Screening Assessment of Persons 40-59 Years of Age in Rural Thailand by a Mobile Health Unit

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Abstract

This paper reports a screening survey using a mobile unit to determine the prevalence of chronic disorders among persons aged 40-59 years in rural Thailand. A total of 4,812 persons from all the 54 rural villages in Mae Sot District, Tak Province, northern Thailand, were interviewed and examined in 1995. A higher proportion (59.3%) of men were current tobacco smokers than among women (40.4%). A higher proportion (69.6%) of men were current alcohol drinkers compared with women (38.6%). Cutting/piercing was the most frequently reported injury, followed by falls. About half (47.9%) of the persons surveyed had a body mass index (BMI) between 20 and 24.9 and only 2.6 per cent had a BMI of 30 or over. The overall prevalence rates of hypertension and diabetes in the persons surveyed were 13.3 per cent and 2.4 per cent respectively. Of the persons screened, 28.8 per cent had borderline-high blood cholesterol (200-239 mg/dl) and 12.9 per cent had high blood cholesterol ($\geq$240 mg/dl). About 61 per cent of hypertensive persons, 92 per cent of diabetic persons, and nearly all of those with dyslipidaemia were first detected during this screening programme. Five women with breast cancer and 22 with benign breast disorders were also identified during the survey. A screening programme using a mobile unit may be useful in identifying treatable disorders in rural areas, where existing screening services cannot effectively cover the population at risk.

Key word : Screening Assessment, Mobile Health Unit, Thailand

Because of changes in life style and increasing life expectancy, the number and proportion of people with non-communicable disorders have been increasing in many developing countries, including Thailand[1-5]. Several studies have shown that early diagnosis and proper management of treatable disorders such as hypertension, diabetes, and ischaemic heart disease in both middle-aged

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and elderly people can reduce morbidity and mortality[5-9]. In Thailand, particularly in rural areas, many individuals with treatable chronic disorders are usually unrecognized and untreated. A screening programme in hospitals and clinics has limited benefits since the majority of people with inapparent illness rarely attend the service. Screening assessment of the elderly in rural northern Thai communities by a mobile health unit indicated that more than half of those with hypertension, three-quarters of those with diabetes, and a number of persons with other treatable disorders were first detected during the survey[10]. The present paper reports on the screening of persons 40-59 years of age using a mobile unit to determine the prevalence of chronic disorders in the same rural areas in northern Thailand as the previous study. It points out that a number of persons with such disorders could be identified and treated.

MATERIAL AND METHOD
Study population and health care setting

The study was conducted in 1995 in Mae Sot District, Tak Province, located 500 km northwest of Bangkok. The total population of the district in 1995 was 71,929; 50,101 (69.7%) lived in the 54 villages outside the municipality. Persons aged 40-59 years in these rural villages were the subjects of the study. In 1995 the district contained 20 public health centres and one 280-bed general hospital. The hospital was located in the municipal area, whereas the health centres were distributed among the rural villages. Each health centre employed two or three health personnel (one nurse, one midwife, and/or one sanitation worker). In general, the rural population received primary care services from the health centres and secondary care from the hospital.

According to the Thailand Primary Health Care Programme, each rural village in the district had 5-30 trained village health communicators (VHCs), each of whom was responsible for about 10-20 households. The VHCs were residents in the village they served and were trained primarily to educate their neighbours and assist health personnel in matters of preventive and promotive health care.

Survey

We organized a mobile health unit for the screening assessment of persons 40-59 years of age throughout all the rural villages. The team comprised both hospital personnel (a physician, social workers, and public health nurses) and health centre workers. All persons aged 40-59 years in each village were identified and registered by the VHCs and the health centre workers. About two weeks before the screening, health information about chronic diseases and the benefits of the screening programme were disseminated to the villagers through village loud speakers and leaflets. Health education through a group lecture and discussion was provided to the VHCs and the target persons in each village at night a few days before the day alloted for the screening programme. The VHCs were asked to deliver the health message directly to those persons who might not have received the health information and to invite them personally to the screening programme. All persons 40-59 years in each village were then interviewed and examined by the mobile health unit at no charge at the village temple. Assessment at home was carried out by the team for those who had severe disabilities and were unable to attend the screening programme.

