

The role and expectation of corporate physicians in occupational health services in Thailand

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Objective : *To explore the roles and expectations of corporate physicians in occupational health (OH) services*

Setting : *Department of Preventive and Social Medicine, Faculty of Medicine, Chulalongkorn University*

Design : *Cross-sectional descriptive study*

Methodology : *The study was conducted by mailing questionnaires to 294 large-scale Enterprise physicians. In-depth interviews were conducted with 10 corporate physicians. The Mann Whitney U test, Kruskal-Wallis H test and Spearman's Rank Correlation were used for statistical analyses.*

Results : *It was found that 219 enterprises employed corporate physicians. The response rate was 59.8 %. Data from the questionnaires revealed that most physicians were employed part-time (85.5 %). Diagnosis and treatment were the duties most performed by, and expected from, these physicians. In contrast, the least performed and expected duties were pre-retirement health examinations, followed by impact assessments of waste disposal. Factors affecting the physician's roles were age, employment, income,*

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working experience, OH training, participation in OH policy making, membership in safety committees, experience gathered abroad, knowledge of law, enterprise's employment status of the physician, and physician's job description ($p < 0.05$). Whereas factors affecting the physician's expectations were the physician's employment, knowledge of law, category of the enterprises, and enterprise's employment status of the physician ($p < 0.05$). The correlation between the physician's roles and expectations was low ($r_s = 0.173$) but significant ($p = 0.048$). In-depth interviews revealed that the additional expected roles were as follows: participation in administration, walk-through surveys, health data analyses, research activity, and health education.

Conclusions : *It was recommended that medical institutes include more adequate training in occupational medicine. These findings indicate that multisectors should collaborate to improve OH services. Medical schools ought to increase the contents on occupational medicine for medical students not only treatment but also the entire practice.*

Key words : *Role, Corporate physician, Occupational health.*

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บทบาทหน้าที่และความคาดหวังของแพทย์ประจำสถานประกอบการขนาดใหญ่ต่องานบริการ
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วัตถุประสงค์ : เพื่อศึกษาบทบาทหน้าที่และความคาดหวังของแพทย์ประจำสถานประกอบการ
ต่องานบริการอาชีวอนามัย

สถานที่ที่ทำการศึกษา : ภาควิชาเวชศาสตร์ป้องกันและสังคม คณะแพทยศาสตร์ จุฬาลงกรณ์มหา-
วิทยาลัย

รูปแบบการวิจัย : การสำรวจแบบตัดขวาง ณ เวลาหนึ่ง

วิธีการ : ส่งแบบสอบถามทางไปรษณีย์ให้แพทย์ประจำสถานประกอบการขนาดใหญ่
ใหญ่ทุกแห่งในประเทศไทย จำนวน 294 แห่ง และสัมภาษณ์เจาะลึกแพทย์
ประจำสถานประกอบการจำนวน 10 แห่ง เปรียบเทียบความแตกต่างโดย
Mann Whitney U test, Kruskal - Wallis H test และหาความสัมพันธ์โดย
Spearman's Rank Correlation

ผลการศึกษา : สถานประกอบการมีแพทย์อยู่ 219 แห่ง อัตราตอบกลับ 59.8% จากแบบ
สอบถามพบว่าแพทย์ประจำสถานประกอบการส่วนใหญ่เป็นแพทย์ Part-time
(85.5%) บทบาทหน้าที่ที่แพทย์ปฏิบัติและคาดหวังให้ปฏิบัติมากที่สุดเป็น
บทบาทด้านการวินิจฉัยและรักษาโรค ที่น้อยที่สุดเป็นการตรวจสุขภาพก่อน
ออกจากงาน รองลงไปเป็นการวิเคราะห์ผลกระทบของเสียจาก กระบวนการ
การผลิต ปัจจัยที่มีผลต่อบทบาทหน้าที่แพทย์ ได้แก่ อายุ ลักษณะการว่าจ้าง
รายได้ ประสบการณ์ทำงาน ชั่วโมงการทำงาน การอบรมด้านอาชีวอนามัย
การร่วมกำหนดนโยบายอาชีวอนามัย การเป็นกรรมการความปลอดภัย การดู
งานต่างประเทศ การทราบกฎหมายเกี่ยวกับอาชีวอนามัย ลักษณะการว่า
จ้างแพทย์ของสถานประกอบการ การมี Job Description ของแพทย์ ($p < 0.05$)
ส่วนปัจจัยที่มีผลต่อความคาดหวังได้แก่ ลักษณะการถูกว่าจ้าง การทราบ
กฎหมายเกี่ยวกับอาชีวอนามัย ประเภทสถานประกอบการ ลักษณะการว่า
จ้างแพทย์ของสถานประกอบการ ($p < 0.05$) ความสัมพันธ์ระหว่างบทบาท
หน้าที่ที่มีกับความคาดหวังมีค่าต่ำ ($r_s = 0.173$) แต่มีนัยสำคัญทางสถิติ
($p = 0.048$) การสัมภาษณ์เจาะลึกพบว่า บทบาทที่ควรเพิ่มเติม ได้แก่ การมี

