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PATTERN AND PREVALENCE OF EYE DISEASES AMONG FARMERS INAN AGRICULTURAL INDUSTRY IN SOUTHERN NIGERIA

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ABSTRACT

Farmers are exposed to certain occupational hazards which predispose them to ocular diseases including ocular injuries. The aim of this study was to determine the prevalence and pattern of ocular diseases among farmers. A descriptive cross-sectional survey carried out among farmers in an agricultural industry in Edo state. A detailed ocular examination including refraction was performed on participants. A predesigned questionnaire was administered to collect data on socio-demographic parameters and work-related ocular history. Three hundred and three (303) field farmers were examined out of which 184 (60.7%) were males. Their age range was 18 to 69 years with a mean age of 42.1 $\pm$10.8 (SD)years.A total of 242 (78.9%) had one or more eye disorder, the most common of which was presbyopia, 47.5%. Other eye diseases found were allergic conjunctivitis (17.2%), pterygium (16.5%), refractive error (15.2%), age related macular degeneration (8.6%), Cataract (7.6%), trauma related visual disorders (3.6%) and glaucoma (3.3%). Three farmers (1.0%) were blind. Trauma was responsible for one case (33%) of bilateral blindness and five cases(83%) of monocular blindness. Ocular diseases found among the farmers were predominantly those associated with hazards of the farming environment and constant exposure outdoors. Eyecare services including provision of protective eyewear should be provided along with general health services for farm workers.

INTRODUCTION

Nigeria is regarded as an agricultural country as most of her population (70%) live in the rural areas where the predominant occupation is farming.[1] In urban areas, many white-collar-job workers also have gardens in their backyards or farmlands in the suburbs which they cultivate to augment income. Farmers are a subset of the general population and are affected by prevalent ocular disorders such as refractive errors,conjunctivitis, glaucoma, cataract, uveitis and retinal diseases including macula degeneration.[2]In addition, farming is a hazardous occupation and has been ranked as one of the top three occupations with the highest rates of injuries.[3]Generally, peasant farmers, especially in developing countries are exposed to environmental hazards: varying and unfavourable weather conditions such as drought, high humidity, rain, heavy winds, very high or low temperature, cold and dry conditions; in addition to dust, pollen, sand and ultraviolet radiation.[4] They are also

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exposed to physical hazards from dangerous farm implements like cutlasses, hoes, sickles and the fluids and fumes of agrochemicals; organic matter of plant origin such as thorns, sticks, leaves, other vegetable matter and of animal origin such as insects, reptiles like snakes, scorpions and other wild animals.[5,6]Other problems include poor sanitary conditions, inappropriate clothing, non-availability or poor access to protective eyewear and health facilities.[7] Lack of awareness and poor education are other factors which negatively affect the health of farmers. Industrial farmers in mechanized farming industries are in particular exposed to injury from heavy and moving machines and equipment such as tractors, ploughs and harvesters amongst others. These hazards and problems predispose the farmer to various ocular disorders. In developing countries including Nigeria, studies have been carried out to highlight the common ocular problems affecting occupational groups such as factory workers, welders, crude and petroleum products workers but there is a paucity of literature on studies carried out amongst farm workers within the country and globally.[2,4,8-12]Agriculture as an occupation engages over 50% of the adult population in Nigeria.[13]It is a large occupational group with known hazards. The provision of data on the epidemiology of eye diseases in any community or occupational group is an important part of planning health delivery for that group. In addition, the government in this country is placing emphasis on agriculture as a viable alternative source of revenue for the nation and in response to this, many individuals and corporate bodies are setting up agro-allied industries[7]. This study can provide relevant data for this industry and other farming communities to enable policy makers and stakeholders plan an effective preventive and curative eye care program for farmers.

The aim of this study was to determine the pattern and prevalence of eye diseases among industrial farmers in an agricultural industry in southern Nigeria.