The screening questionnaire had two parts. The first part contained questions on sociodemographic characteristics. The second part requested information relating to health, including tobacco smoking, alcohol consumption, use of medication and injury within one month before the interview, history of treatment of chronic diseases, and breast symptoms (women only).

Height and weight were measured in light clothing without shoes. Body mass index (BMI) was computed as kilograms per square meter (kg/m^2). Blood pressure was measured twice on the right arm in a seated position with a standard mercury sphygmomanometer and the average of the two readings was recorded. Hypertension was defined as diastolic pressure ≥ 95 mmHg and/or systolic blood pressure ≥ 160 mmHg[11] or current antihypertensive medication. Breasts of the women were physically examined by trained public health nurses, whereafter those with abnormal findings were examined by the physician.

Fasting venous blood was obtained from each person and forwarded to the laboratory of Mae Sot General Hospital within two hours of collection for analysis of plasma glucose and serum total cholesterol by the enzymatic colorimetric method. Persons who had a plasma glucose ≥ 140 mg/dl were referred to the diabetic clinic of the hospital for repeat testing and management. Diabetes was defined as fasting plasma glucose ≥ 140 mg/dl on

two occasions[12] or current antidiabetic treatment. The serum cholesterol categories were those recommended by the National Cholesterol Education Program[13] as follows: desirable (<200 mg/dl), borderline-high (200-239 mg/dl), and high (≥240 mg/dl).

We used the chi-square test for comparison of proportions and analysis of variance (or the Kruskal-Wallis test) for comparison between means. Logistic regression analysis was used to determine the association between risk factors and hypertension or diabetes.

RESULTS

There were 5,897 persons aged 40-59 years in the study area. A total of 4,812 persons (81.6%) participated in the screening programme. 713 persons (12.1%) refused to be screened and claimed that they were healthy. The remainder (6.3%) were absent and could not be contacted at the time of the survey. Most of the nonrespondents (72.4%) were men.

Sociodemographic characteristics

Table 1 presents the sociodemographic characteristics of the respondents surveyed. The number of respondents participating in the screening decreased by age. The male to female ratio was about 0.7:1. Nearly all had an educational level of primary school grade 7 or less. Most were farmers and about 60.4 per cent of the respondents reported a monthly income ≤2,000 baht (US$ 80).

Tobacco smoking, alcohol drinking, and use of medication

The proportion of current smokers was higher among men (59.3%) than women (40.4%) (Table 2). Most (91.5%) current smokers smoked mainly traditional forms of tobacco (hand-rolled tobacco in a rectangular piece of dry leaf). They were predominantly low-rate smokers; 93.7 per cent of daily smokers smoked <10 pieces per day. A higher proportion (69.6%) of men were current alcohol drinkers compared with women (38.6%).

About 74 per cent of the respondents reported having taken a drug within one month of the interview. The most common type of drug used was analgesics (55.2%), followed by antirheumatics (9.6%), and cardiovascular drugs (5.1%). Women reported having taken antirheumatics, cardiovascular drugs, and sleeping pills more frequently than men.

Table 1. Sociodemographic characteristics of respondents aged 40-59 years in the villages surveyed, Mae Sot, Tak Province, 1995.

