



Analysis of health examination results of 774 policemen in a city of Hainan Province

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ABSTRACT

Objective: To understand the health status of policemen in a city of Hainan Province, and find out the potential risk factors influencing their health. **Methods:** Health examination data of 774 policemen was collected, analyzed, and compared between age-groups, gender-groups and marital status-groups by using luster sampling. **Results:** 760 policemen had at least one abnormal examination (98.19%). The highest abnormality rate was blood lipid examination with 582 persons (75.19%), the second was liver function examination with 433 persons (55.94%), the third was body mass index-examination with 385 persons (49.74%). Among 15 examination items, 10 items in men had higher abnormal rate than those in women; 11 items were statistically significant different among three age-groups; 4 items in married had higher abnormal rate than those in unmarried. **Conclusion:** The health condition of policemen in a city of Hainan Province is not so optimistic, the main risk to health comes from lifestyle, and women are in better health condition than men. The older the police are, the worse they are.

1. Introduction

Policemen are a group of law enforcement population to maintain social public safety, whose health conditions directly influence the efficiency of law enforcement[1]. In recent years, more and more attention has been paid to the health of this population. Health examinations provide information of the health condition of policemen, a comprehensive understanding of hidden diseases, and further analysis of the potential risks[2], which can supply scientific, reliable and more specific suggestions for formulating effective public health measurements. The results of 774 policemen who underwent health examinations in our institute in 2016 were reported and further analyzed in this study.

2. Subjects and methods

2.1 Subjects

A total of 774 policemen were selected, who underwent health examination in our institute in 2016, using cluster sampling. Subjects enrolled accounted for 95% of all the policemen receiving health examination throughout 2016. The average age was (34.20±9.52) years, with 322 (41.60%) were younger than 30 years old (low-age group), 368 (47.55%) within 31 to 50 years old (middle-age group), and 84 (10.85%) older than 50 years old (high-age group). There were 594 (76.74%) males and 180 females (23.26%). As for marital status, 73 (9.43%) were unmarried and 701 (90.57%) were married.

2.2 Items of health examinations

There were 15 health examination items in the study, including general examinations (body mass index, BMI; blood pressure),

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medical examination (electrocardiography, ECG), ultrasonic examinations (liver, gall bladder, kidney, thyroid gland), X-rays inspection (chest radiography), and laboratory examinations (blood glucose test, renal function test, liver function test, blood lipid examination, blood routine examination, urine routine examination, tumor biomarker test).

2.3 Diagnostic criteria

The abnormalities in health examination items/indicators were determined according to diagnostic criteria in Internal Medicine, 8th Edition[2].

2.4 Statistical analysis

Excel software was used to extract and collect data of health examinations, and SPSS 22.0 was used for data analysis. Data description was presented with rate or constituent ratio (%). Chi-square test was used for multiple comparisons of abnormal conditions in health examinations in different gender and age groups. $P < 0.05$ was considered statistically significant.

3. Results

3.1 Co-detection of abnormal items/indicators

Of the 774 enrolled subjects, 14 (1.81%) subjects did not present

any of the abnormal items/indicators of health examinations; the other 760 (98.19%) subjects harbored at least one abnormal items/indicator of health examinations. Subjects with four abnormal items/indicators ($N=150$, 19.38%) accounted for the largest proportion. Moreover, two (0.26%) subjects were detected with 11 abnormal items/indicators, which was the highest number in the study. The specific conditions in co-detection of abnormal items/indicators were listed in Table 1.

Table 1.

Co-detection of abnormal items/indicators.

Number of abnormal items/indicators	Number of subjects	Percentage (%)	Rankings
None	14.00	1.81	9
One	48.00	6.20	7
Two	86.00	11.11	5
Three	120.00	15.50	3
Four	150.00	19.38	1
Five	126.00	16.28	2
Six	92.00	11.89	4
Seven	76.00	9.82	6
Eight	36.00	4.65	8
Nine	13.00	1.68	10
Ten	11.00	1.42	11
Eleven	2.00	0.26	12

3.2 The abnormal conditions of health examination items

The highest abnormal rate was detected in blood lipid examination, with 582 (75.19%) subjects, followed by liver function test (433 cases, 55.94%) and BMI (385 cases, 49.74%). The abnormal conditions of the other items/indicators as well as important indicators were listed in Table 2 and 3.

Table 2.

The abnormal conditions of health examination items/indicators.

