

Original Research Article**Perceptions about Vision and Utilization of Eye Care Services among Cocoa Farmers in a Rural Community in Ghana****Samuel B Boadi-Kusi*^{1,3}, Akwasi Kumi-Kyereme², Kofi Awusabo-Asare², Stephen Ocansey¹, Samuel Kyei¹**¹Department of Optometry, University of Cape Coast, Ghana²Department of Population and Health, University of Cape Coast, Ghana³Discipline of Optometry, University of KwaZulu Natal, Durban- South Africa*For correspondence: Email: sbertk@yahoo.com**International Journal of Health Research** September 2013; 6(3): 17-25

*Abstract***Purpose:** To examine the perception of farmers on their vision and the utilization of eye-care services.**Methods:** A community-based cross-sectional study was conducted among cocoa farmers at Mfuom, a rural farming community in Ghana using structured questionnaires, and there was an assessment of distance visual acuity using the Snellen E chart.**Results:** Of the 185 cocoa farmers, 68% were males and 32% females. The ages of the respondents ranged between 19 and 70 years with a mean age of 52.7 (SD= 11.70). About 37% had spent 5 to 9 years in farming with 12% spending more than 30 years. The results revealed that cocoa farmers had a very poor perception of their vision since 85.4% of them reported either poor or very poor vision as against the measured 31.9% of poor or very poor vision upon visual acuity assessment. Only 26.5% reported seeking eye-care within a period of 2 years before the study.**Conclusion:** The data suggests that cocoa farmers in the community have high negative perception of their vision yet they make insufficient use of proper eye care services. It is therefore recommended that cocoa farmers are educated on ocular health issues to help change their negative perception of their vision and promote proper utilization of eye-care services.**Keywords:** Ocular health, farmerworkers, perception, eye-care services, Ghana.

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Introduction

Farm workers suffer from eye conditions due to predisposing risk factors, harsh working conditions, environmental exposures, and lack of ocular protection [1-3]. Airborne, soil particulates

that result from farming practices create environmental conditions that pose a risk to eye health. Exposure to allergens such as pollen also has the ability to cause allergic reactions to the eyes [4]. Similar symptoms of irritated eyes also result from exposure to chemicals such as

pesticides and fertilizers [5, 6]. For these reasons, agricultural work has been reported as one of the riskiest occupations for the eyes [7]. The appreciation of all these hazards may influence the perception of farmers about their visual status and also influence their ocular health seeking behaviour. The World Health Organization and its occupational health partners recommend that all workers should have access to occupational health services [8] to meet the health needs of such workers. However, most often the needs of workers are not met especially in developing countries where there may be absence of adequate human resources, infrastructure and a sustainable management of eye-care facilities and service [9]. Those working in the informal sector, especially in agriculture, are mostly affected by these inequalities in occupational health services [10]. These inequalities may also affect the ocular health seeking behaviour of farm-worker.

Regardless of these inequalities, data on farm-workers' perception on their vision and their utilization of eye care services are barely reported [1] especially in sub-Saharan Africa though governments continue to put measures in place to ensure growth in the agricultural sector. In Ghana, policies and interventions to boost cocoa production have always been in the areas of diseases and pests control, farm rehabilitation, producer price management, produce payment processes, soil fertility management, planting materials, and research and extension services [10] to the neglect of other equally important aspects of human health that may affect production such as ocular health. Due to the invaluable role sight plays in all the activities on the farm, the visual care needs of cocoa farmers is obviously a major concern which must be attended to since cocoa is the bedrock of the Ghanaian economy.

A country whose workplaces are without efficient policy to ensure the health and safety of its workers is likely to experience economic loss [8]. Although, there are legislations on occupational health and safety in Ghana, they apply only to mining (The Mining Regulations Legislative Instrument, L.I. 665 of 1970) [12] and factory

related workers (Factories, Offices and Shops Act, Act 328 of 1970) [13]. Other laws which have implications for occupational health and safety are Workmen's Compensation Law, 1987 [14] Small Scale Gold Mining law, Act 218 of 1989 [15], the Mining and Mineral Act, Act 703 of 2006 [16] and the Environmental Protection Act, Act 490 of 1994 [17]. Section XV of the Labour Act 651, 2003 [18] covers Occupational Safety, Health and Environment. This is based on the tenets of ILO Conventions Nos. 155 and 161 which the country has not yet ratified [19].

