

MENSTRUAL DISCOMFORTS AND PHYSICAL EXERCISE

by

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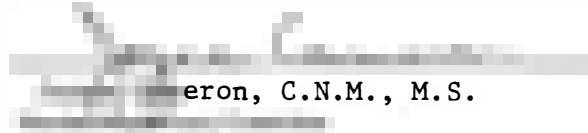
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ABSTRACT

A descriptive correlational methodology was used to investigate the relationship between the type and severity of menstrual discomforts experienced by a sample of undergraduate women and the amount of physical exercise in which they participate. A questionnaire, developed and pilot-tested by the investigator, was administered to 150 women between the ages of 18 and 25 years who were enrolled in classes at The University of Utah.

Analysis of data was completed by use of the Statistical Package for the Social Sciences at The University of Utah Computer Center. Frequency distributions and measures of central tendency, Chi-square correlations, Spearman correlation coefficients, and Pearson product-moment correlation coefficients were employed to answer research questions dealing with menstrual discomforts and physical exercise.

Of the total sample, 98.7% reported experiencing one or more symptoms associated with their periods. This percentage approximated findings of previous studies (Loevsky, 1978). The most common discomforts seen in the sample, as a whole, were abdominal swelling, abdominal cramping, irritability, and weight gain. The most frequent symptoms reported only before the onset of the period were weight gain, acne, and irritability. Those most commonly reported during the period were abdominal cramping, low backache,

abdominal swelling, and diarrhea. Those symptoms most frequently experienced, both before and during the period, were abdominal swelling, irritability, and abdominal cramping.

Of 150 subjects, 96.7% reported participating in one or more physical activities. The most common activities were walking, individualized programs (e.g., calisthenics, stretching, and weight training), and jogging.

The results of the study generally support literature which suggests an association between increasing amounts of physical exercise and a decreasing incidence of menstrual discomforts. The total amount of exercise per week was demonstrated to be negatively correlated ($p < .022$) with the occurrence of discomforts categorized as pain symptoms (abdominal cramping, low backache, breast tenderness, leg discomfort, and other pain). Of the women who reported training for competition in sporting events, the majority experienced favorable effects associated with the physical activity (43.8% reported less severe symptoms, and 25% experienced no symptoms during the time they were training). Women in the general sample reported favorable effects from increased activity (excluding sports training) in relation to their menstrual symptoms. Of 141 respondents, 39.7% reported symptoms as being less severe during the months when they were more active, while 19% reported experiencing no symptoms during more active months.

A higher frequency of symptoms were found in women whose menarche occurred between the ages of 9 and 13 years, than in those

who started menstruating between the ages of 14 and 18. A significant negative correlation was noted between age at menarche and severity of symptoms (as age at menarche decreased, severity of symptoms increased).

Results suggest that increased frequency of symptoms is associated with irregularity in the menstrual cycle, as proposed by Romney et al. (1975). Greater frequency and severity of symptoms, as well as an increased amount of flow during the period were noted in the presence of increasing irregularity of periods. A significant positive relationship was demonstrated between the incidence of vomiting and increasing irregularity of periods. Five significant relationships were noted in regards to the amount of flow during periods: (1) weight gain and increasing flow, (2) diarrhea and increasing flow, (3) vomiting and increasing flow, (4) other pain and increasing flow, and (5) increasing severity and increasing flow.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Since the 1930's, the term 'premenstrual syndrome' has been used in reference to a variety of symptoms which may appear 1 to 10 days prior to the menses, usually reaching a peak just before the onset of menstruation, and subsiding quickly after the menstrual flow has begun (Romney, Gray, Milligan, Little & Stander, 1975, pp. 151, 166). The syndrome may include one or more symptoms such as abdominal cramping, weight gain, bloating, dysmenorrhea, diarrhea, constipation, localized or generalized fluid retention, headache, low backache, joint and muscle pain, breast fullness and tenderness, nausea and vomiting, an increased appetite, or craving for sweets. Depression, irritability, unprovoked crying, and sudden mood changes are commonly associated with the premenstrual syndrome and are referred to as symptoms of 'premenstrual tension' (Romney et al., 1975, pp. 151, 166; Weideger, 1976, p. 47; Loevsky, 1978). As pointed out by Dalton (1977, p. 3), 'premenstrual syndrome' encompasses both physical and psychological symptoms, whereas 'premenstrual tension' refers only to the psychological manifestations of the syndrome.

Symptoms of the premenstrual syndrome are most common in cycles that reflect irregular function of the ovaries. There is an increase in incidence with parity and during the later reproductive

years, when the tendency toward abnormal ovarian activity increases (Romney et al., 1975, p. 166). Reports by Dalton (1977, p. 16) state that premenstrual syndrome symptoms are uncommon in cycles of less than 24 days. In cycles of over 33 days, the symptoms usually remain for a longer time than in cycles of average length.

Congestive dysmenorrhea, often associated with the premenstrual syndrome, manifests itself as a cramping pain (Romney et al., 1975, p. 204), or a continuous heavy, dragging pain (Dalton, 1977, p. 111) primarily in the lower abdomen, which may radiate to the back and thighs. The gradual onset may be noticeable prior to the menses and the peak of discomfort usually occurs during the first 24 hours of the menstrual flow, normally dissipating by the second day of the period. Tissue hypoxia secondary to the intense nature of uterine contractions during menses is thought to be partially responsible for the discomfort (Romney et al., 1975, p. 204).

A differentiation is made by Dalton between congestive dysmenorrhea, which is equated with premenstrual syndrome, and spasmodic dysmenorrhea. The latter is associated with ovulatory cycles only, begins with the menses rather than premenstrually, and the pain is of an intermittent, spasmodic quality rather than the heavy, dragging type associated with congestive dysmenorrhea. Spasmodic dysmenorrhea is usually resolved by the age of 25 years and is relieved by cervical dilatation, delivery of a term pregnancy (due to stretching and tearing of nerves which are credited with much of the discomfort of this dysmenorrhea), or estrogen or combination birth control pills. Congestive dysmenorrhea, on the other

hand, is associated with ovulatory and anovulatory cycles, and is characterized by onset of pain in the late premenstruum. The discomfort is a continuous heavy, dragging pain rather than spasmodic, and there is a tendency toward increased severity with increased parity, and favorable response to progesterone therapy (Dalton, 1977, p. 111).

