PREVENTIVE MEDICINE

DOI: 10.12731/wsd-2017-3-10-18
UDC 613.2

HYGIENIC ASSESSMENT OF ACTUAL DIETING OF THE KHAKAS REPUBLIC ADULT RESIDENTS WITH LOW ENERGY EXPENDITURE

Kondrashova E.A.

The paper presents statistical data on foods consumption by the residents of the Khakas Republic. It also contains an analysis of actual dieting of the adult population with low energy expenditure in terms of dietary adequacy indications. A number of suggestions aimed at dieting optimization are made.

Keywords: foods; energy content; nutrients; vitamins; minerals; dieting.

ГИГИЕНЧЕСКАЯ ОЦЕНКА ПИТАНИЯ ВЗРОСЛОГО НАСЕЛЕНИЯ РЕСПУБЛИКИ ХАКАСИЯ С НИЗКИМИ ЭНЕРГОТРАТАМИ

Кондрашова Е.А.

В статье отражены статистические данные о потреблении пищевых продуктов населением Республики Хакасия. Приведен анализ фактического питания взрослого населения с низкими энерготратами по показателям пищевой адекватности. Изложены предложения по оптимизации питания.

Dieting is considered to be one of the fundamental factors that should be taken into account for the aims of health maintenance and promotion of the employable age population. According to calculations carried out by economists, doctors as well as nutritionists the daily consumption rate per person in Russia is on average 2200 kcal (in 1990–2590 kcal). Based on the FAO (Food and Agriculture Organization) international classification [7], the dieting energy consumption of 2200 calories is thought to be insufficient and is considered to be an indicator of long-term malnutrition. It should be noted that the last few decades are characterized by a decrease in physical activity of the population of the Russian Federation, which in turn leads to a decrease in energy expenditure. This reduces not only the amount of food consumed, but also the intake of essential nutrients [8, pp. 10–24; 9, pp. 5–8, 11]. Therefore, today the priority should be given to dieting studies of people with low energy expenditure.

The aim of the study: to analyse and assess actual dieting of adult residents of the Khakas republic with low energy expenditure along with working out dieting optimization suggestions.

The object of the study: 400 people of employable age engaged mainly in intellectual labour. The criterion being their profession, all the respondents were divided into 2 groups according to the physical activity coefficient (PAC) up to 1.6 and exceeding 1.6.

Methods of the study: the data on actual dieting were obtained using questionnaires and survey procedures. The hygienic assessment of the respondents’ actual dieting was carried out using the method of the daily 24-hour reconstruction in accordance with the guidance notes on the study of actual dieting and health status in relation to the dieting habits as well as the ‘The tables of the Russian food products chemical composition’ reference book [3, pp. 4–23; 6, pp. 6–274]. The diets were assessed in terms of their quantity and quality, taking into account the energy value and structure (the number of calories replenished at the expense of proteins, fats and carbohydrates), chemical composition, including the amount of food (proteins, fats, carbohydrates) and biologically active substances (vitamins A, B1, C, E, minerals Ca, Mg, P, Fe) [4, pp. 12–44; 10, pp. 11–22].

The findings were then compared to the standards 2.3.1.2432-08 ‘The physiologic needs for energy and nutrients standards for different groups of the population’ [1, pp. 2–4]. The study results were processed using the nonparametric
The results of the study

The data provided by the local agency of the Federal State Statistics Service for the Khakas Republic over the period of 2010–2014 show the residents’ reduced consumption of biologically valuable foods (meat and meat products, dairy products, fruit and vegetables), the result being the insufficient intake of complete proteins, polyunsaturated fatty acids, micronutrients and vitamins that might tell on public health due to unbalanced dieting [2, pp. 27–28, 5].

According to the data shown in Table 1, the average per capita consumption of meat and meat products over the period of 2010–2014 in the Khakas Republic remains at a low level compared with the physiological dieting standards (on average 69.4 kg [5].

Over the above-mentioned period consumption of dairy products increased from 250 kg/year in 2010 to 260 kg/year in 2014, that amounted to 81.3% of the required consumption standards.

