



IMPRESSION OF CONFINEMENT CONSEQUENTIAL COVID-19 TO ACHIEVED RECOMMENDATION OF PHYSICAL ACTIVITY AMONG PREGNANT WOMEN

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ABSTRACT

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Pregnant women were recognized as a at risk population and recommended for self-isolate to decrease potential infected of the virus Covid-19. The aim of this study was to identify the effect and influences factor to achieve recommendation level of physical activity of pregnant women during Covid-19 pandemic. A community internet-based survey was conducted with 300 randomly selected pregnant women who required antenatal care at midwives and gynecologists in Makassar City, Indonesia. Physical activity levels were assessed using standardized Pregnancy Physical Activity Questionnaire. The multivariable logistic regressions were used to assess the influences factors associated to achieve recommendation level of physical activity of ≥ 600 MET minutes per week of pregnant women. The logistic regression model was applied to assess the influences factors to achieve recommended level of physical activity of ≥ 600 MET minutes per week among pregnant women. The pregnant women with a higher secondary or above degree were 3.23 times more likely to be achieve recommendation level of physical activity, compared to those with primary or below education (OR = 3.23, 95% CI: 2.20 to 4.73, $p=0.001$). Pregnant women need to be better informed about the positive effects of PA during pregnancy. Health care provider should develop some program to advise and support pregnant women to improve their PA level.

Keywords:

Covid-19, Physical activity, PPAQ, Pregnant women

BACKGROUND

During the Covid-19 outbreak, pregnant women should modify their daily activities to maintain physical fitness and health, including prenatal care (Salma, 2021). Pregnant women were recognized as an at-risk population and were recommended for self-isolating to decrease the potential infection of the Covid-19 virus (Goyal et al., 2020). The other issues are limiting outdoor activities and social distancing for pregnant women, which could decrease physical activity opportunities (Hall et al., 2021). Moreover, numerous pregnant women during COVID-19 reported an increased risk of stress and were afraid of going to the health care center (Fakari & Simbar, 2020). Subsequently, this population should reduce direct interactions with others, spend more time at home, and limit outdoor activities except for important issues (Psn & Mohammed Nawi, 2022).

Social isolation is a crucial strategy to prevent the spread of the COVID-19 virus (Gentil et al., 2021). Pregnant women were recommended to avoid activities in public areas as much as possible to minimize the risk of infection (Boron, 2021). Nevertheless, the COVID-19 outbreak needs increased exercise to boost resistance to the virus (Gentil et al., 2021), especially among pregnant women with weak immune systems. Pregnant women should be aware of this and protect their health because it will influence fetal growth (Mousa et al., 2019; Vitale et al., 2016). Pregnant women need to maintain their health status by promoting physical activity (PA) at the recommended level.

The recommended level of physical activity for pregnant women is at least 150 minutes per week at a moderate level of PA. Physical activity at the recommended level has been shown to be a crucial function to improve and maintain physiological and physical health (Jacob et al., 2020). Evidence has been reported that physically active pregnant women have a decreased risk of depression and anxiety compared to pregnant women who do not achieve the recommended level of PA (Davenport et al., 2020). Pregnant women who are the recommended level of PA have decreased gestational risk of depression (Davoud & Abazari, 2020; Haßdenteufel et al., 2020, Susukida et al., 2020), overweight (de Andrade Leão et al., 2022), diabetes mellitus (Laredo-Aguilera et al., 2020; Harrison et al., 2020, Lotfi et al., 2020), birth weight (Xi et al., 2020, Meander et al., 2021), premature (de Andrade Müller et al., 2020, da Silva et al., 2017), and pre-eclampsia (Kókai et al., 2022, Do et al., 2020). Pregnant women promoting physi-

cal activity could increase cardiac and neurobehavioral growth (Donofry et al., 2021; Chondrogianni & Koinis, 2021).

The other study reported that pregnant women who were not active during the COVID-19 outbreak had a significantly improve risk of infection, severe illness, and death (Hamer et al., 2020). This evidence shows that physical activity was a key issue during the Covid-19 outbreak among pregnant women. This evidence offers a significant problem-how to improve and maintain PA for pregnant women during the COVID-19 outbreak to decrease the risks of infected virus COVID-19. This study aimed to identify the effects and influence factors to achieve the recommended level of physical activity for pregnant women during the COVID-19 pandemic.

METHODS

The type of research employed in this study is retrospective descriptive research with a cross-sectional approach. Convenience sampling was used to select the participants as the study population, drawn from the source population of all pregnant women.

A community internet-based survey was conducted on pregnant women through midwives and gynecologists' clinics in Takalar Regency, Indonesia. This study was conducted from March to July 2021. This study's participants were pregnant women who visited the Mother and Child Welfare Centre in Takalar Regency, Indonesia, for antenatal care. All pregnant women aged 18 years and older who, in the first, second or third trimester of their pregnancy, lived in Takalar Regency for at least 6 months before the study and were willing to participate were included. Pregnant women with chronic diseases, serious illnesses, disabilities, and psychological problems were excluded from this study.

