SOCIAL MOBILITY IN THE CONTEXT OF OCCUPATIONAL HEALTH: THE CASE OF SILK REELING

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INTRODUCTION

Whatever be the means of classifying the poor, absolute poverty is still the lot of about one third the Indian population. Bearing this in mind, the need to develop income generating occupations for the poor (considering their limited education and skills), becomes crucial for their existence. Sericulture has been seen as an activity (or a group of activities) which, in the manner in which it is presently organized, is eminently suitable for people with limited skills and virtually no education can work in. Including such activities as rearing, reeling, dyeing and weaving, each occupation is labour intensive, and what is also important is that men, women and as it happens, children too can be employed in some of these activities. As an income generation activity, sericulture has been seen as part of anti-poverty efforts of both the state and central governments. However, an important by-product of sericulture is the significant number of people who become victims of health problems. While silk reeling is considered the most problematic of sericulture activities, it is still not certain that dyeing[1] or silkworm rearing also do not have health related problems for those working in them.

The focus of this paper is on reeling, the activity in which silk yarn is unwound from cocoons, and stretched into one long silk thread. Karnataka is the single largest producer of silk in the country. Reeling centres such as Sidlaghatta, Ramnagaram and Kollegal are prominent, with silk produced in Sidlaghatta being considered among the better quality of silk. This paper is based on a study which was conducted in Sidlaghatta, in Kolar district of Karnataka. Reeling technology is still relatively of the simple kind, and includes charka, filature (or cottage basin), and multi-end reeling units. With relatively minor modifications, these have remained the mainstay of the reeling enterprises in Sidlaghatta for many years. In recent times a change that has occurred is in the number of reeling units which are either charka based or cottage basin based. While earlier, the more commonly used technology was the charka, with minor modifications in technology and design ensuring that it was still in

[1] For instance, there are few details about the chemicals that are used in dyeing, or their effects on the workers who use them. Also, there is reason to aver that health problems have been encountered in silkworm rearing through the use of pesticides that are used to prevent silkworm diseases.

use. That has changed, with more people opting for cottage basins, and thus, there are more of cottage basin units in Sidlaghatta than there are charka units (at present about 300 charkas and 1100 cottage basin units)[2]. These different types of technology cost different amounts to set up, with the charka units being cheapest and the multi end units the most costly to set up and also run. Charka units can be set up even by those who are not economically very well off, and with relatively modest amounts a small reeling unit can be set up, in the home, and run by family labour. While costs vary for different types of reeling units, it is also seen that the physical environment of the reeling units also differs from the type of reeling units as well as the economic standing of the reeling unit owner. For instance, charka reeling units are set up by those with less capital, and they set them in their own homes, in one corner, while other household activities are carried on simultaneously in the other parts of the single room homes. On the other hand cottage basin units are larger, employ more people to run the units, and are usually set apart from the living space of the unit owners. The latter units are also larger and better ventilated. These factors are also related to the health problems which will be discussed later in the paper.

Workers in reeling units are among the poorest, and are also mostly from groups such as Scheduled Castes, and Muslims. Our study had focused on these groups, and for the purpose of this paper, we have considered only the Scheduled Castes. The study had interviewed 229 reeling workers out of which 52 were of the Scheduled Castes. Muslims are also found among owners of reeling units, and some of the reeling units are relatively large. Although Scheduled Caste people also are found among the owners of reeling units, the units that they own are usually the smallest and based on charkas. Our sample of Scheduled Castes had the following distribution.

Table 1: Caste-wise distribution of reeling workers

	Holeya	Madiga	Tigalaru	Total
Male	4	13	0	17
Female	12	22	1	35

[2] Interview with Assistant Director, sericulture, Sidlaghatta, 15 March 2005.