ส่วนร่วมในงานบริหารการสำรวจสถานประกอบการ การพิจารณาข้อมูลสุขภาพ การวิจัย และการให้สุขศึกษา โดยที่สถาบันการศึกษาแพทย์ควรมีการฝึกอบรมด้านอาชีวเวชศาสตร์ให้เพียงพอ

วิจารณ์และสรุป : การศึกษาครั้งนี้แสดงให้เห็นแนวทางการพัฒนาบริการอาชีวอนามัย ว่า เป็นสิ่งที่ทุกฝ่ายควรร่วมมือกัน โดยเฉพาะโรงเรียนแพทย์ควรเพิ่มเนื้อหาวิชาด้านอาชีวเวชศาสตร์ที่ไม่มุ่งเน้นแต่การรักษาโรคเท่านั้น

คำสำคัญ : บทบาทหน้าที่, แพทย์ประจำสถานประกอบการ, อาชีวอนามัย

Comprehensive health care consists of health promotion, disease prevention, early diagnosis and prompt treatment, and rehabilitation. The threat to global health has shown tendencies to shift from communicable diseases and poverty-related diseases towards non-communicable diseases and behavior-related diseases.⁽¹⁾ Health promotion is one of the key success factors to Health For All, and health promotion at the workplace is crucial for that success,⁽¹⁾ since the majority of the population (58%) spend one-third of their lives at the workplace, and work may put them at risk of getting ill from health hazards. On the other hand, work may contribute positively to their lives economically and socially.⁽²⁾ Hence, occupational health services for workers at the workplace are essential for sustainable national economic and social development.⁽³⁾ The World Health Organization reported that 120 million accidental injuries with 200,000 fatalities and 157 million cases of occupational diseases are estimated to occur among the global workforce annually.⁽⁴⁾ The economic loss was estimated at 10-15 % of the global gross national product.⁽⁵⁾ Workers have limited access to health services : 20-50 % in developed countries and only 5-10 % in developing countries.⁽⁵⁾ The World Health Organization stated in 1995 that most developing countries hardly recognized work-related illness.⁽³⁾ Good occupational health services require competent personnel working as a team. Physicians are usually assumed to be the leaders of health teams, and the same applies to occupational health services. Therefore, occupational health physicians should be competent in occupational health services, properly informed, and entertain the vision to continuously improve such services.^(6,7)

Thailand's direction of health service improvement has adopted the global trend by putting health promotion and disease prevention policies into The 8th National Economic and Social Developmental Plan (1997-2001) emphasizing health and environment in the community and workplace⁽⁸⁾ Currently, the law requires that large workplaces with more than 1000 employees have a physician to provide medical service for at least 2 hours a time.⁽⁹⁾

Occupational injuries reported nationwide increased from 216,525 cases in 1995 to 245,817 cases in 1996 (13.53%).⁽¹⁰⁾ The Division of Epidemiology, Office of The Permanent Secretary, Ministry of Public Health, reported mortality and morbidity from occupational diseases at 3,572 cases in 1995⁽¹¹⁾ and 3,435 cases in 1996.⁽¹²⁾

A survey conducted by Teraoka T. and Chavalitnikul C. in 1990 regarding safety management in medium and large scale enterprises in Thailand revealed that there were 63 large enterprises. Nine of these (14.3%) had a full-time physician, 42 (66.7%) had a part-time physician, 8 (12.7%) did not have a physician, and 4 (6.4%) did not respond to the survey.⁽¹³⁾

Currently, most physicians working in the large enterprises are general practitioners or specialists in fields other than occupational medicine. Therefore, most services provided have their emphasis on treatment and first aid. Improving occupational health services requires some basic information and a thorough understanding of various aspects, some of which are the current practice of the corporate physicians and their expectations regarding these services. To the best of our knowledge, there have been no studies in Thailand addressing corporate

physicians' functions and roles. The purpose of this study was to explore current practice of corporate physicians and their expectations regarding these services. However, we limited our study among large-scale enterprises since they are required by law to have a physician.

