Dysmenorrhea: The Effect Of Daily, Regular Strenuous Physical Exercise On Women Between The Ages Of Seventeen and Twenty-Two

Bobbie Jo Bradbrook
Carroll College

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DYSMENORRHEA: THE EFFECT OF DAILY, REGULAR STRENuous PHYSICAL EXERCISE ON WOMEN BETWEEN THE AGES OF SEVENTEEN AND TWENTY-TWO

Submitted in Partial Fulfillment of the Requirements for Graduation with Honors to the Department of Physical Education at Carroll College, Helena, Montana

Bobbie Jo Bradbrook
March 20, 1981
This thesis for honors recognition has been approved for the Department of Physical Education.

Mr. Thomas J. Kelly, Director

Mrs. DeeAnna Stalnaker, Reader

Dr. Jean Smith, Reader

March 20, 1981
Date
ACKNOWLEDGEMENTS

I would like to thank my mother, who has worked so hard to help me through college. Her unending love and support has given me the strength to complete this thesis and Bachelor of Arts Degree in Physical Education.

I am grateful to all the young women at Carroll who so willingly gave their time to participate in this study. I would also like to thank Mr. Sam Sperry for all his time and energy in helping me conduct this study.

To Mr. Thomas J. Kelly, my director, and my readers, Mrs. DeeAnna Stalmaker and Dr. Jean Smith, I wish to express my sincere gratitude for their guidance and helpful criticisms.

A special thanks goes to all my dear friends who were very understanding and patient throughout the writing of this thesis.
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OUTLINE I

Menstruation and the Positive Effects of Exercise

Thesis: Dysmenorrhea and how it may be relieved through regular physical exercise

I. Introduction: In 1934 a female "Voice of Experience" gave the following advice to young readers: Girls should not exercise, play tennis or wear high-heeled shoes during their periods; such activity can cause a prolapsed uterus. Girls should wear tight-fitting bloomers during the winter menstrual cycles; otherwise, they are likely to develop a "catarrhal condition" in the delicate vaginal tissue.

II. Body.

A. Menstruation is a normal biological process within each woman's body.

1. According to Webster's New Collegiate Dictionary, menstruation has been defined as a "discharging of blood, secretions and tissue debris from the uterus that recurs in non-pregnant breeding-age primate females at approximately monthly intervals and that is considered to represent a readjustment of the uterus to the nonpregnant state following
proliferative changes accompanying the preceding ovulation."

2. The early ancient myths about menstruation is widespread through many countries in the world.

B. The following are the facts about menstruation.

1. The average age of a young girl starting menstruation is between twelve and thirteen.

2. At this time of life, twenty-four percent of a girl's body composition is made up of fat.

3. The "normal" number of days of a menstrual cycle is twenty-eight days.

4. Premenstruation occurs between ovulation and the onset of the menses.
   a. Some of the physical feelings at this time may include weight gain, headaches, acne problems, swelling of the breasts and constipation.
   b. The women at this time may also feel depressed, faint, restless, sluggish and crabby.

C. There are many factors which cause irregularities during a woman's period.

1. The strenuous training of athletes can cause them to miss their period on a regular basis if the training is extended for a long period of time.
2. Excessive amounts of mental pressures such as moving to a new town, a new job or a death in the family can cause the missing of a period.

3. Excessive amounts of physical illnesses can also be a reason for missing a period.

D. The most common disorder of menstruation is dysmenorrhea, or what may be better known as "cramps".

1. Dorland's Pocket Medical Dictionary defines dysmenorrhea as "a painful menstruation".

2. Dysmenorrhea usually occurs in women between the ages of fourteen and twenty-five.

3. The body chemicals related to menstrual cramps is a group called prostaglandins that are produced in the lining of the uterus.

E. Is exercise a beneficial form of relief for dysmenorrhea?

1. Swimming is a form of exercise which often helps to relieve menstrual cramps.

2. Should restrictions be placed upon any young girl in athletics during menstruation?

III. Conclusion. In conclusion, one may tend to believe that physical exercise will not only help to alleviate the problems of menstruation but also build a stronger and more healthy body.
CHAPTER I
Menstruation and the Positive Effects of Exercise

In 1934, "Voice of Experience" gave the following advice to young readers: Girls should not exercise, play tennis, or wear high-heeled shoes during their periods; such activity can cause a prolapsed uterus. Girls should wear tight-fitting bloomers during the winter menstrual cycles; otherwise, they are likely to develop a "catarrhal condition" in the delicate vaginal tissues.¹

Many women and young girls have been disillusioned by the word "menstruation", since the beginning of time. Women have suffered more from the superstitions and myths about menstruation than the actual monthly process.

Among the ancient Persians, it was believed that menstruation lasted for four days. During this time, women were kept apart in isolated huts, and in more recent times, in special rooms within the household. At the end of four days, a woman who still menstruated was given one hundred lashes and sent back into seclusion for five more nights. If, at the end of this time she continued to menstruate, she was given four hundred lashes because she was "possessed" by an evil spirit.²

In Australia, the boys are taught from early childhood
that if they set eyes on menstrual blood, their hair will turn gray and their vigor abate prematurely...the woman is forbidden under pain of death to anything that the men use or to walk on the paths they frequent.\(^3\)

In Angola, the women are obliged to wear a bandage about the head during the period of menstruation.\(^4\)

The most damning euphenism to menstruation reflects the belief that the monthly flow of blood is the curse of God laid upon woman for her sin in Eden. This is not an example of the misconceptions of the ancient past, but continues to carry the weight of belief, as Archie Bunker in "All in the Family" makes sure we understand.

