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# Nutritional Habits of Preschool Children

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## Abstract

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**Introduction.** Proper nutrition is crucial for maintaining good health and provides the basis for proper growth and development of children and adolescents. Insufficient physical activity and inadequate nutrition are among the leading causes of mortality and morbidity.

**Aim.** The aim of this research paper was to examine the nutritional habits of preschool children.

**Methods.** The study was conducted in April 2018 and included a survey of kindergarten children and their parents. A questionnaire consisting of 24 questions was created for the purposes of the study. The survey was conducted entirely anonymously and voluntarily. Of the 100 respondents included in the study, 52% (52) were boys and 48% (48) were girls. The average age of the respondents was 5.12 years.

**Results.** Out of a total of 100 children, 98% (98) have a hot meal every day, while 2% (2) do not. Cereals and cereal products are consumed by 97% of children, while 3% stated that they do not consume cereals. As with cereals, 97% of children use milk and dairy products, while only 3% do not consume them. 29 (76%) boys have normal body weight. Four (5%) were malnourished and 3 (8%) boys were overweight. 30 (70%) girls have normal body weight, 3 (7%) are malnourished, and one (2%) girl is overweight. 8 (21%) girls were obese.

**Conclusion.** According to the obtained research results, it can be concluded that most of the examined children ate properly and had normal body weight. It

is a worrying fact that most of the children consume sweets/snacks on a daily basis, while on the other hand a large number of surveyed children do not consume vegetables and fruits on a daily basis. Nurses in preschools face the challenging task of integrating their professional knowledge into the educational process.

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## Introduction

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Proper nutrition is crucial for the maintenance of good health and forms the basis for proper growth and development in children and adolescents. Insufficient physical activity and inadequate nutrition are among the leading causes of mortality and morbidity (1). The human body uses nutrients such as carbohydrates, fats, proteins, vitamins, minerals and trace elements. Other fibres such as cellulose, pectin and lignin, which are most often indigestible, are also included among the basic nutrients (2). A generally accepted and simple model for a balanced diet is the pyramid of proper nutrition. According to the pyramid of proper nutrition, foods are divided into six groups: cereals, vegetables and fruits, proteins and fats (1). The tasks of nurses as health managers in kindergartens include monitoring the growth and development of children as well as planning and preparing menus, taking care of hygienic and sanitary conditions and implementing children's health care. According to the World Health Organization, obesity among children and adolescents aged five to nineteen has increased from 4% in 1975 to more than 18% in 2016, and it is estimated that today 340 million children are overweight (3). The survey of the European Initiative for Monitoring Childhood Obesity in Croatia in 2015/2016 shows that 34.9% of children are overweight and obese, while in 2003 this figure was 20.8% of children with a body mass index  $\geq 25$  kg/m<sup>2</sup> (3). 67.3% of girls have normal body weight, while 1.6% are malnourished, 20.3% are overweight and 10.7% are obese. Among boys, 60.8% have normal body weight, 0.4% are malnourished, 21.5% are overweight and 17.2% are obese (4). Also, the data show that more than 1/3 of children do not engage in any physical activity, while more than half, as many as 56.1% spend two or more hours a day using elec-

tronic devices or watching TV. More than 1/3 of children use snacks or "fast food" 1 to 3 times a week (3). Juices with added sugar are consumed more than three times a week by more than 29.1% of children. 66.5% of children do not eat fresh fruit every day, while as many as 82.8% of children do not eat vegetables every day (4).

To prevent obesity in children, it is necessary to adopt healthy living habits from an early age, consume a varied diet, spend as little time as possible sitting while using computers, tablets, mobile phones or watching television, and engage in various physical activities (3). In order to be informed about the nutrition of their children during their stay in kindergarten, parents are provided a weekly menu (5). The preschool period is a time of intensive growth and development of the child, and nutrients are needed for normal functioning of the body. Inadequate energy intake results in children being overweight and in malnutrition and susceptibility to infections. The diet of a preschool child should consist of 50-60% carbohydrates, 30-35% fats and 10-15% proteins (6). Carbohydrates form the basis of energy needs, but complex carbohydrates with a medium or low glycaemic index (whole grains, legumes, vegetables) have an advantage. Sugars or simple carbohydrates (sweets, biscuits, juices) should be consumed in as small quantities as possible (7). Excessive protein intake can burden the liver and kidneys, and the best choice are proteins of animal origin because they are biologically more valuable than plant proteins, of which legumes are in the first place (6). The fats to be avoided are the trans unsaturated fats found in industrial bakery products and margarine (7). A healthy child who eats a normal diet receives enough minerals and vitamins and does not need supplements. Due to large ethnic and family variations in food intake, precise quantitative and qualitative recommendations are not possible, but a healthy preschool diet should be varied, protein and energy intake must allow for proper growth and development, food must be high in fibre and the intake of salt should be reduced to a minimum (8). It is important for a kindergarten to have a nurse as the health manager who can supervise children's eating habits and monitor their health status, food intake, body mass index, etc. Nurses can play a crucial role in the detection of allergic reactions to food ingredients or specific allergens. In children, special attention should be paid to an allergic reaction to food or a food ingredient (9).

The evaluation of the nutritional status is complex and based on a series of anthropometric, laboratory, clinical and dietary measurements (10, 11). A person's nutritional status is defined as a health status that depends on nutrient intake and bioavailability of nutrients in the body.

In this research paper, the aim is to assess the nutritional habits of preschool children.

## Methods

This survey was conducted in April 2018. The survey included children at a kindergarten in the county of Kloštar Ivanić, with their parents responding on their behalf. Of the 100 respondents included in the survey, 52% (52) were boys and 48% (48) were girls. The average age was 5.12 years, and the participants were 1-8 years old. A questionnaire was developed specifically for the purposes of this study. It consisted of 24 questions, including those about the age and sex of the child, their daily activities, their food allergies, foods most often consumed during the day and the frequency of intake of fast food and sweets. A total of 160 survey questionnaires were distributed, of which a total of 107 were completed. Of these, 100 were properly completed and 7 were invalid. The survey questionnaire was conducted entirely anonymously and voluntarily. The computer program Microsoft Excel 2010 was used for data analysis. The results are presented using the methods of descriptive statistics and the Chi-square test.

