การศึกษาผลการตรวจสุขภาพของบุคลากรโรงพยาบาลต่างๆในปี พ.ศ. 2559

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กลุ่มงานชีวเคมี โรงพยาบาลตำารวจ กรุงเทพมหานคร

บทคัดย่อ
การวิจัยนี้เป็นการศึกษาระดับสารชีวเคมีในเลือด เพื่อประเมินภาวะสุขภาพของบุคลากรโรงพยาบาลต่างๆจากการตรวจสุขภาพประจำปี พ.ศ. 2559 เป็นการศึกษาเชิงพรรณนา โดยรวบรวมข้อมูลผลการตรวจเลือดที่ไม่ระบุชื่อ วิเคราะห์ระดับ glucose, BUN, creatinine, uric acid, cholesterol, triglyceride, HDL-cholesterol, ALP, AST และ ALT โดยเครื่องตรวจวัดโดยกรณีทั่วไป SIEMENS: ADVIA1800 และคำนวณค่าทางสถิติโดยโปรแกรมไมโครซอฟต์เอกเซล สำนักรายการกรองฟันโดยประมาณ (eGFR) คำนวณด้วยสูตร CKD-EPI จำนวนผู้เข้ารับการตรวจสุขภาพทั้งหมด 1,596 คน เป็นเพศหญิง 1,284 คน (ร้อยละ 80.45) และเพศชาย 312 คน (ร้อยละ 19.55) ค่าเฉลี่ยของอายุ ± SD เท่ากับ 46.42 ± 7.04 ปี (ช่วงอายุ 34–61 ปี) พบจำนวนบุคลากรที่มีระดับ glucose, BUN, creatinine, uric acid, cholesterol, triglyceride, ALP, AST และ ALT สูงกว่าปกติร้อยละ 5.20, 1.32, 18.36, 16.48, 51.63, 16.48 และ 10.46 ตามลำดับ สำหรับ HDL-cholesterol ต่ำกว่าปกติร้อยละ 17.48 โดยอัตราการตรวจวัดระดับ creatinine และ cholesterol ผู้เข้ารับการตรวจสุขภาพประจำปีที่มีระดับ creatinine และ cholesterol หักเกณฑ์ที่วัดไว้ในปี 2558 3 ร้อยละ 0.50 จำานวนผู้เข้ารับการตรวจสุขภาพประจำปีที่มีระดับ creatinine และ cholesterol ต่ำกว่าปกติ 10 ร้อยละ จำานวนผู้วิจัยที่มีภาวะโรคไตในระยะที่ 3 ปรากฏว่าเป็นปัญหาที่สูงมากกว่าภาวะโรคไตในระยะที่ 2 และ 1 การมีภาวะสุขภาพของบุคลากรที่ตรวจสุขภาพประจำปี พ.ศ. 2559 ที่มีการพิจารณาวางแผนเพื่อป้องกันการเกิดโรค และด้านการส่งเสริมสุขภาพต่อไป

คำานุกรม:
การตรวจสุขภาพประจำปี ค่าสารชีวเคมีในเลือด การสุขภาพ ค่าร่าง
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Health Assessment among Staffs of Police General Hospital in the Year 2016

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Abstract

This study was aimed to analyze and evaluate blood chemistry parameters to assess the health status among the staffs of Police General Hospital in the year 2016. The observational description was derived from blood annual checkup records. Unidentified data of glucose, BUN, creatinine, uric acid, cholesterol, triglyceride, HDL-cholesterol, ALP, AST and ALT were derived from automated SIEMENS: ADVIA1800 Chemistry System. Statistical parameters were analyzed by Microsoft Excel. Estimated Glomerular Filtration Rate (eGFR) was calculated by CKD-EPI Equation. There were total of 1,596 staffs: 1,284 females (80.45%) and 312 males (19.55%) with age ranging from 34-61 years (mean ± SD = 46.42 ± 7.04). The percentage of glucose, BUN, creatinine, uric acid, cholesterol, triglyceride, ALP, AST and ALT level higher than reference range were 5.20, 1.32, 18.36, 16.48, 51.63, 18.05, 1.38, 11.09 and 10.46, respectively, whereas the percentage of HDL-cholesterol lower than reference range was 17.48. The percentage of abnormality of all blood chemistry parameters in males were higher than in females except for creatinine and cholesterol. Moreover, the percentage of stage 3 chronic kidney disease found was about 0.50. The prevalence of high blood cholesterol was the major health problem among staffs of Police General Hospital in the year 2016. Health problem should be taken into consideration for planning and implementing health promotion programs and interventions.

