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# Prevalence of Ergonomics Risks and Health Hazards in Sericultural Activities Performed by Hilly Tribal Women of East Garo Hills of Meghalaya, India

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**KEYWORDS** Body Posture. Perceived Exertion. Physical Risk Factors. Sericulture. Workplace Ergonomics Risk Assessment

**ABSTRACT** Sericulture is an important cottage based eco-friendly industry in the rural area of East Garo Hills of Meghalaya where women are involved in almost all activities. Thirty women engaged in sericulture were selected purposively for assessing the prevalent work related risk factors among the tribal women, working in sericulture industries. For assessing, perceived health hazards scale and WERA tool workplace ergonomics risk assessment tools were used. For the purpose of assessing, sericultural activities were divided into three parts viz. rearing of worm, extraction of pupa from cocoon and reeling of silk yarn. Findings showed that most women suffered pain in wrist, neck, back and leg while doing sericultural activities. Further analysis showed that perceived exertion of women was 'high to very high' in case of rearing of silkworm and extraction of pupa from cocoon and 'moderate to high' in case of reeling of silk yarn and causative factors foundwere continuous and repetitive nature of work, poor workstation design, carrying heavy load, etc.

## INTRODUCTION

Sericulture is the most essential part connected with North East India as it is a major cottage based ecofriendly industry in rural or countryside areas of East Garo Hills of Meghalaya state, where rural women play a vital role in providing additional earning and self-employment opportunities. The climate is acceptable for growth of non-mulberry silkworms (that is, muga and eri) in North East India. In this industry of Assam and in the NE region, approximately 1.9 lakh families and about 38,000 sericulture villages are engaged (Unni et al. 2009). For six centuries till 1826 during Ahom kings, silk was the royal fabric of Assam (Kashyap 2000). Assam produces three unique varieties of silk- the golden muga (*Antherea assamensis*), the white pat (*Bombyx mori*) and the warm eri (*Samia cynthia*).

Sericulture is the process of rearing silk worm mainly for the manufacture of cocoons which forms the raw material for producing raw silk, silk worms and hence finally silk fiber (Ganga and Chetty1991). In East Garo Hills of Meghalaya, Eri silk worm production is more than any other silk worm. These worms having both primary along with secondary food plants and are referred to as polyphagous. Primary food plants are Castor (*Recinus communis*) which is mostly annual and Kesseru (*Heteropanas fragrans*) which is perennial in nature. Eri silk, which is found in most parts of Meghalaya, is being cultivated domestically. In this hilly region, Eri silk worms and its host plant is clearly found in natural state. The worms feed on the leaves in the shelter of the rearing house. After that when the worm is matured it is extracted (pupa) by threshing in their fingers for human consumption as it is good source of protein. Some cocoons are allowed to emerge as a moth for laying eggs and continuing the cycle. The involvement of women is more in almost all the activities of sericulture from rearing of worms to reeling.

In sericulture industry, prevalence of occupational health hazards was expressed by women in all the activities from rearing of worms, extraction of pupa from cocoon to reeling of silk yarn. All these sericulture activities are more laborious and tedious where women involvement is more. They face a lot of physical hazards and joint pains in different parts of the body joints due to some causative factors such as continuous repetitive nature of work, poor workstation design and carrying heavy loads etc. The women workers from rearing section were found suffering from pain in shoulder, back, neck, particularly during collection of leaves. Pain in fingers and wrist was caused due to extracting pupa from cocoon by threshing of cocoon in fingers in a repetitive manner in which fingers, wrist and hands are affected due to repetitive work. In reeling of silk

yarn, they felt discomfort in legs and shoulder due to long hours of sitting in one position and bending of legs for hours.

Rural women perform dual activity in farm as well as house. While carrying out an activity, individuals complain about tiredness or fatigue which is only subjective feeling providing reliable information for the estimate of workload (Borg 1982; Rao 1987). The perceived exertion of women was 'high to very high' in rearing of silkworm due to carrying heavy load of collected leaves for feeding of silkworm, extraction of pupa from cocoon was 'moderate to high' due to threshing of cocoons and 'light to moderately light' in case of reeling of silk yarn. Therefore a study was envisaged for Prevalence of Ergonomics Risks and Health Hazards in Sericulture Activities performed by Hilly Tribal Women of East Garo Hills of Meghalaya.

