

Health Status of Health Care Workers at Srinagarind Hospital: Experience from the Annual Health Check-up Program

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The authors conducted this study to evaluate the efficacy of a health check-up program and the health status of health care workers at Srinagarind Hospital, Faculty of Medicine, Khon Kaen University. The authors reviewed all yearly-check up charts of personnel who worked at Srinagarind Hospital from 2002 to 2003 including history taking, physical examination, and laboratory testings. There were 606 office workers and 1,024 nursing staff enrolled. The mean ages of both groups were 38.9 and 36.5 years old, respectively. The office workers visited physicians significantly more often than the nursing staff (553 of 606 vs 271 of 1,024; p -value = 0.00). Obesity was found much more in office workers (127 of 472 versus 129 of 749). There were significant differences between the groups on impaired fasting plasma glucose, DM, HT, high cholesterol level, high triglyceride level, and significant elevation of ALT or AST (all p -value = 0.00). In the obese group, there was also a significantly higher number of cases who had high blood pressure, defined as IFG or DM, high cholesterol level, and high triglyceride level (p -value = 0.00) except the significant elevation of ALT or AST level. Cases of obesity with significant elevation of hepatic enzyme had many atherosclerotic risk factors. Therefore, metabolic derangements are the important problem for health care workers.

Keywords: Annual health check-up, Health care worker, Metabolic risk factors

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Annual health check up is one of the health projects to detect early abnormalities and also urge the health prevention program for the participants. The principal of periodic health examination and maintenance is to encourage health promotion⁽¹⁾. Laboratory tests might or might not change individual behavior such as normal fasting plasma glucose in obese persons may not influence their life style. In addition to laboratory tests, health advice by physicians should be implemented cautiously and individualized. The faculty of Medicine, Khon Kaen University has set the annual health check up program for all health care workers. The program includes history taking, physical examination, and laboratory tests. Here, the authors

would like to demonstrate the abnormalities of the health care workers. Furthermore, the other objectives were to evaluate the check up program such as rate of attendance and doctor visits, and also to assess the benefit of the program. The two main worker's groups who got involved in the health check up program were office workers and nursing staffs.

Material and Method

Study population

The authors reviewed the health check up results of all workers who attended the annual check up program from 2002 to 2003. Authorized physicians would examine all the personnel. Laboratory tests were performed including complete blood count, fasting plasma glucose, serum creatinine, serum alanine transaminase, serum aspartate transaminase, serum cholesterol, serum triglyceride, urinalysis, stool examination,

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and chest X-ray. If the subjects were younger than 35 years old, the chemical laboratories were aborted.

The abnormalities were defined as the following; overweight: BMI (body mass index; body weight in kg/[height in m]²) 23.00-24.99 kg/m², obesity⁽²⁾ BMI more than 25 kg/m², hypertension: SBP \geq 140 mmHg or DBP \geq 90 mmHg, impaired fasting glucose (IFG): FPG 100-125 mg/dl, Suspected DM: FPG \geq 126 mg/dl, high serum cholesterol and triglyceride⁽³⁾ if level more than 200, 150 mg/dl, hepatitis: serum ALT or AST $>$ 40 U/L, significant elevation of ALT or AST if the value above 80 U/L, and anemia: Hb $<$ 12 gm% in female and $<$ 13 gm% in male.

All data were compared between nurse versus office health care workers, and the obese and non-obese group. In the obese and non-obese cases, the metabolic derangement (hypertension, IFG, DM, high cholesterol level, high triglyceride level, and significant elevation of ALT or AST) were evaluated. Furthermore, in terms of significant elevation of ALT or AST cases, the risk factors of atherosclerosis were counted. The atherosclerotic risk factors were age more than 55 in males or 65 in females, obesity (BMI \geq 25 kg/m²), smoking, diabetes mellitus, hypertension (SBP \geq 140 mmHg or DBP \geq 90 mmHg), microalbuminuria, and family history of premature atherosclerotic events.

Statistical analysis

The data were analyzed using STATA version 7. Results of the univariate analyses were presented as mean (SD). Chi square test was used to explore statistical significance between the office workers and nursing staffs by SPSS version 11.0, using Chi square test or Fisher Exact test. A p-value of less than 0.05 was considered statistically significant.

