ORIGINAL ARTICLE

Annals of Agricultural and Environmental Medicine 2011, Vol 18, No 2, 365-374
www.aaem.pl

Physical activity among women at reproductive age and during pregnancy (Youth Behavioural Polish Survey – YBPS and Pregnancy-related Assessment Monitoring Survay – PrAMS) – epidemiological population studies in Poland during the period 2010-2011

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Abstract

Physical activity is among the basic human needs and is the key precondition for the maintenance and enhancement of health throughout all periods of life. Physical inactivity is now identified as the fourth leading risk factor for global mortality. Physical inactivity levels are rising in many countries, with major implications for the prevalence of non-communicable diseases and the general health of the population worldwide.

An adequate level of physical activity among young women at reproductive age is especially important because it is one of the preconditions affecting their capability for procreation which, to a great extent, affects their activity during pregnancy and conditions the course of pregnancy and labour. Unfortunately, many scientific reports indicate a decrease in physical activity among adolescents, especially girls. The primary cause of this alarming phenomenon are changes in behaviours, including an increasingly greater amount of time devoted to so-called sedentary activities. Such negative health behaviours of women may have negative health effects on the functioning of their organism and, in the future, on the development of their offspring.

The objective of the presented study was analysis of the level of physical activity among women at reproductive age (prior to conception), and pregnant women in Poland. The study group covered 3,940 women, (730 girls aged up to 15, and 3,210 women aged over 15), and 6,252 pregnant women. The survey was conducted among schoolchildren and students during the last quarter of 2011, while the survey among pregnant women was carried out twice: in the second quarter of 2010, and in the third quarter of 2011.

The results of the study revealed a relatively low level of physical activity among young women and pregnant women. The analysis showed an alarming downward tendency in the physical activity of women related to age. Such a decrease in physical activity among girls already during the period of puberty may be of key importance during the period of maturity, especially when they become pregnant. It is highly recommended, therefore, that effective actions should be taken in the area of public health; this would enhance the social awareness, especially among females, concerning the importance of physical activity for the normal development of the organism and an adequate course of pregnancy and labour.

Key words

physical activity, pregnancy, risk, public health

INTRODUCTION

According to the classic definition, physical activity is 'each body movement necessary for everyday life or a part of a training programme [1]; this is body movement as a result of muscle contraction, resulting in an increase of energy expenditure above the basic level'. This broad definition covers all forms of physical activity, i.e., recreation physical activity (sports disciplines, dancing), occupational physical activity, motor activity at home and in its environs, and activity associated with transport. Physical activity is characterized by an adequate intensity, duration, and frequency [2,3]. Physical efficacy is generally defined as a capability for performing a hard or long-lasting physical effort, performed with the participation of large group of muscles, without rapidly growing fatigued. This concept also covers the tolerance of changes related with fatigue, and the capability for their quick elimination after the termination of the effort. In a very broad concept, physical activity covers cardiopulmonary efficiency, muscular efficiency, muscular strength and power, as well as speed, flexibility and nimbleness.

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Received: 20 September 2011; accepted: 06 December 2011

Physical activity in combination with health-promoting nutrition is among the basic human needs and a crucial precondition for maintaining and enhancing health throughout all periods of life. Physical activity decreases the risk of the majority of chronic diseases, especially cardiovascular system diseases, overweight and obesity, type 2 diabetes and cancer [4,5]. Continuing the analysis, physical activity strengthens the skeletal system and improves the state of mental health. Beneficial effects of physical activity in the prevention of cardiovascular diseases have been confirmed by long-term epidemiological studies conducted in the United States (the Framingham study, Multiple Risk Factor Intervention Trial (MRFIT), Harvard Alumni Study, and the Nurses Health Study) and in many other countries, including the United Kingdom and Scandinavian countries [6-10].

Meta-analysis shows that physical activity associated with energy expenditure of over 4,200 kJ/week (i.e. >1,000 kcal/week) is associated with a considerable reduction in total mortality (within the range of 25-47%), and the risk of ischemic heart disease decreases by 30-50% [11]. In physically active males and females, the risk of cerebral stroke is reduced by 20-30%, as are both the risk of ischemic and hemorrhagic cerebral stroke [12]. Non-smokers who maintain a normal body weight and perform an adequate amount of exercises live longer, by 5-7 years on average, than those who do not observe the above-mentioned principles of a health-promoting life style [10]. The protective effect of effort in the prevention of cardiovascular diseases and other chronic diseases is dose-related (energy expenditure, duration, frequency, etc.), and is clearly related with the level of physical efficiency [10,13,14]. Motor activity is an important factor in the prevention of primary and secondary type 2 diabetes. It has been confirmed that an increase in energy expenditure of the value of 500 kcal weekly contributed to the decrease in the risk of diabetes by 6%. However, physical effort in individuals with diabetes is conducive for the maintenance of glucose homeosthasis, and reduces the amount of glycolysed hemoglobin [8,15]. There are also reports that routine physical activity reduces the risk of contracting certain types of cancer, especially breast cancer (by 20-30%) and colon cancer (by 30-40%) [16]. An adequate level of physical activity in adolescence and early maturity has a beneficial effect on the somatic, motor, mental and social development of man, and trains the need for continuing physical activity throughout life [17].

