Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/poamed

Original Research Article

Types of physical activity during pregnancy

Marta Makara-Studzińska[a,*], Karolina Kryś-Noszczyk[a], Małgorzata Starczyńska[b], Aleksander Sieroń[c], Zbigniew Śliwiński[b]

[a]Independent Laboratory of Mental Health, Medical University of Lublin, Poland
[b]The Jan Kochanowski University in Kielce, Poland
[c]Medical University in Katowice, Poland

ARTICLE INFO

Article history:
Received 29 September 2012
Accepted 21 February 2013
Available online 27 February 2013

Keywords:
Physical activity
Exercise
Pregnancy
Body mass index
Frequency

ABSTRACT

Introduction: In normal pregnancy, there is no need for women to give up their current life activities. Every woman should take care of her organism through being active and maintaining physical and mental health, good posture and keeping proper body weight. There is no doubt that individually tailored physical activity during pregnancy is essential.
Aim: The aim of this study was to investigate the selected forms of physical activity undertaken during pregnancy and to compare the level of physical activity before pregnancy and during its duration.
Materials and methods: The survey questionnaire method was used and a literature review was performed as well. The research tool was designed for the purpose of this study and it was designed by the author of this research. The study was conducted among 100 pregnant women living in the Lublin Province. The data collected during the survey were subjected to statistical analysis.
Results and discussion: We have observed that the level of physical activity during pregnancy increased in the study group. Before pregnancy, most women chose walking (29%) as a preferred form of physical activity or aerobics (18%). Some subjects practiced several times a week (36%), and some respondents did not practice any physical activity at all (27%). During pregnancy, most women attempted to improve their physical activity, usually by means of walking (43%) or attending antenatal classes (20%). In total, 37% of the respondents exercised once a week, and 28% of the studied women even several times a week.
Conclusions: Physical activity during pregnancy is very popular among women in the Lublin area. According to studies by various authors physical activity carries many benefits for both mother and baby, so pregnant women should be encouraged to perform physical exercises if there are no contraindications.

*Correspondence to: Independent Laboratory of Mental Health, Medical University of Lublin, ul. Chodzki 15, 20-093 Lublin, Poland. Tel./fax: +48 81 718 6592.
E-mail addresses: mmakara@go2.pl (M. Makara-Studzińska), zdrowie.psychiczne@umlub.pl (K. Kryś-Noszczyk), starm@ujk.edu.pl (M. Starczyńska), asieron2@wp.pl (A. Sieroń), dr_sliwinski@post.pl (Z. Śliwiński).

1230-8013/$ - see front matter
http://dx.doi.org/10.1016/j.poamed.2013.02.004

1. Introduction

During pregnancy it is important to take care of one's organism and one's physical condition relatively early. Exercises performed regularly by future mothers can help them in reducing or completely eliminating discomforts associated with pregnancy. Additionally, physical activity has a positive impact on child development, parturition, return to the pre-pregnancy figure, and prevention of chronic diseases such as diabetes.[14,24] The effect of physical activity on a pregnant woman has been the subject of many studies. These studies show that moderate physical exercises performed during pregnancy have a surprisingly positive effect on the course of pregnancy and do not cause additional health problems.[10] Despite these benefits, few women know how to maintain their physical fitness during this period.[6]

Thanks to being physically active, women tolerate physical exertion during pregnancy better. This also refers to exertion during labor itself. An improvement in metabolism causes less weight gain and results in a lower prevalence of obesity, stretch marks and varicose veins. Physical exercises can have a positive impact on the psyche of women,[3] reduce the fear of childbirth and often contribute to their decision to resign from pharmacological analgesia.[15] Research conducted in the 2011–2012 period at the University of Valle indicates a particularly beneficial effect of physical activity during pregnancy in the reduction of perinatal depression.[16]

Statistics show that women who exercised regularly before becoming pregnant and throughout the pregnancy have shorter individual stages of labor; dilation of the cervix progresses much faster in them; and they feel less painful uterine cramping. Postpartum hospital stay of these patients is shorter, maternal mortality rate is three times lower than in the general population of women, and symptoms of diabetes are less frequent.[2,5,21]

The positive impact of physical activity during pregnancy is also noticeable during the puerperium. Women quickly regain physical and mental balance. In addition, as a result of a better blood supply to breasts lactation begins earlier, while lasting longer. Research has confirmed that active women are less likely to suffer from exhaustion during childbirth and they have a reduced likelihood of artificial induction of labor, episiotomy, the appearance of abnormal heart rhythm, and child labor interventions such as forceps or cesarean section.[18]

