Study on the Prevalence of Different Subtypes of Hypertension and the Physique Level of the Elderly Taking Part in the Urban Regular Physical Activity

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Abstract

To explore the difference in the prevalence rate of different sub types of hypertension and physique level of the elderly, and provide a useful reference for the hypertensive health intervention for the elderly. Using cluster sampling method, this paper investigated and analyzed blood pressure and body mass of 799 elderly people in Shaanxi city who are taking part in regular physical activity. There were statistically significant differences in gender ($\chi^2=2.490$) and age ($\chi^2=3.299$) of the hypertension prevalence. There was a high SDH prevalence in 60~69 aged people (22.1% male, 15.3% female), and a high ISH prevalence in the elderly over the age of 70 (15.1% male, 16.7% female); There were statistically significant differences in age groups of hypertension sub type ($F=5.411$), height ($F=5.208$), waist circumference ($F=7.252$), WHtR ($F=3.831$). Regular physical activity helps the elderly to keep BMI and control blood pressure. The elderly people aged 60–69 who are taking part in RAP had SDH as the main high blood pressure disease sub type, and the elderly people over the age of 70 had ISH as the main high blood pressure disease sub type. ISH and SDH patients should pay attention to control the WHtR level in order to effectively improve the blood pressure level.

Keywords: Regular physical activity; the elderly; hypertension; sub type; physique

1 Introduction

Hypertension is a common chronic disease in the elderly\textsuperscript{[1]}, and the most important risk factors of cardiovascular disease\textsuperscript{[2]}. The sub type is divided into isolated systolic hypertension (ISH), isolated diastolic hypertension (IDH) and systolic and diastolic hypertension (SDH). IDH is the focus of early prevention and control of hypertension, and can be gradually developed into ISH and SDH\textsuperscript{[3]}. SDH can increase the risk of cardiovascular disease. The study showed that the risk factors of different sub types of hypertension patients were different, and we should take different measures to prevent and control\textsuperscript{[4]}.

Regular physical activity (RPA) has a very important role in improving the symptoms of chronic disease\textsuperscript{[5]}, and is an effective means of sports health intervention. Exercise intervention can effectively improve the blood pressure of patients\textsuperscript{[6]}, but there were less studies on exercise intervention to the different sub types of hypertension in the elderly. This

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study aims to understand the rules of prevalence of hypertension in the different sub types and different sub types of hypertension patients with physical differences in the level of inquiry, analyze influencing factors and effective monitoring indicators of elderly hypertension, and provide a useful reference for hypertension in the elderly health intervention.

2 Objects and methods
(1)Objects
799 elderly people from Xi’an, Weinan, Xianyang, Baoji of Guanzhong Shaanxi Province administrative division extraction, and Tongchuan, Yan’an, Yulin in the Northern Shaanxi, and Hanzhon, Ankang, Shangluo in southern Shaanxi Province totally ten cities, who participate in regular physical activity 3 times per week, and more than 30 minutes per exercise[7].

(2)Survey methods
By the Self-questionnaires on regular physical activity and health level of Shaanxi Province urban elderly, this paper researched physique level of elderly people in Shaanxi Province in general and regular physical activity in 2015 by cluster sampling of urban, were measured. Each measurement member samples over the age of 60 elderly mouth samples each of male and female 30, in line with the requirements of small sample. The measurement results conform to the normal distribution.

(3)Statistical analysis method
Using for Windows SPSS 22.0 statistical software for statistical analysis of the data. P<0.05 for the difference was statistically significant.

3 Results
(1)The prevalence rate of hypertension for different gender, age groups of the regular sports activities elderly
According to the evaluation standard of hypertension[7] (SBP is above 140mmHg, and DBP is greater than or equal to 90mmHg), the samples of different sub types of hypertension were analyzed. The evaluation criteria of Isolated diastolic hypertension (IDH) is SBP<140mmHg and DBP≥90mmHg. The evaluation criterion of Systolic and diastolic hypertension (SDH) is SBP≥140mmHg and DBP≥90mmHg. The evaluation criteria of Isolated systolic hypertension (ISH) is SBP≥140mmHg and DBP<90mmHg.

Table 1. The prevalence rate of hypertension for different gender, age groups of the regular sports activities elderly (%).

<table>
<thead>
<tr>
<th>Subtype of hypertension</th>
<th>Morbidity</th>
<th>Male</th>
<th></th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>60~69 years</td>
<td>Over 70 years</td>
<td>Total</td>
</tr>
<tr>
<td>IDH</td>
<td>8.4</td>
<td>8.8</td>
<td>9.9</td>
<td>9.3</td>
</tr>
<tr>
<td>SDH</td>
<td>14.8</td>
<td>22.1</td>
<td>13.4</td>
<td>18.1</td>
</tr>
<tr>
<td>ISH</td>
<td>13.4</td>
<td>9.3</td>
<td>15.1</td>
<td>12.0</td>
</tr>
</tbody>
</table>
The survey showed that hypertension prevalence rate of the elderly who take part in regular physical activity was 36.6%, lower than that of the national 60-year-old people (49%)\[8\]. There was statistically significant difference for prevalence rate of hypertension in gender ($\chi^2=2.490$, $P=0.013$), age ($\chi^2=3.299$, $P=0.001$). Male’s (39.4%) was higher than female’s (34%), 60~69-year-old ones (39.35%) was higher than over-70-year-old ones (32.63%); The prevalence rate of 60~69-year-old people was higher in SDH (male 22.1%, female 15.3%), and the prevalence rate of ISH was higher in the elderly over-70-year-old ones (15.1% in males and 16.7% in females). The prevalence rate of IDH was lower, only 8.4%.

