

Prevalence and pattern of ocular disorders seen among artisans in Owerri, Imo State

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伊莫州奥韦里地区技术工人眼部疾病患病率及类型调查分析

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摘要

目的:评估技术工人眼部疾病患病率及模式,向有关部门建议施行必要政策以保护技术工人眼部健康。

方法:描述性横断面研究。采用比例抽样技术和随机简单抽样法进行样本选择。

结果:技术工人中退行性结膜疾病并伴有睑裂黄斑以30.1%患病率高居第一。汽车工中结膜性疾病、角膜混浊、过敏性结膜炎发病率较高。表体异物是与工伤有关的最常见的损伤,而13.6%的工人由此发展为白内障。

结论:政府应该施行可以保护技术工人眼部健康的政策,以减少睑裂黄斑及其它几种眼部疾病的发生。

关键词:患病率;分布;眼部疾病;技术工人

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Abstract

• **AIM:** To determine the pattern and prevalence of ocular disorders among artisans with a view to make recommendations to the appropriate ministries for the formulation of necessary policies to preserve the ocular health status of these artisans.

• **METHODS:** This was a descriptive cross sectional study in which the sample population was selected using the proportion to size technique and simple random sampling.

• **RESULTS:** There was a high prevalence of degenerative conjunctival disorders among the artisans with pingueculum topping the list at 30.1%. Automobile mechanics had the highest prevalence for conjunctival disorders, corneal opacities, and allergic conjunctivitis. Superficial foreign bodies (74.4%) were the most common work related injury observed while 13.6% of the artisans developed cataract from work related injuries.

• **CONCLUSION:** Governmental policies targeted at preserving and maintaining the ocular health of the artisans is needed to reduce the prevalence of ocular disorders noted in this study.

• **KEYWORDS:** prevalence; distribution; eye disorders; artisans

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INTRODUCTION

Artisans such as iron welders, aluminum workers, gas welders, automobile mechanics, drivers, blacksmiths, carpenters, bricklayers and auto-electricians are skilled manual workers who engage in welding, cutting, filing, grinding, hammering, plastering and other potentially dangerous activities as a means of livelihood. These artisans are constantly exposed to the risk of eye injuries from their profession^[1].

Sand, metal chips, battery fluid are some of the agents which can inflict damage and cause temporary or permanent loss of vision^[2]. Other agents such as wind and ultraviolet light may also cause ocular morbidities^[3].

Working outdoors especially in the tropics results in chronic exposure to ultraviolet(UV) radiation with the attendant risk

of developing ocular disorders such as pterygium, pingueculum, dry eyes, cataract and age related macular degeneration because of the hot, dry, dust – filled environment^[4-6]. In some artisans (arc and gas welders), acute exposure to UV radiation results in corneal burns and photokeratitis^[7]. Cataract and keratoconjunctivitis have been reported among these welders and they were shown to occur more frequently than in the control group^[8-10]. Retinal burns and maculopathy from welding arc due to thermal and photochemical insults have also been reported^[11].

A study of prevalent ocular disorders including occupation related ocular injuries among these artisans would give very useful information which the State Ministries of Health, Labour, Commerce and Industries could utilize in formulating effective policies on ocular care for these workers.

SUBJECTS AND METHODS

Study Area The study was conducted in Owerri, the capital of Imo State in the Southeast geographical zone of Nigeria.

Study Population The study population was made up of artisans including automobile mechanics, auto electricians, blacksmiths, gas welders arc welders, carpenters, bricklayers/masons and aluminum workers/fabricators in Owerri metropolis.

Study Design This was a descriptive cross sectional study in which the sample population was selected by stratified random sampling using proportional allocation technique during the period of the study from February to March 2012^[12].

Stratified Random Sampling Using Proportional Allocation The sample size of 426 was calculated using the formula for a population less than 10,000^[12]. The sampling fraction, followed by the required number of artisans for each group and the sampling interval were determined as follows:

^a Sampling fraction

$$= \frac{nf \text{ (sample size)}}{\text{Estimated number of artisans (study population)}} \\ = \frac{428}{2,900} = 0.147$$

Required No. of artisans in each group = Estimated number × Sample fraction

E. g. For automobile mechanics = required number would be $2000 \times 0.147 = 294$

^a Sampling interval $\frac{\text{estimated number} = 2000}{\text{Required number} = 294}$

(for automobile mechanics) = 7

The first artisan was chosen by simple random sampling (balloting) from the list of artisans provided by the union secretaries. Subsequently the seventh person (sampling interval of 7) on the list was recruited. When an artisan declined to be included in the study or was absent that person was skipped and the next person recruited.

Only artisans and apprentices who had spent at least 6mo on the job and were willing to participate in the study were recruited.

Data Collection and Analysis An interviewer administered pre-tested structured questionnaire was completed by each

participant in English. Information was obtained on demographic data, educational history, work history, ocular history including present symptoms, and work related ocular injuries. Details of ocular examination were recorded in a protocol form.