There is no uniform solution for pregnant women as regards choosing forms of exercise and physical activity. Everything depends on the course of pregnancy, its advancement and the health status of the mother. The overriding principle pertaining to all cases is to consult with the physician that one intends to start practicing exercises. In case of high-risk pregnancy an increased physical activity should not be undertaken.[22]

During the first trimester of normal pregnancy it is recommended to begin breathing exercises, relaxation, exercises of postural and pelvic floor muscles and to continue these activities during the entire pregnancy.[9]

In the second trimester, it is recommended to perform exercises in a stable position. It is important that as of the beginning of the fifth month of pregnancy the supine position is not used because of the pressure of the uterus on the vena cava.[9,22]

It is claimed that the greatest benefits of exercise for women are brought about in the third trimester of pregnancy. It is connected directly with the course of delivery. Women who are physically active develop a smaller increase of body fat and return to health after birth faster. In reality, however, in this period women get tired faster and are not sufficiently strong enough to exercise intensively. It is particularly important at this time that women undertake such physical activity as their body best tolerates.[9]

During pregnancy, the following exercise types are mainly practiced:

1. Breathing exercises and how to breathe during labor.[20]
2. General body shaping exercises.[12,22]
3. Relaxation exercises.[3,6]
4. Posture shaping exercises.[12]
5. Exercises to improve elasticity and the perineal muscles of the pelvic floor – Kegel exercises.[6,11]
6. Mock contractions learning.[22]

Irrespective of the kind of sport a pregnant woman practices, her training should be adapted to the pregnancy course, her well-being, the fetus development and whether she is gaining weight appropriately.[1]

Exercises in the pool are very popular among pregnant women. The ability to swim is not required to be able to practice. Non-swimmers can use the accessories that will enhance the sensation of security, such as boards, noodles or other flotation devices. The main objective of water exercises during pregnancy is to obtain relief, thereby reducing pressure on the motion of the joint surfaces and pain during movement, as well as gaining peace of mind.[1,13]

Walking is the most natural and safe form of physical activity available to everyone. Though often underestimated, a walk in fresh air has a very positive impact on pregnant women. Even those women who were rarely active before can begin regular walks during pregnancy as long as there are no medical contraindications for this type of activity. An increasingly popular form of walking is Nordic Walking. This technique has been recommended for pregnant women; it is a combination of walking (race walking) with the technique of cross-country skiing – the repulsion from the substrate. The use of poles stabilizes posture and relieves back pressure, whereas any outdoor activity results in a better oxygenation of the organism. Nordic Walking strengthens the muscles of future mothers. Scandinavian-style walking involves as much as 90% of our muscles, and walking with poles can be practiced throughout the year, irrespective of weather conditions.

Kinesiotherapy and any other exercises are recommended only in normal pregnancy. Any pathology that occurs during pregnancy and any health hazard for a pregnant woman or the child may temporarily or permanently become a contraindication to exercise. Absolute contraindications to exercise during pregnancy include valvular heart disease, circulatory failure, severe hypertension, thyroid disease, acute fevers, inflammation, chronic appendicitis prone to exacerbations, prolonged shortness of breath, active process of tuberculosis,

and dizziness.[4] Among obstetric contraindications, the following are mentioned: pregnancy-induced hypertension, vaginal bleeding, cervical incompetence, premature rupture of the amniotic fluid, pyelonephritis, breech position of the fetus in the last months of pregnancy, recurrent miscarriage, multiple pregnancy, and anemia in pregnant women.[3,4]

2. Aim

The main aim of this work is to investigate which forms of physical activity are most frequently chosen by women during pregnancy and whether there is a correlation between the level of physical activity before and during pregnancy.

3. Material and methods

The method employed in this study was a diagnostic survey. It was conducted using a questionnaire designed by the author. It included 29 open and closed questions concerning the basic demographic information about the subjects (age, place of residence, and education), as well as specific questions related to physical activity before and during pregnancy. Research was conducted among 100 pregnant women living in the Lublin Province. The survey was anonymous, and participation in it was voluntary. Prior to testing, the project received the positive opinion of the Bioethics Committee of the Medical University in Lublin. Data collected in the survey were analyzed statistically.

A critical review of the literature also provided valuable information. It was conducted by using Medline resources (OVID), EMBASE with the search phrases "exercise or physical activity" and "pregnancy," published in the years 2009–2012. The values of the analyzed parameters, measured in nominal scale were characterized by numbers and percentage, while the ratio scale used the mean value, standard deviation, median, lower and upper quartile with the scope of variability. To assess the correlation between the variables a table and a multi-way test of homogeneity or independence were used. There was a 5% error of inference and the associated significance level $p<.05$, which indicates statistical significance. The results are summarized in the tables. Statistical analyses were conducted with 10 STATISTICA software (StatSoft Poland).

