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PREVALENCE OF WORK RELATED MUSCULOSKELETAL SYMPTOMS IN TEA PLANTATION FEMALE WORKERS IN JORHAT, ASSAM: PILOT SURVEY

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ABSTRACT

Background: Tea plantation work requires repetitive activities such as prolonged standing, trunk twisting, and heavy load carrying, increasing the risk of work-related musculoskeletal disorders. In Assam, India's largest tea-producing state, many women are engaged in physically demanding tea leaf plucking, yet their musculoskeletal health remains poorly studied.

Objective: To assess the prevalence of WRMSDs among female tea plantation workers in Jorhat & to identify the commonly affected body regions.

Methods: An exploratory pilot survey with a cross-sectional design conducted using a structured 24-item questionnaire administered through face-to-face interviews. A total of 252 female tea leaf pluckers were randomly selected from two tea estates—Tocklai and Cinnamara in Jorhat district. Interviews were conducted in Hindi and Assamese. A body diagram used to identify symptomatic regions. Data were analyzed using descriptive statistics.

Results: Among the 252 participants, 128 (50.79%) reported musculoskeletal symptoms, accounting 198 total complaints. The lumbar region most commonly affected (32.3%, n=64), followed by knees (25.3%, n=50), hips (14.1%, n=28), and shoulders/arms (9.1%, n=18). The highest proportion of complaints observed among workers aged 41–50 years (43.9%). Workers with more than 20 years of experience reported highest prevalence of symptoms (28.8%). The illiteracy rate among participants was 59.5%. Lower back and knee pain were predominantly chronic, whereas shoulder and arm pain were more frequently acute.

Conclusion: Female tea plantation workers demonstrate a high prevalence of WRMSDs, particularly affecting the lumbar spine and knees. These findings emphasise the need for ergonomic interventions, and accessible occupational healthcare services for this vulnerable population.

INTRODUCTION:

India is the second largest producer of tea in the world with Assam contributing to most of its production among the states.[9,13] About 17% of the workers of Assam are engaged in the tea industry of which female workers in tea garden are mostly assigned in tea leaves plucking.[3] According to the Government of Assam Tea Tribes and Adivasi Welfare Department there are 803 tea estates in Assam and 88 tea estates alone in Jorhat district.[10] Working as a tea leaves plucker one has to do a repetitive movement throughout the day which can lead to the work related musculoskeletal disorders in the wrist, hand, shoulder, back and other

regions.[5] Postures during tea leaves plucking, heavy load carried by the tea garden workers and standing for long hours poses the risk of injuries on shoulders and lower back among the tea garden workers.[6,7,8] A cross-sectional study on tea garden workers in Bangladesh by using Nordic Musculoskeletal questionnaire was done and found that 78.2% of the total 364 tea garden workers had shoulder pain followed by upper back, neck, lower back, wrist/hand, hip and lower limbs. The 79.8% of the workers were female.[7]

The workload, poverty & malnutrition prevails in huge population among the tea leaves plucking workers [8,14]. Poverty may lead to more work for better earning adversely affecting the body structures and increasing the risks of injury. Also, a person may not able to go for treatment as hampered by lack of money and time. Tea leaves pluckers may also have difficulties during summers season as they have to work in open field for long duration posing the risk of heat stroke [3].
Hence a survey was required to know the present condition of the female tea leaves pluckers in tea garden for any further intervention. It will help to identify the prevalence of different kinds of problems and injuries related to working in tea leaves plucking.

REVIEW OF LITERATURE

Das Gautam et al., 2019, had done study on issues of marginality and tea garden women in Assam. Assam is one of the largest tea producers in India and the tea plucking is mostly dominated by the female workers. In compare to male tea garden workers, female tea garden workers are more discriminated [4]

Kairi Kanti Tamal et al., 2022, has done a cross-sectional study on tea garden workers in Bangladesh by interviewing using Nordic Musculoskeletal questionnaire. A total of 364 tea garden workers were interviewed and found that 78.2% of the workers had shoulder pain followed by upper back, neck, lower back, wrist/hand, hip and lower limbs. The 79.8% of the workers were female [7]

Masri Nurhidaya et al., has investigated the prevalence of musculoskeletal disorder among tea pluckers in Malasia using questionnaire and REBA. The questionnaires were distributed among 236 individuals which consisted of 201 males and 33 females from different countries. The workers were also using instruments like scissors and machine cutters. The complaints of knee pain were high in the study followed by upper back and neck regions. Loads above 25 kg were risk factor for the tea pluckers while performing their daily work [12]