There is also a shortage of the per capita consumption of vegetable produce. However, it should be noted that in general consumption of vegetables increased from 109 kg/year in 2010 to 118 kg/year in 2014 and amounted to 98.3% of the required consumption standards.

### Table 1.

<table>
<thead>
<tr>
<th>No</th>
<th>Foods group</th>
<th>2010, kg/pers. a year</th>
<th>2011, kg/pers. a year</th>
<th>2012, kg/pers. a year</th>
<th>2013, kg/pers. a year</th>
<th>2014, kg/pers. a year</th>
<th>The required consumption standards kg/pers. a year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bakery products in terms of flour, flour, cereals, legumes</td>
<td>134</td>
<td>134</td>
<td>135</td>
<td>130</td>
<td>128</td>
<td>95-105</td>
</tr>
<tr>
<td>2</td>
<td>Potatoes</td>
<td>119</td>
<td>119</td>
<td>119</td>
<td>115</td>
<td>115</td>
<td>95-100</td>
</tr>
<tr>
<td>3</td>
<td>Vegetables and gourds</td>
<td>109</td>
<td>110</td>
<td>117</td>
<td>117</td>
<td>118</td>
<td>120-140</td>
</tr>
</tbody>
</table>
According to the data obtained from the questionnaires and survey there is insufficient consumption of basic food products in comparison with the relevant data from the Siberian Federal District and the Russian Federation (Table 2).

<table>
<thead>
<tr>
<th>No</th>
<th>Foods group</th>
<th>Actual consumption kg/pers. a day</th>
<th>Required consumption standards, kg/pers. a day</th>
<th>Divergence, %</th>
<th>Consumption according to the statistical data in 2014, kg/pers. a day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PAC &lt;1.6</td>
<td>PAC &gt;1.6</td>
<td>PAC &lt;1.6</td>
<td>PAC &gt;1.6</td>
</tr>
<tr>
<td>1.</td>
<td>Bakery products in terms of flour, flour, cereals, legumes</td>
<td>0.23</td>
<td>0.29</td>
<td>0.27</td>
<td>85.2</td>
</tr>
<tr>
<td>2.</td>
<td>Potatoes</td>
<td>0.29</td>
<td>0.32</td>
<td>0.27</td>
<td>107</td>
</tr>
<tr>
<td>3.</td>
<td>Vegetables and gourds</td>
<td>0.18</td>
<td>0.21</td>
<td>0.35</td>
<td>51.4</td>
</tr>
<tr>
<td>4.</td>
<td>Fruit and berries</td>
<td>0.12</td>
<td>0.1</td>
<td>0.26</td>
<td>46.2</td>
</tr>
</tbody>
</table>
The average actual energy value of diets intended for men with PAC<1.6 amounts to 1934.80 kcal (Q25-Q75 1451.00-2321.80), with PAC>1.6 - 2253.12 kcal (Q25-Q75 1913.78-3060.89), which is less compared with the established daily energy needs standards of 2100-2800 kcal (for men with PAC<1.6) and 2950-3300 kcal (for men with PAC>1.6). It is also correct for women who have shown a reduced energy value of their daily diet that amounts to 1595.05 kcal (Q25-Q75 1327.60-1825.09) and 1608.70 kcal (Q25-Q75 1248.23-1769.85) for women with PAC<1.6 and PAC>1.6 respectively. The differences are statistically relevant (p ≤0.05).

The ratio of proteins, fats and carbohydrates in the diet of men with PAC<1.6 amounts to 1:1.04:3.1, with PAC>1.6 - 1:1:3.7, of women with PAC<1 6 - 1:1.1:3.9, of women with PAC>1.6 - 1:1:3.4.

The content of calcium, phosphorus and magnesium in the daily diet of men with PAC<1.6 amounts to 1:1.8:0.5, of men with PAC> 1.6 - 1:1.6:0.6. Women with PAC<1.6 showed the following ratio of calcium, phosphorus and magnesium - 1:1.4:0.5, with PAC>1.6 - 1:1.5:0.4.