4. Results

The largest group of subjects was in the age group of 26–30 years. They accounted for 44% of all respondents. Another age group ranged from 31 to 35 years and included 30% of respondents. The least numerous were the age groups of 18–25 years and 36 years and more, accounting for 20% and 6% of all respondents, respectively. The vast majority of women surveyed were from the city and they accounted for 74% of all respondents. The remaining 26% of the subjects lived in rural areas. As regards the educational level, the parameters were as follows: 53% of the subjects had a university degree; 38% of the respondents had secondary education; 8% of women had vocational education, and 1% – primary education. Most women at the time of the study were eight months pregnant, which accounted for 21% of all respondents. The respondents who were five months pregnant accounted for 20% of the study group, whereas those who were seven months pregnant constituted 16%. The number of women in the fourth and sixth months of pregnancy was identical, and each group accounted for 14% of the study group. A slightly less numerous group consisted of those subjects who were three months pregnant (10%). The smallest groups of respondents comprised those women who were two and nine months pregnant, 2% and 3%, respectively.

The average month of pregnancy for the subjects was 5.81 (from two to nine months of pregnancy, SD = 1.80). In total, 82% of the respondents did not suffer from chronic diseases, whereas 18% suffered from chronic diseases such as hypertension (2%), bronchial asthma (3%), allergy (8%), diabetes (3%) and others (2%).

Most of the women (71% of the respondents) were physically active before becoming pregnant. Those subjects who stated that they had been physically active before getting pregnant chose the most popular forms of movement such as walking (29%), aerobics (18%), cycling (14%), gym (13%), swimming (10%), team games (8%), running and others (7%) (Table 1).

The question "How often was the physical activity undertaken before pregnancy?" was answered as follows: a few times a week (36%), not practiced at all (27%), once a week (23%), less than once a week (8%), every day (6%). Women physically active during pregnancy accounted for 78% of the respondents (Table 2).

The largest group of pregnant women chose walking as a form of physical activity, which accounted for 43% of the respondents. In total 20% of the subjects indicated attending Lamaze class, and a fairly large group of women practiced

Table 1 – Preferred forms of physical activity.

Type of activity	N	%
Walking	29	29
Running	7	7
Swimming	10	10
Cycling	14	14
Aerobics	18	18
Gym	13	13
Team games	8	8
Others	1	1
Total	100	100

Table 2 – Frequency of exercise before pregnancy.

Frequency of physical activity	N	%
Every day	6	6
Several times a week	36	36
Once a week	23	23
Less than once a week	8	8
Lack of exercises	27	27
Total	100	100

at home (17%). Other forms of physical activity chosen by the surveyed women were swimming and classes in the swimming pool (9%), aerobics for pregnant women (7%) and yoga (4%) (Table 3).

A large group of women (37%) undertook physical activity during pregnancy once a week; slightly fewer (28%) practiced several times a week. Unfortunately, a large group of respondents (18%) did not exercise at all. There were also women who exercised during pregnancy every day (9%) and some less than once a week (8%) (Table 4).

The study showed a lack of statistically significant correlation between the level of physical activity before and during pregnancy ($p=.09$) (Table 5).

5. Discussion

Physical inactivity is the fourth leading risk factor for premature mortality globally. Unfortunately, many scientific reports indicate a tendency toward a reduced level of physical activity in many countries, especially among teenage girls. Research conducted in Poland in 2011 also shows an alarmingly low level of physical activity among women, especially during pregnancy.[23] A surprising result of this conducted study was the fact that the number of women active before pregnancy ($n=71$, 71%) was lower than the number of women active during pregnancy ($n=78$, 78%). The survey carried out in 1997 in Lublin showed that pregnancy reduces physical activity.[17]

Research carried out in 2012 in Denmark aimed at showing associations between leisure activities undertaken by pregnant women and the children's body mass index (BMI) and risk of being overweight at the age of seven years. It was discovered that the intensity of exercise and habits in performing physical activity during pregnancy was inversely related to the children's BMI and risk of becoming overweight. All recorded associations were mainly explained by smoking habits, socioeconomic status, and maternal pre-pregnancy BMI.[19]

