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Causes of Death among Thai Workers in Taiwan

Introduction

In the recent years, to meet the labor demands for the 14 major construction projects, the six national development projects and the demand for professional manpower and thus to sustain the economic development, foreign labors have been brought into Taiwan since October l989 [(1)]. These laborers come primarily from the south-east Asian region where infectious diseases still abound. They are required of one physical examination in their country of origin before their entry to Taiwan. They are permitted to stay and work in Taiwan for two years only. To prevent them from bringing infectious diseases to Taiwan [(2)], they are required of regular follow-up physical examinations after their entry. Focusing on the common health problems of foreign laborers, items of the physical examination includes: chest x-ray, HIV antibody test, serum test for syphilis, hepatitis B surface antigen test, blood test for malaria, and fecal examination for intestinal parasites [(3)]. Positive cases of infectious diseases of known causative agents can be screened through physical examinations and then treated. Diseases of unknown causative agents such as sudden deaths and accidents, however, can not be identified through examinations. They can only be understood through epidemiological surveys or regular surveillance. Since more foreign laborers come from Thailand, the study focused on Thai migrant workers in Taiwan by applying epidemiological methods to investigate the causes of death and their frequency of occurrence by some demographic factors.

Materials and Method

Thai migrant workers in Taiwan who had died during the period between October 1992 and March 1996 were selected for study. A structured questionnaire

was used to collected information on the deceased. The questionnaire contained questions on the name, sex, age and marital status of the deceased, category of death, time and place of death, and cause of death. Files containing diagnoses and death certificates of the deceased were obtained from the Bureau of Labor Insurance by the passport numbers of the deceased. information on the files was transferred to a pre-designed questionnaire and then stored and verified in database by the Epi-Info software. The information was then analyzed by using either Epi-Info or SAS software. To calculate the crude death rates of Thai workers in Taiwan, the total number of Thai workers by sex and by year in the period between 1993 and 1995 was collected from the Council of Labor Affairs.

Results

It was found that between October 1992 and March 1996, a total of 264 Thai migrant workers in Taiwan had died. Their background information is summarized in Table 1. Of the 264 Thai deaths, eight were female, accounting for 3.0% of the total. They died at the age of 21 to 52 years, with a median age of 34 years. 50.4% of them were married; 15.2% unmarried; and 34.5% either divorced or of unknown marital status. Most of them were either laborers in construction (77 of them, 29.1% of the total, as masons, skilled workers, electricians, carpenters, painters, welders, machine operators) or factory workers (112 persons, 42.5% of the total, as weavers, technicians, manufacturers). The occupations of the rest 75 persons (28.4%) were not known.

Table 1. Background Information of the Thai Migrant Workers (N=264, Oct 1992-Mar 1996)

Variable	Male		Female		Totel	
	No. (n=256)	%	No. (n=8)	%	No. (n=264)	%
Age(year)						
Median	32		31			
Range	21-52		20-43			
Marital status						
Unmarried	38	14.8	2	25.0	40	15.1
Married	132	51.6	1	12.5	133	50.4
Divorced	17	6.6	1	12.5	2	0.8
Unknown	69	27.0	4	50.0	89	33.7
Place of death						
Hospital	88	34.4	3	37.5	91	34.4
Dormitory	34	13.3	0	0.0	34	12.9
Work site	27	10.5	0	0.0	27	10.2
Accident site	23	9.0	1	12.5	24	9.1

Way to hospital	11	4.3	0	0.0	11	4.2
Unknow	73	28.5	4	50.0	77	29.1
Cause of death*						
Car accident	39	15.1	2	25.0	41	15.5
Heart failure	32	12.5	0	0.0	32	12.1
Sudden death	29	11.3	0	0.0	29	11.0
Falling	16	6.3	0	0.0	16	6.1
Crushed	10	3.9	0	0.0	10	3.8
Suicide	8	3.1	0	0.0	8	3.0
Cerebral breeding	7	2.7	0	0.0	7	2.7
Other	115	45.0	6	75.0	121	45.8
Category of death**						
Occupational injury	53	20.7	1	12.5	54	20.4
Occupational disease	2	0.8	0	0.0	2	0.8
Common injury	73	28.5	3	37.5	76	28.8
Common disease	115	44.9	4	50.0	119	45.1
Unknown	13	5.1	0	0.0	13	4.9

