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Dietary behaviours of adolescents from urban and rural areas in the district of Szamotuły – a preliminary study

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Abstract

Introduction: Numerous factors and conditions affect the dietary behaviours of the young population. Urban-rural differences may also influence the lifestyle of adolescents, including diet.

Aim: To describe dietary behaviours of two young populations: living in urban or rural areas in the district of Szamotuły (a city with a population of 19,000 inhabitants).

Material and methods: 116 adolescents aged 15-17 years were included to this preliminary study and asked to answer questions concerning health and lifestyle.

Results: No statistically significant difference was detected in the number of meals eaten daily, and 3 meals a day was the most frequent answer (45.9% in the rural group and 32.7% in the urban group). About 41.0% of rural subjects and 50.9% of urban ones admitted that they ate fresh fruit and vegetables every day. There was no statistically significant difference in the medium consumption frequency of fresh fruit, vegetable, fish, sweets and salty snacks. Conclusions: 1. Between rural and urban adolescents no statistically significant differences were observed in dietary behaviours concerning medium number of meals eaten daily, medium frequency of fresh fruit and vegetable consumption, medium monthly frequency of fish consumption, medium weekly frequency of consumption of sweets and salty snacks. 2. More than a half of the young rural dwellers preferred more salty meals in contrast to over 56% of urban youths who preferred less salty meals. Both urban and rural adolescents most often declared that eat sweets and salty snacks daily. 3. There is a great need to change the dietary habits of teenagers, especially in avoiding an over-intake of high fat and high energy products, in order to reduce the rising prevalence of obesity among adolescents.

Key words

diet, adolescents, rural area, urban area

INTRODUCTION

Unhealthy lifestyles render adolescents prone to chronic cardiovascular and metabolic diseases in later life. When examining their health benefits, the dietary behaviours should be thoroughly considered. The especially unhealthy diet of adolescents should be regarded as an important public health issue, because it is one of the leading causes of pediatric obesity, which usually tracks into adulthood [1, 2]. According to data gathered by the World Health Organization (WHO), excessive body mass in adults is associated with 30% risk of coronary heart disease and ischemic stroke, and 60% risk of arterial hypertension [3]. A strong campaign against obesity should include interventions which will successfully improve the eating habits of adolescents, and reduce the risk for chronic cardiovascular and metabolic diseases.

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Another important argument for improving the lifestyle of youth is that the basic features of dietary habits developed in early periods of life mostly persist until adulthood [4, 5]. This tracking of dietary behaviours from childhood and adolescence into adulthood was well-documented in *The Cardiovascular Risk in Young Finns Study*, which was a prospective cohort study with a 21-year follow-up, conducted on 1,768 subjects aged 3-18 years at baseline [6]. Investigators described evident tracking of the pattern scores, particularly among subjects who were adolescents at baseline.

OBJECTIVE

The presented study is a preliminary study initiated to compare the dietary habits of two young populations: living in typical urban and rural areas in the district of Szamotuły (Wielkopolska). To date, hardly anything is known about urban-rural differences concerning the dietary patterns of teenage populations in small local environments in Wielkopolska. This is an initial exploration of the issue.

MATERIAL AND METHODS

This preliminary study was conducted in 2009 in the district of Szamotuły (a city with a population of 19,000 inhabitants) located in the region of Wielkopolska. The study population consisted of 116 adolescents at age 15-17 years – 61 males (52.7%) and 55 females (47.3%), randomly selected from junior grammar schools and secondary schools. Among the participants there were 61 students from a typical rural area – 32 males (52.5%) and 29 females (47.5%), and 55 pupils from a typical urban area - 29 males (47.5%) and 26 females (47.3%). The subjects were selected from the urban and rural areas in such a way, that they actually differed in the context of local communities and educational backgrounds. An effort was made to avoid so-called 'intermediate environments' and analyse only the typical urban and typical rural communities.

The study participants were asked to complete a specially constructed questionnaire, tested previously in a pre-pilot study. The adolescents were asked to answer whether they were on a special diet or not, and how many meals they usually had every day. The frequency was assessed of meals containing fresh fruit, vegetables and fish. The declared frequency of consumption of sweets and salty snacks was also compared. All the subjects were asked if they preferred more salty meals and, consequently, whether they usually added salt to an average meal.

