ORIGINAL RESEARCH PAPER

Ophthalmology

PREVALENCE AND RISK FACTORS OF OCULAR DISEASES AND INJURIES AMONG RUBBER TAPPERS IN A RURAL AREA IN KANYA KUMARI

KEY WORDS:

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ABSTRACT

Rubber tapping is a major occupation in Kanya Kumari district and it significantly adds to the economy of the country. There are nearly 126 rubber-based industries recognized by the District Industries Centre (DIC), providing employment to 1874 people" .This study aims at analyzing the prevalence and risk factors associated with ocular injuries and diseases among rubber tappers in a rural area in Kanya Kumari. **AIMS AND OBJECTIVES:** 1. To assess the prevalence of ocular diseases and injuries in rubber tappers related to their occupation 2. To evaluate the risk factors associated with ocular diseases and injuries among rubber tappers **METHODS:** Rubber tappers attending the Ophthalmology Out-Patient department in Sree Mookambika Institute of Medical Sciences between 1.10.2020 to 30.11.2020 were evaluated for ocular injuries and diseases. A detailed history was obtained and ocular complaints were analyzed. After a thorough systemic and ocular examination, data was collected. The collected data were analyzed. **RESULTS:** The study was conducted for a time period of 2 months. Data was collected from all the rubber tappers attending the ophthalmology OPD in Sree Mookambika Institute of Medical Sciences. A total of 48 patients were evaluated. Among which 17 had foreign body exposure, 4 had corneal abrasion, 1 had fungal corneal ulcer, 16 had cataracts, 7 had refractive error,3 had pterygium. **CONCLUSION:** Occupation -related injuries are common amidst rubber tappers. The population dependent on this occupation is way too high to be left unattended or their health conditions ignored. The results obtained in this study throws light on the importance of awareness that needs to be advocated among employers and employees involved in rubber plantation and tapping. The use of protective eye goggles and other safety precautions must be propagated among the workers. The rubber tappers must be alerted about the consequences of ignoring safety precautions, specifically how it may lead to severe morbidity, sometimes even loss of vision. They must also be advised to undergo ophthalmic examination whenever necessary and on regular basis, as poor vision due to aging or even physiological refractive errors itself may lead to injuries due to compromised eyesight. After conducting this study, we came to the conclusion that the consciousness of the morbidity that may occur due to poor safety measures at work among the rubber tappers is nearly a flat line. Hence creating awareness and educating them regarding this becomes indispensable.

INTRODUCTION:

One of the aims of The World Health Organization's (WHO) "Right to Sight Vision 20/20" program is to prevent modifiable risk factors causing vision loss before 2020[2]. Achieving this includes acknowledging the epidemiologic distribution and risk factors, evaluating, developing, and insisting prevention steps. Cost-effective strategies are especially critical in countries such as India[3].

In India, Kanya Kumari stands as the second-largest region of rubber plantation next to Kerala[1]. Income from rubber plantations is of great economic importance and it provides huge employment opportunities. They are commercial of enormous importance as these crops contribute to foreign exchange reserves and employment. It is of paramount significance in the development of the hilly and rural areas and modernization of underdeveloped regions. In a nation like India tea, coffee and rubber occupy greater importance while rubber plantation exerts a major influence on the social and economic life of the people.

More than 50000 people including growers, dealers, workers, and processors along with their families entirely depend on this rubber plantation industry for their survival. A study by Sajeena H. in Production and marketing of rubber in Kanyakumari district states that the level of scientific literacy among small scale rubber growers is very low. Even though Kanya Kumari contributes 97.48 percent of rubber production in Tamil Nadu, the number of researches, studies about the rubber tappers, their lifestyle, and occupational hazards are alarmingly low.[4]

Rubber tapping is the process by which latex is extracted from the rubber trees. It is done by cutting a groove in the bark of the trees. It includes carrying heavy loads, navigating through rough terrain, using sharp tools, and handling chemicals. Yet, very little research is available about occupational injury among this small vulnerable population[5]. After the collection of the latex from the rubber trees, rubber is coagulated with formic acid, which creates crumbs that are similar to curds of milk.[6] Exposure to formic acid and injuries by it can cause significant systemic and ocular morbidity. Complete epithelial loss, stromal edema, conjunctival hyperemia, and limbal involvement are some of the features of ocular burns due to formic acid[7]. Immediate systemic and ocular management is a must to reduce morbidity and mortality[8].

