Introduction
CHAPTER I

INTRODUCTION

Charkha spinning, i.e., spinning with multi spindled charkha, is an art confined to women. It provides employment to unskilled women workers on a large scale both in a central place and in a decentralised form at workers’ residences. It is being pursued both as an independent occupation or as a subsidiaty occupation to supplement one’s earnings. Charkha spinning was introduced in India in 1908 by the Fattier of the Nation, Mahatma Gandhi (Hanamashetti, 1998). He advocated the use of a single spindled charkha called Kissan Charkha. This charkha was portable and could be operated outdoors/indoors and in the homes. But its production efficiency was very low, around two hanks per eight hours (Padalkar, 1989).

When khadi was commercialized, the organisers found it difficult to produce sufficient yam on kissan charkha. Due to low productivity, kissan spinning could not be taken up as a viable employment. Moreover, the twist and uniformity of kissan yarn was not suitable for- weaving. So, a search was undertaken for a more productive charkha and the result was the Ambar Charkha.
The Ambar Charkha is an improved type of spinning wheel with multiple spindles linked to the wheel. It was the outcome of the experiments conducted by Ekambaranathan (Padmanablian, 1995). Its invention was a landmark in the history of the khadi industry and it elTeeted a significant improvement in the productivity of the spinners by improving, boll 1 the quality of the yarn and the speed of yarn production.

With the introduction of the principles of ring frame spinning, subsequent improved versions of the ambar charkha, like six spindle, eight spindle, ten spindle, twelve spindle and forty eight spindle charkhas have come out (Khadi and Village Industries Technologies: Machinery and b.quipment Division, 1994). As a result of this, the rate of output of yarn is reported to have increased to 800 or even 1000 metres per hour. An experienced worker working on an ambar charkha for eight hours daily could earn more than what she could earn by other items of work available (Iyer, 19X3).

In India, khadi spinning units are funded and governed by the rules and regulations of {lie Khadi and Village Industries Commission (KVIC), the organisation which was created by an Act of Parliament (No.61 of 1956 and as amended by Act No. 12 of 1987). The Government of India, in every National Five Year Plan, has provided substantial funding for the intensive development of this cottage industry. KVIC is charged with the planning, promotion,
organisation and implementation of programmes for the development of khadi and other village industries in rural areas in coordination with other agencies engaged in rural development wherever necessary (Rao, 2002).

Approximate women participation in spinning activity under KVIC in lakh persons was 7.93, 0.17, 0.30, 1.38 for cotton khadi industry, muslin khadi industry, silk khadi industry and woollen khadi industry respectively during 1997-98 (KVIC Annual Report, 1997-98). The rate of women participation in khadi industry is around 46 percent, whereas, the national average of women participation in other activities is around 14 percent (Chathurvedi, 1995).

Wage and work-wise, the women spinners in the khadi industry are found to be on par with women in the unorganised sector. According to Yadav (2000), women in this sector are forced to work for low wages with no job security. They get money on piece-rate basis. The wage rate of khadi spinners, as compared to that of other industrial workers, is reported to be deplorably low. The average earnings of a woman khadi spinner ranges from Rs.80 to Rs.90 per week, as against Rs.130 to Rs.160 they could have earned from other industrial work (Instruction Manual, KVIC). The comparative figures indicate the need for scientific intervention for raising the earning potential of these workers to raise their status to the level of industrial workers.
For khadi spinning, three types of charkhas, namely six spindle, eight spindle and twelve spindle charkhas were found to be widely used in the study area. The six spindled arnbar charkha is a small ring spinning frame with six spindles in a row and a three roller apron drafting system and a top arm weighing arrangement. 'The charkha is suitable to spin yams of different counts, varying from 20 to 60s metric hanks.* 'The charkha is operated by hand. It produces 16 to 20 metric hanks per eight hours at the normal speed of 65 rpm of the handle. Cotton, polycotton and muslin yarns can be made from this charkha with count numbers 33s, 56s, 64s and 70s. The instruction manual of the charkha claims a production potent in I of 23 to 30 hanks of yam at 80 percent efficiency of the spindle frame.

Like the six-spindle charkha, the eight-spindle charkha has a three-roller apron drafting system and a top arm weighing arrangement, but has two additional spindles. On an improved eight spindle charkha, one can obtain an output of 25 to 35 hanks per day (Padmanabhan, 1995).

For operating both the six and the eight spindle charkhas, the worker squats on the floor beside the charkha and rotates the handle with the right hand.

1 hank = 1000 metres

60s metric hanks indicate the count of yarn as fit).
At the spinning centres women work for eight to nine hours a day with breaks of half an hour for lunch and a quarter of an hour during the two rest pauses.