Archie: Read your Bible, read about Adam and Eve... God against direct orders, she makes poor Adam take a bite out of that apple. So God got sore and told them to get their clothes on and get outta there. So, it was Eve's fault God curses women with this trouble. That's why they call it, what do you call it, the curse.\(^5\)

Although the stories just told about menstruation are absurd and ridiculous, young girls all over the world have been faced with a problem that people try to hide from them. It is not only back in ancient Persia or Angola that young girls have been frightened and threatened by menstruation, but is a reality today even in our society. Young women have been told to rest during menstruation and not to participate in any kind of physical exercise. Why? They are given a variety of reasons such as: it is not ladylike,
you need to rest during this time, you will hurt yourself, or you might not be able to have children when you grow older. All of these myths have been stated by someone's mother or grandmother at one time or another.

The question that needs to be answered at this point is just exactly what is menstruation. According to Webster's New Collegiate Dictionary, menstruation has been defined as "a discharging of blood, secretions and tissue debris from the uterus that recurs in nonpregnant breeding-age primate females at approximately monthly intervals and that is considered to represent a readjustment of the uterus to the nonpregnant state following proliferative changes accompanying the preceding ovulation".

On the average, a young girl will begin to menstruate when she is twelve or thirteen. If, for instance, a girl does not start to menstruate at this time, there is no need to be alarmed because there is a factor which researchers have found that they feel triggers the onset of menstruation.

In the early 1970's, Dr. Rose E. Freoch demonstrated that acquisition of a critical weight triggers the onset of menstrual cycles. As we grow older, progressively more of our body composition is made up of fat tissue in proportion to lean tissue. During the adolescent growth spurt (one of the main indications of puberty), a girl's body composition shows a ratio of lean to fat tissue of five to one. At menarche, (the onset of menstruation), this ratio has become three to one. Fat tissue has increased by one hundred and
twenty-five percent in a period of only two or three years.\textsuperscript{6}

Menarche is the first menstrual cycle, but the next one or two years are a time of especial menstrual irregularity. Most of the cycles occur without ovulation during this phase. By the time most cycles include ovulation, twenty-eight percent of the body composition consists of fat tissue. (The average weight of girls at this time is one hundred and twenty-one pounds.)\textsuperscript{7}

The age in which every girl begins to menstruate is different. This is even true of girls in the same family. In one family, the mother started when she was in the sixth grade, the youngest daughter in the eighth grade, and the oldest daughter did not start to have her period until she was a freshman in college. So, the point here is that it depends upon each individual's body composition.

Yet the menstrual cycle is usually considered to be twenty-eight days in length. (Cycle duration is counted from the first day of flow to the first day of subsequent flow). The only time when cycle duration appears to approximate the twenty-eight day rhythm is the few years in which a woman passes her late thirties. The other thirty years of menstruation are filled with cycles of great variability. It is normal to have cycles as short as twenty days and as long as forty-five, with every kind of variation between these points. Even if an individual's cycle is twenty days one month and forty-three days the next, it is normal.\textsuperscript{8}
Premenstrum usually occurs shortly before the menstrual flow begins within two or three days. This phase is usually accompanied with both physical and mental feelings of tension, impatience, depression, lethargy, deluded, faint, restless, sluggish, crabby and irrational. The most common physical characteristics may include swelling of the breasts, feet, abdomen, hoarseness, constipation, weight gain, easy bruising, backaches, acne, skin eruptions and peeling of fingernails.

Amenorrhea, or a missed period not due to pregnancy, is becoming more wide-spread with increased participation of women in strenuous and competitive sports such as speed and endurance running, swimming competitions, gymnastics, figure skating, ballet dancing and other taxing pursuits.

A study conducted last year by Dr. Edwin Dale of the Department of Obstetrics and Gynecology at Emory University School of Medicine demonstrated menstrual dysfunction in women distance runners with intensive training schedules and the physical and psychological stress of competition. The more exertion, the greater their menstrual irregularity. Recently, there have been reports of a total absence of menstruation in females who train for long distance running. This may be related to their exceptionally low total body weight and reduced levels of body fat.

Kenneth Foreman, Professor of Physical Education at Seattle Pacific University, says about "seventeen percent of the gymnasts, long-distance runners and skiers he has
analyzed have irregular cycles and that thirty percent of all runners, during intensive training, have no periods at all.\textsuperscript{13}

Many of the girls who typically experience amenorrhea---including ballerinas, gymnasts and long-distance runners---have a very low percentage of body fat. Total weight is a combination of fat and lean weight or muscle. Most high school girls have about twenty percent fat while well-trained athletes may drop to ten or twelve percent. Young girls in athletics should not worry about getting their period until their late teens. And women who start a strenuous and hard-working training schedule should not worry about missing a period. Sport-produced amenorrhea, however, is usually temporary, and ovulation and menstrual periods resume once intensive training ceases.\textsuperscript{15}