The specific etiology of the premenstrual syndrome has not been defined although several theories have been proposed to explain its occurrence. Four of these theories are outlined by Loevsky (1978): (1) Excessive production of aldosterone, which causes sodium and water retention when insufficient progesterone is present to act as an aldosterone antagonist; (2) excessive production of estrogen, causing an imbalance of the estrogen/progesterone ratio, resulting in fluid retention and premenstrual hypoglycemia; (3) an alteration in carbohydrate metabolism, causing premenstrual hypoglycemia and associated hunger, headache, and faintness, lethargy and inattention, irritability and mood changes, and increased peripheral nerve sensitivity; and (4) an imbalance in estrogen/progesterone levels resulting from a disturbance in liver function which is attributed to autonomic nervous system action.

Other explanations proposed for the etiology of premenstrual syndrome include excessive prolactin production (which inhibits the normal action of progesterone), and excessive levels of prostaglandins, thought to cause increased contractility in the non-pregnant uterus (Loevsky, 1978). Weidger (1976, p. 51) suggested that lack of exercise and poor diet, as well as hormonal imbalance

and fluid retention, contribute to the symptomatology of the premenstrual syndrome. And, of course, the significance of psychosocial influences cannot be ignored.

Current treatment methods for the premenstrual syndrome are focused on primarily four areas: (1) correction of fluid and sodium imbalance through use of diuretics and dietary salt restriction which is started 7 to 14 days prior to the expected menstrual period; (2) counteraction of excessive estrogen levels by use of progesterone or chorionic gonadotropins (to stimulate secretion of progesterone by the ovaries); (3) relief of symptoms with analgesics, anti-spasmodics, tranquilizers, cervical dilatation, and rarely, surgery to sever nerves in the region of the cervix; and (4) blocking of psychogenic factors through counseling and education (Morton, 1959; Warnes, 1978).

Many pharmacological means have been utilized successfully in the treatment of premenstrual symptoms, and though no method has shown consistency in providing relief or cure for the symptoms, the pharmacological regime appears to be the treatment of choice among physicians and other health care providers today. However, Loevsky (1978) discusses several nonpharmacological alternatives for alleviating monthly distress which have received little recognition. Diet, exercise, heat therapy, massage, orgasm, hatha yoga, progressive relaxation, and biofeedback techniques are some of the methods which allow the patient to become an active participant in her treatment plan. They provide the opportunity for the woman to gain more knowledge of her body, how it responds to different

exercise experiences, and how such exercise can provide benefits beyond premenstrual syndrome relief.

One of the four conservation principles of nursing intervention is based on the conservation of the individual patient's energy (Levine, 1967). Levine illustrates this principle:

Disease processes of every kind create revisions in the energy exchange for the individual, and his response to disease depends on the resource he possesses weighed against the demands made on his physiological function by pathologic processes. (Levine, 1967)

Whether a patient's condition involves a headache or a common cold, a systemic infection or a chronic disabling disease, her ability to cope with the discomfort will be determined by such factors as her general physical health and fitness, mental health, and level of fatigue. These factors constitute the person's available energy supply and coping capabilities, both vital to her favorable adaptation to her situation.

In the case of women with premenstrual syndrome, expenditure of energy occurs through apprehension and anticipation of pain prior to the onset of the menstrual period, as well as through the physical and psychological wearing effect of pain and general discomfort. The approach to conservation of energy in these women may be two-fold.

First, the preferred approach to preserving any patient's energy is to eliminate the factors responsible for the disorder in question. This is, obviously, not possible to do with certainty in the instance of premenstrual syndrome since no definite etiology

has been determined. Secondly, focus should be placed on symptom relief so as to alleviate immediate energy-draining discomforts, even though the relief is only temporary. The latter approach is used by health care providers today; however, for the most part, the treatment involves a rather passive role on the part of the patient. With education and orientation of the patient toward active participation in a regime of physical exercise, the patient would be able to increase her available energy supply, and thus, augment her capability to cope with discomfort.

As seen in the literature, participation in physical exercise appears to have a favorable relationship with decrease or total alleviation of menstrual discomforts. Laboratory studies, as well as subjective accounts from women who take part in regular exercise programs, indicate evidence of greater stamina in exercise as well as in normal daily activities, a greater sense of well-being, and general increase in energy levels. Exercise is also a complement to dieting programs, which is a possible incentive for many women. "Any exercise that improves blood circulation and muscular strength and flexibility in your abdominal region is desirable and frequently relieves the discomforts of cramps and lower backache, as well as the logy feeling" (Cooper & Cooper, 1972, p. 30) associated with the premenstruum and menstrual period.

Symptoms of the premenstrual syndrome have been widely discussed in the literature as a serious social and economic problem due to the association of the premenstruum and menstrual period with a high rate of female absenteeism in business and industry, a

greater number of accidents involving women, increased rates of serious crime committed by women and suicides attempted by women, and a higher incidence of admissions of women to mental hospitals (Gold, 1975, p. 339; Morton, 1959). Various sources report that 30% to 90% of all menstruating women experience some degree of the premenstrual syndrome. It has been estimated that 80% of the violent crimes committed by women are perpetrated during the premenstrual week or during the first few days of menstruation. Forty-three percent of female absentee days have been attributed to influences of menstrual discomforts (Loevsky, 1978; Morton, 1959).

Today, when the positive benefits of physical exercise are becoming well-known to the public and when facilities for sports and exercise participation are more accessible, it behooves health care providers to consider the value of physical exercise in the total treatment regime of health care. Since the cause of menstrually related discomforts has not been unquestionably determined, women have the opportunity to investigate all available safe alternatives for improving general health status and relieving menstrual distress. Also, researchers are free to seek other practical solutions to this persistent problem.

