

SHORT REPORT

Acute respiratory symptoms among sisal workers in Tanzania

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Background	Few studies have focused on respiratory health effects among sisal workers.
Aim	To report on the prevalence of acute respiratory symptoms among sisal processors.
Methods	We interviewed 163 dust-exposed brushing and decortication workers and 31 low-exposed security workers from six sisal estates in Tanzania using a modified symptom score questionnaire to determine the prevalence of acute respiratory symptoms during work. Groups were compared using chi-square tests, Fisher's exact tests, <i>t</i> -tests and logistic regression, adjusting for confounding factors.
Results	After the first working day of the week, 73% of the brushing workers reported dry cough, 66% sneezing, 65% productive cough, 63% running nose and 34% stuffy nose. Brushing workers had a significantly higher prevalence of these symptoms than decortication workers. Brushing and decortication workers had significantly more dry cough and sneezing than the control group of security workers, when adjusting for age, smoking, past respiratory diseases and residence.
Conclusion	Processors of sisal fibre have a high prevalence of acute respiratory symptoms. More detailed studies on work and health in sisal estates are needed, including exposure studies.
Key words	Agricultural workers; respiratory symptoms; sisal.

Introduction

Agriculture is the backbone of the economy of Tanzania, constituting >50% of the gross domestic product [1]. Sisal is an important agricultural export product ranking Tanzania third in the sisal export global market [2]. The demand for sisal is increasing due to increased awareness of the benefits of natural fibres, development of new sisal products and power generation [3,4]. Little is known on respiratory effects among sisal workers, but a few studies have shown higher prevalence of respiratory symptoms among these workers [5–7]. No recent studies have been performed among sisal workers in Tanzania. The aim of this study was to determine the prevalence of acute respiratory symptoms among sisal fibre processing workers.

Methods

A cross-sectional study was done between June and September 2005 among six of 28 actively producing sisal estates. These six estates employed ~1700 workers in December 2004. Each estate had a processing factory comprising an outdoor decortication plant for fibre extraction and a brushing hall (Figure 1) for scraping and brushing of dried sisal fibres.

All workers in the brushing and decortication departments were invited to take part as a dust-exposed group. Security workers presumed to have low exposure to sisal dust were randomly selected as controls from a list of such workers. A modified optimal symptom score questionnaire on respiratory symptoms [8] and parts of a modified British Medical Research Council questionnaire [9] were used for interviewing all consenting workers immediately after the work shift on their first day of the week (Monday). Questions were asked about acute respiratory symptoms occurring since work started on this particular Monday. The symptoms were dry cough, productive cough, shortness of breath, wheezing, stuffy nose, running nose and sneezing. Workers were requested to rate the symptoms according to severity on a five-point scale: none at all, mild, moderate, severe and very severe. Before data analysis, the rated symptoms were dichotomized

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into yes (mild, moderate, severe or very severe) or no (never). The workers were asked if they used any dust masks during work. Information on past respiratory health problems (bronchitis, asthma, tuberculosis and atopy) was obtained as 'yes' or 'no'. In addition, the following sociodemographic information was collected: age (years), residence (in estate camp or outside), smoking habits (current smokers) and any history of past employment in dusty industry. The survey obtained ethical clearance from both Norwegian and Tanzanian medical ethics authorities, and the interviewed workers signed an informed consent. The first author administered all interviews.

SPSS version 13 for Windows was used for statistical analysis. *t*-test was used for comparing age. Chi-square tests and Fisher's exact tests (for values <5) were used for analysing differences in categorical variables. Logistic regression was performed for acute respiratory symptoms adjusting for age, current smoking, area of residence

(in the camp or outside the camp) and past respiratory illnesses (pneumonia, bronchitis, asthma or tuberculosis). Statistical significance was set at 5%.

Results

In all, 165 dust-exposed workers and 32 controls participated. Except for one security worker, all invited workers responded. One hearing-impaired decortication worker and one brushing worker suffering from malaria at the time of the study could not complete interviews and hence were excluded from the analysis. Brushing workers and decortication workers differed significantly in both mean age and mean duration of employment in the current job (Table 1). The prevalence of current smoking was significantly higher among the exposed groups (brushing and decortication) than among the security workers (Table 1). The prevalence of past respiratory diseases was higher ($P < 0.05$) among the exposed group

Table 1. Demographic characteristics, past respiratory illnesses and the prevalence of acute respiratory symptoms among 194 workers in six sisal estates