Characteristics	No.	%
Total	4,812	100.0
Age (years)		
40-44	1,354	28.1
45-49	1,319	27.4
50-54	1,118	23.2
55-59	1,021	21.2
Sex		
Male	1,956	40.6
Female	2,856	59.4
Education		
None	692	14.4
Primary	4,040	84.0
Higher	80	1.7
Marital status		
Single	110	2.3
Married	4,173	86.7
Widowed/divorced/separated	529	11.0
Occupation		
Farmers	3,565	74.1
Workers	537	11.2
Others	458	9.5
None	252	5.2
Income (baht per month) (US$ 1 = 25 baht)		
≤1,000	1,512	31.4
1,001-2,000	1,395	29.0
2,001-3,000	882	18.3
>3,000	1,023	21.3

Frequency of injury

About 7 per cent of the respondents reported injury within one month before the interview (Table 3). Cutting/piercing was the most frequently reported injury, followed by falls. The prevalence of cutting/piercing was not significantly associated with age and sex, whereas, the prevalence of falls was greater among women than men. Both cutting/piercing injuries and falls occurred mostly in the home.

Body mass index (BMI)

Overall, about half (47.9%) of the respondents had a BMI between 20 and 24.9 (Table 4). The proportion of those who had a BMI of 30 or over was only 2.6 per cent. The mean BMI was greater among women than men and decreased with increasing age.

Table 2. **Smoking status, alcohol drinking, and use of medication within one month before the interview in the population surveyed, by sex.**

		Percentage of population			
		Total	Male	Female	p-value*
No. surveyed		4,812	1,956	2,856	
Smoking status					
Current	-daily	40.0	51.5	32.0	
	-occasional	8.1	7.7	8.4	
Former		26.1	28.4	24.6	<0.01
Never		25.8	12.3	35.0	
Alcohol drinking					
Current	-daily	3.6	7.6	0.8	
	-occasional	47.6	62.0	37.7	
Former		17.5	22.3	14.3	<0.01
Never		31.3	8.1	47.2	
Use of medication within one month**					
Analgesic		55.2	54.9	55.5	0.68
Antirheumatic		9.6	8.5	10.3	0.04
Cardiovascular		5.1	2.8	6.7	<0.01
Sleeping pill		4.7	2.8	6.1	<0.01
Bronchodilator		1.6	1.7	1.6	0.93
Antidiabetic		0.6	0.4	0.8	0.06
Others		28.3	24.0	31.2	<0.01
None		25.8	29.0	23.6	<0.01

  * Differences between males and females
** Some persons reported more than one item

Table 3. **Prevalence rate of injury occurring within one month before the interview in the population surveyed, by age and sex.**

	No.	Prevalence rate (%) of injury*					
	surveyed	None	Cutting/ piercing	Fall	Traffic	Animal/ insect bite	Others
Total	4,812	92.9	2.9	1.7	1.0	0.9	0.9
Age (years)							
40-44	1,354	92.2	3.2	1.7	1.5	0.5	1.0
45-49	1,319	93.0	2.8	1.4	1.3	0.7	1.1
50-54	1,118	93.5	3.0	1.6	0.7	1.0	0.9
55-59	1,021	93.0	2.7	2.3	0.3	1.4	0.5
p-value**		0.64	0.92	0.42	0.02	0.13	0.46
Sex							
Male	1,956	92.3	3.3	1.1	1.5	0.8	1.1
Female	2,856	93.3	2.7	2.1	0.7	0.9	0.8
p-value+		0.19	0.21	0.01	<0.01	0.96	0.35

  * Some persons reported more than one incident
** Differences between age groups
 + Differences between males and females

Table 4. Percentage distribution and the mean of body mass index (BMI) of the population surveyed, by age and sex.

	No. surveyed	Distribution of BMI (kg/m^2,%)				Mean*	p-value
		<20	20-24.9	25-29.9	≥30		
Total	4,812	31.8	47.9	17.7	2.6	21.9±3.7	
Age (years)							
40-44	1,354	23.0	52.7	20.3	3.9	22.6±3.6	
45-49	1,319	28.3	49.0	20.3	2.4	22.3±3.6	
50-54	1,118	36.5	46.6	15.0	1.9	21.5±3.7	<0.01
55-59	1,021	42.9	41.3	14.0	1.8	21.1±3.7	
Sex							
Male	1,956	33.3	53.2	12.3	1.2	21.5±3.0	
Female	2,856	30.8	44.2	21.5	3.5	22.2±4.1	<0.01

*±Standard deviation

Table 5. Percentage distribution and the mean of serum total cholesterol of the population surveyed, by age, sex, and BMI.

