The Effect of *Murottal* Intervention in Prolactine Hormone Levels of Breastfeeding Mothers in Takalar Regency

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Abstract: Breast milk is important for the infant's growth and development early in life. Attention to lactating mothers in terms of increasing their breastmilk production is important. This study aimed to investigate the effect of giving murottal therapy on the levels of the hormone prolactin in lactating mothers in Takalar District. This was a true-experimental study in which 44 lactating mothers were divided into two groups, 22 mothers in intervention and 22 in control groups. The study was conducted in Takalar Regency, South Sulawesi Province, Indonesia. The characteristic of the participants showed that the age of participants in the intervention group is two years higher than in the control group. The number of mothers having more than three children is higher compared to the control (31.8% vs 9.1%). All characteristics of intervention and control were statistically not different. The result of this study showed that prolactin hormone levels were decreased in both groups. The prolactin hormone levels in the intervention group showed a lower decrease compared to control group (-89.84 ± 54.14 vs -103.54 ± 65.67), but not significantly different (p=0.453). The Qur'an therapy may be effective to replace music therapy to support lactation period and exclusive breastfeeding program, especially for those from Muslim communities. The District Health Office of Takalar can promote this therapy to improve lactation management program.

Keywords: Breast feeding, prolactin, Qur'an therapy.

INTRODUCTION

Breast milk is the healthiest choice of food for babies because it contains nutrients for the optimal growth and development of the babies. In addition to that, breast milk contains more than 2,000 compounds, including hormones, enzymes, and immune substances which are all essential to support the postnatal period and therefore, these substances should be proportional and balanced. During the lactation period, lactogenic hormones secreted by the anterior pituitary, prolactin, can maintain the production of milk. Thus, increasing the production of this hormone is essential to provide necessary nutrients for the infants early in life. Another substrate present in the breastmilk, colostrum, serves as a protective substance rich in anti-infective, high protein and laxative contents which are ideal for cleaning the unused substances from the newborns gut and preparing the digestive tract of the babies for the next feeding process. Therefore, there is a consensus that breastmilk is the best food for human in the first year of life [1].

In Indonesia, the rate of breastfeeding is relatively low. For example, data from the provincial health office of South Sulawesi in 2013 showed that the prevalence of exclusive breastfeeding was 62.70%. One of the regencies in this province, Takalar Regency, revealed that exclusive breastfeeding just slightly increased from 57.3% in 2011 to 64.7% in 2012 and ended up with 75.4% in 2015. However, there were still one quarter that did not exclusively give their child breastmilk [2]. A study in Takalar recommended that encouraging mothers to give exclusive breastfeeding is necessary to reduce the risk of adverse outcomes for their children [3].

In order to increase the possibility of giving exclusive breastfeeding during lactation, the mother should have awareness, knowledge and must maintain health and nutrition to properly manage lactation. Good lactation practice may stimulate the release of oxytocin, which is important for the lactation process. Therefore, the lack of oxytocin may cause milk-ejection preventing breastfeeding. Oxytocin inhibition in mothers can be also caused by psychological factors [4]. The physical and physiological changes in mothers result in inhbition to release this hormone. Facts show that psychological conditions influence the hormone oxytocin workings.

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Psychological preparation of the mother before breastfeeding is an important factor influencing breastfeeding success. Stress, excessive anxiety, and unhappiness of the mother potentially determine lactation management [5].

To promote the benefits of breastfeeding, standard activities such as breast care aiming to keep breasts always clean and easily inhaled by the baby is done. To date, music therapy is found to be beneficial to improve physical and mental health due to the sound stimulation, and therefore many parents do this therapy. This therapy consists of melody, rhythm, timbre harmony, form and style organized in such a way as to create music that is beneficial for physical and mental health. Listening to music can put a person in a relaxed state that possibly reduces stress and depression experienced by postpartum mothers. Music will stimulate the hypothalamus, producing a calm feeling. This feeling will later affect the production of endorphins, cortisol and catecholamines in the organ regulation mechanism [6].

