

BY INVITATION

CHANGING PATTERNS OF COMMUNITY HEALTH UNIVERSITY RESEARCH IN SINGAPORE DURING 1970-1979

W. O. Phoon

SYNOPSIS

During the last decade, tremendous changes have occurred in health status and patterns of health care in Singapore. These changes have presented great opportunities for the Department of Social Medicine and Public Health to conduct research into a wide variety of topics of vital interest to community health. Subjects studied include health problems of urbanization, especially those related to industrial health, high-rise living and traffic accidents; health consequences of changing life-styles particularly those related to smoking, and alcohol; the changing epidemiology of communicable and non-communicable diseases, particularly those relating to hypertension, cancer, tuberculosis and venereal diseases; new aspects of health care delivery especially those pertaining to the aged; Chinese medicines and primary health care; health education techniques and priorities, with special respect to teachers, mothers and workers and road-users; and medical problems and social changes, including the erosion of the extended family system and the wider practice of abortions.

The enormous coverage of research activities carried out by the department is shown by the following figures of publications by staff and postgraduate students of our Department.

1970	—	5
1971	—	6
1972	—	7
1973	—	23
1974	—	24
1975	—	29
1976	—	28
1977	—	18
1978	—	14
1979	—	23

It is obvious therefore that in this short paper we can only hope to select some of the research projects for mention since it is not possible to include all. Among on-going major projects which did not receive mention in the text of this paper are the Study of Occupational Health Hazards of Firemen, the Prospective Cohort Study on the relationship of Hepatitis B Carrier Status and the development of Hepatoma, a study of transplacental passage of Lead and Problems of Child Rearing in High-rise Apartments.

Department of Social Medicine and Public Health
University of Singapore

W. O. Phoon, AM., M.B.B.S., F.R.C.P., F.R.C.P.E.,
F.R.C.P.G., F.F.C.M., F.F.Oc.Med., D.C.H., D.I.H.,
D.I.H.S.A.
Professor and Head

PROBLEMS OF URBANIZATION

A series of studies were conducted on health in the increasing number of high-rise apartments in Singapore. A systematic sample was drawn from three housing estates, namely, Queenstown, Jurong, and Toa Payoh. The listing of the one-, two- and three-room units in each of these estates were obtained from the corresponding Area Offices. The sample included a total of 594 households from the three areas. The analysis of the data refers to 438 usable household interviews or 74 per cent of the original sample.

The overall findings indicated a small but positive effect of high-rise living conditions on their physical health. For the most part, the health of these flat dwellers remained unchanged after moving into their present accommodation.

With regard to mental health, the major findings were:-

- (a) There was no evidence of direct effects of high rise conditions on the mental health of the sampled population.
- (b) Feelings of worry and the perceived causes of those feelings were found to be associated with the socio-economic status of the respondents.
- (c) The recreational activities of the respondents varied according to their socio-economic status. The majority, however, spent most of their spare time at home.
- (d) High-rise living conditions tended to affect the patterns of social contacts of the residents with their extended families and primary groups.

Three sociological variables, viz., income, education and ethnic group affected the social behaviour of the respondents with regard to health:-

- (a) The preference for, and the actual selection of, the first source of medical treatment varied for the different socio-economic groups (categorised mainly in terms of income and education) and tehnic groups.
- (b) Self-medication was associated with ethnic group.
- (c) The level of education affected the decision on when to receive ante-natal care (Phoon et al., 1976).

The health problems of children in high-rise flats in Singapore were also studied. Four satellite towns in Singapore were included in the present study. They were Queenstown, Bukit Merah, Toa Payoh, and Jurong. The listing of the one-, two-, and three-room units in each of these towns was obtained from the Government Land Office. A systematic sampling procedure was employed. One in every thirty dwelling units was sampled from the listing. This was separately done for each of the three types of housing units for each of the four towns. Altogether, a total sample of 732 housing units were obtained. Of these, there were 111 respondents (i.e. number of families interviewed) in Queenstown, 98 respondents in Bukit Merah, 125 respondents in Jurong, and 244 respondents in Toa Payoh, making up a total of 578 respondents altogether in the four satellite towns.

The findings suggested that children staying in HDB flats were quite happy, although flat life brought with it some restrictions on the children, especially with regards to play space. The children mostly played in their own flats or along the corridors although every satellite town has at least one playground. Only seven out of a total of 2066 children, who had a past history of what was

probably rheumatic fever and eight children with a past history suggestive of renal disease. Only a handful of parents realised the importance of regular medical check-up for these two diseases. The prevalence of worm infestation, scabies and louse infestation seemed to be low, but the authors have reason to believe that the figures were understated. As far as respiratory diseases were concerned, the majority opinion expressed was that there was no increased frequency of respiratory infections in children in their present flat as compared to their previous accommodation. There were found to be 80 children suffering from enuresis. Half of the parents thought that enuresis was normal. Very few parents said that they would seek treatment if their children were affected, but of those who would seek treatment, the majority stated that they would consult a physician (Phoon, Tan and Lee, 1974).

