SHORT ARTICLE

Work related health problems of female workers engaged in Cashew processing Industries- a cross-sectional study from Kollam district, Kerala, southern India

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Citation

Vincy Nelson, Rakesh PS, Simon S, Hashim A, Usman A, Anzil AR. Work related health problems of female workers engaged in Cashew Processing Industries- a cross-sectional study from Kollam district, Kerala, southern India. Indian J Comm Health. 2016; 28, 4: 359-363.

Source of Funding: Nil **Conflict of Interest:** None declared

Article Cycle

Received: 05/12/2016; **Revision:** 17/12/2016; **Accepted:** 20/12/2106; **Published:** 31/12/2016

Abstract

Background: India accounted for one third of the global export market for cashew kernels. Unhealthy sitting posture, working near furnaces and contact with the cashew nut shell liquid may make the workers in the cashew sector vulnerable to many health issues **Aims & Objectives**: To identify the health related problems among female workers of cashew processing industries in Kollam district, southern Kerala, **Setting and Design**: A cross sectional study was conducted in selected cashew units of Kollam, Kerala. **Material & Methods**: An interviewer administered and structured questionnaire was used to collect health related issues from 301 female cashew processing workers. **Statistical analysis**: Descriptive statistics using frequencies was done and chi square test was used to detect difference between proportions. **Results**: Low back pain was the predominant problem (48.8%) followed by hand and wrist pain (46.6%), knee pain (37.8%) and neck pain (32.5%). Among the workers engaged in roasting, 86.6% had experienced a burn ($p < 0.001$). Workers engaged in roasting (53.3%) and shelling (43.7%) had blackish staining of their palms and fingers. **Conclusion**: Health related issues pertaining to musculoskeletal system, respiratory system, and skin conditions are highly prevalent among women engaged in cashew processing industry. A comprehensive programme to prevent health related issues may be considered to promote health of women engaged in cashew processing industries

Keywords

Cashew; Dermatitis; Musculo-skeletal disorders; Occupational health

Introduction

India accounted for one third of the global export market for cashew kernels.(1) Kerala stands fourth in terms of production of cashew in India, after Maharashtra, Andhra Pradesh and Odisha and accounts for nearly one tenth of the country's production.(2)

The cashew processing industry, where raw cashew nuts are converted to cashew kernels, is a major source of livelihood for a large number people in

southern Kerala. The major stages of cashew processing include roasting the raw nuts to facilitate removal of the hard outer shell, shelling or cutting the outer shell, peeling the skin of the kernel and grading the kernels based on quality. The cashew processing industry in Kerala is labour intensive due to many manual works involved in the cashew nut production processes. Majority of the workers are women, especially belonging to the lower socio-economic status.(3)

Unhealthy sitting posture, working near furnaces and contact with the cashew nut shell liquid may make the workers in the cashew sector vulnerable to many health issues. There are some recent reports on the profile of cashew workers, but majority of them are focusing on labour and welfare measures and only a few talks about the health-related issues. (3-7) The current study was done with an objective to identify the health-related problems among workers of cashew processing industries in Kollam district, southern Kerala.

Aims & Objectives

To identify the health-related problems among female workers of cashew processing industries in Kollam district, southern Kerala

Material & Methods

Study Area: Kollam district located in the south west coast of Kerala has a population of around 2.6 million. Decadal growth rate of Kollam is 1.73 against 4.86 in the State. Sex ratio is 1113 females for 1000 males and literacy rate for females is 92%. Kollam is traditionally known as cashew capital of the State with 600 cashews processing units and around 250,000 employees directly involved in the industry. **Study Type:** Cross sectional study. **Study Population:** Female workers engaged in randomly selected four cashew processing units. **Study Duration:** May-June 2015. **Sample size:** Sample size was calculated using one week prevalence of low back pain 20% with 5% absolute precision. **Inclusion criteria:** Only workers from peeling, roasting, grading and shelling sections were included. **Exclusion criteria:** Individuals with known systemic diseases involving musculoskeletal system such as rheumatoid arthritis, Sjogren's syndrome, and cervical spondylosis were excluded. **Data Collection:** An interviewer administered and structured questionnaire was used which included personal data, details of works and the common postures adopted during work, duration of work, symptoms of musculoskeletal involvement, the various joints affected, visual problems, chronic respiratory illness, prolapse uterus and self-reported diabetes mellitus. The questions about musculoskeletal symptoms were adopted from the modified Nordic Questionnaire.(8) A detailed head to foot general examination was conducted using a checklist and findings were recorded. **Data Analysis:** Data were analyzed using the Statistical Package of Social Sciences (SPSS Version 12.0). Descriptive data were expressed as frequencies. Chi square test was used to detect difference between proportions, P value of ≤ 0.05 considered statistically significant.

Results

A total of 301 workers were included in the study. 118 were predominantly involved in peeling job, 80, 58 and 45 were doing shelling, grading and roasting respectively. 16.1% of women in peeling section were older than 60 years. In the group, 68.8% of women doing shelling works had only primary education. Among them, 5.3% were in the habit of chewing tobacco. The socio demographic features of the workers participated in the study were as shown in Table 1. Health Insurance was not available for 19.3% (58/301).

