

DRINKING REGIME IN CHILDREN, ADOLESCENTS, AND UNIVERSITY STUDENTS

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Abstract

The main priority was to find out how high the fluid intake is in various age groups of children, adolescents and university students, if there are differences between individual groups or between girls and boys. We were also interested in the percentage of respondents who have deficient drink intake, again comparing the differences with respect to the above groups and sex. We included in the project both healthy children and chronically ill children, either outpatients or staying in the children's sanatorium.

We have chosen the 24-hour recall as the suitable survey method and compiled the obtained values using the STATISTICA v. 6.0 programme.

We have found that the average fluid intake was only 82.3% (SD=32.6; median 78.6%) of the required volume of fluids, which is inadequate. The differences between individual age groups of children and students were statistically significant ($p < 0.001$), with the best results established for students from the Faculty of Medicine, Masaryk University (median 103.5%). Their drinking regime was all right as regards fluid intake. On the other hand, the worst fluid intake was found among students from a vocational school (median 63.7%) and children from primary schools (median 64.3%). The difference in average fluid intake between the genders was not statistically significant ($p = 0.682$), the fluid intake in girls was higher. We have found inadequate fluid intake in a total of 74.4% of respondents. From all of the groups under examination we evaluated as the most hazardous the group of children from primary schools, where only 6.3% of the children had a correct drinking regime. The students from the Faculty of Medicine showed again the best results, no less than 55.4% had adequate fluid intake. It follows from the results obtained that the degree of education achieved, health awareness and regular drinking regime supervised by another person are of decisive influence on fluid intake. The influence of sex on fluid intake was not confirmed.

Key words

Fluid intake, Children, Adolescents, Students, 24-hour recall, Drinking regime

INTRODUCTION

Very little emphasis has been put on the drinking regime and its observance in our country and in the world. It often takes the last place in the area of interest of both specialists and lay public. We have found by studying the fluid intake in children that their attitude to beverage consumption is influenced in the first

place by the information they get from adults – mainly from parents, teachers and doctors, and also from various kinds of mass media. The first and primary place in this chain belongs to specialists from among doctors and nutritionists. They funnel the basic information about drinking regime principles to children either indirectly through the persons or mass media mentioned above, or they give it to them directly in the form of education seminars and materials, most frequently in the school environment, which is the best way.

We start from our own experience and we can confirm that most children co-operated very well with us, were motivated and, paradoxically enough, they themselves then passed the obtained information on to their parents and coevals. The level of health awareness of the children, adolescents and young adults under study varied, depending mostly on their age, experience and education.

Water is an essential nutrient for human life because it forms a substantial part of the human organism (60% in adults and even more in children) and serves as a transmitter of most diverse materials and nutrients, and as a solvent. In the body it provides a medium where countless reactions take place. The daily fluid intake should be around 2–2.5 litres in dependence on age, weight and human activities (1,2,3).

In general, the younger the child, the larger the water volume in the body and equally higher the requirements for fluid intake. In comparison with adolescents and young adults the child has a larger body surface and the surface of the airways (4), and most of the water in a child's body is found outside the cells, i.e. between the cells and vascular space, which enables a quicker dehydration of the organism (5), mainly by evaporation. Fluid deprivation in not only children but also in adolescents and young adults is mainly due to warm weather, hard physical work (6), disease, fever, diarrhoea, vomiting, and environmental conditions such as air humidity, extremely dry air, etc. The body loses under normal conditions about 1850–2600 ml of fluids per day. This happens via kidneys, lungs, skin, and stool (7). A fluid loss of as little as 1% of the total body weight results in fatigue, weakness, inattentiveness, and loss of appetite. Higher losses of water lead gradually to apathy, decline in psychic and physical performance, dry mucous membrane in the mouth, reduced skin turgor, decreasing blood pressure, increased pulse – the body is gradually developing towards a collapse (5,8,9). Children are particularly sensitive to these water losses, therefore it is necessary to avoid them and try to provide maximum mental and physical comfort for the children, especially if they are to do well at school, or if they suffer from some chronic disease.

MATERIALS AND METHODS

We included in the drinking regime research, which ran for 20 months, a total of 1521 children, adolescents and university students, all from the South Moravia region and 5–29 years of age. The average age was 15 years. The representation of sex in the file was 798 girls and 723 boys.

