The Difference between Physical Fitness Gymnastics and Aerobic Gymnastics to Reduce Dysmenorrhea in Young Female Adolescents (A Study at SMPN I, Pancur Batu, Deli Serdang Regency, Indonesia)

Dina Indarsita¹, Yufdel², and Arbani Batubara³

¹,²,³(Nursing Department of Health Polytechnic Medan, Indonesia)

Abstract: To evaluate the The Difference between Physical Fitness Gymnastics and Aerobic Gymnastics to Reduce Dysmenorrhea in Young Female Adolescents (A Study at SMPN I, Pancur Batu, Deli Serdang Regency) Dysmenorrhea constitutes the imbalance in progesterone hormone in blood which brings about pain. Psychological factor can also plays its role in the incidence of dysmenorrhea in some women. 90% of women have undergone dysmenorrhea. This problem will surely disturb 50% of reproductive-aged women and 60% to 85% of female adolescents that causes many of them are absent from schools or offices. In general, 50% to 60% of women need analgesic medicines to cope with dysmenorrhea (Annathayakheisha, 2009). Sport/gymnastics is one of the methods which can be used to reduce pain. This is because when someone does sport/gymnastics his body will yield endorphine which is produced in brain and backbone nervous system. This hormone can function as natural tranquilizer produced by brain so that it arouses the feeling of comfort. From this research, it was found that dysmenorrhea less occurred in sportswomen, compared with women who do gymnastics.

The researchers applied A quasi experimental. The research used quasi experimental method in two group pretest-posttest design by observing two times before menstruation. Observation group prior to gymnastics is observed again after intervention of gymnastics before menstruation. The data were analyzed by using Mc Nemar test by finding out the difference in each independent and dependent variables. This test was used to in a research which distinguished before and after gymnastics in which each object was used as controlling itself. The research was conducted from January until November, 2016.

The result of the analysis on the difference between physical fitness gymnastics and aerobic gymnastics in reducing dysmenorrhea in young female adolescents in the group of pre and post physical fitness gymnastics in Exact Sig line showed that probability value = 0.039<, which indicated that H0 was accepted (0.039< < 0.05). Therefore, in pre and post physical fitness gymnastics it was the same. Meanwhile, the result of the analysis on the difference in aerobic gymnastics in reducing dysmenorrhea in young female adolescents in the group of pre and post aerobic gymnastics showed in Exact Sig line that probability value = 0.031< which indicated that H0 was accepted (0.031< < 0.05). Therefore, in pre and post aerobic gymnastics it was the same. In other words, both physical fitness gymnastics and aerobic gymnastics could reduce dysmenorrhea.

The conclusion was that there was the difference in physical fitness gymnastics and aerobic gymnastics in pre and post gymnastics in reducing dysmenorrhea in young female adolescents (A Study at SMPN I, Pancur Batu, Deli Serdang Regency). Gymnastics as one of the alternative therapies in the intervention applied by nurses to provide nursing care in the problem of dysmenorrhea is often undergone by young female adolescents.

Keywords: Physical Fitness Gymnastics, Aerobic Gymnastics, Dysmenorrhea

I. INTRODUCTION

Adolescence is a dynamic phase of development in one’s life. This phase constitutes a transition period from childhood to adulthood which is indicated by the acceleration of their physical, mental, emotional, and social development (F. J. Monks Koers, Haditomo, 2002).

The very beginning of the change is biological development. One of the indications of the beginning of adolescence biologically is the beginning of an adolescent to experience menstruation. It begins in puberty and the capacity of a woman to get pregnant or to be in a reproductive period. A girl usually begin to experience menstruation when she is between 10 to 16 years old, depending on various factors, including health, nutritional status, and body weight which is balanced with body height. In reality, however, many women undergo menstruation problems, and one of them is dysmenorrhea (Sumodarsono, 1998).

Dysmenorrhea is the imbalance in progesteron hormone in blood which brings about pain. Psychological factor also plays its role in bringing about the incidence of dysmenorrhea in some women. 90% of women have undergone dysmenorrhea. In Indonesia, the prevalence of the incidence of dysmenorrhea is about

http://indusedu.org
The prevalence rate of the incidence of dysmenorrhea in productive-aged women is about 55%. This problem will surely disturb 50% of reproductive-aged women and 60% to 85% of female adolescents that causes many of them to be absent from schools and offices. In general, 50% to 60% of women need analgesic medicines to cope with this dysmenorrhea (Annathayakheisha, 2009).

II. BACKGROUND

The result of the research conducted by Omodvar S (2012) in the United States on 12 to 17 year old adolescents found that the prevalence of primary dysmenorrhea was 59.7% with the level of pain of 49% mild dysmenorrhea, 37% moderate dysmenorrhea, and 12% serious dysmenorrhea which caused 23.6% of them were absent from schools.