There are several shortcomings of the legal provisions on Occupational Health and Safety. The Factories' Act and Mining Regulations which have for years provided guidance for implementation are very limited in coverage. While the Factories Act caters for factories, offices, shops, ports and construction, the mining regulations cater only for the mining sector. The vast majority of industries, including agriculture and most of the informal sector are therefore not specifically covered.

In 2011, Ghana ratified ILO Convention 184 on Safety and Health in Agriculture. The ratification of this convention should have marked a turning point for safety and health in agriculture but that has not been the case since implementation of the convention has not been comprehensive. The absence of any direct regulatory body on safety on farm practices compounds the challenges in reporting and keeping track of farm related ocular diseases and injuries. The wide spread of subsistent or small household cocoa farming with individual ownership limits the extent to which policies can apply as compared to other countries where farms are mostly owned by identifiable companies. The implication is that individual owners of cocoa farms, though may hire labourers do not take particular interest in the safety of their workers with particular reference to ocular safety. Despite the knowledge of the hazards and risks farmers are exposed to, it is not clear how they perceive the status of their vision. This study therefore examined the perception of vision and utilization of eye-care services among cocoa farmers in a rural community in Ghana.

Methods

Study setting

The study was undertaken at Mfuom, a farming community (with a population of about 2,500 in 2010 [20]) in the Twifo-Hemang-Lower Denkyira District in the Central Region of Ghana. This district is one of the three main cocoa producing districts in the region [20] where more than two thirds of the work force is employed in the agricultural sector of the economy [20]. Located about 40 kilometres north of Cape Coast, the regional capital, the inhabitants of the community are mainly farmers and had no access to hospital or clinic facility. Most of the inhabitants traveled to the regional or the district capital for eye care services.

Study design

In a community-based cross-sectional study within the Mfuom community, a census was conducted for all cocoa farmers. A cocoa farmer, for the purpose of this study, is an individual whose major occupation is cocoa farming and/or works on a cocoa farm for a living throughout the year or major periods of the year. Using this definition, 185 cocoa farmers were identified for the study within the community. Each one of these farmers was not less than 18 years old and has worked on a cocoa farm for a period of not less than three years (the average gestation period of a cocoa tree).

Following recruitment of eligible participants and signing of informed consent form by each participant, data collection was undertaken using a structured questionnaire administered to the farmers through interviewers. Interviewers underwent a 1-day training to be familiarized with the study. The questionnaire covered issues on basic demographic variables and farm characteristics. Also, there were questions on how the farmers perceive their vision (reported vision), frequency of use of eye care facilities and reasons, if they were not seeking eye care services. Participants were also asked to report any major problem relating to their eyes. The

distance and near visual acuity of participants were assessed using the Snellen Tumbling E chart at a distance of 6m and 40cm respectively [21, 22]. In this procedure, the participants first read the chart with their right eye only, followed by the left eye. Farmers who wore glasses had their visual acuity assessed with the glasses on. Both objective and subjective refraction were carried out on all participants and those with refractive errors had their vision corrected and visual acuity was subsequently re-assessed to obtain the best corrected visual acuity (BCVA).

Data analysis

The Statistical Package for Social Sciences (SPSS) version 16 was used to analyze the data. Descriptive statistics were calculated for sample demographic and farm characteristics, major eye complaints and visual acuity. Visual acuity was classified using the International Classification of Diseases -10 (Revised 2010) [23]. According to the classification, normal vision is defined as visual acuity (VA) of 6/18 or better in the worse eye, visual impairment is also defined as a visual acuity of $< 6/18$ to 6/60, while blindness is defined as visual acuity of $< 3/60$ in the better eye [24]. Similarly, the following classification on visual acuity; 6/4- 6/5 (Very good), 6/6-6/18 (Good), 6/24-6/60 (Poor) and 3/60 or worse (Very poor) was done for reported vision [24].