A successive increase of physical activity in previously inactive individuals considerably improves their health status. A decrease in relative death risk by 44% was confirmed in individuals who, within 5 years, changed their status from physically inactive to active. The studies showed that the application of exercises enhancing health (fitness) by previous inactivity, after 5 years led to a decrease in the risk of death by 44% [18]. The studies carried out among women showed a linear positive correlation between the amount of physical exercises enhancing health (fitness) performed and the risk of death.

According to American recommendations, the recommended dose of physical activity is age-dependent. In childhood and adolescence, 60 minutes of moderate-to-vigorous physical activity (MVPA) is recommended for a minimum of five days a week, whereas in adults – 150 minutes of moderate intensity weekly, or 75 minutes of intensive activity performed evenly for a minimum of 5 days a week. The European Agency of the World Health Organization, in its document: *European Platform for Action on Diet, Physical Activity and Health,* announced similar recommendations with respect to the recommended level of physical activity for individual age groups [19,20].

The latest evidence-based guidelines indicate that regular physical activity in pregnancy is a basic precondition of its course [21]. Physical activity during this period, similar to the time of not being pregnant, is a basis for the maintenance of the musculoskeletal system on an adequate level and prevents the development of many disorders, such as varicose veins of the lower extremities, deep venous thrombosis or lumbar spine pain. There is much evidence that regular exercise in the prenatal period is an important element of treatment and prevention of gestational diabetes, preeclampsia and obesity in the mother, and resulting from this, implications for the course of pregnancy, type of pregnancy termination and the state of newborns after birth [22]. Physical exercises are currently considered as supportive therapy for women with gestational diabetes. There is evidence that women who were physically active before becoming pregnant, more rarely contracted gestational diabetes during pregnancy [23]. Regular physical exercise in an early period of pregnancy stimulate placental growth and prevent its pathophysiological changes, which may the cause of preeclampsia [24,25]. Women performing exercises at the early stage of pregnancy show a greater pace of placental growth, its larger size, and an increased amount of placental villi [26,27]. This results in an increase in blood supply to this organ, improves its transport capabilities, mainly with respect to oxygen flow and, consequently, results in the normal growth and development of the foetus [26]. The results of the studies show that systematic physical exercises increase the antioxidative capabilities of the organism of the mother in response to pregnancy-related oxidative stress, which prevents the dysfunction of the placenta endothelium which may lead to preeclampic toxemia [28].

The majority of preliminary evidence available indicates the positive anti-inflammatory effect of regular physical exercises, or alleviates the systemic inflammatory response accompanying preeclampic toxemia [29]. Regular physical exercises prevent obesity and are the method of its control. Overweight and obese women prior to conception more often suffer from infertility and menstruation disorders, and more often contract the polycystic ovary syndrome, which considerably decreases the probability of conception [30,31]. Obesity also increases the probability of spontaneous abortion [32]. Obese and overweight women bear macrosomic babies (bigger than indicated by gestational age) [33]. Obese women more often deliver by Cesarean section or other non-natural ways [34-35]. Regular physical exercises prior to conception and during pregnancy help maintain the normal BMI, prevent obesity and pregnancy complications, and reduce the risk of an excessive weight gain in pregnancy, which facilitates the return to the body weight to that before pregnancy in the puerperal and postpartum periods [36,37]. Physical activity and physical exercises after the termination of pregnancy facilitating weight loss down to the normal BMI values reduce morbidity and mortality risk due to endometrial cancer [38,39]. The majority of guidelines recommend physical exercises in pregnancy, which elevate the heart rate to 60-70% of the maximum heart rate with respect to women inactive or poorly active during the pre-

conception period, and to the maximum heart rate – to 60-90 % of the maximum heart rate for previously active women [40,41]. The above-mentioned recommendations are also related with the age of pregnant women. For pregnant women below the age of 20, a safe range of pulse rate which may occur during physical exercises of the aerobic type is within the range from 140-155 per minute, for those aged 20-29 – from 135-150 beats per minute, in women aged 30-39 – 130-145 beats per minute, whereas in those aged over 40 – from 125-140 beats per minute. Pregnant women who start physical exercises, and who were not active before pregnancy should begin aerobic exercises with 15 minutes of effort 3 times a week, gradually increasing the duration of the effort to 30 minutes 4 times a week [41]. Pregnant women should avoid sports burdened with the risk of injury, such as horse riding, ice hockey, downhill skiing, or gymnastics [42].