The purpose of the tests carried out by the Department of Clinical Nursing at Medical University of Lublin in 1998 was to assess the quality of physical training taken during pregnancy. The study was conducted among 266 pregnant women in the Lublin Province. Nearly 72% of respondents at the time of the study were aged favorably for pregnancy and for 51% it was not the first pregnancy. Studies showed that about 60% of pregnant women preferred passive forms of recreation, 33% of respondents reported knowledge of exercise in preparation for childbirth, and 11% attended antenatal classes. Based on the results, it was concluded that pregnancy led to radical changes in physical recreation. The studies also revealed the insufficient knowledge of women concerning the need for rational recreation. Proposals were put forward related to the commonly held view concerning the need for reducing effort or physical activity during pregnancy which then promotes the passivity of women during that time. In addition, the school system of physical education focuses particularly on the disciplines that rely on competition. This results in a lack of skills in girls in practicing general body shaping exercises that are recommended during pregnancy.[18]

Of all forms of physical activity during pregnancy, most respondents chose their own movement – walking (43%), and gymnastics at home (17%). Specialized activities such as the Lamaze course were reported by 20% of women of this group, whereas aerobics designed for pregnant women by 7% of the respondents. Research conducted in 1998 showed that 60% of the respondents preferred passive forms of recreation, and only 11% attended antenatal classes.[17]

Table 3 – Preferred forms of physical activity during pregnancy.

Form of physical activity	N	%
Walking	43	43
Swimming	9	9
Yoga	4	4
Aerobics for pregnant women	7	7
Lamaze course	20	20
Gymnastics at home	17	17
Others	0	0
Total	100	100

Table 4 – Frequency of physical activity undertaken by pregnant women.

Frequency of physical activity	N	%
Every day	9	9
Several times a week	28	28
Once a week	37	37
Less than once a week	8	8
I do not exercise	18	18
Total	100	100

Table 5 – Physical activity before and during pregnancy.

Variables		Physical activity before pregnancy					
		Yes		No		Total	
		N	%	N	%	N	%
Physical activity during pregnancy	Yes	59	59	19	19	78	78
	No	12	12	10	10	22	22
Total		71	71	29	29	100	100

Significance $\chi^2=4.70$; $p=.09$.

In this study, 37% of women surveyed stated that they undertook physical activity once a week, and 20% several times a week. The majority of the respondents claimed that they derived pleasure from exercising during pregnancy. Ćwiek claims the same. In her opinion exercises during pregnancy are to improve the functioning of the body.[8] The Committee on Guidelines and Quality Control at the Royal College of Obstetricians and Gynecologists evaluating the data from the years 1980–2004 established recommendations for physical activity undertaken by pregnant women:

1. "Pregnant women should be encouraged to practice general body shaping exercises due to their healthy lifestyle,
2. you must choose the form in which the risk of harm to the fetus is minimal,
3. all women should be informed that pregnancy is not an active cause of complications during childbirth and puerperium,
4. the main purpose of exercise should be to maintain good form throughout pregnancy,
5. pelvic floor exercises should be started after delivery, because they reduce the risk of urinary incontinence in the future, and
6. the program should be tailored to the needs and capabilities of women, and preceded by an assessment of their current performance."[7]

6. Conclusions

Summing up the results of conducted studies it is possible for one to conclude that physical activity during pregnancy is very popular among women from the Lublin area. According to studies by various authors, physical activity provides many benefits for both mother and child; consequently pregnant women should be encouraged to exercise in the absence of contraindications. Regular physical activity before pregnancy contributes not only to enhancing the locomotive system, but also improves the functioning of most body systems, prepares the body to welcome a new life into the world, reduces stress and prolongs youthful and healthy appearance. Most importantly, the type of activity undertaken should provide the woman who chooses to exercise during pregnancy both with enjoyment and benefits.

Conflict of interest

None declared.

Financial disclosure

Studies have been conducted from the Authors' own work and finance.

