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Original Research Article

Physical and mental morbidity pattern among female cashew workers in Kollam district, Kerala

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ABSTRACT

Background: The cashew processing is a labour-intensive work with a significant number of female workers. Majority belong to low socioeconomic status and so they join this sector to meet up their daily living. Long hours of work, greater work load and increased family burden lead to increase in morbidity status among workers. As comorbidities gets unnoticed and ignored, there is occurrence of early morbidity as well as mortality in these working groups and this is one of the major concerns.
Methods: Cross-sectional study was conducted among female cashew workers in Kollam district, Kerala. Data was collected using interviewer administered questionnaire using stratified multistage cluster sampling method. Seven workers each were selected from shelling, peeling and grading processing units from eight private and two government factories. Data entered in micrososft excel, coded and analyzed using SPSS software version 25. Descriptive statistics for qualitative data were expressed as frequency and percentages and quantitative data as mean and standard deviation
Results: Out of 210 participants, 95.4% workers were suffering from one or the other morbidities. Arthralgia was the major concern followed by allergy, hypertension and thyroid. Prehypertensive state was found to be present among all participants. Anxiety noticed in majority of participants.
Conclusions: Frequent medical check-ups, recreational activities and health education sessions needs to be implemented in all cashew factories to lessen the morbidity and to up bring the health status of workers.

Keywords: Cashew nut processing, Morbidity pattern, Cashew worker

INTRODUCTION

Globally, cashew ranks third, India, second largest and Kerala stands fifth in the country in production of cashews.[1-3] Kollam district has large number of cashew factories and majority are female workers working at shelling, peeling and grading units.[4-8] These works need energy and they spend almost whole day in factory in order to up bring their livelihood which in turn creates a negative impact on health.[7,9] Few studies were conducted in India regarding morbidity profile of these workers. Hence, we conducted this study to estimate the prevalence of various morbidities in this occupational group.

METHODS

Study design and study participants

A cross sectional study was conducted among female workers of private and government cashew factories for a period of six months from July 2022 to December 2022 in Kollam district, Kerala.

Inclusion criteria

Female workers between 18 and 75 years. of age, full time workers and those who worked for more than a year in any cashew factory were included in study.

Exclusion criteria

Women who haven't attained menarche, pregnant women and lactating women (less than 6 months) and those suffering with diagnosed mental illness were excluded.

Sample size calculation

Sample size was calculated considering the proportion of workers having morbidity (p) as 38.3% from previous study, confidence level (1-α) as 95%, absolute precision as 7%.[3] The sample size was calculated using the formula:

$n = [(Z (1-\alpha/2)) p (1-p)/d^{2}]^{x}$ Deff

Design effect=1+p (n-1), where p is the intra-class correlation coefficient and n is the subjects sampled per cluster.The sample size calculated was 210.

Sampling technique

Multi-stage cluster sampling, with stratification used in study.

Sampling procedure

Level 1-List of factories from cashew worker welfare board: Stratified as government (CAPEX)/private (corporate): Two CAPEX and eight private factories will be selected from each list using probability proportional to size sampling-in the ratio of 1:4. Factories will be selected using simple random sampling

Level 2-List of employees obtained from each factory: Stratified into three based on the state of the work process: seven selected from each list using simple random sampling

Measurement tools and methods

An interviewer administered semi structured questionnaire containing sociodemographic characteristics and morbidity patterns were used. Socio-demographic characteristics- age, sex, education, education of head of family, above poverty line/ below poverty line (APL/BPL), type of occupation in industry, occupation of head of family, monthly Income, daily income, marital status, type of housing and number of family members. DASS 21 scale was also used to find the proportion of workers having depression, anxiety and stress. Depression, anxiety, stress scale 21 (DASS 21) yields three subscale scores for depression, anxiety, and tension/stress.[10]

DASS anxiety=2+4+7+9+15+19+20, DASS depression= 3+5+10+13+16+17+21 and DASS stress=1+6+8+ 11+12+14+18.

The depression, anxiety and stress scale-21 items (DASS-21) are designed to measure the emotional states of depression, anxiety and stress. DASS-21 scale contains seven items, divided into subscales.