Total	14	35	1	52

REELING AND THE HEALTH OF WORKERS

Several issues are important in the consideration of the health of workers who are employed in reeling. We can begin by considering those whose health was impaired in some manner, whether a chronic problem, or even a disease which afflicted them only for a relatively short while. Respondents were asked whether they had suffered any significant health problem during the past six months (essentially self reporting). This was not related to their not being able to go to the reeling units for work, since workers chose to work even when they were ill but thought they can continue somehow, and thereby earned their wages for the day. In this connection their health status was as indicated in table 2. However, there were 16 who stated that in the past one year they had stopped work for varying periods due to ill health.

Table 2: Health status

	Healthy	With health problem	Total
Male	9	8	17
Female	8	27	35
	17	35	52

SPECIFIC HEALTH PROBLEMS

A very large proportion of the workers suffered from respiratory problems, including 7 males, 18 females, 25 in all, out of the 52 workers, i.e. 48.1%. In comparison with the total workers, 83 out of 229 had respiratory problems, i.e. 36.2%, a proportion which has obviously increased due to the presence of the scheduled castes. Why persons of Scheduled Castes have a much higher incidence of respiratory problems is difficult to say, since the reeling workers, regardless of their caste or religious background are essentially in the same economic condition. Living conditions too are about the same, and all of them live in poor quarters, slum-like surroundings, and with poor water supply and environment. This is not to be confused with the working conditions, where those working in charka units (even family owned), work in even worse conditions than in the bigger cottage basin units owned by

relatively better off owners. From our study, it was not evident that the technology levels (i.e. charka or cottage basin was significantly related to greatly differing incidence of respiratory problems, although earlier we had surmised that there would indeed be a significant difference. As it turned out, those who had respiratory problems and also worked in charka units was 40%, and those working in cottage basin units and had respiratory problems was 36%.

Comparing with a group which did not have any sericulture activities in the neighbourhood of their village (a control group), indicated that in their village, the number of those who had respiratory problems was 12 out of a sample of 86 (i.e. 14%, with an equal number of women and men), and there were 8 of SC background who had respiratory problems out of a total of 46 members of Scheduled Castes (i.e. 17.4%). Again we find some difference between the incidence of respiratory problems among the persons of Scheduled Castes and others, though the difference is somewhat modest in comparison with those in reeling work. However, a significant difference in the respiratory problems encountered among reeling workers is that a much larger number of women suffer from respiratory problems than men. Why this should be so, particularly as in the case of the Scheduled Castes where the proportion of people with respiratory problems is higher than in the case of other groups, is difficult to confirm. However, reports of other studies suggest that women in the reproductive years have higher incidence of asthma – compared to men in similar age groups (see Osman 2003; Becklake and Kauffmann 1999; Parikh et. al 1999).

While respiratory difficulties were the main health problem that the reeling workers encountered, the number of those who suffered from respiratory problems caused by allergic reactions to the silk allergens is much lower than the total number of those with respiratory problems. Roughly 17% suffered from allergic reactions to the sericin and pupal allergens, and they could be classified as suffering from occupational asthma (see also Harindranath, N, Om Prakash, P V Subba Rao 1985). However, the others who had respiratory problems could be those who were susceptible to the environment in which

they worked. This was particularly with reference to the smoke and dust which was usually found in the reeling units. The fuel which is used in the reeling units are biomass fuel, frequently crop residues such as groundnut husk, which are very cheap to buy. However, this type of fuel emits plenty of smoke, and is also harmful to the people who work in the reeling units. A factor that may be implicated in the health problems of women is that they not only work the whole day in the reeling units, but also spend substantial time cooking food, using wood as fuel. Wood smoke is also harmful when inhaled for hours everyday. The cumulative effect of wood smoke in their homes and the smoke in the working place appears to have caused more harm to the women than to the men (who, in any case, are less likely to remain at home while the women are engaged in cooking food). Wood smoke (or from biomass fuel) is also implicated in other health problems that the workers have from time to time. For instance, smoke increases the risk of cataract (see Shalini et.al 1994; A Saha et. al 2005).

The main health problems that they had indicated include (as shown in table 3).

