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"OCCUPATIONAL HEALTH IN HOMEWORKERS" A STUDY OF GEMWORKERS AND NETWORKERS IN KHON KAEN PROVINCE, NORTHEAST THAILAND

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ABSTRACT

A study of occupational health of homeworkers was carried out in two villages of Khon Kaen province, Northeast Thailand. The principal homework groups studied were artificial gem polishing and fishnet repairing. Arange of quantitative and qualitative methods were used, questionnaire, clinical examination, interviews and worksite inspection.

There were major differences between the two groups including age, sex and marital status. Gemworkers were young, single. Networkers were older and married. The occupation-related health problems of the two groups were similar with musculoskeletal problems predominating, although other problems such as eyestrain and drowsiness were common. The prevalence of accidents was low.

Cubic zirconia (CZ), often referred to as "Russian Diamond", was first synthesised in the early 1970's[1] and uncut gem is now imported to Thailand from the U.S.A. Large amounts are fashioned in Thailand, in 1989 13,256 kgs (66,280,000 carats) of polished CZ was exported mainly back to the U.S.A.[2]. The uncut CZ is bought by villagers in the district markets from gem merchants.

The processes involved in gemstone work are sawing, cutting carving, grinding, polishing, and buffing and are collectively known as gem polisling. Ng et al[3] noted that the trend to use motor powered tools in jade work achieved much faster wheel speeds with an associated increase in dust, resulting in cases of silicosis among jade workers. The source was identified as the silical flour which was added during the polishing process. During polishing, silica flour paste is coated on the jade, the paste dries and dust is spread by the centrifugal force of the wheel. Other occupational hazards may include ergonomic considerations, physical and mental strain due to the monotonous nature of the work and the concentration required, eye strain due to the visually demanding work, and the risk of injury and hearing impairment due to inappropriate or unserviced machinery.

For fishnet homework, it is difficult to assess the health impact of posture, monotony, the frequent carrying of heavy materials and related work. Ergonomic methods give some assistance[4],[5] but the

mental stress of such work is more difficult to determine. Psychological tension, anxiety and symptoms of depression are more prevalent among workers involved in either repetitive tasks or with time constraints.[6] Eye strain due to long hours of work requiring intensive use of the eyes may also be a problem.[4]

However, few studies have addressed the issues of occupational health for homeworkers. Problems exist because of the pressure to work in a climate of lack of information poor education and absence of legislative protection. Health problems from excess noise, poor lighting, long work hours, poor workplace design and uncontrolled use of chemicals can be expected to lead to occupational health problems at least as frequent as those in similar "formal" industries.

METHODOLOGY

This study combines both quantitative and qualitative techniques to provide information on occupational health problems of homeworkers in two villages, in the context of the social and economic structure of that work. Two villages were required for the study and selection was based on the major type of homework performed (gemwork or network), sufficient number of homeworkers for quantitation evaluation, a village of typical size (100-150 houses) and convenient travelling.

1. Questionnaires, Interviews and Case Studies

The demographic questions were necessarily broad to include the range of issues involved in the study. Questions were chosen to cover the likely most common homework-related health diseases : skin conditions, musculoskeletal disorders, eye problems, and work-related injuries. Interviews concerning health and health behaviour were also held with health centre staff, village health volunteers and shopkeepers who sold medicines. The study selected homeworkers from all gemworkers and networkers in the two villages provided case studies.

2. Worksite Inspections.

The target for inspections was the homeworker who was assessed at his/her workplace within the worksite.

Light, noise measurements, temperature, and work position were considered to assess workers in the working environment.

3. Clinical Examinations.

Simple clinical examinations of works who had answered the questionnaire were carried out at the time of worksite inspections.

Examination methods which could easily be incorporated into the existing primary health care services were chosen.

Visual acuity was tested using a Snellen's chart. Literacy was tested using a short excerpt from a newspaper. Visual acuity and literacy were tested by the researcher who is a medical doctor. The examination method used according to the method described by Shortridge and Lee (1980).[7]

Dermatitis is one of the most commonly reported occupational health problems[8]. The study used simple clinical inspection of workers' hands and arms as a screening test for occupation-related problems.