Results

General characteristics of the study population

There were 1,630 subjects enrolled; 606 cases in the office workers group (male 235, female 371) and 1,024 cases in the nursing staff group (male 58, female 966). The rate of annual health check up attendance was 75.7% (of 801) and 82.6% (of 1,239) in each group, respectively. The mean age (SD) and BMI of each group were 38.9 (8.7) vs 36.5 (7.6) years old and 22.2 (3.4) vs 21.7 (3.0) kg/m², respectively.

Health status of both groups

The office workers visited physicians significantly more often than the nursing staffs 91.2% (553 of 606) vs 26.5% (271 of 1,024); p value = 0.00.

The BMI could be calculated in only 472 cases (77.9%) and 749 cases (73.1%) in office workers and nursing staff group, respectively (Table 1). Obesity was significantly detected in the office workers group but the overweight subjects were similar in both groups (20.1% and 20.2%). Blood pressure was recorded in 97.0% (588 cases of 606 cases) in the office workers group while 75.2% (770 of 1,024) of the nursing staff knew their own blood pressure. Hypertension was suspected in 81 cases (13.8%) and 54 cases (7.0%) in both groups, respectively.

For the metabolic laboratory tests, 419 cases in the office worker group and 675 cases in the nursing staff group, were evaluated (Table 1). The mean value of cholesterol level and triglyceride level of all cases were 207.9 ± 37.9 mg/dL and 89.0 ± 70.2 mg/dL. The number of patients with metabolic abnormalities between the office worker group and the nursing staff group were 60 (14.3%) versus 37 (5.5%), who were defined as IFG; 25 (6.0%) versus 21 (3.1%), who were suspected DM; 346 cases (82.6%) versus 575 (85.2%), who had a high cholesterol level; 109 (26.0%) versus 80 (11.9%), who had a high triglyceride level; 227 (54.2%) versus 148 (21.9%), who had elevation of ALT or AST; and 29 (6.9%) versus 17 (2.5%), who had significant hepatitis, respectively.

Nearly all cases were checked for complete blood count and 26.7% of cases in the office workers group compared with 21.6% in the nursing staff group had low hemoglobin level (Table 1).

Chest X-ray was done in 583 cases (96.2%) and 755 cases (73.7%) in both groups, respectively. The abnormalities were found significantly higher in the office workers group; however the evidence of tuberculosis was detected similarly in both groups (Table 1).

Comparing between patients who were obese and non-obese, there were significant differences between the groups with the number of patients who had high blood pressure, defined as IFG or DM, high cholesterol level, and high triglyceride level (p-value = 0.00) except the significant elevation of ALT or AST value (Table 2).

As shown in Table 3, the atherosclerotic risk factors were counted in cases of significant hepatitis, separately by BMI. The obese group tended to have a high number of atherosclerotic risk factors.

Discussion

Health check up is one of the most important health strategies. It may detect some abnormalities that

Table 1. The number of patients who had laboratory abnormalities in each variable

Variables	Office workers n = 606	%	Nursing staffs n = 1024	%	p-value
Overweight (BMI 23-24.99)	95 (472)	20.1	151 (749)	20.2	0.99
Obesity (BMI \geq 25)	127	27.0	129	17.2	0.00
HT	81 (588)	13.8	54 (770)	7.0	0.00
IFG	60 (419)	14.3	37 (675)	5.5	0.00
DM	25	6.0	21	3.1	0.02
Cholesterol > 200 mg/dL	346 (419)	82.6	575 (675)	85.2	0.25
Triglyceride > 150 mg/dL	109 (419)	26.0	80 (675)	11.9	0.00
Elevation of AST or ALT	227 (419)	54.2	148 (675)	22.0	0.00
Significant elevation of AST or ALT	29	7.0	17	2.5	0.00
Anemia	161 (602)	26.7	219 (1013)	21.6	0.02
Abnormal CXR	48 (583)	8.2	12 (755)	2.0	0.00
Tuberculosis	8	1.4	8	1.1	0.60
Cardiomegaly	21	3.6	4	0.5	0.00
Others	19	3.3	0	0	0.00
Parasite	6 (448)	1.3	7 (411)	1.7	0.67