## Results

Out of a total of 100 respondents, the largest age group consisted of children born in 2011 - 28% (28). The smallest group of respondents consisted of children born in 2010 and 2017. Children born in 2012 make up 21% (21), those born in 2013 make up 22% (22), those born in 2014 make up 10% (10), those

born in 2015 make up 12% (12), and those born in 2016 make up 5% (5) (Table 1).

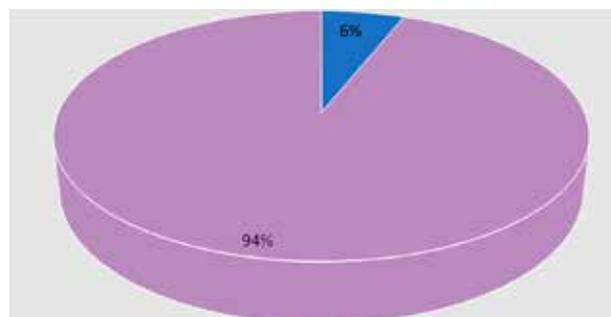
Table 1. **Number of births per year**

YEAR OF BIRTH	BOYS	GIRLS	SUM (%)
2010	1	0	1%
2011	11	17	28%
2012	9	12	21%
2013	14	8	22%
2014	5	5	10%
2015	8	4	12%
2016	3	2	5%
2017	1	0	1%
SUM	52	48	100%

The descriptive statistics show that the median for boys is 5, and for girls it is 6. The standard deviation is 5,33.

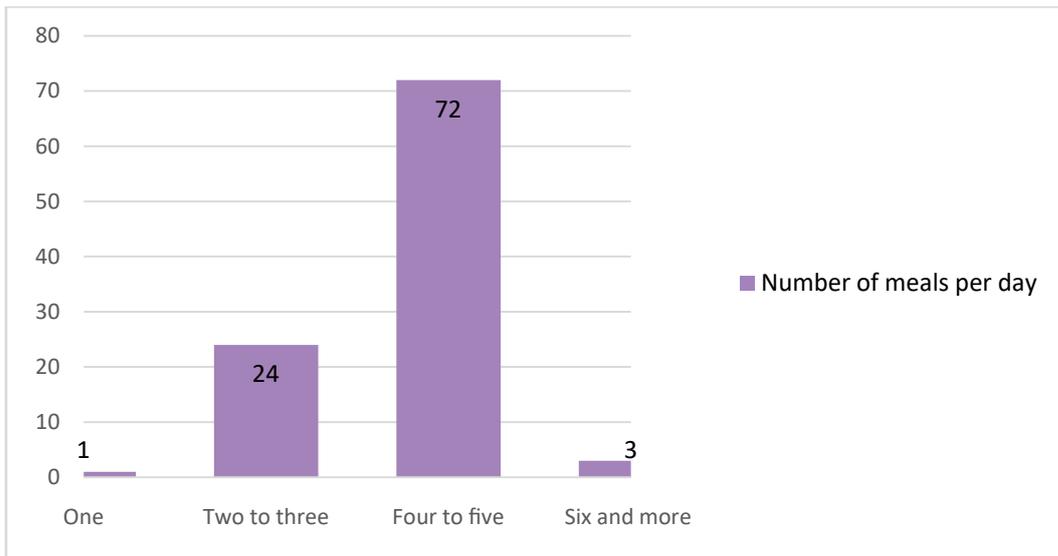
## Nutritional habits of preschool children

The second part of the questionnaire consists of specific questions about children's eating habits. The question "Does your child have a food allergy?" 94 participants answered "No" (94%), and only 6 answered "Yes" (6%). Of these, 5 girls have a food allergy to hazelnuts, milk, and nuts, while only 1 boy reports an allergy to spinach. One person did not list the food they were allergic to (Graph 1).



Graph 1. **Food allergies**

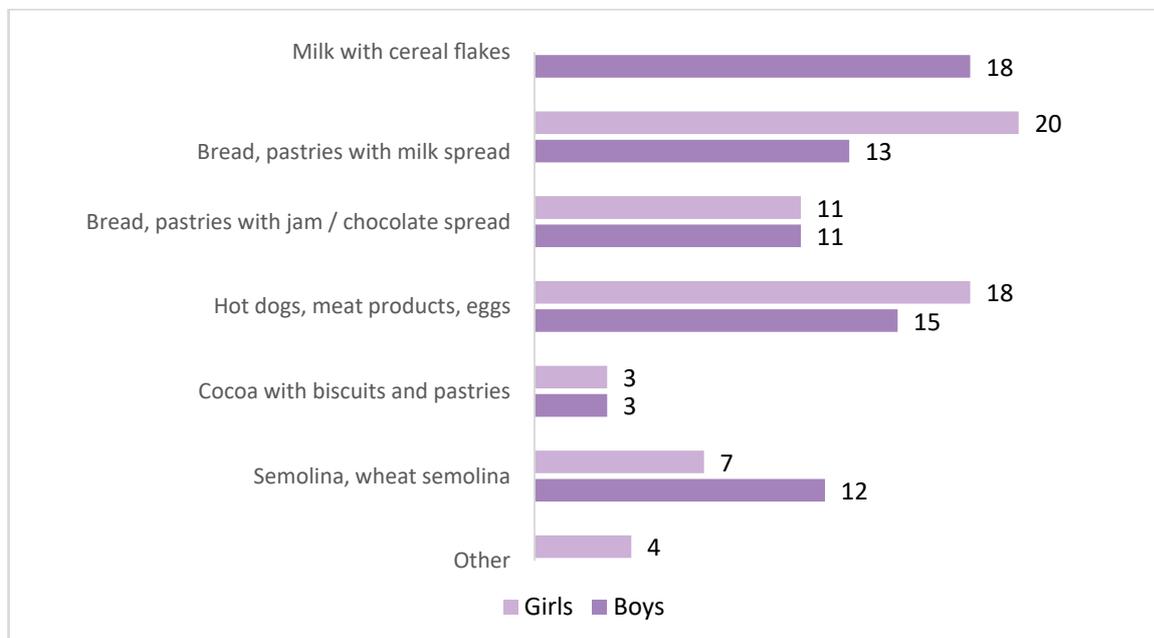
The data obtained about the number of meals per day show that most children (72%) have four to five meals a day. This is followed by children who have two to three meals a day (24%), while 3% have six or more meals. It is worrying that one child (1%) had only one meal per day (Graph 2).