Keywords: Annual checkup, Blood chemistry parameters, Health status, Police

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Introduction

Most people encounter with chronic diseases nowadays. Based on Thai National Health Examination Survey (NHES V) studied in 2014 by the Institute of Public Health Systems, it was found that the prevalence of diabetes in Thai population aged 15 years and over was 8.9%. The figure was much higher than 6.9% of NHES IV recorded in 2009. However, 43.1% of diabetic patients did not know that they had the health problem. This group will be at high risk of developing complications resulting in high mortality.

The number of people with high cholesterol (≥200 mg/dL) in Thai population aged 15 years and over was 43.8% with higher prevalence in females than in males (46.7% and 40.8%). The prevalence of high blood cholesterol is correlated with age. It reached the peak in the age group 45–59 years in males and 60–69 years in females. Prevalence of high triglycerides (≥150 mg/dL) in Thai population aged 15 years and over was 31.0%, in males more than in females (35.7% vs 26.6%).

Currently, chronic kidney disease is a major global public health problem. Due to the high mortality rate, the state has lost a lot of resources in the care of these patients. The cost of haemodialysis is about 400,000 baht (US$12,100) per year. In this study, Estimated Glomerular Filtration Rate (eGFR) in adult was calculated by CKD-EPI formula recommended by the nephrology society of Thailand. CKD-EPI equation.

\[
\text{Female: serum creatinine} \leq 0.70 \text{ mg/dL} \\
eGFR = 144 \left( \frac{\text{SCr}}{0.7} \right)^{-0.329} (0.993)^{\text{Age}} \\
\text{Female: serum creatinine} > 0.70 \text{ mg/dL} \\
eGFR = 144 \left( \frac{\text{SCr}}{0.7} \right)^{-1.209} (0.993)^{\text{Age}} \\
\text{Male: serum creatinine} \leq 0.90 \text{ mg/dL} \\
eGFR = 141 \left( \frac{\text{SCr}}{0.9} \right)^{-0.411} (0.993)^{\text{Age}} \\
\text{Male: serum creatinine} > 0.90 \text{ mg/dL} \\
eGFR = 141 \left( \frac{\text{SCr}}{0.9} \right)^{-1.209} (0.993)^{\text{Age}}
\]

Adverse outcomes of chronic kidney disease can often be prevented or delayed through early detection and treatment. Earlier stages of chronic kidney disease can be detected through routine laboratory measurements. The presence of chronic kidney disease should be established, based on presence of kidney damage and level of kidney function (glomerular filtration rate [GFR]), irrespective of diagnosis. Among patients with chronic kidney disease, the stage of disease should be assigned based on the level of kidney function, irrespective of diagnosis, according to the KDOQI CKD classification. (Table 1)

Chronic kidney disease is defined as either kidney damage or GFR <60 mL/min/1.73m² for ≥ 3 months. Kidney damage is defined as pathologic abnormalities or markers of damage, including abnormalities in blood or urine tests or imaging studies. The study in Thai people in 2010 found that prevalence of CKD level 1 = 3.3%, level 2 = 5.6%, level 3 = 7.5%, level 4 = 1.1%, only 1.9% of the subjects were aware that they had CKD.
Our bodies are constantly changing, using energy. Degradation is possible. It is like a machine that works for a long time. It can be damaged from free radicals that occur in the body all the time. It has the potential to cause disease. Therefore, annual health checkup is needed to determine if the various systems in the body still work normally. Based on an annual blood checkup examination of Police General Hospital staffs with age over 34 years in 2016, this study was aimed to investigate health status among the staffs by using various blood chemistry parameters.