METHODS

This was a descriptive, cross sectional study carried out over a three-week period (16th April to 6th May 2007)in a large government owned agricultural industry involved in the cultivation of oil palm, coconut, raphia and date palm on about 1000 hectares of farmland. Using a total population sample, all persons, both permanent staff and hired casual workers engaged in the various aspects of full-time (minimum of five hours a day or twenty-five hours a week) outdoor farming in this location were included in the study. Exclusion criteria were part-time farmers and other staff who did not engage in full-time farming and those who did not give consent to participate in the study. The total population of farmers listed in this industry was 400, but only 338 were on ground during the study period. The others(about 15%) were reportedly on annual leave at this period which heralded the harvesting season when there is a lull in farming activities.

Ethical approval was granted by the Ethics Committee of the University of Benin Teaching Hospital, Benin City. Facility approval to carry out the study was granted by the management of the establishment. Informed consent was obtained from all participants after verbal explanation of the study to them.

Pretested questionnaires were administered verbally to collect information on participant's bio-data, employment status, work history including work related ocular injury and general ocular

history by junior ophthalmic resident doctors. A thorough ocular examination was carried out by the researcher using the examination room of the industry's dispensary. Visual acuity was done separately for each eye using the Snellen's literate visual acuity chart or illiterate E chart as applicable, at 6 metres. Colour vision was tested using the Ishihara Pseudo-isochromatic plates and findings were recorded as normal if they passed at least 9 of the 15 tests, or abnormal if they passed less than 9. Examination of the anterior segment was done using a pen torch and a portable hand held slit lamp bio-microscope while the fund us was examined with a Heine direct ophthalmoscope. Examination under mydriasis was achieved with 0.5% Tropicamide and 2.5%Phenylephrine for participants whose visual acuity did not improve to 6/6 with pinhole, in those with small pupil or impaired red reflex. Intraocular pressures were measured with a Keeler pulse-air non-contact tonometer. Participants with vertical cup-disc ratio (VCDR) greater than 0.5 or suspicious for glaucoma were transported to the nearby University of Benin Teaching Hospital for visual field analysis where a KOWA automated visual field analyser was used. The pulse rate and blood pressure were also measured and participants with abnormal levels were referred to physicians for further evaluation. In addition, a health talk was given to farmworkers and dispensary attendants on common ocular conditions, prevention of ocular injury and first aid management of ocular injury.

Dry eye syndrome was diagnosed if a participant had symptoms such as tearing, foreign body sensation, dry sensation of eyes in the presence of absent, reduced or broken tear fluid menisci and/ or tear break up time (TBUT) of less than 10 seconds. Glaucoma was diagnosed essentially as defined by the International Society of Geographic and Epidemiologic Ophthalmology (ISGEO)[14] criteria. Glaucoma suspects were diagnosed as described by the Preferred Practice Pattern (PPP) guidelines of the American Academy of Ophthalmology[15] except that central corneal thickness(which was not assessed) was not used asa criteria in this definition. Trauma related visual disorder was diagnosed in the presence of clinical signs of complications of trauma and if trauma was reported as the last event occurring before visual loss in an eye. Blindness was defined using the WHO International Classification of Diseases for blindness and visual impairment (ICD-10).[16]

All data were collected using predesigned questionnaires and analysed with the Statistical Package for Social Service (SPSS, version 13.0, IBM, Chicago).The results are presented using descriptive statistics of mean and standard deviation, distribution tables, simple frequencies and percentages.

RESULTS

Out of the 338 farmers on ground, 303 satisfied the inclusion criteria and gave consent to participate, giving a response rate of 89.6%.

Table 1 shows the age and sex distribution of farmers. There were 184 males (60.7%) and 119 (39.3%) females giving a male to female ratio of 1.5: 1. The mean age was 42.1 ± 10.8 (SD) years with an age range of 18-69 years and majority (38.6%) of farmers were in the 41-50 year age group.

Two hundred and fifty nine (85.5%) farmers had at least 6 years of primary school education while forty-four (14.5%) had not received any formal education.

Fifty two (17.2%) and thirty-two (10.6%) had junior and senior secondary school education respectively. The female farmers had fewer years of formal education than males. Only one female had attended senior secondary school; other females either had no education, had primary education or junior secondary school education.

Table 2 shows the pattern of ocular diseases in order of frequency of occurrence. A total of 242 farmers had one or more eye disease giving an overall prevalence of eye disease of 79.8%.