Table 3: Major health problems of reeling workers

		Yes	No	Total
Asthma	Male	7	10	17
	Female	18	17	35
Eye problems	Male	3	14	17
	Female	5	30	35
Backache	Male	2	15	17
	Female	11	24	35
Tuberculosis	Male	2	15	17
	Female	3	32	35

While this is the general condition, it appears that there are some variations between units depending on the technology used. This is with particular reference to the recently introduced innovations of heat retention through the Tata Energy Research Institute (TERI) designed ovens. Not many units have started using this design, and even those who have tried it find the initial

installation expenditure high.[3] Further, we should also state that while the innovations in the design of the oven may have reduced the amount of fuel required, and also the amount of smoke emitted in the reeling units, the problem of fuel still remains, i.e. the fuel used is usually the same as earlier, biomass fuel. So the problem may have been reduced, but not eradicated. We have no means of confirming this at the moment, since only a few units have the newly designed ovens, and the effect of these ovens on the health of workers is yet to be carefully gauged.

INCOME AND ECONOMIC FACTORS

Reasons for joining reeling work are essentially related to economic factors. For people who live in areas which are silk reeling centres, this seems to be the most regular and suitable occupation to take up, form the income point of view. Other occupations are either not available, or are not sufficiently income generating, for example, agriculture. Hence, in spite of the health problems, people still opt for silk reeling. In fact, despite several physical difficulties caused by the respiratory problems, their immediate reaction to any enquiry about the main effects of asthma is that they lose wages through not being able to go for work every day.

Workers earn daily wages, even if they are paid once a week by the unit owners. They are paid around Rs. 40 to Rs. 55 a day[4], and usually work about six to seven hours, and six days of the week. Considering the income levels of the workers, and health problems that they encounter aggravate their already precarious living conditions. Work in reeling units is not continuous over the year, pays daily wages which are relatively low (compared with wages for agricultural labour for parts of the year). However on the positive side (in their opinion) silk reeling work does not pay different wages to men, women and

[3] There was a case of a woman who was interviewed; who said her unit was one of those which was given a free trial of the new TERI- designed oven attachment. However, they found it expensive to buy it later, and for the time being have postponed the expenditure. Further even TERI's oven was not being used, and we found it lying outside the unit.

[4] Wages are not uniform for all workers, in the sense that they can earn more if they produce more silk yarn. This not only favours the more proficient workers, but also those who choose to work longer hours. Reeling unit owners usually prefer to relate the wages to the quantity of silk yarn produced, rather than just the number of hours worked.

children. For the same kind of work, all of them are paid the same, and a child who works as a reeling labourer is paid the same as a man or woman who is engaged as a reeling worker. Reeling is an occupation that has a significant presence of child labour, due in no small measure to the facility of offering avenues of employment for men, women and children. They could be from the same family, and hence it also common to find parents introducing their children to work in reeling units, even when the children are very young. Nearly one third the women workers had joined a reeling unit when they were less than 10 years old, and some were just six years old when they started work in reeling units. women were also more prone to getting respiratory problems in comparison to the reeling male workers, and not only that, more women were likely to get respiratory problems earlier than men.

Table 4: Age when the worker joined a reeling unit

	6-10 years old	11-15 years old	Over 16 years old	Total
Male	4	8	5	17
Female	11	5	19	35
	15	13	24	52

The fact of starting work in reeling units is of particular importance, since, as our respondents indicated, none of them had respiratory problems before they started work in reeling units. The entry of people into reeling work has some clear patterns. Those who had when they were still very young were introduced to this work by their parents. Those who joined when they were over 16 years, and in the case of women, were those who had moved to Sidlaghatta after getting married, who then started work in reeling. There is a very small number of workers who stated that they had childhood wheezing even when they were not working in the reeling units. The remaining workers developed respiratory problems only after they began to work in the reeling units.

