OTARIA EXERCISE FOR THE INFLUENCE OF 8-HYDROXYDEOXYGUANOSINE (8-OHDG) IN POSTPARTUM WOMEN

Januarsih Januarsih, Anwar Mallongi, Efi Kristiana, Rafidah Rafidah, Erni Yuliastuti, Darmayanti Darmayanti

ABSTRACT

Objectives: If a woman is in a physiological post partum condition, there will be an increase in the production of free radicals in her body. This situation will be worse if the woman is undergoing pathological postpartum, the production of free radicals in her body will be even greater. This condition is known as "oxidative stress".

Theoretical Framework: Doing Otaria exercise will affect the muscle's need for oxygen, which will increase, meaning it requires strong blood flow like the uterine muscles. By doing postpartum exercises, it will stimulate uterine contractions, so that uterine contractions will be better, the release of lochia will be smooth, which will affect the uterine involution process.

Method: The design used in this research was Post Test Only Control Group Design or post test with experimental and control groups. The sample in this study was 20 respondents in the experimental group and 20 respondents in the control group.

Results and conclusion: In postpartum mothers, there is an increase in lipid peroxidation products, especially 8-OHdG. The 8-OHdG is one of the product compounds of the lipid peroxide reaction which is also used as a marker of oxidative stress.

Implications of the research: Research implications: midwifery services, maternal and child health and the reduction of maternal and infant mortality rates are affected by this study. The potential for quality midwifery care in the postpartum period can benefit the health of mothers and their babies. This study allows for further research and collaboration in the future to further reduce maternal mortality in the post partum period.

Keywords: postpartum mothers, Otaria exercise, 8-OHdG.

---

a Master in Midwifery Department, Banjarmasin Polytechnique of Health, Indonesian Ministry of Health, Banjarbaru, E-mail: januarsih.januarsih@gmail.com, Orcid: https://orcid.org/0009-0004-6178-6059
b Professor in Environmental Health, Public Health, Hasanudin University, Makassar, E-mail: rawnaenvi@gmail.com, Orcid: https://orcid.org/0000-0001-6438-1154
c Master in Midwifery Department, Banjarmasin Polytechnique of Health, Indonesian Ministry of Health, Banjarbaru, E-mail: efi.kristiana@gmail.com, Orcid: https://orcid.org/0009-0007-4186-7566
d Master in Midwifery Department, Banjarmasin Polytechnique of Health, Indonesian Ministry of Health, Banjarbaru, E-mail: raafiahendri@gmail.com, Orcid: https://orcid.org/0000-0001-9838-5153
e Master in Midwifery Department, Banjarmasin Polytechnique of Health, Indonesian Ministry of Health, Banjarbaru, E-mail: darmayanti@gmail.com, Orcid: https://orcid.org/0009-0000-0033-1713
f Master in Midwifery Department, Banjarmasin Polytechnique of Health, Indonesian Ministry of Health, Banjarbaru, E-mail: ernirokhadi@gmail.com, Orcid: https://orcid.org/0000-0002-1165-5104
OTARIA EXERCÍCIO PARA A INFLUÊNCIA DE 8-HIDROXIDEOXIGUANOSINA (8-OHDG) EM MULHERES PÓS-PARTO

RESUMO

Objetivos: Se uma mulher está em uma condição fisiológica pós-parto, haverá um aumento na produção de radicais livres em seu corpo. Essa situação será pior se a mulher estiver passando por um pós-parto patológico, a produção de radicais livres em seu corpo será ainda maior. Esta condição é conhecida como "estresse oxidativo".

Estrutura teórica: Fazer o exercício Otaria afetará a necessidade de oxigênio do músculo, que aumentará, o que significa que requer um fluxo sanguíneo forte como os músculos uterinos. Ao fazer exercícios pós-parto, estimulará as contrações uterinas, de modo que as contrações uterinas serão melhores, a liberação de lochia será suave, o que afetará o processo de involução uterina.

Método: O desenho utilizado nesta pesquisa foi Pós-Teste Apenas Design de Grupo de Controle ou pós-teste com grupos experimentais e de controle. A amostra deste estudo foi de 20 participantes no grupo experimental e de 20 participantes no grupo controle.

Resultados e conclusão: Nas mães pós-parto, há um aumento nos produtos de peroxidação lipídica, especialmente 8-OhdG. O 8-OHdG é um dos compostos do produto da reação do peróxido lipídico que também é usado como um marcador do estresse oxidativo.