The benefits resulting from the performance of physical exercises after delivery result from an improvement of the efficiency of the cardiovascular system, facilitation of weight loss, mood enhancement, decrease in anxiety and depression [43]. Women in the postpartum period should start physical activity of moderate intensity as early as possible. It should be emphasized that strengthening of the pelvic bones by performing physical exercises decreases the risk of urinary incontinence [44]. At present, the recommendations suggest that if pregnancy and delivery had a normal course, then directly after delivery the woman should start physical exercises of low intensity in the form of walking, exercises of the pelvic bones or stretching. In the case of a Cesarean section, the return to physical exercises may take place after week 6-8 after delivery, following doctor's advice [45].

Scientific studies and the recommendations of professional medical organizations indicate benefits resulting from physical activity at any phase of human life, including pregnancy [46,47]. Many national medical organizations issued proper recommendations in this respect, including, for example, Canada, the United Kingdom or the USA [21,41,48]. In addition, the US government in its recommendations concerning physical activity among Americans, under the name '2008 Physical Activity Guidelines for Americans', included an entire section concerning recommendations for physical activity among pregnant women, and during the postpartum period [49]. According to these regulations, women at reproductive age, during pregnancy and after delivery, should perform physical activity of a moderate intensity for at least 150 minutes daily, for the majority or all days of the week [41,50,51]. Aerobic exercises are recommended evenly distributed in individual days of the week [52,53]. The recommendations in other countries recommend a similar dose of physical activity of moderate intensity, not only as the method of preventing obesity and risk of gestational diabetes, but primarily as an independent factor affecting the state of a newborn and the course of delivery [22,54,55].

OBJECVTIVE

The objective of the study was investigation of the level of physical activity of women at reproductive age (prior to conception), and pregnant women in Poland.

MATERIAL AND METHODS

Characteristics of the population of women at reproductive age in the study (schoolgirls and students)

Analyses of the population of women at reproductive age was performed based on questionnaire forms collected among a randomly selected, representative group of adolescents attending high schools, secondary schools, and university students in Poland in October 2011. Subsequently, from the total population of schoolchildren and students, girls/women were selected who were then subject to statistical analysis. The study group covered 3,940 women – 730 girls aged 15 and under, and 3,210 aged over 15.

Sample selection procedure – schoolgirls

The selection of schoolchildren from secondary level schools was performed by the determination of all educational facilities selected at random from the territory of the entire country. Sampling frame was the database of the Ministry of National Education, especially 'Identification data concerning schools and educational facilities according to the data by Educational Information System of 30 September 2010' (No. 2010.09.30/01). For the needs of the survey among secondary school adolescents, the sample was selected by double sampling and was of a cluster character. At the first stage of sampling, the scope of the list was limited to 4 types of schools (high schools, general secondary schools, profile secondary schools and technical secondary schools), the schools were then selected, and subsequently classes with the use of the procedures of the statistical software Statistica and SPSS. The sample covered 569 schools from 379 counties in Poland.

Sample selection procedure – students

A procedure analogous to that for secondary school adolescents could not be applied with respect to university students; therefore, all students from a limited sample of universities who were willing to participate in the survey were preliminarily enrolled. The sample of students obtained was then randomized with respect to gender and age by means of subsequent sampling, with the use of proportions for the population of Polish higher education facilities (*Main Statistical Office – 'Higher schools and their finance in 2009'*).

Students were investigated by means of a questionnaire in electronic form, available on a specified university website. The survey was anonymous; however, additional data was collected concerning the university and place of respondents' residence (commune). This served for stratification of the sample obtained during analysis, and allowed a detailed correction of the composition of individual groups of students within the group. Correction procedure was performed in 2 ways: 1) by so-called random removal of excessively analyzed respondents and elimination of questionnaires containing mistakes and repetitions, i.e. structural correction of the sample; 2) all-Polish additional data enabled the ascribing of ranks to individual questionnaire forms, and the standardization of the sample according to additional variables.

Methods of assessment of physical activity of women at reproductive age (schoolgirls and students)

In order to determine the level of physical activity among adolescents at this age, the International Physical Activity Questionnaire (IPAQ) was used. IPAQ describes physical activity in energy expenditure units – minutes per week (MET). Metabolic equivalent of task (MET) is used to estimate the metabolic cost (energy expenditure as reflected by oxygen consumption) of physical activity – resting metabolic rate. According to scientific reports, one MET is equal to approx. 3.5 ml oxygen kg^{-1} body weight per min^{-1}. It was determined that the cost of an intensive physical effort is 8 MET per minute, a moderate effort – 4 MET, walking (march, quick walking) – 3.3 MET. The energy cost of the physical activity is calculated as the MET level multiplied by the standard resting metabolic rate (1.0 kcal/kg/h).