Materials and Methods

Quantitative This was a cross-sectional descriptive study. Questionnaires were mailed to the corporate physicians of 294 large-scale enterprises (more than 1,000 employees each). The questionnaire was comprised of 3 parts: general information, current practice in occupational health services (practiced regularly, occasionally, or not practiced), and their expectations regarding these services (requirement).

Qualitative Then, ten of the subjects willing to participate in phase 2 were randomly selected, 5 were full-time and 5 were part-time employed. They were interviewed using a semi-structured interview guide. Detailed opinions regarding occupational health training were also solicited.

Data obtained were analyzed by appropriate descriptive statistics (percent, mean, standard deviation) and inferential statistics (Chi-square test, Mann Whitney U test, Kruskal-Wallis H test, and Spearman's Rank Correlation Coefficient).

Results

Two hundred and nineteen (74.5%) large-scale enterprises hired at least one physician, 131 of these (59.8%) replied to the questionnaires. Responding and non-responding enterprises had comparable basic characteristics, (geographical location, type of enterprises - products or services, type of physician

employment), and the differences were not statistically significant (data not shown).

The general description of the subject physicians is as follows

- male (84%)
- age 31-40 years (30.5%)
- hired as part-time (85.5%)
- not trained in occupational or preventive medicine (92.4%)
- income from the enterprise 10,000-20,000 Baht per month (32.1%)
- duration of employment in this enterprise 4-10 years (42%) with a mean of 8.5 years
- working hours in the enterprise 1-10 hours (77.9%) with a mean of 10.5 hours
- no experience from other enterprises (49.6%)
- not trained in occupational health or occupational medicine (74.8%)
- not contributing to occupational health policy making (38.9%)
- not a member of occupational and safety committees (83.2%)
- no experience from abroad (87.8%)
- not a member of occupational health or medicine organizations (94.7%)
- not thoroughly informed as to the laws related to occupational health (66.4%)

The general description of the enterprises was as follows:

- without a mother enterprise in a foreign country (63.4%)
- more orientated towards producing products than providing services (103 vs 28)
- hired only part-time physicians (85.5%)
- have physician's job description (52.7%)

- have occupational health policy (66.4%)
- direct line of command to the physician via personnel department (54.2%) vs health or safety departments (6.1%)

Current practices and expectations of occupational health services are shown in Tables 1 to 5.

Table 1 shows that providing health advice before retirement/quitting the enterprise and contribution to health promotion program were not practiced by most physicians. However, they were expected in the future in a much higher percentage.

Table 2 shows that current practice regarding disease prevention were regularly practiced for less than 40%; moreover, preretirement examination were not practiced for 84%. However, they were expected in the future in a much higher percentage.

Table 3 shows that most current practice regarding diagnosis and treatment were regularly practiced.

Table 4 shows that the most regularly-practiced among the current practice regarding rehabilitation was follow up after medical/nursing treatment, and the most not-practiced was return-to-work examination after illness or injury. However, they were expected in the future in a much higher percentage.

Table 5 shows that current practice regarding other aspects that were seldom regularly practiced were conducting or supporting occupational health research, participation in occupational health policy making, analysis of data regarding raw materials, analysis of data regarding the production process, analysis of data regarding waste from the production process, and use of related data in planning for disease/injury prevention. Fortunately, they were expected in a much higher percentage in the future.

Table 6 shows that most corporate physicians expected to be more involved and educated in occupational medicine, which can be considered a good trend.

Table 1. Percent of current practice and expectations regarding health promotion (n = 131).

Functions and roles	Practice (percent)			Expected to be Practiced (percent)
	Regularly Practiced	Occasionally Practiced	Not Practiced	
Providing health advice during employment hours	72.5	25.2	2.3	100.0
Providing health advice before retirement / quitting the enterprise	15.3	31.3	53.4	94.7
Education about health hazards at the workplace	35.9	50.4	13.7	100.0
Education about general health	52.7	36.6	10.7	98.5
Contribution to health promotion program	19.8	25.2	55.0	97.7
Education/training of employee/employer regarding health promotion and disease prevention	22.1	40.5	37.4	96.6

Table 2. Percent of current practice and expectations regarding disease prevention (n = 131).