Note: () represents total number of cases in each variables, %; percentage, BMI; body mass index, HT; hypertension, IFG; impaired fasting glucose, DM; diabetes mellitus, AST; serum aspartate transaminase, ALT; serum alanine transaminase, CXR; chest X-ray, p value by Chi square test/ Fisher Exact test

Table 2. Metabolic abnormalities in obese and non-obese health care worker

Metabolic factors	Obese (n = 256)	%	Non-obese (n = 965)	%	p-value
Hypertension	70	27.3	65	6.7	0.00
IFG	44	17.2	53	5.5	0.00
DM	27	10.5	19	2.0	0.00
Cholesterol > 200 mg/dL	215	84.0	706	73.2	0.00
Triglyceride > 150 mg/dL	59	23.0	55	5.7	0.00
Significant elevation of AST or ALT	11	4.3	35	3.6	0.62

Note: n means number of cases, () means total of cases, %; percentage, AST; serum aspartate transaminase, ALT; serum alanine transaminase, IFG; impaired fasting glucose, DM; diabetes mellitus, p value by Chi square test

Table 3. Number of metabolic risk factors in obese and non-obese health care workers who had elevation of serum alanine or aspartate transaminase

No. of factors	0	1	2	3	4	5	n (total)
Non-obese	14	9	4	4	4	0	35
Obese	0	0	2	6	2	1	11

Note: n means number of cases, metabolic risk factors defined as age more than 55 in males or 65 in females, obesity (BMI \geq 25 kg/m²), smoking, diabetes mellitus, hypertension (SBP \geq 140 mmHg or DBP \geq 90 mmHg), microalbuminuria, and family history of premature atherosclerotic events

have no obvious clinical symptoms or the early stage of diseases⁽⁴⁾ especially metabolic diseases such as DM, HT, and dyslipidemia.

Here, the health check-up program of the authors' faculty was evaluated and the health status of health care workers was also demonstrated. Regarding the program, the recording system needs improvement, for example weight and height which were valuable data and easy to record were missing in nearly 30%. In addition, it seems that the workers were incorporated with some laboratory tests such as chest X-ray or stool examination. The nursing staff group had a very low consultation rate with physicians, which was very much contradicted by the office worker group. This may indicate a misunderstanding concept in a health check-up program. Chest X-ray detected a very low rate of tuberculosis. Even though the nursing staff seemed to be exposed more to tuberculosis, there was no difference between both groups (1.4% in office workers and 1.1% in nurses). Complete blood count and stool examination also showed a very small number of abnormal cases. Complete blood count should be done in cases of suspected anemia by physical examination or had a history or risk of anemia such as family history of thalassemia. Stool occult blood is an important tool to screen colorectal cancer in cases older than 40⁽¹⁾. The authors need to explore the cost effectiveness of some investigations in a health check-up program and the reason for missing the doctor's consultation.

The metabolic abnormalities were markedly detected in both office workers and the nursing staff even there was no report of clinical symptoms. The office workers seem to have significantly more problems related with a sedentary life style such as obesity, hypertension, IFG, DM, and high triglyceride level. Even the mean level of total cholesterol was normal and the number of patients between both groups was not different, but the rate of high total cholesterol (> 200 mg/dL) was more than 80% of both groups (Table 1). Total cholesterol might not be the best indicator because in cases with high HDL-cholesterol may increase the total cholesterol level. On the other hand, low HDL-C may mask the abnormality. The authors suggest checking all lipid values; total cholesterol, triglyceride, HDL-C, and LDL-C⁽⁵⁾. The workers aged less than 35 should also check their fasting lipid profiles, fasting plasma glucose, and blood pressure because these abnormalities usually cause no obvious clinical symptoms⁽⁶⁻⁹⁾ and it may stimulate the health promotion in the young workers. Physicians must play this important role in giving suitable advice. Metabolic

syndrome may be found commonly in health care workers. Unfortunately, because of lack of individual abdominal circumference, the authors could not evaluate the exact rate of metabolic syndrome.