We worked with both healthy and diseased respondents. Included in chronically ill children were children and adolescents who were outpatients of the Brno Faculty Hospital – Children's Hospital,

and children who were placed in the 2nd Children's Spa Sanatorium in Luhačovice. Healthy children and adolescents were contacted directly at school, during the lessons that were oriented towards healthy lifestyle education.

We had prepared a special questionnaire, thanks to which we could consider the fluid intake from consumed beverages and foodstuffs by means of a detailed 24-hour recall. The questionnaires were filled in under the supervision of a nutritionist. In the case of the youngest children we also co-operated with their teachers or parents, and the information was written into the questionnaire by the interviewer.

We have statistically processed the acquired data using the STATISTICA v. 6.0 programme and produced clearly arranged tables and graphs and considered the statistical significance of the resultant values. On the basis of the age, weight and mobility of each respondent we determined the so-called ideal fluid intake, i.e. the volume of fluids in ml that must be taken per day in either solid or liquid form. Then we compared the figure with the objectively established value of fluid intake and expressed it in percentage points. In the fluid intake category the data distribution was tested using the following normality tests: Kolmogorov-Smirnov & Lilliefors test and the Shapiro-Wilk test. The difference in the average fluid intake by children and students of the individual schools was evaluated by the Kruskal-Wallis test. To establish the drinking regime according to sex, the chi-square test was used. In a comparison of the respondents within individual groups and also totally with respect to the different levels they had achieved within the ideal fluid intake evaluation, the chi-square test was used once again. The data were evaluated on the 5 % significance level.

RESULTS

The fluid intake was practically inadequate in all the groups under study (*Table 1*). Only students from the Faculty of Medicine, Masaryk University, were drinking adequate amounts of fluid. The worst results were found for adolescents from the vocational school and in children from the primary schools. It was interesting to find incorrect drinking regime in chronically diseased children who, in view of their impaired health, should definitely take greater care as far as adequate fluid intake is concerned. In the overall assessment of fluid intake in the whole set ($N = 1521$), the average intake of fluids was found to be 82.3 %, which only confirms that the drinking regime of all children, adolescents, and young adults addressed was not correct as regards the amount of the fluids taken.

The percentage distribution of fluid intake within each group is shown in *Fig. 1*. The difference in the amount of consumed beverages between individual groups of respondents was statistically significant ($p < 0.001$). Comparing the fluid intake of girls and boys we did not find any statistically significant differences ($p = 0.682$); see *Fig. 2*. We can only state again that the drinking regime was inadequate in both genders.

We also surveyed what percentage of children, adolescents, and young adults had inadequate fluid intake. Regarding the whole set, we found that nearly three quarters of the children, i.e. 74.4 %, had deficient fluid intake (*Table 2, Fig. 3*), out of which 14.4 % had less than 50.1 % fluid intake. A mutual comparison of the groups (*Table 2*) showed that the students from the Faculty of Medicine again had the best results because only 44.6 % of them consumed less fluids than they should consume; however, in the primary school group we registered no less than 93.7 % of

Table 1
Fluid intake in percentage from the required number

GROUP	N	Average [%] (SD)	Median [%]	Min / Max [%]
Vocational school (UČ)	175	69.8 ^A (28.0)	63.7	14.6 / 196.1
Primary schools (ZŠ)	175	65.9 ^A (22.5)	64.3	24.0 / 133.3
Children's Spa in Luhačovice (L)	141	70.6 ^A (30.9)	66.7	11.4 / 172.0
Children's Hospital - outpatient dept. (N)	177	73.8 ^{AB} (28.3)	69.8	19.7 / 176.3
Grammar schools (G)	177	86.4 ^C (30.5)	83.9	29.4 / 160.4
Nursery school (MŠ)	178	84.3 ^C (17.3)	84.3	50.0 / 171.4
Brno University of Technology (VŠT)	164	92.6 ^{CD} (39.9)	86.2	25.5 / 291.7
Schools for nurses (SZŠ)	177	94.8 ^{CD} (36.6)	89.6	38.8 / 270.7
Faculty of Medicine, MU (VŠM)	157	103.1 ^D (33.6)	103.5	39.0 / 205.5
TOTAL	1521	82.3 (32.6)	78.6	11.4 / 291.7