All the categorial parameters related with each subject's diet were described with numbers and a corresponding percentage. The Chi2 test, Fisher's exact test and Fisher-Freeman-Halton test were used to study the mutual dependence of categorial parameters. Statistical hypotheses were verified at significance level $\alpha<0.05$. Statistical package STATISTICA (data analysis software system) Version. 8.0 was used by the authors of this study.

ETHICS APPROVAL

Before conducting the study, the authors obtained the approval of the Bioethics Committee at Poznan University of Medical Sciences, the Superintendent of Education in Wielkopolska, and school principals. All the students were precisely informed about the aim, purpose and methods of the study. Informed written consent was obtained from all the parents or legal guardians of the adolescents participating in the study.

RESULTS

Among 61 rural adolescents, there were 3 subjects, who declared to be on a diet, whereas among urban peers – only 1 subject. In all 4 cases, it was a low calory diet with reduced carbohydrate and fat intake. No statistically significant difference in number of eaten daily meals was detected, and 3 meals a day was the most often answer (45.9% of the rural group and 32.7% of the urban group). Among urban youths, 6 subjects (11%) had only 1-2 meals daily, while in the rural population only 1 subject (1.6%) had one meal a day. In both groups, similar number of teenagers declared they ate 4-5 meals a day – approximately half of each group. There was no statistically significant difference in the declared medium number of daily meals (3.76 in the rural area vs. 3.75 in urban area; $p>0.05$) (Tab. 1).

Table 1. Declared average number of daily meals eaten by rural and urban adolescents.

Declared average number of daily meals eaten	RURAL ADOLESCENTS (n=61)	URBAN ADOLESCENTS (n=55)
	n (% of rural populations)	n (% of urban population)
1 meal	0	3 (5.5%)
2 meals	1 (1.6%)	3 (5.5%)
3 meals	28 (45.9%)	18 (32.7%)
4 meals	19 (31.2%)	15 (27.3%)
5 meals	11 (18.0%)	12 (21.8%)
6 meals	2 (3.2%)	4 (7.3%)

Both the majority of rural and urban students admitted that they ate fresh fruit and vegetables every day (41.0% of rural subjects and 50.9% of urban subjects). Compared to teenagers from the urban area, twice as many of their rural peers declared that they ate these diet components occasionally, which meant twice a week or even more rarely (18.0 % of rural youths vs. 7.3% of urban subjects). The rural group who answered that they usually ate fresh fruit and vegetables 3-4 times a week was about 1.5 times larger (16.4% vs. 27.3%). There was no statistically significant difference in the medium frequency of fresh fruit and vegetable consumption (5.1 times a week in the rural area vs. 5.4 times a week in the urban area; $p>0.05$) (Tab. 2).

Table 2. Declared average week frequency of meals containing fresh fruit and vegetables in rural and urban adolescents.

Declared average week frequency of meals containing fresh fruit and vegetables	RURAL ADOLESCENTS (n=61)	URBAN ADOLESCENTS (n=55)
	n (% of rural population)	n (% of urban population)
Never	1 (1.6%)	0
Once a week (1)	4 (6.6%)	0
Twice a week	6 (9.8%)	4 (7.3%)
3 times a week	4 (6.6%)	10 (18.2%)
4 times a week	6 (9.8%)	5 (9.1%)
5 times a week	8 (13.1%)	6 (10.9%)
6 times a week	7 (11.5%)	2 (3.6%)
Every day	25 (41.0%)	28 (50.9%)

In both groups, a similar number of subjects declared they ate fish approximately once a week (32.8% of the rural group and 30.9% of the urban group). About one third of rural subjects and 42% urban adolescents admitted that they ate fish rarely, which means once or twice a month. Only 6% of students from the rural area and over 10% of their urban peers answered that they usually ate fish twice a week or even more often. There was no statistically significant difference in the medium frequency of fish consumption (2.7 times a month in the rural area vs. 2.9 times a month in the urban area; $p>0.05$) (Tab. 3).

Daily sweets and salty snacks consumption was declared by over half of the urban group and over 44.3% rural teenagers. Occasionally - defined as twice a week or even more rarely - 23% of rural youths and 12.7% of their urban peers ate these products. There was no statistically significant difference in the medium weekly frequency of sweets and salty snacks consumption (4.7 times a week in the rural area vs. 5.3 times a week in the urban area; $p>0.05$) (Tab. 4).

