

# ASSOCIATIONS BETWEEN PHYSICAL ACTIVITY, SELECTED LIFESTYLE FACTORS, AND QUALITY OF LIFE DURING PUERPERIUM

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A. Study design/planning • B. Data collection/entry • C. Data analysis/statistics • D. Data interpretation • E. Preparation of manuscript • F. Literature analysis/search • G. Funds collection

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## ABSTRACT

**Introduction:** Physical activity and a healthy lifestyle bring many benefits to the health of both mother and child and contribute to the improvement in the well-being of women. Regular exercise prevents depression and prepares the body for delivery and the puerperium, which is associated with significant changes in the quality of women's life.

**Aim of the study** was to assess the impact of physical activity and selected lifestyle elements in pregnant women on their quality of life after birth.

**Material and methods:** The study included 109 women after natural births and caesarean sections. The diagnostic survey method and questionnaire technique were used in the study. The author's questionnaire survey, the Quality of Life Questionnaire SF-36v2, and Ch. B. Corbin's Healthy Lifestyle Questionnaire were applied.

**Results:** The study showed that 85% of the women led unhealthy lifestyles, while 67% of the interviewees were physically active during pregnancy. Proper diet, ability to control stress, and adherence to the advice of doctors contributed to a better quality of life after birth. It was demonstrated that women giving natural birth had a significantly lower quality of mental life compared to women giving birth through caesarean section.

**Conclusions:** A relationship was demonstrated between selected elements of healthy lifestyle in pregnancy and the quality of life after birth. In the group studied, it was the way the pregnancy ended which determined the quality of life of the women. No statistically significant effect of physical activity on the quality of life was determined.

**Key words:** quality of life, pregnancy, lifestyle.

## INTRODUCTION

Taking up and maintaining an active lifestyle by women during pregnancy is a factor affecting the welfare of the mother and the child. Recommendations for physical activity are an element of adequate maternity care among women in the perinatal period [1, 2]. However, the degree of implementation of these recommendations by pregnant women is relatively low [3].

The recommended duration of moderate-intensity exercise should amount to about 150 minutes per week. The exercise should not lead to physical exhaustion, and the intensity should be adjusted to particular trimesters of pregnancy and may not exceed the

level of physical activity from before the pregnancy [1]. The aim of physical exercise is to raise the awareness of body control, increase fitness, and maintain normal body weight. This contributes to a reduction of the risk of pregnancy complications and to a milder course of labour and the post-natal period [4]. Exercises causing increased intra-abdominal pressure are contraindicated [1, 5, 6]. In the case of complicated pregnancy, limiting physical activity is recommended, to avoid premature uterine contractile activity, bleeding, or miscarriage [1, 2].

A positive attitude towards exercise and the expected benefits of it are factors determining undertaking physical activity. Pregnant women are highly susceptible

to the implementation of healthy habits [7]. Among the barriers limiting physical activity, interpersonal factors may be mentioned (such as lack of time, fatigue, pregnancy discomfort), environmental factors (including insecurity, limited access to knowledge), and social factors (lack of support networks) [8].

Physical activity undertaken before pregnancy and maintained during its duration results in fewer cases of complicated pregnancies, premature births, obesity, diabetes, and hypertension. It has an effect on the reduction of the duration of labour by, on average, three hours [9]. The benefit achieved by physically active mothers, as compared to non-exercising mothers, is a reduction in the risk of developing depressive disorders and mood swings [4, 10]. Physical exercise contributes to the reduction of foetal weight gain [1] and to better adaptation of the child in the birth canal. It also increases the blood flow through the placenta. Infants born to exercising women attain higher Apgar scores [5].

Introducing lifestyles changes is common among pregnant women. The term healthy lifestyle means: undertaking physical activity, having a proper diet, being able to control stress, avoiding harmful habits, and adhering to the advice of doctors. Negligence in any of the categories can lead to complications of pregnancy such as impaired foetal development, secondary occurrence of congenital diseases in the child, and increased risk of preterm delivery. An unhealthy lifestyle carries the risk of obesity and delivery by caesarean section [11].