Accordingly, the purpose of this study was to determine the relationship between the type and severity of menstrual discomforts experienced by a group of undergraduate women, ages 18 to 25 years, and the type and amount of physical exercise in which these women participate. With this information, the investigator hoped to obtain information that may provide direction for further research

which, in turn, will serve to generate directional and/or predictive hypotheses useful in establishing guidelines for a physiological treatment regime for symptoms of the premenstrual syndrome.

Nurse-midwifery is primarily concerned with health maintenance and promotion of health care for women and their families. Those persons in a profession which investigates, evaluates, and employs modalities of care and treatment of various types (physical, pharmacological, nutritional, psychological) will find this study to be consistent with the on-going search for practical, cost-effective means of improving the general health and well-being of women.

Examination of the literature reveals that most studies dealing with physical activity and the menstrual cycle have been concerned with the effects of the cycle on sports performance rather than with the effects of sports and physical activities on the menstrual cycle and/or its discomforts (Drinkwater, 1973). Though differing opinions regarding the benefits and disadvantages of women's participation in vigorous physical exercise, are found in the literature, the evidence appears to support such participation in pursuit of increased levels of fitness and well-being.

A physiological treatment for congestive dysmenorrhea and related disorders of menstruation was proposed by Mosher in 1914. She suggested that the condition was due to five factors in addition to the augmentation of the circulatory supply to the pelvic region near the time of menstruation. These include: (1) the upright posture assumed by humans, which interferes with the normal

physiological blood return to the heart from the lower extremities. The return of blood to the heart is accomplished primarily by the action of the diaphragm and abdominal muscles associated with respiration since the vena cava has no valves to aid the return process; (2) alteration of the normal type of respiration through disuse of the diaphragm and abdominal muscles, and substitution of costal breathing; (3) lack of general muscle development, promoting poor posture and decreased circulatory efficiency; (4) inactivity during the menses which fails to encourage proper circulation; and (5) psychosocial influences, which include cultural, social, and familial attitudes toward menstruation.

Based on these factors, Mosher developed and prescribed a simple abdominal strengthening exercise and general physical exercise such as walking throughout the menstrual cycle. Women participating in this regime reported lessened, or totally alleviated, pain, fewer headaches, and less severe backache and cramps than women not participating in the program. Also reported was a decreased flow and duration of periods in women with excessively heavy and prolonged menses (Mosher, 1914).

In 1943, Billig published the benefits of a stretching exercise used to loosen contracted ligaments in the lumbar spinal and pelvic regions. The ligament contractures, presumably a result of faulty posture, were thought to compress and irritate nerves at the twelfth thoracic or first lumbar level of the spine, this resulting in menstrual cramps and backache, aching and pain in the region of the sciatic nerve, and pain in the back of the neck, radiating to

the arms and shoulders. Marked relief or complete alleviation of symptoms was noted in women who conscientiously followed the program (Billig, 1943).

Twisting, bending, and trunk extension are the components of an exercise described by Golub in 1959. In a sample of teenagers, Golub noted a significant decrease in incidence of dysmenorrhea in girls who performed the exercise regularly. One of the researcher's later investigations (Golub et al., 1963) demonstrated the twisting and bending component of the exercise, alone, to be as beneficial, or more beneficial than the additional use of the second component, trunk extension.

Erdelyi (1962) surveyed 729 Hungarian female athletes concerning changes occurring in their menstrual periods during athletic competition. No change was reported by 84%; favorable change by 5%; and unfavorable change was reported by 11% of the athletes. The investigator pointed out that some of the unfavorable changes may have been caused by overtraining.

One thousand female university students were surveyed in regard to experience with the premenstrual syndrome, gymnastics and sports, and smoking habits (Procopé & Timonen, 1971). Sixty-five to 86% of the women reported premenstrual pain; 25%, headaches; 50-60%, tension symptoms (irritability, lassitude, depression); 10-17%, bloatedness; and 44%, dermatological symptoms (3.g., acne). The subjects who participated in sports activities reported fewer tension related discomforts and dysmenorrhea during menses than those who did not participate in regular physical activity. The generally

favorable influence of sports was credited to an improved circulatory capacity that results from regular vigorous exercise.

An abstract by Ryan of a questionnaire survey of students at the University of Bordeaux (Clarke, 1978) evidenced little difference in menstrual symptoms reported by three groups of female students. These groups included (1) physical education majors who participated in regular vigorous exercise, (2) women who took part in two to four hours of exercise per week, and (3) women who had no regular exercise program.

In summary, the literature provides several suggestions concerning physical exercise and the premenstrual syndrome. Exercise increases abdominal and diaphragmatic tone, encourages proper breathing, and increases circulatory capacity. It improves general muscle tone, contributes to better posture, and gives a greater sense of well-being. Through these improvements in general fitness, women may obtain at least partial relief of many of the common symptoms of the premenstrual syndrome.

Research Questions

1. What is the incidence of menstrual discomforts in the sample?
 - a. Incidence of each individual symptom.
 - b. Incidence of symptoms as a whole.
2. What relationship exists between age at menarche and the type and severity of discomforts experienced?
3. What relationship exists between regularity of

periods and the type and severity of discomforts experienced?

4. What relationship exists between the amount of flow during a period and the type and severity of discomforts experienced?

5. What relationship exists between the amount of flow during a period and the regularity of the periods?

6. What relationship exists between the type and severity of symptoms and the incidence of previous pregnancies?

7. What is the frequency of participation in physical activity in the sample?

a. Frequency of participation in each physical activity.

b. Frequency of participation in physical activity as a whole.

8. What relationship exists between the amount of physical exercise and:

a. The total number of symptoms reported?

b. The number of pain symptoms?

c. The number of gastro-intestinal symptoms?

d. The number of muscle and joint symptoms?

e. The number of emotional symptoms?

f. The number of edema-related symptoms?

9. What relationship exists between the amount of flow during a period and the amount of physical exercise

reported?

10. What relationship exists between the number of days of work and/or school missed due to menstrual discomforts and the amount of physical exercise?

11. What relationship exists between the amount of medication taken during the period and the amount of physical exercise reported?