Marak R Tapsiri et al., in the year 2020 conducted a study on 40 female workers in Garo Hills of Megalaya using RULA and REBA techniques. Using back dynamometer, the strength of the back was tested which showed 8.57% strength reduction by the end of the work. During tea leaves plucking, female workers reported severe discomfort in the head, neck, fingers, upper and lower back, feet and knees. With REBA scale they concluded that the workers were working under high physical strain [11]

Jo Hoon et al., has done a study regarding the negative impacts of prolong standing on musculoskeletal symptoms and physical fatigue. Out of 32970 full time workers of different jobs, the prevalences of LBP, lower extremity muscle pain, and whole body fatigue were 3953 (12.0%), 5624 (17.1%), and 8008 (24.3%), respectively. As the proportion of prolong standing work hours increased, also the risk of musculoskeletal pain increases [6].

Yasmin Shamima et al., has done a cross-section study using questionnaire, physical examination and anthropometric assessment on 463 tea garden workers of West Bengal. They found that 81.2% of individuals are from backward social class, 87.9% of individuals have anaemia and 36% of the tea garden workers undernourished [14].

METHODOLOGY

An exploratory pilot survey was conducted using the interview and questionnaire method to a random number of female tea leaves pluckers in branches of two Tea Estates of district Jorhat, Assam. The New Tocklai tea garden, Borbhetta Field Experimental Estate, Cinnamara tea Garden, Murmuria & Hatigarh division Cinnamara tea garden were places from which the data was collected. The interview was taken face to face without disturbing their routine work. A total of 252 female tea leaves pluckers were interviewed.

A questionnaire was prepared in reference to the different studies conducted on tea garden workers in different states of India and other countries and explain to female tea leaves plucker.[7,11,14] A questionnaire contained 24 questions regarding their environment of work and stay, health facilities and work-related musculoskeletal problems. The purpose and objectives of the study were explained to the respondents before the interview. If the participants agree to participate, then a written consent form was explained and signed before the interview. Assurance was given regarding the confidentiality and secrecy of the information they provided. Then the study participants were requested to answer the questions accordingly. To prevent any comprehensive difficulties and misinterpretation of questions, it was read to the subjects, and answers were filled one by one. To identify their symptoms, they were provided with a diagram of the human body (anterior and posterior view) in which they can point out the regions where they have experienced symptoms. The conversation was done in Hindi and Assamese languages as per their preference. Each individuals took about 15-20 minutes to complete an interview. After collection of data, for analysis purpose all the data were tabulated, grouped according to their ages, experiences, areas of pain and compared.

RESULT

All the workers were permanent employed and their homes were within the compound or nearby villages 10-20 min by walk. The workers have to start their work by 8: 30 am and leaves at 4:30 pm for 6 days a week excluding national holidays during plucking season. Throughout the work they are given break for an hour in between during the plucking season. During pruning season, they will leave the garden in between 11:30am and 1 pm as per how fast they complete the work in a given target areas.

Tab.1. - Demographic data of female tea leaves pluckers.

Variables	Category	Frequency	Percentage
Age (years)	21 – 30	77	30.5
	31 – 40	101	40
	41 – 50	71	28.1
	51 – 60	3	1.1
Education	Illiterate	150	59.5
	literate	102	40.4
Work Experience	Below 5 years	55	21.8
	5 to 10 years	76	30.1
	11 to 20 years	61	24.2
	Above 20 years	60	23.8

Table 1 shows a total number of 252 female workers were interviewed which included 111 tea leaves pluckers from Tocklai Tea estate, 141 tea leaves pluckers from Cinnamara Tea Estate and their respective branches. There are highest number of female tea leaves pluckers are under the age of 31 to 40 years (40%). There were only a few individuals in the group above 50 years (1.1 %). 5 to 10 years of experienced tea leaves were of the heights in number (30%) of the tea leaves pluckers. The illiteracy rate of 252 female tea leaves pluckers were 59.5 percent.

Tab.2. Persons suffering from musculoskeletal problems

Total number of persons	No. of people having musculoskeletal problems	No. of people not having musculoskeletal problems
252	128	124
%	50.79	49.2

Tab.3. Musculoskeletal symptoms according to the ages of female tea leaves pluckers.

