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## Physical activity during pregnancy – the state of Polish women's knowledge

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## **ORIGINAL PAPER / OBSTETRICS**

### **Physical activity during pregnancy — the state of Polish women's knowledge**

**Short title:** Physical activity in pregnancy

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## **ABSTRACT**

**Objectives:** Regular and moderate physical activity during uncomplicated pregnancy has been considered beneficial for both the expectant mother and her unborn child. It reduces the risk of gestational diabetes mellitus (GDM) and preeclampsia.

The aim of the study was to assess women's knowledge concerning specific aspects of physical activity during uncomplicated pregnancy.

**Material and methods:** A cross-sectional survey study on a sample of Polish women in a tertiary referral centre was performed. A questionnaire that was validated in the Polish language was based on the Committee Opinion of American College of Obstetricians and Gynaecologists, which was published in December 2015. Sociodemographic parameters in relation to specific aspects of physical activity during pregnancy were analysed.

**Results:** A total of 259 (92.5%) women were aware of the beneficial impact of physical activity on the course of pregnancy. Higher education was associated with greater awareness ( $p = 0.001$ ). Regarding the optimal frequency and recommended duration of exercise, the overall rates of correct answers were only 106 (38.1%) and 167 (59.6%), respectively. The most common sources of information on physical activity during pregnancy were the Internet (81, 50.0%) and books (62, 38.3%). Doctors and midwives instructed the respondents only in 36 (22.4%) and 31 (18.9%) cases, respectively.

**Conclusions:** Women's knowledge about physical activity during pregnancy seems satisfactory. However, awareness concerning the optimal duration and frequency of exercise, as well as recommended voluntary activities during pregnancy, should be improved. Medical professionals may also reinforce their role as a provider of reliable information, resulting in the prevention of many pregnancy complications.

**Key words:** pregnancy; exercise; gestational diabetes; pre-eclampsia

## **INTRODUCTION**

Physical inactivity is proven to be the fourth-leading risk factor for early mortality worldwide [1]. A regular exercise programme should be maintained during uncomplicated pregnancy because its benefits far outweigh the risks both for the mother-to-be and the foetus [2]. In 2015, the American College of Obstetricians and Gynaecologists (ACOG) established

that a moderate-intensity exercise programme lasting 20–30 minutes per day on most or all days of the week is both safe and advantageous for healthy pregnant women [3]. The ACOG Committee Opinion is complementary with the National Institute for Health and Care Excellence Guidelines as well as with the national public health guidelines from seven other countries [4, 5].

Maternal advantages of regular exercise during pregnancy include improved cardiovascular function and reduced incidence of preeclampsia and gestational diabetes mellitus (GDM) [6–9]. Regular aerobic exercise has also been shown to decrease gestational weight gain (GWG) and the risk of obesity after delivery [10]. Excessive GWG and GDM are correlated with an increased probability of delivery of large-for-gestational-age (LGA) neonates and a higher risk of perinatal trauma, neonatal hypoglycaemia and metabolic syndrome in the future [11, 12]. Regular physical activity also has a positive effect on the delivery and postpartum period-exercise is accompanied by shorter labour as well as decreased incidence of operative delivery [13]. No association between moderate physical activity during pregnancy and a higher incidence of preterm births has been proven [14, 15].

However, for pregnant women, some adjustment to regular exercise programmes should be advised, responding to the physiological changes during all three trimesters. The ACOG has published a list of sports that should not be undertaken during pregnancy-contact sports, scuba diving, and activities with a high risk of abdominal trauma [3].

## **Objectives**

Our objective was to assess women's knowledge concerning chosen aspects of exercise programmes during uncomplicated pregnancy and to identify the most common sources of motivation, discouragement and information regarding the subject.

## **MATERIAL AND METHODS**

The cross-sectional survey study involved a sample of Polish women. The inclusion criterion was admission to a tertiary referral centre between December 2016 and January 2017. The exclusion criterion was age over 50 years. Patients included in the analysis were between 17 and 50 years old. Women were asked to complete an anonymous questionnaire before their appointment in the outpatient clinic or during hospitalisation. The questionnaire was accepted by the Bioethics Committee of the Medical University of Warsaw.

The questionnaire was based on the Committee Opinion of the ACOG and included demographic questions, the estimated optimal frequency and duration of exercise during a normal pregnancy, and indicated and contraindicated forms of physical activity. The last section (exclusively for women who were pregnant at least once; n = 202 (72.1%)) was meant to assess the sources of information concerning physical activity during pregnancy and who motivated and discouraged them from undertaking exercise.