Quality of life is a subjective assessment of an individual regarding the scope of concepts accepted as affecting his/her well-being. Categories for the evaluation of the quality of life can be as follows: physical functioning, limitation in fulfilling roles due to physical health problems, limitation in fulfilling roles due to emotional problems, pain, general health, vitality, social functioning, disposition, general assessment of physical health, and general assessment of mental health [12]. Furthermore, family relationships (especially with a partner) significantly affect the quality of life of pregnant women, as well as sensations and ailments associated with pregnancy, occupational activity and material situation, the existence of a support group, lifestyle, and the availability of care [13]. Variables specific for the quality of life in the postpartum period include: coping with pain and the degree to which the expectations connected with pregnancy and childbirth are implemented and reflected. The severity of common postpartum problems (physical, resulting from lack of knowledge and skills, emotional) also has a significant effect [14, 15].

## AIM OF THE STUDY

The aim of the study was to assess the impact of physical activity and selected lifestyle elements of pregnant women on their quality of life after giving birth.

## MATERIAL AND METHODS

The study was conducted from May to July 2018 in the Health Care Complex at the Multi-Specialist Hospital in Sucha Beskidzka. The participants of the study were 109 women who had given birth naturally or through caesarean section. The study was anonymous and voluntary. An original questionnaire composed by the author of the study, as well as standardised research tools – the Quality of Life Questionnaire SF-36v2 (license agreement No. QM045488) and Ch. B. Corbin's Questionnaire of Healthy Lifestyle – were used.

The author's own questionnaire included questions concerning the socio-economic and demographic data concerning the postpartum women, their maternity history, diseases co-occurrent with the pregnancy, and delivery.

The Quality of Life Questionnaire SF-36v2 encompassed the issues of lifestyle in the context of the health consequences of behaviour in a number of areas, including: physical activity, nutrition, stress control, avoiding harmful habits, healthy habits, and adherence to the doctor's advice.

The Quality of Life Questionnaire SF-36v2 describes the functioning of the respondent in the following areas: *Physical functioning* (PF), *Role limitations due to physical health problems* (RP), *Body pain* (BP), *General health perception* (GH), *Vitality energy or fatigue* (VT), *Social functioning* (SF), *Role limitations due to emotional problems* (RE), and *General mental health* (MH). The indicators are grouped into two domains: an overall assessment of physical health – *Physical component summary* (PCS) and mental health – *Mental component summary* (MCS).

The data were collected in direct interviews with women during the postpartum period. The SAS Enterprise Guide 7.1. package was used to develop statistical results. The PRO CoRE Smart Measurement System Version 1.2. was used to analyse the results of the SF-36v2 questionnaire.  $\chi^2$  test was applied for the statistical analysis of the qualitative data and U Mann-Whitney and Student's *t*-test were used for the quantitative variables. The level of statistical significance adopted was  $\alpha = 0.05$ .

The research was conducted in accordance with the requirements of the Declaration of Helsinki. The participation of the respondents was voluntary. The postpartum women gave their informed consent to participate in the study. The patients were informed about the anonymity and the possibility to withdraw from participation in the study at any stage.

## RESULTS

The largest group among the postpartum women were those aged 26-35 years (53%,  $n = 58$ ). A vast majority of the participants were married (91%,  $n = 99$ ),