This ratio fails to comply with the physiologically required ratio (1:1.5:0.5), which might negatively affect the absorption of these minerals.

The average vitamins content in the daily diet of men is shown in Table 3.

<table>
<thead>
<tr>
<th>Table 3.</th>
</tr>
</thead>
</table>

Vitamins content in the daily diet of men according to the data obtained from the questionnaires

| Vitamins | Standard need | Actual content:
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PAC&lt;1.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Average value</td>
</tr>
<tr>
<td>A, mkg (ret. eq.)</td>
<td>900</td>
<td>580</td>
</tr>
</tbody>
</table>
The analysis of men’s daily rations vitamin content found out that those with PAC>1.6 had a higher vitamins consumption rate, being relevant from the statistics point of view, compared with those with PAC<1.6. (р≤0.05).

Table 4.

<table>
<thead>
<tr>
<th>Vitamins</th>
<th>Standard need</th>
<th>Actual content:</th>
<th>PAC&lt;1.6</th>
<th>PAC&gt;1.6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PAC&lt;1.6</td>
<td>Average value</td>
<td>Divergence</td>
</tr>
<tr>
<td>A, mkg (ret. eq.)</td>
<td>900</td>
<td>590</td>
<td>-34.4%</td>
<td>510</td>
</tr>
<tr>
<td>C, mg</td>
<td>90</td>
<td>64</td>
<td>-28.8%</td>
<td>45.3</td>
</tr>
<tr>
<td>B₁, mg</td>
<td>1.5</td>
<td>0.63</td>
<td>-42%</td>
<td>0.64</td>
</tr>
<tr>
<td>E, mg (toc. eq.)</td>
<td>15</td>
<td>10.2</td>
<td>-32%</td>
<td>11.4</td>
</tr>
</tbody>
</table>

According to the data obtained, women’s diet vitamin composition fails to comply with the physiologically required ratio.

Conclusion

Actual dieting of the adult population with low energy expenditure in the Khakas republic is characterized as being unbalanced in terms of foods themselves, energy adequacy ratio as well as nutrients.

The survey revealed the reduced energy value of the residents’ daily ration. The actual ratio of proteins, fats, carbohydrates and minerals is thought to be unbalanced.

To maintain and promote health as well as reduce the risk of alimentary-dependent diseases development a number of measures should be taken aimed at optimizing dieting of the residents with low energy expenditure. The complex of measures that should be implemented with the participation of the government of the republic, as well as health authorities and the Federal Service on Surveillance for Consumer Rights Protection and Human Welfare is as follows:

– in order to handle the issue of micronutrient deficiency fortification of mass consumption foods, especially bread and bakery products, should
be one of the trends of the Khakas Republic regional policy in the sphere of healthy dieting;

– medical staff (especially GPs) should be more aware of alimentary risks leading to the development of diseases and their complications, as well as the link between health indicators and actual dieting, of using food supplements as an additional source of micronutrients;

– residents with low energy expenditure should be more aware of dieting issues including the ones related to age and occupation, ration energy value and chemical composition.

References


**Список литературы**


Шибанова Н.Ю. Гигиеническая оценка фактического питания шахтеров Кузбасса: Дис. ... д-ра мед. наук. Кемерово, 2009. С. 274.
Шибанова Н.Ю. Гигиеническая оценка фактического питания шахтеров Кузбасса: Автореф. дис. ... д-ра мед. наук. Кемерово, 2008. С. 46.

DATA ABOUT THE AUTHOR
Kondrashova Ekaterina Aleksandrovna, Postgraduate Student Department of Hygiene
Kemerovo State Medical Academy
22a, Voroshilova St., Kemerovo, Kemerovo Region, 650029, Russian Federation
kemsma@kemsma.ru
SPIN-code: 8189-3662

ДАННЫЕ ОБ АВТОРЕ
Кондрашова Екатерина Александровна, аспирант кафедры гигиены
Кемеровская государственная медицинская академия
ул. Ворошилова, 22 а, г. Кемерово, Кемеровская область, 650029, Российская Федерация
kemsma@kemsma.ru