	Departments			Significance level	
	Decortication (<i>n</i> = 92)	Brushing (<i>n</i> = 71)	Security (<i>n</i> = 31)	Exposed ^a versus security	Brush versus decortication
Demographics					
Age, arithmetic mean (range)	43 (19–94)	51 (17–81)	51 (21–75)	ns ^b	**b
Smoking habits, <i>n</i> (%)					
Current smoking	49 (53)	45 (63)	10 (32)	**c	ns ^c
Residence, <i>n</i> (%)					
In camp	74 (80)	58 (82)	20 (64)	*c	ns ^c
Years of employment in current job					
Arithmetic mean (range)	7 (0.1–64)	13 (0.1–66)	8 (0.1–24)	ns ^b	*b
Past respiratory illness, <i>n</i> (%)					
Bronchitis	34 (37)	21 (30)	3 (10)	**d	ns ^c
Pneumonia	36 (39)	22 (30)	5 (16)	*d	ns ^c
Asthma ^e	12 (13)	5 (7)	2 (6)	ns ^d	ns ^c
Pulmonary tuberculosis	3 (3)	0 (0)	0 (0)	–	ns ^c
Allergy or atopy	5 (5)	2 (3)	3 (12)	ns ^d	ns ^d
Acute respiratory symptoms, <i>n</i> (%)					
Dry cough	47 (50)	52 (73)	10 (32)	**c	**c
Productive cough	40 (43)	46 (65)	11 (35)	ns ^c	**c
Shortness of breath	31 (33)	26 (37)	0 (0)	–	ns ^c
Wheezing	13 (14)	14 (20)	1 (3%)	*d	ns ^c
Stuffy nose	15 (16)	24 (34)	3 (10)	ns ^d	**c
Running nose	37 (40)	45 (63)	10 (32)	ns ^c	**c
Sneezing	36 (39)	47 (66)	6 (19)	**c	***c

^aExposed = decorticators + brushing.

^bIndependent *t*-test.

^cChi-square tests.

^dFisher's exact tests.

^eTwenty-seven did not know their asthma status.

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$; ns = not significant.

Table 2. Acute respiratory symptoms among sisal processing workers compared to security workers and among two groups of sisal processing workers (decortication workers and workers in brushing) by use of logistic regression, adjusting for current smoking, age, past respiratory illnesses and residence

Symptoms	Sisal processing workers compared to security workers	Decortication workers compared to workers in brushing
	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Dry cough	2.9 (1.2–6.9)	2.7 (1.3–5.4)
Productive cough	1.8 (0.8–4.3)	2.6 (1.3–5.1)
Running nose	1.8 (0.7–4.2)	2.7 (1.4–5.2)
Sneezing	4.2 (1.6–11.1)	3.2 (1.6–6.2)
Wheezing	– ^a	1.5 (0.6–3.5)
Stuffy nose	– ^a	3.1 (1.4–7.0)
Shortness of breath	– ^a	1.2 (0.6–2.3)

^aNot analysed due to low prevalence among security workers.

than among the security workers (Table 1). Except for one worker who used his simple personal dust mask, no other workers reported using respiratory protection equipment.

Workers in the brushing department had a significantly higher prevalence of dry cough, productive cough, stuffy nose, running nose and sneezing than decortication workers (Table 1). The combined exposed group of brushing and decortication had a significantly higher prevalence of dry cough, sneezing, wheezing and shortness of breath than the control security workers (Table 1). After adjusting for the effects of age, current smoking, past respiratory illnesses and area of residence, the exposed group (brushing and decortication) still had significantly higher odds ratio for sneezing and dry cough

compared to security workers (Table 2). Age and years at current job were strongly correlated ($P < 0.01$), hence of these parameters only age was included in this analysis. Also with the same adjustments, workers in the brushing department had significantly higher prevalence of sneezing, stuffy nose, dry cough, running nose and productive cough compared to decortication workers (Table 2).

Discussion

Our study found a high prevalence of acute respiratory symptoms in dust-exposed sisal workers. This is in agreement with a study in Croatia [10]. In our study, workers in the brushing departments had the highest prevalence of acute symptoms which is in agreement with the findings of Mustafa *et al.* [7]. Low prevalence of byssinosis which is considered to be among chronic obstructive respiratory diseases was found in two other studies among sisal workers, but these also reported low dust levels [5,6]. Our study focused on acute symptoms. Lack of exposure measurements and information on chronic respiratory symptoms including chest tightness in our study does not allow for further comparison with these studies.

In our study, the workers in the brushing department had more nasal symptoms when compared to workers in decortication. This could be due to differences between the departments in both the level and type of airborne exposure.

The high prevalence of acute respiratory symptoms among the sisal production workers might also be associated with exposure to the aerosol and sisal fibre dust in the sisal processing areas. Exposure studies as well as improvements of the work environment ought to be performed.



Figure 1. Sorting, brushing, grading and packing of sisal fibres.

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Conflicts of interest

None declared.

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