Table 2
Subdivision of the whole set into categories by fluid intake percentage¹

GROUP	N	≤50 %	50.1 % - 99.9 %	≥ 100 %
Vocational school (UČ)	175	25.7 %	57.7 %	16.6 %
Primary schools (ZŠ)	175	25.7 %	68.0 %	6.3 %
Children's Spa in Luhačovice (L)	141	27.0 %	56.7 %	16.3 %
Children's Hospital - outpatient dept. (N)	177	18.1 %	65.5 %	16.4 %
Grammar schools (G)	177	13.0 %	54.8 %	32.2 %
Nursery school (MŠ)	178	0.0 %	86.0 %	14.0 %
Brno University of Technology (VŠT)	164	11.6 %	49.4 %	39.0 %
Schools for nurses (SZŠ)	177	4.5 %	58.8 %	36.7 %
Faculty of Medicine, MU (VŠM)	157	5.1 %	39.5 %	55.4 %
TOTAL	1521	14.4 %	60.0 %	25.6 %

¹The difference among groups is statistically significant (N = 1521, p < 0.001)

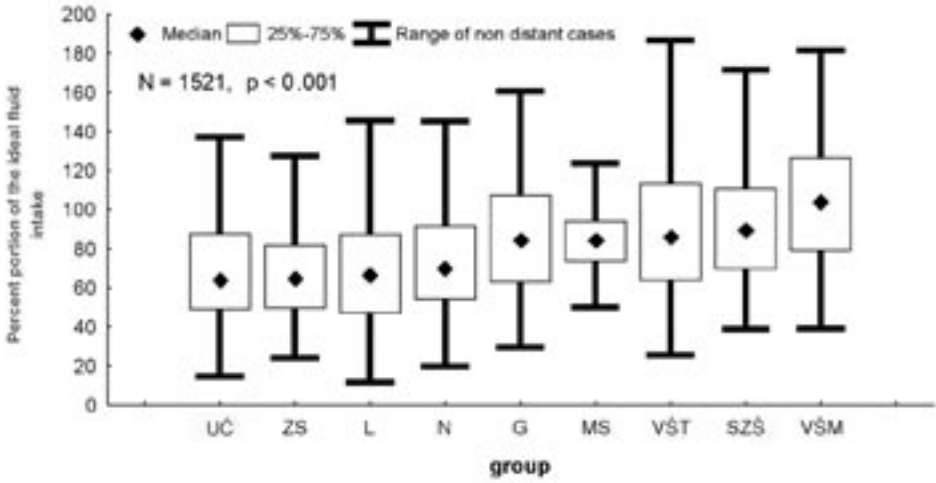


Fig. 1
Per cent distribution of fluid intake in individual groups



Fig. 2
Comparison of the percentage of fluid intake from the required amount between girls and boys