Table 5: Years of work when wheezing started

	Less Than One year	2-3 years	4-5 years	Ten years	Fifteen	Twenty	Over 20	None	Total
Male	0	2	0	1	0	0	1	13	17
Female	4	4	2	2	1	2	0	20	35
	4	6	2	3	1	2	1	33	52

Despite the knowledge that reeling causes respiratory problems as well as other health problems, particularly if they work in reeling for a relatively long period of time, there is a substantial number of reeling workers who have followed into this line of work after their parents, and in two cases this is the third generation in reeling. Parents working in the same units as their children involves 18 reeling workers (see table 6). This is not to suggest that they are eager to enter into silk reeling work. There were a substantial number of workers who emphatically stated that they did not want their children to work in reeling (30, including 7 men and 23 women workers). There is no doubt that when women have more forcefully stated that they did not want their children to work in reeling, they were also reflecting the fact that more women suffer from health problems while working in reeling, than the number of men who do.

Table 6: Generations in reeling

	First generation	Second generation	Third generation	Total
Male	9	7	1	17
Female	20	14	1	35
	29	21	2	52

Table 7: Parents in reeling units as their children

	Yes	No	Total
Male	8	9	17
Female	10	25	35
	18	34	52

Women bear several responsibilities, which also enhance or increase their propensity to suffer from various health problems. While their work in the reeling units entails both exposure to silk allergens which are generated through the steam when cocoon are boiled, they are also exposed to the pollution caused by burning biomass fuel in these units. Further they are also exposed to several hours of wood fuel smoke in their homes while they cook

food. Taken together, such exposure faced by the women could cause respiratory problems in some, and aggravate respiratory problems in others. As we observed, women who took time off from reeling work due to their respiratory problems were often not at the same time able to avoid cooking food at home. During this time, as a woman complained, her main problem was that she could not blow through the pipe to raise the flame for cooking, since she immediately started coughing. Thus, avoiding cooking food and keeping away from the cooking stove was possible only if they were hospitalized due to acute respiratory problems.

Table 7: Needed to be hospitalized for breathing difficulties

	Yes	No	Total
Male	5	12	17
Female	10	25	35
	15	37	52

Table 8: hours of reeling work per day

	1-5 hours	6-8 hours	Over 9 hours	Total
Male	2	5	10	17
Female	3	10	22	35
	5	15	32	52

Evidently, women are exposed to biomass fuel smoke for much of the day, both at work as well as through their cooking food at their homes. Men suffer from relatively fewer factors causing respiratory problems. For instance, they work through the day in reeling units, facing similar conditions of work as women workers. However, there is a feature which is peculiar to the men, and that is, almost all men are smokers, who smoke tobacco. They take several breaks during work to smoke, and also smoke after work from reeling. However, they do not usually face the smoke from cooking at home. Respiratory problems faced by men are almost always aggravated by *beedi* smoking (see also Chhabra et. al 2001).

The unusual circumstances of the silk reeling is in the fact that workers not only know that health problems may follow from working in reeling, but even

more so, in their perception of cause of death too of those who have passed away from their own families, they have implicated asthma as the cause of death in a very significant number of cases. There is no means of ascertaining whether this was so, since it was very rarely that medical doctors were involved in certifying the cause of death after proper clinical investigation. The Chief Registrar's office in Sidlaghatta which maintains the record of births and deaths also had a column of the cause of death. In many cases, the cause of death was listed as asthma.

DISCUSSION

In a situation of acute poverty, people of Sidlaghatta take up silk reeling as their means to earn a living. However, they face the twin problems of working in an atmosphere which has silk allergens which cause allergic reactions in some people, as well as asthma. The other condition is one of pollution caused by burning biomass fuel, to boil the cocoons and release the silk yarn. A recurring question in this context is that the conditions of work as well as the consequent health problems are known to the people. Most families have members who suffer from such problems as acute cough, chest congestion, and difficulties in breathing. However, there are also several silk reeling workers who do not suffer from breathing or asthma problems. This is what makes them take a chance on the possibility that they would not succumb to the same problems, but would be able to carry on a full working life without such health problems as asthma, or other less debilitating diseases. However, with a very high proportion of workers being victims of respiratory problems, this seems to be a high risk occupation, which leads to not only health problems but also a lessening of their quality of life.