Graph 2. **Number of meals per day**

Milk with cereal is consumed by most children (25%), 22 girls and 18 boys. Bread or pastries with milk spread are consumed by 20 girls and 13 boys (20%); hot dogs, meat products and eggs are eaten by 20% of the participants. Bread or pastries with jam or chocolate spread are consumed by 13% of partici-

pants, semolina or wheat semolina by 12%, while cocoa with biscuits or pastries is consumed by only 4% of the participants. 6% answered "Other" but provided no details. More than one answer was selected by 39 parents (Graph 3).



Graph 3. **Food that is most often consumed for breakfast**

Out of a total of 100 children, 98% (98) have a hot meal every day, while 2% (2) refused to eat a hot meal in kindergarten. According to the obtained data, most boys (58%) and girls (54%) consume vegetables 2-3 times a week. 33% of the boys consume vegetables every day, while 7% consume them once a week, and 2% do not consume vegetables at all. 17 girls (36%) consume vegetables every day, and 6% once a week, while 2 girls (4%) do not consume vegetables at all. No participants answered that they consume vegetables once a month or 2-3 times a month (Table 2).

Fruits are consumed daily by 31 boys (60%) and 25 girls (52%). 2 girls (4%) consume fruit once a week, and no boy (0%) consumes fruit once a week. 19 boys (36%) and 21 girls (44%) consume fruit two to three times a week. Fruit is not consumed at all by 2 boys (4%) (Table 2). Table 3 shows the statistical significance in the observed sample.

The chi-square statistic is 2.17 and the p-value is 0.140437. The results shown in table 3 are not significant at  $p < .05$ . The chi-square statistic with Yates's correction is 1.24 and the p-value is 0.265679. There were no significant differences in results at  $p < .05$  after Yates's correction

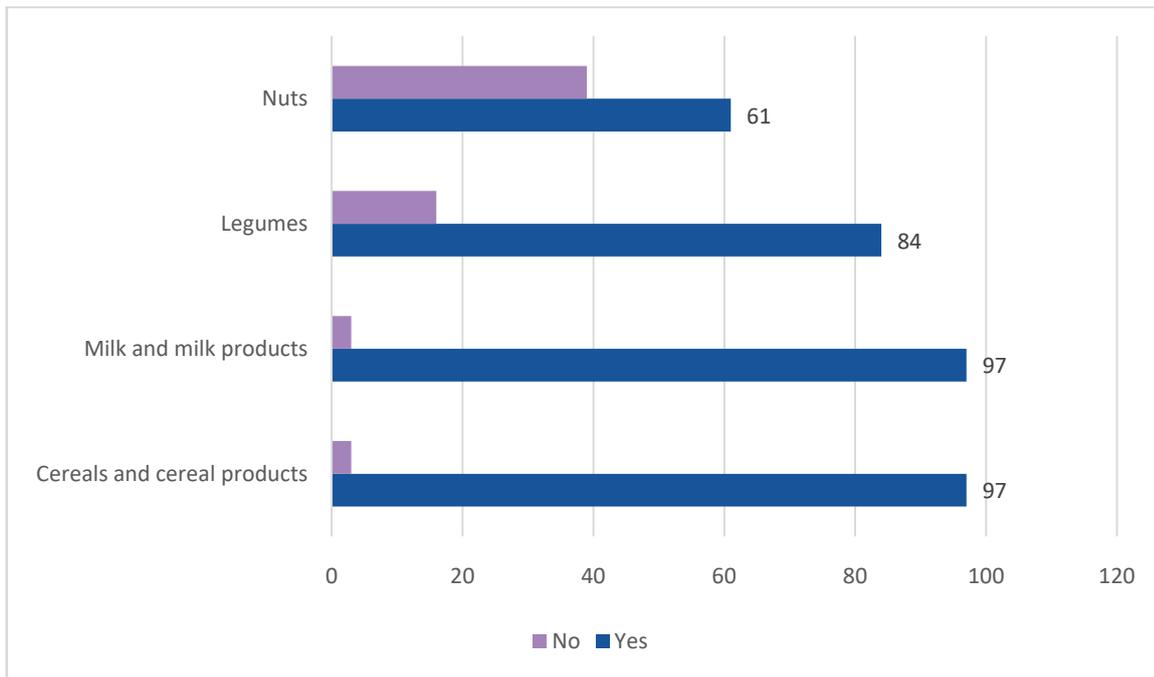
Cereals and cereal products are consumed by 97% of the participants, while 3% stated that they do not consume cereals. As with cereals, 97% of the children use milk and dairy products, while only 3% do not consume them. In the case of legumes, 16% do not consume them, while a larger number (84%) consume legumes. Nuts such as walnuts, almonds, hazelnuts and others are consumed by 61% of the children, while 39% do not consume them due to allergies to certain foods (hazelnuts) or because the children are too young, and their parents fear the risk of suffocation (Graph 4).

