JURNAL KEPERAWATAN PPNI JAWA BARAT
Volume 2 No 2 Desember 2024

EXPLORING PHYSICAL ACTIVITY PATTERNS DURING PREGNANCY IN MOTHERS WITH CESAREAN DELIVERY

[1]Nina Mariam, [2] Dewi Marfuah*, [3]Astri Mutiar, [4]Gina Nurdina
[1,2,3,4] STIKep PPNI Jawa Barat, Jalan Muhammad No.34, Bandung, 40173, Indonesia
Corresponding Email: dewi.marfuah@yahoo.com

ABSTRACT

Background: The quantity of babies born by the cesarean delivery procedure in Indonesia is 17.6%. One way to prevent complications from childbirth is to do physical activity because doing regular and directed physical activity can maintain the health of the mother and fetus during pregnancy. **Methods:** The study, conducted in a private hospital in Bandung, involved 81 respondents aged 40-18 years old, who were categorized based on factors such as maternal age, gestational age, education, occupation, obstetric status, and physical activity during pregnancy. **Results:** Pregnant women's activities were analyzed, with a total average score of 325.72, with the highest score being 941.73. The highest scores were found in household physical activity, occupational activity, exercise activity, transportation activity, and sedentary activity. The highest score was in work activities, with a score of 450.50, while the lowest scores were in work activities, exercise/sports, transportation, and sedentary activities. **Conclusion:** Household activities are the highest activities and the lowest activities are sports.

Keywords: Cesarean Delivery, Physical Activity, Pregnanc, Maternal health, Physical activity types

INTRODUCTION

Cesarean section is an effective procedure to overcome abnormalities in the delivery process, where the operation can be carried out electively or in an emergency according to the indications of the operation itself (Calbara & Budiono, 2023). Action *section Caesarea* (SC) is the first choice for medical personnel to save the mother and fetus when facing complications of childbirth. A fetus cannot or should not be birthed vaginally for a number of reasons. Reducing the number of first-time cesarean sections is a priority, because many women who have had a Caesarean section will eventually give birth to their children by cesarean section, choosing a cesarean section again for various reasons, or may not be suitable for normal childbirth anymore. Labor dystocia, aberrant fetal heart rate patterns, fetal malpresentation, multiple fetal pregnancies, and probable fetal macrosomia are the most

often reported reasons for a first-time cesarean delivery. (Marfuah et al., 2019).

Based on RISKESDAS data in 2021, the number of births with the Sectio Caesarea (SC) method in Indonesia is 17.6%. Indications for Sectio Caesarean delivery (SC) are caused by several complications with a percentage of 23.2% with transverse/breech fetal position (3.1%), bleeding (2.4%), eclampsia (0.2%), premature rupture of membranes (5.6%), long partus (4.3%), cord twist (2.9%), placenta previa (0.7%), placenta lag (0.8%), hypertension (2.7%), and others (4.6%) (Marfuah et al., 2019).

One way to prevent complications from childbirth is by doing physical activity, in Indonesia and various other regions, there are many myths circulating from ancient times that state that physical activity needs to be limited during pregnancy. However, various studies show that physical activity has a positive effect on the physical and mental health of pregnant women, as well as preventing mothers from complications during pregnancy and postpartum (Alifah, 2023).

The health status of the mother during pregnancy needs to be considered from the beginning of pregnancy because doing regular and directed physical activity can maintain the health of the mother and fetus during pregnancy. Moving limbs and using energy to keep one's physical and mental well-being and quality of life while staying in shape is known as physical activity. When pregnant women engage in frequent, guided activities, the birth process can be facilitated, so that it will reduce the pain, disability, and death of pregnant women and childbirth (Indarwati et al., 2019).

Exercise is one of the physical activities so that pregnant mothers stay healthy and fit. Some of the physical activities that can be done by pregnant women include pregnancy exercises, swimming, walking, yoga exercises (Marfuah Dewi, 2024), pilates exercises, kagel exercises, jogging, cycling, and other activities in cleaning the house such as mopping (Y. L. Astuti et al., 2023).