The problems of self-medication among residents in high-rise and high-density housing in Singapore were studied. It was found that those with secondary school or higher education were more likely to store at home medicines for respiratory disorders and first aid items than those with lower education. On the other hand, those with primary school education or no formal education at all were more inclined to keep at home medicines for "strength". The Chinese households were found to be more likely to use traditional medicines than non-traditional medicines for self-medication. The opposite was true of non-Chinese households.

The practice of self-medication was also found to be directly associated with the subjective health status of the potential user of medicines. Frequent fever and the long-lasting cough seemed more likely than other health disorders to induce consultation with a physician. Repeated headaches and backaches, on the other hand, appear more likely to be treated with self-medication (Phoon, 1975).

A study was also made into accident prevention in Singapore particularly with regard to road safety. The role of government and voluntary agencies were analysed. The conduct and impact of road safety campaigns were studied. It was found that in general the number of road accidents usually drops during and just after a campaign. It was concluded that health education efforts in accident prevention should be concentrated on a few vulnerable groups rather than over a broad front. In traffic safety it was concluded that efforts should be directed in particular towards school children, cyclists, motor-cyclists and pedestrians (Phoon, 1975). It was also concluded that first-aid should become a regular feature of the school curriculum and included in the driving test. It was recommended that all drivers of cars should carry a first-aid kit. (Phoon, 1979).

HEALTH CONSEQUENCES OF CHANGING LIFE-STYLES

As public health is essentially concerned with major health problems of the community, its attention has to shift with changing disease patterns. Mortality trends have shown a decline in importance of infective and parasitic diseases and the increasing impact of cardiovascular diseases and cancer as causes of death. The crude rates for infective causes have decreased from about 187 per 100,000 population in 1950, to 55 in 1960

and 35 in 1970. From the age-specific rates, the decline has been most marked in childhood and early adulthood.

(a) Cigarette-smoking

As cigarette smoking is an important risk factor in the aetiology of coronary heart disease and lung cancer, the department conducted a survey on smoking habits in a local Housing and Development Board estate. About 23% of the respondents aged 10 years and above were current smokers, with males predominating 5 to 1. Prevalence was higher at succeeding decades, from about 6% at 10-19 years to 44% at 50 and above. The majority, who started in late teens or early twenties, were light smokers, averaging about 13 cigarettes a day. About 56% of the smokers attempted to stop but failed (Lee et al, 1977). In view of the need for therapeutic support to help smokers stop the habit, staff members were also involved in Smoking Cessation Clinics in Singapore General Hospital and Singapore Cancer Society (Lee, 1979).

(b) Alcohol consumption

A study was launched into the subject of alcohol consumption in Singapore. Rather surprisingly, very little published information is available concerning alcoholism or alcohol-related problems in Singapore. There has been a moderate increase in recent years in the quantities of intoxicating liquors, on which excise tax is paid.

Many researchers have contended that there is a close correlation between the incidence of alcoholism, alcohol-related problems, on the one hand, and the total consumption of alcohol in a country, on the other. If we accept this contention therefore, there does not appear to be much ground for the thesis that the incidence of alcohol and alcohol-related problems is increasing significantly in Singapore. Leong (1976) reported that toddy was sold in Singapore as a government monopoly, dating from the Spirit ("arrack") Farm of 1820, the rights of which were sold for \$100/-. From 1930, government shops took over from licensed retail shops. In 1976, there were four toddy shops in Singapore, with about 2,000 to 2,500 customers per day (Leong, 1976).

A survey on toddy drinking was done in 1975 by medical students (Ong et al, 1975) under the Department of Social Medicine and Public Health, University of Singapore. In a sample of toddy-drinking customers frequenting a government toddy shop in Singapore, it was found that they comprised Indians 66%, Chinese 30% and Malays 4%. Those in the 45-55 years age group comprised 32%, 56% were economically active; 75% had changed their jobs recently. Most of them were manual labourers earning less than Singapore \$250/- per month; 66.4% had primary education and 15.9% had no formal education. The majority visited the place daily, spending more than an hour there and drinking an average of 2 mugs a day (1 mug = 1 pint, costing Singapore 50 cents). They spent 12.5 — 20% of their daily income on toddy. They drank today because it was cheap and thought it was good for their health, especially for constipation (Ong et al, 1975).

The study did not find anything concrete to account for the apparent proneness to alcoholism and other alcohol problems among Indians, as compared with other local communities. The Indians live in the same general environment and are subject to the same stresses and strains as the other races.