12. What relationship exists between the amount of physical exercise and the incidence of seeking medical advice and/or treatment for menstrual discomforts?

13. What relationship exists between the severity of discomforts and the subjects' participation in training for competition in sports?

CHAPTER II

METHODOLOGY

The Design

A descriptive correlational design was used to investigate the relationship between the type and severity of premenstrual and menstrual discomforts experienced by the subjects and the type and amount of physical exercise in which the subjects participate. Because of time limitations, a nonrandomized convenience sample was used.

The Sample

A sample of 150 subjects was obtained from a group of undergraduate women between the ages of 18 and 25 who volunteered to complete the questionnaire. Approximately one-half of these volunteers were obtained from The University of Utah Psychology 101 Subject Pool and the remainder from two University of Utah Health Science classes.

After written and/or verbal consent was secured from appropriate authorities (Review of Research with Human Subjects Committee, Psychology Department Research Participation Committee), Psychology 101 subjects were solicited through notices posted on bulletin boards in the Behavioral Sciences Building. The notices were accompanied by a Posting Form (Appendix A) provided by the Psychology

Department. This form explained the study and announced the time and location for questionnaire completion. The Health Science subjects were contacted at the end of a scheduled class period, with the consent of the class instructor.

The Instrument

A two-part self-administered questionnaire was prepared by the investigator. A pilot test was completed using a convenience sample of 20 subjects following which the questionnaire was revised appropriately. The questions follow the pattern used in obtaining health histories (Kraytman, 1979, pp. 3-8). Those questions pertaining to physical exercise were written with consideration given to Cooper's standards regarding aerobic exercise (Cooper & Cooper, 1972, pp. 21-26, 37-42, 149-155).

Questions pertained to: (1) the subjects' menstrual cycle: (a) menstrual history, (b) type and severity of menstrual discomforts experienced, (b) modalities used for alleviation of menstrual discomforts; and (2) type and amount of physical exercise participated in by the subjects.

The Procedure

The questionnaire was administered directly to the subjects by the investigator in order to insure compliance. A consent form and questionnaire were distributed to each subject, the study was explained, and directions for questionnaire completion given. Questionnaires were collected upon completion.

Data Analysis

Statistics were computed at The University of Utah Computer Center using the Statistical Package for the Behavioral Sciences (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975). The following computations were obtained: (1) frequency distributions and measures of central tendency, (2) cross-tabulations for generation of Chi-square, (3) Spearman correlation coefficients, and (4) Pearson product-moment correlation coefficients (Polit & Hungler, 1978).

CHAPTER III

RESULTS AND DISCUSSION

The sample consisted of 150 undergraduate women ranging in age from 18 to 25 years. The mean age was 19.84 years. As a whole, the sample reflected basically normal findings in regards to frequency, duration, regularity, and amount of flow of menstrual periods (Tables 1, 2, and 3). The data are presented according to each research question.

1. What is the incidence of menstrual discomforts in the sample?

Of the 150 subjects, 98.7% reported experiencing one or more symptoms associated with their periods, this frequency approximating findings from previous studies (Weideger, 1976; Loevsky, 1979). Of 149 respondents, 22% reported having symptoms with every period; 43.6%, with most periods; and 33%, occasionally with their periods. Those reporting symptoms of mild intensity were 40.3% of the sample, while 47.7% reported moderately uncomfortable discomforts and 10.7% described symptoms as being severe.

Tables 4 and 5 describe the frequency and timing of symptom occurrence in the sample. The most frequent symptoms reported only before the onset of the period were weight gain (61%), acne (60%), and irritability (53%). Those most commonly reported only during the

Table 1
 Age of Subject, Menarche, Frequency and Duration of Menstrual Periods
 in a Sample of 150 University Women

Statistic	Age of Subject	Age at Menarche	Frequency of Periods	Duration of Periods
Mean	19.84 yrs.	13.02 yrs.	31.545 days	5.338 days
Mode	19.00	12.00 13.00	27.00	
Median	19.296	12.814	29.083	5.880
SD	1.918	1.575	5.847	.148
Range	18-25 yrs.	9-18 yrs.	25-45 days	2-10 days

Table 2
 Regularity of Menstrual Periods in a Sample of
 150 University Women

Regularity	N	Percent
Never miss a period	116	77.35
Occasionally miss a period	24	16.0
Frequently miss a period	10	6.7

Table 3
 Amount of Menstrual Flow in a Sample of
 150 University Women

Amount of Flow	N	Percent
Light	94	62.7
Moderate	53	35.3
Heavy	3	2.0

Table 4
Time of Symptom Occurrence in Menses of a Sample of
150 University Women

Symptom Group	Symptom	Before Period Only		During Period Only		Before and During Period	
		N	%	N	%	N	%
Edema-related	Abdominal swelling	35	23.3	30	20.0	60	40.0
	Weight gain	61	40.7	20	13.3	34	22.7
	Breast tenderness	53	35.3	22	14.7	43	28.7
Gastro-intestinal	Nausea	7	4.7	24	16.0	6	4.0
	Vomiting	1	.7	4	2.7	2	1.3
	Constipation	11	7.3	17	11.3	4	2.7
	Diarrhea	6	4.0	30	20.0	3	2.0
Muscle & Joint	Leg discomfort	10	6.7	21	14.0	11	7.3
	Low backache	28	18.7	50	33.3	26	17.3
	Abdominal cramping	15	10.0	64	42.7	41	27.3
Emotional	Irritability	53	35.3	22	14.7	43	28.7
	Sudden mood changes	42	28.0	17	11.3	38	25.3
	Depression	44	29.3	21	14.0	20	13.3
Other	Acne	60	40.0	6	4.0	26	17.3
	Other pain	3	2.0	9	6.0	4	2.7
	Other	1	.7	2	1.3	0	0.0

Table 5
 Frequency of Occurrence of Individual Symptoms in Relation to
 Menses of 150 University Women

Symptom	N	Percent
Abdominal swelling	125	83.3
Abdominal cramping	120	80.0
Irritability	118	78.7
Weight gain	115	76.7
Low backache	104	69.3
Breast tenderness	103	68.6
Sudden mood changes	97	64.6
Acne	92	61.3
Depression	85	56.6
Leg discomfort	42	28.0
Diarrhea	39	26.0
Nausea	37	24.7
Constipation	32	21.3
Other pain*	16	11.0
Vomiting	7	4.7
Other**	3	2.0

* Vaginal/perineal throbbing, headache, joint pain or swelling.