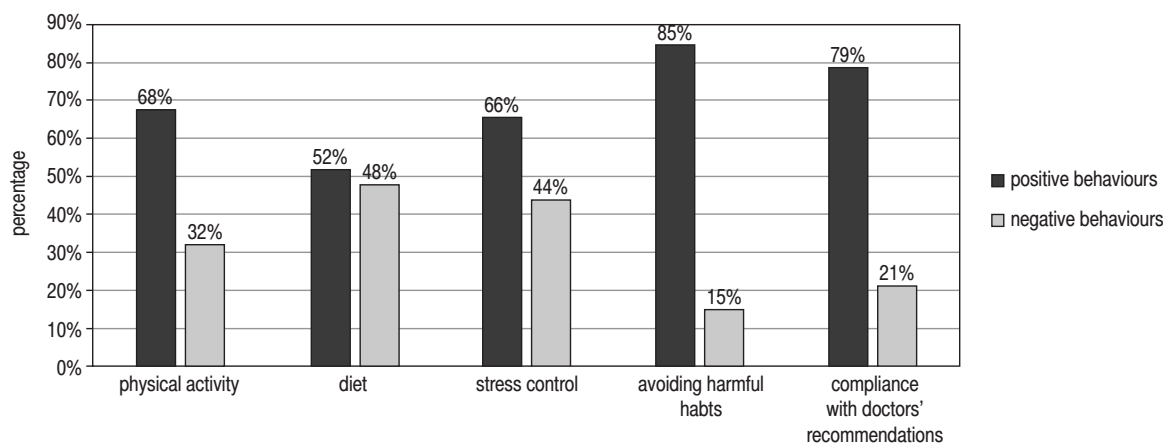


Figure 1. The analysed categories of the Quality of Life Questionnaire

Table 1. The quality of life of women surveyed assessed with the use of the SF-36v2 questionnaire

Quality of life indicators	X	SD	Min	Max
PF	50.32	7.97	26.92	57.54
RP	45.72	7.83	23.47	57.16
BP	45.80	9.62	25.71	62.00
GH	52.55	7.28	35.59	66.50
VT	51.56	7.35	31.80	67.45
SF	44.74	8.12	22.25	57.34
RE	49.11	7.44	28.31	56.17
MH	47.32	6.88	24.71	61.33
PCS	48.79	7.51	29.11	63.01
MCS	48.10	6.67	33.00	62.28

X – arithmetic mean; SD – standard deviation; Min – minimum; Max – maximum; PF – physical functioning; RP – role limitations due to physical health problems; BP – body pain; GH – general health perception; VT – vitality energy or fatigue; SF – social functioning; RE – role limitations due to emotional problems; MH – general mental health; PCS – Physical Component Summary (PF, RP, BP, GH); MCS – Mental Component Summary (VT, SF, RE, MH)

had secondary or higher education (45%, n = 49), lived in the countryside (76%, n = 83), and described their financial situation as good (72%, n = 78).

Almost twice as many women gave birth naturally (65%, n = 71) than by caesarean section (35%, n = 38). Continuing analysis of data from the interview, it was revealed that 22% (n = 24) of the respondents experienced at least one miscarriage in their lives. Thirty-four per cent of the women (n = 38) were primiparae. Among the 71 multiparae, for 45 (63%) this was their second delivery. Sixteen per cent of respondents (n = 17) reported diseases co-occurrent with pregnancy, and in 10 women it was associated with a change in lifestyle.

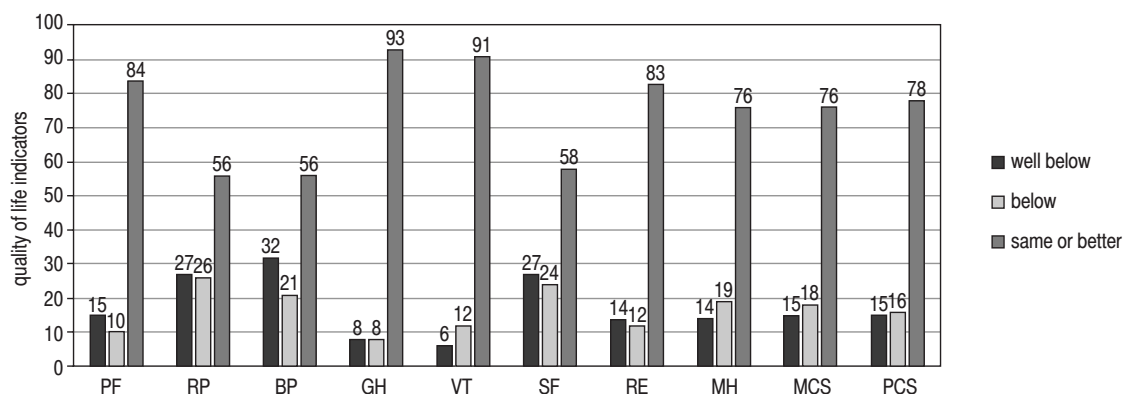
The analysis of the Quality of Life SF-36v2 questionnaire demonstrated that only 15% (n = 16) of respondents led a healthy lifestyle. For the purpose of the study five selected categories of behaviour were analysed: physical activity, nutrition, stress control,

avoiding harmful habits, and adherence to the advice of doctors. 68% of the women declared pursuing regular physical activity. Slightly more than half of the women (52%, n = 57) described their nutrition as healthy. 66% of the postpartum women coped with stress (n = 72), and up to 85% (n = 93) avoided harmful habits during pregnancy. 79% of respondents (n = 86) followed the advice of doctors (Fig. 1).