Data was analysed using the statistical package for social science (SPSS version 17.0) software. The chi-square test was used to test for association between variables and a $P < 0.05$ was regarded as statistically significant.

Ethical Considerations Ethical clearance was obtained from the Ethics Committee of Federal Medical Centre, Owerri and permission to carry out the study was obtained from the unions of the various groups of artisans.

Informed consent was also obtained from each respondent who participated in the study after the details of the study were explained to them.

RESULTS

A total of 428 male artisans participated in the study.

The age range was < 20 and ≥ 60 with a mean standard deviation of 34.8 ± 10.6 . Eighty three (42.8%) were married and more than 2/3 had secondary school or technical. Majority were auto mechanics 68.7% (294) and 1.8% (9) were auto-electricians (Table 1 and 2).

Majority (97.9%) of the artisans as shown in Table 3 had normal visual acuity with only one person blind.

Ocular surface disorders (pingueculum and pterygium) were the most prevalent disorders noted. These disorders occurred more in the automobile mechanics (Table 4 and 5).

Superficial foreign body (221, 74.4%) was the most common type of ocular injury seen followed by blunt injury (78, 25.9%) then penetrating injury (2, 0.7%).

DISCUSSION

Majority of the artisans in this study were young adults with those less than 40y accounting for 68.3%. The largest work force was in the age group of 20 – 29y similar to other studies^[13]. The physical exertion and hazards associated with the work may account for the age group seen^[14]. This finding however differed from that in other studies^[15]. The latter study was on industrial workers who are basically employees that may have been working for years in one establishment.

Majority of the artisans had a normal visual acuity, none was severely visual impaired and only one was person was blind.

Degenerative conjunctival disorders accounted for 51.9% of ocular disorders in this study. Pingueculum was responsible for 30.1% of the cases, while 21.8% was due to pterygium.

The prevalence of pingueculum and pterygium in this study is similar to reports from previous studies but at variance with the prevalence of 3.3% and 0.2% reported for pterygium and pingueculum respectively in a community based study done in the same State^[16-18]. Automobile mechanics had the highest prevalence of pingueculum (80.7%) and pterygium (74.4%) among the artisans.

Pingueculum and pterygium are ocular surface disorders associated with chronic exposure to UV-radiations either from arc and gas welding or from sunlight^[5,19]. In fact, working

Table 1 Study sample using the proportional allocation technique

Artisans	Estimated No. in Owerri metropolis	Sampling ^a fraction	No. of required artisans	Sampling interval
Automobile mechanics	2000	0.147	294	7
Iron welders	250	0.147	36	7
Gas welders	200	0.147	29	7
Aluminium workers	200	0.147	29	7
Blacksmiths	50	0.147	12	7
Bricklayers	70	0.147	10	7
Carpenters	80	0.147	9	7
Auto electricians	50	0.147	9	7
Total	2900		428	

Table 2 Socio-demographic characteristics of the artisans

Characteristics	Frequency	Percent (%)
Age (a)		
<20	10	2.3
20-29	148	34.6
30-39	136	31.8
40-49	93	21.7
50-59	33	7.7
≥60	8	1.9
Marital status		
Single	183	42.8
Married	231	54.0
Others ^a	14	3.2
Educational status		
No formal education	14	3.3
Primary	126	29.4
Secondary	273	63.8
Technical school	15	3.5

Mean age = 34.8 ± 10.6y; ^awidow/divorced/separated.

Table 3 Visual acuity among the artisans in the better eye

Visual acuity	Frequency	Percent (%)
Normal	419	97.9
Moderate VI	9	2.1
Severe VI	0	0.0
Blindness	1	0.2

VI: Visual impairment; Moderate VI = <6/18-6/60; Severe VI = <6/60-3/60; Blindness 3 = <3/60-1/60.

Table 4 Ocular disorders among the artisans

Disorders	Frequency	Percent (%)
Pingueculum	119	30.1
Pterygium	86	21.8
Refractive error	38	9.6
Corneal opacity	36	9.1
Allergic conjunctivitis	30	7.6
Glaucoma	22	5.6
Cataract	22	5.6
Presbyopia	20	5.0
Purulent conjunctivitis	17	4.3
Optic atrophy	4	1.0
Phthisis bulbi	1	0.3

outdoors without ocular protection has been associated with a higher risk of developing pterygium and/or pingueculum^[20-22].

Corneal opacity was found in 9.1% of the artisans examined similar to the 10.4% prevalence reported in a study done in Ile Ife, Osun State, Nigeria^[3]. This may have been due to corneal foreign body from metal debris, and burns from arc rays as reported in other studies^[3]. In fact superficial foreign bodies in the eye were the most common type of work related ocular injury noted in this study similar to other studies^[2]. The prevalence of corneal opacity in this study was higher than what had been reported previously in other studies^[23-25]. However, a much higher value was reported in a study among industrial welders in Port Harcourt, Nigeria^[26]. This may be attributed to differences in methodology and study designs. Corneal opacity (scar) accounted for 0.1% of ocular disorders in a community based study in Imo State^[18]. A value much lower than that from the present study implying that these artisans may be at risk of developing non-infective scars from trauma. Corneal opacity is a significant cause of blindness in the developing countries. The Nigeria National Blindness and Visual Impairment Survey reported that corneal scarring from non-infective causes was responsible for 7.9% of blindness^[27]. However none of the corneal opacities in this study was visually significant. Corneal opacity was also observed more among the automobile mechanics (61.1%).