With regard to traffic accidents, it was found that alcohol plays an appreciable part in causing casualties. The figures for 1978 showed that one-third of deaths among car-drivers were attributed to alcohol, at least in part. The previous lack of enthusiasm for western-type wines was also found to be vanishing. While wine has a lower alcohol content than hard liquor the new fad for wine might increase the total amount of alcohol consumed. (Phoon, 1980).

(c) Attitudes toward breastfeeding

A study was conducted concerning breastfeeding behaviour in women attending a maternal and child health clinic in Singapore. The decline in the incidence of breastfeeding in Singapore has been dramatic in recent years. Since behaviour is largely determined by attitudes it was felt that understanding of the determinant of the attitude towards breastfeeding is of primary importance in any attempt to change behaviour and to promote in practice of breastfeeding. The study population included 201 mothers. Of the mothers, 73.1% were for breastfeeding while 26.9% were against it. Concern for the health of the baby was the most common reason given by mothers wanting to breastfeed, while inconvenience of breastfeeding was the reason most often stated by those not wanting to breastfeed. The infant feeding practices of the mothers were consistent with their reported attitudes — the majority of those for breastfeeding actually attempted to breastfeed their infants, while most mothers against breastfeeding gave artificial feeds. In the whole sample, 54.2% breastfed and 45.8% gave artificial feeds.

Certain beliefs which may be considered as negative influences on breastfeeding e.g. breastfeeding weakens the mother, were more widely held by mothers against breastfeeding feeding. Conversely, the positive belief "Breast milk is a better food for babies" was more prevalent amongst those for breastfeeding. It therefore appears that common beliefs regarding infant feeding do contribute towards determining a mother's attitude on breastfeeding.

Significant differences in maternal attitude and behaviour towards breastfeeding were observed between the Chinese and non-Chinese races. Not only was a favourable attitude to breastfeeding much more common in the non-Chinese mothers, but these mothers also breastfed their babies for longer periods than the Chinese mothers. Possible reasons for these ethnic differences were discussed. Apart from ethnic group, socio-economic group was also found to affect maternal breastfeeding behaviour. Considerably more mothers from the upper and middle socio-economic group tended to breastfeed their infants than those from the lower socio-economic group.

Other variables like maternal age, parity, level of education obtained and the economic activity of the mother did not appear to affect maternal breastfeeding behaviour. Based on the findings of the study, various recommendations on how to promote breastfeeding amongst mothers in Singapore were suggested (Chung, 1979).

CHANGING EPIDEMIOLOGY OF COMMUNICABLE AND NON-COMMUNICABLE DISEASES

a) Cancer Epidemiology

In a study on cancer mortality between two 5-year periods, 1955-59 and 1968-72, the number of cancer deaths increased by about 100% while the annual death rate increased 43%. The over-all age-standardised cancer death rate rose from 96.4 per 100,000 for 1955-1959 to 126.1 for 1968-72. As expected, the Chinese had the highest rates while the Malays had the lowest. The important sites responsible for cancer deaths were long, stomach, oesophagus and nasopharynx for males, and stomach, lung, breast and cervix for females. The problem of cancer mortality is expected to increase as the population gets older with longer survivals and lowered fertility (Lee, 1975).

Staff from the department are also involved in the work of the Singapore Cancer Registry, which is mainly engaged in epidemiological research on cancer problems in Singapore. One such study undertaken by the department was on nasal and paranasal carcinoma. The overall average annual incidence rate of this rather rare cancer was 0.4 per 100,000 (made up mainly of the squamous cell type). 75% of the cases were diagnosed in persons aged 50 years and above, and there was male predominance of 2.5 to 1. The main interests were on ethnic group variation (as opposed to nasopharyngeal carcinoma) and occupation (as reported elsewhere in the West). No associations were found in any particular ethnic group or occupation (Lee, 1978).

(b) Cardiovascular Epidemiology

The department also participated in the first national survey of blood pressure in Singapore, in collaboration with the Clinical Departments of Medicine in Singapore General Hospital. The mean blood pressure measurements for specific age-groups at 5-year intervals were derived according to sex and ethnic grouping. Systolic pressures for males were about 120 mm Hg at 20 year, 130 mm Hg at 40 year, and 140 mm Hg at 60 year. Females had slightly lower readings up till 50 years of age, after which the situation was reversed. Diastolic pressures also had linear increase with age, but with much smaller gradients, all below 90 mm Hg. About 14% of the survey population were hypertensive (WHO Criteria 160/95), two-thirds of whom were unaware of their condition (Lee et al, 1977).