The SF-36v2 questionnaire was used to assess the quality of life of the respondents. The results obtained by the women studied in all eight indicators (PF, RP, BP, GH, VT, SF, RE, MH), as well as general physical and mental health assessment (PCS and MCS), are presented in Table 1.

For the purpose of a more detailed analysis and interpretation, the results obtained by the postpartum women were compared with the results obtained by the general population. The results were classified into three categories: “the same or better”, “below”, and “well below”. The “same or better” category refers to quality of life the same as or better than in the general population, while “below” and “well below” refer to quality of life much lower than in the general population.

The vast majority of the postpartum women obtained a better or the same quality of life as the general population in terms of general health (85%, n = 93), mental health (70%, n = 76), physical health (77%, n = 84), limitations due to emotional problems (76%, n = 83), and vitality (84%, n = 92). More than half of the respondents were in the same category also with respect to the indicators of limitations due to health problems (51%, n = 56) and social functioning (53%, n = 58). Also, the vast majority of women rated their quality of life in the domain of general physical health (72%, n = 78) as well as mental health (70%, n = 76) as the same or even better. Most of the surveyed women rated their quality of life as worse or much worse compared to the general population in terms of constraints in fulfilling roles due to physical health problems (49%, n = 53) and pain (49%, n = 53), and in terms of social functioning (47%, n = 51; Fig. 2).



PF – physical functioning; RP – role limitations due to physical health problems; BP – body pain; GH – general health perception; VT – vitality energy or fatigue; SF – social functioning; RE – role limitations due to emotional problems; MH – general mental health; PCS – Physical Component Summary (PF, RP, BP, GH); MCS – Mental Component Summary (VT, SF, RE, MH)

**Figure 2.** The quality of life of the respondents as compared with the general population

When comparing the results of the evaluation of the quality of life of women who declared pursuing regular physical activity during pregnancy and those who were not physically active no statistically significant differences were determined in any of the indicators. Physically active women were characterised by a better quality of life in the sphere of mental health (47.69) and general mental health assessment (48.17); however, this advantage was minor and statistically irrelevant ( $p > 0.05$ ) and ( $p > 0.05$ ; Table 2).

The majority of respondents declared that they were physically active during pregnancy (68%,  $n = 74$ ). In order to assess whether variables such as education and place of residence influenced the physical activity undertaken by the subjects, a chi-square test was carried out. However, no statistically significant differences were found in the context of the variable of education ( $p > 0.05$ ) and place of residence ( $p > 0.05$ ).

Postpartum women who adhered to a healthy diet during pregnancy were characterised by a slightly better quality of life in terms of: limitations in fulfilling roles due to physical health problems (46.09), general health perception (53.25), vitality (52.70), social functioning (45.64), limitations in fulfilling roles due to emotional problems (49.69), and mental health (48.62), compared to those who ate unhealthy diets. These differences were not statistically significant ( $p > 0.05$ ). Only in the context of the general assessment of the mental health did women who adhered to healthy diet have a statistically significantly higher score (49.51,  $p = 0.0350$ ).

