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Do women play sports while pregnant?

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ABSTRACT

Objectives: The aim of the study was to evaluate the relationship between sociodemographic factors, perinatal data and physical activity in pregnancy, to determine the sources of information about physical health that pregnant women got from and preferred types of sport activities before and during gestation.

Material and methods: The study included 247 pregnant women who fulfilled a questionnaire.

Results: 73.7% of respondents declared doing sport in pregnancy. The preferred types of pre-pregnancy activities were walking, riding a bicycle and swimming. It did not change during pregnancy, but more women declared swimming than cycling. In general, the females chose each type of activity less often in pregnancy than before, except pilates, of which that frequency did not change. The respondents declared that they ran, swam, did aerobics, roller skating and rode a bike significantly less often in pregnancy in comparison to the pregestational period. The sociodemographic factors that influence the physical activity were age, education and net income. The incidence of cesarean section was significantly higher among physically inactive women comparing to those, who declared physical activity during pregnancy. Fifty-five point one percent of survey respondents declared barriers precluding sport activities. The most of women got the information about physical activity from the Internet, books or magazines and an obstetrician.

Conclusions: Pregnancy has an impact on the type of chosen physical activity. The sport activities are dependent on age, education and salary. The active women have 30% lower risk for cesarean section in comparison to inactive respondents. Finally, a great group of women gets the information about proper physical activities during pregnancy from unreliable sources.

Key words: physical activity; sport; pregnancy; perinatal outcomes

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INTRODUCTION

Physical activity in pregnancy has not only minimal risk but primarily is related with many benefits for both mother and fetus [1]. The regular and supervised exercise program throughout pregnancy does not affect fetal well-being, but above all improves maternal physical condition and cardiovascular efficiency [2]. However, due to the changes in women's body during pregnancy, some modifications should be made regarding the physical activity. From a medical point of view, also pregnancy complications should be considered. According to the American College of Obstetricians and Gynecologists Committee opinion, the pregnant women should implement the exercises of moderate intensity for at least 20 to 30 minutes a day for the most or even all days a week [1].

Recommended forms of physical activity during pregnancy are as follows: aerobic, cross-country skiing, Nordic walking, pelvic floor exercise, stationary cycling, strengthening, stretching, walking, water exercise, swimming and yoga [3]. Moreover, Spanish recommendations give an example of activity to do with a caution which include bowling, cross-country skiing, horseback riding, golf, gymnastics, mild jogging and racquet sports [4].

Regular physical activity in gestational period helps to maintain proper weight and physical fitness, reduces the risk of diabetes mellitus and ensures the mood stability [5–7]. It improves glycemic and gestational weight control and decreases the risk of preeclampsia [8]. Furthermore, physical activity during gestation may increase the success rate of vaginal birth after previous cesarean section [9].

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Table 1. The general characteristics of survey respondents

Characteristics	Physically active (n = 182)	Physically inactive (n = 65)	p-value
Age (years, Mean ± SD)	30 ± 5	31 ± 5	ns
BMI (kg/m^2, Mean ± SD)	22.7 ± 3.7	23.2 ± 6.1	ns
Gestational weight gain (kg/m^2, Mean ± SD)	11 ± 6	9 ± 8	ns
Gravidity (n, Median; Min-Max)	1 [0–6]	1 [0–6]	ns
Parity (n, Median; Min-Max)	1 [0–5]	1 [0–4]	ns
Work activity (%) before pregnancy during pregnancy	 89.6 63.7	 81.5 50.8	 ns ns

Table 2. The diseases and pregnancy complications of survey respondents

Diseases and pregnancy complications (%)	Physically active (n = 182)	Physically inactive (n = 65)	p-value
Chronic arterial hypertension	4.4	4.6	ns
Pregnancy induced arterial hypertension	4.9	3.1	ns
Gestational diabetes mellitus	9.3	10.8	ns
Anaemia	8.8	4.6	ns
Polyhydramnion	2.2	1.5	ns
Oligohydramnion	1.1	4.6	ns
Premature membrane rupture	3.8	4.6	ns
Fetal growth restriction	3.8	3.1	ns
Cervical insufficiency	5.5	3.1	ns
Threatening preterm delivery	20.3	15.4	ns
Threatening miscarriage	7.7	4.6	ns
Spinal pain	70.3	55.4	**< 0.05**

Objectives

The aim of the study was to evaluate the association between sociodemographic factors and physical activity in pregnancy. Moreover, the objective was to determine the preferred types of physical activity before and during gestation, comparison of perinatal data between physically active and inactive women. Furthermore, we would like to check the sources of information about physical health and barriers to do sports among pregnant respondents.