Some common symptoms were also studied in relation to blood pressure levels. The only significant symptoms associated with the hypertensive group were palpitation, shortness of breath, polyuria and

nocturia, all suggestive of target-organ involvement. The other symptoms like headache and giddiness were not specifically associated with raised blood pressure (Lee et al, 1978). The influence of arm circumference on indirect sphygmomanometry was also studied. The mean arm girth for male adults in Singapore was about 27.0 cm, and 26.5 cm for females. Although mean blood-pressure was correlated with mean arm-girth in specific age-groups, the average change of blood pressure was only 1 — 3 mm Hg per unit cm change in arm girth. It was calculated that, except for unusually large or small arms, there is no necessity for a correction factor in clinical and epidemiological work (Lee, 1979).

(c) Disease Control (Interventive Epidemiology)

The department was also actively involved in the control of these multi-factorial diseases. With the recognised importance of health education as a tool for cancer control, a survey was done to determine the baseline knowledge and opinions of Secondary 4 students on cancer. 75% of the 3125 students surveyed considered cancer "most fearful" and "incurable". Previous exposure to health talks had some positive effects, while previous experience of cured sufferers contributed more to producing positive opinions and attitudes about the disease (Lee, 1978).

(d) Tuberculosis

A review of the records of a random sample of 1,286 notifications of pulmonary tuberculosis in 1974 was carried out. Bacteriological examinations showed that among those investigated, 35.1% and 40.5% of cases were initially smear and culture positive respectively. A large proportion of patients were not bacteriologically examined in 1975 and 1976 as a result of laboratory renovations. Good resource management ensured that the limited laboratory facilities were concentrated on smear positive rather than on smear negative patients.

By 1976, 75%-79.6% of patients successfully completed treatment with a higher proportion reported amongst those initially smear negative than amongst initially positive smear. This could be explained by the higher treatment failure and mortality rates noted among the smear positive cases. It is suggested that smear positive cases be hospitalised during their initial treatment phase in an attempt to lower the treatment failure rate noted in this population.

6.9%-9.9% of the patients were lost to the treatment services, 2 years after notification. This was significantly higher than that previously reported in 1969. Defaulters accounted for 6.9% of this loss. It was felt that the revision of the cases record filing system in 1975 would minimise further loss of case notes (Chan and Goh, 1979).

A project to devise a dynamic model of Tuberculosis Epidemiology for Singapore is being conducted. An epidemiological model is being developed to circumvent this delay so as to permit "instant" evaluations of different control programmes for Singapore over the next 50 years, from 1975 to 2025.

It is predicted that tuberculosis however would still remain a major public health problem in 2025 as it was estimated to account for more than 3000 new, bacteriologically proven cases annually.

The present programme, if pursued unchanged, is estimated to produce a 10.0% and 14.5% reduction of the tuberculosis problem (as measured in man years) over the natural trend of the disease by 2000 and 2025 respectively.

BCG vaccination of infants is expected to have a relatively small effect on the overall tuberculosis control programme in Singapore over the next 50 years. Only a marginal increase of the tuberculosis problem over the expected impact of the current programme was estimated when the efficacy of the vaccine was lowered from 80% to 20% and when the BCG coverage of infants was reduced from 90% to 20%.

Another project concerned with the management of household contacts of active Pulmonary Tuberculosis in Singapore has just been completed. This project was conducted in collaboration with the TB Control Unit of the Ministry of Health.

(e) Venereal Diseases

In conjunction with Middle Road Hospital the department studied the epidemiology of venereal diseases among national servicemen in Singapore. The study subjects comprised 401 national servicemen from the Singapore Armed Forces who were selected by periodic stratified random sampling from among army patients at the hospital. These subjects were divided into two groups, one consisting of those suffering solely from venereal diseases and the other from non-venereal skindiseases only. Studies were made to compare the personal characteristics, educational and social backgrounds and sexual behaviour between these two groups. On the basis of the results, a profile of a soldier likely to contract venereal diseases was made. The study showed that soldiers have inadequate knowledge of venereal diseases. Patients with venereal diseases tended to be less well educated. There was also a higher proportion of regular drinkers among patients with venereal diseases compared with those with non-venereal skin diseases attending the same hospital. There was no evidence of any association between religious practice and venereal diseases. Suggestions are made to improve education as to venereal diseases and to reduce risk of infection in the armed forces. (Rajan et al, 1979).

NEW ASPECTS OF HEALTH CARE DELIVERY

(a) The role of Chinese traditional medical practice in Singapore

A preliminary study aimed at investigating some of these issues was carried out in one of the major institutions providing Chinese traditional medicine — Chung Hwa Free Clinic. The study is an initial attempt to analyse some of these factors through a retros-

pective study of a systematic sample of patient records for cases seen at the Chung Hwa Clinic in 1976.

The study revealed that the patients were mainly Chinese with a distribution of their dialect groups closely following that for the Singapore Chinese population for the same reference year. On the whole, there were slightly fewer male patients than female patients, giving a sex ratio of 1:1.13. While patients came from all age groups, there seemed to be proportionately fewer patients from the paediatric age groups and more from those aged 30 years and above when compared with the age distribution of the Singapore Chinese population for the same reference year.