Respondents coping well with stress control obtained higher scores with respect to the following indicators: pain (46.1), general health assessment (53.48), vitality (52.6), social functioning (45.78), mental health (48.8), and general mental health (49.24). Statistically significant differences were demonstrated be-

**Table 2.** Physical activity during pregnancy and its impact on the quality of life of postpartum women

Quality of life indicators	Women who did not declare being physically active ( $n = 35$ )				Women who declared being physically active ( $n = 74$ )				p-value
	X	SD	Min	Max	X	SD	Min	Max	
PF	51.96	7.58	26.92	57.54	49.55	8.08	26.92	57.54	0.0592A
RP	47.28	6.76	30.21	57.16	44.99	8.23	23.47	57.16	0.1923A
BP	46.56	10.02	25.71	62	45.43	9.47	25.71	62	0.4847A
GH	53.99	6.36	40.35	66.5	51.87	7.62	35.59	66.5	0.1567B
VT	53.62	8.12	31.8	67.45	50.71	6.82	31.8	64.48	0.0537B
SF	45.45	7.7	22.25	57.34	44.4	8.34	22.25	57.34	0.5182A
RE	49.7	7.51	31.8	56.17	48.83	7.44	28.31	56.17	0.4820A
MH	46.53	7.56	24.71	61.33	47.69	6.56	24.71	58.72	0.4117A
PCS	50.74	7.56	29.31	63.01	47.86	7.35	29.11	59.06	0.0740A
MCS	47.97	6.74	33	60	48.17	6.68	33.47	62.28	0.8874B

N – number of women; X – arithmetic mean; SD – standard deviation; Min – minimum; Max – maximum; A – Mann-Whitney U test; B – Student's t-test; PF – physical functioning; RP – role limitations due to physical health problems; BP – body pain; GH – general health perception; VT – vitality energy or fatigue; SF – social functioning; RE – role limitations due to emotional problems; MH – general mental health; PCS – Physical Component Summary (PF, RP, BP, GH); MCS – Mental Component Summary (VT, SF, RE, MH)

tween the social functioning ( $p = 0.0387$ ), mental health ( $p = 0.0060$ ), general mental health ( $p = 0.0284$ ), and stress control, indicating a positive impact of stress control on the quality of life (Table 3).

Women manifesting positive behaviour in the category of avoiding harmful habits obtained slightly higher scores with respect to the indicator of limitations in fulfilling roles due to emotional problems (49.13) but the difference was not statistically significant ( $p > 0.05$ ). This may attest to the fact that avoiding harmful habits during pregnancy does not affect quality of life after birth.

Respondents from the group adhering to the advice of doctors were characterised by a slightly better quality of life with respect to the indicators of pain (46.40), vitality (52.19), social functioning (45.51), limitations in fulfilling roles due to emotional problems (49.29), and mental health (48.22). Statistically significant differences were demonstrated in the sphere of mental health

( $p = 0.0036$ ) and general mental health assessment ( $p = 0.0093$ ; Table 4).

Women after a caesarean section rated their quality of life slightly higher in terms of the indicators of pain (45.84), general feeling of health (53.37), vitality (51.66), social functioning (44.81), limitations in fulfilling roles due to emotional problems (50.67), and mental health (47.98), as well as general physical health perception (46.97) and mental health assessment (49.88). Statistically significant differences were observed only in the case of general mental health assessment ( $p = 0.0417$ ).

Analysing the impact of parity on the quality of life, it was found that multiparae obtained only slightly higher values with respect to the indicators of physical functioning (50.86), pain (46.60), social functioning (45.12), and general health perception (49.11) compared to women who had given birth for the first time. These differences were not statistically significant ( $p > 0.05$ ).

**Table 3.** Stress control and its impact on the quality of life of postpartum women

Quality of life indicators	Positive behaviour (n = 72)				Negative behaviour (n = 37)				p-value
	X	SD	Min	Max	X	SD	Min	Max	
PF	49.83	8.55	26.92	57.54	51.28	6.69	26.92	57.54	0.7807
RP	44.96	7.92	23.47	57.16	47.2	7.53	30.21	57.16	0.1554
BP	46.1	10.27	25.71	62	45.2	8.31	25.71	62	0.6335
GH	53.48	6.52	38.92	66.5	50.73	8.35	35.59	65.07	0.0823
VT	52.6	6.84	31.8	67.45	49.79	8.04	31.8	64.48	0.0784
SF	45.78	7.92	22.25	57.34	42.71	8.22	22.25	57.34	<b>0.0387</b>
RE	48.53	7.27	31.8	56.17	50.24	7.74	28.31	56.17	0.2017
MH	48.8	5.77	35.17	61.33	44.43	7.96	24.71	58.72	<b>0.0060</b>
PCS	48.45	8.08	29.11	63.01	49.45	6.3	37.5	59.3	0.6774
MCS	49.24	6.01	35.26	62.28	45.89	7.39	33	60.04	<b>0.0284</b>