Materials and Methods

The observational descriptive study was based on annual blood checkup records of Police General Hospital staffs during 1 to 11 August 2016. There were total of 1,596 staffs: 1,284 females (80.45%) and 312 males (19.55%) with age ranging from 34-61 years. Blood samples were collected to determine chemistry parameters including glucose, BUN, creatinine, uric acid, cholesterol, triglyceride, HDL-cholesterol, ALP, AST and ALT by an automated SIEMENS: ADVIA 1800 Chemistry System. Unidentified data records were collected. The min, max, mean, SD, 95% confidence interval (CI) and percent of abnormality were analyzed by Microsoft Excel. The criteria for diagnosis of diabetes was blood glucose ≥ 126 mg/dL. The criteria of abnormality of chemistry parameters are shown in Table 2. Estimated glomerular filtration rate (eGFR) was calculated by CKD EPI Equation.

Results

There were total of 1,596 staffs: 1,284 females (80.45%) and 312 males (19.55%) with age ranging from 34-61 years (mean ± SD = 46.42 ± 7.04). The percentage of glucose, BUN, creatinine, uric acid, cholesterol, triglyceride, ALP, AST and ALT shown higher than reference range were 5.20, 1.32, 18.36, 16.48, 51.63, 18.05, 1.38, 11.09 and 10.46, respectively. Whereas the percentage of lower level of HDL-cholesterol found was 17.48. The min-max, mean ± SD, 95% confidence interval (CI) of blood chemistry parameters are shown in Table 3. Abnormality
of glucose, BUN, uric acid, triglyceride, three liver function parameters including ALP, AST and ALT of males were found higher than of females. (Fig.1)

The KDOQI stages of kidney disease found among staffs of Police General Hospital in year 2016 were 86.45%, 13.24% and 0.31%, in females, 67.31, 31.41% and 1.28%, in males and 82.71%, 16.79% and 0.50% in total, in stage 1, 2 and 3, respectively. (Table 4)

### Discussion

The percentage of staffs in Police General Hospital with hyperglycemia, high cholesterol, triglyceride and ALP were lower than those in the study of annual checkup among staffs in Chiangmai University in the year 2014, which were 9.38%, 65.72%, 22.6% and 4.57%, respectively in both genders. The percentage of staffs in Police General hospital with high level of BUN, creatinine, uric acid, AST and ALT were higher than those in the study of annual checkup among staffs in Chiangmai University in year 2014, which were 0.20%, 2.54%, 6.87%, 6.84% and 10.17%, respectively in both genders. The percentage of staffs in Police General Hospital with high cholesterol were higher than those in the fifth National Health Examination Survey of Thai (NHES V) in the year 2014 (43.8%), but the percentage of staffs with high triglyceride were lower (31.0%). Life modification by adjusting diet and exercise was important to reduce lipidemia.

The prevalence of diabetes among the staffs in Police General Hospital (4.21% in females and 9.29 % in males) were higher than those in the study among 6,921 police officers and employees who attained annual checkup at Police General Hospital in 2009: 2,363

### Table 2 Method and criteria for abnormal blood biochemistry tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Method</th>
<th>Criteria for Abnormal result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose</td>
<td>Hexokinase</td>
<td>≥ 126 mg/dL</td>
</tr>
<tr>
<td>BUN</td>
<td>Urease with GLDH</td>
<td>≥ 20 mg/dL</td>
</tr>
<tr>
<td>Creatinine</td>
<td>Creatininase</td>
<td>female &gt; 0.75, male &gt;1.1 mg/dL</td>
</tr>
<tr>
<td>Uric acid</td>
<td>Uricase / Peroxidase</td>
<td>female &gt; 6.0, male &gt; 7.2 mg/dL</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>Enzymatic colour (CHOD-PAP)</td>
<td>&gt;200 mg/dL</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>GPO, Trinder without serum blank</td>
<td>&gt;150 mg/dL</td>
</tr>
<tr>
<td>HDL- Cholesterol</td>
<td>Elimination / catalase</td>
<td>female &lt;50, male &lt;40 mg/dL</td>
</tr>
<tr>
<td>Alkaline phosphatase (ALP)</td>
<td>Modified IFCC; pNpp-AMP</td>
<td>&gt;129 U/L</td>
</tr>
<tr>
<td>Aspartate aminotransferase (AST)</td>
<td>Kinetic UV(IFCC) without pyridoxal</td>
<td>female &gt;31, male &gt;35 U/L</td>
</tr>
<tr>
<td>Alanine aminotransferase (ALT)</td>
<td>Kinetic UV(IFCC) without pyridoxal</td>
<td>female &gt; 33, male &gt;44 U/L</td>
</tr>
</tbody>
</table>
### Table 3  Level of blood chemistry parameters among staffs of Police General Hospital during 1-11 August 2016