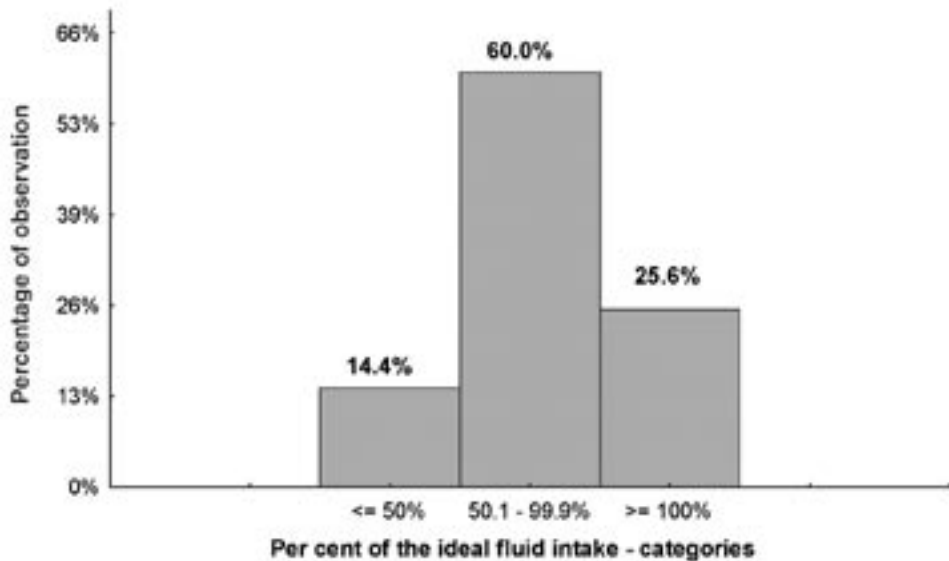


Fig. 3

Subdivision of the whole set into categories by fluid intake percentage

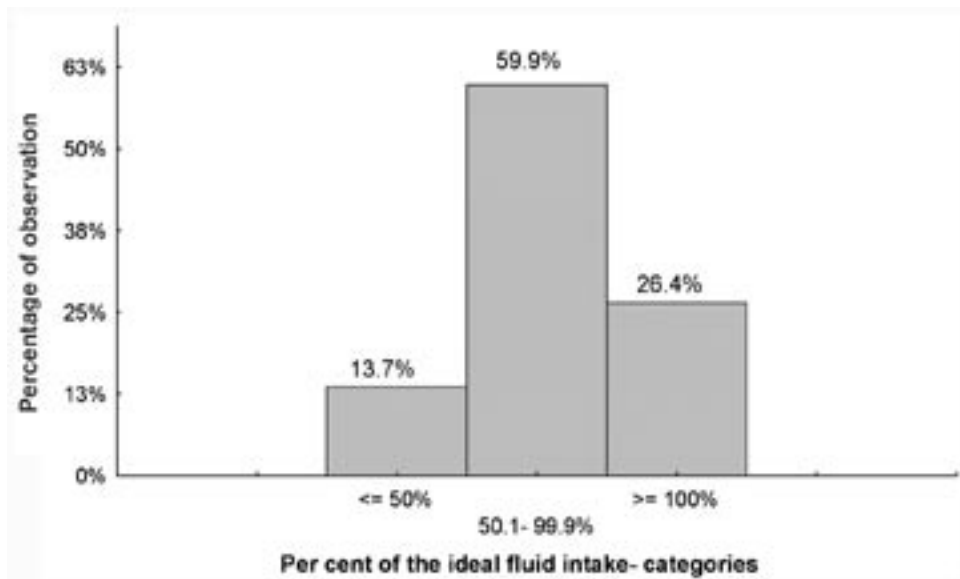


Fig. 4

Subdivision of the girls set into categories by fluid intake percentage

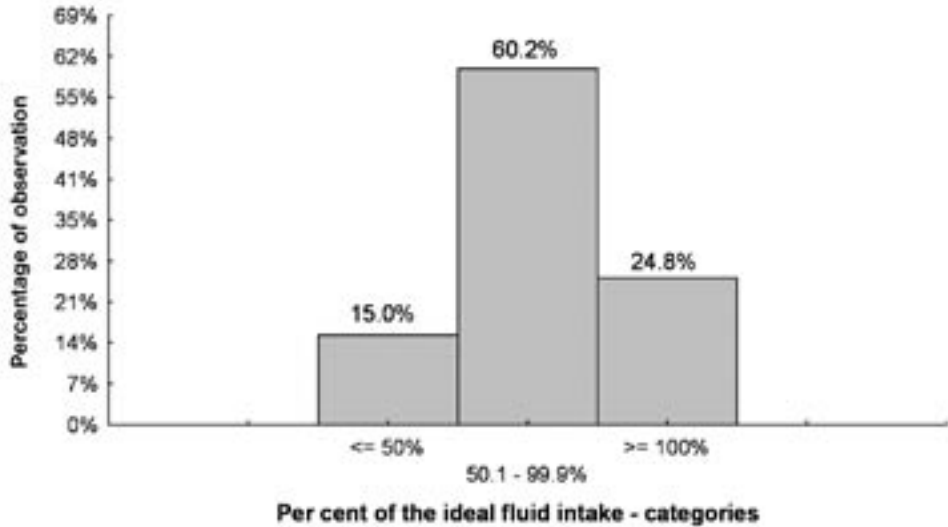


Fig. 5

Subdivision of the boys set into categories by fluid intake percentage

children with deficient fluid intake. The difference between girls and boys was not statistically significant ($p=0.620$), although girls had again somewhat better results than boys (Figs. 4, 5).