Ocular burns with the acids used for coagulation is quite rare but still are a true ocular emergency requiring immediate and

intensive evaluation and treatment. The sequelae of an ocular chemical burn can be very severe and challenging to manage [9] Strict regulations are needed to prevent accidental chemical injuries.

Not only rubber tappers, but farmers as a whole have a remarkably high tolerance for risk. Their previous experiences with risk make them believe that their knowledge, skills, and experience immune them from the occupation's dangers. As daily wage workers, they feel safety measures lessen their productivity and efficiency.

A study on prevalence of work-related eye injuries among rubber tappers in Sri Lanka quotes ocular injuries as the second major work-related injury and only 58% took consultation for it [5]. The study also states poor vision as an important barrier the rubber tappers face. Good vision is crucial to this group to prevent injuring themselves. Almost 26% of study participants reported poor vision as a barrier to their efficiency[5]. As age increases, vision may become worse, exacerbating this issue. Many studies have reported poor vision leading to increased incidents of injuries, including falls and transport injuries. The study shows that provision of single-vision eyeglasses has to have reduced the risk of falls. Such a program could help to make rubber tapping safer, as well as prevent damage to trees, benefiting both the tapper, and the plantation as a whole[5].

Another study by Arcury TA, Quandt SA, on Latinx Farmworkers in the Eastern United States: A study on Health, Safety, and Justice says agriculture workers experienced eye pain (40%), redness (43%), itching (25%), and blurred vision (13%). In a group of 120 of these workers, 67% described one or more of the of eye symptoms, eye pain (29%), redness (49%), itching (43%), and blurred vision (43%). development of pterygiums documented a 23% due to exposure to wind and dust (10% bilateral). vegetable workers complained of fogging and discomfort with some designs of eye protective equipment(10).

AIMS AND OBJECTIVES:

1. To assess the prevalence of ocular diseases and injuries in rubber tappers related to their occupation
2. To evaluate the risk factors associated with ocular diseases and injuries among rubber tappers

METHODOLOGY:

a) STUDY DESIGN: cross-sectional study
b) STUDY DURATION: 2 months (1/10/2020- 3/11/2020)
c) STUDY SETTING: Rubber tappers attending Ophthalmology OPD in Sree Mookambika Institute of Medical Sciences during the study period.

PROCEDURE:

In every case, informed written consent was obtained. A detailed ocular and medical examination were done preceded by a general physical examination. In all the cases, a detailed general physical examination including vitals and systemic examination was done. Visual acuity for distance (Snellen's chart) and near, Best Corrected Visual Acuity (BCVA) and IOP (using Noncontact Tonometer) was recorded in every case possible.

An elaborate slit-lamp biomicroscopy (Carl Zeiss Meditech) examination of the anterior segment was also performed. Lids, meibomian glands, conjunctival surface for dryness congestion, cornea for sheen surface, and sensation were all checked in detail. Detailed examination of the fornices for foreign body was done. Detailed fundus examination under mydriasis was done under direct and indirect ophthalmoscopic examination.

SAMPLE COLLECTION:

Total sample size of the study: 48
Sampling technique: Convenient sampling

INCLUSION CRITERIA:

1. Rubber tappers attending ophthalmology outpatient department in Sree Mookambika Institute of Medical sciences.
2. 20- 60 years of age
3. ocular injuries related to rubber tapping
4. ocular diseases among rubber tappers

EXCLUSION CRITERIA:

1. Ocular injuries not related to rubber tapping.
2. Other agricultural workers
3. Both rubber tapping and other agricultural workers
4. Above 60 years

Whether placebo is used in the study: No
Whether drug used in the study: No
If research is a clinical trial: No
Parameters to be studied [If quantitative data mention the units of measurement]: nil

RESULTS:

Conditions	No of patients	Percentage
Foreign body exposure	17	35.4%
Cataract	16	33.3%
Refractive error	7	14.5%
Corneal abrasion	4	8.3%
Pterygium	3	6.2%
Corneal ulcer	1	2%

Out of 48 rubber tappers who visited the Ophthalmology OPD in Sree Mookambika Institute of Medical Sciences, 37 were males and 11 were females.