Implicações da pesquisa: Implicações da pesquisa: serviços de parteiras, saúde materna e infantil e redução das taxas de mortalidade materna e infantil são afetados por este estudo. O potencial para cuidados de parteira de qualidade no período pós-parto pode beneficiar a saúde das mães e seus bebês. Este estudo permite uma maior pesquisa e colaboração no futuro para reduzir ainda mais a mortalidade materna no período pós-parto.

Palavras-chave: mães pós-parto, exercício Otaria, 8-OhdG.

1 INTRODUCTION

Maternal and newborn deaths reflect the poor quality of obstetric health services. Maternal mortality rate (MMR) or infant mortality rate (IMR) is a sensitive measure to see the success of health services, especially for mothers and children. According to a report from the World Health Organization (WHO), in 2014 the maternal mortality rate in the world was 289,000. The United States 9300, North Africa 179,000 and Southeast Asia 16,000 (Hejazi et. al, 2019).

The World Health Organization (WHO) states that the causes of maternal mortality in the world are bleeding by 27%, infection by 11%, hypertension in pregnancy by 14%, abortion complications by 8%, prolonged labor and others by 9%. While the cause of
maternal mortality in Indonesia, namely bleeding, is the highest rate compared to other causes of maternal death such as poisoning in pregnancy, abortion, and infection (Wathanakom, 2023)

Maternal mortality rate is also one of the important indicators in determining the degree of public health. MMR refers to the number of maternal deaths associated with pregnancy, childbirth, and postpartum. Based on data obtained from Karang Intan 2 Health Center, Banjar Regency, South Kalimantan Province, there were 978 postpartum mothers during 2022.

Post partum mothers need essential care so that uterine contractions can be optimal to support the uterine involution process. One of the essential care is postpartum exercise. Postpartum exercises are in the form of mobility or muscle stretching exercises. Postpartum exercises can be done after giving birth. The exercise consists of early mobilization exercises and physical exercises starting from light exercises and then increasing them with heavier mobilizations. Rianti Abdominal Muscle Postpartum Exercise or Otaria Postpartum Exercise is a modified postpartum exercise using relaxation techniques and abdominis muscle training with caregiver assistance, the aim is to accelerate the reduction of TFU to its original form, prevent complications, speed up recovery and increase fitness for postpartum mothers (Sumarni and Nahira. 2022).

In a study conducted by Ilma Saufika and Machmudah (2020) on the effect of postpartum exercises on the process of uterine involution in postpartum women at Ratu Zalecha Hospital, Banjar Regency in 2019 obtained from 68 (77.8%) respondents showed that most respondents performed postpartum exercises. The results of chi-square analysis showed a significance value of P = 0.000 (sig < 0.05) which means that there is an influence between postpartum exercises on the process of uterine involution in postpartum women.

If a woman is in a physiological post partum condition, there will be an increase in the production of free radicals in her body. This situation will be worse if the woman is undergoing pathological postpartum, the production of free radicals in her body will be even greater. This condition is known as "oxidative stress". This means that there has been a disturbance in the balance between oxidants and antioxidants. Oxidative stress is characterized by a decrease in antioxidant activity accompanied by an increase in levels of oxidants/free radicals. These highly toxic oxidants/free radicals will circulate throughout the body in the bloodstream (Liguori et al., 2018). This situation of course
causes disruption/delay in recovery during the postpartum period. If this continues, it will cause damage or pathological conditions both physically and psychologically to the mother. This situation can be prevented by postpartum mothers doing Otaria exercises (Sumarni and Nahira. 2022; A, Asrina et al., 2023; Siokal et al., 2023; Pobas et al., 2023; Hattu et al., 2023).

Some antioxidants themselves are already found in the body (endogenous) and some are obtained from outside the body (exogenous). In general, antioxidants are divided into 2 groups, namely: enzymatic antioxidants / primary antioxidants / preventive antioxidants and non-enzymatic antioxidants consisting of superoxide dismutase (SOD), Glutathione peroxidase (GPx) and Catalase (CAT). (Warraich et al., 2020).

The purpose of this study was to determine the effect of otaria gymnastics on 8-OHdG levels in postpartum women in the Karang Intan 2 Health Center working area.