Quantitative variables are presented as medians and quartiles. Qualitative variables are presented as numbers and percentages. The chi-square test was used for comparisons of qualitative and quantitative parameters. The calculations were conducted with STATISTICA 13.1 (manufactured by Statsoft, Poland). P-values < 0.05 were considered statistically significant.

## **RESULTS**

A total of 622 eligible women were approached to participate in the study. A total of 298 agreed to partake and completed most of the survey's questions (non-response rate 52.1%). Women who declined to partake in the study were older (median age 37 years old) in comparison to the respondents (median age 31 years old), the percentage of pregnant women was also lower among non-respondents — 29.0 % in comparison to 49.7% in the group of women who agreed to partake in the study. In the respondents' group, ten women were older than 50 years old and were not included in the analysis, leaving a total of 288 women. The exact demographic characteristics of the study population are presented in Table 1.

The crucial questions that arise when mothers-to-be are considering initiating or continuing physical activity are safety and possible advantages. Most respondents [n = 259 (92.5%)] answered that the benefits of moderate exercise during uncomplicated pregnancy outweigh the possible disadvantages. We also attempted to assess surveyed women's knowledge of the precise medical advantages of exercise programs during pregnancy; 204 (80.0%) and 202 (82.4%) respondents were aware of a reduced risk of GDM and preeclampsia, respectively, associated with the physical activity of mothers-to-be. A total of 202 (75.9%) of the surveyed women answered that moderate physical exercise decreases the probability of operative labour. Thirty-one (11.8%) respondents claimed that moderate exercise is responsible for a higher risk of preterm birth; this theory has not been proven in previous studies.

The number of correct answers concerning the optimal frequency and duration of exercise during pregnancy were only 106 (38.1%) and 167 (59.6%), respectively. Furthermore, according to surveyed women, pelvic floor training should be delayed at least three weeks after delivery.

The study revealed a statistically significant impact of sociodemographic parameters on knowledge about physical activity during pregnancy. The rates of correct answers concerning specific aspects of regular physical activity in relation to sociodemographic parameters are presented in Table 2.

Not all types of exercise recommended by the ACOG were considered safe by most surveyed women, namely, cycling and jogging. There was a tendency of decreasing acceptance of physical activity over the course of the three trimesters of pregnancy (Tab. 3).

Some respondents who had been pregnant at least once most frequently indicated their use of the Internet (81, 50.0%) and maternity books (62, 38.3%) as sources of information concerning physical activity during pregnancy. Medical professionals (doctors and midwives) instructed the surveyed women only in 36 (22.4%) and 31 (18.9%) cases, respectively. Partners, doctors and family members were the main sources of motivation for respondents—in 28 (18.3%), 22 (14.4%) and 19 (12.4%) cases, respectively. In our study, family members, doctors and acquaintances most often discouraged pregnant women from undertaking physical activity during pregnancy—in 35 (22.3%), 15 (9.6%) and 11 (7.0%) cases, respectively.

## **DISCUSSION**

In our study, we identified the weak points concerning specific aspects of Polish women's knowledge regarding physical activity during pregnancy. These weaknesses may be easily addressed in a simple, cost-effective way, with potential benefits for both mothers-to-be and their children.

Numerous gynaecologists' and obstetricians' societies, including the ACOG, emphasise that recreational physical activity in uncomplicated pregnancy is a significant component of a healthy lifestyle [2–5]. However, in a study by Evenson et al. [14], involving 1979 pregnant and 657 non-pregnant women, it was shown that the prevalence of any leisure-time physical activity was higher for non-pregnant women [73.1% (95% CI 72.4–73.9) vs 65.6% (95% CI 62.0–69.1)]; they also engaged in recommended physical activity more often (26.1% vs 15.8%).

While the knowledge of the surveyed women regarding beneficial roles may be considered satisfactory, respondents with higher education proved to be more aware of this fact.

The analysis also showed significant differences regarding awareness of the reduced risk of preeclampsia and GDM depending on the place of residence of the surveyed women. In our study, only 106 (38.3%) and 167 (59.6%) respondents chose the recommended optimal frequency and duration of exercise in pregnancy. This may lead to negative consequences. In the Danish National Birth Cohort study, which included 83 139 women, it was proven that excessive physical activity for more than 270 minutes weekly in the first trimester was associated with a higher risk of severe subtypes of preeclampsia than in a non-exercising group (OR 1.6, 95% CI 1.1–2.4 vs OR 1.8, 95% CI 1.1–3.0) [15].