The result of the research conducted by Novia (2012) revealed that 84.4% of adolescents at SMA S. Thomas, Medan, underwent dysmenorrhea with 46.7% of mild intensity, 30% of moderate intensity, and 23.3% of severe intensity. The research conducted by Andi (2012) found that 87.1% of female adolescents at SMAN 1 Kahu, Bone Regency, South Sulawesi Province, underwent dysmenorrhea.

The result of the research conducted by Frenita (2013) showed that 81.30% of female adolescents underwent dysmenorrhea at SMK Negeri 10, Medan.

The result of the research conducted by Sirait, Deby Shinta O (2014) revealed that the prevalence of dysmenorrhea in female adolescents at SMA Negeri 2, Medan, was 85.9%, with 79.1% of mild intensity, 8.2% of moderate intensity, and 12.7% of severe intensity.

Dysmenorrhea can be handled by using pharmacological and non-pharmacological therapy. Pharmacological therapy consists of taking analgesic medicines, hormonal therapy, and non-steroid prostaglandin medicines. Non-pharmacological therapy consists of warm compress and relaxation (Marinda R. Rosalina and Purwaningsih P, 2013).

One of the therapies which can reduce dysmenorrhea is by performing low impact aerobic gymnastics. Gymnastics is a physical exercise which is intentionally created, organized systematically, and done consciously; it is aimed to establish and develop personality harmoniously (Widianti & Proverawati, 2010).

Sport of physical exercise can produce endorphin hormone. It is proved that sport can increase β-endorphin content four to five times in blood so that the more one does gymnastics or sport, the higher his β-endorphine content. When a person does gymnastics or sport, β-endorphin will excrete and caught by receptor in hypothalamus and limbic system which are functioned to organize emotion. The increase in β-endorphin is closely related to the decrease in pain, the increase in memory, and improve appetite, sexual capacity, blood pressure, and respiration (Suparto, A, 2011).

Light sports exercise is highly suggested to educe dysmenorrhea. Sport/gymnastics is one of relaxation techniques which can be used to reduce pain. This is because when a person does sport/gymnastics, his body will produce endorphin. This hormone can function as natural tranquilizer which is produced by brain so that it causes the feeling of comfort (Harry, 2007).

The result of a research showed that dysmenorrhea seldom occurs in sportswomen, compared with women who do not do sport/gymnastics (Sumodarsono, 1998).

The result of the research conducted by Sirait, Deby Shinta O (2014) revealed that there was significant correlation of the habit of doing sport with the incidence of dysmenorrhea (p = 0.040). The result of the research conducted by Nurjanah, Ana Afita Afiah (2014) on female students of Diploma III, Physiotherapy Department, Muhamadiyah University, Surakarta, also found that after doing sport/gymnastics there was significant decrease in pain (p = 0.004).

The result of a preliminary survey on female students at SMPN 1 Pancur Batu, Deli Serdang Regency, found that of the 422 female students (Grades 7 = 6 classes = 133 students, Grade 8 = 6 classes = 148 students, and Grade 9 = 7 classes = 141 students) in 2015, 35 of them per month did not attend school because of sickness.

According the researchers’ assumption, to reduce dysmenorrhea, many women use pharmacology therapy, using expensive analgesic medicines and herbal instead of doing sport or gymnastics which is inexpensive of even free of charge.

From the explanation above, the researchers would like to do a research on the difference between physical fitness gymnastics (henceforth it is called PFG) and aerobic gymnastics for reducing dysmenorrhea in young female adolescents (A Study at SMPN I Pancur Batu, Deli Serdang Regency).

III. METHODS

The research used quasi experimental method with two group pretest-posttest design

Participants

The samples were anything which could be the objects of research observation or any factors which played their role in the event or phenomena which would be studied. The research samples were young female adolescents at SMPN I Pancur Batu, Deli Serdang Regency who underwent dysmenorrhea.

http://indusedu.org
The samples were taken by using purposive sampling technique, based on the consideration of the researchers with the characteristics and the requirements of the population which had been known (Notoadmojo, 2005). The criteria of the samples were as follows:

1. Being ready to be the respondents;
2. Being ready to participate in sport/gymnastics;
3. Being ready not to consume analgesic medicines of dysmenorrhea;

Based on the inclusive criteria which had been determined by the researchers, the population of the research for being taken as the samples was ± 30 young female adolescents who underwent dysmenorrhea during their menstruation.

**Intervention**

Observation was performed twice: before and after intervention was given. Observation group before the treatment was re observed after the intervention in another time which had been determined (Setiadi, 2007). The researchers measured the pain scale of the adolescents who underwent dysmenorrhea which occurred in the last month, before gymnastics was conducted. The pain scale was then re-measured after gymnastics was conducted during menstruation cycle in the next month.