Out of 37 males, 11 were diabetics, 9 were on treatment, 2 were newly diagnosed and were started on treatment.

Out of 11 females, 2 were known diabetics and were on treatment.

23 patients complained of diminution of vision, out of which 7 had refractive errors. Power glasses were prescribed to those patients.

16 patients over the age of 50 had cataract changes in one or both eyes and were operated for the same.

17 patients gave history of foreign body exposure, out of which 11 had foreign body present in their eyes when they attended the OPD.

None of them used any eye protective equipment or goggles. And less than 60% of the study population were aware of the ocular injuries associated with rubber tapping.

4 patients complained of non-work-related foreign body exposure.

DISCUSSION:

This study focuses on the prevalence of ocular injuries and ocular diseases in rubber tappers that may affect their productivity.

The study shows that there is very poor awareness among the rubber tappers regarding ocular injuries during work.

In a study by Samarat Chatterji and Deepshika Agarwal on Primary prevention of ocular injuries in agriculture workers with eye goggles found that almost (76.2%) of workers used the goggles all or most of the time during work(11). While in

our study none of the rubber tappers used any sort of protective equipment. Another study by Voraporn Chaikitmongkol, Thidarat Leeungurasatien, Sabyasachi Sengupta on Work-Related Eye Injuries: Important Occupational Health Problem in Northern Thailand states that agricultural workers experienced a higher number of open-globe injuries (37/58) [(12)]eyes while in our study no open globe injuries were noted.

A study on Farm Activities Associated with Eye Injuries in the Agricultural Health Study by Nancy L. Sprince states that foreign body in the eye was the most frequent type of eye injury overall, accounting for 32 (80%) [(13)]of the eye injuries while in our study it is only 35.4%, 17/48 cases had foreign body exposure.

A study of the health profile of rubber plantation workers in rural Kerala by Tapas Sadasivan Nair, Suneela Garg, and Mongjam Meghachandra Singh found out that Chemical exposure was the most common hazard reported by rubber plantation workers (70.1%) but in our study, no chemical exposure-related injury was noted.

Prevalence of occupational injury and its contributing factors among rubber tappers in Galle, Sri Lanka Kayla Stankevitz, Catherine Staton confirmed 26%[(5)] of workers complaining of poor vision, in our study 48% complained of poor vision which was corrected by power glasses or cataract surgery.

CONCLUSION:

A study conducted for the WHO Program for Prevention of Blindness stated that 55 million eye injuries that restrict everyday activities occur every year, causing almost 750,000 hospital admissions and reported approximately 1.6 million cases of trauma-induced total blindness. Though the causes of eye injury vary throughout the world, every individual who works in an environment that may put him or her at risk for ocular injuries must be warned and made aware of its consequences. The WHO reported in 2007 that low- and middle-income countries had particularly high rates of occupational eye injuries, especially in agriculture and in cottage and unregulated industries.[(3)]

Occupation -related injuries are common amidst rubber tappers. The population dependent on this occupation is way too high to be left unattended or their health conditions ignored. The results obtained in this study throws light on the importance of awareness that needs to be advocated among employers and employees involved in rubber plantation and tapping. The use of protective eye goggles and other safety precautions must be propagated among the workers. The rubber tappers must be alerted about the consequences of ignoring safety precautions, specifically how it may lead to severe morbidity, sometimes even loss of vision. They must also be advised to undergo ophthalmic examination whenever necessary and on regular basis, as poor vision due to aging or even physiological refractive errors itself may lead to injuries due to compromised eyesight. After conducting this study, we came to the conclusion that the consciousness of the morbidity that may occur due to poor safety measures at work among the rubber tappers is nearly a flat line. Hence creating awareness and educating them regarding this becomes indispensable.

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