** Nose bleed before period begins, blackout from pain, increased appetite, dizziness, urinary frequency, pain in area of ovaries.

menstrual period were abdominal cramping (42.7%), low backache (33.3%), abdominal swelling (20%), and diarrhea (20%). Those symptoms most frequently experienced both before and during the period were abdominal swelling (40%), irritability (28.7%), and abdominal cramping (27.3%). Table 5 illustrates the frequency of individual symptoms without regard to the timing of their occurrence. The most common symptoms seen in the sample, as a whole, were abdominal swelling (83.3%), abdominal cramping (80%), irritability (78.7%), and weight gain (76.7%).

The symptoms mentioned here are among the most common ones reported in the literature (Romney et al., 1975, pp. 151, 166). However, the literature does not report information regarding specific timing of individual symptoms (before period, only; during period, only; before and during period). The findings regarding such timing of symptoms appears to be a unique contribution to the literature in this topic area.

2. What relationship exists between the age at menarche and the type and severity of discomforts experienced?

Table 6 describes the occurrence of symptoms in relation to the subjects' age at menarche. There is a higher frequency of symptoms in those women in the sample who started menstruating between the ages of 9 and 13 than in those whose menarche occurred between the ages of 14 and 18. Statistical significance, however, was not found to exist between age at menarche and the incidence of discomforts (all levels of significance were greater than $p < .0853$).

The Spearman correlation coefficient of age at menarche and

Table 6

Frequency and Timing of Symptom Occurrence According to Age at Menarche in
150 University Women

Symptom	Age At Menarche	Before Period		During Period		Before and During Period		Totals		χ^2 *	df
		N	%	N	%	N	%	N	%		
Abdominal swelling	7-13 yrs.	29	19.3	21	14.0	42	28.0	92	61.3	6.61	3
	14-18 yrs.	6	4.0	9	6.0	18	12.0	33	22.0		
Weight gain	9-13	45	30.0	14	9.3	25	16.7	84	56.0	2.28	3
	14-18	16	10.7	6	4.0	9	6.0	31	20.6		
Breast tenderness	9-13	37	24.7	11	7.3	25	16.7	73	48.7	1.05	3
	14-18	14	9.3	3	2.0	13	8.7	30	20.0		
Nausea	9-13	6	4.0	17	11.3	4	2.7	27	18.0	.91	3
	14-18	1	.7	7	4.7	2	1.3	10	6.7		
Vomiting	9-13	1	.7	2	1.3	2	1.3	5	3.3	2.05	3
	14-18	0		2	1.3	0		2	1.3		
Constipation	9-13	5	3.3	13	8.7	4	2.7	25	16.7	5.22	3
	14-18	6	4.0	4	2.7	0		10	6.7		
Diarrhea	9-13	4	2.7	21	14.0	3	2.0	28	18.7	1.34	3
	14-18	2	1.3	9	6.0	0		11	7.3		
Leg discomfort	9-13	8	5.3	16	10.7	9	6.0	33	22.0	2.16	3
	14-18	2	1.3	5	3.3	2	1.3	9	6.0		
Low backache	9-13	24	16.0	33	22.0	19	12.7	76	50.7	4.85	3
	14-18	4	2.7	17	11.3	7	4.7	28	18.7		
Abdominal cramping	9-13	10	6.7	47	31.3	30	20.0	87	58.0	2.06	3
	14-18	5	3.3	17	11.3	11	7.3	33	22.0		

Table 10--Continued

Symptom	Age At Menarche	Before Period		During Period		During and During Period		N	Totals		χ^2 *	df
		N	%	N	%	N	%		N	%		
Irritability	9-13	35	23.3	17	11.3	32	21.3	84	56.0	1.64	3	
	14-18	18	12.0	5	3.3	11	7.3	29	19.3			
Sudden mood changes	9-13	32	21.3	11	7.3	24	16.0	67	45.0	1.91	3	
	14-18	10	6.6	6	4.0	14	9.3	30	20.0			
Depression	9-13	30	20.0	16	10.7	15	10.0	61	40.7	.86	3	
	14-18	14	21.0	5	3.3	5	3.3	24	16.0			
Acne	9-13	42	28.0	4	2.7	18	12.0	64	42.7	.05	3	
	14-18	18	12.0	2	1.3	8	5.3	28	18.7			
Other pain	9-13	3	2.0	3	2.0	2	1.3	8	5.3	2.31	3	
	14-18	1	.7	0		0		1	.7			
Other	9-13	1	.7	2	1.3	1	.7	4	2.7	1.68	3	
	14-18	0		0		1	.7	1	.7			

* All levels of significance were greater than $p < .0853$.

severity of symptoms (Table 7) revealed a significant ($p < .021$) negative correlation between these two variables. As age at menarche increased, less severity in symptoms was noted. The literature suggests a greater occurrence of symptoms in women whose menstrual cycles are characterized by abnormal ovarian function (Romney et al., 1975, p. 166). The significant correlation between age at menarche and severity of symptoms (severity was found, in this study, to be negatively correlated with regularity of symptoms), may be indicative of a greater incidence of irregular ovarian function in women who begin menstruating at a younger age.

These findings may have implications for teaching young girls who have not yet started to menstruate. Considering the association that seems to exist between early onset of menstruation and increased amount of severity of menstrual symptoms, as well as that between increased severity of symptoms and increasing irregularity of periods (Romney, et al. (1975) state that irregularity in periods is common during the first one or two years following the menarche), premenarcheal instruction might include teaching the benefits of regular exercise, as well as proper diet, hygiene, etc., in order to prepare these girls for the experience of menstruation. Perhaps early teaching in these areas would aid in preventing or minimizing the occurrence of many symptoms linked to poor posture and muscle tone, compromised circulatory capacity, or psychosocial factors related to misconceptions or lack of knowledge about menstruation.