Table 2. **Frequency of fruit and vegetable consumption in boys and girls**

FREQUENCY	VEGETABLE		FRUIT	
	BOYS	GIRLS	BOYS	GIRLS
DAILY	17	17	31	25
2-3 TIMES PER WEEK	30	26	19	21
ONCE A WEEK	3	3	0	2
ONCE A MONTH	0	0	0	0
2-3 TIMES A MONTH	0	0	0	0
DOES NOT EAT	1	2	2	0

Table 3. **Statistically significant difference in fruit and vegetable consumption in boys and girls**

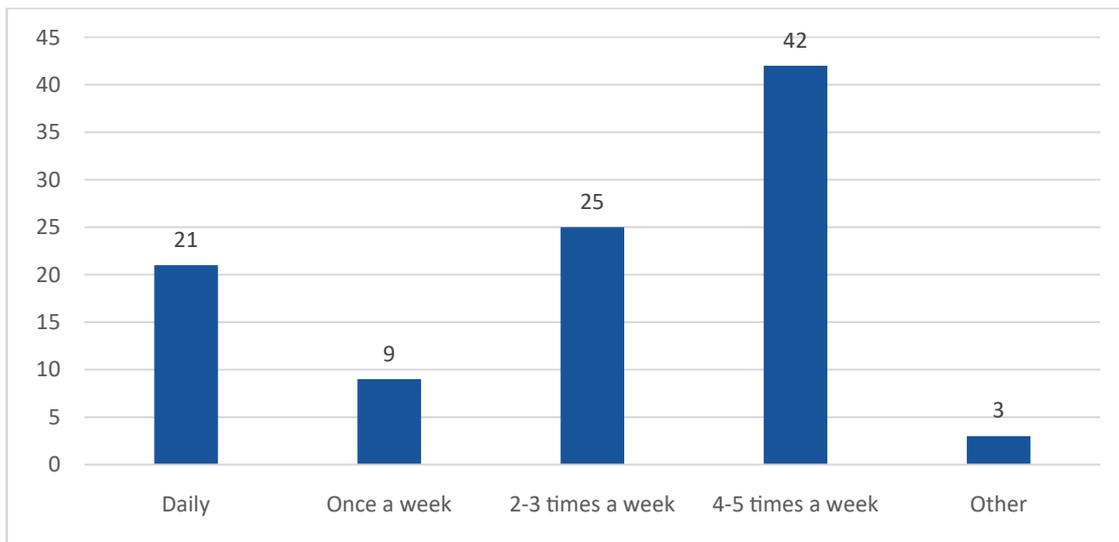
	Vegetable	Fruit	Marginal row totals
Daily and/or weekly	90 (92.04) [0.05]	96 (93.96) [0.04]	186
Once a week/monthly	6 (3.96) [1.05]	2 (4.04) [1.03]	8
Marginal column totals	96	98	194 (total)



Graph 4. Consumption of cereals, milk, legumes, and nuts

According to the above chart, we see that 42% of the children eat meat 4-5 times a week, while 25% consume it 2-3 times a week. 21% of the children con-

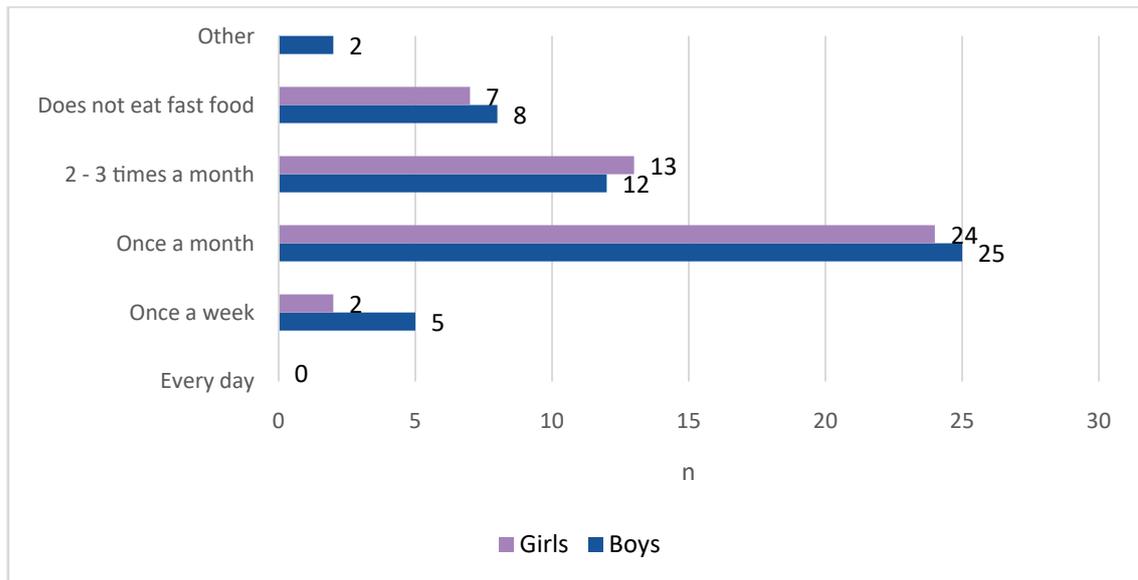
sume meat every day, while 9% consume meat once a week. 3% answered "Other" but provided no details (Graph 5).



Graph 5. Frequency of meat consumption in boys and girls

Most of the children, 24 girls and 25 boys (49%), consume fast food once a month, while 13 girls and 12 boys (25%) consume it 2-3 times a month. Fast food is consumed once a week by 2 girls and 5 boys (7%).