In Muslim populations, there is a belief that listening to recitation of Qur'an can give a positive effect on the person's mind and therefore, it may also contribute to the lactation management process. This is supported by a study by Motagghi and colleagues that reported that reading and listening to the verses of the Qur'an could act as a simple drug-free method, effective, affordable, accessible and most important for reducing anxiety in athletes before the competition [7]. Another study demonstrated that therapy by reciting the verse of the Quran, called murottal Qur'an, can be useful and give a positive impact on the individual [8]. The period of giving the murottal Quran therapy is at least 11-15 minutes to give benefits [9]. Understanding the potential benefit of murottal in affecting anxiety, it can provide a new approach to increase the successfulness of exclusive breastfeeding. Therefore, this study aimed to investigate the effect of giving murottal therapy on the levels of the hormone prolactin of lactating mothers in Takalar District.

MATERIALS AND METHODS

This research was conducted in Polobangkeng Utara and Polongbangkeng Selatan Subdistricts, Takalar Regency from January to December 2018. The reason why this study was conducted in this location due to the low rate of prevalence of exclusive breastfeeding. This was a true-experimental study using a randomized pre-test and post-test control group design. The population in this study were all breastfeeding mothers in Polobangkeng Utara and Polongbangkeng Selatan sub-districts of Takalar Regency, while the samples in this research were breastfeeding mothers who met the criteria using the random cluster sampling method. The research data was analyzed in bivariate analysis.

Blood samples were taken at 10.00 - 12.00 in the local time (WITA) and conducted by Community Health Center laboratory personnel. Blood was obtained from the median vein in the anterior arm (the elbow inside) for two ccs. The blood sample was deposited, then the serum was separated and stored in the freezer. After the results of blood sampling and the hormone prolactin measurement, the effect analysis of murottal administration on prolactin hormone levels was carried out in breastfeeding mothers.

We acknowledge that at the beginning, 60 lactating mothers recruited as the participants. However, in the second month, ten mothers were dropped out due to several reasons, such as moved to other locations or did not give exclusive breastfeeding because of the lack of breastmilk. Next month, other six lactating mothers were dropped out due to not giving exclusive breastfeeding. Therefore, we could only get 44 mothers until the end of the study (Table **1**).

Table 1: Distribution of Participants

Stage	Polongbangkeng Utara Subdistrict (Intervention)	Polongbangkeng Selatan Subdistrict (Control)	Total
Month I	30	30	60
Drop out	0	0	0
Month II	30	30	60
Drop out	4	6	10
Month III	26	24	50
Drop out	4	2	6
Total	22	22	44

Table 2: Characteristic of Participants

Characteristics	Intervention	Control
Age, mean±SD	32.18±6.86	30.23±5.61
Occupation, n (%)		
Employed	2 (9.1)	1 (4.5)
Unemployed	20 (90.9)	21 (95.5)
Education, n (%)		
Low	15 (68.2)	16 (72.7)
High	7 (31.8)	6 (27.3)
Children, n (%)		
1-3	15 (68.2)	20 (90.9)
>3	7 (31.8)	2 (9.1)

Table 3: Prolactin Levels Change of the Participants

Prolactin level	Pre Mean ± SD	Post Mean ± SD	Difference Mean ± SD	p[1]
Intervention	136.01 ± 52.67	46.16 ± 26.18	-89.84 ± 54.14	<0.001
Control	164.46 ± 46.04	60.92 ± 40.86	-103.54 ± 65.67	<0.001
p[2]	0.063	0.161	0.455	

[1]Wilcoxon Signed Ranks Test; [2]Mann-Whitney test.

RESULTS

The characteristic of the participants is shown in Table **2**. It can be seen that the age of participants in the intervention group is two years higher than in the control group. Similarly, the number of mothers having more than three children is higher compared to control (31.8% vs 9.1%). However, all characteristics of intervention and control are not statistically different.