<table>
<thead>
<tr>
<th>Test</th>
<th>Min-Max</th>
<th>Mean ± SD (95%CI)</th>
<th>% Abnormal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Total</td>
</tr>
<tr>
<td>Glucose (mg/dL)</td>
<td>50-360</td>
<td>50-412</td>
<td>92.91 ± 25.47 (91.52-94.30)</td>
</tr>
<tr>
<td>BUN (mg/dL)</td>
<td>5-42</td>
<td>4-24</td>
<td>11.68 ± 3.13 (11.51-11.85)</td>
</tr>
<tr>
<td>Creatinine (mg/dL)</td>
<td>0.36-1.73</td>
<td>0.52-2.05</td>
<td>0.67 ± 0.11 (0.66-0.68)</td>
</tr>
<tr>
<td>Uric acid (mg/dL)</td>
<td>1.6-9.5</td>
<td>3-10.6</td>
<td>4.83 ± 1.08 (4.77-4.89)</td>
</tr>
<tr>
<td>Cholesterol (mg/dL)</td>
<td>84-353</td>
<td>84-318</td>
<td>204.28 ± 36.54 (202.28-206.28)</td>
</tr>
<tr>
<td>Triglyceride (mg/dL)</td>
<td>27-773</td>
<td>39-818</td>
<td>100.81 ± 60.19 (97.52-104.10)</td>
</tr>
<tr>
<td>HDL-C (mg/dL)</td>
<td>24.4-134.6</td>
<td>22.9-107</td>
<td>64.89 ± 16.32 (64.00-65.78)</td>
</tr>
<tr>
<td>ALP (U/L)</td>
<td>8-553</td>
<td>30-240</td>
<td>66.49 ± 25.31 (65.11-67.87)</td>
</tr>
<tr>
<td>AST (U/L)</td>
<td>10-96</td>
<td>13-192</td>
<td>22.75 ± 7.62 (22.33-23.17)</td>
</tr>
<tr>
<td>ALT (U/L)</td>
<td>1-119</td>
<td>5-431</td>
<td>17.95 ± 12.70 (17.26-18.64)</td>
</tr>
</tbody>
</table>
Table 4  The KDOQI stages of kidney disease among staffs of Police General Hospital in the year 2016

<table>
<thead>
<tr>
<th>Stage</th>
<th>eGFR (mL/min/1.73m²)</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>≥ 90</td>
<td>1100</td>
<td>86.45</td>
<td>210</td>
</tr>
<tr>
<td>2</td>
<td>60-89.9</td>
<td>170</td>
<td>13.24</td>
<td>98</td>
</tr>
<tr>
<td>3</td>
<td>30-59.9</td>
<td>4</td>
<td>0.31</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>15-29.9</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>&lt;15 or on dialysis</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

KDOQI (Kidney Disease Outcomes Quality Initiative)

% Abnormality

Fig. 1 Summary graph of abnormalities of blood checkup results among staffs of Police General Hospital in the year 2016

females and 4,558 males, which were founded to be 2.5% in females and 8.6% in males.\(^{(20)}\)

Whereas the prevalence of diabetes in total (5.20%) was lower than those in the previous study in 2009 (6.5%), the NHES V study in 2014 (8.9%), the study in India in 2011 (15%)\(^{(21)}\), and CDC report in 2014 that 9.3% of the United States population had diabetes\(^{(22)}\)

There were some heterogeneity in the estimates within the Region with the age-adjusted prevalence in 2013 estimated at 9.2% for the USA, 7.9% for Canada, 12.6% for Mexico, and 9.6% for the Caribbean islands.\(^{(23)}\)
The KDOQI stages of kidney disease above stage 3 were lower than those in the studies among the staff of Electricity Generating Authority of Thailand in 1997 (6.8%)(24), the staff of Ground officer of Thai Air Force in 2003 (4.6%) (25) and the population survey of The Nephrology Society of Thailand in 2007 (8.7%). (26)

Conclusion

High cholesterol was shown to be the main problem of health in staffs of Police General Hospital with the age over 34 in the year 2016. This should be taken into the consideration for planning and implementing through health promotion programs and interventions.

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References