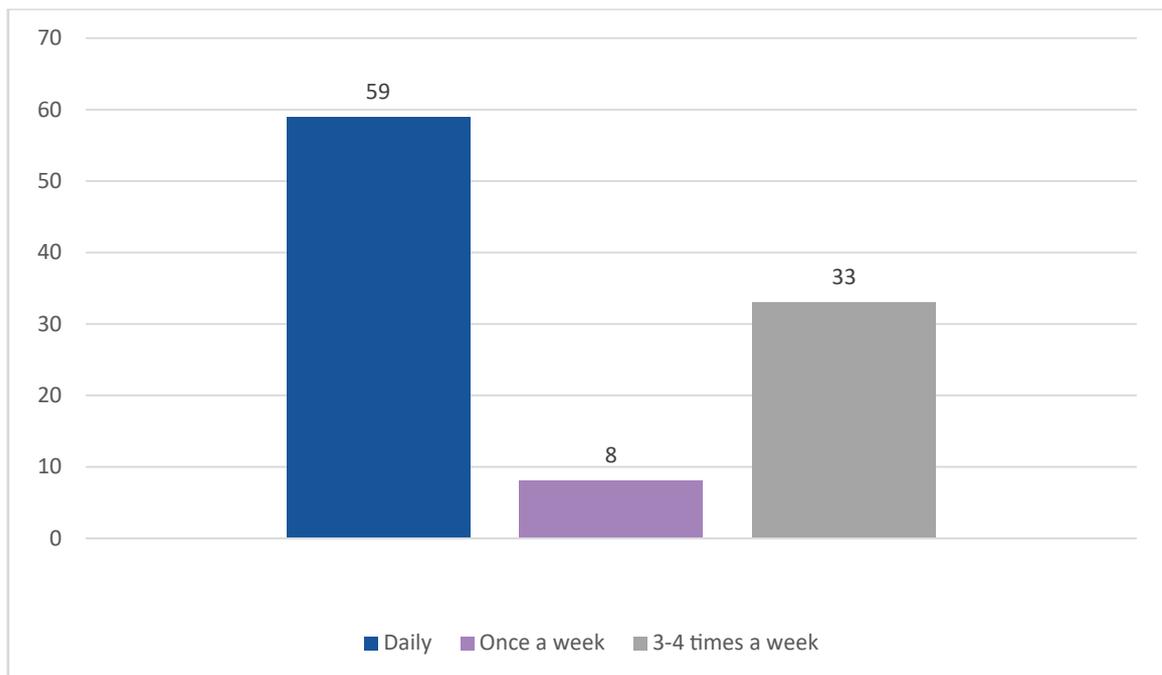
15% of the children (7 girls and 8 boys) do not consume fast food at all. 4% answered "Other", while the answer "Every day" was not selected by any parent (0%) (Graph 6).



Graph 6. Consumption of fast food

Most boys (60%) and girls (58%) consume sweets/snacks every day. 2% of the boys and 15% of the girls consume sweets/snacks once a week, and 38% of the boys and 27% of the girls consume them 3-4 times a week. No child consumes sweets/snacks once

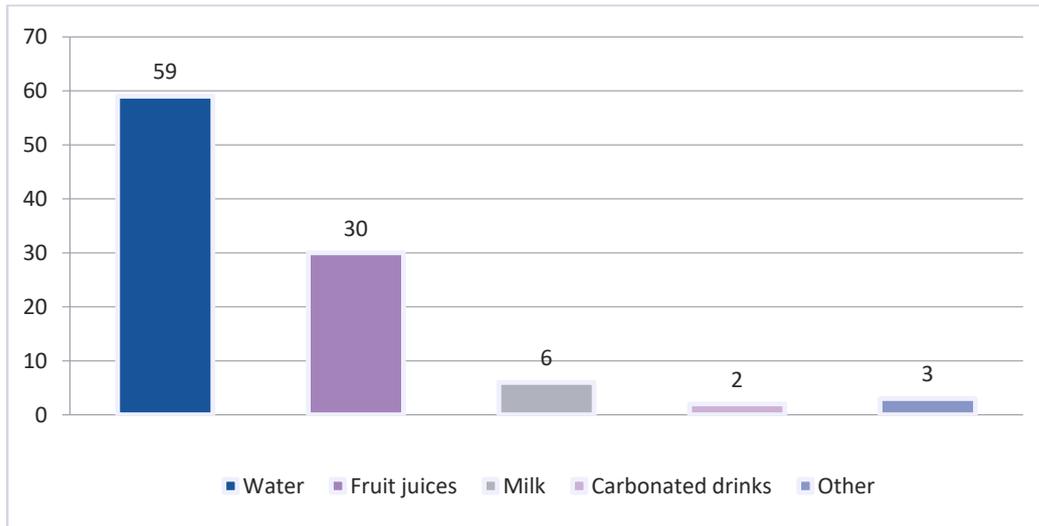
a month, and there are no children who do not consume sweets/snacks. Therefore, it can be concluded that 59% of all participants consume sweets/snacks daily, 8% consume sweets/snacks once a week and 33% consume them 3-4 times a week (Graph 7).



Graph 7. Consumption of sweets/snacks

Graph 8 shows that most of the children (59%) consume water when they are thirsty. This is followed by fruit juice (30%), and milk (6%), which was the answer selected by 5 boys and 3 girls. 2% answered

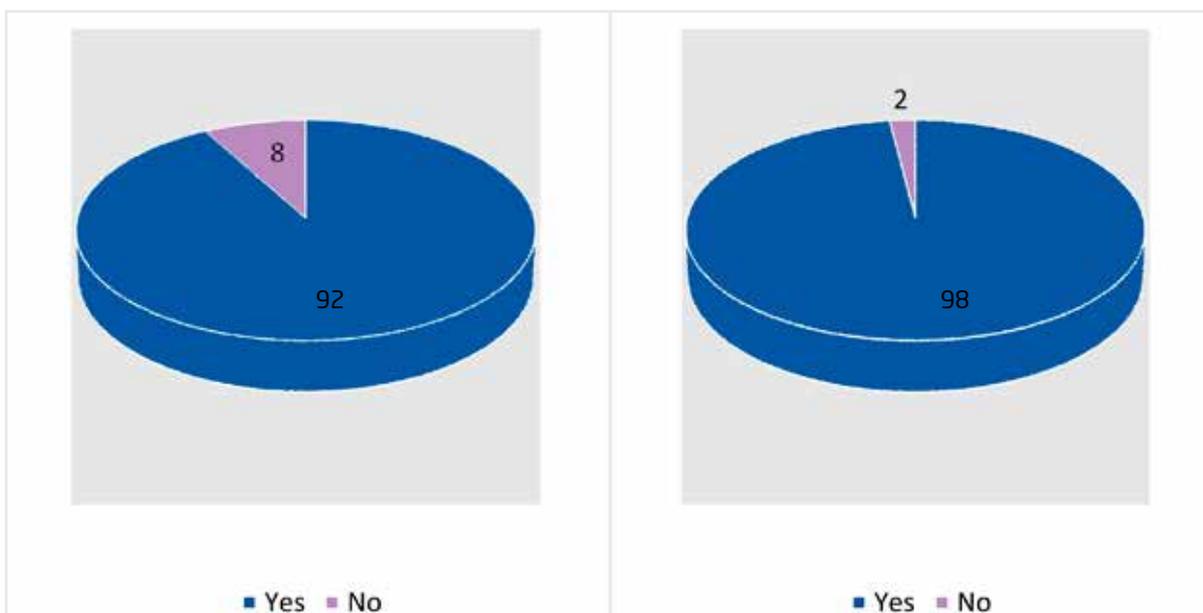
that they drink carbonated drinks, while the answer "Other" was chosen by 3% of participants, who said that they drink tea. More than one answer was selected by 26 parents.