N – number of women; X – arithmetic mean; SD – standard deviation; Min – minimum; Max – maximum; PF – physical functioning; RP – role limitations due to physical health problems; BP – body pain; GH – General health perception; VT – vitality energy or fatigue; SF – social functioning; RE – role limitations due to emotional problems; MH – general mental health; PCS – Physical Component Summary (PF, RP, BP, GH); MCS – Mental Component Summary (VT, SF, RE, MH)

**Table 4.** Adherence to the advice of doctors and the quality of life of postpartum women

Quality of life indicators	Positive behaviour (n = 86)				Negative behaviour (n = 23)				p-value
	X	SD	Min	Max	X	SD	Min	Max	
PF	50.11	8.32	26.92	57.54	51.13	6.59	36.49	57.54	0.8995
RP	45.56	7.85	23.47	57.16	46.32	7.92	30.21	57.16	0.7298
BP	46.4	9.81	25.71	62	43.54	8.69	25.71	62	0.2377
GH	52.47	7.03	37.97	66.5	52.84	8.3	35.59	65.07	0.7215
VT	52.19	7.34	31.8	67.45	49.63	7.22	31.8	64.48	0.1163
SF	45.51	7.84	22.25	57.34	41.86	8.67	22.25	57.34	0.0803
RE	49.29	7.24	31.8	56.17	48.45	8.26	28.31	56.17	0.8064
MH	48.22	6.84	24.71	61.33	43.93	6.04	32.56	53.48	<b>0.0036</b>
PCS	48.59	7.77	29.11	63.01	49.53	6.53	37.68	59.3	0.7523
MCS	48.97	6.55	33	62.28	44.88	6.24	33.47	54.6	<b>0.0093</b>

N – number of women; X – arithmetic mean; SD – standard deviation; Min – minimum; Max – maximum; PF – physical functioning; RP – role limitations due to physical health problems; BP – body pain; GH – general health perception; VT – vitality energy or fatigue; SF – social functioning; RE – role limitations due to emotional problems; MH – general mental health; PCS – Physical Component Summary (PF, RP, BP, GH); MCS – Mental Component Summary (VT, SF, RE, MH)

## DISCUSSION

Quality of life after giving birth is a problem that is difficult to assess correctly, due to the specific, dynamic changes in well-being in the postpartum period and the number of factors affecting the assessment. The way a pregnancy ends also exerts an impact on mental and physical health.

Our own research has shown that the quality of life of women after delivery through caesarean section is better than the quality of life of women after natural childbirth, especially in the general assessment of the quality of mental life (MCS). Torkan *et al.* obtained similar results when studying quality of life of women in two time intervals: between 6-8 weeks after the delivery and 12-14 weeks after the delivery. During the first evaluation, the respondents who had undergone a caesarean section obtained a higher score in general health perception, which coincides with the results in the author's own study. However, during the next evaluation, women who had given birth naturally had a much higher quality of life in terms of physical functioning, while women after a caesarean section assessed their vitality and social functioning much higher [16]. These differences may be due to the fact that women after a caesarean section receive greater care on the part of medical staff due to the surgery they have undergone as compared to those who have given birth naturally. On release from the hospital, they can also expect support and assistance on the part of their families in performing daily life activities and infant care. Zaheri *et al.* came to a similar conclusion having conducted their research. Similarly to this study, the Iranian women they studied obtained a slightly higher quality of life than those who gave birth naturally [17].

Majzooobi *et al.* obtained different results from their research, assessing the quality of life of women after childbirth in five periods: during the first week after birth, and two months, four months, six months, and a year after giving birth. During each of the assessments, the women who gave birth naturally had a better quality of life compared to women after a caesarean section [18]. Although these findings differ from those obtained in this study, it should be noted that the quality of life of a significant part of the respondents was the same or better than that of the general population, and the differences between the women after giving a natural birth and after a caesarean section were small.