The twelve spindle charkha is a small ring spinning frame with 12 spindles in a row and a three-roller apron drafting system and a top arm weighing arrangement. The charkha is suitable to spin 72s metric hanks. This charkha is pedal operated. It produces 30 to 40 metric hanks per eight hours (Padmanabhan, 1995). The worker operates the charkha by pedalling with both the legs. For this, she sits on a raised stool. The hands remain comparatively free and are, at times, used to regulate the spinning process, especially when yam breaks. Though details could be gathered in the increase in the spinning speed of the charkhas with the increase in the number of spindles, no specific data on the drudgery reduction and changes in physical and physiological cost of spinning resulting from the shift from the six spindle charkhas to the eight spindle and the twelve spindle charkhas could be obtained from the literature available and hence the present study.

Continuous spinning on any of the three types of charkhas with little rest in between can lead to occupational strain. The quality of the design of the work place in terms of the requirements of the task and of the worker has an important effect on the ease with which the action is accomplished (Steidl and Bratton, 1968). It is often noticed in many working situations that workers are
forced to assume bad working postures due to poor design of work, workplace, machines and tools. Some of the traditional postures adopted by Indian women while performing different activities are stooping, sitting-cum-bending, standing-cum-bending and standing erect, which develop a combination of static and dynamic muscular effort and cause early fatigue by putting an extra load on the circulatory system, as reflected in the rise in heart rate out of proportion to the metabolic cost of work (Varghese et al., 2000). By systematic analysis of the work and the work posture and the metabolic cost of work it is possible to eliminate undue stress and strain in work performance.

Sitting for long imposes a strain on the principal support areas of the body, the ischial tuberosites, the lower position of the thigh and on the buttocks (Grandjean, 1973; Panero and Zelnik, 1979). The effects of heavy tissue pressure on such a small area can progress from discomfort to intolerable pain. In addition to this, the bad working posture adopted by women in spinning activity exerts many adverse effects on health.

The continuous abduction and adduction of the shoulder while spinning is reported to cause strain/pain in the upper arm and shoulder and prolonged work without adequate rest periods may lead to pain in the joints and the continuous forward and backward movements in the work posture can lead to low back pain. Repetitive operations, when performed for prolonged periods of time with
small periods of relaxation, lead to musculoskeletal disorders resulting in low back pain, pain in the neck and shoulder-arm region, pain in joints, bones and muscles (Varghese et al., 2000).

Many women, during casual enquiries, complained of back pain, shoulder pain, nervous complaints and eyestrain. If the causative factors for all these strains are identified, efforts can be made to check the recurrence of the problem and its aggravation. Towards identification of such constraints of the workers, the present study has been planned.

Scope of the Study

One of the reasons reported for the low earning, potential of khadi spinners is their frequent absenteeism (Parameswari, 1990). The genuine reason for abstaining from work could not be traced from the available literature. The strain involved in the occupation could be an additional factor. Hardly any woman above 45 years of age was found working in these units.

Postural problems were reported (Report of the National Commission on Self Employed Women and Women in the Informal Sector, 1988) by several charkha spinners probably due to extensive use of shoulders, arms and lingers for pulling the thread. There were complaints of aches in shoulders and upper right arm; backaches; finger aches; and, respiratory problems. Cotton dust and fibres in the atmosphere were also reported to be causing, respiratory problems.
These observations required verification through scientific observation to make a generalisation.

The observation of the work styles of women working with spinning wheels revealed the need for improvement through reduction in the static effort, application of body mechanics and necessary changes in the body posture. Whether the handle/pedal of the spinning wheel requires modification is not known. Through work study techniques it will be possible to identify the stressors in this work so as to suggest their elimination to the maximum for increasing the productivity. It is hoped that this study may help to come up with ideas for reducing the fatigue of the workers, thereby improving their work output and earning potential.

KVIC is a central body providing employment to lakhs of people, mainly targeting rural areas. So a study of this kind will have scope for wide application. The study will throw light on the ways of improving the occupational health of the women of the working class. Moreover specific studies in this line could not be traced among the available literature.

Objectives of the Study -

The objectives of the study are:

1. to make a profile of the women working in the charkha spinning units.
2. to understand the job context and content of charkha spinning.
3. to identify the occupational and non-occupational health problems of 
charkha spinners.

4. to evaluate the man-inachine system of charkhas by assessing a) the postural 
   and physical stress, b) productivity, and c) the workers’ perceived exertion in 
   spinning with the three types of charkhas.

5. to select the most productive and woman friendly charkha, and,

6. to suggest measures for increasing productivity and reducing postural strain 
   in charkha spinning.

Delimitations

1. The study is delimited to evaluation of the three models of charkhas (six, 
   eight and twelve spindled charkhas) in use in the study area. Other models 
   could not be evaluated because they were not in use in the study area.

2. The psychological stress and stress from the home environment, though it 
   may affect the productivity of a worker, could not be studied in depth 
   because of the complexity involved in their measurement.