Graph 8. **The most common drink that children drink when they are thirsty**

Graph 9 shows that most of the parents (92%) are familiar with their children’s diet at the kindergarten, while 8% claim that they are not familiar with it. Most parents, 98%, claim to be satisfied with the food, while 2% state the opposite. If the parents an-

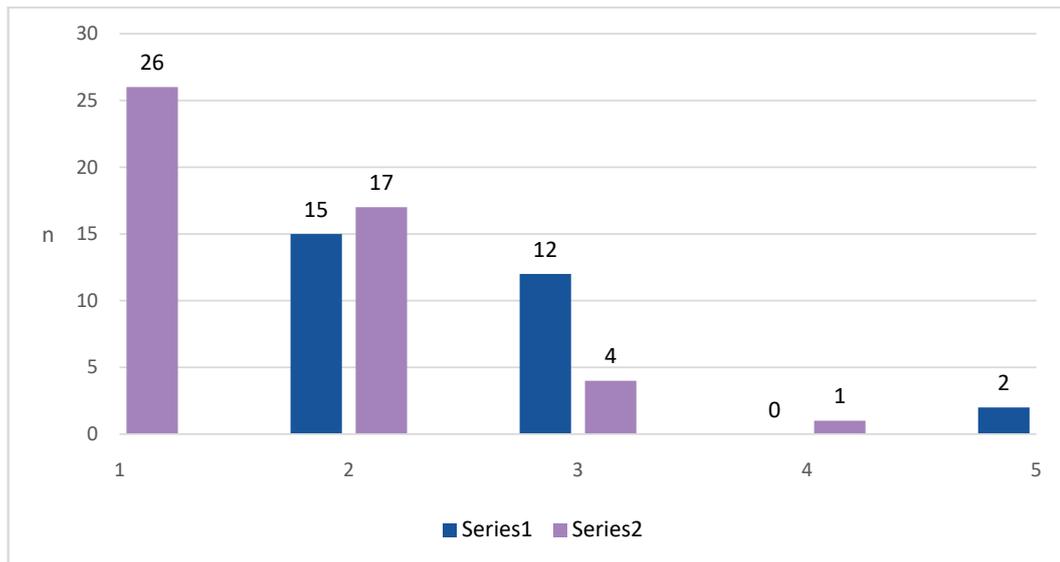
swered "No" to the question "Are you satisfied with the food your child consumes in kindergarten?", they should have stated the reason for their dissatisfaction, but none of the parents provided an explanation (Graph 9).



Graph 9. **Parent responses to familiarity with the menu and food consumed by their children in kindergarten**

49 children (49%) spend less than an hour playing on a computer/mobile phone, while 32% spend 1-2 hours. 16 children (16%) spend 2-3 hours playing on a computer/mobile phone, while one child spends

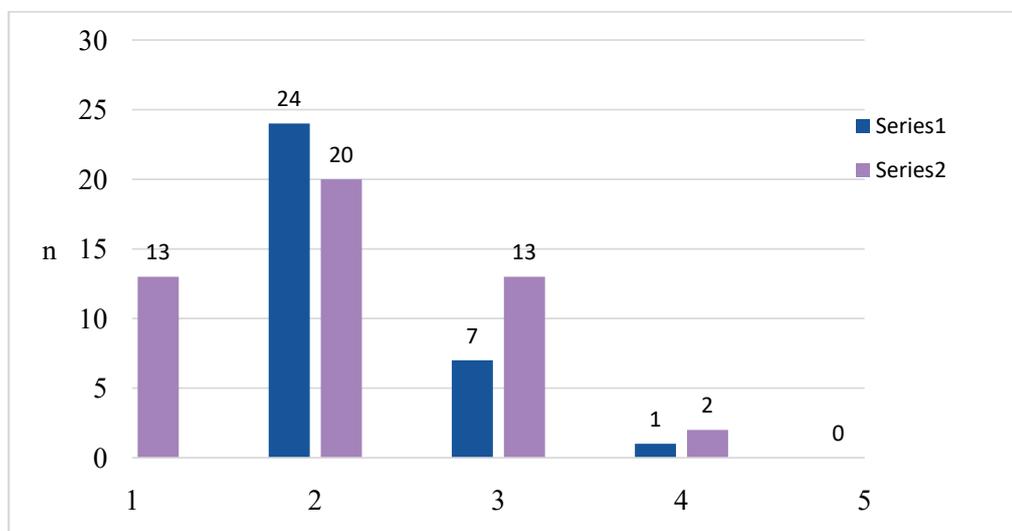
4-5 hours. Two children spend more than 5 hours a day on a computer/mobile phone (Graph 10).