Allergic conjunctivitis had a prevalence of 7.6% similar to other studies among artisans and among community dwellers in Imo State, Nigeria^[17-18]. It was noted more among automobile mechanics (36.7%). This may be attributed to the various irritants the artisans are exposed to such as fuel and other chemicals. A similar prevalence (20%) was also reported by Omoti *et al*^[28] in their study among petroleum industrial workers.

Cataract accounted for 5.6% of eye disorders among the artisans. This was mainly in artisans aged 50 years and above. Three (13.6%) participants who were less than 50 years developed cataract from work related ocular injury, while others were of undetermined etiology. Exposure to UV radiation is a known risk factor for the development of cataract^[8-9]. This was corroborated in a study by Delcourt *et al*^[29] in France which showed that solar radiation was associated with a 60% increase in risk of mixed cataracts. The

Table 5 Distribution of ocular disorders among artisans according to categories

n, %

Ocular disorder	Automobile mechanics	Iron welders	Gas welders	Aluminum workers/fabricators	Auto electricians	Carpenters	Blacksmiths	Bricklayers
Pingueculum	96(32.7)	5(13.9)	6(20.7)	6(20.7)	2(25.0)	2(16.7)	0	2(20.0)
Pterygium	64(21.8)	4(11.1)	7(24.1)	3(10.3)	1(11.1)	3(25.0)	2(22.2)	2(20.0)
Corneal opacity	22(7.5)	7(19.4)	0	3(10.3)	0	1(8.3)	3(33.3)	0
Allergic								
Conjunctivitis	11(3.7)	3(8.3)	5(17.2)	6(20.7)	1(12.5)	2(16.7)	0	2(20.0)
Glaucoma								
Suspect	8(2.7)	1(2.8)	0	0	1(12.5)	2(16.7)	0	0
Glaucoma	6(2.0)	1(2.8)	2(6.9)	1(3.4)	0	0	0	0
Cataract	17(5.8)	2(5.6)	1(3.4)	0	0	0	0	2(20.0)
Refractive error	27(9.2)	5(13.9)	0	0	2(22.2)	2(16.7)	2(22.2)	0
Presbyopia	13(4.4)	3(8.3)	2(6.9)	2(6.9)	0	0	0	0
Phthisis bulbi	0	1(2.8)	0	0	0	0	0	0
Optic atrophy	1(0.3)	1	0	1	0	0	0	1
Total	294	37	29	29	8	12	9	10

prevalence of cataract in this study is much lower than the 12.5% reported in the community based study in Imo State^[18]. Age in spite of occupation is the commonest cause of cataract. It is a leading cause of reversible blindness and thus a disorder of public health importance. It is responsible for 47.8% of world blindness^[30].

Glaucoma accounted for 2.5% of ocular disorders among the artisans. Glaucoma is the leading cause of irreversible blindness worldwide and a significant cause of visual impairment. None of the participants as at the time of the study was blind from glaucoma but if left untreated, blindness is inevitable. A high prevalence of glaucoma has been reported in the southeastern part of the country where Imo State is located with a prevalence similar to a community based study in Imo State^[18, 31].

Refractive error and presbyopia combined had a prevalence of 15.2%. This is at variance with a community based study in the same area which reported a combined prevalence of 48.6%^[18]. Majority of the artisans in this study were less than 40y and therefore may not show symptoms of presbyopia. Refractive error on the other hand does not occur as a factor of age or occupation and so higher values in a community based study is expected. The few cases noted were diagnosed during the study. This is a reflection of poor utilization of eye care services and poor knowledge as some of the artisans erroneously believe that spectacles are for the severely visual impaired and could result in worsening of refractive error. A similar study reported a prevalence of 25.2% for uncorrected refractive error and 36.8% of presbyopia^[25]. The latter were in their 4th decade in contrast to our study population and made up of only welders.

There is a high prevalence of pingueculum and pterygium among the artisans in Owerri metropolis particularly the automobile mechanics. Superficial foreign bodies a possible cause of corneal opacities were the most common type of work related ocular injury noted while 13.6% had work related cataract. Refractive error and presbyopia were mostly diagnosed during the study and it's a reflection of the poor attitude to eye care displayed by these artisans.

The necessary authorities need to formulate policies aimed at preserving the ocular health of these artisans through attitudinal changing education targeted at enlightening these workers on proper eye care particularly as regards their profession and the associated hazards. These authorities should specifically enforce the use of ultraviolet rays protected glasses, face masks and goggles during welding, hammering and other activities that may threaten their ocular health.

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