Pelvic floor muscle training is recommended by the ACOG directly after delivery, and as shown in the Cochrane Review in 2012, women who undertake intensive pelvic floor exercise were less likely to report urinary incontinence twelve months after delivery (RR 0.60, 95% CI 0.35-1.03) [3, 16]. Therefore, delay in introducing pelvic floor muscle training may be disadvantageous for postnatal women, both for those who leak and those who do not leak urine while pregnant [16]. The effect of pelvic floor exercise may be greater in certain groups, for instance, in women who are at higher risk of urine incontinence, such as primiparous women, those who have bladder neck hypermobility in early pregnancy or those who are anticipating a forceps delivery [16].

Despite generally good knowledge on the safety of specific forms of leisure-time activities in pregnancy, there is still room for improvement. In contrast to ACOG recommendations, the majority of our respondents claimed that stationary cycling and jogging should not be undertaken during uncomplicated pregnancy [3]. Yoga during the first and second trimesters of pregnancy was accepted by more than half of the surveyed women, while Clark et al. [17], proved that some yoga positions may result in decreased venous return and hypotension in 10–20% of pregnant women.

Reliable and up-to-date sources of information and high levels of motivation are essential for continuous physical effort in every stage of life, including pregnancy. In the process of implementing guidelines, it is essential to define and develop reliable and widely available sources of information. In addition to our study, the Internet is an important part of women's information-seeking and decision-making during pregnancy [18, 19]. The question that arises is the reliability of online published data. In a review of Eysenbach et al. [20], 77% of 79 analysed studies concluded that the quality of information is a problem on the Internet. In a recent study by Cannon et al. [21], among nine identified government and leading industry websites providing information on physical activity during pregnancy, only one website aligned fully with the guidelines. Moreover, 66% of the websites did not report any information on



pelvic floor exercises. Thus, reliable online sources based on up-to-date medical knowledge should be considered. The cost-effectiveness of this intervention could also be regarded.

The results of our study indicate that the role of medical professionals providing information concerning physical activity during pregnancy is limited: respondents chose doctors and midwives as sources of information only in 36 (22.4%) and 31 (18.9%) cases, while they motivated the surveyed women in 22 (14.4%) and 9 (5.9%) cases, respectively. In the qualitative analysis of De Vivo et al. [22], midwives emphasised the challenges to the effective promotion of physical activity-increasing demands and expectations of their profession, the burden of responsibility, and a lack of time and proper training. In the same study, midwives suggested how these barriers could be addressed; advised interventions included professional development, team cooperation, effective communication and stronger internal motivation. These issues could be addressed by the health authorities, reinforcing the role of midwives providing more consistent advice regarding physical activity during pregnancy.

The antenatal dietary and intervention of the OPTIMISE randomised trial showed no effect on either excessive gestational weight gain or the proportion of infants with birth weight above 4.0 kg [23]. These findings were consistent with the results of the GeliS trial regarding adiposity gain in pregnancy [24]. Introducing a lifestyle programme into daily work and arranging individualized counselling sessions remain a challenge. Thus, efficient cooperation among all health professionals may increase the adherence of pregnant women to lifestyle advice and improve health outcomes.

According to the study of Connelly et al. [25], a lack of motivation is one of the main modifiable factors in leisure-time physical activity during pregnancy. In the analysis of Findley et al. [26], women with a history of pregnancy reported that family members and partners advised them to stop physical activity during pregnancy and offered them advice, leading them to perceive a lack of ownership over their bodies. In our study, family members discourage the pregnant women from undertaking physical activity most frequently [in 35 (22.3 %) of cases]. Widely accessible programmes dedicated to reaching people who influence pregnant women and educating them on this subject could help them recognise their influence over the decision-making process regarding physical activity during pregnancy and support women in overcoming their worries concerning exercise during pregnancy.

## **CONCLUSIONS**

The findings indicate that knowledge about physical activity during pregnancy in Polish women is satisfactory. However, awareness concerning the optimal duration and frequency of physical activity in uncomplicated pregnancies could be improved. Medical professionals do not frequently educate and motivate women to undertake physical activity in pregnancy, although it could be beneficial for both mothers-to-be and their children.

***Conflict of interest***

None declared.