Operational definitions

Full time workers: Those workers who work for minimum of four days per week i.e., 20 days per month with an eight-hour duration of work per day and also those who work for minimum of 150 days per year.

Cashew factory: Is a place where processing of cashew nuts is being carried on and includes the factory building, the site thereof, and the lands nearby the factory which is necessary for, or in connection with, the working of the factory.[11]

Data analysis

Data was entered into micrososft excel and coded. Data analyzed using SPSS software version 25. Descriptive ststistics including frequency and percentage were calculated for all variables.Association between various qualitative variables were found using chisquare test.

Ethical considerations

Clearance from the institutional ethics committee was obtained. Written informed consent obtained from participant before inclusion in the study. Confidentiality of the information was maintained at every stage of data collection and analysis. All principles of the declaration of Helsinki were followed for the study.

RESULTS

This cross sectional study was conducted among 210 female cashew factory workers of Kollam district belonging to 10 factories, including eight private and two government firms. Female workers involved in shelling,peeling and grading sections were selected. About 125 participants were permanent workers while 85 were temporary workers.Among the permanent workers those engaged in shelling, peeling and grading section were 41, 44 and 40 and among temporary workers were 29, 26 and 30. Higher proportion of workers (96, 45.7%) were aged 51-60 years followed by 41-50 years (68, 32.4%). The mean age of the study participants was 50.3 years with an 8.32 standard deviation of years. Majority of them (173, 82.4%) were married and completed their high school education. Educational level was high among grading section compared to that of other groups. Those

having least educational level were involved in shelling section. More than three-fourth (88.6%) the workers have pink or yellow colour ration cards (BPL category) and 11.4% labourers have blue or white colour ration cards (APL category). Proportion of women belonging to upper lower socioeconomic status was high in all the occupational categories according to modified Kuppuswamy classification.[12] However, the share was highest among women engaged in shelling compared to other categories. The minimum and maximum working years of the employees ranges from 11 to 50 years. The mean years of work is 19.79±10.80 years.

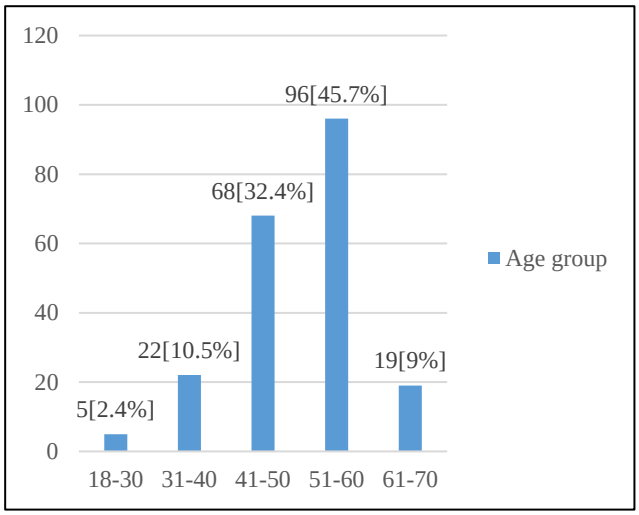

Figure 1: Age group of study participants.

General characteristics of the study participants based on demographic profile

General characteristics of the study participants based on demographic profile shown in the Table 1 below.

Anthropometric measurements and vitals of study participants

Since the main concern of this study is to find the morbidity patterns, anthropometric measures were taken to assess the risk of being morbid among the participants. The mean height and weight of all respondents was found to be 154.48±6.07 cm and 57.29 ±9.47 kg respectively. Table 2 shows body mass index assessed using Asian classification, prevalence of those having normal weight was found to be (70, 33.3%).[13] Among the 140 malnourished participants, those found to be obese, overweight and underweight were (78, 37.1%), (46, 21.9%) and (16, 7.6%). On comparing with the type of work, those involved in shelling process had normal (23, 32.9%) underweight (10, 14.3%), overweight (14, 20%) and obese (23, 32.9%). Those involved in peeling process had normal weight among (26, 37.1%) participants, (4, 25%) were underweight, (14, 30.4%) were overweight and (26, 33.3%) were obese. In grading section, (21,30%) had normal weight, only (2, 12.5%) were underweight, (18, 39.1%) were overweight and (29, 37.2%) were obese. On comparing the nutritional status as per body mass index of participants with type of work, no significant association between nutritional status and type of work.