Other reasons for amenorrhea are cycles not yet established in young girls, approaching menopause in older women, hormonal disturbances, change of location or altitude, stress and shock.\textsuperscript{16} A major cause of amenorrhea is drastic weight gain or weight loss. Menstrual abnormalities result from obesity. But too little as well as too much body fat may alter the menstrual cycle.\textsuperscript{17}

There is some evidence that the excessive amount of physical and mental pressure placed on female athletes during menstruation may produce changes during the menstrual cycle, but these changes are usually so slight and of such short duration that it does not place any limitation on
healthy, well-trained women. Thirty to fifty percent of women of childbearing age suffer from dysmenorrhea, which results in the loss of more than one hundred and forty million working hours every year.\textsuperscript{18} Dorland's Pocket Medical Dictionary defines dysmenorrhea, "a painful menstruation." Dysmenorrhea is most wide-spread among women between the ages of fourteen and twenty-five.\textsuperscript{19}

Some cases of dysmenorrhea are caused by known pathological conditions, such as fibroid tumors of the uterus or endometriosis, a condition in which tissue resembling the uterine lining occurs abnormally in various locations in the pelvic area.\textsuperscript{20}

Although the type of dysmenorrhea that will be discussed in this study is "primary dysmenorrhea" (menstrual cramps without having any sign of abnormalities such as the ones mentioned above).

The cause of menstrual cramps is a group of body chemicals called prostaglandins (PG) that are produced in the lining of the uterus (endometrium) these body chemicals regulate such functions as reproduction, blood pressure and hormone activity.\textsuperscript{21} An accumulating body of evidence is showing that primary dysmenorrhea does have a physiological basis---overproduction by the uterus of prostaglandins, potent chemicals that have a number of physiological effects and are produced by many tissues of the body. "Not only does a prostaglandin excess help to explain the painful cramps of dysmenorrhea," says gynecologist Arpad Csapo of
Washington University Medical School, "but it can readily account for the additional symptoms." These include nausea, vomiting, diarrhea, headache, fatigue and nervousness. They often found more prostaglandins in menstrual fluid from dysmenorrheic women than in fluid from women who did not suffer menstrual cramps.22

The concentrations, says W.Y. Chan and Yusoff Dawood of Cornell University Medical College, are some two to three times higher than those in menstrual fluid from women who do not have the problem are the highest just when a woman's symptoms are most severe, on the first day or two of menstruation.

When the level of concentration decreases, accompanying the increased concentrations, according to Csapo, are higher resting pressures in the uterus between contractions and also an increased contraction frequency.23

The excessive resting pressure causes pain, especially since it may slow the flow of blood to the uterine muscle just when the demand for it is high because of the work the muscle is doing. Such oxygen deprivation produces pain. In addition, both the prostaglandins and some of the substances from which they are synthesized may act directly on pain nerve endings, making them more sensitive.24

Dysmenorrhea, or in more common language, "cramps", is definitely a problem for many young women. Not all girls experience cramps but those who do suffer greatly. There are pills out on the market today that claim to help
alleviate this pain along with many other remedies. But through regular, strenuous physical exercise, one could prevent as well as relieve this pain. Regular exercise helps to carry off body fluids in the form of perspiration. Exercise also keeps the abdominal muscles in good working order and prevents the congestion that so often leads to cramps during the first or second day of the period. Muscular activity has been shown to relieve pain and to be beneficial in the period of menstruation.

Timonen and Procope' suspect that inactivity may contribute to the severity of premenstrual symptoms. After studying the menstrual experience of competitive athletes and gymnasts, they found that athletics has a "strikingly favorable effect" on the premenstrual syndrome. While there was a dramatic reduction in the incidence of headache and tension associated with menstruation, premenstrual swelling, premenstrual cramps and constipation were not reduced at all. However, cramping during flowing was less commonly experienced among these athletes. The researchers offer this hypothesis to explain their findings: swelling before menstruation leads to poor physiological brain performance. Continuous physical exercise (a fact of life for some athletes) increases the circulation to the brain, and in effect, overrides the limitations caused by the swelling. They conclude: it seems obvious that the need for physical exercise is not sufficiently satisfied in modern society. Facilities and guidance ought to be available
explicitly for mass sports. Evidently mankind has strayed too far from a natural manner of living to find the way back without guidance. While lack of adequate exercise may make the symptoms of PMS more severe, it is not the cause of the syndrome's initial appearance.\textsuperscript{27}

Important consideration centers on the influence that training has on various aspects of the menstrual cycle. It has been traditionally reported and accepted that moderate activity provides the female with both physical and mental benefits, the most notable being the relief of dysmenorrhea\textsuperscript{28} certain symptoms of the premenstrual syndrome.\textsuperscript{29}

"I have found from my experience in dealing with athletic girls over a long period of years that about eighty five percent of all girls may play their sports with the usual satisfaction during their period." There are, however, a certain number (eight to possibly as high as fifteen percent) in whom vigorous exercise during the period seems to bring on pain and cause a profuse or heavy menstrual flow which may be prolonged. It is interesting to note that many girls who complain of severe pain are greatly relieved by vigorous exercise. In fact, the majority of these girls who complain of menstrual pain are helped by suitable exercise.\textsuperscript{30}

Exercise teaches us how to relate to our bodies, how best to make our bodies respond to our individual needs and problems. The exercises most often recommended for women suffering menstrual difficulties or wanting to prevent such difficulties from ever occurring are muscle toning and
breathing exercises. Such recommendations are based on a scientifically proven theory that a problem-free menstrual period is closely tied to proper amounts of oxygen in the body, and the free flow of oxygen in the body, and the free flow of oxygen-carrying blood to all the systems and organs.  