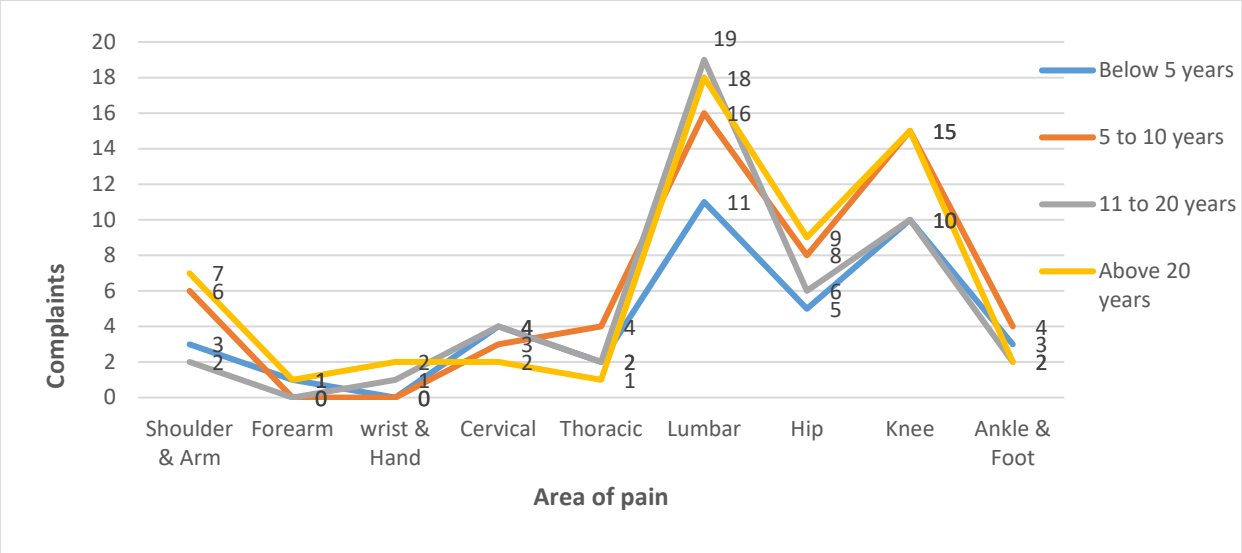
AGE (years)	**Musculoskeletal symptoms**									**Total**
	Shoulder & Arm	Forearm	Wrist & Hand	Cervical	Thoracic	Lumbar	Hip	Knee	Ankle & Foot	
21 - 30	1	0	0	1	0	15	3	11	3	***34***
31 - 40	5	0	1	7	5	26	13	15	3	***75***
41 - 50	12	2	2	5	4	22	12	23	5	***87***
51 - 60	0	0	0	0	0	1	0	1	0	***2***
Frequency	**18**	**2**	**3**	**13**	**9**	**64**	**28**	**50**	**11**	**198**
Percentage	***9%***	***1.01%***	***1.15%***	***7%***	***5%***	***32%***	***14%***	***25%***	***6%***	

Out of 198 musculoskeletal symptoms, (Table 3) pain in the lumbar region was the highest 32% (64), followed by the knee pain 25% (50). The age group of 41 to 50 years has the highest number of complaints 43.9%. of total complaints. Only a few of the female tea leaves pluckers had wrist pain.

Tab.4. Work experiences and musculoskeletal symptoms.

Experience (in years)	**Musculoskeletal symptoms**									**Total**
	Shoulder & Arm	Forearm	wrist & Hand	Cervical	Thoracic	Lumbar	Hip	Knee	Ankle & Foot	
Below 5	3	1	0	4	2	11	5	10	3	***39***
5 to 10	6	0	0	3	4	16	8	15	4	***56***
11 to 20	2	0	1	4	2	19	6	10	2	***46***
Above 20	7	1	2	2	1	18	9	15	2	***57***
Total	**18**	**2**	**3**	**13**	**9**	**64**	**28**	**50**	**11**	198

Table 4 shows that the female tea leaves pluckers above 20 years of experience have the highest number of complaints 57 (28.7%) of 198. 5 to 10 years of experienced females in tea leaves plucking has almost the same number of complaints 56 (28.2 %).



Whether the individuals have less or more experience in tea leaves plucking, all the groups of female tea leaves pluckers have the most discomfort and pain on the lumbar region followed by the knee pain and shoulder (Figure 2).