Low back pain was the predominant problem (48.8%) reported by the subjects. In the study group, 61% of women engaged in peeling and 56.2% engaged in shelling reported low back ache while the figures were 32.7% and 22.4% among those who were engaged in grading and roasting. Wrist and hand joint pains were reported by 68.7% of workers engaged in shelling and 50.5% of workers engaged in peeling. Among them 44% of workers engaged in peeling and 37.5% of workers engaged in shelling reported neck pain.

Chronic respiratory illness was highest among those engaged in shelling with 22.5% among them having the condition ($p < 0.001$).Among the workers engaged in roasting, 86.6% had experienced a burn ($p < 0.001$) which is higher as compared to those engaged in other sections. Workers engaged in roasting (53.3%) and shelling (43.7%) had blackish staining of their palms and fingers. Among the study subjects, 10.2% of workers reported prolapse of uterus. Frequent eye pain/strain was reported mainly by workers engaged in peeling (42.5%) and it was lowest (4.4%) among those engaged in roasting ($p<0.001$). 15.2% of the study subjects had hypertension and 21.2% had self-reported diabetes mellitus.

Discussion

The working conditions of cashew workers have been a policy concerns for long. However, many of the health related issues seem to have persisted till date. It is important that relevant policy measures are adopted to improve the health conditions of cashew workers. The study throws light on the health related issues faced by female workers of cashew processing industry in Kollam district, Kerala. The demographic characteristics of the workers engaged in cashew processing industry were consistent with previous reports regarding same from Kollam district with relatively low presence of the younger workforce. (3)

Low back ache, Wrist and hand pain, Knee pain and neck pain were the major musculo skeletal problems reported in the decreasing order among the cashew workers in the current study. Ravi et al. in 2013 reported back pain and leg pain as the major health problems among cashew workers.(5) Girish et al. in 2012 examined the health aspects of cashew factory workers in Karnataka and found that self-reported pain and discomfort among the workers were more prevalent for the knee, followed by back and then shoulder.(6)

Wrist and hand pain were highest among workers engaged in grading and peeling so as the low back ache, knee pain and neck pain. Shelling/cutting is the process of breaking the shell from a roasted nut by hammering the shells with a stone or a wooden flail to extract the nuts from the outer shell of the nut and peeling involves the removal of the outer skin of the kernel with the help of a sharp knife. This could explain the higher pains in hand and wrist among those engaged in these processes. A large majority of the women workers in the industry sit/squat on the floor to perform tasks such as shelling and peeling. Squatting postures can affect soft tissues such as muscles, ligaments, and spinal discs. Squatting exerts great pressure on different body parts such as the leg, knee, thigh, back, spinal cord, and on the shoulder and feet as well. In the shelling section, the workers squat barefooted on the floor with the trunk bent and eyes fixed on the kernel to be hit. Intra-discal pressure at the lumbar region is reported to be high with trunk in bent forward position. It leads to degenerative tissue changes and functional defects on the musculo-skeletal system.(9) In the peeling and grading section, women workers squat flat on the ground.

The usual work time in the cashew processing sector is from 8AM to 5PM. Long hours without regular break, repetitive movements, fixed working position and prolonged visual concentration are common among cashew nut workers and might be leading to musculoskeletal and visual problems. The industry standard is to have three rest intervals/breaks in a day during work. Wages for Shelling and peeling of cashew nuts are on a piece rate basis and the remaining on a time rate basis as graders. Previous study found that one-third of the workers skipped rest intervals and this was more prevalent among female workers who are paid on a piece rate basis.(3) There is a need to provide benches/chairs for the workers so as to discontinue the current unhealthy practice.

Chronic respiratory illness was higher among the workers engaged in shelling. Linkage between exposure of cashew kernel oil and chronic respiratory illness need to be further studied. Cashew shelling involves breaking the nuts by hammering and this may generates aerosols. A relationship between the period of flowering of the cashew tree and the increased number of allergic asthma cases has been reported from Brazil.(10) Cashew nuts also produce noxious fumes when heated and leads to indoor air pollution. An improvement possible in the workspace is to install exhaust fans and promoting use of masks.

A majority of workers engaged in roasting section reported burns. Roasting is carried out at a temperature of 185°C to 190°C to remove the moisture from the nuts. Cashew nut shell liquid can causes cauterization and permanent staining of skin, a severe dermatological problem. While doing shelling or cutting, the cashew nut shell liquid may fall on the hands of the workers, which in turn can develop black spots on the skin. This has been reported previously also.3 It can also cause dryness in the skin. Gloves are not usually used by the workers while handling the nuts. There is a need to provide proper orientation to the workers to use gloves especially as there exists apprehension about reduction in output if gloves are used. Hazards are much less in steam cooking method as opposed to drum roasting.

