Identification of motives and barriers to physical activity of Polish young mothers

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Abstract
Background The aim of the study was to determine the level of physical activity of young mothers living in rural and urban areas and their free time budget, as well as to indicate motivating factors and barriers encountered during physical activity. Methods In the study a diagnostic survey method was applied, including two survey IPAQ questionnaires – the long version and author’s questionnaire. A representative sample consisted of 1,064 young mothers giving birth in 2017. Student T test and discriminate function analysis were used in statistical analysis. Results The level of physical activity of young mothers from rural areas did not differ from that of young mothers from urban areas. However, certain differences appeared while taking into account different aspects of physical activity. The main motives for participation in physical activity of young mothers from rural areas were to improve their physical condition and reduce pain complaints. Young mothers from towns emphasized such motives as strengthening self-confidence and improving their position in the family. While the main barriers for both group of respondents in physical activity were the lack of money and interest in occasional events. Conclusions The main conclusion that arise from the study is to need to make efforts which aim to reduce the burden of daily duties of young mothers, strengthen family support, strengthen material status of young families, eliminate barriers related to infrastructure especially of villages in order to facilitate the access to physical activity, raise awareness among population on the importance of health education, create specialized educational programs to promote healthy lifestyle, and finally, to introduce systematic monitoring in order to understand determinants of physical activity of young mothers.

Background
Lifestyle is one of the four main determinants of human health with its most important element that is physical activity, next to physical and social environment, genetic factors and organization of medical care. The physical activity is essential for the proper functioning of human body, health, morbidity and mortality [1, 2].

Physical activity causes numerous mental health benefits, which include improvements in well-being, reduction of depression and anxiety, enhancements of cognitive functioning and improvements in
overall quality of life [3, 4].

Modern public health studies focus on determinants of physical activity in order to fight the pandemic development of non-communicable diseases [5] such as cardiovascular disease, cancer, depression, hypertension, diabetes, and osteoporosis [6-8].

Globally, many adults and children do insufficient physical activity to maintain good health [9]. The population burden of inactivity is unacceptably high, this also applies to women [10-13]. It was found that a high socioeconomic position (including occupational position, income and educational level) positively correlates with a higher degree of physical activity in leisure time [14-15].

Despite so many health benefits, women’s participation in physical activity is lower than men’s. It is observed especially among women who lack sports and recreational skills, and have lower socioeconomic and material status [16]. It has been shown that women’s participation in physical activity during their free time declines throughout their life, especially during maternity period [17, 18].

There is evidence to suggest that the onset of parenthood may cause a decline in physical activity of adults [19, 20] as it is associated with decreased sleep time, increased stress, anxiety and reduced mental well-being [21].

The additional demands of parenthood necessitate lifestyle changes and decreases the physical activity of young parents [22]. This applies to both groups, mothers and fathers, however women experience declines in their physical activity to a greater degree [13].

According to social cognitive theory there is a relationship between environment and behavior [23]. Studies have shown a link between environmental factors and physical activity [24]. Neighborhood environment attributes such as the presence of other people being active and access to exercise facilities, are physical activity behaviors associated with adults from rural areas [25]. Rural communities are notably different from urban ones and unique consideration should be given to them when assessing the relationship between the environment and physical activity [26].

The aim of the study is to determine the level of physical activity of young mothers living in rural and urban areas and their free time budget, as well as to define the hierarchy of motivating factors and
barriers that they encounter during physical activity.

The research hypothesis assumes that young mothers from rural areas have lower level of physical activity and less free time than mothers living in urban areas. Additionally, the main barriers that affect a level of participation in physical activity of young mothers from rural areas are the lack of time, limited financial resources, difficult access to sports and recreation infrastructure, and small support from their families.

Materials And Methods
Study Population
In the sampling procedure, in its first step, the quota sampling was applied. The total population of Polish women who gave birth to living children in 2017 was 357 400 [27], and it was divided into two groups: women living in rural areas and those living in towns and cities. While determining the size of representative sample, which eventually consisted of 1 064 respondents, the confidence level was set at 0.95, the estimated size fraction at 0.42, and the maximum error at 0.03. The survey was conducted on the basis of respondents’ availability, until the limit was reached for each province. The study was carried out in April 2018 among young mothers who gave birth in 2017. In order to collect the study material, the following web portals were used: forum.e-mama.pl, webmama.pl, familie.pl and maluchy.pl.