The level of physical activity in pregnant women is still relatively low, only a small percentage of respondents admit to regular physical activity (Marfuah et al., 2024). The physical activity carried out is quite diverse, ranging from doing homework to walking. The biggest supporting factor for pregnant women in physical activity is because they want to have a smooth delivery process, maintain the health of the mother and fetus, and be accompanied when exercising. There was a positive relationship with moderate strength between physical activity during pregnancy and the incidence of cesarean section. The chance of a cesarean section is 1.63 times higher for pregnant women who

are not physically active than for those who are (Rahmawati, 2019).

From the results of research that has been carried out by previous researchers, it was found that there are still many pregnant women who lack physical activity, so researchers are interested in identifying the results of previous research to find out the picture of the history of physical activity of pregnant women in post-section cesarean section patients.

METHOD

Study Design

This research is a descriptive study designed to examine the physical activity history during pregnancy among mothers with cesarean delivery. The study aims to provide insights into the types and frequencies of physical activities, particularly household activities and sports, among mothers who have undergone cesarean section (C-section) within the first 1-3 days postpartum.

Sample

The respondents for this study were mothers who had undergone a cesarean delivery (post-section) on days 1 to 3. The inclusion criteria for the study were:

1. Mothers who had a cesarean section within 1-3 days post-surgery,
2. Mothers aged over 18 years,
3. Mothers who were able to read and write.

The sample size was determined using G-Power software (version 3.1.9.7) with a t-test compromise. The parameters for the sample size calculation included α and power with a given β/α ratio, sample size, and effect size with a correlation assumption (ϱ H1 = 0.12, β/α ratio = 16, and correlation ϱ H0 = 0.5). The total sample size calculated for this study was 81 respondents.

Instrument

The Pregnancy Physical Activity Questionnaire (PPAQ), developed by Lisa Chasan-Taber, was used to assess the physical activity levels of the participants. The PPAQ measures the physical activity patterns during pregnancy, focusing on different types of activities, such as household chores, occupational activities, exercise, transportation, and sedentary behavior. The PPAQ does not assess absolute energy consumption but instead provides a relative measure of physical activity levels. The activities are categorized based on intensity (sedentary, light, moderate, and vigorous) and the frequency of each activity type (Mottola et al., 2018).

Data Collection

The data collection was conducted in the obstetrics and gynecology (OBGYN) room of Humana Prima Hospital, located on the 3rd floor. The data were collected through the administration of the PPAQ, either self-administered by the participants or

researcher-administered. The questionnaire asks participants to recall their physical activity levels during their current pregnancy trimester, with a particular focus on the 1-3 days postpartum period.

The PPAQ includes 33 activity-related questions that assess various domains of physical activity, including household activities, occupational tasks, exercise, transportation, and sedentary behaviors. The sports/exercise section includes an open-ended question allowing respondents to report any additional activities not previously listed. Responses to these activities are scored based on the amount of time spent on each activity, categorized by intensity level (METs: Metabolic Equivalent of Task).

Data Analysis

The data analysis involved calculating the average daily energy expenditure (in MET-hours per day) for each activity reported on the PPAQ. The number of hours spent on each activity was multiplied by its intensity to determine the MET-hours/week for each activity. Activities were categorized into the following groups:

- Sedentary: >1.5 METs
- Light activity: 1.5–<3.0 METs
- Moderate activity: 3.0–<6.0 METs
- Severe activity: >6.0 METs (ACOG, 2020).

Each response received a score based on the participant's reported hours of activity per week, and the values were used to estimate the total physical activity for each participant. Statistical analysis was performed to examine the distribution and patterns of physical activity levels in the sample.