## MATERIAL AND METHODS

A total of thirty rural tribal women workers belonging to the age group of 20-50 years who were engaged in sericulture industries were selected by purposive sampling procedure from two villages of Samanda block of East Garo Hills district of Meghalaya. One personal interview schedule was structured having three parts viz. rearing of worms, extraction of pupa from cocoons and reeling activities. This study adopted interview method along with observation for collection of data and also for assessing the physical risk factors prevalent among the women working in sericulture industries by assessing perceived health hazards and by using a workplace ergonomics risk assessment tool (WERA).

### WERA Method

The Workplace Ergonomics Risk Assessment (WERA) method was used to assess the workplace and physical exertion of women involved in sericulture activity. The WERA is an experimental tool presenting the working task instantly for hazard to the physical risk factor associated with work-related musculoskeletal disorder (Rahman et al. 2012). In WERA there are five main body parts including shoulder, back, neck, wrist, and leg which were assessed for the risk factor comprising of six physical risk factors including repetition, posture, vibration, forceful, task duration and contact stress. An action level and scoring system was provided for detailed assessments where only pen and paper were used without using any special equipment. It was implemented without disturbing the workers and workplace.

### Rated Perceived Exertion

To estimate occupational workload, heart rate is widely used. It is often difficult to measure it in the tasks of very short period. To prevent this difficulty, for assessment of workload, scientists suggested the use of another simple method which provides equally reliable information, that is, subjective perception of exertion and came out with a scale known as "Rating of Perceived Exertion (RPE)", based on extensive research (Gamberale 1972; Skinner et al. 1973; Arstila et al. 1974; Pendolt et al. 1977; Borg 1982; Varghese et al. 1994). This scale has been designed as a practical method for rapid appraisal of all occupational work. In this study a modified 5-point scale of perceived exertion by Varghese et al. (1994) was used.

### Analysis of Data

Simple average, percentage, standard deviation and average mean were used to analyse collected data for the study. Scoring techniques were used for calculating mean scores for rated perceived exertion and WERA tool.

## RESULTS AND DISCUSSION

### WERA Assessment for Rearing of Silk Worm

The result of ergonomics risk assessment was done by using WERA for women involved in rearing of silk worms in sericulture activity are presented in Table 1 which reveals that the shoulder score was 4.03 and 50 percent respondents were at high risk level where farm women bent their shoulder in posture or hands were at above the chest level and 13.33 percent respondents exercised heavy movement with no rest for shoulder repetition. The score for wrist was 4.56 where 53.33 percent respondents were at high risk level and their posture was bent up wrist posture or bent down with twisting and 30 percent respondents had over 20 times per

**Table 1: Workplace Ergonomic Risk Assessment (WERA) for rearing of silk worm**

| *S. No.* | *Physical risk factor* | | *Risk level in (f)* | | | *Score* |
|---|---|---|---|---|---|---|
| | | | *Low* | *Medium* | *High* | |
| 1. | Shoulder | 1a. Posture | 2(6.66) | 13(43.33) | 15(50) | 4.03 |
| | | 1b. Repetition | 14(46.66) | 12(40) | 4(13.33) | |
| 2. | Wrist | 2a. Posture | 2(6.66) | 12(40) | 16(53.33) | 4.56 |
| | | 2b. Repetition | 7(23.33) | 14(46.66) | 9(30) | |
| 3. | Back | 3a. Posture | 2(6.66) | 14(46.66) | 14(46.66) | 4.5 |
| | | 3b. Repetition | 6(20) | 17(56.66) | 7(23.33) | |
| 4. | Neck | 4a. Posture | 3(10) | 15(50) | 12(40) | 4.2 |
| | | 4b. Repetition | 9(30) | 19(63.33) | 2(6.66) | |
| 5. | Leg | 5a. Posture | 3(10) | 15(50) | 12(40) | 4.36 |
| | | 9. Task duration | 7(23.33) | 19(63.33) | 4(13.33) | |
| 6. | Forceful | 6. Forceful | 3(10) | 9(30) | 18(60) | 4.46 |
| | | 3a. Posture | 4(13.33) | 21(70) | 5(16.66) | |
| 7. | Vibration | - | - | - | - | - |
| 8. | Contact stress | | - | - | - | - |
| 9. | Task duration | 9. Task duration | 1(3.33) | 25(83.33) | 4(13.33) | 4.36 |
| | | 6. Forceful | 2(6.66) | 14(46.66) | 14(46.66) | |
| Action Level: Task need to further investigate and required change Total Score | | | | | | 30.5 |