**Procedures and measures**

Prior to the intervention, the respondents basic demographic information was collected and documented on an excel spread sheet.

Data were gathered from September 5 until October 7, 2016. The respondents of this research were 60 which were divided into 2 (two) groups: 30 respondents were in the physical fitness exercise and 30 respondents were in the aerobic gymnastics.

**Ethical consideration**

Approval from the Universitas Sumatera Utara was obtained. Human Subject protection was insured by eliminating any identifiable characteristics of the participants. All Electronic data were stored in a password protected computer in a locked office. Only the principal investigator and co-investigator will have access to the data.

**Statistical Analysis**

*The Statistical Program for the Social Science*

Data analysis was done by using computer program with the stages as follows:

1. Univariate analysis was done to find out descriptively the variables which were being analyzed in the distribution frequency tables to find out data distribution;
2. Bivariate analysis was done to find out the correlation of each of independent and dependent variables. Statistical test which was used was McNemar test. This test was used to compare pre-event/treatment with post-event/treatment in which each object was used as the controlling of its own self. The test was done in 2 (two) correlated sample groups; the scale measurement was nominal type (binary response) and for cross-tabulation 2x2.

**IV. RESEARCH RESULT**

1. **Age characteristics**
   Age Characteristics of Young Female Adolescents (A Study at SMPN I Pancur Batu, Deli Serdang Regency).
   The result of the analysis found that the majority of the respondents were 13 years old (46).

2. **Age Characteristics of Menarche**
   Age Characteristics of Menarche in Young Female Adolescents (A Study at SMPN I Pancur Batu, Deli Serdang Regency).
   The result of the analysis found that the majority of the respondents (28 respondents) experienced menarche when they were 12 years old.

3. **Characteristics of Dysmenorrheal Symptom in PFG Group and Aerobic Gymnastics Group in pre Gymnastics**
   The result of the analysis, it was found that the majority of the respondents (9% and more than 50%) complained about their getting angry easily during dysmenorrhea.

4. **Characteristics of Dysmenorrheal Symptom in PFG Group and Aerobic Gymnastics Group in post Gymnastics**
   The result of the analysis based on the Table of the characteristics of supplementary dysmenorrheal symptom in PFG group and in Aerobic Gymnastics group in post gymnastics, it was found that the majority of the respondents (9% and more than 50%) complained about their getting angry easily during dysmenorrhea.

5. **Characteristics of Dysmenorrheal Scale**
   Characteristics of Dysmenorrheal Scale in PFG Group in pre and post Gymnastics
Based on the Pain Scale felt by the respondents during dysmenorrheal gymnastics, it was generally found that there were 6 (20%) of the respondents (20%) who underwent the decrease in dysmenorrhea with troublesome pain scale.

Characteristics of Dysmenorrheal Scale in Aerobic Gymnastics Group in pre and post

Based on the Pain Scale felt by the respondents during dysmenorrhea in pre dysmenorrhea gymnastics, it was generally found that there were 6 respondents (20%) who underwent the decrease in dysmenorrhea with troublesome pain scale.

6. Disparity test in pre and post PFG

The result of the analysis on McNemar Disparity Test of PFG in Reducing Dysmenorrhea in Young Female Adolescents (A Study at SMPN I Pancur Batu, Deli Serdang Regency)

The result of the analysis on the disparity in PFG for reducing dysmenorrhea in young female adolescents in pre and post PFG, using McNemar test, showed that in Exact Sig line the probability value was 1.000 so that H0 was rejected (1.000 > 0.05). Therefore, the decision which was made was H1 so that pre PFG and post PFG were not the same. It means, PFG had the influence on decreasing dysmenorrhea.

7. Disparity test in Pre and Post Aerobic Gymnastics

The Result of the Analysis on Disparity Test of Aerobic Gymnastics in Reducing Dysmenorrhea in Young Female Adolescents (A Study at SMPN I Pancur Batu, Deli Serdang Regency) with Mc Nemar Test

The result of the analysis on the disparity in aerobic gymnastics in reducing dysmenorrhea in young female adolescents in pre and post aerobic gymnastics, using McNemar test, showed that in Exact Sig lines the probability value was 0.250 so that H0 was rejected (0.250 > 0.05). Therefore, the decision which was made was H1 so that pre aerobic gymnastics and post aerobic gymnastics were not the same.

In other words, Aerobic Gymnastics had the influence on reducing dysmenorrhea.

Discussion

There was the difference between PFG and Aerobic Gymnastics in reducing dysmenorrhea in young female adolescents (A Study at SMPN I Pancur Batu, Deli Serdang Regency)

The result of McNemar test Exact Sig lines found that probability value was 1.000 in PFG while the probability value in aerobic gymnastics was 0.250. In other words, both PFG and aerobic gymnastics had the influence on reducing dysmenorrhea.