	No. surveyed	Distribution of serum total cholesterol (mg/dl,%)			Mean*	p-value
		<200	200-239	≥240		
Total**	4,802	58.3	28.8	12.9	195.9±42.5	
Age (years)						
40-44	1,353	63.3	26.8	9.8	191.7±43.8	
45-49	1,316	59.5	29.6	10.9	194.3±40.6	
50-54	1,116	55.9	28.7	15.4	199.0±42.3	<0.01
55-59	1,017	52.7	30.5	16.8	200.0±42.5	
Sex						
Male	1,953	66.5	23.9	9.6	187.7±39.2	
Female	2,849	52.7	32.1	15.2	201.5±43.7	<0.01
Body mass index						
<20.0	1,526	69.7	23.8	6.6	184.4±36.7	
20.0-24.9	2,301	57.9	29.1	13.0	196.7±41.3	
25.0-29.9	853	42.1	35.2	22.7	211.2±44.0	<0.01
≥30.0	122	37.7	40.2	22.1	216.7±68.1	

* ±Standard deviation
** Ten persons with missing information were excluded from the analysis

Prevalence of some chronic disorders

Few respondents had ever been screened for serum total cholesterol before the survey. Of the persons screened, 28.8 per cent had borderline-high blood cholesterol (200-239 mg/dl) and 12.9 per cent had high blood cholesterol (≥240 mg/dl) (Table 5). The mean cholesterol level for women was greater than that for men. The mean level increased with increasing age and greater BMI.

The overall prevalence rate of hypertension in the population surveyed was 13.3 per cent (Table 6). The rate of hypertension increased with increases in age, BMI and serum cholesterol levels, and being diabetic. Of the 642 hypertensive persons, 389 (60.6%) were first detected during the survey. Of the remaining 253 persons who had ever been diagnosed as hypertensive, only about half (47.4%) reported receiving regular treatment.

Table 6. Prevalence rate of hypertension and diabetes in the population surveyed.

Characteristics	Hypertension			Diabetes		
	No. surveyed	Rate (%)	p-value	No. surveyed	Rate (%)	p-value
Total*	4,812	13.3		4,801	2.4	
Age (years)						
40-44	1,354	9.2		1,353	2.1	
45-49	1,319	12.7		1,315	1.7	
50-54	1,118	14.8	<0.01	1,115	3.1	0.11
55-59	1,021	18.1		1,018	2.8	
Body mass index						
<20.0	1,531	9.1		1,527	1.2	
20.0-24.9	2,303	12.3		2,299	2.0	
25.0-29.9	854	20.8	<0.01	852	4.8	<0.01
≥30.0	124	33.1		123	7.3	
Cholesterol level						
<200	2,800	11.1		2,800	1.6	
200-239	1,382	15.4	<0.01	1,378	2.7	<0.01
≥240	620	18.9		620	5.3	
Diabetes						
No	4,686	13.1				
Yes	115	24.3	<0.01			

* Those with missing information were excluded from the analysis

The overall prevalence rate of diabetes was 2.4 per cent. The rate of diabetes increased with increases in BMI and serum cholesterol levels. Of the 115 diabetic persons, 106 (92.2%) were first detected during the survey. The remaining 9 persons who had previously been diagnosed reported receiving regular treatment.