Swimming especially when done regularly throughout a woman's cycle, can do more to build up proper muscle tone and prevent menstrual problems than almost any other activity.

Participating in physical exercise and athletic competition during menstruation should be the decision of each individual girl. Yet, if a girl chooses to participate in sports she will not be damaging her body or taking any sort of risk exercising while menstruating.

If you want to feel better during your period, do not get excused from gym class; rather, be more active than usual.

In conclusion, one may believe that physical exercise will not only help to alleviate the problems of menstruation but build a stronger and more healthy body.
CHAPTER II
Experimental Study of Women Between the Ages of Seventeen and Twenty-two

The purpose of this study on menstruation is to determine whether women between the ages of seventeen and twenty-two who are involved in regular daily exercise (this meaning three or more strenuous hours of exercise six days a week) experience dysmenorrhea menstrual symptoms to a lesser degree than those of minimal physical activity.

"Regular exercise" in this study does not include the exercise performed as part of an individual's everyday routine. It refers to some type of strenuous physical exercise that is done in addition to the individual's physical activity.

Procedure:
All of the women involved in this study are strictly volunteers from Carroll College. The women in this study were selected on the basis that they either were physically active or did not participate in any extra physical activity at all.

In this study there are actually two different groups: the control group and the regular daily exercisers.

The control group involves ten women between the ages
of seventeen and twenty-two who do not participate in any sport or who are not engaged in any strenuous physical training or conditioning. These women are selected on the criteria that they do minimal physical activity.

The regular daily exercisers consist of fifty women between the ages of seventeen and twenty-two who are involved in strenuous physical exercise or training for three or more hours, five to six days a week.

Each individual woman received a packet containing the following: a general questionnaire (asking questions about her own menstrual cycle and physical activities), eight detailed forms concerning her menstrual cycle for the following eight months: January, February, March, April, May, June, July, August and September, and five self-addressed envelopes with stamps.

Then, during each month of the woman's menstrual cycle she was to fill out and send one of the eight forms to Bobbie Jo Bradbrook.

Data:

The data acquisition was completed by the end of September, 1980. It was then evaluated and separated into the control group and regular daily exercisers group.

Due to the summer break and lack of participation in exercise, the numbers of women dropped from sixty to thirty-nine. Now, instead of fifty physically active women there were twenty-nine and the remaining ten were in the control group.
Examining the questionnaires and detailed forms carefully, the pertinent information was then coded and charted for easier evaluation.

The following questions were the only ones pertinent to this study:

11. At what age did you begin to compete in sports?
12. How many years have you competed in sports?
13. During the training or competition of the above sports stated did you ever experience any discomfort or pain before, during or after menstruation?
14. If you answered question thirteen with a yes, please describe the pain or discomfort.
15. At what age did you begin menstruation?
16. What is the average number of days of your menstrual cycle?
17. Do you ever skip your period?
18. Do you ever get cramps?
19. Do you get cramps before, during or after your period?
20. Do you participate in any form of physical exercise during your period?
21. Do you take any form of medication or therapy for cramps?
22. Please list any mental attitudes felt before and during your period.
24. Please list any physical changes that take place within your body one to two weeks before your period.

25. Do you feel that you have more energy before, during or after your period?

27. If you never have your period or only have it once or twice a year, please indicate that in the following space.

37. Do you exercise during your menstrual cycle?

38. If you answered "yes" to question thirty-seven, please describe how you felt before, during and after exercising during your menstrual cycle.

Before actually making any conclusions on the data the following assumptions and sample conclusions were formed:

Assumptions:

1. Women between the ages of seventeen and twenty-two are physically active.

2. Women between the ages of seventeen and twenty-two do have menstrual cycles.

3. Before each woman's active menstrual flow she experiences certain physical changes.

4. Not all women experience dysmenorrhea before or during menstruation.

5. Not all women begin their menstrual cycles at the same age.

6. Not all women have the same percentage of body fat.
7. Each woman's menstrual cycle lasts for a different number of days.

8. Not all women are involved in a strenuous physical training program.

Sample Conclusions:

1. Women who are engaged in strenuous physical training for a long period of time tend not to experience dysmenorrhea, whereas women who are not engaged in any additional physical exercise other than their everyday minimum physical activity suffer from dysmenorrhea to a greater degree.

2. Normally active women who experience cramps do so for a longer period of time than those who are "overly active."

3. Women who are engaged in regular strenuous physical exercise before, during and after menstruation have dysmenorrhea to a lesser degree than those who do not exercise before, during or after menstruation.

4. An individual's menstrual cycle during strenuous physical training does not restrict her performance.

Conclusions then were made from each sample conclusion using the data present from the questionnaire-form chart.

The women in the study were then divided into two groups. There was an active group (A) which meant that they had participated in daily, physical strenuous exercise for six or more years since the onset of menstruation.
The rest of the women which were categorized as the normally active group (B) were characterized by the fact that they participated in exercise off and on for five years or less since the onset of menstruation.