The study conforms to the code of ethics of the World Medical Association and the standards for research recommendations of the Helsinki Declaration. The protocol was approved by the local university ethics committee at the Siedlce University of Natural Sciences and Humanities. To ensure confidentiality, all data were anonymized before analysis. The survey was conducted in the form of telephone inquiries, where the interviewers asked questions to respondents and applied responses to prepared spreadsheets. The standard interview with the respondents lasted 10 min.

Data Collection and Definitions
A diagnostic survey with two research tools (survey questionnaires) were used in the study. The first is IPAQ (International Physical Activity Questionnaire) - long version, developed as a surveillance instrument for measuring four areas of physical activity: professional work, housework and around the house, sports and recreation, as well as everyday movement [28]. The questionnaire is a proven and
widely used method for determining a level of physical activity [29].
The second questionnaire is the author’s survey questionnaire which aims to diagnose leisure time
budget of young mothers and determine the hierarchy of motivating factors and barriers that
respondents have to cope with while making attempt to participate in physical activity. The above-
mentioned aims refer to a socio-demographic factor that is the place of residence.
A five-point Likert scale was used to measure attitudes. The use of questionnaire survey was
preceded by two-stage pilot studies which allowed evaluating the content of the questionnaire,
examining its reliability, validity, and discriminate power.

Descriptive Statistics Of Participants
The analytical material was collected on the basis of 1064 questionnaires; 446 questionnaires were
fulfilled by respondents from rural areas, while 618 from towns and cities around Poland. The average
age of respondents living in rural areas was 25.3 ± 1.8, while those from urban areas 29.3 ± 4.9. The
body mass of respondents from rural areas was 60.7 ± 8.9 kg and the body height 165.7 ± 3.5 cm. In
the case of young mothers from urban areas, the body mass was 62.7 ± 9.6 kg and the body height
167.3 ± 5.8 cm. On the basis of calculated BMI, it was shown that 30.7% of young mothers from rural
areas were underweight, 46.3% represented normal weight-growth ratio, while 22.9% were
overweight. In the case of respondents from urban areas, 25.6% were underweight, 59.7% had
normal parameters, while 14.6% were overweight. Additionally, 53.9% of women residing in rural
areas had a university degree, 42.2% the average educational level, while 3.9% declared professional
or basic educational skills. On the other hand, 79.5% of respondents from urban areas declared
higher education, 17.8% the average level of education, while 2.7% basic or professional. The high
economic status was declared by 8.2% of women from towns and cities and none from rural areas,
the average economic status was referred by 57.4% women from rural areas and 50.1% from urban
areas, while low economic status concerned 42.4% of respondents from rural areas and 41.7% from
urban areas.
The study sample consisted of 88.5% of young mothers from villages having one child and 11.5% with
two children. In the case of urban residents, 55.4% of them had one child, 32.4% two, 8.2% three, and
4.0% four or more children. The sample of respondents from towns and cities was divided into 92.0% of those having full family and 8.0% with incomplete families. In the case of respondents from rural areas, 88.3% had full family and within this group 22.9% declared extended family status, which did not occur in the case of respondents from towns and cities, while 11.7% were single-parent families.

Statistical Analysis
The Statistica 13.1 PL software with a set of tests was used for statistical analysis. It was applied to calculate statistical averages and standard deviations. Additionally, the following tests were applied: Shapiro-Wilk normality test, Student t test, Chi-square compliance test, and a test of discriminate function analysis. They were applied to determine which factors of studied phenomena discriminate two naturally emerging groups. The test of discriminate function analysis consisted of calculating values of classification functions in a form of their coefficients. Prior to discriminate analysis, the multivariate normality was verified by checking each variable for its distribution normality. It was assumed that the variable variance matrices were homogeneous within groups. Slight deviations were not valid due to the size of groups, which were respectively: 618 in urban and 446 in rural areas. Differences of mean values of which probability of uncertainty was less than $p < 0.05$, were defined as statistically significant.

Results
While analyzing the obtained results, no significant differences appeared in the level of physical activity between young mothers living in rural and urban areas. However, certain significant differences appeared in particular areas of physical activity. Higher levels of physical activity at $p < 0.001$ appeared among respondents from towns and cities in the area of professional work, movement and participation in recreation and sports, while respondents from rural areas showed significantly (at $p < 0.001$) higher level of physical activity related to housework (Table 1).