The analysis results showed the differences in the hormone prolactin levels before and after being given the intervention as in Table **3**. In both groups, there was a significant change in prolactin levels ($p<0.001$). There was no statistical difference between the change in the intervention group and the control group ($p=0.455$).

DISCUSSION

The main finding of this study was that the prolactin level in both groups significantly decreased. In the treatment group, prolactin decreased from 136.01±52.67 to 46.16±26.18. Meanwhile, in the control group, the prolactin level declined from 164.46±46.04 to 60.92±40.85. However, the difference between control and intervention group was not significantly different ($p=0.455$). Although there was a significant reduction in both groups, those receiving Qur'an treatment showed a lower declining compared to control groups (-89 vs -103). The changes of prolactin may be affected by the secretion of dopamine and thyroid-releasing hormones (THR), both of which produce in the hypothalamus [10].

A joyful voice from Qori, the person reciting the Qur'an, may suppress stress hormones, activate natural endorphins, and increase feelings of relaxation, and slow down brain wave activity. Deeper or slower respiratory rate is very good and help in calming down, emotional control, deeper thinking and better metabolism [7]. Feeling relaxed can increase the production of the hormone prolactin. When baby is being breastfed, it can stimulate the letdown reflex (flow reflex) cooperation between the anterior hypophysis in optimizing the production of mother's milk, leading to a slow brain wave activity condition. That is why promoting mothers to give breastmilk to their babies immediately after delivery will increase the prolactin hormones and control their emotion.

Early initiation breastfeeding practice, according to WHO [11], is recommended to do by all mothers for their babies in order to support the success of providing exclusive breastfeeding. As Republic of Indonesia Government Regulation Number 33 the Year 2012 stated, exclusive breastfeeding, giving breastmilk to the children up to 6 months, is supposed to be given in

order to improve child's health. The situation will more easily stimulate the production of the hormone prolactin in the lactation process in nursing mothers to meet the scope of exclusive breastfeeding. High prolactin levels support optimal milk production because it produces quality milk production to meet the needs of breast milk [12].

The production of prolactin hormone begins from pregnancy and delivery and increases during postpartum. In this study, it can be seen that both groups are in the range of normal level of prolactin, although after the intervention, the result showed a declining. The normal level of prolactin is 10 - 25 ng / mL, rising to 200 - 400 ng / mL during pregnancy and childbirth [12]. At the first three months of breastfeeding, the hormone prolactin level is 100 ng / mL before decreases to about 50 ng / mL in the first six months. Murottal Qur'an therapy can inhibit a high reduction of prolactin hormone among lactating mother compared to control. Women who are not giving breastfeeding, the level of the hormone prolactin will immediately go down and return to normal shortly after giving birth [13].

The prolactin hormone is released at various times throughout the day and night. However, the highest levels of prolactin are at 4 - 6 am and breastfeeding at that time will help increase supply of breastmilk because babies drink more often and therefore, prolactin continues to be stimulated [14]. The more breastmilk released from the *lactiferous sunis*, the more breastmilk is produced. In other words, the more often breastfeeding the more milk obtained by the infants. If infants stop being breastfed, the mother's breast will stop producing the breast-milk [15]. Together with the prolactin formation by the anterior pituitary, stimulation originating from the baby's puff generating nerve stimulation which continues into the posterior pituitary gland [16]. As a result, the posterior pituitary produces oxytocin which causes myoepithelial cells around the alveoli to contract and push milk into the lactating vessels so that more milk flows out. This condition is called oxytocin reflex or let down reflex [17].