Results

The total number of respondents for this study was 185 cocoa farmers out of which 125 (67.6%) were males while the rest (60, 32.4%) were females. As shown in Table 1, the ages of respondents ranged between 19 and 70 years with a mean age of 52.7 ± 11.7 years. Only 3.7% of respondents (2.4% males and 6.7% females) were under 30 years old. Approximately half of the population (48.6%) had only attained middle school or junior secondary/high school education. Only 15% had obtained secondary school education with 7% of the farmers attaining tertiary education (Table 1). About two-third of the respondents were married with 15.7% and 10.3% living together and widowed, respectively.

Table 1: Demographic characteristics of respondents

Demographic Characteristics	Male n =125	Female n = 60	Total N = 185
Age			
< 30	3 (2.4)	4 (6.7)	7 (3.8)
30-39	8 (6.4)	9 (15.0)	17 (9.2)
40-49	32 (25.6)	13 (21.7)	45 (24.3)
50-59	37 (29.6)	21 (35.0)	58 (31.4)
60-69	29 (23.2)	13 (21.7)	42 (22.7)
70-79	16 (12.8)	0 (0.0)	16 (8.6)
Level of education			
Never attended any school	13 (10.4)	13 (21.7)	26 (14.1)
Primary	16 (12.8)	12 (20.0)	28 (15.1)
Middle/JSS/JHS	62 (49.6)	28 (46.7)	90 (48.6)
Secondary/SSS/SHS/Tec/Voc	22 (17.6)	6 (10.0)	28 (15.1)
Tertiary	12 (9.6)	1 (1.7)	13 (7.0)
Marital status			
Never married	3 (2.4)	0 (0.0)	3 (1.6)
Married	17 (63.2)	34 (56.7)	113 (61.1)
Living together	24 (19.2)	5 (8.3)	29 (15.7)
Divorced	11 (8.8)	6 (10.0)	17 (9.2)
Separated	1 (0.8)	3 (5.0)	4 (2.2)
Widowed	7 (5.6)	12 (20.0)	19 (10.3)
Household size			
1-3	12 (9.6)	6 (10.0)	18 (9.7)
4-6	46 (36.8)	31 (51.7)	77 (41.6)
7-9	60 (48.0)	18 (30.0)	78 (42.2)
10+	7 (5.6)	5 (8.3)	12 (6.5)

The farmers had large family sizes with 83.8% having between 4 and 9 household members.

Major ocular complaints of farmer and perception about vision

The major ocular complaints (Table 2) presented by the farmers were mainly poor distance vision (37.8%) and poor near vision (22.2). Others were itching (17.8%) and ocular pain (5.4%).

The reported vision of the participants is presented in Table 3. Majority of them (85%) perceived their vision to be either poor or very poor. Only 14% reported that their visions were either very good or good. For some of them, their poor vision was attributable to exposure to the sun whereas 64% reported it was due to exposure to chemicals. There was no statistically significant difference between males and females in the reported vision measures ($p = 1.056$, $\chi^2 = 0.788$, $df = 3$).

Table 2: Major complaints of cocoa farmers

Chief complaint	N (%)
Poor distance vision	70 (37.8)
Poor near vision	41 (22.2)
Foreign body sensation	5 (2.7)
Itching	33 (17.8)
Ocular pain	10 (5.4)
Photophobia	4 (2.2)
Tearing	8 (4.3)
Trauma	5 (2.7)
Others	9 (4.7)
<i>Total</i>	<i>185 (100)</i>

Ocular health seeking behaviour

Of the total number of participants, 26.5% (24.8% males 30.0% females) reported seeking eye care services within the last two years of this study (Table 4). Of the number that sought eye care, 79.6% visited hospitals and clinics, 4.1% visited herbalists or used traditional medicine and 16.1% visited chemical shops or self-medicated. No female reported using traditional medicine or