The mean SpO_2 and PR were found to be 98.50±1.69% and 79.05±9.82 bpm, respectively, by checking vital signs. The mean general random blood sugar was found to be 115.16±30.63 mg. and the mean systolic and diastolic blood pressure was determined to be 133/80 mmHg, which is of prehypertensive state.

Morbidity patterns of the study participants

Out of 210 participants, 95.2%, CI=93.3-96.2% had one or the other comorbidities. From the Table 3, we can see that among the morbid study group, arthralgia was common among all groups (173, 82.4%) followed by allergy (76, 38%) which is more significant in peeling (30, 39.3%) and shelling section (26, 34.2%). The prevalence of non-communicable diseases was found to be higher among majority of the respondents. The most-reported morbidities were hypertension (66, 33%) followed by thyroid disorder (42, 21%), respiratory disorders (18%, 37) and diabetes mellitus (36, 176%). Genitourinary infections were seen in (41, 20.5%) participants, predominantly seen in those involved in shelling section. The major complaints were abnormal vaginal discharge, irregular painful bleeding, fibroid uterus and ovarian cyst. Now when we compare the morbidities with the type of work, allergy, chronic obstructive pulmonary disease, varicose vein, myalgia and genitourinary issues were common among those involved in shelling group. Whereas in peeling section, allergy, hypertension, diabetes mellitus, varicose vein, arthritis, myalgia and coronary artery disease were predominantly seen. Finally, in grading section, thyroid disorder, diabetes mellitus, coronary artery disease, dyslipidaemia, arthritis, myalgia and migraine were commonly seen.

On comparing morbidity pattern and type of work, there was no significant association found whereas on comparing morbidity pattern and nature of job, there showed statistical significance in those affected with diabetes mellitus with a chi-square value of 4.101 at p=0.043.

Half of the participants face depression and anxiety while one fourth of the participant's experience stress. Among the participants, (73, 34.8%) and (23, 11%) had moderate level of depression and stress whereas (41, 19.5%) had extreme severe anxiety.

While comparing with the various type of work, depression was noticed more in peeling group (46, 40%), anxiety among shelling group (42, 35.9%) and stress among grading group (22, 36.7%). On comparing depression, anxiety and stress of participants with the nature of work, no significant association was found.

Table 1: Distribution of study participants based on demographic profile, (n=210).

Demographic profile	Type of worker	Category	N	Percentage (%)
Nature of work	Permanent	Shelling	41	32.8
		Peeling	44	35.2
		Grading	40	32.0
	Temporary	Shelling	29	34.1
		Peeling	26	30.6
		Grading	30	35.3
Marital status		Married	173	82.4
		Widow	29	13.8
		Divorce	7	3.3
		Unmarried	1	0.5
Type of family		Nuclear	154	73.3
		Joint family	35	16.7
		Three generation	21	10.0
Type of housing		Semipucca	109	51.9
		Pucca	80	38.1
		Katcha	21	10.0
Socioeconomic status according to modified Kuppuswamy classification 2022		Lower	17	8.1
		Upper lower	189	90
		Lower middle	4	1.9

Table 2: Distribution of study participants based on the body mass index with respect to their type of work.

Category	Shelling, n (%)	Peeling, n (%)	Grading, n (%)	Total, n (%)	Test statistics and p value
Underweight	10 (62.5)	4 (25)	2 (12.5)	16 (7.6), CI=4.02-11.18	χ^2=8.431, 0.208
Normal range	23 (32.9)	26 (37.1)	21 (30)	70 (33.3), CI=26.64-39.36	
Overweight	14 (30.4)	14 (30.4)	18 (39.1)	46 (21.9), CI=16.31-27.49	
Obese	23 (29.5)	26 (33.3)	29 (37.2)	78 (37.2), CI=30.66-43.74	

Table 3: Distribution of study participants based on their morbidity status with respect to their type of work.