Majority of the farmers (92.1%) had normal vision, 16 (5.3%) had moderate visual impairment, 5 (1.6%) had severe visual impairment, 6 (2.0%) had monocular blindness and 3 (1%) were blind with VA of<3/60 – 1/60.Glaucoma (33.3%), pterygium (33.3%) and trauma (33.3%) were responsible for the 3 cases of bilateral blindness. Trauma was also the cause of monocular blindness in 5 (83.3%) of 6 cases.

Table1: Age and Sex distribution of farmers.

AGE (YEARS)	SEX		
	MALE	**FEMALE**	**TOTAL**
< 20	9(3.0)	5(1.7)	14(4.6)
21 – 30	22(7.3)	17(5.6)	39(12.9)
31 – 40	35(11.6)	25(8.3)	60(19.8)
41 – 50	67(22.1)	50(16.5)	117(38.6)
51 – 60	37(12.2)	20(6.6)	57(18.8)
61 and above	14(4.6)	2(0.7)	16(5.3)
TOTAL	**184(60.7)**	**119(39.3)**	**303(100.0%)**

Table 2: Pattern and distribution of eye diseases

Ocular disease/disorder	Frequency	percent (%)*
Presbyopia	144	47.5
Allergic conjunctivitis	52	17.2
Pterygium	50	16.5
Refractive error	46	15.2
Macula degeneration	26	8.6
Cataract	23	7.6
Trauma related visual disorders**	11	3.6
Glaucoma	10	3.3
Glaucoma suspect	9	3.0
Pingueculum	8	2.6
Dry eyes syndrome	7	2.3
Bacterial Conjunctivitis	4	1.3
Macula scar	4	1.3
Hypertensive/Diabetic retinopathy	3	1.0
Optic atrophy	2	0.7
Color vision defect	2	0.7
Couching	1	0.3
Retinitis pigmentosa	1	0.3
Squint	1	0.3

*multiple responses **Consists of 5 cases of corneal opacities, 2 traumatic cataracts, 1 case each of corneal laceration with uveal prolapse, phthisis bulbi, empty socket and retinal detachment.

DISCUSSION

There were more male farmers, with majority of them in the 40 – 50 year age group. This finding differs from Nwosu's[17] in a study on rural young adults in Anambra state whose predominant occupation was farming, in which there were more females than males. He postulated that it was probably due to the rural- urban drift of more males than females. In this study, the government owned agricultural industry was situated in a semi-rural locality and had social amenities such as water, electricity, schools and a health dispensary. Many men may therefore be attracted to live there. In addition, oil palm farming is a physically tasking job that would attract more men than women in most communities.

A majority (85.5%) of farmers had at least six years of formal education. This is quite different from a report by Ajayi[18] in a study carried out to determine the occupational safety practices of rural farmers in Ile-Ife,

where 34.1% of the farmers had six years of formal education. Farming has been classified as a semi-skilled labour that falls into the lower social economic class (IV)[19] and this study was carried out in a government establishment, where farmers were required to have at least a primary six certificate to enhance their employment status. This would explain the high number of farmers with formal education and partly explains why farmers in this study were more educated than in the Ile-Ife study of largely rural farmers. Males were also notably more educated than females, this may be attributed to traditional beliefs that operate in this part of the world which places more value on male education over female education.

There is paucity of literature on the pattern of eye diseases in a purely agricultural industry as this, but there are a number of studies on pattern of eye disease in rural communities where the predominant occupation was farming and in other occupational industries such as technical, sawmill, welding and petroleum industries amongst others.[8-12,17,20-23.]