While comparing the diet behaviours of these two populations, it was found that more urban adolescents

Table 3. Declared average frequency of fish consumption in rural and urban groups of adolescents.

Declared average frequency of fish consumption	RURAL ADOLESCENTS (n=61)	URBAN ADOLESCENTS (n=55)
	n (% of rural population)	n (% of urban population)
Never	12 (19.7%)	7 (12.7%)
Once a month	7 (11.5%)	11 (20.0%)
Twice a month	13 (21.3%)	12 (21.8%)
3 times a month	5 (8.2%)	2 (3.6%)
4 times a month (= once a week)	20 (32.8%)	17 (30.9%)
Twice a week	3 (4.9%)	6 (10.9%)
3 times a week	1 (1.6%)	0

Table 4. Declared average frequency of sweets and salty snacks consumption by rural and urban adolescents.

Declared average week frequency of sweets and salty snacks consumption	RURAL ADOLESCENTS (n=61)	URBAN ADOLESCENTS (n=55)
	n (% of rural population)	n (% of urban population)
Never	2 (3.3%)	0
Once a week	6 (9.8%)	2 (3.6%)
Twice a week	6 (9.8%)	5 (9.1%)
3 times a week	7 (11.5%)	8 (14.5%)
4 times a week	7 (11.5%)	4 (7.3%)
5 times a week	3 (4.9%)	4 (7.3%)
6 times a week	3 (4.9%)	4 (7.3%)
Every day	27 (44.3%)	28 (50.9%)

preferred less salty meals (56.4% vs 43.6%), whereas among young rural dwellers a little more than half of them liked more salty meals, and admitted that they usually added salt to an average meal (50.8% vs 49.2%). The difference was not statistically significant ($p>0.05$).

DISCUSSION

The presented study revealed the dietary habits among adolescents with regard to their place of residence, and the results are in accordance with several former investigations which described the eating habits of urban and rural youths. Some authors did not notice any significant differences in dietary patterns of adolescents living in urban or rural environments [7, 8]. Italian investigators compared the diet of over 900 urban and rural pupils aged 8 years, younger than in our study, and found complete similarity of their dietary habits. This observation was in accordance with findings from a Greek study conducted on over 4,000 adolescents aged 11.5-15.5 years. A previous study from Greece among over 1,000 children and adolescents, showed minor urban-rural differences which, however, did not follow a consistent pattern [9]. Differences between urban and rural areas were also observed in Polish studies concerning the diet of pregnant women [10].

In the presented study, no statistically significant difference was detected in the number of meals eaten daily. The majority of students had 3 meals daily, and it was shown that more rural students had 3 meals a day than their urban counterparts. Olumakaiye et al. also reported that the majority of 401 Nigerian adolescents aged 10-19 years ate 3 meals a day; this percentage was significantly higher among rural (75.4%) than urban (61.4%) students [11]. Gajewska et al., who conducted a study among upper secondary school pupils in Mazowsze area, did not detect significant differences between the number of daily meals and their regularity between investigated groups of youth from Warsaw and a rural area. However, urban adolescents more often than pupils from small towns or rural areas consumed at least three so called 'full' meals daily. They also had more often 'full' first breakfasts, second breakfasts and suppers [12]. Opposite to our study, some authors have shown that due to poor socio-economic status, a minority of adolescents had three meals a day: one-third in a Chinese study, and one-fourth in a study conducted among Palestinian adolescents [13, 14]. Similar observations were made in the studies of Polish children and adolescents [15].

Interesting findings originate from a Cypriot study which revealed that rural adolescents had more meals daily, as celebrating meals with family and friends is an important part of the Mediterranean style of life [16]. The authors analysed how urbanization influences dietary habits of over 1,000 Cypriot children aged 9-13 years. They also noticed that rural pupils consumed more traditional foods, were less likely to eat fast-food products, eat alone and eat outside the home. However, the differences relating diet to the place of residence were not significant, which in the author's opinion may reflect the changes in eating habits and the abandonment of the Mediterranean diet, which in turn may be attributed to the nutrition transition and urbanization phenomena.