Morbidity status	Shelling, n (%)	Peeling, n (%)	Grading, n (%)	Total, n (%)	Test statistics and p value
Arthralgia	58 (33.5)	57 (32.9)	58 (33.5)	173 (82.4), CI=77.25-87.55	χ^2=0.066, 0.968
Allergy	26 (34.2)	30 (39.5)	20 (26.3)	76 (38), CI=31.44-44.56	χ^2=3.134, 0.209
Hypertension	18 (27.3)	25 (37.9)	23 (34.8)	66 (33), CI=26.64-39.36	χ^2=1.723, 0.422
Thyroid disorder	11 (26.2)	14 (33.3)	17 (40.5)	42 (21), CI=15.49- 26.51	χ^2=1.607, 0.448
Genitourinary problems	16 (39)	12 (29.3)	13 (31.7)	41 (20.5), CI=15.04-25.96	χ^2=0.788, 0.674
Respiratory illness	15 (40.5)	9 (24.3)	13 (35.1)	37 (18), CI=12.80-23.20	χ^2=1.837, 0.399
Diabetes mellitus	6 (16.7)	15 (41.7)	15 (41.7)	36 (17.6), CI=12.45-22.75	χ^2=5.431, 0.066
Arthritis	9 (28.1)	11 (34.4)	12 (37.5)	32 (16), CI=11.04-22.96	χ^2=0.516, 0.773
Varicose vein	9 (33.3)	10 (37)	8 (29.6)	27 (13.5), CI=8.8-18.12	χ^2=0.255, 0.880
Myalgia	8 (33.3)	8 (33.3)	8 (33.3)	24 (11.4), CI=7.10-17.70	χ^2=0.00, 1.00
Coronary artery disease	4 (22.2)	9 (50)	5 (27.8)	18 (9), CI=5.13-12.87	χ^2=2.552, 0.279
Dyslipidaemia	2 (28.6)	2 (28.6)	3 (42.9)	7 (3.5), CI=1.01-5.99	χ^2=0.296, 0.863
Migraine	1 (20)	2 (40)	2 (40)	5 (2.5) CI=3.91-4.61	χ^2=0.410, 0.815

Table 4: Association between morbidity pattern and nature of job.

Morbidity status	Temporary, n (%)	Permanent, n (%)	Total, n (%)	P value
Arthralgia	68 (39.3)	105 (60.7)	173 (82.4)	χ^2=0.558, 0.455
Allergy	30 (39.5)	46 (60.5)	76 (38)	χ^2=0.050, 0.824
Hypertension	30 (45.5)	36 (54.5)	66 (33)	χ^2=0.99, 0.320

Continued.

Morbidity status	Temporary, n (%)	Permanent, n (%)	Total, n (%)	P value
Thyroid disorder	12 (28.6)	30 (71.4)	42 (21)	χ^2=3.088, 0.079
Genitourinary problems	15 (36.6)	26 (63.4)	41 (20.5)	χ^2=0.320, 0.572
Respiratory illness	15 (40.5)	22 (59.5)	37 (18)	χ^2=0.00, 0.993
Diabetes mellitus	20 (55.6)	16 (44.4)	36 (17.6)	χ^2=4.101, 0.043

Table 5: Prevalence of mental health state of workers among study participants according to DASS 21 scale, (n=210).

Category	No, n (%)	Mild, n (%)	Moderate, n (%)	Severe, n (%)	Extreme severe, n (%)
Depression, (n=115)	95 (45.2)	2 (10)	73 (34.8)	15 (7.1)	25 (11.9)
Anxiety, (n=117)	93 (44.3)	17 (8.1)	37 (17.6)	22 (10.5)	41 (19.5)
Stress, (n=60)	150 (71.4)	17 (8.1)	23 (11)	15 (7.1)	5 (2.4)

Table 6: Distribution of study participants based on mental health status.