Selected items from the YPBS survey were used in the study, concerning physical activity, which reflects the short version of the IPAQ. The survey contains 7 questions covering all types of physical activity:
- physical activity associated with the occupation performed, or at school;
- physical activity at home and around the house;
- moving to various places and mobility during free time devoted to recreation, playing games, sports, tourism, or other muscular work.

Only the physical activity lasting longer than 10 minutes was estimated, without rest breaks, and within the last 7 days. During the study, an average number of hours of the respondent's remaining in a sitting position daily was noted. The following were recorded in the study:
- frequency, duration and intensity of physical activity (assuming that a moderate physical activity means physical effort with slightly accelerated – with respect to resting – respiration, and slightly accelerated heart rate, an intensive physical activity is a hard physical effort which forces strongly intensified respiration and considerably accelerated heart rate);
- frequency and duration of walking;
- average duration of remaining in a sitting position daily.

The respondents' height and body weight were also recorded to calculate the BMI index, and the form of physical activity while performing occupational activity or at school, and also during free time. Demographic data and information concerning the type of occupation performed by the respondent was also collected. Weekly physical activity was calculated by summing-up the MET obtained during intense and moderate physical activity, and while walking during the entire week.

In the methodology of the assessment of the level of weekly physical activity by means of the IPAQ, its 3 following categories were selected:
1. Insufficient (LOW) physical activity – when the total energy expenditure does not reach 600 MET min./week.
2. Sufficient (MIDDLE) physical activity – when the total energy expenditure ranges within 600-1,500 MET min./week, assuming that this expenditure is the effect of 3 or more days of intense physical activity for a minimum of 20 minutes daily; 5 or more days of moderate physical activity or marching-walking for at least 30 minutes; combinations of intensive or moderate physical activity jointly burning more than 600 MET min/week.
3. High physical activity (HIGH) – when the total energy expenditure exceeds 1,500 MET min/week, and results from at least 3 days of intensive effort of approx. 30 minutes daily, or practically an everyday half-an-hour moderate physical activity or walking.

Sample selection procedure – pregnant women

In Poland during 2009-2011, a 'first of its kind' surveillance project was conducted on maternal attitudes and experiences before, during, and shortly after pregnancy, according to the Pregnancy Risk Assessment Monitoring (PRAMS), as used in the USA since 1987. The study was a pilot one. A randomised group of post-partum Polish mothers and their newborn infants were monitored. Women were recruited from all hospitals in Poland where mothers, (lying-in women) had been hospitalised after giving birth to newborns. The study was performed on a single day in the second week of June 2009, as legally designated by the Chief Sanitary Inspector. The survey was carried out by staff from Provincial Sanitary-Epidemiological Stations previously and freshly trained by public health experts from the Chief Sanitary Inspectorate and Regional Sanitary-Epidemiological Stations, adopting a cascade system. Subjects were interviewed face-to-face. The study design was in accordance with the appropriate Chief Sanitary Inspectorate regulations, and the questionnaire was divided into 2 sections. The first part consisted of the following:
- mother's age, place of residence, education, marital and social status;
- reproductive history, (previous deliveries, abortions, potential problems with becoming pregnant, etc.);
- risky health behaviours of the mother prior to and during pregnancy, (e.g. tobacco smoking, drinking alcohol, use of narcotics and psychoactive substances).

The second part consisted of:
- condition of the newborn after birth evaluated by the Apgar Scale;
- newborn's gender, birth weight, height and date of delivery;
- type of delivery and potential labour complications;
- any congenital defects in a newborn.

Subjects answered the first section of the questionnaire, whereas the second section was completed by medical staff (physician or nurse providing healthcare), based on medical records (e.g. pregnancy chart and hospitalisation history). Consent for the study was obtained from the Bioethical Commission as well as the management from each hospital. Prior to the survey, obstetricians were sent a letter supporting the study, signed by the National Consultant for Obstetrics and Gynecology.

Of the total number of 402 Polish hospitals where deliveries took place, consent for the study was expressed by 382 hospitals (95%). Answers were obtained from 3,346 mothers (81.6%) after delivery, of which 3,280 were suitable for statistical analysis (98%). The total number of mothers who, after delivery, stayed in hospitals with their newborns was 4,100.