MATERIAL AND METHODS

The study included 247 pregnant women who delivered a child in the Obstetrics and Gynecology Hospital University of Medical Sciences in Poznan. The patients signed informed consent and fulfilled a questionnaire. The survey included general questions concerning the age, place of residence, education, type of work, net income and pregnancy complications. The next part of the questionnaire referred to the kind of physical activity before and during pregnancy, subjective assessment of physical condition, sources of information about exercises during pregnancy and perinatal data. The patient's characteristics and diseases were presented in the Tables 1 and 2.

The calculations were made in Microsoft Excel 2010 and in Statistica Statsoft 13.1. The Gaussian distribution was checked using Kolmogorov-Smirnov test and Lilliefors test. If the data met the assumptions of normal distribution the t-Student test was used, if not the Mann-Whitney test was performed. The data in nominal scale were calculated using Chi-square statistic or Fisher's exact test if the expected values were less than five. In reference to the Fisher's exact test the two-sided p-value was considered. The data that fulfilled the assumptions of Gaussian distribution were described as Mean (M) and Standard Deviation (SD), otherwise as Median and Minimal and Maximal value. The results in nominal scale were presented in percentages. The significance level was assumed as p-value below 0.05. The data collected in the Tables 2 and 3 were the multiple questions.

RESULTS

Seventy-three-point three percent of survey respondents declared doing sport in pregnancy. The preferred

Table 3. Kind of physical activity before and during pregnancy

Physical activity (%)	Before pregnancy (n = 247)	During pregnancy (n = 247)	p-value
Walking	75.3	72.1	ns
Running	10.1	1.2	**< 0.0001**
Roller blading	6.5	2.4	**< 0.05**
Riding a bicycle	29.1	10.5	**< 0.0001**
Swimming	19.0	11.3	**< 0.05**
Team games	2.0	0.8	ns
Nordic walking	3.2	2.0	ns
Aerobics	13.8	4.9	**< 0.001**
Gym	4.0	1.2	ns
Pilates	2.0	2.0	ns
Yoga	5.3	4.0	ns
Other	3.2	0.8	ns
None	16.6	26.3	**< 0.01**

types of pre-pregnancy activities were walking (75.3%), riding a bicycle (29.1%) and swimming (19.0%). It did not change significantly during pregnancy, but more women declared swimming (11.3%) than cycling (10.5%). In general, the females chose each type of activity less often in pregnancy than before, except pilates that frequency did not change (2.0%). The respondents declared running (10.1 vs 1.2%, $p < 0,0001$), swimming (19.0 vs 11.3%, $p < 0.05$), doing aerobics (13.8 vs 4.9%, $p < 0.001$), roller blading (6.5 vs 2.4%, $p < 0.05$) and riding a bike (29.1 vs 10.5%, $p < 0.0001$) significantly less often in pregnancy in comparison to the pregestational period (Tab. 3).

The sociodemographic factors that influence the physical activity were age, education and net income. The most active women were between 26 and 30 years old (78.5%), the least between 31 and 35 (68.8%). The significant differences according to the percentage of women who were active during pregnancy were observed between all age groups. The women with higher education level were significantly more physically active than those with basic, vocational or secondary one (78.0% vs 63.5%, $p < 0.05$). The most of active females were in group who earned between 3000 and 6000 Polish Zloty (78.2%) and the number of active women was significantly higher in comparison to those with lower salary (78.2 vs 69.3%, $p < 0.05$). Any significant association according to the place of residence or type of work' performed and physical activity was observed (Tab. 4).

The incidence of cesarean section was statistically higher among not exercising women comparing to those who were physically active during pregnancy (58.5 vs 40.7%, $p < 0.0001$). The physically inactive women were nearly two-fold [OR 2.05 (95% CI: 1.15–3.65); $p < 0.05$] more likely to have cesarean section with about 40% of higher relative risk [RR 1.43 (95% CI: 1.09–1.88); $p < 0.01$] for this mode of delivery than active respondents. Because the frequency of cesarean section did not correlate with age, BMI, gestational weight gain, term of delivery, newborn birth weight, gravidity, parity, arterial hypertension, gestational diabetes mellitus and fetal growth restriction, we did not evaluate the aOR. Any significant difference according to the term of delivery, duration of the first and the second stage of labor, perineal excision, oxytocin administration, the other modes of deliveries, fetal weight or length and Apgar score in the first and in the fifth minute was observed (Tab. 5).

Fifty-five-point one percent of survey respondents declared barriers precluding sport activities during pregnancy. The patients listed pregnancy complications (32.0%), feeling unwell (19.0%) and aversion to physical activity (4.1%).