Socio-demographic variables included anthropometric (age, height, and weight), education levels, religions, and place of current residence and obstetric (week of gestation) data. The barriers to physical activity involved perceived obstacles to physical exercise and care in preparing for childbirth. A standardized Pregnancy Physical Activity Questionnaire (PPAQ) measured the physical activity level of pregnant women. Intraclass correlation coefficients used to measure the reproducibility of the PPAQ were 0.78 for total activity, 0.82 for moderate activity, 0.81 for vigorous activity, and ranging from 0.83 for sports or exercise to 0.93 for occupational activity. Spearman correlations between the PPAQ and

three published cut points used to classify actigraphy data ranged from 0.08 to 0.43 for total activity, 0.25 to 0.34 for vigorous activity, 0.20 to 0.49 for moderate activity, and 0.08 to 0.22 for light-intensity activity. The PPAQ is a semi-quantitative questionnaire that asks respondents to report the time spent participating in 32 activities, including household or caregiving (13 activities), occupational (5 activities), sports or exercise (8 activities), transportation (3 activities), in-activity (3 activities). For each activity, respondents were asked to select the category that best approximates the amount of time spent in that activity per day or week during the current trimester. Possible durations range from 0 to 6 or more hours per day and from 0 to 3 hours per week. To determine the category cut points, the researchers examined the frequency distribution of time spent in each questionnaire activity as reported on the 24-hour recalls. Categories were selected such that single categories did not encompass substantial variation in participation to increase the discriminatory capacity of questionnaire items further (Wolf et al., 1994). The categories were then translated into durations and computed into the average weekly time spent on each activity. The intensity was calculated based on the specific MET values assigned to each activity (Ainsworth et al., 2011). Based on the total number of MET minutes per week, the women were classified as either fulfilling the recommended minimum level of physical activity of ≥ 600 MET minutes per week or not fulfilling the recommendations with <600 MET minutes (Ainsworth et al., 2011).

This study collected the data online because it is not feasible to do an institutional-based sampling survey during this outbreak period. Relying on the authors' networks with midwives and gynecologists in Indonesia, a one-page recruitment poster was posted to moments and groups of their "WhatsApp, Line, Facebook and Twitter" accounts. This poster contained a brief introduction on the background, objective, procedures, voluntary nature of participation, declarations of anonymity and confidentiality, notes for filling in the questionnaire, and the link to the online questionnaire.

Eligible participants were instructed to complete the questionnaire by clicking the link with the Google Forms application. The eligible participants answered a yes-no question to confirm their willingness to participate voluntarily. After confirmation of the question, the eligible participants were directed to complete the self-report questionnaire. Over 5 months, a total of 300 pregnant women who attended the care center for antenatal care participated in this

study. Trained research assistants used the structured self-administered interview questionnaires to collect data.

The research protocol was reviewed and approved by Muhammadiyah Yogyakarta University, Indonesia (No.163/EC-KEPK FKIK-UMY/VI/2021). Ethical research aims to ensure confidentiality, protect respondents' identity, and respect respondents' rights by asking for therapeutic approval. The nature of participation in the study is voluntary, and therefore, researchers were given the freedom of eligible participants to participate or not in this study. Researchers also permitted the respondents to discontinue participation at any time, either before or during the study. The participants were informed that data would be used only for research purposes. Written informed consent was obtained from all participants before participation in this study. It was mentioned that anonymity and confidentiality would be maintained and that the participation was voluntary. To ensure respondents' privacy, the data collection questionnaire did not include names and any identifying information.

All data were analyzed using SPSS version 23.0. The physical activity variable was dichotomized as a sufficient level of physical activity for those who achieved a recommendation level of physical activity of ≥ 600 MET minutes per week and insufficient for those who did not fulfill the recommendation level. Descriptive statistics were completed to determine the variables' means, frequencies, and percentage distributions. Chi-square analysis was employed to identify the association between sufficient and insufficient physical activity and socio-demographic variables.

The multivariable logistic regressions were used to assess the influences and factors associated with achieving the recommended level of physical activity of ≥ 600 MET minutes per week for pregnant women. The odds ratio (OR) with 95% confidence interval (CI) demonstrated the strength of association between variables. Variables with a p-value <0.05 were statistically significant.