*(Figures in parentheses indicate percentage)*

minutes wrist repetition. Mufti et al. (2018) also in Indonesia found in small scale household small business where women are involved that wrists are moderate bent up or bent down at about >15 at the cake making process. The repetition does exist in this kind of position at about 11-20 times/ minutes. Therefore this position is categorized as moderate. The position at printing process is by pressing it. This position is at the moderate working risk position. The repetition does exist in this kind of position at about 11-20 times/minutes. Therefore this position is categorized as moderate The total mean score for back was 4.5 where 46.66 percent respondents were at medium risk in which back posture was moderate bent forward and 56.66 percent with 4-8 times per minute for the repetition. Stooped work is expected as one of the most necessary factor to low back disorders. Moreover, it is also considered as a main ergonomic hazard for all agricultural operation (Fathallah et al. 2008). The neck score was 4.2 and 50 percent respondents were at medium risk level where neck was moderate bent forward for 10º-20º where 63.33 percent respondents were in moderate movement with some pauses for neck repetition. The table estimated 4.36 score for the leg. In rearing activity 50 percent respondents were medium risk in which legs are moderate bent forward or sitting with feet not touching the floor with task duration of 2-4 hours per day. In case of forceful in rearing activity score was 4.46 and 60 percent respondents were high risk where lifting of load more than 10 kg for rearing activity while collecting leaves. There was no need of using vibration tools for the activity of Castor leaf collection or while feeding leaves to silkworm. The score for task duration was 4.36 where 83.33 percent respondents were at medium risk level where women did their work for 2-4 hours per day. The WERA final score was 30.5 in medium risk level with highest score 4.56 for wrist and lowest score was 4.03 for shoulder which indicated that the tasks needed further investigation and changes in working condition is required.

**Assessment for Extraction of Pupa from Cocoon**

For extraction of pupa from cocoon in sericulture activity by using WERA assessment data is presented in Table 2. Table 2 reveals that the shoulder score was 4.1 and 80 percent respondents were at medium risk level where shoulder posture was moderate bent up and 43.33 percent respondents were moderate movement with some pauses for shoulder repetition. The score for wrist was 5.1 where 46.66 percent respondents were at medium risk in which wrist are moderate bent up or bent down and 40 percent respondents were wrist repetition of 11-20 times per minute. From data it was concluded

**Table 2: Workplace Ergonomic Risk Assessment (WERA) for extraction of pupa from cocoon**

| *S. No.* | *Physical risk factor* | | *Risk level in (f)* | | | *Score* |
|---|---|---|---|---|---|---|
| | | | *Low* | *Medium* | *High* | |
| 1. | Shoulder | 1a. Posture | 4(13.33) | 24(80) | 2(6.66) | 4.1 |
| | | 1b. Repetition | 7(23.33) | 13(43.33) | 10(33.33) | |
| 2. | Wrist | 2a. Posture | 3(10) | 14(46.66) | 13(43.33) | 5.1 |
| | | 2b. Repetition | 2(6.66) | 12(40) | 16(53.33) | |
| 3. | Back | 3a. Posture | 5(16.66) | 14(46.66) | 11(36.66) | 4.83 |
| | | 3b. Repetition | 6(20) | 4(13.33) | 20(66.66) | |
| 4. | Neck | 4a. Posture | 8(26.66) | 5(16.66) | 17(56.66) | 4.56 |
| | | 4b. Repetition | 1(3.33) | 20(66.66) | 9(30) | |
| 5. | Leg | 5a. Posture | 6(20) | 14(46.66) | 10(33.33) | 4.23 |
| | | 9. Task duration | 7(23.33) | 21(70) | 2(6.66) | |
| 6. | Forceful | 6. Forceful | 17(56.66) | 5(16.66) | 8(26.66) | 3.93 |
| | | 3a. Posture | 2(6.66) | 19(63.33) | 9(30) | |
| 7. | Vibration | - | - | - | - | - |
| 8. | Contact stress | | - | - | - | - |
| 9. | Task duration | 9. Task duration | 4(13.33) | 20(66.66) | 6(20) | 4.03 |
| | | 6. Forceful | 7 (23.33) | 21(70) | 2(6.66) | |
| Action Level: Task need to further investigate and required change Total Score | | | | | | 30.8 |