Table 3: Self reported vision of farmers (values are percentages)

	Very good	Good	Poor	Very Poor	Total
All (n = 185)	3.8	10.3	42.7	43.2	100.0
Sex					
Male (n = 125)	4.0	11.2	44.8	40.8	100.0
Female (n = 60)	3.3	8.3	40.0	48.3	100.0
Age					
<30	28.6	14.3	42.9	14.3	100.0
30-39	17.6	17.6	52.9	11.8	100.0
40- 49	2.2	17.8	48.9	31.1	100.0
50-59	1.7	6.9	37.9	53.4	100.0
60-69	0.0	7.1	42.9	50.0	100.0
70-79	0.0	0.0	31.2	68.8	100.0

Table 4: Ocular health seeking behaviour of farmers

	Male (%)	Female (%)	Total
Had eye examination in the last 2 years	24.8	30.0	26.5
Place of examination			
Hospital	64.5	22.2	49.0
Clinic	22.6	44.4	30.6
Herbalist(Traditional medicine)	6.5	0.0	4.1
Others	6.5	33.3	16.3
Total	100.0	100.0	100.0

Table 5: Distance visual acuity (VA) of cocoa farmers

Visual acuity	OD Frequency	(%)	OS Frequency	(%)	BCDVA Frequency	(%)
6/4	7	3.8	7	3.8	7	3.8
6/5	47	25.4	39	21.1	52	28.1
6/6	35	18.9	36	19.5	42	22.7
6/9	19	10.3	32	17.3	47	25.4
6/12	18	9.7	18	9.7	6	3.2
6/18	15	8.1	11	5.9	10	5.4
6/24	10	5.4	10	5.4	7	3.8
6/36	7	3.8	6	3.2	3	1.6
6/60	9	4.9	10	5.4	5	2.7
3/60	3	1.6	1	0.5	-	-
CF@3m	10	5.4	10	5.4	6	3.2
HM	2	1.1	-	-	-	-
LP	1	0.5	4	4.0	-	-
NLP	2	1.1	1	0.5	-	-

visiting a herbalist for eye care. Reasons cited among the 73.5% not seeking eye care were absence of any previous eye problem (29.1%), absence of any eye problem (8%) and not being registered with National Health Insurance Scheme (32%).

Visual acuity assessment of farmers

In a paired t- test analysis (Table 5), there was no significant difference between the visual acuity (VA) of the right eyes (OD) (4.72 ± 3.04) and those of the left eyes (OS) (4.71 ± 2.96). For this

reason, OD was conventionally used for categorization of the presenting VA of the farmers. From the presenting VA, 38.9% and 29.2% of them had good and very good vision respectively, while 22.2% and 9.7% had poor and very poor vision respectively.

Comparison between self-reported vision and measured visual acuity

Figure 1 presents a comparative of self reported vision and measured habitual or presenting visual acuity of participants. Presenting visual acuity was used for this comparison because that is what the participants use in their everyday life. The figure reveals that, farmers under-reported very good and good vision but over reported poor and very poor vision. For example, whereas only 3.8% of the farmers reported that they had good vision, the actual habitual vision revealed that 29.2% of the farmers rather had very good vision. On the other hand, while 43.2% reported having very poor vision, only 9.7% of them really had very poor vision upon assessing visual acuity.