Functions and roles	Practice (percent)			Expected to be Practiced (percent)
	Regularly Practiced	Occasionally practiced	Not Practiced	
Promoting vaccination for general infectious diseases	35.1	38.9	26.0	96.9
Promoting vaccination for work-related infectious diseases	29.0	35.1	35.9	99.2
Preplacement examination	32.1	22.1	45.8	93.1
Considering the employee's health and his job	26.7	7.6	65.7	88.5
Periodic examination	29.0	16.8	54.2	93.1
Preretirement examination or examination before quitting the enterprise	3.8	12.2	84.0	81.7
Analysis of health examination data	32.8	19.9	47.3	96.9
Walk-through survey	9.9	26.7	63.4	85.5
Applying health data for planning disease prevention	31.3	28.2	40.5	96.9

Table 3. Percent of current practice and expectations regarding diagnosis and treatment (n = 131).

Functions and roles	Practice (percent)			Expected to be Practiced (percent)
	Regularly Practiced	Occasionally practiced	Not Practiced	
Taking of general history	92.4	4.6	3.0	100.0
Taking of history regarding exposure to health hazards at the workplace	75.6	18.3	6.1	100.0
General physical examination	89.3	6.9	3.8	99.2
Physical examination for occupational diseases	70.2	19.1	10.7	100.0
Disease diagnosis	89.3	3.8	6.9	100.0
Providing treatment in medical/nursing room	93.1	6.1	0.8	100.0
Referring the employee to specialists	90.9	7.6	1.5	100.0

Table 4. Percent of current practice and expectations regarding rehabilitation (n = 131).

Functions and roles	Practice (percent)			Expected to be Practiced (percent)
	Regularly Practiced	Occasionally practiced	Not practiced	
Return-to-work examination after illness or injury	19.9	18.3	61.8	92.4
Follow up after medical/nursing treatment	64.1	26.0	9.9	100.0
Assessment of working ability after illness/injury/disability	39.7	34.3	26.0	99.2
Consideration of occupational change after illness/injury/disability	32.1	30.5	37.4	95.4

Table 5. Percent of current practice and expectations regarding other aspects (n = 131).

Functions and roles	Practice (percent)			Expected to be Practiced (percent)
	Regularly Practiced	Occasionally practiced	Not practiced	
Conducting or supporting occupational health research	16.8	25.2	58.0	99.2
Participation in occupational health policy making	17.6	30.5	51.9	98.5
Keeping health data confidential	67.9	13.8	18.3	96.2
Analysis of data regarding raw materials	9.1	21.4	69.5	87.8
Analysis of data regarding the production process	9.1	21.4	69.5	87.0
Analysis of data regarding waste from the production process	8.4	19.8	71.8	87.0
Use of related data in planning for disease/injury prevention	11.4	23.7	64.9	92.4
Recording illness/ injury	91.6	6.1	2.3	100.0
Conducting disease/injury investigation	55.7	26.7	17.6	99.2
Reporting the illness/injury	63.4	20.6	16.0	97.7
Analysis of data regarding health and disease/injury	33.6	22.9	43.5	94.7
Suggesting disease/injury prevention and control measures to employers and concerned bodies	31.3	45.0	23.7	98.5

Table 6. Percent of physicians' expectations regarding their status and education (n = 131).

Physicians' expectation	Percent of physicians
Membership in occupational health and safety committee	96.2
Knowing and participating in law compliance regarding	
Labour protection	93.9
Designated high risk jobs	97.7
Occupational diseases	99.2
Welfare related to employees' health	95.4
Postgraduate training in occupational health/medicine	95.4
Member in occupational health/medicine organization	95.4

Table 7 shows that full-time physicians had higher mean rank than part-time physicians in both current practice and expectation. Factors affecting both current practice and expectation were knowledge of occupational health laws and type of physician employment. Type of enterprise affected only expecta-

tion, whereas the remaining other factors affected only current practice. Spearman's Rank Correlation coefficient between mean rank of current practice and expectation was low ($r_s = 0.173$) but significant ($p = 0.048$).

Table 7. Mean rank of factors influencing the current occupational health practice and expectations from these services.