3. What relationship exists between regularity of periods and the type and severity of discomforts experienced?

Table 7
Spearman Correlation Coefficients of Various Variables in
150 University Women

	Age at Menarche	Regularity of Periods	Amount of Flow With Periods	Severity of Symptoms	Parity
Total Exercise Per Week	.1702* $\underline{N} = 150$ $\underline{p} < .019$	- .0175 $\underline{N} = 150$ $\underline{p} < .416$	- .1205 $\underline{N} = 150$ $\underline{p} < .058$	- .4792* $\underline{N} = 149$ $\underline{p} < .042$.4792* $\underline{N} = 14$ $\underline{p} < .041$
Age at Menarche	--	- .1781 $\underline{N} = 149$ $\underline{p} < .021$	- .0921 $\underline{N} = 150$ $\underline{p} < .131$.1671 $\underline{N} = 150$ $\underline{p} < .015$.1923 $\underline{N} = 14$ $\underline{p} < .255$
Regularity of Periods	--	--	- .0550 $\underline{N} = 150$ $\underline{p} < .252$	- .1206 $\underline{N} = 1206$ $\underline{p} < .072$.0849 $\underline{N} = 14$ $\underline{p} < .386$
Amount of Flow with Periods	--	--	--	.1532* $\underline{N} = 149$ $\underline{p} < .031$.3516 $\underline{N} = 14$ $\underline{p} < .109$
Severity of Symptoms	--	--	--	--	- .1767 $\underline{N} = 14$ $\underline{p} < .273$

*
 $\underline{p} < .05$

Cross-tabulations of regularity of periods and symptom type were computed to obtain Chi-square values for these variables (Tables 8 and 9). Statistical significance was revealed in only one instance. A significant ($p < .0448$) positive correlation was demonstrated between the incidence of vomiting and increasing irregularity of periods. Though the correlations between period regularity and other symptoms did not show statistical significance, positive relationships were demonstrated between these variables. This finding seems to support the suggestion in the literature that irregular periods are associated with a higher incidence of symptoms (Romney et al., 1975, p. 166).

The Spearman correlation was used to determine the relationship between the severity of symptoms and regularity of periods (Table 7). A nonsignificant negative relationship was demonstrated (as severity increased, regularity of periods decreased).

4. What relationship exists between the amount of flow during a period and the type and severity of discomforts experienced?

Cross-tabulations were used to generate the Chi-square value for the relationship between the amount of flow (Table 8) and the type of symptoms experienced. Statistical significance was demonstrated between the following variables: (1) weight gain and increasing flow ($p < .001$); (2) diarrhea and increasing flow ($p < .0184$); (3) vomiting and increasing flow ($p < .0001$), and (4) other pain and increasing flow ($p < .0027$). A Spearman correlation (Table 7) of severity of symptoms and amount of flow revealed a significant ($p < .031$) positive correlation between these two variables (with

Table 8

Chi-Square Correlations of Symptom Occurrence and Various Variables in
150 University Women

Symptoms	Parity of Subjects		Amount of Flow During Period		Regularity of Periods		Total Weekly Exercise	
	χ^2	df	χ^2	df	χ^2	df	χ^2	df
Abdominal swelling	9.28	6	7.47	6	- 3.50	6	268.74	255
Weight gain	5.49	6	22.40**	6	- 8.13	6	257.52	255
Breast tenderness	9.07	6	5.45	6	- 7.78	6	249.87	255
Nausea	1.71	4	10.98	6	- 3.18	6	221.47	255
Vomiting	2.36	4	28.76**	6	-12.89*	6	207.31	255
Constipation	15.00**	4	4.71	6	- 4.88	6	324.95**	255
Diarrhea	1.91	4	15.25*	6	- 7.59	6	316.77**	255
Leg discomfort	8.18	4	4.51	6	- 4.62	6	245.10	255
Low backache	12.25	6	7.45	6	- 4.80	6	243.58	255
Abdominal cramping	4.22	4	4.57	6	-10.67	6	247.49	255
Irritability	5.58	6	10.97	6	- 5.12	6	250.02	255
Sudden mood changes	8.55	6	7.67	6	- 2.89	6	246.07	255
Depression	5.81	6	8.39	6	-10.77	6	233.55	255
Acne	3.04	6	5.24	6	- 1.44	6	278.25	255
Other pain	1.08	2	23.58**	8	- 3.70	8	342.42	340
Other	1.08	2	2.02	6	- 2.66	6	269.418	255

*
p < .05

**
p < .01

Table 9

Incidence of Menstrual Symptoms in 150 University Women According to
Regularity of Periods

Symptom	Never Miss A Period		Occasionally Miss A Period		Frequently Miss A Period	
	<u>N</u>	%	<u>N</u>	%	<u>N</u>	%
Abdominal swelling	98	65.3	20	13.3	7	4.7
Weight gain	93	62.0	15	10.0	7	4.7
Breast tenderness	79	52.2	17	11.3	7	4.7
Nausea	28	18.7	6	4.0	3	2.0
Vomiting	3	2.0	4	2.7	0	
Constipation	25	16.7	5	3.3	2	1.3
Diarrhea	27	18.0	11	7.3	1	.7
Leg discomfort	35	23.3	7	4.7	0	
Low backache	81	54.0	16	10.7	7	4.7
Abdominal cramping	94	62.7	21	14.0	5	3.3
Irritability	92	61.3	18	12.0	8	5.3
Sudden mood changes	74	49.3	16	10.7	7	4.7
Depression	72	48.0	7	4.7	6	4.0
Acne	71	47.3	16	10.7	5	3.3
Other pain	9	6.0	0		0	
Other	4	2.7	0		0	

increasing severity, increased amount of flow as noted). Once again, greater incidence of symptoms appears to be associated with the manifestation of cycle irregularities, specifically, increased amounts of flow.

5. What relationship exists between the amount of flow during a period and the regularity of the periods?

The Spearman correlation was used to determine the relationship of the amount of flow to the regularity of menstrual periods (Table 7). A nonsignificant negative relationship was found (as flow increased, regularity decreased).