Questions 17, 18, 19, 25, 37 and 38 were all used in making the final conclusions about the experiment.

The following are the charts, figures and tables used to state the conclusions for each sample conclusion.

**Question 16:** What is the average number of days of your menstrual flow?

**Table 1.-**The average for the number of days between Group A's and Group B's menstrual flow. The numbers in each column represent the number of days of each woman's menstrual flow. At the bottom of each column is the "mean" of each column.

Due to such a small population no other statistics could be used for this particular table.

<table>
<thead>
<tr>
<th>Days of Menstrual Flow</th>
<th>No. of days of the menstrual flow Individuals in Group A</th>
<th>No. of days of the menstrual flow Individuals in Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
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<td>2</td>
<td>2</td>
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<tr>
<td>7</td>
<td>7</td>
<td>2</td>
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<tr>
<td>8</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Average of Gp. A &amp; B</strong></td>
<td><strong>u=5</strong></td>
<td><strong>u=6</strong></td>
</tr>
</tbody>
</table>

Conclusion: Group A tends not to flow as long as Group B.
Question 17: Do you ever skip your period?

Table 2.- The percentages of women in Group A and Group B who skip their periods. The abbreviations of "Y" and "N" may be found on the Code Chart.

<table>
<thead>
<tr>
<th>No. of women in Group A who skip their periods</th>
<th>Y</th>
<th>N</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12</td>
<td>17</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Women in Group B who skip their periods</th>
<th>Y</th>
<th>N</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>7</td>
<td>10</td>
</tr>
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| Total                                       | 15| 24| 39    |

<table>
<thead>
<tr>
<th>% of women in Group A</th>
<th>Y</th>
<th>N</th>
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<tbody>
<tr>
<td></td>
<td>41%</td>
<td>59%</td>
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</table>

<table>
<thead>
<tr>
<th>% of women in Group B</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30%</td>
<td>70%</td>
</tr>
</tbody>
</table>

Conclusion: Women in Group A tend to skip their period more often than women in Group B.
Question 18: Do you ever get cramps?

Table 3.-The percentages of women in Group A and Group B who do not get cramps during menstruation. The abbreviations of "Y-cramps" and "N-cramps" may be found on the Code Chart.

<table>
<thead>
<tr>
<th>No. of women in Group A who do or do not have cramps</th>
<th>Y-Cramps</th>
<th>N-Cramps</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15</td>
<td>14</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of women in Group B who do or do not have cramps</th>
<th>Y-Cramps</th>
<th>N-Cramps</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Y-Cramps</th>
<th>N-Cramps</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (≥ 6)</td>
<td>51.7%</td>
<td>48.3%</td>
</tr>
<tr>
<td>B (0-5-R)</td>
<td>90%</td>
<td>10%</td>
</tr>
</tbody>
</table>
Question 19: Do you get cramps before, during or after your period?

Table 4.-The percentages of women in Group A and Group B who do or do not get cramps before, during or after menstruation. The abbreviations "BF-Cramps", "D-Cramps", "A-Cramps" and N-Cramps may be found in the Code Chart.

<table>
<thead>
<tr>
<th></th>
<th>BF-Cramps</th>
<th>D-Cramps</th>
<th>A-Cramps</th>
<th>N-Cramps</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of women in Group A</td>
<td>9</td>
<td>13</td>
<td>1</td>
<td>12</td>
<td>35</td>
</tr>
<tr>
<td>No. of women in Group B</td>
<td>4</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>21</td>
<td>1</td>
<td>13</td>
<td>48</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>BF-Cramps</th>
<th>D-Cramps</th>
<th>A-Cramps</th>
<th>N-Cramps</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of women in Group A</td>
<td>25%</td>
<td>37%</td>
<td>3%</td>
<td>34%</td>
</tr>
<tr>
<td>% of women in Group B</td>
<td>31%</td>
<td>61%</td>
<td>0%</td>
<td>7.6%</td>
</tr>
</tbody>
</table>

Conclusions:
1. Women in Group A tend not to experience cramps before their menstrual cycle more than Group B.
2. Women in Group A tend not to experience cramps during their menstrual cycle more than Group B.
3. Women in Group B tend to experience cramps throughout their menstrual cycle more often than Group A.
Question 24: Please list any physical changes that take place within your body one to two weeks before your period.

Table 5.-The percentages of women in Group A and Group B who do or do not have cramps one to two weeks before their period. The abbreviations "Y-C-BF" and N-C-BF" may be found on the Code Chart.

<table>
<thead>
<tr>
<th></th>
<th>Y-C-BF</th>
<th>N-C-BF</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of women in Group A</td>
<td>1</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>No. of women in Group B</td>
<td>2</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>36</td>
<td>39</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Y-C-BF</th>
<th>N-C-BF</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of women in Group A</td>
<td>3%</td>
<td>96.5%</td>
</tr>
<tr>
<td>% of women in Group B (0-5-R)</td>
<td>20%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Conclusion: Women in Group A tend not to have cramps one to two weeks before their period more than women in Group B.
Question 25: Do you feel that you have more energy before, during or after your period?

Table 6.-The percentages of women in Group A who do or do not have more energy before, during or after their menstrual cycle. The abbreviations "E-BF", "E-D", "E-A", and "N-D" may be found on the Code Chart.