Mental health status	Shelling, n (%)	Peeling, n (%)	Grading, n (%)	Total, n (%)	P value
Depression	33 (28.7)	46 (40)	36 (31.3)	115 (54.8), CI=48.05-61.53	χ^2=5.344, 0.069
Anxiety	42 (35.9)	38 (32.5)	37 (31.6)	117 (55.7), CI=48.98-62.42	χ^2=0.811, 0.667
Stress	19 (31.7)	19 (31.7)	22 (36.7)	60 (28.5), CI=22.39-34.61	χ^2=0.420, 0.811

DISCUSSION

In the present study, 95.4 percentages of workers had morbidities which is of very significant number. Highest proportion of workers (45.7%) were aged 51-60 years and around (9%) of workers were older adults (60 and above). This shows that even with advancing age they persist to strive to meet up their family needs. About 73% of workers were having nuclear families and lived in semipucca house. Around 87% of workers belonged to below poverty line. The mean working years is 19.08±10.80 years. The proportion of women from BPL category was higher in shelling compared to grading and peeling. Another study conducted by Sajeena also found that the proportion of workers were having similar age group (51-59 years), work years (>11 years of work experience) and below poverty level families (80%) especially in shelling section.[3] Suryalekshmi stated that with rise in age and number of work experience, the number of occupational diseases also goes high.[8] In a study conducted by Srinivas in the year 2013 at Kanyakumari district found that higher proportion of workers were aged twenty one to thirty years, attained middle school education mainly and were living in nuclear families.[14]

Various socioeconomic factors such as poverty, lack of education, poor housing conditions as well as the poor diet contribute to the medical problems.[15] As women shares the burden in earning families daily bread, their ill health hampers their working productivity which may subsequently lead to the reduction in household income as well as the economic growth.[16] They receive payment based on the weight of nuts and so they even skip breaks or rest intervals to do more work or to complete the work in order to get the more salary irrespective of their health status, thus deteriorating their health furthermore.[8,17]

In the present study, in order to assess risk factors for the morbidity, body mass index was assessed using Asian classification and found that 33.3% of participants belong to normal category, the rest (66.7%) were found to be malnourished which is of serious concern. Those found to be obese, overweight and underweight were (37.1%), (21.9%) and (7.6%). Among the malnourished, obese and overweight were found to be high (69%) whereas underweight was just 7.6%. The reason why majority falls in the overweight and obese classification could be due to their sedentary job. The risk factors and comorbidities may be partially decreased if any recreational activity a 15-minute group walk is implemented. With regard to the nature of work, shelling group had more undernourished people (14.3%) than peeling (5.7%) and grading (2.9%) groups which could be because of their low socio- economic status and work criteria. Similar study conducted by Geetanjali also found that 50% respondents working in shelling process were undernourished which could be due to their heavy work while beating the roasted cashew which might need more energy consumption.[18] A study conducted by Borah in Meghalaya found that 77.5% of workers belonged to normal category whereas 22.5% belonged to chronic energy deficient category.[19] Satheesh Kumar on doing study in Kollam district, Kerala found similar findings that higher proportion of workers (63.7%) falls under normal category, 13.1% workers fall under the category of underweight. 21.7% of workers fall under the category of overweight. 1.4% of workers fall under the category of obese.[20]

Arthralgia (82.4%) was the most common issue among the health problems followed by allergy (38%), hypertension (33%) and thyroid disorder (21%). The reason for arthralgia could be because of the increased working hours, unnatural sitting posture while working

and also due to repetitive fashion of their work. It was found more common among permanent workers than temporary workers which could be because of increased and persistent years of work. Giri also reported similar finding that arthralgia was the major health issue concerned by the workers.[4] Borah stated they faced lot of physiological and musculoskeletal hazards including pain in fingers, wrist, joints, upper and lower extremities due to continuous working right from early morning till evening.[6] Girish stated that pain increases with increase in years of work.[21]Jayakumar reported that the extent of physical pain depends upon the type of work.[16] Study conducted by Priya at Cuddalore district found that workers involved in shelling had more of low backache (79.2%), and knee pain (58%) and those involved in peeling and grading had wrist pain (41.5%).[22]

Allergy was found among 38% of workers, of which it was found more in peeling (30%) and shelling (26%) followed by grading (20%) section. Similar study by Kinslin also stated that shelling and peeling group workers face allergic reaction more.[16] Another study by Andonaba in West Africa found that shelling section was exclusively occupied by illiterate women (72.3%) without personal protective equipment and as a result there was aesthetic damage due to hand injuries which had significant psychosocially impact in 97.32% of cases.[23] Whereas in our study, only 14.3% were illiterate in the shelling group, the reason for lesser number of illiterate workers in Kerala can be attributed to the high literacy rates among women.