Graph 10. Time spent on a computer/mobile phone

Out of a total of 52 boys, 20 (38%) watch less than one hour of television, while 24 (46%) watch television for 1-2 hours a day. 1 boy (2%) spends 4-5 hours a day watching television. Of the 48 girls surveyed, 20 of them (42%) watch television for 1-2 hours a day. 13 girls (27%) watch television for less than one

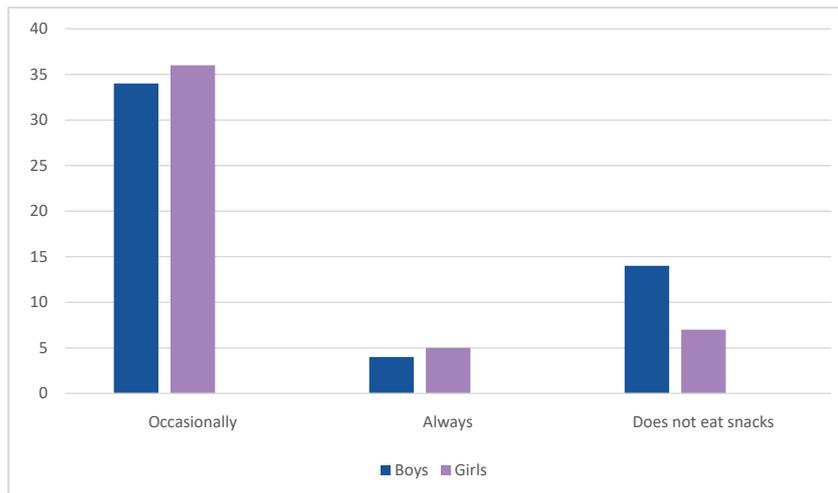
hour, and the same number watch television for 2-3 hours a day, while 4 girls (4%) watch television for 4-5 hours a day. None of the surveyed boys and girls watch television for more than 5 hours a day (Graph 11).



Graph 11. Time spent watching television

Most boys (65%) and girls (75%) occasionally eat snacks while watching television and playing games on a computer/mobile phone. 4 boys (8%) and 5 girls (10%) always consume snacks while watching televi-

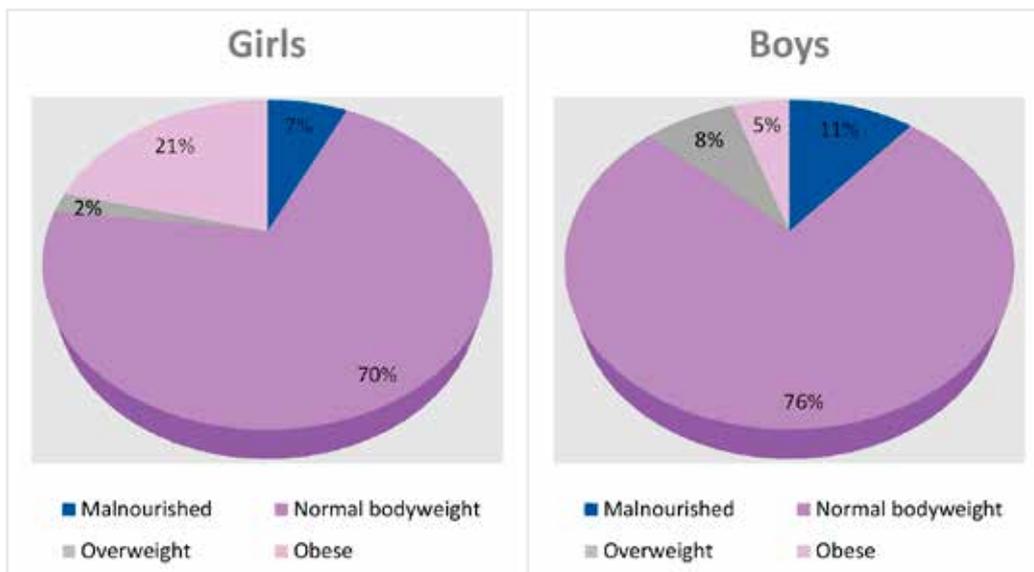
sion, while 14 boys (27%) and 7 girls (15%) do not snack at all when watching television and playing on a computer or mobile phone (Graph 12).



Graph 12. Eating snacks while watching television or playing games on a computer/mobile phone

The following diagram shows that 29 (76%) boys have normal body weight. Four boys (5%) were malnourished, and 3 (8%) boys were overweight. 12 (11%) boys were obese, while four boys did not report their body weight and height.

30 (70%) girls have normal body weight. 3 (7%) were malnourished and one (2%) girl was overweight. 8 (21%) girls were obese. 6 girls did not report body weight and height (Graph 13).



Graph 13. Nutritional status in boys and girls

Table 4. **Statistical significance in body weight in boys and girls**

	Boys	Girls	Marginal row totals
<b>Malnourished and normal body weight</b>	87 (82) [0.3]	77 (82) [0.3]	164
<b>Overweight and obese</b>	13 (18) [1.39]	23 (18) [1.39]	36
<b>Marginal column totals</b>	100	100	200 (total)

These results were also checked using the Chi-Square test to see if there is any statistical significance. The results are shown in table 4.

The chi-square statistic is 3.3875. The  $p$ -value is 0.065691. These results are not significant at  $p < .05$ . Also, the chi-square statistic with Yates' correction is 2.7439. The  $p$ -value is 0.097626. and the results are not significant at  $p < .05$ .

## Discussion

The aim of this study was to assess children's nutritional habits. The health manager of the kindergarten is a nurse with knowledge in medical sciences, organizational models and health care processes. They also transfer their knowledge and skills to kindergarten teachers and take on the role of educator and promoter of health and healthy lifestyles. The nurse in the preschool system has the task of integrating their professional knowledge into the educational process and providing the best possible conditions necessary for optimal child development. It is very important to educate parents and children from an early age about the importance of proper nutrition and eating habits and to encourage children to engage in physical activity. Nurses are guided by the principles of nursing care, respect for individuality and a holistic approach.