6. What relationship exists between the type and severity of symptoms and the incidence of previous pregnancies?

Fourteen subjects reported previous pregnancies (Table 10). Cross-tabulations of parity and symptom type (Table 8) demonstrated a significant positive relationship ($p < .0047$) between the incidence of constipation and the number of previous pregnancies. No significance was noted between parity and other symptoms. A Spearman correlation (Table 7) between severity of symptoms and parity revealed a nonsignificant negative relationship (as severity increased, number of previous pregnancies decreased). The number of subjects involved must be considered in evaluating the importance of these findings.

7. What is the frequency of participation in physical activity in the sample?

Of the total sample, 96.7% reported participating in one or more physical activities (Table 11). The most commonly reported activities were walking (68.7%), individualized programs (50.7%)

Table 10

Parity of Fourteen University Women Who Have Had At Least One Previous Pregnancy

Statistics	Number of Pregnancies	Number of Full Term Deliveries	Number of Premature Deliveries	Number of Miscarriages	Number of Abortions
Mean	1.643	1.333	None Reported	1.5000	1.455
Mode	2.000	1.000		1.000	1.000
Median	1.643	1.250		1.5000	1.417
SD	.633	.577		.707	.522
Range	1 to 3	1 to 3		1 to 2	1 to 2

Table 11

Amount of Participation in Individual Physical Activities by a Sample of
145 University Women in Hours per Week

Activity	Total		Up to 1 Hr.		Up to 2 Hr.		Up to 3 Hr.		Up to 5 Hr.		5-10 Hr.		Over 10 Hr.	
	<u>N</u>	%	<u>N</u>	%	<u>N</u>	%	<u>N</u>	%	<u>N</u>	%	<u>N</u>	%	<u>N</u>	%
Jogging	67	46.2	37	25.5	16	11.0	9	6.2	2	1.4	2	1.4	1	.69
Walking	91	62.8	10	6.9	18	12.4	23	15.9	21	14.5	10	6.9	9	6.9
Swimming	26	18.0	14	9.7	8	5.5	1	6.9	2	1.4	1	.69	0	
Biking	23	15.9	11	7.6	6	4.1	3	2.1	1	.69	1	.69	1	.69
Stationary cycling	16	11.0	11	7.6	3	2.1	2	1.4	0		0		0	
Downhill skiing	71	49.0	2	1.4	2	1.4	10	6.9	25	17.2	27	18.6	5	3.4
Cross-country skiing	7	4.8	0		3	2.1	2	1.4	2	1.4	0		0	
Racquetball/ squash	33	22.8	19	13.1	11	7.6	1	.69	1	.69	1	.69	0	
Tennis	28	19.3	10	6.9	11	7.6	3	2.1	2	1.4	2	1.4	0	
Individualized program	74	51.0	19	13.1	23	15.9	4	2.8	15	10.3	6	4.1	7	4.8

including such exercise as calisthenics, stretching and weight training (Table 12) and jogging (46.7%). The average time (hours per week) of participation in each activity varied widely from subject to subject. The mean was 9.97 hours per week, and the standard deviation was 9.03 hours per week.

8. What relationship exists between the amount of physical exercise and:

- a. The total number of symptoms reported?
- b. The number of pain symptoms?
- c. The number of gastro-intestinal symptoms?
- d. The number of muscle and joint symptoms? and
- e. The number of emotional symptoms?

Pearson product-moment correlation coefficients (Table 13) were required to investigate the relationship between two interval data variables, the total amount of exercise per week, and the number of total symptoms experienced. A nonsignificant ($p < .057$) negative relationship was demonstrated between total exercise and the incidence of menstrual discomforts, as a whole (as the amount of exercise increased, frequency of discomforts decreased).

Chi-square Correlations were calculated for the total amount of weekly physical activity (Table 8), and each symptom. Two statistically significant relationships were revealed: (1) a positive correlation between diarrhea and an increasing amount of activity ($p < .005$), and (2) a positive correlation between constipation and an increasing amount of activity ($p < .002$). The first correlation supports the idea found in the literature that exercise

Table 12
Description of Individualized Exercise Programs In
a Group of 74 University Women

Activity	Number	Percent
Dance	15	13.0
Stretching	17	15.0
Calesthenics	29	25.0
Weight training	16	14.0
Yoga	7	6.0
Volleyball	8	7.0
Gymnastics	12	11.0
Other*	10	9.0

*Work out at spa.

Table 13

Pearson Product-Moment Correlation Coefficients of Total Weekly
Exercise and Number of Categorized Menstrual Symptoms
Experienced by 150 University Women

<u>Symptom Category</u>	<u>r</u>	<u>N</u>	<u>Significance</u>
<u>Total number of symptoms experienced</u>	- .1293	150	p < .057
<u>Pain Symptoms</u> (Abdominal cramping, low back-ache, breast tenderness, leg discomfort, other pain)	- .1640	150	p < .022*
<u>Edema-related Symptoms</u> (Abdominal swelling, weight gain, breast tenderness)	- .1292	150	p < .057
<u>Gastrointestinal Symptoms</u> (Nausea, vomiting, constipation, diarrhea)	- .0761	150	p < .177
<u>Muscle and Joint Symptoms</u> (Leg discomfort, low backache, abdominal cramping)	- .1212	150	p < .070
<u>Emotional Symptoms</u> (Irritability, sudden mood changes, depression)	- .0377	150	p < .324

*
p < .05

increases gastro-intestinal motility (Cooper & Cooper, 1972, p. 100; Thiroloix, 1976, pp. 79-80). The second finding suggests that decreased motility results from participation in regular exercise.

The presence of these two contradicting findings may be due to the fact that many variables besides exercise (e.g., diet, fluid intake, psychosocial influences) may be involved in the cause of constipation and diarrhea (Thiroloix, 1976, pp. 72, 74, 134-137). The balance or imbalance of hormones during the menstrual period is another consideration which should be given attention. It is known that the hormonal changes of pregnancy (similar to those of the menstrual period) are associated with relaxation of smooth muscles, including the digestive tract, and with decreased peristalsis in the intestines (David & Doyle, 1976, p. 1945). In many women, this results in an increased incidence of constipation during pregnancy. A similar explanation may be involved in the case of constipation and diarrhea in premenstrual and menstrual period.

