

Effects of Otarian Gymnastics on Malondialdehyde (GoM) Levels in Postpartum Women

Tut Barkinah¹, Januarsih^{1*}, Isnaniah¹

¹Department of Midwifery, Poltekkes Kemenkes, Banjarmasin, Indonesia.

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Corresponding Author:
Januarsih
januarsih.januarsih@gmail.com

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Abstract: If a woman is in a physiological postpartum condition, her body will increase the production of free radicals. 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 situation can be prevented by postpartum mothers doing Otaria exercises. The design used in this research was Post Test Only Control Group Design or Post-test with an experimental group of 20 respondents and 20 respondents in a control group of 20 respondents. The research was conducted in the PKM Karang Intan 2 working area, Banjar Regency, South Kalimantan Province, which includes 13 villages. The research instrument or measuring tool used to see the effect of exercise on MDA levels in postpartum mothers is the GoM Assay Kit (TBA method) from Assay Genie with product catalog: MAES0037. In the treatment group with a low average GoM, it can be seen that the average GoM shows an increase in the control group. This shows that Otaria exercise is able to reduce GoM levels significantly. Oxidative stress can be prevented with antioxidants as a mechanism for the body's defense system against free radicals. Oxidative stress in mothers during the post-partum period can be prevented by doing Otaria exercises which have been proven to be able to reduce GoM levels in post-partum maternal plasma.

Keywords: GoM; Gymnastics otaria; Post partum

Introduction

The postpartum period (puerperium) begins after the birth of the placenta and ends when the uterine organs return to their pre-pregnancy state (Gonzalo-Carballes et al., 2020). In Latin, a certain time starting after giving birth to a child is called puerperium. The word puerperium comes from the word "puer" which means baby and the word "parous" which means giving birth, so puerperium means the period after giving birth to a baby leading to a period of recovery (Adams et al., 2023). During the puerperium period, around 50% of maternal deaths occur in the first 24 hours postpartum, so quality postnatal care must be provided during that period (Tsfay et al., 2022). This must be done to meet the needs of the mother and baby.

Postpartum mothers need essential care so that uterine contractions can be optimal to support the uterine involution process (Rukmawati et al., 2020). One

of the essential cares is postpartum exercise. Postpartum exercises are in the form of mobility or muscle stretching exercises. Post-partum exercises can be done after giving birth. The exercise consists of early mobilization exercises and physical exercises starting with light exercises and then increasing them with heavier mobilizations (Billinger et al., 2014). (Purwati, 2019), Abdominal Muscle Post Partum exercise or Otaria' Postpartum exercise is a modified Post Partum exercise with relaxation techniques and abdominal 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 (Amalia & Hidayah, 2022).

Just like exercise in general, exercise done after giving birth also brings various health benefits (Lee et al., 2023). Doing postpartum ovarian exercises will affect the muscle's need for oxygen, which will increase,

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meaning it requires strong blood flow like the uterine muscles (Hadianti & Sriwenda, 2019). By doing Post Partum exercises, it will stimulate uterine contractions, so that uterine contractions will be better, and the release of lochia will be smooth which will affect the uterine involution process (Qin et al., 2022). The duration of each exercise is between 15-30 minutes, and there are 3 main steps in doing the exercise, namely the initial, core, and final relaxation steps (Petropoulos et al., 2022). Meanwhile, each step consists of several gymnastic movements. Exercise is done every day from the first to the seventh day postpartum (Santos-Rocha et al., 2022).

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 (Korcowska-Lącka et al., 2023): enzymatic antioxidants and non-enzymatic antioxidants consisting of superoxide dismutase (SOD), Glutathione peroxidase (GPx) and Catalase (CAT) (Ighodaro & Akinloye, 2018). Oxidative stress is defined as an imbalance between levels of prooxidants (free radicals) and antioxidants which causes free radical levels to be higher than antioxidant levels in the body (Sharifi-Rad et al., 2020).

Oxidative stress that occurs repeatedly and continuously can trigger lipid peroxidation, where free radicals react with proteins, lipids and DNA which has the potential to cause wider cell tissue damage and produce the compounds Malondialdehyde (GoM), 8-Hydroxydeoxyguanosine (GoM), Nitric Oxide (NO) and Isoprostane (IsoP) (Sies et al., 2017). The aim of Otaria postpartum exercise is to speed up recovery and fitness for postpartum mothers.