Ethical Considerations

This study was conducted following ethical guidelines to ensure the safety, privacy, and confidentiality of the participants. Informed consent was obtained from all participants before participation in the study. Participants were informed about the purpose of the study, the voluntary nature of participation, and their right to withdraw at any time without consequence. Confidentiality was maintained by coding participant responses and ensuring that personal identifying information was not disclosed in the study's results. Ethical approval was sought and granted by the Institutional Review Board (IRB) of Humana Prima Hospital prior to data collection.

Table 1. The Hours/Week Score Assigned to The Response for Each Question

Question	Duration Category	Hours/Week
4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 20, 21, 22	None	0
	Less than 1/2 hour per day	0.84
	1/2 to almost 1 hour per day	3.5
	1 to almost 2 hours per day	7
	2 to almost 3 hours per day	14
	3 or more hours per day	21
12, 13, 32, 33, 34, 35, 36	None	0
	Less than 1/2 hour per day	0.84
	1/2 to almost 2 hour per day	3.5
	2 to almost 4 hours per day	14
	4 to almost 6 hours per day	28
	6 or more hours per day	42
17, 18, 19, 23, 24, 25, 26, 27, 28, 29, 30, 31	None	0
	Less than 1/2 hour per week	0.12
	1/2 to almost 1 hour per week	0.5
	1 to almost 2 hours per week	1
	2 to almost 3 hours per week	2
	3 or more hours per week	3

The intensity of the remaining PPAQ activities is estimated using Compendium-based MET values while the activity intensity for walking and light-to-moderate-intensity household tasks (Mottola et al., 2018). The table that follows lists the precise MET values that were given to each inquiry. Based on *Compendium of Physical Activities 2024 for questions 30 and 31. The number of hours/week spent on each activity multiplied by its intensity is the MET-hours/week.

Table 2. The Specific MET Values Assigned To Each Question

Question	4	5	6	7	8	9	10	11	12	13	14
MET Value	2.0	2.0	3.0	2.2	3.5	2.1	4.0	1.3	1.3	1.4	2.6
Question	15	16	17	18	19	20	21	22	23	24	25
MET Value	2.8	2.3	2.8	2.5	3.8	2.8	4.1	1.5	2.8	4.1	6.5
Question	26	27	28	29	30	31	32	33	34	35	36
MET Value	7.0	2.3	6.0	5.0	*	*	1.5	3.8	2.0	4.8	4.3

The validity and reality test of the PPAQ questionnaire that has been carried out by Chasan is declared valid, showing based on the intensity of physical activity—the

coefficient values for consistent, light, moderate, and heavy intensity are 0.79; 0,78; 0; 82 and 0.82. And it is realistic because the value of Chronbach's Aplha is greater than 0.6. Ethical considerations are carried out during the research procedure, including autonomy, justice, confidentiality, and non-maleficence. This analysis uses descriptive statistical analysis as its data analysis method.

Table 3. The Data Analysis

Purpose	Data types	Statistical test	Rational
Univariate analysis			
Identify the characteristics of the respondents: Mother's age	Ratio	Frequency distribution	To find out the age range of respondents' mothers
Identifying the mother's gestational history	Ratio	Frequency distribution	To find out the mother's gestational age whether it is full-term or less
Identifying Mother-Performed Jobs	Nominal	Frequency distribution	To find out what jobs pregnant women do
Education	Ordinal	Frequency distribution	To find out the level of education of mothers
Parity status	Nominal	Frequency distribution	For the number of births in life that a woman has
Identifying the physical activity of pregnant women	Continuous	Frequency distribution	To find out the physical activity of the respondent during pregnancy

RESULT

Participant Characteristics

The results of the study showed that the lowest age of respondents was 20 years old and the highest age was 87 years old. The respondents in this study were 29 years old on average. The lowest gestational age of the respondents was 28 weeks and the highest age of the respondents was 42 weeks. The average age of the respondents' gestation was 37 weeks.

Table 4. Characteristics of Demographic Data Respondents

Variable	Mean±SD	Min	Max

Mother's age	29.4±5.70	20	44
Gestational age	36.7±2.96	28	42

The study's findings demonstrated that the total number of respondents was 81 mothers. Based on educational characteristics, there are more (51.9%) respondents in high school/vocational schools. Based on employment, more respondents (65.4%) worked than did not. Based on obstetric status, there were more primigravida respondents (49.4%).