<table>
<thead>
<tr>
<th>E-BF</th>
<th>E-D</th>
<th>E-A</th>
<th>N-D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2</td>
<td>14</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5</strong></td>
<td><strong>2</strong></td>
<td><strong>14</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% of women in Group A</th>
<th>E-BF</th>
<th>E-D</th>
<th>E-A</th>
<th>N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>16%</td>
<td>6%</td>
<td>47%</td>
<td>30%</td>
<td></td>
</tr>
</tbody>
</table>

Conclusions:
1. Women in Group A tend to have more energy after menstruation.
2. Women in Group A tend not to have any more or less energy before or during menstruation.
Question 37: Do you exercise during your menstrual cycle?

Table 7.- The percentages of women in Group A and Group B who do or do not exercise during their menstrual cycle. The abbreviations "Y" and "N" may be found on the Code Chart.

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of women in Group A</td>
<td>27</td>
<td>2</td>
<td>29</td>
</tr>
<tr>
<td>No. of women in Group B</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>7</td>
<td>39</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of women in Group A</td>
<td>93.1%</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>% of women in Group B</td>
<td>50%</td>
<td>50%</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion: Women in Group A tend to exercise during their period more than those in Group B.
Question 38: If you answered "yes" to question thirty-seven, please describe how you felt before, during and after exercising during menstruation.

Table 8.-The percentages of women in Group A and Group B who did or did not have cramps before, during or after exercising while menstruating. The abbreviations "CBM", "CDM", "CAM", and "NAM" may be found in the Code Chart.

<table>
<thead>
<tr>
<th>No. of women in Group B</th>
<th>CBM</th>
<th>CDM</th>
<th>CAM</th>
<th>NAM</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% of women in Group B</th>
<th>CBM</th>
<th>CDM</th>
<th>CAM</th>
<th>NAM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>20%</td>
<td>0%</td>
<td>80%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of women in Group A</th>
<th>CBM</th>
<th>CDM</th>
<th>CAM</th>
<th>NAM</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>23</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>23</td>
<td>33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% of women in Group A</th>
<th>CBM</th>
<th>CDM</th>
<th>CAM</th>
<th>NAM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18%</td>
<td>12%</td>
<td>0%</td>
<td>67%</td>
</tr>
</tbody>
</table>

Conclusions:

1. Women who exercise while menstruating tend not to be affected by cramps before, during or after their menstrual cycle.

2. Women in Group A tend not to have cramps more than Group B during menstruation while exercising.
The information gained from the questions was then applied to each sample conclusion where appropriate to help make the final conclusion about the experiment.

Sample Conclusion #1

Women who are engaged in strenuous physical training for a long period of time tend not to experience dysmenorrhea, whereas women who are not engaged in any additional physical exercise other than their everyday minimum physical activity suffer from dysmenorrhea to a greater degree.

The questions that pertained to sample conclusion number one were numbers 18, 19, 37 and 38.

18. Women in Group A tend to experience cramps to a lesser degree than those in Group B.

19. 1. Women in Group A tend not to experience cramps before their menstrual cycle more than Group B.
   2. Women in Group A tend not to experience cramps during their menstrual cycle more than Group B.
   3. Women in Group B tend to experience cramps throughout their whole cycle more than Group A.

37. Women in Group A tend to exercise during their cycle more than those in Group B.

38. 1. Women who exercise while menstruating tend not to be affected by cramps before, during or after their menstrual cycle.
   2. Women in Group A tend not to have cramps more than Group B during menstruation while exercising.
Sample Conclusion #2

"Normally" active women who experience cramps do so for a longer period of time than those who are "overly active."

Questions that pertained to this sample conclusion were numbers 16, 17, 18 and 19.

16. Group A tends not to flow as long as Group B.

17. Women in Group A tend to skip their period more often than Group B.

18. Women in Group A tend to experience cramps to a lesser degree than those in Group B.

19. 1. Women in Group A tend not to experience cramps before their menstrual cycle more than Group B.

2. Women in Group A tend not to experience cramps during their menstrual cycle more than Group B.

3. Women in Group B tend to experience cramps throughout their whole cycle more than Group A.

Sample Conclusion #3

Women who are engaged in regular, strenuous physical exercise before, during and after menstruation have dysmenorrhea to a lesser degree than those who do not exercise before, during or after menstruation.

The questions pertaining to this sample conclusion included numbers 18, 19, 37 and 38.

18. Women in Group A tend to experience cramps to a lesser degree than those in Group B.

19. 1. Women in Group A tend not to experience cramps
before their menstrual cycle more than Group B.

2. Women in Group A tend not to experience cramps during their menstrual cycle more than Group B.

3. Women in Group B tend to experience cramps throughout their whole cycle more than Group A.

37. Women in Group A tend to exercise during their cycle more than those in Group B.

38. 1. Women who exercise while menstruating tend not to be affected by cramps before, during or after their menstrual cycle.

2. Women in Group A tend not to have cramps more than Group B during menstruation while exercising.

Sample Conclusion #4

The individual's menstrual cycle during strenuous physical training does not restrict her performance.

Questions pertaining to this sample conclusion included numbers 17, 18 and 25.

17. Women in Group A tend to skip their period more than Group B.

18. Women in Group A tend to experience cramps to a lesser degree than those in Group B.

25. 1. Women in Group A tend to have more energy after menstruation.