Table 1 The level of physical activity in each of its areas at Polish young mothers living in rural and urban areas (in MET-min./week)
| Area of physical activity | Urban area | Rural area | t-test value |
|---------------------------|------------|------------|--------------|
|                           | ±SD        | n          | ±SD          | n          |
| Total activity            | 4691.3±2562.3 | 618        | 4674.6±2025.2 | 446        | 0.240 |
| Job                       | 682.5±642.1 | 618        | 1050.6±623.2 | 446        | 4.931 |
| Movement                  | 612.5±554.3 | 618        | 993.6±523.2  | 446        | 4.603 |
| Work at home              | 2548.6±1765.2 | 618       | 1386.3±723.8 | 446        | 4.101 |
| Sport and recreation      | 847.7±423.9 | 618        | 1244.7±762.2 | 446        | 6.402 |

* - difference significant at p<0.005

High critical value of test at p<0.001 pointed to a significant dependence between the amount of free time and place of residence of respondents. The dependencies concerned both leisure budget of young mothers at the weekdays as well as at the weekends, when nearly half of them declared daily limit of free-time to about 2 hours. A greater number of respondents from villages than from urban areas had free time in a dimension more than 5 hours a day. At the weekdays it referred to three times greater number of women, while at the weekends twice more than in the case of respondents from urban areas. Nearly two times less women from rural areas than from towns and cities declared to have free time in a dimension less than two hours at weekdays and nearly the same at weekends (Table 2).

Table 2 Free time budget of Polish young mothers on weekdays and weekends with regard to their residence place
| Days       | Place of residence | Free time budget (%) |          |          |          |
|------------|-------------------|----------------------|----------|----------|----------|
|            |                   | Below 2 hours        | From 2 to 5 hours | Above 5 hours | Tot |
| Weekdays   | Urban area        | 37.42                | 18.13    | 2.41     | 57.96   |
|            | Rural area        | 19.38                | 14.46    | 8.20     | 42.04   |
|            | Total             | 56.8                 | 32.59    | 10.61    | 100.00  |
| Weekends   | Urban area        | 26.62                | 19.38    | 11.96    | 57.96   |
|            | Rural area        | 19.38                | 0.00     | 22.66    | 42.04   |
|            | Total             | 46.00                | 19.38    | 34.62    | 100.00  |

Pearson chi-square 71.937 \(p=0.001^*\)

* - difference significant at \(p<0.05\)

The high value of test indicated a significant difference between observed values and expected values. This was confirmed by a significant dependence at \(p<0.001\) between young mothers’ declarations on dimension of free time and their place of residence. Nearly twice as many respondents from rural areas than from urban areas declared that their free time was fully sufficient. Interestingly, more young mothers from rural areas declared that they could have more free time. There were no respondents from rural areas that suffered from a total lack of free time, whereas in the case of respondents from towns and cities this number accounted for over 10%. Regardless of the place of residence, more than 44% of all respondents declared that they do not have enough free time (Table 3).

**Table 3** Dimension of leisure time of Polish young mothers living in rural and urban areas
Among eleven motives proposed in the survey affecting participation of young mothers in physical activity, six of them were in the model of discriminate function. The following motives were not included in this model: creating healthy lifestyle, improving the beauty, improving personal well-being, strengthening the body immunity and weight loss. While assessing discriminatory power, presented in the form of Wilks' Lambda, significant differences in values of particular factors in the model were found between two groups surveyed. The highest value of classification function was reached by a factor related to a desire to improve health condition through participation in physical activity, which was significantly more important at p <0.001 for respondents from rural areas than from urban areas.

For young mothers from rural areas, significantly more important than for those living in towns and cities, was to participate in physical activity in order to reduce pain complaints (p<0.001). On the other hand, such motives as strengthening self-esteem (p<0.001), strengthening position in the family (p<0.001) or relieving stress (p=0.002) were significantly more important for women from urban areas than from the village. Additionally, the motive of toughening the body through physical activity was more strongly exhibited by respondents from urban areas (Table 4).