The most of pregnant women got the information about physical activity from the Internet (51.0%), books or magazines (45.3%) and doctors (31.1%). Moreover, the other pointed sources of knowledge were schools of childbirth (20.6%) and midwifes (15.8%). They gained information from TV (13.0%), family or friends (8.5%) and physiotherapists (3.2%) the least often. Even about one tenth of women (9.3%) had no information about proper physical exercises during gestation.

DISCUSSION

The increasing rate of obesity and its consequences is one of the major public health concerning problem. Pregnant women belong to the high risk's group of excessive weight gain so regular physical activity and its protective benefits constitutes a fundamental part of both the mother and fetus well-being [10]. We checked the behaviors

Table 4. Association between physical activity in pregnancy and sociodemographic factors

Parameter	Physically active (n = 182)		Physically inactive (n = 65)		p-value
	n	%	n	%	
Age [years]					
≤ 25	30	75.0	10	25.0	
26–30	73	78.5	20	21.5	**< 0.0001**
31–35	55	68.8	25	31.2	
> 35	24	70.6	10	29.4	
Place of residence					
Urban areas	120	74.1	42	25.9	ns
Rural areas	62	72.9	23	27.1	
Education					
Basic, vocational or secondary	47	63.5	27	36.5	**< 0.05**
Higher	135	78.0	38	22.0	
Marital status					
Unmarried	25	13.7	14	21.5	ns
Married	153	84.1	50	76.9	
Divorced	4	2.2	1	1.5	
Type of work					
Sitting	122	75.3	40	24.7	
Physical	51	70.8	21	29.2	ns
Student	6	75.0	2	25.0	
Unemployed	3	60.0	2	40.0	
Net income [PLN]					
≤ 3000	61	69.3	27	30.7	
3000–6000	86	78.2	24	21.8	**< 0.05**
6001–10000	24	70.6	10	29.4	
> 10000	11	73.3	4	26.7	

Table 5. The association between physical activity in pregnancy and perinatal data

Perinatal data	Physically active (n = 182)	Physically inactive (n = 65)	p-value
Term of delivery (week, Mean ± SD)	39 ± 2	38 ± 2	ns
1st stage of labour (hours, Mean ± SD)	7 ± 6	6 ± 3	ns
2nd stage of labour (minutes, Mean ± SD)	46 ± 54	33 ± 21	ns
Episiotomy [%]	42.9	45.9	ns
Oxytocin administration [%]	24.2	16.9	ns
Mode of delivery [%] Spontaneous	49.5	38.5	ns
Cesarean secion	40.7	58.5	**< 0.0001**
Instrumental vaginal	9.9	3.1	ns
1-minute Apgar score (points, Median; Min-Max)	10 [1–10]	10 [7–10]	ns
5-minute Apgar score (points, Median; Min-Max)	10 [3–10]	10 [10–10]	ns
Birth weight (g, Mean ± SD)	3328 ± 589	3408 ± 585	ns
Birth length (cm, Mean ± SD)	55 ± 4	55 ± 3	ns

and attitude to physical activity of women hospitalized in the tertiary care center.

In our study, from all physical activities, the respondents preferred walking (72.1%), swimming (11.3%) and riding a bicycle (10.5%). The most common types of physical activity during pregnancy in Stadnicka et al. [11] study were walking (38.2%), fitness (27.6%), yoga (18.4%) and pilates (32.9%). Moreover, in contrast to the cited study, only small amount of our respondents declared aerobic (4.9%), yoga (4.0%) and pilates (2.0%).

Our study revealed the association between doing sport and age, education, salary. The most active group were women between 26 and 30 years old (78.5%). The high educated females declared doing sport activities statistically more often (78.0%). Moreover, the group of women, who earned between 3000 and 6000 Zloty was more ac-

tive (78.2%) than females with the lowest salary (69.3%). According to the study of Stadnicka et al., physical activity in pregnancy was dependent on education, place of residence, professional status and age. The most active women were below 25 (59.3%) and between 26 and 30 (58.6%) years old. The respondents with higher education and from urban areas were more active during gestation. Moreover, the professionally active females and students did different types of sport more often than non-working women [11]. Furthermore, Lindqvist et al. observed that women, who achieved recommended level of physical activity in pregnancy had lower BMI, very good or good self-rated health and higher educational level [12]. Szatko et al. [13] observed that higher education was associated with greater awareness of the beneficial impact of physical activity on the course of pregnancy, while no relationship was noted between respondents' place of residence and physical activity, like in our study, but both pregnant and non-pregnant women participated in the survey.