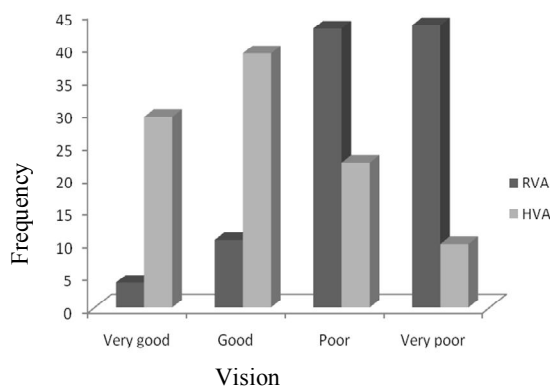


Figure 1: Self reported vision versus actual vision
RVA- Reported Visual Acuity, HVA- Habitual Visual Acuity

Discussion

The age distribution of participants in this study reflected a largely old generation of farmers with about eighty-seven percent between 40 and 70 years. The distribution of farmers' age in this study is consistent with reports that the cocoa farming industry is dominated by older people [11, 25, 26]. The study revealed that cocoa

farmers have high negative perception of their vision. The negative perception was higher than that reported by Verma [21]. For example whereas 43.2% of farmers in this study reported having very poor distance vision only 4.9% reported same among a group of farm-workers in North Carolina [21]. In this study, only one out of every four who reported very poor vision actually had poor vision confirmed upon distance visual acuity assessment. Likewise, only half of the participants reporting poor vision really had confirmation of poor vision upon visual acuity assessment. Older farmers reported very poor and poor vision as compared to younger ones. This is a significant finding since it confirms that with increasing age vision deteriorates leading to high reports of poor or very poor vision [27]. The ocular complaints of farmers presented in this study are comparable to studies in North Carolina which found 25% itching and 22% blurred vision among farm-workers [2, 28]. Similarly, in the California Agricultural Workers Health Survey, 23% reported irritated itchy eyes and 12%, blurred vision [29].

Personal perception is a factor which might influence farmers' health seeking behaviour negatively or positively. Individual perception is very subjective; thus different people or the same person at different times may hold different views on their visual health status [30], and this may influence their course of action in seeking health care. With the magnitude of poor vision reported, one would expect that cocoa farmers involved in this study would seek eye care regularly. On the contrary, only one out of every four of the respondents reported seeking eye care services within the last two years of this study. The low reports of seeking eye-care among the farmers are consistent with what has been reported in the literature [1, 31]. However, the 26.5% of farmers seeking eye care in this study was higher than the 8.7% reported among farm-workers in North Carolina [21]. This could be due to the fact that the utilization of eye-care services was restricted to a period of one year among farm-workers in North Carolina as opposed to two years in this study. One can therefore infer that the negative perception of vision of participants did not impact positively on their ocular health seeking behaviour. Females were more likely to seek eye

care than their male counterparts. This finding is consistent with the fact that a growing body of gender-specific studies highlights a trend of delayed help seeking by men when they become ill [32]. Traditional masculine behaviour has been given as an explanation for delays in seeking help among men when they experience illness [32]. Of the numbers seeking eye-care, 79.6% visited hospitals and clinics, 16.1% visited chemical shops or self-medicated and 4.1% visited herbalists or used traditional medicine. It appeared that herbalists and chemical sellers provide a substantive eye care along regular hospital services in the area [33]. The number of farmers who had never had an eye examination in this study constituted 73.5% of the study population, and compared favourably with the 74.4% reported among other farm-workers [21]. The reasons cited for not seeking eye-care were consistent with those reported in literature [21, 34, 35].

Visual impairment among the population studied is consistent with the 10.7% visual impairment reported among Hispanics in the Latino farm-workers study [1]. It was however higher than the 1.7% reported among farm-workers in North Carolina [21]. Visual impairment can present significant risks for farm-workers. The level of visual impairment could affect the output of cocoa farmers on their farms and subsequently lead to low performance and productivity [36]. Since about 87% of the population studied were above 40 years, findings on near vision was not reported in this study since almost the entire population were presbyopic.

Given the same event, different persons hold different perceptions of the cause of the event [37]. As a result, majority of the farmers who participated in this study believed that their poor vision was either due to exposure to sun radiations or chemicals. It is worthy of note that the effect of pesticide use on the ocular health of farmers, as well as the ocular effect of radiations from the sun among farmers has widely been reported in literature [1-3, 30, 38]. These, possibly, may explain the reason for the high reported poor perception of vision among farmers in this study.