In a study by Kavosi *et al.*, the quality of life among postpartum women who gave birth naturally, in water, and by caesarean section was assessed. It was demonstrated that women after a normal vaginal delivery obtained the highest scores in terms of physical health, while those who gave birth in water were characterised by the highest overall quality of life and obtained the highest results in the field of mental health. However, no statistically significant differences be-

tween the overall quality of life of postpartum women were found with respect to the type of delivery [19]. Although the results of this study were different, it should be noted that Kavosi *et al.* assessed the quality of life of their respondents two months after giving birth, and the research in the author's own study did not include groups of women who gave birth in water.

Chinweuba *et al.* demonstrated in their study that postpartum women with higher education and higher income were characterised by a better quality of life [20]. This is consistent with the results of the author's own research, in which women obtained quality of life the same as or better than in the general population, and in which the vast majority of them had secondary or higher education (92%,  $n = 84$ ).

The analysis of the lifestyle of the postpartum women demonstrated that only 15% (17) of the respondents led a healthy lifestyle. According to data from the Healthy Lifestyle Questionnaire, only 52% of the respondents adhered to a proper diet during pregnancy. Assessing body weight changes in pregnant women, Hyżyk and Sokalska demonstrated that 54% of the interviewees did not change their eating habits in connection with being pregnant, and 74% of them did not diversify their meals [21]. The author's own research confirmed that women on a proper diet had a slightly better quality of life, especially in the category of the general assessment of mental health ( $p = 0.0350$ ). The results of the research can be used as an argument for including nutritional education as a vital element of antenatal education.

Although the author's own research did not demonstrate dependencies between physical activity and the quality of life after birth, it should be borne in mind that physical activity during pregnancy is an important factor reducing the likelihood of postpartum complications, and it may increase the chances for natural childbirth [22, 23].

Using progressive muscle relaxation (PMR) in a group of postpartum women, Gökşin and Ayaz-Alkaya demonstrated its influence on the increase in the quality of life following childbirth [23]. Analysing the results of the author's own research, it was shown that 68% ( $n = 74$ ) of the respondents declared pursuing physical activity during pregnancy, including stretching exercises three times a week. However, the influence of physical activity on the quality of life after delivery has not been demonstrated. Convergent results were obtained in the context of stress control, which positively influenced a number of indicators of the quality of life: pain, general sense of health, vitality, social functioning, mental health, and general assessment of mental health. The category of stress control includes, among others, regular practice of exercises which reduce the tension and devoting time for relaxation daily. It can thus be compared to progressive muscle relaxation. The results obtained point to the importance of

teaching pregnant women proper muscle relaxation and stress control.

In their research, Nascimento *et al.* demonstrated that factors such as education, the number of past births, being physically active before pregnancy, and the incentive to exercise offered during medical visits increased the frequency of undertaking exercise during pregnancy [24]. The author's own research showed no effect of education on physical activity during pregnancy. The fact that, according to Nascimento *et al.*, pregnant women encouraged to exercise by their doctor were three times more physically active points to the important role of persons who offer care to pregnant women, including midwives [24]. Every pregnant woman should be informed about the benefits of physical activity and encouraged to perform exercises adjusted to her current condition.

The presented study group was relatively small and consisted of patients from one hospital, so it may be considered unrepresentative. In the future, the study should be continued and extended to a larger group of postpartum women from various hospitals.

## CONCLUSIONS

1. A relationship was demonstrated between selected elements of a healthy lifestyle in pregnancy and the quality of life after birth. In women practising exercise, mental health (MH) was slightly better than in inactive women; however, the results are not statistically significant. Based on the studies conducted, it was demonstrated that physical activity does not significantly affect the quality of life after giving birth.
2. In the group studied, it was the way the pregnancy ended which determined the quality of life of the women. Postpartum women who had undergone caesarean section had a better quality of life after giving birth than women who gave birth naturally. It was confirmed that the women who gave birth naturally were characterised by a statistically significant lower score in the general assessment of mental health (MCS).

### Disclosure

The authors declare no conflict of interest.

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