The following year (9-13 August 2010), a similar survey carried out but with certain changes. The questionnaires were now independently completed by the hospitalized mother and ward medical staff. The first part of the questionnaire was expanded to cover body weight, nutrition of the pregnant

woman prior to and during pregnancy, frequency of eating meals and their quality, dietary supplementation, taking vitamins and medications, arterial hypertension and diabetes prior to and during pregnancy, as well as physical activity. Also included were further questions on examinations for breast and cervical cancer, the condition of the vagina prior to and during pregnancy, and the women's knowledge concerning cancer prevention. The second part also had some additions as follows;

– results of blood tests and examinations of other biological material performed in pregnancy, during delivery and immediately after childbirth, in the mother and possibly in her newborn;
– congenital defects with a precise specification of their external symptoms.

Of the total number of 398 hospitals where deliveries took place, 373 managers expressed their consent to participate in the survey (94%). 3,064 'lying-in' mothers hospitalized with their newborns completed the questionnaire forms (77%), of which 2,972 were suitable for statistical analysis (97%). On the day of the study, 3,979 'lying-in' mothers with their babies were hospitalized in Poland. The survey results were subsequently entered on-line into answer sheets on the server at the Institute of Rural Health in Lublin and subjected to statistical analysis.

For the purpose of the presented study the results of the above-presented population studies were used, conducted in Poland during the period 2009-2010. Analysis was performer based on the results of replies concerning self-reported physical activity prior to and during pregnancy, as declared by the respondents.

STATISTICAL ANALYSIS

Statistical analysis was performed by means of the statistical software package *Statistica 8.1 PL*. Compilation of variables distribution was presented by means of frequency tables, descriptive statistics and contingency tables. In order to investigate the characteristics expressed in a nominal scale, contingency tables and Pearson chi-square test were applied. For analysis of the relationships between the variables expressed in continuous measurement scales, the ANOVA test was used, or in the case of the lack of fulfillment of conditions of a parametric test, the Kruskall-Wallis rank ANOVA test.

RESULTS

Results of the survey showed that the physical activity of young women varies. As many as 31.51% of girls aged 15 and under, and 23.08% of those aged over 15 showed low physical activity (Tab. 1). Analysis of physical activity according to the 3 above-mentioned IPAQ categories indicated that only approximately one-third of young girls are characterized by high physical activity. An especially alarming fact is that 31.51% of girls aged 15 and under show low physical activity. The results obtained revealed an alarming forecast of the trend towards a decrease in physical activity among adolescents, which is confirmed by the percentage of girls/women with low physical activity (31.51% up to the age of 15, 23.08% over 15).

Table 1. Women's physical activity acc. to the IPAQ questionnaire by age category.

Physical activity						
GROUP		low	middle	high	total	Chi² p
aged 15 and under	n	230	247	253	730	p<0.000
	%	31.51	33.84	34.65		
aged over 15	n	741	1,483	986	3,210	
	%	23.08	46.20	30.72		
Total	n	971	1,730	1,239	3,940	
	%	24.64	43.91	31.45	100.00	

The weekly physical activity of schoolgirls and students was also recalculated into MET min. according to the abbreviated IPAQ questionnaire. The difference between the population of girls aged 15 and under and girls/women aged over 15 was not statistically significant; however, a clear decrease is noted in weekly physical activity in the group of women aged over 15 (Fig. 1).

A comprehensive analysis of physical activity among the schoolgirls and students in the study, which included the time spent by the respondents in a sedentary position, showed that girls/women aged 16 and over, compared to schoolgirls aged 15 and unde, spend considerably more time in a sedentary position (Fig. 2). The difference was highly significant statistically (p<0.000). The analysis showed an alarming tendency towards the reduction in physical activity of women with age. Such a decrease in physical activity of girls during the period of adolescence may be of a crucial importance at the age of maturity, especially in pregnancy.

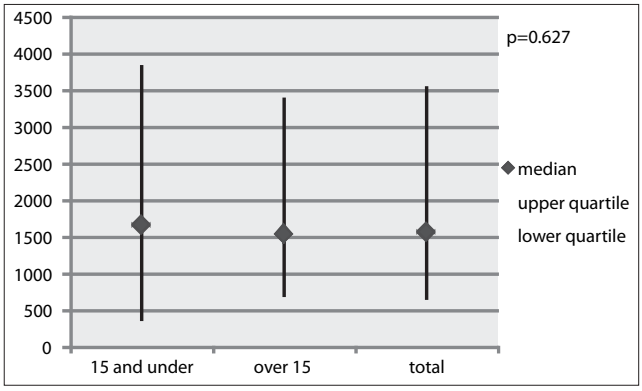

Figure 1. Weekly physical activity of young woman in MET according to short IPAQ *(due to non-homogeneity of variance and deviations from normal distribution, Kruskall-Wallis rank test ANOVA was applied).*