A similar number of girls and boys participated in this study. 6% of the participants had food allergies, which is similar to the percentage (9.3%) in a study by Lao-ayaya et al. (12). Most of the children (72%) had four to five meals per day, which is simi-

lar to Kostecka's result that children ate 4 meals in the kindergarten and 2 meals at home (13). Kostecka also found that 58% of the children ate at least one serving of sweets per day, while our study showed that 65% of the boys and 75% of the girls eat snacks occasionally (13). Our study showed that vegetables are not consumed daily by 63% and fruits by 42% of the children. Dennison et al. found that most of the children in their study (~97%) do not consume enough vegetables on a daily basis (14), and the results of a study by Figueiredo et al. conducted on Finnish children found that 43.3% avoid fruits and vegetables (15). A Hong Kong study found that 94% of the children included in the study consume grains (16), which is similar to our result of 97%. Ebenegger et al. found that 27.9% of children consume meat daily (17), which can be compared to our result of 21%. In a study by Taveras et al., 22% of parents reported that their child ate at fast food restaurants at least once per week (18), but our study found that 7% of pre-schoolers eat fast food weekly.

Our study showed that 49% of the children spend less than one hour a day on a computer/mobile phone, 32% spend one to two hours, 16% spend two to three hours, and 1% spend four to five hours. 2% spent more than 5 hours a day on a computer/mobile phone. According to Graczyk, 52.74% of preschool children use mobile devices for 1 hour a day and 19.78% use their smartphone/tablet for 1.5-2 hours a day (19). 44% of children spend 1-2 hours watching television every day, while none of the participants watch television for more than 5 hours a day. Dennison et al. found that the 1-, 2-, 3-, and 4-year-old children watched, on average (mean  $\pm$  SEM), 10.9  $\pm$  0.6, 14.9  $\pm$  0.6, 16.3  $\pm$  0.7, and 18.4  $\pm$  0.8 hours of television/videos per week (20).

Concerning the participants' nutritional status, most of the girls (70%) are of normal body weight, while

2% of the girls are overweight. 21% of the girls were obese and 7% were malnourished. Most of the boys (76%) have normal body weight, while 11% are malnourished. 8% of the boys are overweight and 5% are obese. Jovančević et al. found that 6.8% of boys and 6.4% of girls were overweight in their study of Croatian pre-schoolers (21).

Our results showed that most children of preschool age have regular eating habits for their age, although they could reduce the intake of snacks. It is positive that more than half the children choose water as their first choice when they are thirsty. Kindergartens have daily meal and activity plans, and questions regarding eating habits can also tell us what children eat when they are at home, not only in kindergarten. Parents might apply their kindergarten's meal plans at home while the intake of snacks while watching television should be reduced or replaced with healthier options (dried fruits, nuts, etc.). Nurses in kindergartens could help parents make meal plans while respecting children's wishes and/or finding healthier solutions. Also, attention should be paid to breakfast cereals, which is a type of food most commonly consumed. Unhealthy sugars are among their most common ingredients, and those should be avoided. For instance, oatmeal can be sweetened with stevia or honey. Future studies should include questions about eating habits at home as well as sociodemographic questions.

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## Conclusion

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According to the results of this study, it can be concluded that most of the child participants eat properly and have normal body weight. Furthermore, most of the children have four to five meals a day and eat a varied diet. Cereals and cereal products are consumed by a large number of children, just like milk and dairy products. No child consumes fast food daily. It is a worrying fact that most children consume sweets or snacks on a daily basis, while on the other hand a large number of the surveyed children do not consume vegetables and fruits every day.

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## PREHRAMBENE NAVIKE PREDŠKOLSKE DJECE

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### Sažetak

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**Uvod.** Pravilna prehrana ključna je za održavanje dobrog zdravlja i predstavlja temelj za pravilan rast i razvoj djece i adolescenata. Nedovoljna tjelesna aktivnost i neadekvatna prehrana među vodećim su uzrocima smrtnosti i morbiditeta.

**Cilj.** Cilj ovog istraživačkog rada bio je ispitati prehrambene navike djece predškolske dobi.

**Metode.** Istraživanje je provedeno u travnju 2018. i temelji se na anketi djece vrtičke dobi i njihovih roditelja. Za potrebe istraživanja izrađen je upitnik koji se sastoji od 24 pitanja. Anketa je provedena potpuno anonimno i dobrovoljno. Od 100 ispitanika uključenih u studiju, 52 % (52) bili su dječaci, a 48 % (48) djevojčice. Prosječna dob ispitanika bila je 5,12 godina

**Rezultati.** Od ukupno 100 djece, 98 % (98) ima topli obrok svaki dan, dok 2 % (2) nema. Žitarice i proizvode od žitarica konzumira 97 % djece, dok je 3 % izjavilo da ne konzumiraju žitarice. Kao i kod žitarica, 97 % djece konzumira mlijeko i mliječne proizvode, dok ih samo 3 % ne konzumira. Normalnu tjelesnu težinu ima 29 (76 %) dječaka. Četiri (5 %) su bila pothranjena, a tri (8 %) dječaka imala su prekomjernu tjelesnu težinu. Normalnu tjelesnu težinu ima 30 (70 %) djevojčica, tri (7 %) su pothranjene, a jedna (2 %) djevojčica ima prekomjernu tjelesnu težinu. Pretilo je bilo osam (21 %) djevojčica.

**Zaključak.** Prema dobivenim rezultatima istraživanja može se zaključiti da se većina ispitanice djece pravil-

no hrani i ima normalnu tjelesnu težinu. Zabrinjava činjenica da većina djece svakodnevno konzumira slatkiše/grickalice, dok s druge strane veliki broj ispitanice djece ne konzumira povrće i voće na dnevnoj bazi. Medicinske sestre u predškolskim ustanovama suočene su s izazovnim zadatkom integriranja svojeg stručnog znanja u obrazovni proces.

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**Ključne riječi:** medicinska sestra, prehrana, predškolski odgoj

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