DISCUSSION

It clearly follows from our results that the drinking regime constantly remains somewhere in the background of interest of our children and students. The same problem, although not in children but in women, was described by *Susan M Kleiner (1)* in her publication. In her research she was comparing the drinking regimes of women in the USA. Their age ranged from 15 to 49 years. The women were divided into three groups - not pregnant, pregnant, and lactating. She found inadequate fluid intake in all respondents. Even if it need not be clear at first sight, there is an extremely strong tie between mother and her child. The mother's behaviour, postures, and professed values have a very important impact on the child's development, and this may be the explanation of why, also in the Czech Republic, we could find the same alarming results for the fluid intake in our children.

As regards the method chosen for acquiring information from the respondents, the possibility of monitoring children and adolescents for longer than just one day would certainly contribute to a higher accuracy of the results. The ideal would be a 24-hour recall pursued for three days. Another important asset would be simultaneous monitoring of fluid losses via urine during 24 hours (3), but both methods are so time-, financially, and technically demanding that we cannot afford to realise them at present.

The very low fluid intake found in chronically diseased children is definitely puzzling, and for doctors, nurses and teachers in hospitals it is a signal that the child patients need a stronger motivation to respect the drinking regime principles. A suitable form in this respect would be, for example, funny rhymes, colouring books, pictures, and works of art created by children and adolescents on the theme of water and all that goes with it. All this could in final context have a positive influence on the attitude of children and adolescents to the consumption of beverages and foods with a higher content of water, and it should contribute to their quicker recovery or to stabilizing the desirable health condition of the child.

It is thus necessary to admit that the problem of respecting the drinking regime does exist in children and adolescents of all age groups, and our task is not to disregard this deficit but to try to resolve and correct it as fast as possible.

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PITNÝ REŽIM U DĚTÍ, ADOLESCENTŮ A STUDENTŮ VYSOKÝCH ŠKOL

S o u h r n

Naší hlavní prioritou bylo zjistit, jak vysoký je příjem tekutin u různých věkových skupin dětí, adolescentů a vysokoškolských studentů, zda se mezi jednotlivými skupinami vzájemně liší a jsou-li nějaké rozdíly mezi dívkami a chlapci. Také nás zajímalo, jak velké procento respondentů má nedostatečný příjem tekutin a porovnání rozdílů opět v rámci skupin a pohlaví. Do projektu jsme zařadili jak děti zdravé, tak děti chronicky nemocné, které docházely do dětských ambulancí nebo pobývaly v dětské léčebně.

Jako vhodnou metodu výzkumu jsme zvolili 24-hodinový záznam a získané hodnoty zpracovali za použití statistického programu STATISTICA v. 6.0.

Zjistili jsme, že průměrný příjem tekutin byl pouze 82,3% (SD=32,6; medián 78,6%) z požadovaného množství tekutin a je tedy nedostatečný. Rozdíl mezi jednotlivými věkovými skupinami dětí a studentů byl statisticky signifikantní ($p < 0,001$), přičemž nejlepší výsledky měli studenti z Lékařské fakulty Masarykovy univerzity (medián 103,5%), jejichž pitný režim byl z hlediska množství tekutin zcela v pořádku. Naproti tomu nejnižší příjem tekutin měli studenti z učilišť (medián 63,7%) a děti ze základních škol (medián 64,3%). Rozdíl v průměrném příjmu tekutin mezi pohlavími nebyl statisticky významný ($p = 0,682$), u dívek byl však příjem tekutin vyšší. Nedostatečný příjem tekutin jsme zjistili celkem u 74,4% respondentů. Ze sledovaných skupin jsme vyhodnotili jako nejrizikovější děti ze základních škol, z nichž mělo pouze 6,3% správný pitný režim. Studenti z lékařské fakulty měli opět nejlepší výsledky; celých 55,4% z nich mělo adekvátní příjem tekutin.

Rozhodující vliv na příjem tekutin má tedy podle získaných výsledků stupeň dosaženého vzdělání, informovanost a pravidelný režim s dohledem druhé osoby. Vliv pohlaví na příjem tekutin se nepotvrdil.

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