Conclusion

Health related issues pertaining to musculoskeletal system, respiratory system skin conditions and eye strain are highly prevalent among women engaged in

cashew processing industry. Musculoskeletal problems are more among workers engaged in shelling and peeling of cashew nuts probably due to repetitive movements of same joints and fixed squatting working position. Majority of the workers involved with roasting of nuts had experienced burns.

Recommendation

A comprehensive programme to prevent health related issues including education on postural change, infrastructure improvement by providing benches for sitting and exhaust fans, substitution of techniques like steam cooking for drum roasting, behaviour change communication for use of gloves and masks may be considered to promote health of women engaged in cashew processing industries.

Limitation of the study

Healthy worker effect has to be considered while assessing the morbidity among the workers in the unorganized sector. Other limitations of the study are the lack of postural analysis, not using a validated tool and non-assessment of the confounders including many socio demographic factors.

Relevance of the study

Literature on occupational health problems of cashew workers in India are sparse. The study found a high prevalence of work related health problems among female workers engaged in cashew processing industry in Kerala, India.

Authors Contribution

VN, RPS, SS conceived the idea, VN, RPS, AH, AU, AAR designed the study, AH, AU, AAR collected the data, RPS, SS analysed and interpreted the data, RPS drafted the manuscript, VN, SS,AH,AU,AR edited the manuscript and approved it.

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Tables

TABLE 1 CHARACTERISTICS OF STUDY SUBJECTS

	Peeling(N=118)	Shelling (N=80)	Grading (N=58)	Roasting(N=45)	Total (N=301)
Age groups					
< 30	05 (4.2%)	0 (0.0%)	06 (10.3%)	08 (17.8%)	19 (6.3%)
31 – 45	49(41.5%)	36 (45.0%)	24 (41.4%)	21 (46.7%)	130 (43.2%)
46 – 60	45 (38.1%)	37 (46.2%)	25 (43.1%)	14 (31.1%)	121 (40.2%)
>60	19 (16.1%)	07 (8.8%)	03 (5.2%)	02 (4.4%)	31 (10.3%)
Education					
Illiterate	06 (5.1%)	03 (3.8%)	02 (3.4%)	01 (2.2%)	12 (4.0%)
Primary	62 (52.5%)	52 (65.0%)	16 (27.6%)	11 (24.4%)	141 (46.8%)
High school	46 (39.0%)	24 (30.0%)	34 (58.6%)	33 (73.3%)	137 (45.5%)
Higher secondary	03 (2.5%)	01 (1.2%)	05 (8.6%)	0 (0.0%)	09 (3.0%)
Degree and above	01 (0.8%)	0 (0.0%)	01 (1.7%)	0 (0.0%)	02 (0.7%)

Habits					
Smoking	03 (2.5%)	0 (0.0%)	01 (1.7%)	02 (4.4%)	06 (1.9%)
Alcohol	01 (0.8%)	01 (1.2%)	0 (0.0%)	0 (0.0%)	02 (0.6%)
Tobacco chewing	08 (6.7%)	07 (8.7%)	0 (0.0%)	01 (2.2%)	16 (5.3%)

TABLE 2 HEALTH PROBLEMS AMONG WOMEN WORKING IN CASHEW PROCESSING INDUSTRIES

	Peeling (N=118)	Shelling (N=80)	Grading (N=58)	Roasting(N=45)	Total (N=301)	Chi square p value
One year Pain- regional distribution						
Low Back pain	72 (61.0%)	45 (56.2%)	19 (32.7%)	11 (24.4%)	147(48.8%)	<0.001
Wrist and hand pain	60 (50.8%)	55 (68.7%)	21 (36.2%)	04 (8.8%)	140 (46.5%)	<0.001
Knee pain	27 (46.5%)	23 (51.1%)	34 (28.8%)	30 (37.5%)	114 (37.8%)	0.025
Neck pain	52 (44.0%)	30 (37.5%)	13 (22.4%)	03 (6.6%)	98 (32.5%)	<0.001
Respiratory Illness						
Chronic respiratory illness	12 (10.1%)	18 (22.5%)	05 (8.6%)	02 (4.4%)	37 (12.2%)	0.009
Skin conditions						
Burns	10 (8.4%)	11 (13.7%)	0 (0.0%)	39 (86.6%)	60 (19.9%)	<0.001
Staining of palm and fingers	12 (10.1%)	35 (43.7%)	08 (13.7%)	24 (53.3%)	79 (26.2%)	<0.001
Other conditions						
Prolapse of uterus	11 (9.3%)	10 (12.5%)	03 (5.1%)	07 (15.5%)	31 (10.2%)	0.316
Eye pain/strain	50 (42.3%)	25 (31.2%)	20 (34.4%)	02 (4.4%)	97 (32.2%)	<0.001
Hypertension	18 (15.2%)	11 (13.7%)	13 (22.4%)	04 (8.8%)	46 (15.2%)	0.279
Diabetics Mellitus	15 (12.7%)	17 (21.2%)	07 (12.1%)	15 (33.3%)	54 (17.9%)	0.011