In the present study, the mean systolic and diastolic blood pressure was found to be 133/80 mmHg which is of prehypertensive state and those under medication for hypertension were found to be (33%). Geetanjali on observing blood pressure measurements found that systolic blood pressure in shelling group of prehypertensive state in 100% of workers followed by 90% in peeling and grading groups.[18] The rise in proportion of workers having prehypertensive state could be either because of white coat hypertension or due to stress in completing their days task. Rakesh et al reported that 15.2% of their participants working in factories of Kollam district had hypertension.[7]

Other factors responsible for the morbid conditions in current study are thyroid disorder (21%), genitourinary problems (20.5%), respiratory disorders (18%), diabetics (17.6%), arthritis (16%), varicose problem (13.5%), myalgia (11.4%), heart disease (9%), hypercholesterolemia (3.5%) and migraine (2.5%). Genitourinary problems were common in all working groups but more significant in shelling section. This could be because of the increased heat generated while shelling the cashews, also the release of cashew shell nut liquid can contaminate the fingers which can indirectly lead to genitourinary infections. Another reason could be due to prolonged sitting and less frequent urination due to work overload. In a study conducted by Anjana et al found that 17.6% of female cashew workers were suffering from genitourinary infections.[24] Jayakumar reported that as the work increases, the occurrence of urinary infection increases especially in shelling and peeling group women.[16] Current study showed that Respiratory disorders like chronic obstructive pulmonary disease or asthma is frequently seen in shelling group due to increased smoke released while working. In a study conducted by Madhura et al found that the prevalence of diabetes mellitus is more compared to hypertension and chronic respiratory illness which was found to be 6.75%, 5.4% and 3.80%.[25] In our study depression and stress were found to be at moderate level whereas anxiety was at extreme severe level. This could be because of the fear of completing their work as wages gets cut if not over within the stipulated time. Kinslin found that the stress among workers might be due to fear of job insecurity, long working hours, work intensification etc. without proper social support from the part of employers and their superior workers.[17] Whereas study conducted by Sajeena showed dissimilar result with anxiety and depression being low.[3] Women workers spend almost whole day in factory and return to their respective homes only in the evening. Managing household activities and work life is stressful and difficult task. Bearing the work load of dependent population further drain their energy.[15] Even after the day's work, they are not able to spend quality time with family or leisure time. This in turn creates a negative impact on health issues. It affects physically, psychologically and socially and thereby slowly resulting in general life dissatisfaction.[17]

Limitations

Study was conducted only in Kollam district, hence the morbid conditions among workers in other districts were not found, hence it does not represent the whole state. Another drawback is that previous investigations concerning their health issues were not collected and checked as follow up of these workers requires a lot of cooperation from factory owners and workers.

CONCLUSION

Cashew production is high in Kollam district. Majority of the cashew employees are females. In this study, 95% of participants had health issues. Of which majority suffer from arthralgia due to their work criteria. Allergy is the second most concern which could be due to falling of cashew nut shell liquid or may be due to dust particles from roasted cashews. Hypertension and thyroid are the other major issues. Though only 33% of participants were under medication for hypertension, prehypertensive state was discovered on checking the mean blood pressure. Obesity and overweight were noticed in grading and peeling sections whereas underweight was found in shelling group. Reason for the varying physical status in shelling group is because majority belong to low socioeconomic status with less education and lot of

financial burden due to which they ignore their health condition.

Recommendations

Ergonomic exercises have to be taught with the help of health care workers. A canteen with provision of free meals at factories with required protein and calorie just like mid-day meal scheme can tackle the issue. For those overweight and obese, a recreational activity such as walking for 15 minutes can boosts their energy levels. Majority suffer from anxiety due to their fear of completing their day's task. This can be reduced by decreasing their work load and giving them their day's salary without deduction. In addition to it, playing music while work in turn can reduce stress and depression thereby increasing work output. Regular health education sessions by imminent health care workers 'on how to identify their own health issues and ways to tackle them' has to be taught. Personal protective equipment's has to be provided free of cost especially to those involved in shelling to prevent allergy and respiratory disorders. Frequent health check-up and camps need to be implemented in cashew factories both in private and government firms and a record of it has to be documented to know the current health status of workers thereby promoting active labour force which in turn may subsequently lead to increased production of cashews as well.

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