When the disease conditions from the patient records were analysed, it was noted that some of the more common illnesses seen at the Chung Hwa Free Clinic were "Infective" diseases and "Internal, emotional and weakness" conditions. "Infective" diseases are common conditions for which treatments were sought by patients of all age groups. They include mostly symptomatic conditions such as influenza, fever of short duration, a common colds and upper respiratory tract infections. Those are also some of the most common conditions seen in Government outpatient clinics and by general practitioners of western medicine. "Cough and dyspnoea" conditions appeared to be most prevalent among patients below 15 years old while "Obstruction" (musculo-skeletal) conditions were generally prevalent in patients aged 30 years and above. "Internal, emotional and weakness" conditions were generally associated with adult patients above 20 years of age (Ho et al).

(b) Health problems of the aged in the community

This study was carried out to discover the health status and problems of the aging population in Singapore. A random sample of persons aged fifty years and older, living in public housing, was taken. A detailed questionnaire concerning health was administered, and the subjects given a full clinical, laboratory and radiological examination. To date 110 persons have been studied. 23 persons (20.9%) were in good health and had no detected abnormality. The remaining 87 persons (79.1%) had a wide range of medical abnormalities, including signs of cerebrovascular abnormalities, coronary heart disease, pulmonary tuberculosis, carcinoma of the lungs and uterine cervix, chronic bronchitis, cataract and thyrotoxicosis.

The study analysed the reasons why so many older people have ailments either not diagnosed or not treated, despite the ready availability of medical facilities in Singapore, and makes some recommendations for the improvement of this state of affairs. The reason for this were varied and many. They included:-

- (i) Unawareness that medical attention was required. This applied to cases of asymptomatic diabetes mellitus, hypertension, etc.

- (ii) Stoppage of necessary follow-up treatment. Sometimes it was due to the doctor or nurse not explaining fully to them why and what follow-up was required. Sometimes it was due to the inability of the patient to visit a doctor or a hospital clinic regularly because he was not prepared to lose a day's wages in doing so.
- (iii) Inability to come for initial diagnosis and treatment. A few of these patients claimed to be ignorant of where to go to for such purposes. One or two others claimed that they were too weak to go up and down the lifts or steps and make the journey to the clinic or hospital. They said they could not afford calling a doctor to the home, and thought that ambulances would not come for cases, such as theirs, which were not acutely ill. One of such cases, unfortunately, included the case of inoperable cancer of the lung, which perhaps could be saved if detected earlier.
- (iv) Unwillingness to use medical facilities. In this category was a Chinese-type physician ("Sinseh") who was found to have active pulmonary tuberculosis, with many acid-fast bacilli in this sputum. Another case is the old lady with asymptomatic cancer of the cervix, detected on Papanicolaou Smear. Despite repeated attempts and warning that her condition is potentially fatal, she was adamant in refusing treatment, as she was prepared to resign herself to "fate" (Phoon et al, 1975).

An on-going study is proceeding on the socio-medical problems of residents of several homes for the aged in Singapore. Preliminary findings showed that the majority of residents do not have close relatives who were living in Singapore. Most of them seemed to accept residence in such homes with complacency. However, very few of them have regular visitors and most of them seldom have the opportunity to go outside the homes.

HEALTH EDUCATION TECHNIQUES AND PRIORITIES

A study was made on the attitudes of school teachers in Singapore in health education. A sample of 1052 teachers forming 6.7% of the total teacher strength in Singapore schools after religious, vocational and trade schools were excluded was used. The number of teachers chosen from a school was derived by a formula giving small schools greater weightage in representation. The selection of teachers was done by ballot. The sampling included English, Chinese, Malay and Tamil stream schools. The questionnaire method was used. The following were the findings:-

- (a) Single teachers, both in Primary and Secondary Schools were more willing to take responsibility in Health Education than were married teachers. Almost 90% of the teachers in the sample felt that health education is necessary for all children. There were no real differences when analysed by academic qualifications, age, marital status and sex.
- (b) Willingness to be trained was found to vary inversely with teaching experience and with age. Almost 2/3 of the sample stated that health education being given to schools at present was insufficient. About 93% of

the sample agreed to the introduction of health education in schools. Those feeling that health education should be introduced into schools on a formal basis constituted 76.8% of the sample. Only 6 teachers (0.6%) were definitely against the introduction of health education into schools. It was thought by 65.9% that every education into schools. It was thought by 65.9% that every teacher should be responsible for health education of school children. Only 4.6% felt that the parents should be solely responsible for health education of school children. Single teachers were more willing to take responsibility than married teachers.