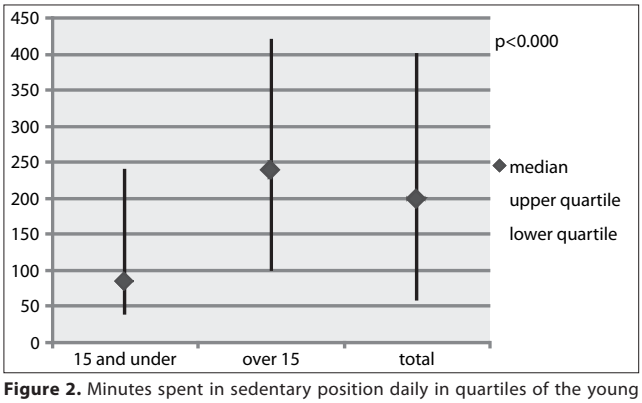

Figure 2. Minutes spent in sedentary position daily in quartiles of the young woman`s population *(due to non-homogeneity of variance and deviations from normal distribution, Kruskall-Wallis rank test ANOVA was applied).*

During pregnancy, the percentage of women who did not perform any physical activity increased to 55.87%. Approximately 15.09% of respondents declared physical activity during pregnancy, performed every day or more often than 3 times a week for at least 30 minutes. About 10% of respondents mentioned that they performed physical activity 3 times a week for at least 30 minutes. Approximately 10% of respondents admitted that they performed physical activity 3 times a week for less than 30 minutes (Tab. 2). Self-reported physical activity by pregnant women confirmed that approximately one-quarter of respondents reduced this activity (24.11%), and 4.83% considerably reduced the activity. The majority of pregnant women mentioned that during pregnancy they did not change the level of their physical activity (71.03%).

Table 2. Women's physical activity during free time prior to and during pregnancy*.

Physical activity	before pregnancy	during pregnancy
	%	%
Yes, daily or more than 3 times a week, for at least 30 minutes	22.99	15.90
Yes, 3 times a week for at least 30 minutes	13.59	10.09
Yes, 3 times a week, for less than 30 minutes	8.32	9.31
Less than 3 times a week	10.01	8.82
Did not perform any exercises	45.09	55.87

**percentages were calculated with relation to the number of women who answered the question.*

The majority of pregnant Polish women decrease their physical activity in association with becoming pregnant. This is due to fear of risks for the course of pregnancy and negative effect of physical exercises on the state of the foetus. This is most often at the suggestion of gynecologists providing care in pregnancy. Nearly all the mothers (96%) reported that during current pregnancy they had counterindications for performing physical activity. The counterindications for performing physical activity most frequently reported by respondents were uterine cramps (39%), followed by cervical incompetence (11%) and past obstetric history (10%) (Fig. 3).

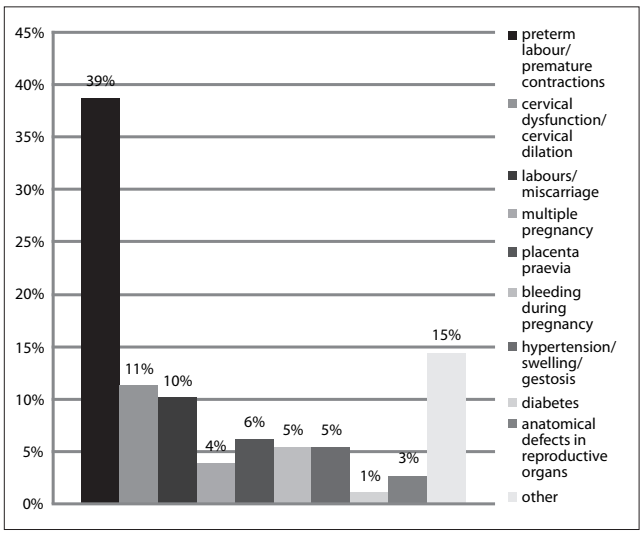

Figure 3. Characterisitics of declared counterindications for performing physical activity in pregnancy *(percentages were calculated with relation to respondents who declared a decrease in activity).*

DISCUSSION

Low physical activity is responsible for 6% of deaths worldwide [56] and 5-10% of deaths in the countries of the WHO European Region, according to country [57]. It was estimated with the use of the disability adjusted life-years (DALY) index, that every year in the WHO European Region over 8 million of the population experience a decline in health (lose years of life) as a result of too low physical activity, while about a million deaths annually are directly associated with the lack of physical activity [56]. Studies by the Eurobarometer conducted in 2006 show that an average European spends over 6 hours daily in a sitting position [58]. The Eurobarometer survey of 2010 showed that 34% of respondents did not practice sports or gymnastics, or did so within a limited scope [59]. In Poland, a low percentage of the population is noted who use any regular physical activity apart from work. Epidemiological studies indicate that only 45% of the adult Polish population are active apart from work, the percentage of active women being considerably lower than that of males (50.3% of males vs. 40.8% of females) [60].