Comparing the obese and non-obese group, the significant clinical variables were high triglyceride, high blood pressure, impaired fasting plasma glucose, and diabetes mellitus. These data (Table 2, 3) confirm the strong atherosclerotic risk factor of obesity⁽¹⁰⁾ and may indicate a high prevalence of metabolic syndrome. There was a previous report from Thailand⁽¹¹⁾ about the correlation of obesity with elevation of hepatic enzymes (NASH: non-alcoholic steatohepatitis). Although there was non-significant comparison between hepatitis and obesity (Table 2), it seems to be related between hepatitis and obesity (Table 3). The high number of atherosclerotic risk factors were also observed in NASH patients. However, in the present study, HBV and HCV profiles, alcohol, and drugs were not completely excluded. Because of the high number of cases who had elevation of ALT or AST level and the high incidence of HBV and HCV carrier⁽¹²⁾, the authors suggest checking HBV and HCV profile in the check up program for all health care workers.

According to the clinical practice guidelines in periodic health examination⁽¹⁾ and the present review, laboratory tests such as complete blood count, chest X-ray, and stool examination should not be done routinely. On the other hand, metabolic derangement, atherosclerotic risk factors, and hepatitis B, C virus should be emphasized in both the office and nursing staff. Furthermore, physician visit is also an important activity and should be stressed.

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ผลการตรวจสุขภาพของบุคลากรทางการแพทย์ รพ.ศรีนครินทร์: ประสบการณ์จากโปรแกรมตรวจสุขภาพประจำปี

นภาพร ครุสันธิ์, กิตติศักดิ์ สวรรยาวิสุทธิ, เนสินี ไชยเอื้อย

การศึกษานี้มีวัตถุประสงค์เพื่อประเมินผลโปรแกรมการตรวจสุขภาพประจำปีและผลการตรวจสุขภาพของบุคลากรทางการแพทย์ รพ.ศรีนครินทร์ คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่นโดยได้ศึกษาผลการตรวจสุขภาพของบุคลากรระหว่างปี พ.ศ. 2545-2546 ทั้งประวัติ ผลการตรวจร่างกายและผลการตรวจทางห้องปฏิบัติการพบว่า มีเจ้าหน้าที่ประจำสำนักงานมารับการตรวจจำนวน 606 รายและเจ้าหน้าที่พยาบาลมารับการตรวจ 1,024 ราย อายุเฉลี่ยของบุคลากรทั้งสองกลุ่มคือ 38.9 และ 36.5 ปีตามลำดับ เจ้าหน้าที่ประจำสำนักงานมาตรวจกับแพทย์มากกว่าเจ้าหน้าที่พยาบาลอย่างมีนัยสำคัญ (553 รายจาก 606 ราย และ 271 รายจาก 1,024 ราย ตามลำดับ, p value = 0.00) มีบุคลากรที่อ้วนในกลุ่มเจ้าหน้าที่ประจำสำนักงาน (127 รายจาก 472 ราย และ 129 รายจาก 749 ราย) ผลการตรวจทางห้องปฏิบัติการพบว่า impaired fasting plasma glucose, โรคเบาหวาน, โรคความดันโลหิตสูง, ระดับโคเลสเตอรอลสูง, ระดับไตรกลีเซอไรด์สูง, และภาวะตับอักเสบมีความแตกต่างกันอย่างมีนัยสำคัญ ระหว่างเจ้าหน้าที่ทั้งสองกลุ่ม (p value = 0.00) ในผู้ป่วยที่อ้วนพบว่ามีระดับความดันโลหิตที่สูง, เป็น IFG หรือเบาหวาน, ระดับโคเลสเตอรอลสูง, และระดับไตรกลีเซอไรด์สูงมากกว่ากลุ่มที่ไม่อ้วน (p value = 0.00) ยกเว้นภาวะตับอักเสบ ในผู้ป่วยที่อ้วนและมีระดับ ALT, AST ที่สูงจะพบว่ามีปัจจัยเสี่ยงต่อโรคหัวใจและหลอดเลือดสูง ดังนั้นความผิดปกติทางเมตาบอลิกเป็นปัจจัยที่พบได้บ่อยในบุคลากรทางการแพทย์