**Table 1.** Demographic characteristics of respondents included in the analysis

<b>Parameter</b>		
		Overall n = <b>288</b>
<b>Age [years], median (Q1, Q3)</b>		31 ( <b>26.35</b> )
<b>Pregnancy</b>	Pregnant	146 ( <b>51.2</b> )
	Non-pregnant	<b>139 (48.8)</b>
<b>History of pregnancy</b>	Yes	<b>202 (72.1)</b>
	No	<b>78 (27.9)</b>
<b>Educational level</b>	Elementary	4 (1.4)
	Vocational	8 (2.8)
	Secondary	<b>62 (22.2)</b>
	Higher	<b>205 (73.5)</b>
<b>Residence</b>	Up to 20 000 inhabitants	<b>52 (18.8)</b>
	20 000–100 000 inhab.	<b>53 (19.2)</b>
	More than 100 000 inhab.	<b>171 (62.0)</b>

Data are presented as number (percentage) unless stated otherwise. Numbers may not add up to totals because of missing data. Q1 — first quartile; Q3 — third quartile

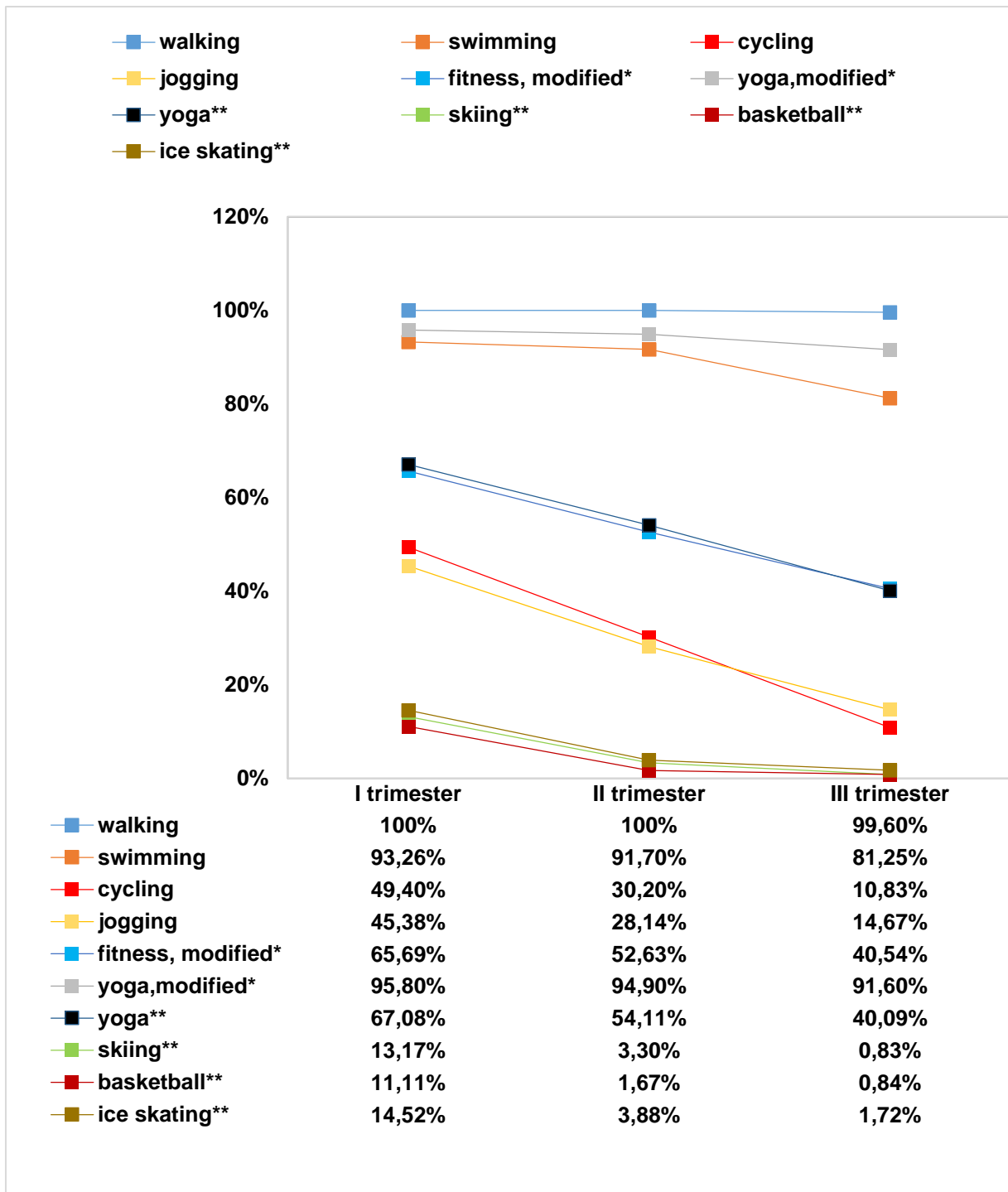
**Table 2.** Patients' awareness rate of chosen aspects of regular and moderate physical activity of uncomplicated pregnancy in relation to sociodemographic parameters