Conclusion

There is a high perception of poor vision among the study population attributed to exposure to agricultural hazards and yet the participants studied made insufficient use of proper eye care services. It is therefore recommended that Agricultural Extension Officers, health workers and other State Agencies involved in the agricultural industry institute measures to educate cocoa farmers on ocular health issues as well as proper utilization of eye care services and to help them gain a positive perception of their vision so that they can take steps to protect and preserve their vision. A more representative national data is needed in this area.

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Conflict of interest

There is no conflict of interest associated with this work

Contribution of authors

The authors declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors.

References

1. Quandt SA, Feldman SR, Vallejos QM, Schulz MR, Verma A, Fleischer AB, Arcury TA. Vision problems, eye history, and ocular protection among migrant farm-workers. *Arch Environ Occup Health*. 2008; 63(1):13-16.
2. Verma R, Mohanty SA, Deneen J, Wu J, Azen SP. Burden and predictors of undetected eye disease in Mexican-Americans: The Los Angeles Latino eye study. *Med Care* 2008; 46 (5):497-506.
3. Verma A, Schulz R.M, Quandt A S, Robinson N E, Grzywacz G J, Chen H, & Arcury A T. Eye Health and Safety Among Latino Farm-workers. *J Agromed*, 2011: 16 (2), 143-152.