RESULTS

Ban Non Fun Rua, Tombol Kud-Kuang, Nong Rua District and Ban Non-Rung, Tombol Savathee, Muang District were selected for the study.

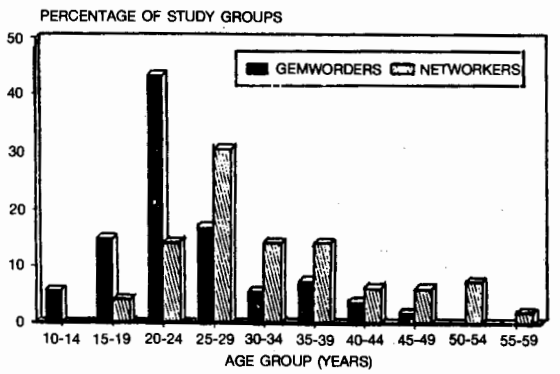
Ban Non Fun Rua is 67 kms. from Khon Kaen, 5 kms. from the highway and is reached by a dirt road. The population is about 2000 people in 310 households. Artificial gemwork started in the village six years ago with the arrival of electricity.

Ban Non Rung is 26 kms. from Khon Kaen. There are 428 households and a population of 1732 people. Fishnet homework began in the village 5 years ago.

1. Demography

Age, sex and marital status were major differences between the two groups. Gemworkers were young, single. Networkers were older and married. The mean age of 56.6% females and 43.4% males of gemworkers was 24.0 years (range 12-45) (Figure 1). The gemwork sample included 5.7% workers who were aged from 12 to 14. By contrast, network was exclusively female. All networkers in the sample were female, and had a mean age of 32.7 years (range 19-57). Moreover, 46.7% of the female gemworkers had never been married compared with only 4.1% of the networkers. Similarly, while no female gemworkers were classified as separated/divorced or widowed there were a number of networkers in these categories (10.2% and 3.8% respectively). The male gemworkers had a similar pattern of marriage to their female counterparts, again with no widowed or separated/divorced.

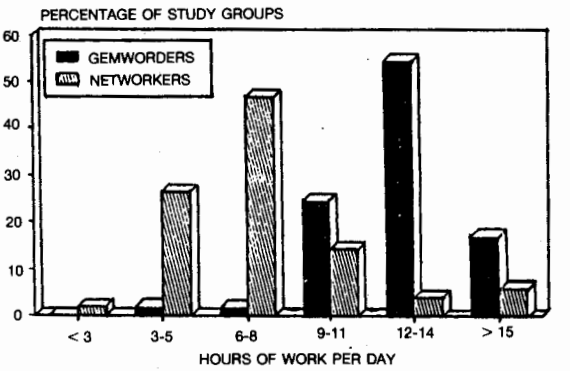
FIG 1 : AGE OF GEM AND NET HOMEWORKERS BY 5 YEAR GROUPS



2. Working Time

The gemworkers worked long hours each day (Figure 2) with a mean 12.74 hours, and most (93%) worked 6 days a week. Male and female gemworkers reported similar daily work hours. Gemworkers worked a mean of 10.7 months a year. The only break in the work routine was during rice planting, when many workers left their gems to work in the rice fields. Networkers averaged less work time than the gemworkers by all of the time variables. Network is seasonal and the potential work hours are determined not by the needs of the outworker but by the demands of the net factories. The survey was taken in the dry season and networkers worked a mean of 7.5 hours a day, 5.2 days a week. The repaired nets for a mean of 10.0 months a year, again with a seasonal break for working in the fields.