Our analysis revealed that inactive females had statistically more often cesarean section. Other perinatal data were comparable in both groups. Stadnicka et al. revealed that physical activity had significant influence on the mode of delivery, onset of spontaneous contractions and close to the statistical significance impact on the rate of perineum damage during delivery. The active women had spontaneous contractions (57.0%) and delivered physiologically (55.6%) more often. Perineum incision or rupture was observed less often among active females, but it was a result on the verge of statistical significance (45.0%) [11]. Many studies checked the association between physical activity and perinatal data. Clapp et al. noticed decreased rate of cesarean sections among active women [14–15], what our study proved. Most studies did not show any relationship between frequency of cesarean section and sport activities [14, 16–24]. Clapp et al. observed significantly lower occurrence of vaginal operative delivery [14, 15], whereas other researchers did not notice such observation [14, 16, 17, 19–21, 24–26]. Melzer et al. revealed lower rate of vaginal operative labor after adjusting for parity, maternal weight gain and newborn birth weight [14, 23]. Takami et al. observed that instrumental delivery rate increased among group with very low physical activity level's group compared to the medium one. Furthermore, the occurrence of cesarean section in the low active group and instrumental delivery in the high active group were higher than the risks in the group of medium activity [27]. The shorter labor was observed by Clapp et al. [14, 15]. Moreover, Melzer et al. and Dias et al. observed shorter second stage of labor without differences in duration of the first stage [14, 23, 24]. Contrary, Ghodsi et al. noticed shorter first stage of the labor but similar duration of the second stage [14, 28]. Interestingly, Megann et al. observed prolongation of the labor among heavy exercise group. Other studies did not reveal differences according to the labor length [14, 16, 19, 20, 25, 26] as in our study. Most researchers did not observe significant differences in frequency of episiotomy [14, 16, 19, 21, 23, 24, 28] as in our study but Clapp et al., Kardel et al. and Salvesen et al., independently, noticed decreased rate of this procedure among active women [14, 15, 25, 26]. Our study did not show any difference in Apgar score according to physical activity in pregnancy, what is compatible with many other studies [14, 20, 23, 26]. On the other hand, Clapp et al. observed higher Apgar score among active women [14, 15].

Forty-six-point two percent of our respondents declared permanent or temporary barriers to sport activities because of pregnancy complications (32.0%), feeling unwell (19.0%) and aversion to physical activity (4.1%). Some women had more than one reason for restricting their sport activity. According to the study of Stadnicka et al., the causes of physical inactivity during pregnancy were lack of time (51.4%), barrier of access to physical classes (44.6%), fear of losing pregnancy (23.0%) and other (14.9%) [11]. On the other hand, the most frequent contraindications reported by Wojtyła et al. included uterine contractions (39.0%), cervical incompetence (11.0%) and past obstetrical history (10.0%). Nearly two-fold more of females declared barriers to sport activities than in our study (96.0 vs 55.1%) [29]. In independent Wojtyła et al. study, 69.4% of women had limitations to physical activity in pregnancy and the most often causes to avoid sport were fear of normal course of pregnancy (59.9%) and doctor's recommendations (32.3%) [30].

The most of our respondents got the information about proper physical activities in pregnancy from the Internet (51.0%), books or magazines (45.3%) and doctor (31.1%). The above-mentioned sources of information were also the most common in the study of Szatko et al. [13]. Torbé et al. [31] observed similar preferences, but the survey respondents based on knowledge from the doctor only in 2%. Basing on the other persons experience was placed on the third position. In the study of Mercado et al. most women received information from books (60.6%) or the Internet (58.3%). Physicians, dietitians or nurses advice were declared by 55.6%, 48.2%, and 33.9% of respondents, respectively [32], so the percentage of probably reliable knowledge was much higher than observed.

CONCLUSIONS

Our study revealed that pregnancy has an impact on the type of chosen physical activity. The pregnant women chose running, roller blading, riding a bicycle, swimming and aerobic less often than before. The most popular physical activity is walking both before and during gestation. Statistically more women resign from doing sport in pregnancy comparing to the periconceptional period. Moreover, the level

of physical activity during gestation are dependent on age, education and salary. Women aged 26–30 years old, higher educated and with income between 3000–6000 Zloty are more active during gestation. Furthermore, the physically inactive women have appropriately two-fold higher chance of cesarean section with about 40% of higher relative risk for this mode of delivery than active respondents. Almost half of pregnant women declares permanent or temporary barriers for physical activity because of pregnancy complications, bad mood and aversion to exercises. Finally, a great group of women gets the information about proper physical activities from unreliable non-medical sources or do not achieve it at all. Because of the importance of physical activity both for mother and fetus well-being, physicians should implement programs for appropriate planning of exercises after considering contraindications and complications of pregnancy.

Conflict of interest

All authors declare no conflict of interest.

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