Table 4 Motives affecting the actively spent free time by young mothers from urban and rural areas
### Motive

| Motive                              | Model of discriminant analysis | Classification function | Place of residence |
|-------------------------------------|-------------------------------|--------------------------|-------------------|
|                                     | Wilks’ Lambda: 0.437          | F (10.212)=6.945 p<0.001 |                   |
|                                     |                               |                          |                   |
| Improving the health                | 0.472                         | 120.9                    | 0.001*            |
|                                     |                               | 80                       | 1.498             |
| Improving the self-confidence       | 0.466                         | 72.55                    | 0.001*            |
|                                     |                               | 5                        | 1.632             |
| Relieving the pain                  | 0.513                         | 41.14                    | 0.001*            |
|                                     |                               | 7                        | 0.007             |
| Strengthening the status in family  | 0.505                         | 30.54                    | 0.001*            |
|                                     |                               | 0                        | 1.139             |
| Rebounding the stress               | 0.489                         | 9.335                    | 0.002*            |
|                                     |                               | 0                        | 0.177             |
| Hardening of the body               | 0.484                         | 2.445                    | 0.118             |
|                                     |                               |                          | 0.123             |
| Constant                            |                               |                          | 7.761             |

* - difference significant at p<0.05

Source: Own data on a base of study results

On the basis of discriminate analysis and Wilks' Lambda values, there were found significant differences in values of individual barriers faced by young mothers from rural and urban areas while participating in physical activity. Within six factors that were found in the model of discriminate function concerning barriers, the lack of money was the most often declared by all respondents. This factor, to a greater extent, was recognized among young mothers from urban areas, whose values of expression were significantly higher (p = 0.008) than of respondents from the countryside. The factor associated with young mothers’ lack of interest in offers of active recreation reached high values in both groups of respondents. However, this factor concerned, to a greater extent, young mothers from urban areas, whose declarations were significantly higher at p=0.004. On the other hand, such barriers as the lack of offers from the centers organizing active recreation (at p=0.002), the lack of
family support (at p<0.001), and the lack of free time (at p<0.001) were more often declared by young mothers from rural areas than from towns and cities. The lack of access to sports and recreation facilities was another important factor which had a great influence on the frequency of participation in physical activity of respondents. Interestingly, this barrier was more often encountered (at p<0.001) by young mothers from urban areas rather than from rural areas (Table 5).

Table 5 Barriers affecting the active leisure time by Polish young mothers living in rural and urban areas

| Barrier                  | Model of discriminant analysis | Classification function |
|--------------------------|-------------------------------|--------------------------|
|                          | Wilks’ Lambda: 0.507          | Place of residence       |
|                          | F (10.212)=6.945 p<0.001     |                          |
|                          | Wilks’ Lambda | F of introduction | p level | Urban area | Rural area |
| No offers of centers     | 0.508             | 9.273                 | 0.002*  | 1.443      | 1          |
| No family support        | 0.501             | 132.017               | 0.001*  | 0.408      | 1          |
| No free time             | 0.493             | 17.044                | 0.001*  | 0.928      | 1          |
| No access to sport facilities | 0.521         | 13.581                | 0.001*  | 1.726      | 1          |
| No interests in offers   | 0.507             | 8.319                 | 0.004*  | 5.252      | 5          |
| No financial resources   | 0.486             | 6.919                 | 0.008*  | 7.641      | 7          |
| Constant                 | 0.486             | 6.919                 | 0.008*  | 7.641      | 7          |

* - difference significant at p<0.05

Source: Own data on a base of study results

Discussion

There is no evidence for research hypothesis that assumed a lower level of physical activity among young mothers from rural areas, compared to those living in urban areas. The levels of physical activity in both groups surveyed were at similar levels, thus study results conducted in the United States, which showed significant difference in favor of women from urban areas, were not confirmed [30, 31]. In the case of young Polish mothers, significant differences resulted only from different types of physical activity. Female respondents from rural areas spent nearly half of their physical activity on housework and outside works. Such study results are not surprising as many women from countryside
connect their housework with work on the farm. It is a common phenomenon, often being compared to household activities done by women (housework and childcare), which are significant factors influencing high daily levels of physical activity [32].

In both studied populations of young Polish mothers, around 25% of total physical activity was related to sports and recreational activities, without a clear indication of the prevalence of any group surveyed. Dzewaltowski et al. [33] point out that in the case of children strongly attached to their families, what can be observed in multigenerational families, there is a higher probability of taking over the same patterns. This applies particularly to female children who learn their parents’ approach to physical activity, especially of mothers, and introduce these patterns to their own families in the future [34, 35]. Hence, a statement arises that physical activity gives not only health benefits, but also a potential to provide their offspring with appropriate cultural behaviors related to healthcare, what has been also confirmed by other authors [36, 37].

