Available pediatric vision screening charts (*Left*) Allen object recognition chart. (*Right*) "Tumbling E" chart, used in the proposed research.

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