- (c) Teachers under 35 years of age were more in favour of giving Sex Education for Secondary school children than were older teachers and were also more willing to be personally involved in giving instruction in either or both Sex and Family Planning. According to 79.5% of the sample, Sex Education should be given to children before they leave secondary school. However, only 56.5% felt that Family Planning instruction should be given. Teachers in the English stream were most favourably disposed to Sex Education being (85.8%) while teachers in the Chinese stream were least disposed (17.0%). Younger teachers were more in favour of Sex Education being given than older teachers. More women than men in the sample had objection to Education in Sex and Family Planning (Tan, 1973).

MEDICAL PROBLEMS AND SOCIAL CHANGES

- (a) The psycho-social sequelae of abortion in Singapore. A prospective study looking into the psycho-social sequelae of induced abortion was undertaken in Singapore in September 1974. The study lasted two years. The subjects were the abortees who came for abortion in Kandang Kerbau and Alexandra Hospitals. To make the study meaningful, the abortees were compared to a control group which consisted of women who came to the two hospitals for antenatal examination and subsequent delivery. There were altogether 850 abortees and 869 delivery women. Each woman had a total of three interviews. The first interview took place pre-abortion/pre-delivery, the second at six weeks post-abortion/post-delivery, and the third at one year post-abortion/post-delivery. The findings of the study showed that induced abortion does not carry psychological sequelae, rather, the women improved in psychological status post-abortion. Morbidity is low in induced abortion and the abortees had a harmonious family life post-abortion. The abortees' practice of contraception, which was rather haphazard pre-abortion, became more regular post-abortion. Fertility among the abortees was low post-abortion, refuting the popular notion that with Singapore's liberal abortion law, women will utilise abortion as a method of family planning (Tan, 1978).

- (b) Suicide in Singapore.

Suicide because it is connected with premature death and violence evokes uneasiness, fear and anger and because it brings up the questions of

'meaning of life' and 'the right to die' is being discussed frequently by philosophers, theologians, anthropologists and legalists. The scientific studies of suicide, however, have been conducted mainly by sociologists, psychiatrists and psychologists.

The study comprised of:-

- (i) All the case-files (1283 cases) in the Coroners' Courts in which the verdict of suicide was returned by the Coroners for the years 1969-1974.
- (ii) A 'Psychological post-mortem' survey in which visits were made to the homes of the suicides for the year 1974 to interview members of the family to gather, where possible, psycho-social, medical and other data pertaining to the suicide victims and to ascertain their background.

In Singapore, it is discovered that the official suicide rate is under-estimated by 15.4%. Suicide ranks as the eighth commonest cause of death. In the year 1974, 1.8% of total male and 2.1% of the total female deaths were by suicide. The dominant factors found associated with suicides for both sexes in the year 1974 were: mental illness (29%), physical illness (26%), interpersonal problems (23%), economical/job problems (13%), social problems (6%), and chronic alcoholism and opium addiction (2%). Interpersonal problems were found to be more important factors for female than male suicides.

For the aged male suicides, physical illness was an important contributing factor. Seventeen percent of suicide cases had past histories of having been admitted into a mental hospital in Singapore. It is also discovered that 74% of the suicides had received medical or some forms of care prior to their final acts.

Among the different ethnic groups, the suicide rate was lowest for the Malay and highest for the Indian followed by the Chinese. Beside the marked differential suicide rates, the frequency of methods adopted, the occupational status involved, the major causative factors responsible, the frequency of suicide communications, and prevalence of alcoholism and opium addictions among the suicide population were different for the three main ethnic groups in Singapore. Because of rapid and massive urbanization and resettlement during the last decade in Singapore, the suicide geographic pattern had been drastically altered within a period of five years — 1970 and 1974. In Singapore, the commonest method of suicide is by leaping from high-rise flats — 42% of the total suicides.

Sixty-one percent of male suicides and 72% of female suicides communicated to their immediate relatives by verbal remarks, presuicidal notes, suicide attempts and suicide letters. Analysis of suicide letters reveals not only the reasons for the suicide but also provides the suicidologist a glimpse of the mental state of the suicide victims prior to the final acts. In this series, there were 50 cases of suicides occurring in hospitals, 8 cases of 'murder and suicide' and one case of 'suicide-pact'. Reactions of immediate relatives to the suicide one year after the suicide were still severe (Chia, 1976).

- (c) School performance, physique and child-parent relationships of children of teenage mothers.

A pilot study on 46 children of teenage mothers (mothers aged below 20 at the time of the child's birth) and an equal number of controls (children of mothers aged 20-29 at the time of the birth of the child), matched for age, sex, ethnic group and birth order, has just been completed. The 92 children (all born in 1971) were selected from 6 urban schools allotted by the Ministry of Education.