Table 5. Characteristics of Demographic Data Respondents

Variable	Frequency (n=81)	Percentage (%)
Education		
Junior High School	4	4,9
Senior High School	42	51,9
D3/S1	35	43,2
Sum	81	100
Work		
Work	53	65.4
Not working	28	34.6
Sum	81	100
Obstetric status		
Primigravida	40	49.4
Multigraphide	37	45,7
Grande graphide	4	4
Sum		100

Overview of physical activity of pregnant women

The results of the study showed that the high category was 0, the zinc category (12.35%), and the low category (71%). Based on the category of the most responses, it is in the low category (71%).

Table 6. Overview of Mom's Physical Activity Category

CATEGORY	n	f(%)
Heavy	0	0

Moderate	10	12,35
Light	71	87,65
Sum	81	100

Table 7.Overview of Mother's Physical Activity in Each Indicator

Variable	Mean±SD	Min	Max
Physical Activity	325.73±195.16	22.02	325.73
Domain indicator	**Mean±SD**	**Min**	**Max**
Household Activities	148.14±90.07	8,05	425.52
Work	96.67±112.97	0	450.80
Exercise	14.11±11.69	0	66,53
Transportation	18.88±19.01	0	101,50
Sedentary activities	49.38±36.53	0	199

Note: The domain indicator is Min it's from METs

Based on table 7, describing the mother's physical activity during pregnancy, it shows an average of 946.88 physical activity per week and the picture on each indicator related to physical activity shows low and moderate results.

DISCUSSION

Demographic Characteristics

The ideal age for a woman to get pregnant is between the ages of 20 to 35 years. Too young an age, which is less than 20 years old, may not have experienced physical, mental, and material readiness. Meanwhile, women who get pregnant at a very old age (>35 years) have many risks that may occur during pregnancy (Ariska & Marfuah, 2019).

The lowest age of the respondents in this study was 20 years old and the highest age was 44 years old and This study's average age was 29 years old. The results of this study are in line with the theory that the age range of most respondents is 25-35 years old. Older people (30-35 years) are more likely to have sufficient weight gain. This can happen because pregnant women in this age range are more aware of the adequacy of weight gain during pregnancy which is characterized by adequate food intake compared to pregnant women who are young (Widiastuti & Marfuah, 2019).

The character of gestational age in this study is the lowest age of 28 weeks and the highest age of 42 weeks, the average gestational age of this study is 37 weeks. Results from third-trimester pregnant women indicated a correlation between physical activity and constipation. This is reinforced by the results of previous studies that 16 out of 35 pregnant women who experienced constipation were at a low intensity of physical activity. Pregnant

women tend to reduce or even not do physical activity for the purpose of health pregnancy. The older the gestational age, the mother will be lazy to move because the weight of the body is getting heavier and the body is getting bigger, in addition to that the worry of pregnancy disorders when doing physical activity makes the mother afraid to exercise (Calbara & Budiono, 2023). In this literature review, moderate-intensity physical activity performed regularly and purposefully help lessen the third-trimester discomfort that expectant mothers experience. and reduce medical intervention in delivery process.

The characteristics of education in this study are based on the characteristics of education more (51.9%) of high school/vocational school respondents and the least (4.9%). The mother's education level affects the brain's performance to think critically. Mothers who have a high level of education tend to have an open mindset and are informed while mothers with less education tend to think old-fashioned and lack of information. The characteristics of work in this study are more (65.4%) respondents who work and the least number (34.6%) do not work (Marfuah et al., 2022).

The characteristics of obstetric status in this study were more (49.4%) primigravida respondents and the least (4%). Based on the findings of the earlier research, it was shown that the majority were at an age that was not ideal for pregnancy, namely 20-35 years old (86%), the characteristics of the gestational age of the respondents showed that most expectant mothers were in the third trimester (66%), while from the pregnancy status, there were only 14 primigravida pregnant women (28%) (Marfuah et al., 2024).