*(Figures in parentheses indicate percentage)*

that most of women were using wrist and finger while doing pupa extraction. In case of back in extracting pupa from cocoon activity score was 4.83 and 46.66 percent respondents were at medium risk level and they were moderately bent forward and 13.33 percent with 4-8 times per minutes of repetition. The neck score was 4.56 and 56.66 percent respondents were at high risk level where neck is extreme bent forward or bent back for less than 20 degrees and 30 percent were heavy movement with no rest for neck repetition. Women (66.66%) had moderate movement with some pauses in case of neck repetition. Forceful score was 3.93 and 16.66 percent at medium risk level in which 63.33 percent respondent's back were moderately bent forward. Women never used any kind of sophisticated tool where there was vibration and any kind of PPE (hand glove) while extracting pupa from cocoon. The table shows the final score (30.8) with highest score in wrist which required further necessary investigation and some changes are recommended.

## Assessment for Reeling of Silk Yarn

Again WERA assessment data for reeling of silk fiber in sericulture activity are presented in Table 3. It was found that the shoulder score for reeling activity was 4.5 where 60 percent respondents were at medium risk level. Shoulder posture was moderate bent up and 30 percent respondents were moderate movement with some pauses for shoulder repetition. Bernard (1997) found that the possibility of shoulder tendon disorders increases because of highly repetitive shoulder/arm movement. It was revealed that movement of shoulders with frequencies higher than 2.5 per min was found to remain associated with work related musculo skeletal disorders. An empirical study was carried on the effect of external factors by Antony and Keirin (2010), such as hand loading, arm posture and forceful effort on shoulder muscle activity and this produced insight into the connection between internal and external loading of the shoulder joint. The wrist score was 3.9 and 73.33 percent respondents were at medium risk level while doing reeling activity. In case of the back, score was 3.8 where 56.66 percent respondents were at low risk level in which back posture was in neutral position as they worked by using reeling machine with sitting posture. In case of neck, the total mean score was 3.3 and 60 percent respondents were in low risk level where as neck was in neutral position with little bent forward

**Table 3: Workplace Ergonomic Risk Assessment (WERA) for reeling**

| *S. No.* | *Physical risk factor* | | *Risk level in (f)* | | | *Score* |
|---|---|---|---|---|---|---|
| | | | *Low* | *Medium* | *High* | |
| 1. | Shoulder | 1a. Posture | 4(13.33) | 18(60) | 8(26.66) | 4.5 |
| | | 1b. Repetition | 6(20) | 9(30) | 15(50) | |
| 2. | Wrist | 2a. Posture | 3(10) | 22(73.33) | 5(16.66) | 3.9 |
| | | 2b. Repetition | 12(40) | 14(46.66) | 4(13.33) | |
| 3. | Back | 3a. Posture | 17(56.66) | 10(33.33) | 3(10) | 3.8 |
| | | 3b. Repetition | 4(13.33) | 14(46.66) | 12(40) | |
| 4. | Neck | 4a. Posture | 18(60) | 10(33.33) | 2(6.66) | 3.3 |
| | | 4b. Repetition | 4(13.33) | 24(80) | 2(6.66) | |
| 5. | Leg | 5a. Posture | 2(6.66) | 12(40) | 16(53.33) | 4.5 |
| | | 9. Task duration | 1(3.33) | 28(93.33) | 1(3.33) | |
| 6. | Forceful | 6. Forceful | 20(66.66) | 9(30) | 1(3.33) | 2.6 |
| | | 3a. Posture | 20(66.66) | 9(30) | 1(3.33) | |
| 7. | Vibration | - | - | - | - | - |
| 8. | Contact stress | | - | - | - | - |
| 9. | Task duration | 9. Task duration | 10(33.33) | 18(60) | 2(6.66) | 3.4 |
| | | 6. Forceful | 7(23.33) | 20(66.66) | 3(10) | |
| Action Level: Task is acceptable Total Score | | | | | | 26.2 |

*(Figures in parentheses indicate percentage)*

for 0º-20º. For the leg, score was 4.5 for the reeling activity and 53.33 percent respondents were in high risk level in which legs are bent forward with task duration of 2-4 hours per day. After analysis it was found that the final score for reeling activity was 26.2 which are considered within acceptable limit.