Assessments were made on school performances and the related factors, and physical growth of these two groups of children. Preliminary analysis shows no significant differences between the study subjects and their controls. Interviews of their mothers to look into the social environment, maternal attitude and child-parent relationship will follow (Ho, 1979).

INDUSTRIAL HEALTH

The principles of occupational health may be the same in temperate countries and tropical ones. However, there can be wide divergences in the practice and problems of occupational health in those two regions. Heat stress, the greater importance of biological hazards, the differences due to genetic constitution and in levels of education and sophistication, and the preponderance of small-scale and traditional industries, are but some examples which contribute to such divergences. Many complex and new occupational health problems are occurring in tropical countries which are rapidly industrializing without adequate safeguards for health or safety.

It is therefore contended that the training of occupational health practitioners for the tropics should be modified accordingly and preferably conducted in-situ. The author discussed a newly-established course in his school planned to provide such training (Phoon, 1977).

A case study was done on problems of industrial health in Singapore. It was found that silicosis, dermatitis, lead poisoning, decompression illness, leptospirosis, heat stress and psychological problems due to jobs maladjustment figured among the commoner occupational health problems in Singapore in 1972 (Phoon, 1975).

A survey of environmental and health conditions in small factories in Singapore was conducted. From the Ministry of Labour, lists of factories with a labour force of more than ten but less than one hundred workers were obtained. Random samples were drawn for each group of small factories engaged in a particular manufacturing process. A sample size of 80 or so was decided upon as this was the number of factories that we could complete within the two month period given to us, with the proviso that each category of four factories.

The survey was conducted by two mobile teams, comprised of two occupational medicine consultants, some other doctors, an industrial hygienist, some laboratory technicians and field investigators. At each factory, a preliminary discussion was held with the factory manager or senior chargehand. Information about the history and general details about the factory and its employees were obtained and recorded on the spot by the field investigators.

Tests for environmental conditions were made. A thorough inspection of the shop floor, stores, toilets and

rest-rooms, canteens, and compound was performed, usually in the company of a responsible staff-member of the factory. At the end of each visit, a final discussion was usually held between members of the team and senior staff of the factory concerned (Phoon et al, 1974).

The factors in the environment investigated were the levels of lighting and sound, stress due to heat and the concentration of hazardous substances. A total of 14 types of industries were surveyed. The total number of factories surveyed was 83, total number of workers in all the factories surveyed was 2,795. Average number of workers per factory was 33.7. 12 of the factories were found to be satisfactory. Of these 12 factories, three were undergoing maintenance servicing and hence were not in production at the time of the survey. The remaining 71 factories surveyed were unsatisfactory (Phoon and Tan, 1975).

Some of the industrial health problems in Singapore were studied in greater depth. An epidemiological study of industrial dermatitis in a factory situation in Singapore was made. A study was made of 59 workers in a ball-bearing manufacturing factory in Singapore. Of these, 5 cases were found to have definite contact dermatitis with eczema; 14 to have folliculitis with or without acneiform lesions and 3 to have mild popular lesions. In addition, 14 other cases gave a history suggestive of contact dermatitis after commencement of work in the factory, but no rash was present at the time of the study. In only 23 workers was there neither contact dermatitis nor a history of such. The cases of contact dermatitis with eczematous lesions worked in three sections of the factory, but the cases with folliculitis and acneiform lesions came from several sections of the factory.

Patch tests, with the coolant oils they were exposed to, were done on the 5 cases of contact dermatitis with eczematous lesions. Positive results were obtained in all these cases. Control patch tests, with the same oils, were done on 14 workers without any rash or history of such. All, except one, of these controls gave negative results.

Study of the factory showed that the physical environment was generally very satisfactory. All the working areas were air-conditioned and kept scrupulously clean. Facilities for washing and changing were adequate. However, most of the processes involved constant and extensive handling of oils, in the form of lubricants or coolants. Barrier creams were used and protective gloves were provided. No other protective clothing was provided. In some of the processes, usage of gloves was either impractical or dangerous or both (Phoon and Bong, 1974).

Another group of workers studied were the deep-sea fishermen. Deep sea fishermen in Singapore number approximately one thousand or more. Most of them are groups of individuals who band themselves together and contract themselves to owners of small fishing boats, with a tonnage of 10 to 40 tons. During the trip, work is very intensive. All members of the crew work for 10-14 hours a day. The diver may dive from 10-20 times a day, and each dive may take up to 1½ hours but averages ¾ to 1 hour. Depth of diving is down to 200 feet, but averages 80-100 feet. The purpose of the dives is ostensibly to set and to operate the nets at the bottom of the sea.