Mother's physical activity by category

Based on the results of the research, the researcher can conclude that of the 81 respondents, most of the people who responded don't do much physical activity with a total of 71 (87.65%). This study supports earlier studies conducted by the 95 respondents, the majority of respondents had a light level of physical activity with a total of 47 (49.5%) respondents and the rest had moderate and heavy physical activity. Pregnant women with light and heavy physical activity intensity are more at risk of premature labor than pregnant women with moderate physical activity intensity. The intensity of light physical activity causing premature labor is associated with the relationship between the intensity of light physical activity and the incidence of gestational diabetes and preeclampsia which together cause placental damage and an increase in inflammatory cytokines that cause premature labor (Calbara & Budiono, 2023).

From the results of the above study, it was found that of the 5

physical activity domain indicators, the household physical activity indicator received the maximum value, which was 425.52, which was included in moderate activity (Arizabaleta et al., 2010). The energy expenditure expended from moderate activity causes breathing to be somewhat stronger and is done in more than 10 minutes with a total of 600-2999 METs/minute/week. Pregnant women who do moderate activities are doing housework such as mopping the floor, cleaning the house, and drying clothes. Of course, this activity will expend enough energy, require muscle strength and can increase the work of the heart to supply energy needs to the whole body. Household activities that are usually carried out include taking care of children, taking them to school, shopping at the supermarket, mopping the floor, and washing dishes. These activities are also included in the calculation of physical activity. This activity is included in the moderate-strenuous activity for pregnant women (ACOG, 2020).

Activity Characteristics based on household categories received the highest score of 425.52 and the lowest score of 8.05. Pregnant women do activities in the form of household activities and do an average of 141.23 MET hours per week during pregnancy. The results showed that most pregnant women felt more comfortable and safe doing household activities than engaging in work or sports activities during pregnancy (Ketut et al., 2022).

Activity Characteristics based on the job category got the highest score of 450.80 and the lowest score of 0. This study aligns with previous studies that the types of activities of pregnant women recorded include housewives as much as 43.2%, workers as much as 41.6%, private employees as much as 9.6%, and civil servants as much as 5.6%. Pregnancies at age 35 and older tend to increase, most likely due to advances in education and employment for women. The characteristics of the work of pregnant women show that most of them are housewives, while 41.6% of them work as laborers. Working pregnant women usually have more physical activity compared to those who don't work. This activity can affect the health and condition of pregnancy, because working mothers have to handle household chores as well as work outside the home. As a result, the lack of rest time can interfere with the condition of pregnancy and fetal growth (Y. Astuti & Amin, 2021).

The characteristics of activities based on the Exercise/sports domain category in this study are the highest score of 66.53 and the lowest score is 0. According to the American College of Obstetricians and Gynecologists (ACOG), pregnant women should to walk 10,000 steps per day or 30 minutes per day of moderate activity. The results of the earlier research showed

that of the 37 mothers who did pregnancy exercises, 32 (86.5%) mothers who did pregnancy exercises had a normal delivery process, while 29 mothers who did not do pregnancy exercises, as many as 12 people (41.4%) mothers gave birth abnormally. The results of statistical tests using *chi-square* showed the result of p = 0.010 where p < α (α=0.05) which means that there is an influence between pregnancy exercises on the delivery process. These results are in accordance with the benefits of pregnancy gymnastics which is an workout program designed to help expectant mothers maintain and improve the suppleness of the muscles and ligaments of the abdominal wall, the pelvic floor muscles that are related during the delivery process (Ketut et al., 2022).

The characteristics of activities based on the transportation domain category in this study are the highest score of 101.50 and the lowest score of 0. This research is in line with a previous article that showed that individuals in China are less likely to view physical activity while traveling as a viable way to improve their health. Previous studies have found that there is a change in physical activity while traveling that is less active when traveling in early pregnancy compared to before pregnancy, due to the increased use of private transport. Physical activity while traveling can be beneficial for mental health, which has great public health significance, and needs to be investigated further (Todorovic et al., 2020).