Multiple logistic regression analysis was used to test the association between risk factors and hypertension or diabetes. The rate of hypertension increased 1.059-fold (95% confidence interval [CI] 1.042-1.075) for 1 year increase in age, 1.123-fold (95% CI 1.097-1.149) for 1 kg/m^2 increase in BMI, 1.004-fold (95% CI 1.001-1.006) for 1 mg/dl increase in fasting plasma glucose, and 1.003-fold (95% CI 1.001-1.005) for 1 mg/dl increase in serum cholesterol. The rate of diabetes increased 1.050-fold (95% CI 1.015-1.086) for 1 year increase in age, 1.162-fold (95% CI 1.110-1.216) for 1 kg/m^2 increase in BMI, and 1.005-fold (95% CI 1.002-1.008) for 1 mg/dl increase in serum cholesterol.

Health education through a group lecture and discussion was provided to those with hypertension, diabetes, and high cholesterol level. They were registered, treated, and followed up, either at the health centre for persons with mild hypertension or in the hospital for those with moderate or severe hypertension, diabetes, and high cholesterol level.

Abnormal physical findings of the breasts were identified in 27 (0.9%) women. Five had breast cancer and the remaining 22 had benign breast disorders. Of the five women with carcinoma of the breasts, four were first detected during the survey, whereas the fifth experienced recurrence of the disease. All women attending the screening programme were taught breast self-examination and were encouraged to perform regular examination by themselves.

DISCUSSION

Thailand is experiencing rapid urbanization and industrialization, lifestyle changes, and increased longevity following an improvement in the control of infectious and parasitic diseases. This results in a rising incidence of cardiovascular diseases. A number of clinical trials have shown that treatment of hypertension and dyslipidaemia can reduce cardiovascular morbidity and mortality (6,14-17). Early detection of diabetes in asymptomatic persons will result in effective treatment that may retard its progression and reduce the risk or the

severity of complications, thus diminishing premature morbidity and mortality[7]. The underdiagnosis of hypertension, dyslipidaemia, and diabetes is a major problem in rural areas and can be solved by an accessible screening programme. Our screening programme revealed that 61 per cent of hypertensive persons, 92 per cent of diabetic persons and nearly all of those with dyslipidaemia were first detected during the survey. Some women with breast cancer and benign breast disorders were also identified during the screening programme. Since these persons could be brought to treatment, there were potential benefits from our screening programme using a mobile unit.

Our survey indicated that tobacco smoking was highly prevalent among the study population. Cessation of smoking has beneficial effects on both cardiovascular and non-cardiovascular morbidity and mortality[18,19]. The dramatic decline in the prevalence of smoking in many developed countries shows that smokers can be persuaded to give up either on their own or in response to a variety of intervention programmes[18,19]. Smoking cessation programmes should be one component of preventive measures beneficial to the study population. In addition to health personnel, monks might serve as agents for change of smoking behaviour in rural Thailand[20].

Cutting/piercing injuries and falls were the two most common causes of reported injury in the population surveyed. Compared with older persons in the area, this 40-59 year old population experienced a higher rate of cutting/piercing, whereas, the elderly suffered more from falls[10]. Educating people about the potential hazards of cutting tools and safe handling procedures may be effective in reducing cutting/piercing injuries. People should be encouraged to perform regular excercise for prevention of osteoporosis, a risk factor for fractures following falls. Further study of the factors contributing to the incidence of such injuries is needed for the development of prevention.

Overweight and obesity have been shown to be associated with an increased risk of a number of chronic diseases[5,7,21,22]. Our survey also found an increase in the prevalence of hypertension, diabetes, and hypercholesterolaemia with increasing BMI. Control of excess weight in the area could result in improvement in such disorders and thus in cardiovascular diseases. However, weight loss is notoriously difficult in obese persons[23]. Instructing people to maintain a healthy body weight and avoid obesity should be one beneficial preventive strategy.

Early detection of inapparent health problems in persons before reaching the age of 60 and proper management can not only reduce morbidity and mortality but also slow the transition from disease to disability and therefore reduce the need for institutional long-term care in the elderly. We suggest that, in rural areas, where existing screening services cannot effectively cover the population at risk, the use of mobile units may be helpful in identifying medically treatable conditions.