Health examination items/indicators	Number of subjects (n, %)	Ranking	Health examination items/indicators	Number of subjects (n, %)	Ranking
Blood pressure	138 (17.83)	10	Blood glucose test	126 (16.28)	11
BMI	385 (49.74)	3	Liver function test	433 (55.94)	2
ECG	235 (30.36)	7	Kidney function test	293 (37.86)	6
Liver ultrasound	306 (39.53)	5	Blood lipid examination	582 (75.19)	1
Gall bladder ultrasound	98 (12.66)	12	Blood routine examination	318 (41.09)	4
Kidney ultrasound	87 (11.24)	13	Tumor biomarker test	23 (2.97)	14
Thyroid gland ultrasound	211 (27.26)	8	HBsAg detection	20 (2.58)	16
Chest radiography	21 (2.71)	15	Urine routine examination	155 (20.03)	9

Table 3.

The abnormal conditions of important indicators of health examinations.

Health examination indicators	Number of subjects (n, %)	Health examination indicators	Number of subjects (n, %)		
Kidney function test	Creatinine	8 (1.03)	Blood lipid examination	Triglyceride	206 (26.61)
	Urea nitrogen	12 (1.55)		Total cholesterol	422 (54.52)
	Uric acid	284 (36.69)		High-density lipoprotein	202 (26.10)
Blood routine examination	Hemoglobin	56 (7.23)	Liver function test	Low-density lipoprotein	398 (51.42)
	Platelet	58 (7.49)		ALT	195 (25.19)
Tumor biomarker test	AFP	3 (0.39)	GGT	193 (24.94)	
	CEA	20 (2.58)	AST	393 (50.78)	

3.3 Group comparisons of abnormality in health examination items

marital status groups were listed in Table 4-6.

The differences in abnormal rates in different gender, age and

Table 4.

Chi-square test of abnormal rate in health examination items between male and female.

Items	Male (n, %)	Female (n, %)	χ^2	P	OR (male/female)
Blood pressure	104, 17.51	34, 18.89	0.18	0.672	1.097(0.714, 1.685)
BMI	331, 55.72	54, 30.00	36.56	0.000	0.341(0.238, 0.487)
ECG	191, 32.15	44, 24.44	3.884	0.049	0.683(0.466, 0.999)
Liver ultrasound	275, 46.30	31, 17.22	48.84	0.000	0.024(0.159, 0.367)
Gall bladder ultrasound	85, 14.31	13, 7.22	6.28	0.010	0.466(0.253, 0.857)
Kidney ultrasound	77, 12.96	10, 5.56	7.59	0.006	0.395(0.200, 0.781)
Thyroid gland ultrasound	166, 27.95	45, 25.00	0.60	0.437	0.859(0.587, 1.259)
Chest radiography	17, 2.86	4, 2.22	0.21	0.644	0.771(0.256, 2.322)
Blood glucose test	108, 18.18	18, 10.00	6.78	0.009	0.500(0.294, 0.849)
Liver function test	384, 64.65	49, 27.22	78.49	0.000	0.205(0.141, 0.296)
Kidney function test	279, 46.97	14, 7.78	90.19	0.000	0.095(0.054, 0.168)
Blood lipid examination	458, 77.10	124, 68.89	4.99	0.025	0.658(0.455, 0.951)
Blood routine examination	235, 39.56	83, 46.11	2.44	0.118	1.307(0.934, 1.829)
Tumor biomarker test	22, 3.70	1, 0.56	4.74	0.029	0.145(0.019, 1.085)
HBsAg detection	15, 2.53	5, 2.78	0.03	0.852	1.103(0.395, 3.077)
Urine routine examination	123, 20.71	32, 17.78	0.74	0.390	0.828(0.538, 1.273)

Table 5.

Chi-square test of abnormal rate in health examination items among different age groups.

Items	Low-age group (n, %)	Middle-age group (n, %)	High-age group (n, %)	χ^2	P
Blood pressure	38, 11.80	72, 19.57	28, 33.33	22.53	0.000
BMI	144, 44.72	190, 51.63	51, 60.71	7.82	0.020
ECG	92, 28.57	119, 32.34	24, 28.57	1.29	0.523
Liver ultrasound	77, 23.91	173, 47.01	56, 66.67	67.34	0.000
Gall bladder ultrasound	24, 7.45	49, 13.32	25, 29.76	30.25	0.000
Kidney ultrasound	18, 5.59	51, 13.86	18, 21.43	21.57	0.000
Thyroid gland ultrasound	68, 21.12	102, 27.72	41, 48.81	25.84	0.000
Chest radiography	4, 1.24	12, 3.26	5, 5.59	6.39	0.041
Blood glucose test	17, 5.28	66, 17.93	43, 51.19	104.44	0.000
Liver function test	167, 51.86	217, 58.97	49, 58.33	3.74	0.155
Kidney function test	113, 35.09	148, 40.22	32, 38.10	1.92	0.383
Blood lipid examination	229, 71.12	284, 77.17	69, 82.14	5.81	0.055
Blood routine examination	106, 32.92	169, 45.92	43, 51.19	15.97	0.000
Tumor biomarker test	2, 0.62	14, 3.80	7, 8.33	15.43	0.000
HBsAg detection	13, 4.04	5, 1.36	2, 2.38	4.91	0.086
Urine routine examination	66, 20.50	78, 21.20	11, 13.10	2.87	0.237

Table 6.