The average score for the sedentary domain categories of activities in this study was 49.38, with the highest score being 199 and the lowest being 0. During pregnancy, the workplace can offer chances for energy expenditure and physical activity. Sedentary employment, on the other hand, involve spending a lot of time sitting down at work, which is linked to low energy use. About 60% of women in this study said that their jobs forced them to sit for extended periods of time, with an average of 4.1 ± 2.7 hours spent sitting at work. PPAQ was used in this study to measure sedentary behavior; sedentary time is also calculated as the amount of time spent sitting at work, using computers, and watching television on weekdays and weekends (Adeoye, 2022).

CONCLUSION

The results of the research conducted by the researcher on the history of maternal physical activity during pregnancy have several indicators in maternal physical activity and the lowest is in household physical activity which gets a minimum score of 8.13. From the demographic overview of the results obtained for education with a frequency of 48.1%, the average age frequency at the age of 29 years and at the gestational age is at an average of 36 weeks. The description of the

mother's physical activity during pregnancy has 5 domains including Mean household±SD 148,140±**90.07,** Mean Occupation**±SD** 96.67 ± 112.97, Mean Exercise/Sports ±SD 14.11**±11.69,** Mean Transportation±SD 18.88 ± 19.01, Sedentary Activity Mean±SD 49.38±36.53. The results of 5 domains from this study were obtained that the highest indicator results fell on household activities with an average value of 148.14. Meanwhile, the lowest indicator is in sports activities with an average score of 14.11. This study makes a significant contribution to expanding the understanding of the physical activity history of pregnant women. It is hoped that this research in the form of findings can be used as a basis for developing health promotion strategies to prevent difficulties in the delivery process.

REFERENCES

ACOG. (2020). *Exercise During Pregnancy*.

Adeoye, I. A. (2022). Pattern and correlates of physical activity and sedentary behaviours of pregnant women in Ibadan, Nigeria: Findings from Ibadan pregnancy cohort study. *PLOS Global Public Health*, *2*(10 October), 1–16. https://doi.org/10.1371/journal.pgph.0001153

Ariska, S., & Marfuah, D. (2019). The Description of Problems Correlated to Pregnancy. *KnE Life Sciences*, *2019*(2015), 463–475. https://doi.org/10.18502/kls.v4i13.5278

Arizabaleta, A. V. M., Buitrago, L. O., de Plata, A. C. A., Escudero, M. M., & Ramírez-Vélez, R. (2010). Aerobic exercise during pregnancy improves health-related quality of life: A randomised trial. *Journal of Physiotherapy*, *56*(4), 253–258. https://doi.org/10.1016/S1836-9553(10)70008-4

Astuti, Y., & Amin, C. (2021). Physical activity of pregnant women during COVID-19 outbreak in Yogyakarta. *Bali Medical Journal*, *10*(3 Special Issue ICONURS), 1390–1393. https://doi.org/10.15562/bmj.v10i3.2980

Astuti, Y. L., Chou, H.-F., Liu, C.-Y., & Kao, C.-H. (2023). PRENATAL GENTLE YOGA HELPS PREGNANT WOMEN IN REDUCING FEAR OF CHILDBIRTH. *PLACENTUM Jurnal Ilmiah Kesehatan Dan Aplikasinya*, *11*(1), 2023.

Calbara, O. A., & Budiono, D. I. (2023). Pengaruh Aktivitas Fisik Selama Kehamilan dan Luaran Kehamilan: Literatur Review. *Jurnal Ilmiah Universitas Batanghari Jambi*, *23*(2), 1142. https://doi.org/10.33087/jiubj.v23i2.3435

Indarwati, K., Ayu Kurniawati, A., & Sri Wahyuni, E. (2019). KAJIAN AKTIVITAS FISIK IBU HAMIL DALAM MENJAGA

KEHAMILANNYA DI WILAYAH KERJA PUSKESMAS KARANGTENGAH KABUPATEN WONOGIRI StudyOf Phyisical Activities Of Pregnant Moms In Keeping Pregnancy In The Working Area Of Karangtengah Health Center, Wonogiri District. *Jurnal Kebidanan Indonesia*, *10*(2), 8–18.