RESULTS

Most pregnant women aged 21-to 35 years old participated in this study. More than half of respondents with insufficient levels of physical activity ($n=70$; 39.1%) had completed a secondary degree. Almost all pregnant women with insufficient physical activity ($n=166$; 92.7%) were housewives. The majority of respondents with insufficient levels of

Table 1. The Socio-demographic Characteristics of Sufficient and Insufficient Levels of Physical Activity

Variables	Categories	Sufficient level of physical activity, n (%) N = 121 (40.3)	Insufficient level of physical activity, n (%) N= 179 (59.7)	p-value
Age (years)				0.717
	≤ 20	10 (8.3)	19 (10.6)	
	21-35	95 (78.5)	140 (78.2)	
	≥ 36	16 (13.2)	20 (11.2)	
Educational levels				0.000
	Primary or below	10(8.2)	59(33.0)	
	Secondary	29(24.0)	70(39.1)	
	Higher secondary and above	82(67.8)	50(27.9)	
Occupation of pregnant women				0.048
	Housewife	103 (85.1)	166 (92.7)	
	Government employees	4 (3.3)	7 (3.9)	
	Private employees	3 (2.5)	1 (0.6)	
	Entrepreneur	11 (9.1)	5 (2.8)	
Occupation of husband				0.740
	Government employees	4 (3.3)	8 (4.5)	
	Private employees	4 (3.3)	8 (4.5)	
	Entrepreneur	81 (67.0)	109 (60.9)	
	Others	32 (26.4)	54 (30.1)	
Husband monthly income				0.942
	≤ 2.5 million IDR	114 (94.2)	169 (94.4)	
	>2.5 million IDR	7 (5.8)	10 (5.6)	
Pregnant women monthly income				0.040
	No income	102 (84.3)	164 (91.6)	
	≤ 2.5 million IDR	15 (12.4)	8 (4.5)	
	>2.5 million IDR	4 (3.3)	7 (3.9)	
Family size				0.034
	≤ 2 members	111 (91.7)	149 (83.2)	
	≥ 3 members	10 (8.3)	30 (16.8)	
Pregnancy duration				0.186
	1st trimester	40 (33.1)	50 (27.9)	
	2nd trimester	48 (39.7)	62 (34.7)	
	3rd trimester	33 (27.2)	67 (37.4)	

physical activity had one or two children (n=149; 83.2%), and the husband's income was below two and half million Indonesian Rupiah (IDR) monthly (n=169; 94.4%). Most of the respondents with insufficient levels of physical activity were in the third trimester (n=67; 37.4%) of pregnancy.

More than half of the participants in this study (59.7%) did not fulfill the recommended level of physical activity of less than 600 MET minutes per week (Table 1). More education level ($p = 0.001$) of pregnant women achieved the recommended level of physical activity of ≥ 600 MET minutes per week. The majority of pregnant women (92.7%) who were housewives had insufficient levels of physical activ-

ity. Almost all pregnant women in this study (91.7%) without income were physically inactive (p -value 0.040). The Majority of pregnant women with less than two children significantly achieved the recommended level of physical activity of ≥ 600 MET minutes per week (p -value 0.034).

Pregnant women with sufficient physical activity reported spending more hours per week on different activities and more hours of sedentary time per week. The mean total activity hours per week in the physically active group was 48.81 (10.74) compared to 35.75 (6.71) in the physically inactive group (p -value 0.000) (Table 2).

The logistic regression model was applied to

Table 2. Different Activities about Sufficient and Insufficient Levels of Physical Activity

Variables	Sufficient level of physical activity N = 121 (40.3) Mean (SD)	Insufficient level of physical activity N= 179 (59.7) Mean (SD)	<i>p-value</i>
Sedentary time (h/week)	9.40 (3.62)	7.60 (2.47)	0.000
Housework (h/week)	24.20 (4.50)	17.07 (3.42)	0.000
Light intensity level of physical activity (h/week)	15.95 (4.00)	10.80 (3.43)	0.000
Moderate intensity level of physical activity (h/week)	19.30 (4.88)	14.55(3.82)	0.000
Vigorous intensity level of physical activity (h/week)	2.71(1.45)	2.18(1.57)	0.003
Occupational of physical activity (h/week)	0.53(1.01)	0.15(0.48)	0.000
Other physical activity (h/week)	10.49(5.51)	7.99(4.55)	0.000
Total time for physical activity (h/week)	213.69(39.52)	143.73(23.95)	0.000
Total activity (h/week)	48.81(10.74)	35.75(6.71)	0.000

Table 3. Logistic Regression Predicting the likelihood of not Achieving a Recommended Level of Physical Activity per Week

Variables	Odds Ratio	95%CI	<i>p-value</i>
Age	0.680	0.22-2.15	0.512
Occupation of pregnant women	0.735	0.05-11.55	0.826
Occupation of husband	0.470	0.40-5.53	0.548
Educational Qualification	3.226	2.20-4.73	0.000
Husband monthly income	0.47	0.04-5.53	0.795
Pregnant women's monthly income	0.714	0.06-9.03	0.795
Family size	2.147	0.93-4.96	0.074
Pregnancy duration	1.292	0.67-2.50	0.446

assess the factors influencing the achievement of the recommended level of physical activity of ≥ 600 MET minutes per week among pregnant women (Table 3). The pregnant women with a higher secondary or above degree were 3.23 times more likely to achieve the recommended physical activity level than those with primary or below education (OR = 3.23, 95% CI: 2.20 to 4.73, $p=0.001$).