Chi-square test of abnormal rate in health examination items between married and unmarried subjects.

Items	Unmarried (n, %)	Married (n, %)	χ^2	P	OR (unmarried / married)
Blood pressure	7, 9.59	131, 18.69	3.74	0.053	2.167(0.972, 4.832)
BMI	33, 45.21	352, 50.21	0.66	0.415	1.223(0.753, 1.984)
ECG	15, 20.55	220, 31.38	3.67	0.055	1.769(0.981, 3.190)
Liver ultrasound	10, 13.70	296, 42.23	22.51	0.000	4.604(2.324, 9.123)
Gall bladder ultrasound	4, 5.48	94, 13.41	3.76	0.053	2.671(0.953, 7.491)
Kidney ultrasound	4, 5.48	83, 11.84	2.68	0.102	2.317(0.842, 6.513)
Thyroid gland ultrasound	12, 16.44	199, 28.39	4.76	0.029	2.015(1.062, 3.823)
Chest radiography	0, 0	21, 3.00	2.25	0.134 ^a	—
Blood glucose test	5, 6.85	121, 17.26	5.26	0.022	2.837(1.120, 7.184)
Liver function test	32, 43.84	401, 57.20	4.79	0.029	1.713(1.053, 2.784)
Kidney function test	25, 34.25	268, 38.23	0.446	0.504	1.188(0.716, 1.973)
Blood lipid examination	50, 68.49	532, 75.89	1.94	0.164	1.448(0.858, 2.444)
Blood routine examination	23, 31.51	295, 42.08	3.05	0.080	1.580(0.943, 2.646)
Tumor biomarker test	0, 0	23, 3.28	2.47	0.116 ^a	—
HBsAg detection	4, 5.48	16, 2.28	2.685	0.101	0.403(0.131, 1.239)
Urine routine examination	16, 21.92	139, 19.83	0.180	0.671	0.881(0.491, 1.581)

^a Fisher's exact test was adopted.

4. Discussion

4.1 The unsatisfactory health conditions of policemen in XX city

Of the 774 policemen enrolled, only 15 of them were not detected any abnormal items in health examinations, the other 760 subjects harbored at least one abnormal item. The total abnormal rate was up to 98.19%, which was significantly higher than the previous studies[3,4]. The co-detection of at least two abnormal items, and at least five abnormal items were seen in 712 (91.99%) cases and 356 (45.99%) cases, respectively. Most seriously, two subjects were detected to have 11 abnormal items. Taken together, the health conditions of the enrolled policemen are threatened by multifactorial risks, which exert relatively complex health problems.

4.2 The disease risks mainly originate from unhealthy lifestyle

The highest abnormal rate was detected in blood lipid examination (75.19%), followed by liver function test (55.94%), BMI (49.74%). Dyslipidemia is generally seen in chronic diseases, including cardiovascular and cerebrovascular diseases, diabetes, fatty liver, obesity and etc[5]. Abnormal liver function indicates the potential risk of liver injury, and the common risk behaviors include alcoholism, unhealthy diet, fatigue, drug damage, viral damage, etc[6]. The high BMI is generally accompanied with abnormality in blood lipid, blood pressure, blood glucose, etc., which is mainly due to unhealthy lifestyle, including high caloric diet, a lack of exercise, alcohol abuse, extreme fatigue, etc[7]. Therefore, it is extremely essential to enforce lifestyle intervention in policemen, such as advocating of smoking-free work scenes, strict control of drinking times and drinking volume, low salt and low fat diet, body weight control, reasonable duty turns, reduction of workload, and maintenance of good mental health.

4.3 The differences of detection rate of abnormality between different genders, age groups

In this study, female had a better health condition than male, and the older they are, the poor health they have. This was consistent with the previous studies[8]. In public security system, on the one hand, female officers tend to have a milder work intensity, a more comfortable work scene, and a more relaxing work environment than

male officers, on the other hand, the average age of female officers (19.45±7.76) years old is younger than male officers (34.89±9.84) years old, female officers present relatively good health conditions. From a biological perspective, the older subjects are burdened with more cumulative risk factors and higher risks of diseases, hence, the detection rate of abnormality was higher in this population. In addition, the rate of abnormality was not obviously different between married and unmarried subjects (only four items were different), which was in consistent with relevant studies focusing on general population[9]. According to relevant reports, the high workload is prevalent among policemen, who have no time to spare for family life[10]. There is no difference between married and unmarried officers in professional level, hence, there is no obvious difference in health conditions between them.

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