4. Lacey SE, Forst LS, Petrea RE, Conroy LM. Eye injury in migrant farm workers and suggested hazard controls. *J Agric Saf Health*. 2007; 13(3):259-274.
5. Villarejo D, Baron SL. The occupational health status of hired farm workers. *Occup Med* 1999; 14(3):613-635.
6. Weinbaum Z, O'Malley MA, Samuels SJ. Determinants of disability in illnesses related to agricultural use of organophosphates (OPs) in California. *Am J Ind Med* 1995; 28, 257-274.
7. Forst L, Noth IM, Lacey S, Bauer S, Skinner S, Petrea R, & Zanoni J. Barriers and benefits of protective eyewear use by Latino farm-workers. *J Agromed* 2006; 11(2), 11-7.
8. Rantanen J. Global strategy on occupational health for all: The way to health at work, 1994. <http://www.who.int/oeh/OCHweb/OSHpages/OSHdocuments/Globalstrategy/Globalstrategy.pdf> [Accessed 20. 06.2011].
9. Trabelsi A. Blindness in North Africa - A look at the Nadi Al Bassar System and an overview of the state of ocular health in North Africa. *Cataract & Refractive Surgery Today*, 2006.
10. World Health Organization. Description of six activity area of the WHO global network of collaborating centres work plan 2006-2010. http://www.who.int/occupational_health/network/workplan2006.pdf [Accessed 10. 06.2011].
11. Asuming-Brempong S, Sarpong DB, Asenso-Okyere K, Amoo P. Labour practices in cocoa production in Ghana (pilot survey), 2004. <http://www.aktiv-gegen-kinderarbeit.de> [Accessed 3. 06.2011].
12. Government of Ghana. Mining Regulations (L.I 665), Accra: Ghana Publishing Corporation, 1970.
13. Government of Ghana. Factories, Offices and Shops Act (Act 328). Accra: Ghana Publishing Corporation, 1970.
14. Government of Ghana. Workmen's Compensation Law, (PNDCL 187). Accra: Ghana Publishing Corporation, 1987.
15. Government of Ghana. Small scale Gold Mining law- (Act 218). Accra: Ghana Publishing Corporation, 1989.
16. Government of Ghana. The Minerals and Mining Act, (Act 703). Accra: Ghana Publishing Corporation, 2006.
17. Government of Ghana. Environmental Protection Agency Act, (Act 490). Accra: Ghana Publishing Corporation, 1994.
18. Government of Ghana. Labour Act of Ghana, (Act 651). Accra: Ghana Publishing Corporation, 2003.
19. Wilson JD, Takahashi K, Smith RD, Yoshino M, Tanaka G, Takala J. Recent Trends in ILO Conventions Related to Occupational Safety and Health, *International Journal of Occupational Safety and Ergonomics (JOSE)*, 2006; 12(3), 255-266.
20. Ghana Statistical Service. Population and Housing Census, 2010. http://www.statsghana.gov.gh/docfiles/2010phc/Census2010_Summary_report_of_final_results.pdf. [Access 25.06. 2012]
21. Verma A. Visual Impairment and Eye Health and Safety among Latino Farm-workers. 2010. http://libres.uncg.edu/ir/uncg/f/Verma_uncg_0154_D_10479.pdf [Accessed 23.11. 2012]
22. Tanle A, Ilechie AA, Awusabo-Asare K, Ovenseri GO, & Anderson M. Ocular conditions among women involved in palm kernel oil processing in the Cape Coast Metropolis, Ghana. *SBHA* 2011:76(2), 25-40.
23. World Health Organization, WHO. *International Statistical Classification of Disease and Health Related Problems*. 10th Revision. Instructional Manual, 2010 Ed. http://www.who.int/classifications/icd/ICD10Volume2_en_2010.pdf [Accessed 2.06. 2011]
24. Pascolini D, Mariotti SP. Global estimates of visual impairment. *Br J Ophthalmol*, 2010; 96 (5), 614-8.
25. Teal F, Zeitlin A, Maamah H. Ghana Cocoa Farmers Survey 2004: Report to Ghana Cocoa Board. Centre for the Study of African Economics University of Oxford, Oxford, United Kingdom, 2006.
26. Vigneri, M. Drivers of cocoa production growth in Ghana, [ODI Briefing No 4], Overseas Development Institute, 2007.
27. Kanski JJ. *Clinical Ophthalmology*-a synopsis, London: Butterworth Heinemann Elsevier limited, 2009, 2nd ed.
28. Mittal S, Apoorva M, Ramakrishnan R. Ocular manifestations in bidi industry workers: Possible consequences of occupational exposure to tobacco dust *Indian J Ophthalmol*, 2008; 56(4), 319-322.
29. Villarejo D, Lighthall D, Williams D, Souter A, Mines R, et al. Suffering in silence: a report on the health of California's agricultural workers. The California Endowment. Rep 47, Calif. Endow, Woodland Hills, Calif. 2000.
30. Slappendel C. Dominant theories of work-related injury causation. In C. Slappendel (Ed.), *Health and Safety in New Zealand Workplaces*. Palmerston North: The Dunmore Press, 1995.
31. Quandt SA, Elmore RC, Arcury TA, Norton D. Eye symptoms and eye protection use by seasonal and migrant farm-workers. *South Med J*. 2001; 94, 603-607.
32. Galdas PM, Cheater F, Marshall P. Men and health help- seeking behaviour: literature review. *J Adv Nurs* 2005; 49, 616-623.
33. Ntim -Amponsah C T, Amoaku WMK, Ofosu-Amaah S. Alternate eye care services in a Ghanaian district. *Ghana Med J* 2005:39 (1), 19-23.
34. Quandt AS, Schulz RM, Talton WJ, Verma A, Arcury AT. Occupational Eye Injuries Experienced by Migrant Farm-workers. *J Agromed* 2012; 17(1), 63-69
35. Liebman K A, Augustave W. Agricultural Health and Safety: Incorporating the Worker Perspective, *J Agromed* 2010:15 (3), 192-199
36. Pitts GD, Kleinstein NR. *Environmental vision; interactions of the eye, vision and the environment*. London: Butterworth-Heinemann Publications, 1993.
37. Torell U, Bremberg S. Unintentional injuries: Attribution, perceived preventability, and social norms. *J Safety Res* 1995:26(2), 63-73.

38. Banjo AD, Aina SA, Rije OI. Farmers' knowledge and perception towards herbicides and pesticides usage in Fadama area of Okun-Owa, Ogun State of

Nigeria. Afr J Basic Appl Sci 2010; 2 (5-6): 188-194.