The period of adolescence and youth is characterized by a decrease in physical activity. This phenomenon concerns especially girls, in whom after the occurrence of the first menstruation, a clear unwillingness for movement is observed, or even locomotor 'laziness', which maintains itself in the subsequent years. This results in a decrease in physical activity in a part of girls (early involution in motor development). The results of studies carried out during the period 1979-1999, in a large number of groups of children and adolescents (aged 7.5-19.5) in Poland, indicate a clear regression in physical activity and physical efficiency among adolescents [61]. The main cause of this phenomenon is the tendency towards reduction of physical activity among children and adolescents. The activities which are competitive for physical activity are so-called sedentary activities.

The International HBSC studies (Health Behaviour in School-aged Children: A WHO Collaborative Cross-National Study) conducted in Poland also confirmed that the physical activity of girls is insufficient [62]. The majority of adolescents of both genders (59% of boys and 71% of girls) in Poland do not achieve the recommended level of physical activity (60 minutes daily for 5 days a week). This is the group at increased risk of disorders related with motor deficiency. This risk is especially high in every fourth adolescent with very low physical activity. During adolescence in both genders, physical activity decreases with age. In the presents study, an objective method for evaluating the physical activity of girls and women at reproductive age was applied. The physical activity of young women is highly insufficient and does not achieve the generally adopted recommendations. Some researchers define an insufficient physical activity as an energy expenditure related to physical effort lower than 10% of the total daily energy expenditure, or of a duration shorter than 25 minutes daily [63,64].

Insufficient physical activity is an important but still underestimated factor affecting the state of health, morbidity and mortality. In the majority of highly developed countries, for at least 20 years, one may talk explicitly about an epidemics of 'motor laziness' [64]. One the one hand, this is the effect of the blessing of civilization and, associated with it, changes in the style of life. On the other hand, however, there is a lack of

knowledge concerning the importance of physical exercises for human health. The latest studies indicate that 50-60% of adult Poles are characterized by too low physical activity [65]. This concerns especially women, inhabitants of large urban agglomerations, and people of lower socioeconomic standard. Too low physical activity among children and adolescents is an increasing public health problem: over 50% of girls and approx. 33% of boys in Poland show too low physical activity [66]. It is noteworthy that in our country the lack of physical activity is rarely perceived as a risk factor for cardiovascular diseases [67].

The results of the HBSC study in Europe show that the mean duration of physical activity among adolescents was 3.8 hours weekly. The highest degree of activity was observed in Austria, England, Ireland and Lithuania, whereas the lowest level was noted in Belgium, France, Italy and Portugal. Boys showed a higher physical activity than girls. Approximately 34% of adolescents in the study did not perform the recommendations of at least 60 minutes of mediocre intensity effort for 5 or more days a week. Only 40% of boys and 27% of girls performed the recommendations. This percentage decreased with age, especially among girls [2]. Similar tendencies are also observed among Polish adolescents. Nearly a half of high school and secondary school adolescents in the survey showed an insufficient physical activity, girls constituting the majority of them. The respondents spent most of their free time in a sedentary position (watching TV, using a computer). Practicing physical activity during free time was not intensive and irregular. A family practicing sports was rare in the group examined, and correlated with the education level of parents (the higher the education level the higher the level of physical activity) [68]. In the majority of children and adolescents (60-70%), motor activity is unsatisfactory, limited only to the obligatory physical exercise classes at school. It is estimated, that every fourth school adolescent shows deviations from the normal state of health, and risk factors of non-contagious diseases occur at an increasingly younger age. The results of the presented study confirm these relationships.

Scientific reports reveal the fact that pregnant women decrease their physical activity, both with respect to its duration and intensity, as well as frequency, compared to the period before conception [69]. The most frequent causes of decreasing physical activity in pregnancy reported by women are: fatigue, poor general wellbeing, lack of time, discomfort associated with performing this activity, feeling of lack of energy, physical limitations related with pregnancy, lack of motivation, as well as the conviction about the negative effect of physical exercises on pregnancy and the foetus [70-72]. The causes of decreasing physical activity of pregnant women were very thoroughly analyzed [70,73]. It was noted that the level of this activity prior to becoming pregnant played a very important role [74,75]. Therefore, the study focused on women at reproductive age – adolescence, before conception. The presented study conducted in a randomized group of women confirm that the activity of females in this period is insufficient. In addition, there is a clear tendency towards its constant reduction with age. The level of physical activity prior to pregnancy, as confirmed by the study, is a very important factor conditioning to a great extent its continuation during pregnancy [74]. According to many reports, pregnant women decrease their physical activity out of concern for its negative effects, mainly of miscarriage, and also due to the negative complaints related with pregnancy, nausea and fatigue [70,72,76]. It should be emphasized that here, the concern and fear for the health of the foetus, and the conviction about the negative effects of physical exercises on the course of pregnancy is of the utmost importance [76]. The physical activity of Polish pregnant women is clearly lower than in other countries worldwide. In the USA, two- thirds of pregnant women perform physical exercises during their free time as leisure-time physical activity (LTPA) [77,78].