Ketut, N., Devi, A., Heri, M., Studi, P., Ners, P., Tinggi, S., & Kesehatan Buleleng, I. (2022). Perilaku Physical Activity (PA) pada ibu hamil: Narrative Review. *Jurnal Online Keperawatan Indonesia*, *4*(1), 7–16.

Marfuah Dewi. (2024). DEVELOPMENT AND USABILITY TESTING OF MOBILE APPLICATION ON EXERCISE MANAGEMENT FOR PREGNANT WOMEN IN INDONESIA. *Journal of Healtcare Technology*, *1*(1).

Marfuah, D., Fitriana, A. N., Mutiar, A., & Juniarni, L. (2024). The Effect of Yoga with Motivational Interviewing During Pregnancy on Physical Activity . *Jurnal Keperawatan Komprehensif (Comprehensive Nursing Journal)*, *10*(3 SE-Articles). https://doi.org/10.33755/jkk.v10i3.705

Marfuah, D., Mutiar, A., Nuswantoro, B., Jubaedah, A., Mardiah, S., Lisalsabila, T., Siti Mariyam, L., Keperawatan Maternitas, D., PPNI Jawa Barat, Stik., & Author, C. (2022). Utilization of Electronic-Antenatal Care Education (E-ACE) to Increase Knowledge and Awareness in The Prevention of High Risk Pregnancy among Pregnant women in Pandemic Pemanfaatan Electronic-Antenatal Care Education (E-ACE) untuk Peningkatan Knowledge an. *Jurnal Abdi Masyarakat*, *3*(1), 72–79.

Marfuah, D., Nurhayati, N., Mutiar, A., Sumiati, M., & Mardiani, R. (2019). Pain Intensity among Women with Post-Caesarean Section: A Descriptive Study. *KnE Life Sciences*, *2019*, 657–663. https://doi.org/10.18502/kls.v4i13.5322

Mottola, M. F., Davenport, M. H., Ruchat, S. M., Davies, G. A., Poitras, V., Gray, C., Jaramillo, A., Barrowman, N., Adamo, K. B., Duggan, M., Barakat, R., Chilibeck, P., Fleming, K., Forte, M., Korolnek, J., Nagpal, T., Slater, L., Stirling, D., & Zehr, L. (2018). No. 367-2019 Canadian Guideline for Physical Activity throughout Pregnancy. *Journal of Obstetrics and Gynaecology Canada*, *40*(11), 1528–1537. https://doi.org/10.1016/j.jogc.2018.07.001

Rahmawati, D. (2019). Hubungan Aktivitas Fisik Ibu Saat Hamil Dengan Kejadian Seksio Sesarea Di Kediri. *Jurnal Kebidanan*, *7*(2), 112–117.

https://doi.org/10.35890/jkdh.v7i2.103

Standing, S. O. R. (n.d.). *Updated Pregnancy Physical Activity Questionnaire (PPAQ) – Lisa Chasan-Taber*. 1–4.

Todorovic, J., Terzic-Supic, Z., Bjegovic-Mikanovic, V., Piperac, P., Dugalic, S., & Gojnic-Dugalic, M. (2020). Factors associated with the leisure-time physical activity (LTPA) during the first trimester of the pregnancy: The cross-sectional study among pregnant women in Serbia. *International Journal of Environmental Research and Public Health*, *17*(4). https://doi.org/10.3390/ijerph17041366

Widiastuti, I., & Marfuah, D. (2019). The Screening Description of Mothers with Risk Pregnancy. *KnE Life Sciences*, *2019*, 422–428. https://doi.org/10.18502/kls.v4i13.5274