## Final Score and Action Level by Using WERA

Final Score and Action Level by using WERA are presented in Table 4. The table reveals that rearing of worm and extracting pupa from cocoon had a final score 32, which indicated the medium risk level. The result showed that the tasks need to further investigate and required change in the activities of rearing silk worm and extracting pupa from cocoon. While doing rearing activity farm women have to travel here and there in search of Castor and Kesseru leaves and carried on their back with a heavy load of fresh leaves in their *kokcheng* (a native bamboo basket). And while extracting of pupa from cocoon, women thresh the cocoon on their left fingers for extracting pupa as a whole which is inside the cocoon and afterwards used it for human consumption in North East India. But in other part of country, cocoon is boiled to kill the pupa to obtain undamaged silk filament. In case of reeling activity, final score was 26, which indicate low risk level and the task was accepted. Therefore, the total final score for all the task in sericulture was 30±3.46 scores in medium risk level. From the Table 4, results revealed that the tasks need to further investigate and required change. Rahman et al. (2011) reported that in

**Table 4: Assessment of various activities performed by women in sericulture by using WERA with final score and action level**

| *Physical risk factor* | *Score for WERA assessment* | | | | |
|---|---|---|---|---|---|
| | *Task* | | | | |
| | *Rearing of worms* | *Extraction of pupa from cocoon* | *Reeling* | *Mean* | *SD* |
| Shoulder | 4 | 4 | 4 | 4.00 | 0.00 |
| Wrist | 4 | 6 | 4 | 4.67 | 1.15 |
| Back | 5 | 5 | 4 | 4.67 | 0.58 |
| Neck | 4 | 5 | 4 | 4.33 | 0.58 |
| Leg | 5 | 5 | 5 | 5.00 | 0.00 |
| Forceful | 5 | 3 | 2 | 3.33 | 1.53 |
| Vibration | - | - | - | - | - |
| Contact stress | - | - | - | - | - |
| Task duration | 5 | 4 | 3 | 4.00 | 1.00 |
| **Final score** | **32** | **32** | **26** | **30** | **3.46** |
| **Action level** | ***Medium** | **Medium** | ****Low** | **Medium** | - |

**Medium: Task needs to further investigate and required change. **Low: Task is acceptable*

wall plastering job for 8 tasks the total score was 36 ± 5.63 which indicate medium risk level and the job was still accepted but needs to further investigate and required to change.

## Rated Perceived Exertion of Women Involved in Sericulture Industry

While performing an activity, individual's complains of subjective rating of tiredness or fatigue provides reliable information for the assessment of workload (Borg 1982; Rao 1987). Exertion perceived by the respondents in performance of the activity was recorded as very light to very heavy according to the modified Borg's Rating of Perceived Exertion Scale (Varghese 1989). In sericulture industries, the women workers reportedly perceived the rearing of silkworm activity as 'heavy to very heavy' because they are used to carrying a heavy load of Castor/Kesseru leaves up to 25 kgs on their back to rearing house to feed the larvae. They carry loads of Castor/ Kesseru leaves in their *kokcheng* (A kind of traditional bamboo basket). It is in conformity with Borah (2015), who found that women carrying heavy load of firewood from forest perceived it as heavy to very heavy.

In case of extraction pupa from cocoon, the activity was 'moderately heavy to heavy' as the activity was tedious and repetitive in nature by threshing of cocoon in fingers in a repetitive manner in which fingers, wrist and hands are affected due to repetitive job. But in reeling activity, women reported that the workload was 'light to moderately heavy' as they are using reeling machine and a stool or chair for sitting while doing the activity (Table 5).