	Mean Rank	
	Current practice	Expectation
Age (n = 126)	(**)	(ns)
Below 31 years	46.3	56.5
31 - 40 years	55.5	56.0
41 - 50 years	59.0	75.7
51 - 60 years	88.4	70.1
Above 60 years	74.6	58.2
Type of employment (n =131)	(*)	(*)
Full -time	104.0	85.6
Part -time	59.6	62.7
Income from the enterprise (n =128)	(**)	(ns)
Less than 10,000 Baht per month	42.4	72.7
10,000 - 20,000 Baht per month	66.2	58.5
20,001 - 30,000 Baht per month	73.5	59.4
30,001 - 50,000 Baht per month	67.7	59.1
Above 50,000 Baht per month	99.6	73.8

Table 7. (Continued)

	Mean Rank	
	Current practice	Expectation
Duration of employment (n =131)	(**)	(ns)
1 -3 years	48.2	64.2
4 - 10 years	75.0	71.6
Above 10 years	75.9	58.8
Work hours per week (n =131)	(**)	(ns)
1 - 10 hours	60.7	63.0
11 - 40 hours	79.4	75.6
More than 40 hours	116.6	82.5
Training in occupational health/medicine (n =131)	(*)	(ns)
Had	81.9	67.4
Did not have	60.6	67.7
Participation in occupational health policy making (n =87)	(*)	(ns)
Participate	54.9	47.1
Did not participate	36.3	41.8
Membership in occupational health and safety committee (n =131)	(*)	(ns)
Yes	89.2	67.6
No	61.3	65.7
Occupational health/medicine experience acquired abroad (n =131)	(*)	(ns)
Yes	101.8	64.3
No	61.0	64.1
Knowledge of occupational health laws (n =131)	(*)	(*)
Yes	84.3	74.5
No	56.8	61.7
Type of enterprise (n =131)	(ns)	(*)
Produce products	65.5	61.8
Provide services	67.7	81.4
Type of physician employment (n =131)	(**)	(**)
Full - time only	100.7	81.5
Part - time only	59.7	62.7
both Full - time and Part - time	107.8	94.5
Physician's job description available (n =130)	(*)	(ns)
Yes	73.9	68.6
No	56.0	62.0

* significantly different ($p < 0.05$) by Mann Whitney U test , ns = not significant

** significantly different ($p < 0.05$) by Kruskal-Wallis H test

The data obtained from in-depth-interviews could be described as follows:

1. Job description was essential as a guideline for occupational health practice.

2. Laws related to occupational health and medicine were important as a framework for occupational health practice, however, these laws should be strictly enforced.

3. A health insurance system, social security system, and health-care-cost-reimbursement system might result in incompleteness of the employees health data and erroneous diagnoses.

4. Major obstacles to the physician's practice were : lack of authority to change the job of the ill or exposed employees, lack of access to those employees at highest risk for occupational health hazards, employees lack of knowledge and understanding in disease/injury prevention, budget and time constraints, lack of employers support for the projects, employees working environment highly competitive, and line of command separates treatment from prevention components.

5. Function and roles of corporate physicians to be added : participation in occupational health management, walk-through surveys, health data assessment for individual employees, research, and health education of employees.

6. Roles of medical schools in occupational health/medicine improvement : integration of occupational health and safety into the medical curriculum, enlarging the occupational medicine training program, co-ordination of related organizations, and offering short course training in occupational medicine.

7. The laws to regulate the minimum functions and roles of corporate physicians were appropriate,

but they had to be clear and practicable according to the enterprise's characteristics, and be strictly enforced.

Discussion

A 59.8% response rate and non-significant difference between responders and non-responders implied the subjects to be good examples of the study population.

Enterprises with more than 1,000 employees that had not hired any physicians relied on their contracted hospitals to provide occupational health services. This practice might be against the law and lead to poor quality of occupational health services since there was no in-house occupational health service provided by trained professionals. This also pointed to a weakness of the current laws, and their poor enforcement.