2 THEORETICAL FRAMEWORK

Maternal mortality rate is also one of the important indicators in determining the degree of public health. MMR refers to the number of maternal deaths associated with pregnancy, childbirth, and the postpartum period (Frijhoff, et al. 2015).

The postpartum period is the period of return of the uterus to its original form as before pregnancy or also known as the process of uterine involution which is characterized by a decrease in the height of the uterine fundus. Uterine involution in postpartum women is influenced by many factors, one of which is physical activity, namely puerperal gymnastics or postpartum gymnastics (with healthy maternal conditions) which aims to reduce infections that occur in uterine involution due to residual blood that is not removed, reduce the risk of abnormal bleeding and to avoid blood clots that clog veins. Other benefits of postpartum exercises are to help improve blood circulation, body and back posture after childbirth, improve muscle tone, pelvic and abdominal muscle stretching and improve pelvic muscles and help mothers to be more relaxed and refreshed after giving birth (Bresciani, et al 2015).

Doing postpartum exercise will affect the muscle's need for oxygen, which will increase, meaning it requires strong blood flow like the uterine muscles. By doing postpartum exercises, it will stimulate uterine contractions, so that uterine contractions will be better, the release of lochia will be smooth, which will affect the uterine involution process. The duration of each exercise is between 15-30 minutes, and there are 3 main
steps in doing exercise, namely the initial, core and final relaxation steps. Meanwhile, each step consists of several gymnastic movements. Exercise is done every day from the first to the seventh day postpartum.

Rianti Abdominis Muscle Postpartum Exercise or 'Otaria' Postpartum Exercise is postpartum exercise modified by relaxation techniques and abdominis muscle training with the assistance of a caregiver. The caregiver or closest person in question is the husband or parents/in-laws or siblings (brother/sister) who live in the same house as the postpartum mother with the aim of providing support to the mother. The duration of each exercise is between 15-30 minutes, and there are 3 main steps in doing exercise, namely the initial, core and final relaxation steps. Meanwhile, each step consists of several gymnastic movements. Exercise is done every day from the first day to the seventh day postpartum. The aim of Otaria postpartum exercise is to speed up recovery and fitness for postpartum mothers (Sumarni and Nahira. 2022).

3 MATERIAL AND METHODS

The implementation of this research was carried out by providing Otaria postpartum exercise treatment in the intervention group and no postpartum exercise treatment in the control group for 7 days. The design used in this research was Post Test Only Control Group Design or post test with experimental and control groups.

The population in this study were all mothers who underwent the 2 hour postpartum period on 01 – 20 September 2023 (20 days) in the PKM Karang Intan 2 work area, Banjar Regency, totaling 53 people. The sample in this study was 20 respondents in the experimental group and 20 respondents in the control group. Those who meet the criteria include: physiological postpartum, have normal blood pressure and are willing to voluntarily become respondents.

Take a 5 mL venous blood sample, insert it into a non-EDTA (Ethylene Diamine Tetra Acetate) tube, then centrifuge the blood sample at 3000 rpm for 15 minutes to separate the fluid from blood cells, then take the serum, and store it at -20 0C before parameter measurements are carried out.

The research was conducted in the Public Health Center Karang Intan 2 work area, Banjar Regency, which includes 13 villages, namely Sungai Alang Village, Sungai Landas, Sungai Asam, Abirau, Nyiur Island, West Mandikapau, East Mandikapau, West
Mandiangin, East Mandiangin, Padang Panjang, Kiram, Awang Bangkal West and East Awang Bangkal.

The research instrument or measuring tool used to see the effect of postpartum exercise on 8-OHdG levels in postpartum women is the 8-OHdG ELISA Assay Kit from AssayGenie with catalogue product code: UNES00018.

4 RESULTS AND DISCUSSION

The research was conducted in the Public Health Center Karang Intan 2 work area, Banjar Regency, which includes 13 villages, namely Sungai Alang Village, Sungai Landas, Sungai Asam, Abirau, Nyiur Island, West Mandikapau, East Mandikapau, West Mandiangin, East Mandiangin, Padang Panjang, Kiram, Awang Bangkal West and East Awang Bangkal.