Aerobic gymnastics can increase blood circulation because aerobic included accurate perspiration exercise, more oxygen circulates in lungs, heart, and blood vessel which make the body functions well. It can also increase blood volume which flows to the whole body, including reproductive organs which accelerate the supply of oxygen to blood vessels which undergo vasoconstriction so that dysmenorrheal can decrease (Rosidah N). This is in accordance with the result of this research which showed that there were 6 (six) respondents (20%) who underwent the decrease in dysmenorrhea in the post aerobic gymnastics.

Each time one does sport or physical exercise with repeated movements like bouncing body organs, muscle elasticity will automatically increases (Chew, 1985; Larry, S & Frank, B, 1986). PFE will most probably increase flexibility. It can accelerate blood circulation.

Gymnastics is one of the relaxation techniques which are useful to produce endorphin hormone. Endorphin hormone is neuropeptide produced by the body during relaxation or peacefulness. When someone does gymnastics, his endorphin beta will excrete and grasped by receptor in hypotalamus and limbic system which functions when pain is delivered to brain. The result is that descendent nerves will be active in excreting endogenous opiate like endorphin beta which is a natural medicine in eliminating pain from the body. Endorphin is produced in the brain and nervous system of backbone and some parts of the body which are useful to cooperate with sedative receptor in reducing pain. Gymnastics is proved to be able to increase endorphin content four to five times in blood so that the more one does gymnastics, the higher his endorphin beta content (Laili N, 2012)

Some factors which influence the incidence of dysmenorrhea, among others, are psychological factor in which the stage of adolescence development is emotionally unstable and constitutional factor which can decrease resistance against pain like weak physical condition or fatigue (Eny K, 2012).

Stress will cause a reaction which can decrease resistance against pain. During the stress the body will produce excessive adrenaline, estrogens, progesterone, and prostaglandin hormones. Estrogen can cause the increase in uterus contraction which brings about pain. Besides that, increasing adrenalin hormone can cause muscles to be stiff, including uterus muscle; it can also cause pain during menstruation (Laili N, 2012).
V. CONCLUSION
The result of the research found that there was the difference between PFE and aerobic gymnastics in reducing dysmenorrhea in young female adolescents (A Study at SMPN I Pancur Batu, Deli Serdang Regency). The conclusion of the research was that:

1. There were 20 young female adolescents (66.7%) who underwent dysmenorrhea in pre PFE, and there were 17 young female adolescents (56.7%) who underwent dysmenorrhea in pre aerobic gymnastics.

2. The result of McNemar test showed that there was the difference in gymnastics in dysmenorrhea, that is, in Exact Sig line it was found that probability value was 1.000 in PFE and 0.250 in aerobic gymnastics.

Relevance to Clinical Practice
Based on the result of the research on the difference between PFE and aerobic gymnastics in reducing dysmenorrhea in young female adolescents (A Study at SMPN I Pancur Batu, Deli Serdang Regency), it was suggested that:

1. Health providing professionals, especially maternity nurses, be more active in providing information about dysmenorrhea and about reducing dysmenorrhea through the activity of public service by providing demonstration/counseling about the method to reduce dysmenorrhea in young female adolescents by distributing leaflets and counseling about reproductive health.

2. Educational professionals collaborate with health educational agency in providing information about reproductive health (dysmenorrhea)

3. The management of SMPN I Pancur Batu, Deli Serdang Regency, increase the activity of UKS and KRR so that information about reproductive health (dysmenorrhea) will be received properly and accurately and the students are able to reduce dysmenorrhea.

4. Young female adolescents attempt to obtain information about reproductive health in order that they will be able to reduce dysmenorrhea by doing gymnastics and being active in UKS and KRR activities at school.

5. The next researchers use this research as an input which will be a reference to do their researches deeply about how to reduce dysmenorrhea.

Acknowledgements
We deeply appreciate the help from the staff SMPN I Pancur Batu, Deli Serdang Regency and nursing department and research department at Poltekkes Medan.

VI. REFERENCES

[27] Narjanah, Ana Afita Afiah., 2014. Pengaruh Senam terhadap penurunan dysmenorrhea primer pada mahasiswa I Diploma III Fisioterapi Universitas Muhammadiyah Surakarta. Thesis Physics Therapy Undergraduate Study Program, the Faculty of Health Science, Muhammadiyah University, Surakarta.
[34] Sirait Deby Shinta O., dkk. 2014. faktor – faktor yang berhubungan dengan kejadian

http://indusedu.org

This work is licensed under a Creative Commons Attribution 4.0 International License.