*by death certificates

**by categories of insurance payment, Bureau of Labor Insurance

By death certificates, the major causes of death were: traffic accidents (41 persons, 15.5%), cardiac failure (32 persons, 12.1%), sudden deaths (29 persons, 11.0%), falling from high places (16 persons, 6.1%), crushing by machines or heavy subjects (10 persons, 3.8%), suicide (8 persons, 3.0%), cerebral hemorrhage (7 persons, 2.7%) and others (121 persons, 45.8%). Others included: drowning, electrical shock, burn, poisoning, heart attack, beating and illnesses. Those who died of illnesses spread across occupations. Accidental deaths occurred more in construction laborers.

The Bureau of Labor Insurance pays for deaths under four categories: occupational injuries, occupational diseases, common injuries, and common diseases. Occupational injuries are accidental deaths during the course of work. Occupational diseases are deaths due to exposures to occupational hazards. Common injuries are accidental deaths unrelated to work. Common diseases are deaths from illnesses unrelated to work. Of the 264 deaths, about 45% came under the category of common diseases such as sudden deaths and deaths due to illnesses; 20.4% were in the common injuries such as traffic accidents, drowning and suicide; 20.4% in the occupational injuries such as crushing by machines, falling from high places; 0.8% in the occupational diseases category; and 4.9% of unknown category.

More Thai workers died in hospitals (34.5%), in the dormitories (12.9%), at

work sites (10.2%), on the way to hospitals (13.3%); and at places not specified (29.1%).

They died within 1 month to 22 months after entry to Taiwan, with a median period of 9 months. Six died within a month after entry: from traffic accident (1 person), cardiac-pulmonary failure (1 person), death in sleep (3 persons), and alcoholic poisoning (1 person). Deaths by month are shown in Figure 1. More deaths occurred in the following order: winter, autumn, spring, and summer.

The time of death was available for 181 workers. Their distribution is shown in Figure 2. More workers died at 4 to 5 pm (18 persons), at midnight (13 persons each at midnight to 1 am and 1-2 am). Time of death was related to their activities: deaths during daytime were either work or accident-related; deaths in the night were related to illnesses.

Of the 264 Thai deaths, 29 were sudden unexplained deaths. All of them were male, aged 22 to 48 (averaging 33 years). Most of them were married (79.3%), had been in Taiwan for less than a month to 21 months (median 9 months). Most of them were manual laborers. Many died between 11 pm and 8 am in their dormitories or on way to hospitals.

Figure 1. Monthly Distribution of Death Toll for Thai Migrant Workers,Oct 1992-Mar 1996