There were only a few physicians trained in occupational or preventive medicine, compared to a study by Holness D, et al in Canada where 60% had been trained in occupational medicine.⁽¹⁶⁾ The reasons for these few training programs might be a lack of knowledge and recognition of occupational diseases, toxic substances, and environment by the employees, employers, and the government.⁽¹⁷⁾ Investments in health and safety usually do not guarantee obvious financial return.⁽¹⁷⁾ Physicians experienced difficulty and conflict in diagnosing occupational diseases. In other words, there were ethical dilemmas between the workers health and corporate goals.⁽¹⁸⁾ Some physicians might have a bad attitude towards occupational health.⁽¹⁷⁾ Moreover, most health professionals lacked knowledge and understanding of workplace health hazards.⁽¹⁹⁾ The general population

and workers in particular still lack a proper safety attitude, for example regarding the use of toxic substances.⁽¹⁷⁾ This situation holds true even in developed countries such as the United Kingdom.⁽²⁰⁾ Occupational medicine is a specialty that can draw little attention from physicians seeking to further their postgraduate training. Most institutes are not prepared and not ready to offer such training. In-depth interviews revealed that most corporate physicians wanted medical schools to increase the occupational medicine contents in the curriculum including prevention and treatment of occupational diseases.

Most corporate physicians are hired part-time. This is in agreement with a study by Teraoka T. and Chavalitnitikul C. performed in 1990 in which 66.67 % of the physicians in Thailand were hired part-time.⁽¹³⁾ This obviously differs from the Canadian situation where the full-time : part-time ratio was 55 : 45.⁽¹⁶⁾

The average of the physicians working hours amounted to 10.5 hours per week, whereas the majority (77.9 %) worked for less than 10 hours per week. Few corporate physicians were trained in occupational medicine as could be expected since there are few training institutes in Thailand, and few physicians were interested in this specialty. This study revealed that 75 large scale enterprises (25.4 %) did not hire any physicians, compared with 12.7 % in a 1990 survey.⁽¹³⁾ Most of them explained that in cases of health problems they would refer the employees to the contracted or near-by hospitals. This implied that they were not concerned with primary prevention which could be more cost effective.^(23,24) Even in those enterprises that hired a physician, some assigned only treatment jobs to the physicians, especially to those employed

part - time.

The current trend has shown more cases of claims and legal settlements related to work. However, some corporate physicians (66.4 %) do not know the laws related to occupational health practice. In developed countries, this has been a serious concern⁽²⁸⁾ as can be seen in the Code of Ethics of The American College of Occupational and Environmental Medicine (ACOEM)⁽²⁹⁾ or in the Code of Conduct of The American Medical Association and The International Commission of Occupational Health.⁽³⁰⁾ In-depth interviews revealed that corporate physicians view the current laws as unclear, unpractical, lacking specificity regarding the different types of enterprises, and lacking strict enforcement. They suggested these need to be revised and corrected as appropriate.

There were 4.6 % of the enterprises that hired both full - and part-time physicians. This represents a new trend compared to the 1990 survey that found that none of the enterprises hired both types of physicians. It might have ensued because the full-time physicians also had to perform administrative work and/or the enterprises grew larger with more employees thus requiring more physicians.⁽¹³⁾

Some corporate physicians thought that occupational health and safety policies and the physicians job descriptions rendered their work more difficult; they viewed their roles as only providing treatment. In contrast, some thought that they should participate in making occupational health and safety policies and in revising their job description so that they could provide suggestions; they viewed their roles as comprehensive health care providers, including prevention. Another problem was to

separate treatment from prevention, which rendered the health data incomplete and some useful information got lost.

Most of the functions of corporate physicians regarding general health promotion were regularly practiced. This was in agreement with a study by Williams, et al which found that medical advice regarding the working environment was the most important,⁽³²⁾ whereas health promotion programs at the workplace ranked tenth in importance.⁽³²⁾

Regarding physical examinations of employees, most physicians regularly performed preplacement and periodic examinations, but few performed pre-retirement or exit examinations. In-depth interviews revealed that some physicians viewed the previous annual periodic examination as a good surrogate for a pre-retirement examination.

Only 35.9 % of the corporate physicians regularly performed health education on workplace health hazards. This should be encouraged since most employees tend to believe their physicians.⁽³³⁾ In the United States and several European countries, there have been laws to oblige physicians to give health education on health hazards to the employees and perform preventive measures.⁽³⁴⁾

Few (9 %) of the corporate physicians regularly performed a walk-through survey which constitutes one of the more important preventive measures. Walk-through surveys are one of the pillars of environmental monitoring and occupational disease surveillance,⁽³⁵⁾ helping to understand the workplace health hazards and risk factors and hence, leading to appropriate preventive measures.⁽³⁶⁾ However, some physicians did not perform this because the enterprise's policy did not allow them to.