2. Women in Group A tend not to have any more or less energy before or during menstruation.
Conclusion:

Based on the information gained from the experiment and research in this study, it is possible to state that women who engage in regular strenuous exercise for more than three or more hours, six days a week, experience cramps to a lesser degree than those women who do not participate in regular strenuous physical exercise.

Discussion:

In concluding this study, I found there to be many limiting factors:

Limitations:

1. Previous research on this topic is very limiting although more studies are being done on it now.

2. Due to the small population of women in this study, no statistics could actually be calculated for this experiment. Although one can say that here at Carroll College the women who do engage in regular, strenuous physical exercise three or more hours six days a week experience dysmenorrhea to a lesser degree.

3. Because of the overlapping of questions in the questionnaire and detailed forms some of the questions were found to be irrelevant to the study.

4. Due to summer break there was a lack of participation in the experiment which caused the number of women in the study to drop.

5. Due to lack of facilities and instruments, other
methods of testing could not be performed.

Overall, the experiment did indicate that women who are actively involved in regular strenuous physical exercise are not as likely to experience dysmenorrhea as those who do not exercise. The figures stated in this experiment are only relevant to the women at Carroll College. It is not possible from this study to say that all women in the world who exercise "regularly" will experience dysmenorrhea to a lesser degree than those who do not participate in regular, strenuous physical exercise.
FOOTNOTES


3 Ibid., p. 87.

4 Ibid., p. 87.

5 Ibid., p. 87.

6 Ibid., pp. 20-21.

7 Ibid., p. 21.

8 Ibid., p. 31.

9 Delaney, p. 73.

10 Ibid., p. 73.

11 Erika Reider Mark, "What you probably don't know (it's too new) about menstruation," Good Housekeeping, October, 1979, pp. 247-248.

12 Ibid., pp. 247-248.


15 Ibid., pp. 74-76

16 Mark, pp. 247-248.

17 Ibid., pp. 247-248.

18 Ibid., pp. 247-248.

20 Weideger, p. 73.

21 Jean L. Marx, pp. 175-176.

22 Delaney, p. 78.

23 Jean L. Marx, pp. 175-176.

24 Ibid., pp. 175-176.

25 Ibid., pp. 175-176.

26 Delaney, p. 78.

27 Weideger, p. 51.


32 Ibid., p. 125.

33 Kaplan, pp. 74-76.
SELECTED BIBLIOGRAPHY

Books


Magazines or Journals


23. Brown, C. H.


Figure 1.

CODE FOR QUESTIONNAIRE-FORM CHART

A  active
AF  after
B  break out
BE  breasts enlarge
BF  before
C  cramps
CAM  cramps after exercise during menstruation
CBM  cramps before exercising during menstruation
CDM  cramps during exercise while menstruating
D  during
E  energy
H  hungry
I  irritable
L  lower back pain
MAF  more active before
N  no
NA  no affect
NAM  no cramps while exercising during menstruation
ND  no difference
NP  not appropriate
P  pills
R  regular exercise (normal)
RW  retain water
T  tired
Y  yes
QUESTIONNAIRE CONCERNING YOUR MENSTRUAL CYCLE

The following questionnaire consists of thirty questions concerning an individual's menstrual cycle.

In answering each question, please be as precise as you possibly can in your answer.

Each individual questionnaire will be kept confidential and under no circumstances will anyone be allowed to read it.

If at any time you do not wish to answer a question in the questionnaire or the question does not pertain to you, please leave the space blank.

Thank you for your cooperation and participation in this study concerning the effects of exercise before, during and after menstruation.

1. How old are you? _______
2. How much do you weigh? _______
3. Are you going to school? _______
4. If you are going to school, indicate what year you are in. _________________________
   Please indicate whether you are in high school or college.
   _________________________
5. What is your major, if in college? _________________________
6. Do you have a job? _________________________
7. How active are you? Please circle one.
   A. Inactive (you get no physical exercise other than the normal activities you do everyday such as walking to work, school or housework).
   B. Moderate Activity (you are engaged in some type of physical exercise for at least two hours out of the day).
   C. Very Active (training for competition or physical exercise for at least 3 hours or more).

8. Do you participate in any sport? __________________________

9. List the sports you participate in:
   1. _______ 3. _______ 5. _______
   2. _______ 4. _______ 6. _______

10. Have you ever competed in any sport? __________________________
    If so, please indicate the type of sport it was. _______

11. At what age did you begin to compete in sports? _______

12. How many years have you competed in sports? _______

13. During the training or competition of the above sports stated, did you ever experience any discomfort or pain before, during or after menstruation? __________________________

14. If you answered question number thirteen with a "yes", please describe the pain or discomfort. __________________________
15. At what age did you begin menstruation? _______________________

16. What is the average number of days of your menstrual cycle? ________________________

17. Do you ever skip your period? ________________________
   If so, please indicate how often you miss a period. ________________________

18. Do you ever get cramps? ________________________

19. Do you get cramps before, during or after your period? ________________________
   If you experience cramps throughout the whole cycle, please indicate that by stating it.
   ________________________

20. Do you participate in any form of physical exercise during your period? ________________________

21. In context to question number twenty, explain how exercise affects your performance during and after exercising. If you don't feel any different or nothing significant is felt, please indicate that. ________________________