(2) **Physical condition from different groups of hypertension subtypes**

The calculation method of BMI and waist to height ratio: body mass index (BMI) = body weight (kg) / height (m) $^2$ ($18.5 \leq \text{BMI} < 24$ normal)$^9$ and waist to height ratio (WSR) = waist circumference (CM) / height (CM) (WHtR<$0.5$ normal)$^{10}$. There were statistically significant differences ($P<0.05$) between groups in different sub types of hypertension ($F=5.411$), height ($=5.208$ F), waist circumference ($=7.252$ F), F ($=3.831$ WHtR). LSD multiple mean comparison showed that there were statistically significant difference ($P<0.05$) between the SDH group and the normal group of age, height, waist circumference, WHtR. There were statistically significant difference ($P<0.05$) between ISH group and normal group in waist circumference, WHtR. There were statistically significant difference ($P<0.05$) among group IDH and group ISH, group SDH.

Table 2. Physical level difference analysis on elderly patients with different types of high blood pressure and sub type who take part in regular physical activities.

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Age</th>
<th>Height</th>
<th>Weight</th>
<th>Waist</th>
<th>WHtR</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 IDH</td>
<td>68.36±5.96b</td>
<td>162.73±6.67a</td>
<td>59.17±8.12c</td>
<td>82.64±9.14</td>
<td>0.51±0.06</td>
<td>22.34±2.72</td>
</tr>
<tr>
<td>n=67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 SDH</td>
<td>67.05±5.15de</td>
<td>165.36±6.63de</td>
<td>61.17±11.21</td>
<td>85.14±7.35e</td>
<td>0.52±0.05e</td>
<td>22.35±3.66</td>
</tr>
<tr>
<td>n=118</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 ISH</td>
<td>70.15±5.76f</td>
<td>161.78±8.15</td>
<td>59.46±9.61</td>
<td>83.28±10.75f</td>
<td>0.52±0.07f</td>
<td>22.69±3.00</td>
</tr>
<tr>
<td>n=107</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Health</td>
<td>68.66±5.93</td>
<td>162.62±7.71</td>
<td>61.01±9.88</td>
<td>80.73±10.45</td>
<td>0.50±0.07</td>
<td>23.06±3.37</td>
</tr>
<tr>
<td>n=507</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>5.411</td>
<td>5.208</td>
<td>2.599</td>
<td>7.252</td>
<td>3.831</td>
<td>1.253</td>
</tr>
<tr>
<td>P</td>
<td>0.001</td>
<td>0.001</td>
<td>0.051</td>
<td>0.000</td>
<td>0.010</td>
<td>0.289</td>
</tr>
</tbody>
</table>

Note: LSD multiple mean comparison among the groups $p<0.05$, 1 and 2 compared with A, 1 and 3 compared with B, 1 and 4 compared with C, 2 and 3 compared with D, 2 and 4 compared with E, 3 and 4 compared with F.

(3) **Blood pressure condition of WHtR group of regular physical activity in elderly patients**

According to the WHtR<0.5$^{[9]}$ as the standard to the elderly in the regular physical activity group, data analysis showed that there were statistically significant difference between WHtR
normal group SBP (130.86±17.04), DBP (82.37±13.16) and WHtR ultra high group SBP (133.84±18.32), DBP (85.14±16.58), SBP (t=-2.367, P<0.05), DBP (t=-2.602, P<0.05). The SBP and DBP from WHtR normal group of regular physical activity elderly were lower than WHtR ultra high group.

4 Discussions

With the increase of age, systolic blood pressure of male and female increases. The study\textsuperscript{[10]} pointed out that twice-a-day for 30 min 45% maximum oxygen uptake of walking training can make the elderly maintain their systolic pressure acute effect in 24hs. Regular physical activities help the elderly to control the blood pressure level.

IDH is more common in the early stage of hypertension, and is a common type of hypertension in young people\textsuperscript{[11]} IDH prevalence rate for the sample is low, and most of the elderly patients with essential hypertension (EH) has been developed for SDH and ISH. SDH is the main hypertension sub types for the regular physical activity 60-69-year-old people. ISH is the main hypertension prevalence sub type for over 70-year-old people. The survey pointed out that the age of ISH elderly was higher than SDH elderly. The prevalence rate of ISH in elderly people was high and increased with the growth of the age, also was the independent risk factors for total cardiovascular events, acute myocardial infarction and cerebral infarction events, with high mortality and disability rate\textsuperscript{[12]}, which should be caused enough attention.

WHtR of ISH and SDH was higher than that in normal group. According to WHtR grouped by 0.5 point of, systolic blood pressure and diastolic pressure of WHtR normal group are lower than the high group for the regular physical activity elderly people. It can help patients with ISH and SDH improve blood pressure levels by controlling WHtR below 0.5. The study pointed out that BMI overweight can cause blood pressure increased, and BMI of samples were within the normal standard. Regular physical activity can keep normal BMI levels in the elderly. In Hypertension subtype groups, BMI did not differ significantly, presumably with the movement to improve muscle strength in the elderly, resulting in lean body weight increased.

5 Conclusions

Regular physical activity helps the elderly maintain normal BMI, control blood pressure level. Primary hypertension prevalence sub type of 60-69-year-old people who take part in regular physical activity is SDH and over 70-year for patients with ISH. ISH and SDH should pay attention to control the level of WHtR, to effectively improve the level of blood pressure. On health intervention to hypertension of the elderly, we should be aimed at different ages common hypertension sub types with specific measures to intervene, and pay attention to control levels of systolic blood pressure, prevent its development to ISH, in order to reduce the health hazards of hypertension in the elderly.
Acknowledgment

Scientific Research Program Funded by Shaanxi Provincial Education Department (Program No.15JK1619); Scientific Research Program Funded by Sports Bureau of Shaanxi Province (Program No.16052).

References