FIG 2 : DAILY WORK HOURS GEM AND NET HOMEWORKERS



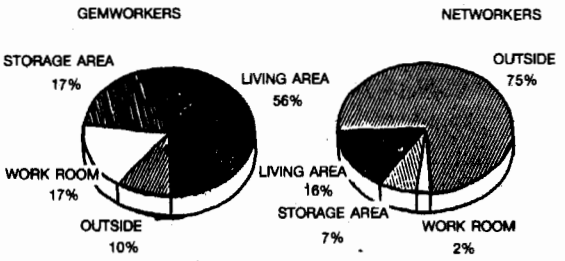
3. Place of Work

By definition, homework is carried out at a home. 56% of the gemworkers worked in the living area of a house where people eat, relax or sleep (Figure 3). Other specific places of work were ; multipurpose storage rooms (17%) ; special work rooms (17%) and outside under shelter (10%).

Networkers are less restricted by machinery than gemworkers and were often

found at different locations. The reasons for moving may be social, environmental (eg. light and heat) or occasionally because of the large size of a net.

FIG 3 : PLACE OF WORK GEM AND NET HOMEWORKERS



4. Worksite and Workplace Assessement

All gem and net worksites had sufficient exits and ventilation, working place was also generally adequate. Some worksites and workplaces were dirty with both rubbish and dust, particularty those sites with earth floors. 23% of the gemworkers' machines were dusty. None of the gemwork machines had safety guards.

Light

General light in gem worksites ranged from 25-3000 lux (mean 720.9 lux), while the work-bench light ranged from 480-3000 lux (mean 2049.6 lux), using a Hioki Lux Hi Tester 3421 lightmeter. Most networkers were outdoors during the inspection and working in good light.

Noise

The mean general noise level using a sound level meter (Quest Electronics 214), in gem worksites was 66 dB (range 56-82 dB) and at the worker's ear it was 67 dB (range 56-82 dB). The noise level generated by polishing machines was 60-70 dB at the worker's ear. Cutting and grinding generated less noise. However, the source of noise was not the machines of the workers but music from stereo radio systems. Noise levels testing was in appropriate for networkers.

Temperature

The temperature readings were taken during the hottest part of the day and in March-April wich is the hottest time of the year. Despite these factors all gem and net workers were working at the wet bulb globe temperature index (WBGT) of 25-31.5 ℃, by using wet, globe and dry thermometers.

5. Health Problems of Homeworkers

Figure 4 and 5 detail the most commonly reported symptoms which occured at least weekly and the proportion of these workers who related these symptoms to work. These symptoms occuring at least once a week are stressed as the most occurate because of recall bias and the 20% sample is taken as the comfortable limit of accuracy of the results within the wide confidence interval of the small samples. The results may be described in some groups : musculoskeletal, eye, psychosocial, miscellaneous symptoms, and work accidents.

Musculoskeletal Symptoms

Four symtoms are clearly in this category : joint pain, low back pain, limb pain and neck pain. Musculoskeletal symptoms were among the most frequent complaints for both gemworkers and networkers. These symtoms were found a common problem in both study groups (Figure 4 and 5).

FIG 4 : GEMWORKERS MOST COMMON REPORTED SYMPTOMS AND PROPORTION RELATED TO WORK

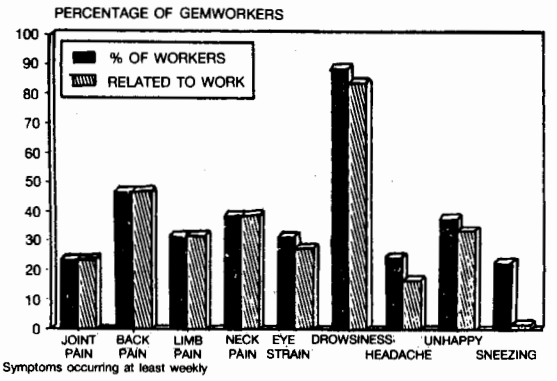
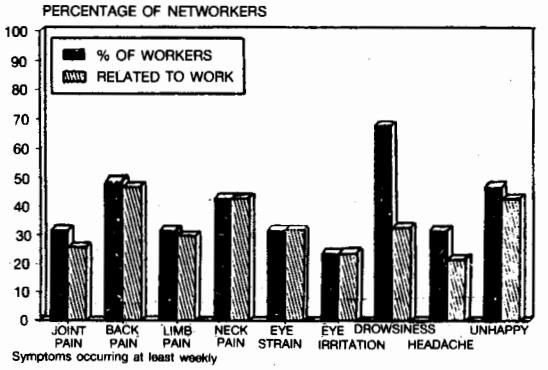