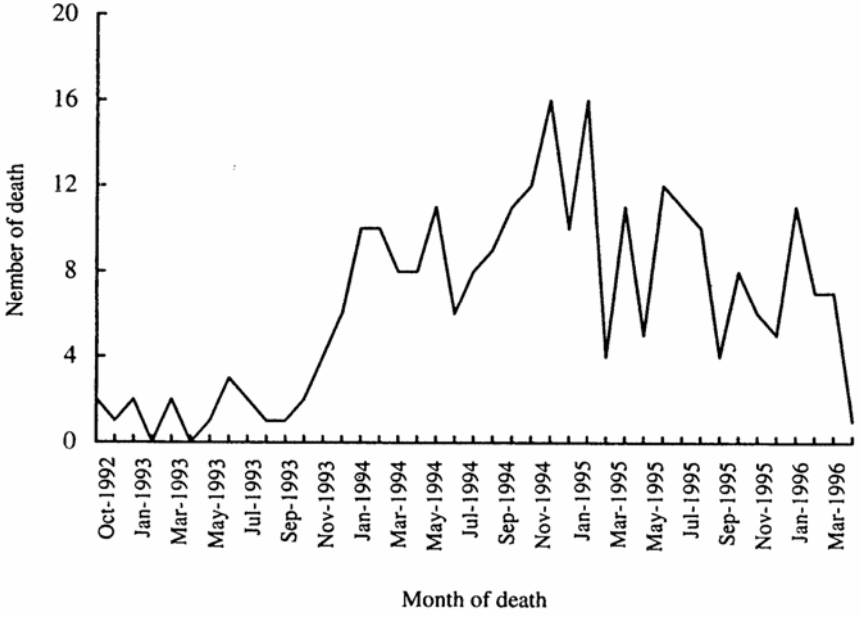
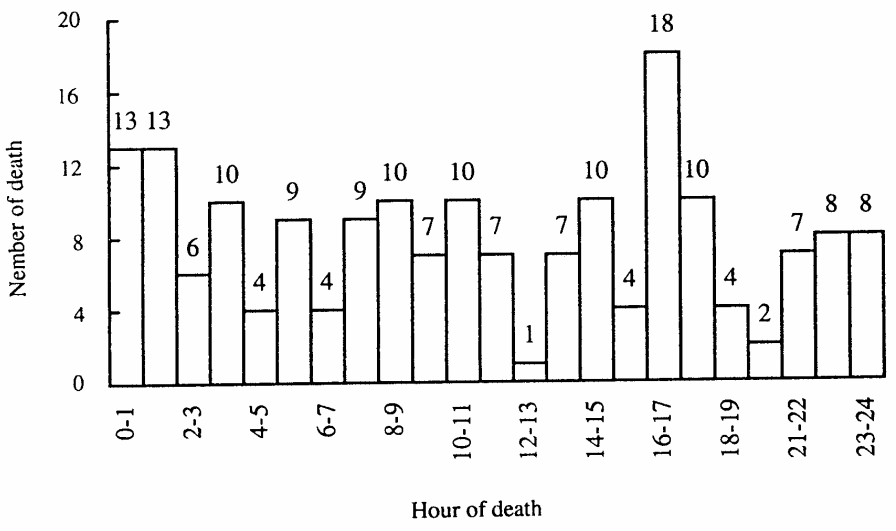


Figure 2. Distribution of Deaths by Hour among Thai Migrant Workers, Oct 1992-Mar 1996



Discussion

Data from the Foreign Labor Center of the Bureau of Occupational Training, the Council of Labor Affairs, shows that: there were 68,530 Thai migrant workers in Taiwan in 1993 (64,103 males and 4,427 females); 108,367 in 1994 (98,679 males and 9,688 females); and 133,953 in 1995 (116,081 males and 17,872 females). Data collected by the present study shows that there were 24 Thai deaths in 1993 (22 males and 2 females), 119 in 1994 (117 males and 2 females), and 103 in 1995 (99 males and 4 females). Thus, the crude death rates of Thai migrant workers in Taiwan were: 0.35 per 1,000 in 1993 (0.34 per 1,000 for male and 0.45 for female), 1.10 per 1,000 in 1994 (1.19 per 1,000 for male and 0.21 for female), and 0.69 per 1,000 in 1995 (0.77 per 1,000 for male and 0.20 for female). When compared with the crude death rate of Taiwanese aged 20 to 49 (1.81 per 1,000 for the years 1993, 1994 and 1995) [4-6], the crude death rates of Thai migrant workers were not meaningfully higher.