## Perceived Health Hazards

Health hazards indicated by farm women were recorded, causative factors were analyzed and types of hazards were noticed for women involved in sericulture industries (Table 6). They had lots of physical risks including pains in fingers, wrist, upper and lower back, shoulder, etc. and neck stiffness. This may be due to tiresome movement, carrying heavy loads while doing sericulture activities. Women involved in extracting pupa from cocoon in a repetitive nature had shoulder, wrist and finger pain. Stock (1991)also found that due to the repetitive nature of job (Cumulative Trauma Disorder-CTD) and poor design of the spinning wheel can cause shoulder and wrist pains. The pains associated in carrying heavy load of Castor/ Kesseru leaves in *kokcheng* involves pains in both upper and lower back and neck. As regards to frequency of pains suffered in sericulture activities, 53.33 percent women were found suffering from pains in their upper and lower back for 1 to 5 days followed by between 6 and 10 days (13.33%) pain in back in last 2 weeks. Only 10 percent of them opined that there was no back pain at all. Again it was reported that most of the women (66.67%) perceived their worse back pain due to continuous standing posture and 30 percent reported due to awkward sitting posture. According to research report, women are more vulnerable to back pain than men and it is true globally (Bailey 2009).

**Table 5: Rated perceived exertion of sericulture activity**

| *S. No.* | *Activities* | *Frequency* | *Rating* | *SD* |
|---|---|---|---|---|
| 1. | Rearing of worm | 30 | 4.2 | 0.76 |
| 2. | Extraction of pupa from cocoon | 30 | 3.8 | 0.77 |
| 3. | Reeling | 30 | 2.7 | 0.72 |

*Rating: 5-Very Heavy, 4-Heavy, 3-Moderately Heavy, 2- Light, 1-Light

**Table 6: Perceived health hazards of farm women involved in sericulture industry**

| *S. No.* | *Health hazards* | *Causative factor* | *Types of hazards* |
|---|---|---|---|
| a) | Pain in finger and wrist | Extracting pupa from cocoon in repetitive motion | Physical |
| b) | Upper and lower back pain | Carrying heavy load | Physical |
| c) | Shoulder pain | While doing reeling of fibre for a long time | Physical |
| d) | Neck stiffness | Carrying of heavy load of Castor/ Kesseru | Physical |
| e) | Snake/leech bite | While collecting Castor/ Kesseru leaves from forest | Zoonotic |
| f) | Cuts/bruises | While collecting leaves | Physical |
| g) | Eye irritation | While spraying formaldehyde for disinfection of worm rearing room | Chemical |

Nagi et al. (1973) said that women whose age is more than 50 years have more problems in case of back ache. Kirkhorn et al. (2010) also mentioned that during agricultural operation, musculo skeletal problems are most frequently reported by workers as it demands a significant physical labour. Therefore it is of great concern and we should consider it seriously. Moreover, rural women reported to snake/leech bite along with cuts/bruises in their fingers, hands etc. while collecting leaves for silk worm. Chemical health hazards leading to eye irritation was also reported by the respondents because of spraying formaldehyde for disinfection in the rearing house of silk worm. Wani and Jaiswal (2011) also found that women involved in sericulture activities in Kashmir area of India had more pain in back, respiratory problem, allergies, headache and injuries, etc.

## CONCLUSION

From the findings of the present study, it can be concluded that while doing sericulture activities in hilly areas of East Garo hills of Meghalaya, women were having various work related health problems and ergonomics risks factors were found common. After assessment of workplace and perceived exertion it was observed that the job of sericulture performed by women of East Garo Hills of Meghalaya was labour intensive job as rearing of silk worm was not easy in hilly area. Women have to travel up and down in forest areas and sometimes they have to cross rivers on boat in search of Castor and Kesseru leaves as a feed for worm. Extracting pupa from cocoon was also very tedious job for farm women as they have to thrash the cocoon on their finger to extract the worm which is very much repetitive nature of job. In the long run these farm women may suffer various musculoskeletal disorders such as carpel tunnel syndrome, arthritis etc. Musculoskeletal disorders (MSDs) are considered to be the most frequent injury in all kind of agricultural jobs. Again it was reported that musculoskeletal disorder increases a lot of production cost, medical and insurance costs, loss of employees' turnover, reduction in working capacity and competition from other less physically demanding industries. Therefore some changes in terms of technologies and ergonomics intervention are required to improve their occupational health.

## RECOMMENDATIONS

Some new or improved technologies can be introduced such as improved *kokcheng* (a kind of bamboo basket) for collecting Castor/ Kesseru leaves from forest and pupa extractor for extracting pupa from cocoon. Additionally, these data can be used as a guideline for workstation and technology designing for sericulture operations.

## LIMITATIONS

This study is limited to the women workers involved in sericulture industry of Williamnagar, East Garo Hills district of Meghalaya.

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