In many studies, attention has been paid to the role of professional medical staff (physicans and primarily midwives) in the shaping of the opinion of young women concerning physical activity and its importance, both for the pregnant woman and her baby [73]. Professional advice indicates a considerable role of medical counseling in encouraging pregnant females to lead an active life style. In studies conducted in Brazil on a large randomized group of pregnant women, the role of medical counseling was confirmed in the popularization of physical activity during pregnancy. The presented study also indicates that the majority of women decreased their to-date physical activity. These women usually heeded the recommendations of the gynecologists taking care of them, who advised restraint from efforts due to the threat for the course of pregnancy, especially in the case of an increased risk of premature birth or miscarriage.

Therefore, following other countries, the education of physicians in charge of pregnancies is necessary with respect to the promotion of physical activity among pregnant women [21]. Medical staff, especially those in charge of pregnant and postpartum women, in their practice should inform pregnant women concerning the benefits of physical activity during pregnancy and postpartum period, and inform them that normally there is no danger associated with physical exercises, neither for the mother nor her baby [43,79,80]. In many countries, consultations are recommended in this respect with medical professionals taking care of the mothers [73,81]. In Finland, consultations are carried out by nurses according to a strictly specified methodology, during 5 of 11 free visits during pregnancy [82]. Women who are inactive before pregnancy are encouraged to perform physical activity with the use of known models for changing health behaviours [83].

A change in the conservative approach of medical associations in Poland is also recommended. In the past in many countries worldwide, pregnant women were advised to avoid physical effort in order to avoid the risk of deterioration of health and the health of the foetus. It was confirmed that a sedentary mode of life and lack of physical activity results in a shortening of the duration of pregnancy, a more difficult course of labour, and a lower body weight of the newborn [84]. In addition, it was confirmed that occupational activity in the second and third trimester of pregnancy, even when associated with physical activities requiring leaning and bending, prevents the dystrophy of a newborn. Manual work and physical activity in the second and third trimester of pregnancy also correlates with a decreased risk of premature birth. Only shift work (night duty) in the first trimester of pregnancy is related with the risk of premature delivery. The Polish Gynecological Association in its recommendations, does not recommend physical efforts inducing hyperthermia, such as using a sauna or extreme physical effort in pregnancy and the postpartum period [85]. Activities burdened with a high risk of injury are also not recommended. According to

these recommendations, the undertaking of physical activity '*de novo*' during pregnancy is also contraindicated. In the recommendations, miscarriage and premature birth are indicated as the main causes of risk related with performing physical exercises by pregnant women. Attention is paid to the risk related with performing physical exercises during pregnancy: for the foetus – disorders in maternal placental blood flow, hyperthermia, dehydration, restriction of maternal-foetal exchange, and growth disorders; for the mother: injuries, excessive fatigue, fainting, loosening of joints (especially the spine). Such an information, focusing primarily on threats related with the negative effects of physical activity in pregnancy and the postpartum period, influence the value of medical advice provided by gynecologists-obstetricians for pregnant women.

SUMMARY

The presented results of the analyses show that physical activity among young women at reproductive age is insufficient; its level and volume do not guarantee normal health and create the risk of many chronic diseases at the age of adulthood. Physical activity is considerably reduced during pregnancy and the postpartum period. This is associated with poor knowledge among women at reproductive age of benefits resulting from an active life style one's own body, and in the case of pregnancy, for its course and termination, as well as for the development of the foetus during intrauterine life and after birth. Recommendations by professional medical organizations in Poland place an insufficient emphasis on the popularization of physical activity among pregnant women, focusing mainly on hazards for pregnant women and the foetus resulting from the performance of physical exercises during the course of pregnancy. Compared to the recommendations by other organizations worldwide, these institutions are far too conservative.

CONCLUSIONS

1. It is necessary to promote physical activity among women at reproductive age, and educational programmes should cover large populations. It is highly justifiable to promote an active life style among young women, and organize sports activities in secondary schools and universities which should be adjusted especially to the preferences/interests of girls/women.
2. There is a need to popularize knowledge of the benefits for a woman's body resulting from physical activity, especially during the pre-conception period. It seems highly recommended that the services responsible for public health should prepare an all-Polish educational action promoting physical activity among pregnant women.
3. A greater emphasis should be placed on the education of physicians and other staff of health services on the benefits resulting from an active life style at any stage, especially during the pre-conception period.
4. Recommendations by the Polish Gynecological Association should contain information concerning the positive aspects of physical activity in pregnancy.

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