While the problems associated with silk allergens has been confirmed in terms of their causal relationship, and may be classified under occupational asthma, a considerable grey area persists with the remaining and still high proportion who do not show allergic reactions to the silk allergens but do have respiratory problems. This has been, in the literature linked with atmospheric pollution, or indoor pollution, and the burning of biomass fuel for cooking. While the studies reported on their findings of cooking stoves and cooking

food, the relationship is almost entirely with women, who do the bulk of cooking in most homes, and are the ones who are near these stoves and face the most of polluted air and smoke. What needs to be emphasized in silk reeling is that the predominant number of workers is women, that they are in an environment of both silk allergens as well as smoke from burning biomass fuel, and therefore are the major victims of respiratory problems. That they also cook food at home, and which adds to the smoke from biomass/wood smoke is just the additional problem that they endure. The literature also gives indication that children less than five years of age also suffer from being in the proximity of wood/biomass smoke and suffer from health problems. These should also be considered along with the problems of the women silk workers, who spend hours in the reeling units and then again in front of their cooking stoves at home. Their children/infants also suffer similar conditions since infants are usually placed in the corner of reeling units, or even on the women's laps, and inhale both the silk allergens as well as the wood/biomass smoke. While no large scale survey which includes a clinical examination seems to have been done to confirm the morbidity among infants of reeling workers, there is every reason to expect that they too suffer from various health problems. These are due not only to their own proximity to harmful physical conditions, but their problems may have their origins even before they are born, i.e. while their mothers work in reeling units and also cook food using wood/biomass fuel (on related problems of low birth weight, respiratory tract infections see Mishra, 2003, Mishra et. al 2004).

There is always a dilemma associated with the working of the reeling industry. While the people who are poor need work to earn a living, their low skills and virtually no education (most of them are illiterate), make it difficult to get jobs elsewhere. The silk reeling technology, which is predominantly used, is of relatively simple design and technology, making it possible for poorly educated people to work with them. However, the health problems associated with reeling is going to get into their income, and make it less likely that they can move out of reeling, or into better paying and higher skill occupations. This makes it likely that most of the reeling workers will remain in

reeling for their working life, and their children too, would in most cases, enter and remain in reeling work.

The technological innovations that have been introduced have been with the intention of making silk reeling “more efficient”, and thus, there have been some changes in the design of the reeling equipment, and the ovens that are used in reeling units. Though they are more efficient in using fuel, and also save on the amount of fuel needed, the newly designed ovens, have the same drawback as earlier, and i.e. the reeling units still use biomass fuel. There is less smoke than earlier, but smoke still remains a problem in the units, and brought about through burning the same fuel such as groundnut husk, wood chips, other crop residues, and essentially cheap fuel. Health problems associated with smoke from burning biomass fuel is still a major problem in most units. Further, even the units which may use more recently devised technology still use open ovens for cooking the cocoons, and the steam from these ovens, along with the serecin from the cocoons, causes allergic reactions in a significant number of workers, as with earlier technology. Thus, health problems may have been marginally reduced, but still exist.

A disease which a few workers have is often associated with the burning of biomass fuel, i.e. tuberculosis. Tuberculosis has not been confirmed as being ‘caused’ by smoke from biomass fuel, but has been shown to be associated in some way, i.e. statistically shown to be related to smoke from burning biomass fuel (Mishra et. al 1999). In reeling units, which are relatively small, and with several workers in close physical proximity, someone with TB can spread the disease through coughing, which happens (cough) often in the smoke filled units.

Two important factors impinge on the situation of the workers. The first being poverty, keeps them working in reeling, which uses fuel that is on the lowest rung of the energy ladder. The same fuel is used in their homes to cook food, and this is also a reflection of their relatively low income. The second is a major item of expenditure incurred to try and reduce the impact of their

respiratory problems, and that is the use of alcohol. Both men and women consume alcohol, in varying quantities, as a 'medicinal drink'. From clinical reports, it appears that alcohol may in fact have beneficial effects on some individuals (to dilate air passages), and may be used in moderation (see Cuddy and Guohua 2001). However, from information that workers gave, and particularly the men, a significant quantum of their incomes, may be even upto half their daily wages, is spent on buying alcohol.

