

Relationship between Physical Activity and Bone Density of Pregnant Women in Padang

Ratna Dewi, Rahmatul Ulya

Abstract— Background: This illustrates that the proportion of osteoporosis is greater in women and based on the risk, women are four times more likely to experience osteoporosis than men. Physical exercise with moderate intensity will increase serum 1.25-dihydroxycoleciferol and parathyroid hormone. **Methods:** The design of this study was analytic descriptive, with cross sectional study approach. Data collected using modified Baecke Questionnaire and Quantum Resonance Magnetic Analyzer (QRMA). **Results:** more than half of 64.5% respondents have a high activity and more than half of respondents have a abnormal bone density (54.8%). **Conclusion:** There was a significant relationship between the physical activity with density bone of pregnant women.

Index Terms— Activity, Density Bone, Pregnant.

I. INTRODUCTION

Data from Indonesian Orthopedic Association, 41.8% of men and 90% of women already have symptoms of osteoporosis. This illustrates that the proportion of osteoporosis is greater in women and based on the risk, women are four times more likely to experience osteoporosis than men.(1)

Based on data from West Sumatra in 2019, based on examining bone mass density with densitometry tools in various places in West Sumatra, the results were that from 4,521 people examined, the incidence of osteoporosis was 15.43% osteoporosis, 35.96% osteopenia and 48.59% normal. Especially in the city of Padang in 2017, out of 1105 people examined by densitometry, it was found that 14.02% were osteoporosis, 44.97% osteopenia and 40.99% normal.(2)

The effect of physical activity on biological functions can be in the form of positive effects, namely improving body functions and negative effects that are destructive or inhibiting the body's metabolism. Changes in calcium metabolism during exercise depending on the intensity of exercise. Exercise also changes the motility and permeability of the small intestine so that calcium absorption increases. Physical exercise with moderate intensity will increase serum 1.25-dihydroxycoleciferol and parathyroid hormone. In a previous study, high intensity exercise in female rats (Sprague-Dawley) had higher duodenal calcium absorption compared to controls.(3)

The results of research by Recker et al in Groff and Gropper prove that physical activity is associated with increased bone density. If there is no effort to maintain bone

density, osteoporosis will quickly occur, the presence of bone reserves in middle age can slow down the appearance of clinical manifestations of osteoporosis in the elderly.(4)

II. MATERIALS AND METHODS

A. Study Design and Research Sample

The design of this study was analytic descriptive, with cross sectional study approach. The study was conducted at Padang City, West Sumatera Province, Indonesia. Sample size 93 people. Data were collected using Baecke form to measure physical activity and Quantum Resonance Magnetic Analyzer (QRMA) to measure bone density.

B. Operational Definitions

The variables of this study included independent variable is physical activity and dependent variable is bone density.

C. Data Collection Technique

Physical activity data were obtained through direct interviews with pregnant women using a modified Baecke questionnaire (attached).

Bone density is measured using a Quantum Resonance Magnetic Analyzer (QRMA) performed with a device that collects the frequency and energy of the human body from a magnetic field sensor via a handgrip sensor.

D. Data Analysis

Data were analyzed univariately and bivariately. Univariate analysis in the form of distribution, data frequency, percentage and mean. Bivariate analysis using the chi square formula with p value <0.05.

III. RESULTS

Description of physical activity pregnant women in Padang

Ratna Dewi, Midwifery Academy Pasaman Barat, West Sumatera Province, Indonesia

Rahmatul Ulya, Midwifery Program, West Sumatera School of Health, Lubuk Alung, West Sumatera Province, Indonesia

Table 1: Frequency distribution of physical activity of pregnant women in Padang

No	Physical Activity	f	%
1	Active	60	64.5
2	Less active	33	35.5
Total		93	100

Table 1 showed that more than half of respondents have a high activity (64.5%).

Description of bone density pregnant women in Padang

Table 2: Frequency distribution of bone density pregnant women in Padang

No	Bone Density	f	%
1	Normal	42	45.2
2	Abnormal	51	54.8
Total		93	100

Physical Activity	Bone Density				Total n	Total %	OR (95% CI)
	Normal		Abnormal				
	N	%	N	%			
- Active	29	48,3	31	51,7	60	100	1,439
- Less Active	13	39,4	20	60,6	33	100	0,6-3,4
Total	42	45,2	51	54,8	93	100	

p value 0.04

Based on the statistical test, the p value was <0.05, which means that there was significant relationship between the level of physical activity and the bone density of pregnant women.

IV. DISCUSSION

Physical activity in this study uses the Baecke questionnaire where there are three indexes that were interviewed combined, namely work index, sports index and leisure time index. Subjects classified as active were not only contributed from the sports index but also from the work index and leisure index. When answering questions, the subject was hesitant to answer questions. Meanwhile, according to several studies, physical activity related to bone density is routine sports or activities that expend energy and support loads.(5)

This result is not in accordance with that obtained by William and Margaret who concluded that women who actively do physical activity experience less bone density reduction than those who do not exercise regularly. This difference in results is because in William and Margaret's study, pregnant women were actually given regular exercise which was then compared to controls, namely pregnant women who did not exercise regularly.

V. CONCLUSION

The conclusion of this study confirmed there was a significant relationship between physical activity with bone density pregnant woment.

VI. ACKNOWLEDGMENT

We would like to thank all respondents who participated in

this study.

REFERENCES

- [1] RISKESDAS. Riset Kesehatan Dasar; Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI Tahun2019. Lap Nas 2010. 2010;1-446.
- [2] Provinsi Sumbar D. Jln. Perintis Kemerdekaan No.65A Padang. 2018;(65).
- [3] Rahmawati D. Hubungan Aktivitas Fisik Ibu Saat Hamil Dengan Kejadian Seksio Sesarea Di Kediri. J Kebidanan. 2019;7(2):112-7.
- [4] Wei W, Shary JR, Garrett-Mayer E, Anderson B, Forestieri NE, Hollis BW, et al. Bone mineral density during pregnancy in women participating in a randomized controlled trial of Vitamin D supplementation. Am J Clin Nutr. 2017;106(6):1422-30.
- [5] Agueh VD, Tugoué MF, Sossa C, Métonnou C, Azandjemè C, Paraiso NM, et al. Dietary Calcium Intake and Associated Factors among Pregnant Women in Southern Benin in 2014. Food Nutr Sci. 2015;06(11):945-54.