REFERENCES

[1] Balaskas J. *Rodzić po ludzku. Poród aktywny. Nowe spojrzenie na naturalny sposób rodzenia [Give Birth as a Human Being. Active Childbirth. A New Look at Natural Childbirth]*. Warszawa: Niezależna Oficyna Wydawnicza; 1997 223–226.
[2] Baptiste-Roberts K, Ghosh P, Nicholson WK. Pregravid physical activity, dietary intake, and glucose intolerance during pregnancy. *J Womens Health (Larchmt)*. 2011;20(12):1847–1851.
[3] Berk B. *Aktywna mama. Ćwiczenia i porady dla przyszłych matek [Active Mom. Exercises and Advice for Mothers]*, 2nd ed. Warszawa: Buk Rower; 2010 187–189.
[4] Bowen-Simpkins P, Pugh D. *Położnictwo i ginekologia [Obstetrics and Gynecology]*. Warszawa: PZWL; 1995 165–175.
[5] Chasan-Taber L. Physical activity and dietary behaviors associated with weight gain and impaired glucose tolerance among pregnant Latinas. *Adv Nutr*. 2012;3(1):108–118.
[6] Cram C, Drenth TS. *Aktywna ciąża dla bystrzaków [Active Pregnancy for Smart People]*. Gliwice: Helion; 2008 255–280.
[7] Kozłowska J., Ćwiczenia fizyczne u kobiet w ciąży. Aktualne stanowisko Royal College of Obstetricians and Gynecologists [Exercise in pregnancy Royal College of Obstetricians and Gynecologists Statement No. 4]. Med Prakt Ginekol Położ. 2007;5:13.
[8] Ćwiek D. *Szkoła rodzenia [School of Birth]*. Warszawa: PZWL; 2010 65–90.
[9] Difiore J. *Gimnastyka dla kobiet w ciąży [Gymnastics for Pregnant Women]*, 1st ed. Warszawa: MUZA; 2003 90–122.
[10] Ferraro ZM, Gaudet L, Adamo KB. The potential impact of physical activity during pregnancy on maternal and neonatal outcomes. *Obstet Gynecol Surv*. 2012;67(2):99–110.
[11] Fijałkowski W. *Gimnastyka dla kobiet w czasie ciąży i połogu [Gymnastics for Women During Pregnancy and Postpartum Period]*. Warszawa: PZWL; 1976 54–85.
[12] Fijałkowski W. *Rehabilitacja w położnictwie i ginekologii [Rehabilitation in Obstetrics and Gynecology]*. Wrocław: AWF; 1998 76–107.
[13] Kasprzak W, Mańkowska A. *Hydroterapia [Hydrotherapy]. Fizykoterapia, medycyna uzdrowiskowa i SPA [Physical Therapy, Medical Spa and Natural Spa]*. Warszawa: PZWL; 2008 24–27.
[14] Penney DS. The effect of vigorous exercise during pregnancy. *J Midwifery Womens Health*. 2008;53(2):155–159.
[15] Phelan S, Hart C, Phipps M, Abrams B, Schaffner A, Adams A, et al. Maternal behaviors during pregnancy impact offspring obesity risk. Exp Diabetes Res. 2011;2011(2011):9, http://dx.doi.org/10.1155/2011/985139 (Article ID 98513).
[16] Robledo-Colonia AF, Sandoval-Restrepo N, Mosquera-Valderrama YF, Escobar-Hurtado C, Ramírez-Vélez R. Aerobic exercise training during pregnancy reduces depressive symptoms in nulliparous women: a randomised trial. *J Physiother*. 2012;58(1):9–15.
[17] Rutkowska E, Łepecka-Klusek C. Fizyczne przygotowanie kobiet do porodu [Physical preparation of women for childbirth]. *Pielęg Pol*. 2001;2(12):368–371.
[18] Rymaszewska J, Dolna M, Gryboś M, Kiejna A. Zaburzenia psychiczne okołoporodowe [Perinatal mental disorders]. *Ginekol Pol*. 2005;76:422–430.
[19] Schou Andersen C, Juhl M, Gamborg M, Sørensen TI, Nohr EA. Maternal recreational exercise during pregnancy in relation to Children's BMI at 7 years of age. *Int J Pediatr*. 2012;2012:9205–9283. http://dx.doi.org/10.1155/2012/92058.
[20] Sempolska K. *Aktywność fizyczna kobiety ciężarnej – problem nierozwiązany [Physical activity of the Pregnant Woman – The Unresolved Problem]*. Warszawa: PZWL; 2002 37–55.
[21] Stafne SN, Salvesen KÅ, Romundstad PR, Eggebø TM, Carlsen SM, Mørkved S. Regular exercise during pregnancy to prevent gestational diabetes: a randomized controlled trial. *Obstet Gynecol*. 2012;119(1):29–36.

[22] Szczuka E, Pawelec R, Mydłowski R. Kinezyterapia w okresie ciąży [Kinesiotherapy during pregnancy]. *Med Sport*. 1996;64/65: 21–24.
[23] Wojtyła A, Kapka-Skrzypczak L, Biliński P, Paprzycki P. Physical activity among women at reproductive age and during pregnancy (Youth Behavioural Polish Survey – YBPS and Pregnancy-related Assessment Monitoring Survey – PrAMS) – epidemiological population studies in Poland during the period 2010–2011. *Ann Agric Environ Med*. 2011;18(2):365–374.
[24] Wolfe LA, Weissgerber TL. Clinical physiology of exercise in pregnancy: a literature review. *J Obstet Gynaecol Can*. 2003;25(6):473–483.