FIG 5 : NETWORKERS MOST COMMON REPORTED SYMPTOMS AND PROPORTION RELATED TO WORK



Eye Problems

Eye strain was common complaint for both study groups (Figure 4 and 5). Assessment of visual acuity (Table 1) indicated that only 58% of gemworkers and 57% of networkers had normal, 6/6 vision in at least eye which was a better rate than the 64% of the networkers. This difference is consistent with the combined effect of the older age of the networkers and, "the healthy worker effect" of the greater visual demands of gemwork. although many workers were aware of eyesight proplems, eye testing and the purchase of glasses were considered expensive and beyond their financial means. Few workers had glassess. Irritated eyes were less common. Only few networkers related irritate eyes as a serious problem and associated the symptom with the "chemicals" in nets.

TABLE 1 : RESULTS OF VISUAL ACUITY TESTED AT 6 METRES GEM AND NET HOMEWORKERS

EYE TESTING	GEMEORKERS	NETWORKERS
Bilateral 6/6	58%	57%
Non-bilateral 6/6	42%	43%
Acuity of best eye		
6	85%	64%
9	10%	23%
12	2%	5%
15	2%	7%
60	0%	2%

Pyschosocial

Three symptoms have been grouped into this category : drowsiness during the day, headache and depression/unhappiness. These are clearly separate and ofter unrelated symptoms however it is convenient to deal with them together.

These symtoms were found a common problem in both study groups (Figure 4 and 5).

Miscellaneous.

These symptoms (skin irritation, breathing problems, nose and chest congestion, sneezing and bumpy heart) were less commonly reported but provide completeness for the rang of symptoms and also test the reliability of the questionnaire, not all symptoms were reported as common and not all symptoms were associated with work.

The networkers consistently reported the cause of their skin problems as being

a chemical which was used for treating the nets and which was at times was either more concentrated in the nets, or not dried from the nets before delivery to the village. This chemical was a common concern of the networkers and attempts to clarify its composition were met with denial of use of "chemicals" by the management of the net factory. The reporting of skin irritation was supplemented by clinical examination (Table 2) in which there was only few workers with clinically related skin conditions of their hands and arms. The 9% networkers with work related irritation had mild irritation and exfoliation of their hands and all blamed the chemical from the nets.

TABLE 2 : PREVALENCE OF DERMATOSES OF HANDS AND FOREARMS GEM AND NET HOMEWORKERS

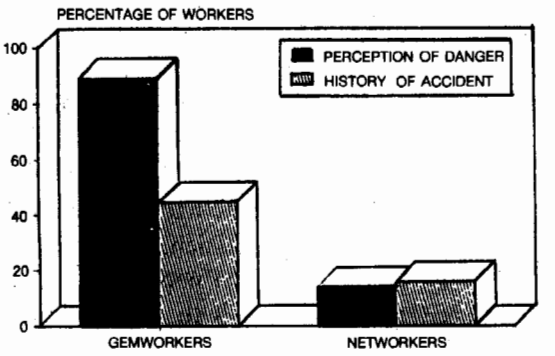
SKIN EXAMINATION	GEMWORKERS	NETWORKERS
Normal	89%	88%
Dermatoses unrelated to work	4%	2%
Dermatoses related to work	6%	9%

Work Accidents.

There were large differences between the two homework group (Figure 6), with 89% gemworkers and only 14% networkers recognising dangers at work. 45% gemworkers and 16% networkers recounted presonal work accidents.