Thai migrant workers suffer from the poor traffic conditions in Taiwan, their leading cause of death was traffic accident. Together with other causes of death such as falling from high places, crushing by machines and heavy subjects, electrical shock, burn, drowning and suicide, more than one-thirds of Thai deaths

were due to accidents and adverse effects. In Taiwan, accidents and adverse effects were the third leading cause of death for the entire population (the first and the second being malignant neoplasms and cerebra-vascular diseases) [4-6]. Authorities concerned should be alerted to this fact.

Of all deaths of unknown causes, sudden death is one of our major concerns. Of the 264 Thai deaths, 29 (11.0%) were sudden deaths. All of them were male and died in the night. The mortality of sudden deaths in 1993 was 2.9 per 100,000, and 11.1 and 9 per 100,000 in 1994 and 1995 respectively. They were, however, lower than the mortality of sudden deaths of Thai males (70 per 100,000) [7], the mortality of Thai migrant workers in Singapore (130 per 100,000) [8], and the mortality of Laotian refugees (92 per 100,000) and Cambodian refugees in the US (59 per 100,000) [9]. The age, dates and seasons of the sudden deaths of Thai migrant workers in Taiwan, however, were similar to the sudden deaths of these areas [7-9].

Parrish et al. [10] named deaths of this kind the "sudden unexplained death syndrome, SUDS)". There was already report in as early as 1915 the sudden deaths of young people in Manila [11]. They were reported as sudden death in the night. CDC (Centers for Disease Control and Prevention) has also reported sudden deaths of Thai and Laotian refugees [12].

Table 2. Background Information of Thai Workers with Sudden Deaths

Variable	No.	%
Age (years)		
22-29	11	37.9
30-39	13	44.9
40-49	5	17.2
Average (SD)	33.3(± 6.8)	
Range	22-48	
Marital status		
Unmarried	4	13.8
Married	23	79.3
Unknown	2	6.9
Place of death		
Hospital	5	17.2
Dormitory	20	69.0
Work site	2	6.9
Way to hospital	2	6.9
Hour of death		
0-1	4	13.8
1-2	5	17.2
2-3	3	10.3
3-4	3	10.3

4-5	2	6.9
5-6	2	6.9
6-7	1	3.4
7-8	2	6.9
21-22	2	6.9
22-23	2	6.9
23-24	1	3.4
Unknown	2	6.9
Occupation		
Machine laborer	7	24.1
Machine operator	6	20.7
Molder	4	13.8
Technician	2	6.9
Electrical technician	1	3.4
Welder	1	3.4
Painter	1	3.4

A large-scale study was the one conducted by the Singapore authorities on the 235 sudden deaths in 1982-1990 of Thai migrant workers in Singapore [8]. From autopsies, they found that the hearts of most of the deceased were not enlarged and that their coronary arteries were normal. In the lungs of the 36 Thai workers who died in 1990, breeding and emphysema were noted; of them, 11 showed symptoms of cardiomegalia, breeding or cardiopericarditis. Histologically, breeding of moderate to serious degrees in alveoli and inflammation of cardiac muscles and lung were found. Electronic microscope observations of hearts and lungs did not reveal any unusual disorders in them after death. No influenza virus, respiratory tract virus or enterovirus were isolated from hearts and lungs. No traces of amphetamine, barbituric acid or alkaloid were found in the dead bodies, either. Epidemiological investigations showed that genetics and infection of bacillus pyocyaneus either before or at the time of death were related to the sudden deaths. Biochemical and toxicological investigations did not find any substances that were related to the sudden deaths. However, mental and social pressures such as poor adjustment to the new environment, being away from home, financial difficulties and long working hours might have something to do with the sudden deaths.

Other studies on sudden death come up with different causes. Vimokesant et al.[13] and Munger et al.[14] gave vitamin B1 deficiency as the likely cause. Nimmannit et al.[15] insisted that long-term potassium deficiency was the reason. Serfass and Manatt [16] held a similar view. Kanai and Dejsirilert [17] proposed a theory of bacillus pyocyaneus and sudden death. More studies are needed to understand the causal agents of sudden death.

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