In our study, about a half of the urban group and over 40% of the rural group ate fresh fruit and vegetables every day. Compared to urban students, twice as many of their rural peers admitted that they ate these diet components twice a week or even more rarely. However, there was no statistically significant difference in the medium frequency of fresh fruit and vegetable consumption between adolescents from both regions. Some authors have pointed out that even despite no statistically significant differences in fruit and vegetable consumption between urban and rural groups of pupils, there is a correlation between standard of living and consumption of these diet components [14, 17, 18]. Similar relationships were noted among adult population in the PONS study [19]. Canadian authors noticed that selected food behaviours of youth from Ontario and Alberta improved with increasing socio-economic status and vary with urban-rural school localization. It was estimated that vegetable and fruit consumption increased with increasing income [17]. In comparison with our results, Mikki et al. reported a higher percentage of students who consumed fruit (58.9 % of boys and 55.2 % of girls, respectively) and vegetables (72.8 % boys and 73.8 % girls, respectively) daily. They also emphasized that a high standard of living index and residence in the city (Ramallah) were associated with frequent intake of fruits and vegetables, and also with frequent intake of foods high in sugar and fat [14]. Similar findings were reported by Ortiz-Hernandez et al., who also noticed that the consumption of fruit and vegetables increased with the improvement of socio-economic position. The authors analysed the diet of 7,218 Mexican adolescents aged 12-19 years. It was shown that only one-third of this group consumed fruit and vegetables every day [20]. In keeping with our study, Park et al. reported that a fruit intake of less than once a day was more often detected among rural adolescents [21].

Simultaneously, there are Polish data consistent with the above-mentioned results, indicating a higher consumption of fruit and vegetables by youths living in urban areas, and in

better socio-economic conditions. Suliga evaluated nutrition habits in relation to socio-economic status in a group of 529 boys and 535 girls aged 7-16 years from Kielce (a city with a population of over 200,000 inhabitants) or from a rural area where families lived off the land. It was proved that the higher the family socio-economic status, the more frequent the consumption of fruit and vegetables [18]. Other Polish authors, Gajewska et al., reported that the daily menu of urban pupils contained more vegetables and fruit [12].

As far as fish consumption by urban and rural youth is concerned, the authors of the presented study did not find statistically significant difference in the medium frequency of the eating of fish. It was shown that about one third of each group declared that they ate fish approximately once a week, whereas one third of rural subjects and significantly more urban adolescents (42%) admitted that they rarely ate fish, which means once or twice a month. Some data were consistent with the above-mentioned data, indicating no evident relationship between the place of residence and fish consumption. The important issue is a correlation between standard of living and fish consumption, as discussed by Suliga and Gajewska [12, 18]. As the possibility to prepare meals with fish differs in various regions and countries, some authors indicated higher fish consumption by urban students [12, 18, 22], whereas others achieved opposite results [16, 23]. Monge-Rojas et al. demonstrated that in a group of 275 randomly-selected Costa Rican adolescents aged 12-18 years, the consumption of fish was significantly higher in urban participants than among rural ones. Opposite results, indicating higher fish consumption by rural youths, were achieved in China, where 2,116 students aged 9-20 were studied [23]. The sporadic fish consumption by Polish adolescents, shown in our study, is a common, nutritional problem, which has also been indicated by other investigators [24].

In the presented study, the daily consumption of sweets and salty snacks was declared by over a half of the urban group, and over 44.3 % rural teenagers. However, no statistically significant difference in medium weekly frequency of eating sweets and salty snacks were noted. As in the presented study, Kelishadi et al. reported a high intake of unhealthy snacks among Iranian students aged 6-18 years; he also did not notice any significant difference concerning the consumption snacks (sweet, fatty or salty) between urban and rural areas [25].

Numerous studies indicate an evident higher intake of unhealthy snacks among urban adolescents who had more opportunities to buy unhealthy snacks and eat. The results of a Costa Rican study demonstrated that urban dwellers were exposed since adolescence to higher intakes of saturated fat, cholesterol and trans fatty acids, in contrast to their rural counterparts. Of the 275 randomly selected Costa Rican adolescents aged 12-18 years, the urban subjects consumed less dietary fibre, foliates, and carbohydrates, but more total energy, total fat, protein, cholesterol, saturated fatty acids, trans-fatty acids, and n-3 and n-6 fatty acids. The consumption of fast foods and bakery products was significantly higher in urban participants than among rural ones [22]. Similar findings originate from a Vietnamese study which was based on a 24-h recall to collect food intake data in a cross-sectional study of over 1,100 adolescents from urban and rural areas. Among other factors, residence in urban areas was more often associated with the consumption of out-of home foods, which was positively associated with energy contribution from various unhealthy snacks [26].