The commonest source of injury in the drive belt for the polishing bench. This belt connects the motor to a pulley beneath the bench and close to the workers' legs. If the belt breaks it can wrap around the bench or legs. Another source of injury is the rotating spindle above the polishing bench. Perception of risk and actual injuries include catching hair or clothing in the spindle and also the dislodgin of the spindle. Other perceived dangers included injury from grinding and cutting wheels, and from electric shock. Actual injuries included lacerations from grinding and cutting wheels and foreign bodies in eyes. The perceived dangers of network were : lacerations from pulling threads, scissors and the repair needle; and, from the previously mentioned chemical which is reportedly sometimes present on the nets.

FIG 6 : ACCIDENTS-DANGER AND EXPERIENCE GEM AND NET HOMEWORKERS



6. Drug Use Patterns.

As noted, many homeworkers complain of work-related health problems resulting in frequent use of drugs. The commonly used drugs were combinations of

analgesics and caffeine and were used as either analgesics or stimulants. Other stimulants were available illegally, including the prescription drugs "Yaa E" (ephedrine) and Sudafed (pseudoephedrine). Homeworkers preferred self-treatment and most drugs were available at the village shops. Very few other medicines either prescribed or unprescribed were taken.

DISCUSSION

There are a multiphicity of determinants and outcomes which effect the cycle of homework. Homework is not homogeneous and even workers within one industry have an individual balance within a matrix of these factors. Income is the principal factor but this study demonstrates the other factors; age, sex, marital status.

Both the principal study groups and particularly gemworkers are relatively young. Gemworkers have not reached full social maturity, many are teenagers, some even children. An issue related to age is health. Workers need to be health in order to complete their responsibilities and problems of ageing such as chronic back pain and poor eyesight would preclude many older workers.

Sex of the worker is also related to workplace control. For networkers the division is complete. Men do not repair nets, and women are the principal household workers in both productive and reproductive roles. For gemworkers both sexes earn cash but men dominate the preferred jobs.

Health Problems.

Desipte the heterogeneity of homeworkers a very similar pattern of occupational health problems exists for the two principal study groups. Both groups recorded a high level of complaint for musculoskeletal symptoms. Back pain is the most common of these complaints with 47% of gemwork and 43% of networkers suffering at least weekly episodes. Other common symptoms for both groups are eye strain, headache, and unhappiness. Drowsiness was also common for both groups, a consequence of the long hours of work of the gemworkers and the dual role of the networkers. The worksite inspections and observations demonstrated workers spending long hours in ergonomically inadequate positions, conditions which will lead to both short and long term problems. The rate of accidents for both industries was lower than might be expected in an unregulated work environment. Nevertheless, the addition of some safety features in the design of the cutting wheels and polishing benches would reduce the rate of accident and also relieve a constant source of anxiety for the workers who are very aware of the risks of broken machine belts of falling spindles.

Drug use is also a concern, especially the habitual use by some gemworkers of stimulants, which are bought in an unregulated market. Admitted use is likely to be an understimate of the true rate. The gemworkers have returned from Bangkok, with more than their lessons of gem preparation.

While the study has tried to assess common problems, there is a need for assessment of hazards which are industry specific. An example of this is reports gastrointestinal symptoms among flower prepares in another village near Khon Kaen. The symptoms may well be related to the high levels of insecticides which are used in flower growing. A common complaint of "wet chemicals" on the fish nets was also reported by the net repairers, who associated this with skin and eye irritation. With greater resource these type of complaints could have been investigated and the suspicions of workers either allayed or resolved.

There are some recommendations for the health problems of homeworkers which though not changing the structure of work, will make the worker more comfortable and suffer less of the array of complaints. The method by which to institute these changes is not by legislation or mobilisation of a new public service but by education and information, through the existing primary health care system. The type of information is for example, how to constract a polishing bench which is worker specific. The village carpenter is able to build a bench two inches higher or lower, provided such specifications are provided. For the net-worker the first step is as simple. Many networkers have not considered the benefits of a bench for their work, and yet the bench need not be elaborate. Similarly chairs with backs are available, but are not the village fashion. A fashion which is able to be changed with appropriate education. The implementation of these solutions requires two facilities; the first is a structure for the dispersal of information and resources, and the second is the information it self by occupational health service.

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