CONCLUSION

Considering sericulture as a means to improve the economic conditions of poor people is fraught with problems of another kind. Inasmuch as some income is generated through sericulture, and may be seen as a positive outcome, it simultaneously, and as a by-product causes and is instrumental in health problems in a significant proportion of workers. This is particularly so in silk reeling, which provides employment and income to many, but leads to a poorly quality of life, due to their ill health. With a substantial portion of their income being spent on medicines and medical treatment, the possibility of effecting any savings is virtually impossible. Further, much of their income is required for basic subsistence, and therefore, very little is left for their children's education. In fact, the children too contribute towards the family income by working in reeling units, and thus, play an adult role even when they are very young (some are less than ten years old). Reeling as a means of social mobility has very great limitations, and can hardly be considered as an effective means of improving the lives of the workers, in the long run. In the short run, it does provide some income, and the possibility of supporting their bare existence.

REFERENCES

1. Becklake, Margaret R and Francine Kauffmann, 1999. 'Gender differences in airway behaviour over the human life span,' *Thorax*, 54 (12): 1119-38.

2. Cuddy R. and L. Guohua, 'The role of alcohol in asthma: a review of clinical and experimental studies, *American Journal of Emergency Medicine*, 19: 501-503.

3. Harindranath, N, Om Prakash, P V Subba Rao, 1985. 'Prevalence of occupational asthma in silk filatures,' *Annals of Allergy,* 55 (3): 511-15.

4. Chen, B H, C J Hong, M R Pandey and K R Smith, 1990. 'Indoor air pollution in developming countries,' *World Health Statistical Quarterly*, 43 (3): 127-38.

5. Chhabra, S K, S Rajpal and Ra Gupta 2001. 'Patterns of smoking in Delhi and comparison of chronic respiratory morbidity among *beedi* and cigarette smokers,' *Indian Journal of Chest Diseases and Allied Sciences*, 43 (1): 19-26.

6. Mishra, Vinod K, Robert D. Retherford, and Kirk R. Smith, 1999. 'Cooking with biomass fuels increases the risk of tuberculosis,' *National Family Health Survey Bulletin*, number 13.

7. Mishra, Vinod, Xiaolei Dai, Kirk R. Smith, Lasten Mika, 2004. 'Maternal exposure to biomass smoke and reduced birth weight in Zimbabwe,' *Annals of Epidemiology*, 14 (10): 740-747.

8. Mishra, Vinod, 2003. 'Indoor air pollution from biomass combustion and acute respiratory illness in preschool age children in Zimbabwe,' *International Journal of Epidemiology*, 32: 847-53.

9. Osman, M., 'Therapeutic implications of sex differences in asthma and atopy,' *Archives of Disease in Childhood*, 88: 587-90.

10. Parikh, Jyoti, Kirk Smith, Vijay Laxmi, 1999. 'Indoor air pollution: a reflection on gender bias,' *Economic and Political Weekly*, 34 (9) : 539-44.

11. Saha, A, P K Kulkarni, 2005. A Shah, M Patel and H N Saiyed, 'Ocular morbidity and fuel use: an experience from India,' *Occupational and Environmental Medicine*, 62: 66-69.

12. Schirnding, Yasmin von, Nigel Bruce, Kirk Smith, Grant Ballard-Tremeer, Majid Ezzati and Kseniya Lvovsky, 2002. 'Addressing the impact of household energy and indoor air pollution on the health of the poor: implications for policy action and intervention measures. Paper prepared for the Commission on Macroeconomics and Health, World Health Organization.

13. Shalini, V K, M Luthra, L Srinivas, S H Rao, S Basti, M Reddy, D Balasubramanian, 1994. 'Oxidative damage to the eye lens caused by cigarette smoke and fuel smoke condensates,' Indian *Journal of Biochemistry and Biophysics*, 31 (4): 261-6.