DISCUSSION

This study identified how the Covid-19 outbreak affected physical activity among pregnant women. It is clear from the results that the COVID-19 outbreak significantly impacts the physical activity levels of this group of women. This study found that less than half (40.3%) of the pregnant women had sufficient physical activity or achieved a recommended level of physical activity based on a minimum of ≥ 600 MET minutes per week. These results showed a higher percentage of pregnant women who achieved the recommended level of physical

activity than in prior studies (Richardson et al., 2016; Di Fabio et al., 2015; Santo et al., 2017). The possible reason for differences in findings could be from instruments in which pregnant women in this study used self-report. Recall bias might have influenced when the pregnant women reported physical activity levels during pregnancy. The pregnant women in this study have lower levels of physical activity due to the fact that pregnancy already restricts physical activity chances, with opportunities being further restricted because of the COVID-19 outbreak. Consequently, we need to develop an online physical activity program occupied by an instructor competent in prenatal exercise for this group of women to prevent the decline of opportunities in future lockdowns. There is a need for the development of online PA or exercise classes.

Our findings were lower levels of physical activity than studies from Bangladesh (Kundu et al., 2021), Iran (Davoud & Abazari, 2020; Lotfi et al., 2020) and the United States (Rhodes et al., 2020). In contrast, the prior study reported that 58.3% of preg-

nant women were physically active during pregnancy (Kundu et al., 2021). The discrepancies in the level of physical activity could be due to differences in the occupation and education levels of pregnant women. Pregnant women with a higher education degree have greater access to information about physical activity during the COVID-19 outbreak from the Internet (Hillyard et al., 2021; Atkinson et al., 2020).

The majority of pregnant women in our study were housewives, which reduced involvement in occupational activity. Employed women were more likely to engage in physical activity during pregnancy than housewives. In general, Indonesian pregnant women frequently take maternity leave, which may cause them to spend less time at work. Most pregnant women feel more comfort and security performing housework than participating in occupational or sporting activities during their pregnancy (Gebregziabher et al., 2019).

A recent study found that pregnant women with a sufficient level of physical activity with secondary and below the levels of education did not achieve the recommended level of physical activity. Our finding was similar to previous studies that higher-educated pregnant women were more active throughout pregnancy than lower-educated people (Nascimento et al., 2015). Higher-educated women may be better informed about pregnancy exercise. During the COVID-19 outbreak or further restrictions, pregnant women need a guidance book related to physical activity during pregnancy, including benefits, recommendation levels, physical activity guidelines during pregnancy, and type of physical activity (Health & Social Care, 2020). This book could better understand how pregnant women perform their physical activity during outbreaks.

Our study demonstrates that the COVID-19 outbreak caused limitations on all daily activities. The majority of pregnant women in the second trimester lack physical activity. Our results were similar to a previous study found that pregnant women in trimester two during lockdown COVID-19 (Hillyard et al., 2021; Shehzadi et al., 2022). Pregnant women prefer to be physically active during the third trimester because they would like to decrease the risk of low-birth-weight outcomes (Leiferman & Evenson, 2003). Pregnant women continued to maintain their physical activity to improve their well-being (Thompson et al., 2017). In the second and third trimesters, provider recommendations gradually improved women's intentions to achieve physical activity requirements (Mousavi et al., 2020). Midwives and other health professionals involved in prenatal care are crucial in

supporting physical exercise.

The Strengths and Limitations of the Study

To the best of our knowledge, this is the first study investigating the impact of COVID-19 on the physical activity levels of pregnant women. This study has valuable findings that could prove helpful in future lockdowns and pandemics.

The present study has several limitations. First, this study recruited Indonesian pregnant women in Sulawesi Island as study subjects; thus, the results cannot be generalized to other women from other islands in Indonesia. Future studies suggest recruiting participants from another island in Indonesia. Second, cultural variation may exist in the questionnaire; the possible reason for differences in findings could be from instruments for which pregnant women in this study used self-report. Recall bias might have influenced when the pregnant women reported physical activity levels during pregnancy. Third, this study used a cross-sectional design, which cannot assume the variables are causally related.

CONCLUSION

Pregnant women with primary or below degrees were more likely to engage in insufficient physical activity than those with higher secondary or above degrees (OR = 3.23, 95% CI: 2.20 to 4.73, $p=0.000$). Healthcare care professionals, especially midwives, need advice and support for pregnant women with low education backgrounds to improve their physical activity to the recommended level.

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