The pattern and prevalence of eye disorders in this study were in the order of presbyopia, 47.5%, allergic conjunctivitis (17.2%), pterygium (16.5%), refractive error (15.2%), age related macular degeneration (8.6%), Cataract (7.6%), trauma related visual disorders (3.6%) and glaucoma (3.3%). Presbyopia was also the commonest eye disorder seen in most general population studies.[12, 20-22]In rural underserved communities of Edo and Delta states, Osahon et al [20] reported a pattern and prevalence of eye diseases in the order of refractive error (presbyopia inclusive) (41.8%), cataract (20.0%), glaucoma (9.4%), allergic conjunctivitis (8.3%), pterygium (5.7%) and macula degeneration (3.8%). Among rural dwellers in Imesi-Ile, south-western Nigeria, the common eye problems encountered were cataract (48.0%), glaucoma (21.1%), allergic conjunctivitis (16.4%), refractive errors (12.4%), age-related macular degeneration (0.7%) and corneal opacities (0.7%.[21]The study from Kaduna state, northern Nigeria reported cataract (34%), conjunctivitis (32%), glaucoma (5.8%), refractive errors (4.2%) and pterygium (3.1%).[22] The pattern in these general population studies were quite similar but differ from the pattern observed in this study.Generally, the variations seenwere most likely due to differences in the age groups and varied occupational exposures of the different populations under study. The general population studies had more elderly participants than this study. Differences in diagnostic criteria may also be responsible for some differences obtained, especially for conditions such as refractive errors where pin-hole assessment alone or an objective or subjective refraction may have been used to determine refractive status. The criteria for glaucoma diagnosis may have also differed, while this study employed the ISGEO[14] definitions of glaucoma, most studies compared did not clearly state the criteria used.

Generally, in comparison withsimilar and other occupational groups, eye disorders seen among these farmers were similar to those seen among farmers at Igbariam farm settlement in Anambra State.[12] It was also similar to that reported from cement, sawdust, coal, steel,welding and petroleum industries where the risk factors of exposure to ultraviolet radiation, chronic ocular irritation and allergens were present.[7-11]The study of industrial workers in cement, coal, steel and sawdust industries in south-eastern Nigeria showed similar occurrence of presbyopia, refractive error, pingueculum / pterygium, cataract and self-reported eye injury and the overall prevalence of ocular morbidity was 81.3%, whereas in this study it was 79.8%.[8] Another study of

industrial workers in India similarly showed a high occurrence of conjunctival diseases and eye injury and overall point prevalence of ocular disorders of 746.03/1000.[23] This suggests that industrial workers of different industries subjected to similar occupational hazards (outdoor exposure, ultraviolet radiation, allergens and ocular irritants) may suffer comparable prevalence and types of ocular disorders.

The high occurrence of allergic conjunctivitis in this study may be because of higher pollen content of the farming environment than other industrial environments. Pterygium was also relatively common and may be attributable to the fact that farmers being outdoor workers, suffer from high exposure to dust and ultraviolet radiation which have been implicated as strong risk factors in the development of pterygium, prevalent in those who live in high altitude and peri-equitorial regions of the tropics such as the location of this study.[23,24]

The farmworkers had a high occurrence of trauma-related visual disorders which was attributed to the fact that they were directly in contact with occupational hazards such as dust, projectiles of organic agricultural materials such as twigs and seeds, falling objects, chemicals, and heavy machinery such as tractors. Trauma can be considered as the most significant eye problem affecting these farmers from occupational and public health contexts, considering that although largely preventable, it was responsible for 83% of monocular blindness and one out of three cases (33%) of bilateral blindness. The other causes of blindness (glaucoma and pterygium)although largely not preventable, can be treated to prevent blindness.

Age related macular degeneration was also relatively common in these farmers. The prevalence of 8.6% is high compared to reports from other studies.[10-12, 20-23]The reason for this is not clear, especially as the elderly were fewer in this study than most of the other studies compared.[11,20-23]Increased exposure to ultraviolet radiation was implicated in the pathogenesis of age related macular degeneration in a study in the USA but there is insufficient causal evidence to base this association.[24,25]Further epidemiological studies need to be carried out to prove or disprove such an association.

In conclusion, there was a high distribution of ocular diseases associated with constant exposure to the environment and farming-related hazards among this population of industrial farmworkers. The causes of blindness were both preventable and treatable (avoidable). Eye care services from qualified professionals should be part of health services provided for farmers especially in organized industrial settings. They should be made aware of protective, preventive and curative measures of maintaining good eye health through effective health education. Farm workers are encouraged to wear protective eye devices such as googles that reduce exposure to ultraviolet radiation and offer protection against ocular injury. The feasibility and acceptability of such a practice should be investigated through research to arrive at definite recommendations that will help reduce the prevalence of these ocular diseases among farm workers and enhance their quality of life and productivity.

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