		Beneficial role		Optimal frequency (per week)		Optimal duration		Lower risk of GDM		Lower risk of preeclampsia	
		Yes	No	6–7 times	Other	20–30 min	Other	Yes	No	Yes	No
<b>Overall</b>	<b>n</b> <b>%</b>	<b>259</b> <b>92.5</b>	<b>21</b> <b>7.5</b>	<b>106</b> <b>38.1</b>	<b>172</b> <b>61.9</b>	<b>167</b> <b>59.6</b>	<b>113</b> <b>40.4</b>	<b>204</b> <b>80.0</b>	<b>51</b> <b>20.0</b>	<b>202</b> <b>82.4</b>	<b>43</b> <b>17.6</b>
<b>Maternal age (years)</b>											
≤ 30	n %	129 94.2	8 5.8	42 30.6	95 69.4	89 65.0	48 35.0	101 80.2	25 19.8	107 87.0	16 13.0
> 30	n %	138 91.2	13 8.6	63 45.0	77 55.0	77 54.6	64 45.4	102 80.3	25 19.7	95 78.5	26 21.5
p		<b>0.366</b>		<b>0.014*</b>		<b>0.078</b>		<b>0.975</b>		<b>0.079</b>	
<b>Pregnancy</b>											
Pregnant	n %	173 92.0	15 8.0	57 39.6	87 60.4	78 53.8	67 46.2	105 77.8	30 22.2	108 80.0	27 20.0
Non-pregnant	n %	81 93.1	6 6.9	36 42.4	49 57.6	56 65.1	30 34.9	67 85.9	11 14.1	63 85.1	11 14.9
p		<b>0.753</b>		<b>0.680</b>		<b>0.091</b>		<b>0.148</b>		<b>0.357</b>	
<b>History of pregnancy</b>											
Yes	n %	187 92.6	15 7.4	82 41.0	118 59.0	113 55.9	89 44.1	144 78.2	40 21.8	143 80.8	34 19.2
No	n %	72 92.3	6 7.7	24 30.8	54 69.2	54 69.2	24 30.8	60 84.5	11 15.5	59 86.8	9 13.2
p		<b>0.940</b>		<b>0.115</b>		<b>0.042*</b>		<b>0.264</b>		<b>0.271</b>	
<b>Education level</b>											
Elementary Vocational or Secondary	n %	62 83.8	12 16.2	31 41.9	43 58.1	31 50.8	30 49.2	52 77.6	15 22.4	55 88.7	7 11.3
Higher	n %	196 95.6	9 4.4	75 36.9	128 63.1	131 63.9	74 36.1	152 80.8	36 19.2	147 80.3	36 19.7
p		<b>0.001*</b>		<b>0.454</b>		<b>0.066</b>		<b>0.569</b>		<b>0.134</b>	
<b>Residence</b>											
Up to 20 000	n %	46 88.5	6 11.5	22 43.1	29 56.9	28 53.8	24 46.2	36 78.3	10 21.7	37 84.1	7 15.9

inhabitants											
20 000 – 100 000 inhab.	n %	<b>48</b> <b>90.6</b>	<b>5</b> <b>9.4</b>	<b>16</b> <b>30.8</b>	<b>36</b> <b>69.2</b>	<b>35</b> <b>66.0</b>	<b>18</b> <b>34.0</b>	<b>30</b> <b>65.2</b>	<b>16</b> <b>34.8</b>	<b>29</b> <b>69.0</b>	<b>13</b> <b>31.0</b>
More than 100 000 inhab.	n %	<b>162</b> <b>94.7</b>	<b>9</b> <b>5.3</b>	<b>66</b> <b>38.6</b>	<b>105</b> <b>61.4</b>	<b>102</b> <b>59.6</b>	<b>69</b> <b>40.4</b>	<b>134</b> <b>84.3</b>	<b>25</b> <b>15.7</b>	<b>133</b> <b>85.2</b>	<b>23</b> <b>14.8</b>
<b>p</b>		<b>0.246</b>		<b>0.416</b>		<b>0.444</b>		<b>0.018*</b>		<b>0.048*</b>	

Numbers may not add up to totals because of missing data.

\*statistically significant correlation ( $p < 0.05$ )



**Figure 1.** Respondents' acceptance rate of voluntary activities during three trimesters of pregnancy

\*regular activity needs some modification for pregnant women — some stationary positions may cause compression of vena cava inferior and hypotension

\*\*sports considered unsafe in ACOG Committee Opinion from Dec 2015

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