Similar observations were made by researchers from the GRECO study who found that in comparison to urban schoolchildren, fifth and sixth grade students from rural and semi-urban regions had better adherence to the Mediterranean diet. They reported a healthier lifestyle, including a diet rich in starchy foods and cereals, fruits, fruit juices, vegetables, dairy products, fish and seafood. What is more, they less frequently consumed ice cream, burgers, salty snacks, soft drinks, sweets and products high in sugar [27]. Data coming from the CYKIDS study also confirmed that rural adolescents ate less unhealthy snacks, but it should be underlined that in this study the differences relating the diet to place of residence were not significant [16]. Some data from Croatia were consistent with the above-mentioned data, indicating that rural residency was associated with a more healthy dietary pattern, whereas among urban subjects aged 12-13 years, a significantly higher consumption of fast food, soft drinks and sweets was detected [28]. Similar to those findings, Shi et al. reported that among Chinese adolescents aged 12-14 years, high socio-economic status and living in an urban area was positively associated with greater consumption of high-energy products, including unhealthy snacks. More than a half of the students reported a liking for Western style fast foods, including hamburgers, soft drinks and chocolate [13]. A higher intake of sweets and other unhealthy snacks among urban pupils have been described by some investigators mentioned above [11, 14, 20].

Similar observation concerning the Polish population came from the paper written by Kośmider et al. who evaluated the frequency intake of 'fast-food' products by 282 pupils aged 14 years in urban and rural secondary schools in the Mazowsze area. It was found that urban boys statistically significantly more often consumed 'fast-food' products in comparison with boys from a rural region. However, no differences in the frequency of 'fast-food' consumption were found in the population of adolescent girls [29].

In the presented study, no statistically significant difference were found in declared salt consumption in both populations, although it was noted that the majority of urban adolescents preferred less salty meals. Kelishadi et al. also did not show any differences in salt consumption among rural and urban students. However, only 19.7% of examined Iranian students answered that they never added salt to meals they consumed at the table [25]. Our findings are also consistent with data mentioned by the GRECO investigators who reported that consumption of salty products was higher in the group of urban schoolchildren [27]. It was simultaneously pointed out that almost one-fourth of Greek adolescents had a too high sodium intake from 'hidden' sources like bread, processed cereals and white cheese [27, 30]. Some authors claim that a smaller consumption of table salt by young rural dwellers may be explained by the fact that their families tend to add more spices to the food, such as chilli, to enrich the flavour of the food [30].

LIMITATIONS

One of the important limitations seems to be the reliance on the self-reports by the students and the lack of accurate information concerning meals, especially their weight and

nutrition value. Such data obtained from a quantitative food frequency questionnaire do not provide proper figures for the precise nutrient and energy intake of a studied population. Another important limitation that has to be acknowledged is that the age range in this study (15-17 y.) does not cover all the age sections of adolescence, and the number of study participants inevitably limits our findings to generalizations beyond this sample. The presented paper shows only the results of a preliminary study, which will be followed-up. It is obvious that there is a great need to conduct study on more numerous, randomly selected Polish children and adolescents in order to explore the problem of dietary behaviours in the Polish population aged under 18 years.

CONCLUSIONS

No statistically significant differences were observed in dietary behaviours between rural and urban adolescents concerning the medium number of meals eaten daily, medium frequency of fresh fruit and vegetable consumption, medium monthly frequency of fish consumption, medium weekly frequency of the consumption of sweets and salty snacks.

Although more than a half of young rural dwellers preferred more salty meals and over 56% of urban youths preferred less salty meals, the difference was not statistically significant.

Both urban and rural adolescents declared most frequently that they eat approximately 3 meals a day, eat fresh fruit and vegetables every day, eat fish approximately once a week, and eat sweets and salty snacks daily.

It should be emphasized that priorities should be given to changing the dietary habits of adolescents, especially in avoiding an excessive intake of high fat and high energy products, in order to reduce the rising worldwide prevalence of obesity. As dietary patterns formed in childhood and adolescence usually track into adulthood, an unhealthy diet should be prevented as early as possible, while behaviours beneficial to health should be encouraged.

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