22. Do you take any form of medication or therapy for cramps? ________________________
   If so, please indicate what it is you take or do for relief. ________________________

23. Please list any mental attitudes felt before and during your period. ________________________
24. Please list any physical changes that take place within your body one to two weeks before your period. 
__________________________________________________________________________
__________________________________________________________________________

25. Do you feel that you have more energy before, during or after your period? ________________________________

26. List the other female members in your immediate family and whether or not they experience any type of cramps.
1. ___________________________  2. ___________________________
2. ___________________________  3. ___________________________
3. ___________________________  4. ___________________________
4. ___________________________
5. ___________________________  6. ___________________________

27. If you never have your period or only have it once or twice a year, please indicate that in the following space. 
__________________________________________________________________________

28. Please list all the activities or organizations you are involved in other than the ones mentioned above.
1. ___________________________  2. ___________________________
2. ___________________________  3. ___________________________
3. ___________________________  4. ___________________________
4. ___________________________
5. ___________________________  6. ___________________________

29. Please indicate the position you hold in each activity whether you are an active member, president, director, etc.
1. ___________________________  2. ___________________________
2. ___________________________  3. ___________________________
3. ___________________________  4. ___________________________
4. ___________________________
5. ___________________________  6. ___________________________

30. Anything that you experience before, during or after your period you have not already stated.

Thank you for your cooperation,
Bobbie Jo Bradbrook
MENSTRUAL CYCLE FORM

NAME: ___________________________ DATE: _________________________ WEIGHT: _________________________

31. If you participated in any form of physical exercise this month, list it in the following spaces: 1. ______________ 2. ______________ 3. ______________ 4. ______________ 5. ______________ 6. ______________ 7. ______________

32. List any individual or team sports you participated in this month. 1. ______________ 2. ______________ 3. ______________ 4. ______________

33. Did you compete while menstruating? ___________________________

34. Did you feel any discomfort competing while menstruating? ___________________________

35. If you answered "yes" to question number thirty four, please explain how you felt before and during competition while menstruating. ________________________________________________________________

______________________________________________________________

also how you felt after competing _______________________________________

______________________________________________________________

36. How long have you been competing in the sport mentioned above? ___________________________

37. Do you exercise during your menstrual cycle? ___________________________
38. If you answered "yes" to question number thirty seven, please describe how you felt before, during and after exercising during your menstrual cycle. ________________________________
______________________________________________________________
______________________________________________________________
39. List any physical changes that take place before, during and after menstruation.
Please be specific.
1. ______________________________ 2. ______________________________ 3. ______________________________
4. ______________________________ 5. ______________________________ 6. ______________________________
7. ______________________________ 8. ______________________________
40. List any mental attitudes that take place before, during and after menstruation.
Please be specific.
1. ______________________________ 2. ______________________________ 3. ______________________________
4. ______________________________ 5. ______________________________ 6. ______________________________
41. Have you experienced any type of pressure or trauma this month? ______________________________
If so, please explain, and be specific. _______________________________________________________
_____________________________________________________________________________________
42. Do you have a job? ______________ What is it? ______________________________
43. Are you enrolled in school? ___________________________________________________________
44. Number of days your menstrual cycle lasted. ____________________________________________
Figure 2.

<table>
<thead>
<tr>
<th>(Active)</th>
<th>Number of Questions</th>
<th>(Cramps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A C 18</td>
<td>11 12 13 14 15 16 17 19 20 22 23 24 25 27 37 38</td>
<td></td>
</tr>
<tr>
<td>R C Y 11 10 Y C 14 2 N B B P Y BE Af N Y T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R N N 16 2 N N 14 3 Y N Y N Y BE NA Y Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R C Y 13 6 Y C 12 5 Y D Y N Y B BF N Y T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A N N 13 6 N 13 4 Y N Y N N NA N Y ND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A C Y 6 12 Y C 16 5 N D Y N Y N AF N N NP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A N N 8 9 N 15 5 N N Y N Y N NA N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A C Y 14 6 N D Y N Y BH BF N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A R W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A C Y 13 6 N B Y P Y RW Af N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A N N 7 8 N N 15 8 N N Y N N NA N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A N N 10 7 N N 13 6 Y N Y N Y RW NA N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A C Y 4 10 Y C 15 9 N B Y N Y LB Af N Y +</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A C Y 14 4 Y L 14 5 N B Y P Y RW BF N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A N N 7 13 N N 16 4 Y N Y N N NA N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A C Y 15 3 Y C 11 3 Y B Y N Y RW D N Y T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A N N 11 6 N N 14 3 Y N Y N N RW NA N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A N N 14 4 N N 12 6 N N Y N N N D N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A N N 10 9 N N 11 5 Y N Y N Y RW B N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A C Y 12 7 Y C 13 7 N D Y P Y RW Af N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A C Y 8 10 Y C 14 6 N B Y N B AF N Y NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A N N 13 8 N N 14 4 Y N Y N Y H Af N Y NA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations used to chart answers to questions.

46
Figure 3.

<table>
<thead>
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Abbreviations used to chart answers to questions:

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Number of Questions
Figure 4.

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Figures 2, 3 and 4: These three charts represent the raw data of the study. The abbreviations used in these charts can be found on the Code Chart.