DISCUSSION

The aim of the survey was to find out the prevalence of work-related musculoskeletal symptoms in tea plantation female workers in the tea gardens of Lichubari, Borbhetta and Murmuria, Jorhat in which 252 females working as tea leaves pluckers were interviewed. This exploratory pilot survey was conducted using the interview and questionnaire method to a random number of female workers in the tea estates gardens of Tocklai and Cinnamara tea estate Jorhat, Assam.

From a total of 198 complaints of pain and discomfort in the body, the lumbar area had the highest number of musculoskeletal symptoms of 32.3% followed by knee pain 25%. The female tea leaves pluckers had pain on the shoulder and arm of 9% which were more on muscles and it would relieve on rest without causing any problem the next day on work.

The female tea leaves pluckers use bags for collecting tea leaves and dry branches, sickles & spades for pruning and clearing grasses. As per the tea pluckers, they have different grades of pain and discomfort according to the height of the tea plant and usage of instruments. During the season of pruning, the height of the tea plant is deducted from its original length. The height of the tea plant greatly differs before and after the pruning season. In the above Tea Estates, the height of tea-plants is identical, reaching maximum up to the chest level of the female tea leaves pluckers (around 3- 4 ft) and lowest up to the knee level (around 1.5-2ft) after pruning (fig.3 & 4 respectively). The female tea leaves pluckers may require different posture and positions to pluck the new tea leaves according to the height of the tea plant. The instrument used during pruning seasons also differs and may change the pattern of work injuries. Few of the individuals complained about wrist pain during pruning on using sickle and some of them had fall injury on wrist in the past. In the season of pruning a female tea leaves pluckers have to bend more forward while pulling and cutting the branches with a sickle or sometimes with spades to cut grass and uproot dead plants. They also have to use more forces during this season which might increase the risk of injury to the back (fig.2).

During plucking seasons, the workers might be having problems regarding prolonged standing, repetitive motions of upper limb, twisting motion of trunk and weights on shoulder.[5,6] During these seasons, the female tea leaves pluckers would carry some amount of tea leaves continuously on the shoulder throughout their work. Some female tea leaves pluckers would also carry their belongings like lunch, drinks, dry branches from tea plants and other items along with plucked tea leaves contributing to more weight on the body. By carrying their belongings, they need not turn back a long-distance during break period, as it saves lots of time and energy dragging themselves through the bushes to open spaces. The female tea leaves pluckers

complained about crossing the drains in the garden, which is approximately 3 to 5 m width and 3 ft deep. The drain is usually dry most of the time but the weight and pain on the body sometimes makes it difficult to step up and down the drain (fig.4). Most of the female tea leaves pluckers having back pain and knee pain is chronic in

Fig. 1

Fig. 2

nature, unlike other parts of body pain like hand and shoulder which subsides on rest. So, crossing drains with weights may be difficult with the pain. The study done by Buragohain C R et al. used radiography on tea gardens of Jorhat shows the prevalence of 29.4% of 320 individuals with primary osteoarthritis of knee joint.1 As per the female tea leaves pluckers, they frequently have muscle pain on lower limb and back on initial few months of joining the work and later on adapted with the work. Other than the physical injuries, the high temperature in summer makes it difficult to work for a long period of time and they have to rest by the tree shades or beneath the tea plants. The total amount of plucked leaves also decreases as they have to take a frequent rest to avoid heat strokes. The lateral side skin of the 2nd digit (index finger) is a bit harder with no problem in the range of motion in the same finger. It may be hardened due to continuous plucking of tea leaves. Few of the workers complained about discomfort on the interphalangeal joint of thumb of the dominant side

Fig.3

Fig.4

Fig.5

Limitation of the study

More samples from different tea estates are required to represent an entire tea garden of Jorhat, Assam. There is a probability of false answers to the questions asked. Need an appropriate assessment and diagnosis to specify the injuries.

Future Perspectives

The studies can be done in other tea garden workers with different jobs like pesticide sprayer, bungalow workers, water carriers, field multitaskers etc.

To specify the problems, assessment can be done on the same population in the future.

CONCLUSION

The pain on shoulder and arm is minimal, and acute in nature of female tea leaves pluckers. The complaint of pain in the lower back is more and chronic in nature which ranges from months and years of constant pain. The prevalence of back pain is high among the female tea leaves pluckers and many of them seem to have a

neurological sign in lower limbs which needs to be assessed. Female tea leaves pluckers suggested for steps or crossovers on drains.

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