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การสำรวจภาวะสุขภาพของประชากรอายุ 40–59 ปี ในชนบทไทย โดยหน่วยสาธารณสุขเคลื่อนที่

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ฉวีวรรณ เขาวกีรดิพงศ์, วท.บ.*, พัชรี เงินตรา, วท.บ.*, ยุวดี ตาทิพย์, สศ.บ.*,

ศุภวรรณ คุณโชติ, สศ.บ.*, ชิด บุญมาก, สศ.บ.*, ปิยนิตย์ ธรรมาภรณ์พิลาศ, พ.บ., ส.ม.**

รายงานฉบับนี้ได้นำเสนอผลการสำรวจภาวะสุขภาพ โดยหน่วยสาธารณสุขเคลื่อนที่ ในกลุ่มประชากรอายุ 40–59 ปี ของ 54 หมู่บ้านในเขตอำเภอแม่สอด จังหวัดตาก เมื่อปี พ.ศ.2538 โดยการสัมภาษณ์ การตรวจร่างกาย และการตรวจทางห้องปฏิบัติการ มีผู้เข้ารับการสำรวจรวม 4,812 ราย จากการศึกษาพบว่า ร้อยละ 59.3 ของเพศชาย และร้อยละ 40.4 ของเพศหญิง ปัจจุบันยังคงสูบบุหรี่อยู่ สำหรับผู้ที่ยังดื่มแอลกอฮอล์อยู่ในปัจจุบัน ก็พบสูงในเพศชาย (ร้อยละ 69.6) มากกว่าในเพศหญิง (ร้อยละ 38.6) การโดนของมีคมบาดเป็นการบาดเจ็บที่พบได้บ่อยที่สุดในประชากร กลุ่มนี้ รองลงไป ได้แก่ การพลัดตกหกล้ม ร้อยละ 47.9 ของประชากรที่สำรวจมีความหนาแน่นของมวลกายอยู่ระหว่าง 20 ถึง 24.9 กก./ม.^{2} และเพียงร้อยละ 2.6 ที่มีความหนาแน่นของมวลกายเท่ากับหรือมากกว่า 30 กก./ม.^{2} อัตรา ความชุกของโรคความดันโลหิตสูง และโรคเบาหวานในประชากรที่สำรวจเท่ากับร้อยละ 13.3 และ 2.4 ตามลำดับ สำหรับ ระดับโคเลสเตอรอลในเลือด พบว่าร้อยละ 28.8 มีระดับโคเลสเตอรอลอยู่ระหว่าง 200–239 มก./ดล. และร้อยละ 12.9 มีระดับโคเลสเตอรอลเท่ากับหรือสูงกว่า 240 มก./ดล. จากการศึกษาพบว่า ร้อยละ 61 ของผู้ที่มีความดันโลหิตสูง ร้อยละ 92 ของผู้ป่วยโรคเบาหวาน และเกือบทั้งหมดของผู้ที่มีระดับโคเลสเตอรอลสูง ไม่เคยได้รับการตรวจวินิจฉัยมาก่อน และ เป็นการตรวจพบครั้งแรกจากการออกหน่วยเคลื่อนที่ สตรี 5 ราย ที่เป็นมะเร็งเต้านม และอีก 22 ราย ที่มีความผิดปกติอื่น ๆ ของเต้านม ก็เป็นการตรวจพบจากการออกหน่วยเคลื่อนที่เช่นเดียวกัน ผู้รายงานมีความเห็นว่า การออกหน่วยสาธารณสุข เคลื่อนที่จะมีส่วนช่วยในการค้นหาปัญหาสุขภาพ โดยเฉพาะโรคไม่ติดต่อที่สามารถให้การรักษาได้ในประชากรเขตชนบทไทย

คำสำคัญ : การสำรวจภาวะสุขภาพ, หน่วยสาธารณสุขเคลื่อนที่, ประเทศไทย

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