During the 21 year period from 1954-1974, a total of 8 deaths from acute decompression was recorded in the

Department of Pathology, Singapore. These fatalities all involved Chinese fishermen of ages ranging from 18 years to 36 years, with an average of 28 years. All of them had a common history. The reason why anchors so often get fouled is because of the common occurrence of corals in the typical waters fished. The victims dived to a depth of 60-100 feet to free the anchor or propeller of the boat meeting pressure equivalent to 2-3 atmospheres. Most of them were experienced divers with up to 19 years experience in diving. They had used a crude air hose with air pumped in from atmospheric pressure to about 100 lbs/sq. in. They made one or two dives averaging 10-29 minutes. It is common practice, however, for such divers to make repeated dives of long duration in the course of any working day. Three of them were pulled out unconscious from the sea while the rest complained of uneasiness or pain and died shortly after. At postmortem, four of the cases had evidence of air embolism to the extent of having gas bubbles in the mediastinum, heart and major vessels. Histology showed a uniform extreme congestion of the alveolar capillaries with some oedema and rarely intra-alveolar haemorrhages. The hearts showed evidence of focal acute myocarditis in those who survived for a longer period. All other organs were congested. In one case only did the liver show fatty change, the rest just exhibited increased lymphocytic infiltrate in the portal tracts with occasional eosinophils (Chao et al, 1976).

A cross-sectional and prospective study was also conducted among fishermen-divers in Singapore. 108 subjects were examined. All the subjects studied so far were Chinese men except for two Malays. Nearly half of them were over 40 years old. The vast majority, however, commenced diving work before the age of 30. The majority had been diving for several years, more than half for ten years or longer. About half the subjects said that they usually dive for less than five times a day, and about half said that they usually dive for more than five times a day. The majority of the subjects (68.5%) claimed that their average dives were around half to one hour in duration. The range of duration in a particular subject, however, is quite wide. The maximum time taken was two hours. The majority (71%) claimed that the average depth of their dives was 20-35 metres. The maximum depth was 65 metres, but it is to be noted that none of the subjects said that the average depth of their dives was more than 50 metres. The divers measured depth usually by depth gauge, rarely by plumbing.

In 74 men, the long bones were subjected to radiological examination. It was found that those with no bone lesion accounted for 37.84% of the population studied. In 62.16%, there were bone lesions in one or more of the long bones. Other abnormal findings included fibrosis of the ear-drum on one or both sides (15.5%) and abnormal audiometric findings in 42 out of 80 subjects tested (Phoon et al.).

A further study of dysbaric osteonecrosis in fishermen divers was conducted in 123 cases. The overall incidence was 55% which was high to compare favourably with that of the Japanese fishermen-divers. This group of workers therefore appears to be very vulnerable to occupational hazards. This high incidence could be due to their unawareness of the disease. They use primitive compressed air apparatus, do not have any protection against

effects of decompression, and they do not follow any particular schedule of rate of ascent from the sea bed and since no proper medical examinations are carried out periodically, they go on to develop the most florid picture of dysbaric osteonecrosis. (Boey et al, 1978).

A survey was conducted on the application of ergonomic principles in factories in Singapore. It was found that there were several instances in which the application of ergonomic principles led to improvement of health and productivity and other instances in which neglect of some aspect of ergonomics gave rise to adverse effects. Many instances were found in which the equipment used were not appropriate for the anthropometric measurements of Singapore workers. It was also found that there were cases of electrical accidents due to the lack of uniform colour coding of cables. At the same time, there were instances found of how technical improvement led to increased mental strains on the part of workers. The conversion from mechanical devices to automated ones often lead to an increase of efficiency but sometimes also gave rise to adjustment problem especially among the older workers (Phoon, 1976).

MISCELLANEOUS

Concern over the toxic effects of lead on health has increased tremendously in recent years. This in turn generated an intense interest in improved methodology for the measurement of lead exposure. It is generally agreed that determination of lead concentration in whole blood is one of the most useful test for lead absorption. The microsampling technique using Delves's system offers several advantages. It is rapid, relatively simple and only small quantity of blood is required. However, this technique is shown to be affected by many parameters. Among the parameters which must be carefully considered are:-

- (1) alignment of the absorption tube and lead sampling cups
- (2) oxidising agent
- (3) calibration of standards.

Studies of this problem in the department resulted in the production of a modified method for the determination of lead in blood at normal and toxicological levels. This method is more reproducible, reliable and convenient than older methods. The accuracy of this method has been established by inter-laboratory studies with other methods (Ong et al, 1979).

The principle of ergonomics can be readily applied to many factories in Singapore to improve the quality of working life, maximise the efficiency of production operators and minimise human errors. Collaborative studies with National Productivity Board were carried out which showed that improved working environment resulted in higher job performances, lower turnover rate and reduction in sickness absenteeism (Ong and Hoong, 1979). A detailed study in a large manufacturing industry has shown that improved lighting conditions resulted in higher production output with improvement in efficiency (Bar and Ong, 1979).

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