A part of research hypothesis concerning leisure time budget did not work in the case of young mothers from rural areas. This was due to the fact that young women from countryside, especially on weekdays, had much more leisure time than women living in towns and cities. To a great extent, it is due to the fact that many women from urban areas function in multigenerational families. This helps them to save more free time as all duties are divided among a greater number of family members. Both studied groups of young mothers, compared to men, experience some restrictions in leisure time budget. This applies especially to housework duties and family responsibilities, which to a great extent limit their free time spent on physical activities [38]. It is also worth mentioning that mothers with young children tend to protect at first the needs of their children, and then they meet their own ones [39], often feeling that they are not entitled to have time for leisure. According to some authors [40, 41], this makes them unable to participate in physical activity regularly.

The above-mentioned opinions and studies presented in this paper show that contemporary Polish young mothers living in rural areas reasonably manage their time, as it is evident in the dimension of free time that is at their disposal. This is reflected in the reduced severity of their declarations on the lack of free time than it was a decade earlier [42].
When analyzing the results of studies, the hypothesis that the lack of financial resources is a barrier for young mothers from rural areas to perform physical activity has been confirmed. On the other hand, the hypothesis that the lack of access to sports and recreation facilities is a reason for non-participation in physical activity has been not proven. It is worth emphasizing that the previous studies [25, 43] indicated that environmental factors and the lack of access to sports and recreation infrastructure were barriers which significantly exerted a negative impact on the level of participation in physical activity of women from rural areas.

The conducted studies showed that young mothers living in rural areas, to a significantly greater extent than women from urban areas, felt the lack of support from their families, what proved assumptions of this part of research hypothesis. At the same time, conducted studies confirmed that women from rural areas wanted to underline the importance of their position in the family as well as strengthen their self-esteem [44, 45]. It should be noted that the same factors, with even greater intensity, were declared by women from urban areas. This shows that women, in general, feel unappreciated by their families [46, 47]. It should be noted that in conducted studies these factors proved to be even more important than more traditional problems such as weight loss, improving the beauty or creating healthy lifestyle through participation in physical activity.

The analysis of questionnaire responses reveals that the fact of being a mother is an important factor of deficiency of active behavior, what is confirmed in studies carried by other authors [48–50]. It has been found that low economic status that often occurs in the case of young families, results in young mothers’ reluctance and the lack of pleasure and motivation to participate in physical activities [51, 52].

Conclusions
The priority for young mothers and their families living in rural and urban areas is the growth of their financial resources, and thus the raise of their material status. These problems affect particularly young mothers who are obligated to educate and protect needs of their children. Young mothers, to some extent, should have less daily duties in order to be able to participate in physical activity. This will help them reduce stressful situations and will have a good influence on restoring a sense of
control over their own health and well-being. Young mothers, especially from rural areas, should have more support from their families, especially from their husbands who may help them in raising children. This may eliminate stereotypes of young mothers who do not have any free time. Such approach will also strengthen a position of young mothers in the family and in the society. Elimination of barriers associated with infrastructure of rural areas such as building bicycle and pedestrian paths, will help young people, including young mothers, spend their free time actively. This social support with the support of a spouse and more distant family are factors which have a positive influence on active behavior of young mothers. The creation of specialized programs related to physical activity and organization of group activities by professionals will give the opportunity for young mothers, especially from rural areas, to spend their free time actively. There is a need to introduce systematic monitoring of young mothers’ participation in physical activity, especially research panels that will define tendencies as well as allow identification and systematic comparison of young mothers’ behaviors in relation to other social groups. Such studies would aim at understanding determinants of physical activity of young mothers from rural areas. They would also help them by influencing public health policy, especially increasing participation of this population in physical activity during free time.

Declarations

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Author Contributions

AS, AG and EK-N conceptualized the original study. AS and AG data collection, data analysis, manuscript writing/editing, EK-N and PK data collection, data analysis. All authors have read and approved the final manuscript.

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dissemination of findings.

**Availability of data and materials**

The data supporting our findings are found at, kept in confidentiality and stored at the corresponding author both in hard and soft copies. If someone wants our data, we are voluntary to share it and the corresponding author should be contacted through the email address on the cover page.

**Ethics approval and consent to participate**

The study conforms to the code of ethics of the World Medical Association and the standards for research’s recommendation of the 1964 Helsinki Declaration. The protocol was approved by the University Ethics Committee Siedlce University of National Science and Humanities. To ensure confidentiality, all data were anonymised before analysis. Before the respondents started to answer the questions posed in the study, they declared their willingness to participate in the study.

Acceptance was provided online.

**Consent for publication**

The study participants were informed that finding of the study would published. Identifying images or clinical details of participants that compromise anonymity were not applicable in this manuscript.

**Competing interests**

The authors declare that they have no competing interests.

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