Similarly, oxytocin hormone is also often found in women with menstruation. Many women return menstruation before ovulation, but only merely 2% of women ovulate and can get pregnant before menstruation again. Mothers who have babies age six months and still give breastfeed only have less than 2% of probability to get pregnant. This chance will be increased to 10% after the age of their babies for more than six months. If the mothers have experienced menstruation after childbirth, prolactin levels will decrease [13]. Changes in the hormone prolactin can be influenced by other factors such as age and other hormone levels, such as the estradiol hormone.

Furthermore, nutrient intake and drug use can also affect the production of the hormone prolactin. A study showed that nutrient densities have a positive association with plasma prolactin concentration, thus increasing dietary intake for lactating women is essential [18]. Besides, drugs such as Bromocriptine and Carbegoline, the hormone-imbalance drugs, suppress the prolactin hormone production. These drugs act in the same way as dopamine which inhibits the production of prolactin. A study has reported that consuming vegetables, such as Moringa leaves, will increase the hormone prolactin and breast-milk production. It may be due to some chemical compounds containing in Moringa [19].

Psychological factors also influence prolactin hormone production. Post-partum mothers with stress, in a pressure condition, sadness, lack of confidence and various forms of emotional tension will reduce the hormone prolactin and will not produce the breastmilk. In relation to murottal Qur'an therapy, listen to the person who recite the verse of Qur'an very, may reduce these depression events. A study in Urmia Iran showed that the murottal Qur'an was able to reduce the level of maternal morbidity during childbirth significantly [20].

Murottal therapy may be capable of reducing stress due to the Qori recite the Qur'an with a good melody, and Qur'an itself is meaningful to the human soul. A good sound voice can reduce stress hormones, activate natural endorphins, increase feelings of relaxation, and divert attention from fear, and reduce anxiety and tension. These conditions may improve the body's chemical system, affecting blood pressure and slowing down breathing, heart rate, pulse, and brain wave activity. The rate of deeper or slower breathing is very good and helps in calming down, emotional control, deeper thinking and better metabolism [21]. This pattern is similar to the music therapy used to increase breastmilk production. A study by Jayamala *et al*. (2015) reported that there was a positive impact of music therapy on breast milk secretion in mothers with premature newborn babies. The result of this study showed that the volume of breastmilk secretion increased significantly ($p= 0.033$) after music therapy, compared to the non-music therapy group. This study

also demonstrated that there was a significant stress reduction (p= 0.00) postpartum to those having premature babies after received music therapy [22].

In addition, Mottaghi *et al*. demonstrated that the Qur'an has a positive impact on anxiety. There was a significant reduction the anxiety from 20.3+2.68 to 17.5+1.02 after giving the Qur'an therapy, while the control group remained stable from 20.7+1.6 to 20.2+1.87 [7]. Reciting the Qur'an is one of the non-invasive procedures that has beautiful and harmonious types of composition when listening to it and therefore, the Qur'an can reduce anxiety. An athlete's anxiety score that is affected by reading the Qur'an was significantly less than an athlete who is not affected, which shows people who read the Qur'an are likely to have a low anxiety level.

Likewise, a study observed stress of the students in the thesis preparation stage showed that there were significant differences between stress levels before and after classical music therapy. Audio therapy can eliminate muscle tension and stress, reduce pain, anxiety, stimulate the immune system, reduce blood pressure, and improve communication in patients with autism, hearing loss, and Alzheimer's disease. Although the mechanism is unclear, sound may affect the transmission of impulses into the body, stimulating cells in the body. The sound received by the ear is then sent to the central nervous system and then transmitted throughout the body [23].

CONCLUSIONS

Although there was no difference between intervention and control group, lactating mother who received murottal Qur'an therapy may have their prolactin level declined similar to control group. This study suggested that the Qur'an therapy may be effective to replace music therapy to support lactation period and exclusive breastfeeding program, especially for those from Muslim communities. Therefore, the Health Office of Takalar Regency can promote such of this therapy to improve lactation management program for all breastfeeding mothers in the area.

CONFLICT OF INTEREST

All authors declared that there is no conflict of interest.

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