Testing the assumption of homogeneity of variance is done using the Levene test. The assumption of homogeneity of variance is said to be fulfilled if the p-value of the calculation results is greater than $\alpha = 0.05$. The following are the results of testing the assumption of homogeneity of variance:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>p-value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-OHdG Levels</td>
<td>1.899</td>
<td>0.150</td>
<td>Homogenous</td>
</tr>
</tbody>
</table>

Source: Prepare by author (2023)

Based on the results of testing the assumption of homogeneity of variance in the table above, it is shown that the variable 8-OHdG levels obtained a p-value of more than 0.05 ($p > 0.05$). Therefore, the assumption of homogeneity of variance in the variable 8-OHdG levels has been fulfilled. This shows that the assumption of homogeneity of variance in the 8-OHdG variable has been fulfilled. Therefore, testing on the 8-OHdG variable was carried out parametrically using ANOVA.

Based on the results of the analysis using ANOVA, the p-value is 0.000, smaller than $\alpha = 0.05$ ($p < 0.05$). So from this test it can be concluded that there is a significant effect of otaria exercise on MDA levels. Or in other words, there is a significant difference in MDA levels due to the implementation of Otaria exercises.
Based on the results of the 5% LSD test, the comparison between groups K- and K+, showed that there was no significant difference between groups K- and K+. This is indicated by the mean ± sd value which contains the same letter.

Figure 1. The Histogram of 8-OHdG Levels Changes
Implementation of the Otaria exercise was able to reduce 8-OHdG levels significantly.

The figure shows a histogram of the average 8-OHdG levels in the plasma of postpartum women who did the Otaria exercise and those who did not do the Otaria exercise. Significantly, 8-OHdG levels were lower in the group of postpartum mothers who did Otaria exercise compared to the group of postpartum mothers who did not do Otaria exercise.

In this study, postpartum mothers who did not do the Otaria exercise had an increase in 8-OHdG levels. The postpartum period is a condition that is vulnerable to all kinds of stress. This is the result of physiological changes and metabolic functions since the beginning of pregnancy and fatigue during childbirth, causing oxidative reactions to increase to produce the energy needed by women during the postpartum period. Oxidative reactions increase, which will also increase the need for oxygen. If oxygen use is not optimal and the body is unable to eliminate it, oxidative stress will form (Violi et al., 2021). The formation of reactive oxygen species, due to oxidative stress, triggers peroxidation of polyunsaturated fatty acids (lipids) in cell membranes and blood, thereby affecting cell function. Some of the oxidation reactions that occur produce oxygen free radicals (Thirupathi et al., 2021).

Increased levels of 8-OHdG in postpartum women are caused by increased levels of lipid peroxidation due to ROS. Excessive ROS release causes disruption of intracellular oxidant and antioxidant balance (Goodyear et al, 2022).
In postpartum mothers, there is an increase in lipid peroxidation products, especially 8-OHdG (Adiga et al., 2007). 8-OHdG is one of the product compounds of the lipid peroxide reaction which is also used as a marker of oxidative stress. Plasma of postpartum mothers contains oxidative stress ingredients and cytokines (TNF-α, IL-6), ANG II (Sankaralingam et al., 2016; Gilbert et al., 2017).

These cytokines are thought to induce inflammatory reactions. If the plasma of postpartum mothers contains oxidative stress materials and inflammatory materials, it will produce high superoxide anion (O2\(^-\)) as well. This is in line with Candra in Abimulyani et al. (2014) who said that in the plasma of postpartum mothers who did not do puerperal exercises, there was an increase in H2O2 levels compared to H2O2 levels in the blood plasma of postpartum mothers who did Otaria exercises (Andican et al., 2012).

Postpartum is a state that is vulnerable to all kinds of stress resulting in physiological changes and metabolic functions that have begun from the beginning of pregnancy (Patil et al., 2017). It has also been known that during normal pregnancy there is an increase in free radical production compared to non-pregnancy (Gupta et al., 2019). This is because in pregnant women the number of mitochondria increases because when the placenta begins to form, it will be followed by an increase in the formation of mitochondria following the development of placental enlargement.

5 CONCLUSION

Oxidative stress can be prevented with antioxidants as a mechanism for the body's defense system against free radicals. Oxidative stress in postpartum mothers can be prevented by doing Otaria exercises which can reduce 8-OHdG levels in the plasma of postpartum mothers.
REFERENCES


Sumarni and Nahira. 2022. Increasing the Knowledge of Postpartum Mothers About Otaria Gymnastics in Moncongloe Village, Maros Regency. UNIMUS National Seminar Proceedings. Volume 5