Method

The implementation of this research was carried out by providing Otaria Post Partum exercise treatment in the intervention group and no Post Partum 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 postpartum period of 2 hours postpartum 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 PKM Karang Intan 2 work area, Banjar Regency, South Kalimantan Province, 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, West Bangkal Awang and East Bangkal Awang.

The research instrument or measuring tool used to see the effect of exercise on GoM levels in postpartum mothers is the GoM Assay Kit (TBA method) from AssayGenie with product catalog: MAES0037.

Result and Discussion

Post-partum exercises for Abdominal Muscles Rianti or postpartum exercises 'Otaria' are post-partum exercises modified to relax and exercise abdominal muscle techniques with the assistance of a caregiver. The caregiver or closest person in question is the husband or parents or siblings (brother/sister) who live in the same house as the postpartum mother with the aim of providing support to the mother (Beyers-Carlson et al., 2022). The duration of each exercise is between 15-30 minutes, and there are 3 main steps in doing the exercise, namely the initial, core, and final relaxation steps (Sumedi et al., 2021). Meanwhile, each step consists of several gymnastic movements. Exercise is done every day from the first day to the seventh day postpartum (Pohan, 2023).

If a woman is in a physiological postpartum condition, her body will increase the production of free radicals (Watanabe et al., 2013). This situation will be worse if the woman is undergoing pathological postpartum, the production of free radicals in her body will be even greater (Rana et al., 2019). This condition is known as "oxidative stress". This means there has been a disturbance in the balance between oxidants and antioxidants (Kruk et al., 2022). Oxidative stress is characterized by a decrease in antioxidant activity accompanied by an increase in levels of oxidants radicals (Vona et al., 2021). These highly toxic oxidants radicals will circulate throughout the body in the bloodstream (Liguori et al., 2018). This situation of course causes disruption in recovery in 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.

The complete average GoM of the control and treatment groups is shown in the following histogram:

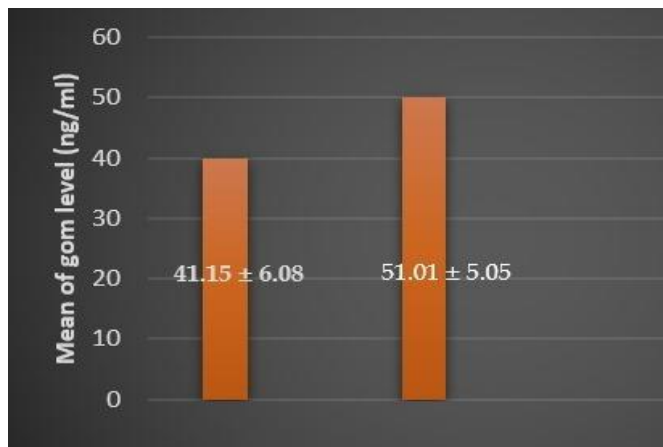


Figure 1. Histogram of changes in GoM levels

Implementation of the Otaria Exercise Can Reduce GoM Levels Significantly

In the figure, the histogram of the average GoM of the Otaria exercise treatment group and the control group is shown. Starting from the treatment group with a low average GoM, it can be seen that the average GoM shows an increase in the control group. This shows that Otaria exercise is able to reduce GoM levels significantly. In this study, Post Partum mothers who did not do Otaria exercises had an increase in GoM levels. The Post Partum period is a condition that is vulnerable to all kinds of stress (Juncker et al., 2022). This is a 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 in the Post Partum 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 (Murphy et al., 2022). The formation of reactive oxygen species, due to oxidative stress, triggers peroxidation of polyunsaturated fatty acids (lipids) in cell membranes and blood (Borza et al., 2013), thus affecting cell function. Some of the oxidation reactions that occur produce oxygen free radicals (Martemucci et al., 2022).

Conclusion

Oxidative stress can be prevented with antioxidants as a mechanism for the body's defense system against free radicals. Oxidative stress in mothers during the post-partum period can be prevented by doing Otaria exercises which can reduce GoM levels in post-partum maternal plasma.

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Author Contributions

Conceptualization, T. B., J. J., I. I.; methodology, T. B.; validation, J. J. and I. I.; formal analysis, T. B.; investigation, J. J., and I. I.; resources, T. B. and J. J.; data curation, I. I.; writing – original draft preparation, T. B. and J. J.; writing – review and editing, I. I.; visualization, and T. B. and J. J. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

No conflicts of interest.

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