Most physicians (65.7 %) did not consider health and job fitness, although "to fit the man to the job and fit the job to the man" is the ultimate goal of occupational health.⁽³⁷⁾ This differed from the situation in Israel where health and job fitness is one of the most frequent practices.⁽³⁸⁾ In general, functions regarding disease prevention were regularly performed in only 36 % of the enterprises, and this has to be corrected.⁽²³⁾

Functions regarding treatment were regularly performed. But functions regarding rehabilitation were hardly performed on a regular basis, as for example return-to-work examinations were regularly performed in only 19.9 % of the enterprises, and occupational change was considered in only 32.1 %. The reasons might be that these functions overlapped with other personnel's functions and authority, especially the managers. The solution should be for the physicians to make suggestions to the managers about employees job changes.

Functions regarding other aspects that were seldom performed were health data analyses, prevention program planning, and participation in occupational health policy making. These might be viewed as administrative aspects of occupational health services expected to be performed and increasingly important in the future.⁽⁴⁰⁾ In-depth interviews revealed that full-time physicians performed more administrative work than their part-time counter-parts and that they also had a better attitude towards disease prevention. Hence, to increase the physicians administrative functions might require a change in the enterprise's policy towards full-time employment of the physician.

Functions regarding research were hardly performed. This has to be altered and improved⁽²⁰⁾

as a study in the United Kingdom has shown that most physicians trained in occupational medicine viewed this as the most important function.⁽⁴¹⁾

The main reason that most physicians still perform only the treatment aspect of the comprehensive health services might lie in the enterprises policy and the physicians job description which they did not participate in creating. Besides, some employers did not realize the importance of occupational health services, some physicians did not understand their roles, and some employees did not realize the occupational health problems.

Regarding expectations of the physicians practice, most physicians were expected to perform most appropriate activities, however, this might have resulted from using closed - end questions, which was a bias in this study. The fact that the activity should, must, or could be performed might not have been thoroughly considered. This study could, however, solicit the physicians opinion on a theoretical basis.

It is of note that functions regarding the assessment of work impact on health and using health data in planning prevention programs, were performed least compared with other functions(87.0-87.8 %). This might be due to the physicians not being educated in workplace health hazards since they had not been specifically trained in occupational health. Moreover, most enterprises hired them part-time with less than 10 working hours per week, thus discouraging them to participate in administrative functions. This was confirmed by in-depth interviews. The current trend that OSHA (Occupational Safety and Health Administration) and NIOSH (National Institute for Occupational Safety and Health) proposed is that the physician act as the leaders of

the health component of the safety, health, and environment components (i.e., be the Chief Health Officer).⁽⁴³⁾ Data analyses and management were parts of the administrative tasks. Muto, et al found the application of statistics and health data for planning to be the most frequent approaches towards improvement of occupational health services.⁽⁴⁴⁾ Other practices not currently practiced on a regular basis (less than 40 %) and expected to be performed to a larger extent in the future were membership in the occupational health and safety committee, knowledge of the laws and contribution to their compliance, continuing education, and membership in an occupational health organizations.

Although the correlation between the current practice and the expectations was positive and significant ($p = 0.048$), the magnitude of the correlation was low ($r_s = 0.173$). Of course, this was based on non-parametric tests that were appropriate since the data was not normally distributed. Had the data been normally distributed, parametric tests (i.e., Pearson's correlation coefficient) would have been used and the magnitude of the correlation would have been higher.⁽⁴⁵⁾

In general, the current practice of corporate physicians was not theoretically complete. This might be due to the fact that they had not been properly trained by the medical schools. They did not expect to lead the occupational health team; this should be viewed as an urgent problem. Behrens, et al also reported that the roles of physicians regarding occupational disease prevention were not adequately taught in medical schools.⁽⁴⁶⁾ In-depth interviews, again, revealed that some physicians expected the medical schools to augment occupational health and medicine

contents in the medical curriculum and offer short course training and continuing education in occupational medicine.

In summary, this study has revealed that most large-scale corporate physicians were not adequately trained in occupational medicine, and moreover, were hired as part-time. These limit their current practice to only treatment and not disease/injury prevention. We proposed some long-term and short-term remedies for medical schools. Long-term measures are (post-graduate) residency training program in occupational medicine and improvement of (undergraduate) occupational health classes by emphasizing disease/injury prevention. Short-term measures are some practical short courses in occupational medicine for these corporate physicians. Along with these, law amendments such as requirement of the large-scale enterprises to have a full-time physician should also be processed.

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