Next, Pearson coefficients (Table 13) were calculated for total weekly exercise and the frequency of symptoms categorized as pain symptoms (abdominal cramping, low backache, breast tenderness, leg discomfort, and other pain). A negative correlation with a significance level of $p < .022$ was noted to exist between total exercise and this symptom group (as amount of total weekly exercise increased, incidence of pain symptoms decreased). Pearson product-moment correlation coefficients between total exercise and the groups of gastro-intestinal, muscle and joint, emotional and edema-related symptoms did not demonstrate statistical significance. However,

the correlation of total weekly exercise and edema-related symptoms did demonstrate a negative relationship with a significance level approaching .05 ($p < .057$).

The symptoms categorized above as pain symptoms seem to be related to lack of muscle tone, poor posture, and lessened circulatory capacity which regular exercise tends to correct. This may explain the significant negative correlation obtained between exercise and pain symptoms.

9. What relationship exists between the amount of flow during a period and the amount of physical exercise reported?

The relationship of the amount of flow to the total amount of weekly exercise was investigated by use of the Spearman correlation coefficient (Table 7). The negative relationship between these two variables (as amount of total exercise increased, the amount of flow decreased) was demonstrated to have a level of significance of $p < .058$. The negative correlation corresponds with Mosher's (1914) findings associating decreased flow with regular exercise.

10. What relationship exists between the number of days of work and/or school missed due to menstrual discomforts and the amount of physical exercise?

Of 146 respondents, 52.6% reported needing to lie down during the course of one to three days during their period. Of these same subjects, 22.6% missed from one to two days of work or school because of menstrual discomforts, this being a lower percentage than that reported in a study (43%) discussed by Morton (1959). The variation in this percentage may be due to differences in sample

characteristics such as age, health status and varying psychosocial influences. A Pearson correlation between days of work and/or school missed and the total amount of weekly exercise revealed a highly significant negative correlation between the two variables ($p < .0001$). This finding, once again, suggests the favorable association of regular exercise with the smaller incidence of menstrual discomforts.

11. What relationship exists between the amount of medication taken during the period and the amount of physical exercise reported?

Thirty-five percent of 149 respondents reported using medication of some kind to relieve menstrual discomforts (Tables 14, 15, and 16). The majority of these medications were analgesics (57.4%). Nonprescription menstrual preparations (e.g., Midol, Pamprin) compiled 16.8% of the medications used, while 25.8% of medications were categorized as 'other' (herbs, anti-inflammatory medications, prostaglandin synthesis inhibitors, etc.).

The fact that the majority of medications used by subjects are nonprescription, over-the-counter drugs, may indicate that many of these women are willing to take responsibility for self-care regarding menstrual discomforts and, perhaps, their own health care, in general. The use of some of these medications, of course, may have been suggested by health care providers.

The relationship of the amount of medication taken during a period and total weekly exercise was investigated by use of the Pearson product-moment correlation coefficient. A correlation of

Table 14
Amount of Medication Taken During the Menstrual Period by a
Group of 81 University Women

Doses Per Day	Number	Percent
1	40	58.8
2	12	17.7
3	8	11.8
4	5	7.4
5	2	2.9
6	1	1.5

Table 15
 Type of Medication Used During Menstrual Periods by a Group
 of 94 University Women

Medication	Number	Percent
<u>Analgesics</u>		
Arthritis pain reliever	1	1.1
Ascriptin	1	1.1
Aspirin	45	47.9
Belladonna Tincture	1	1.1
Codeine	2	2.1
Cope	1	1.1
Darvon	4	4.3
Empirin	2	2.1
Exedrin	1	1.1
Extra Strength Tylenol	4	4.3
Fiorinal	1	1.1
Percodan	1	1.1
Percogesic	1	1.1
Tylenol	23	24.5
Tylenol with Codeine #3	1	1.1
<u>Menstrual Preparations</u>		
Midol	24	25.5
Pamprin	2	2.1
<u>Other</u>		
Diuretics	1	1.1
Dolomite (Calcium and magnesium suppositories)	1	1.1
Lobelia and Cayenne	2	2.1
Magnesium phosphate salt tablets	1	1.1
Medrin	1	1.1
Motrin	3	3.2
Muscle relaxants	1	1.1
Peptobismol	1	1.1
Valium	1	1.1

Table 16
 Type and Amount of Medication Used During Menstrual Periods
 in a Group of 81 University Women

Type of Medication	Number of Subjects Using Medication	Percentage of Medications Used
Analgesics	89	57.4
Other*	40	25.8
Nonprescription menstrual preparations	26	16.8

* Herbs, anti-inflammatory medications, prostaglandin synthesis inhibitors, sedatives, anti-diarrhea medication, calcium lactate, and Vitamin D.

total exercise with the number of pills (or doses of medication) taken per day during a period revealed a nonsignificant negative relationship (as total exercise increased, number of pills decreased). Such a negative relationship may indicate that many women experiencing menstrual discomforts are participating in a self-care regime of over-the-counter medications or other non-pharmacological modalities. Other women may be tolerating their discomforts as an unavoidable happening and may not be using any discomfort-alleviating means.

12. What relationship exists between the amount of physical exercise and the incidence of seeking medical advice and/or treatment for menstrual discomforts?

Of the total sample, 20.7% (31) reported having sought medical advice for relief of their symptoms. The modes of treatment and/or advice recommended by care-givers are described in Table 17 and the results of the treatment or advice are presented in Table 18. The most commonly reported treatments/advice were analgesics (31.52%), birth control pills (18.52), and 'other' (18.52), including advice to 'have a baby,' anti-diarrhea medication, prostaglandin synthesis inhibitors, and anti-inflammatory medications. Of those who received advice/treatment, 12.5% (5) experienced great relief from their discomforts, 57.7% (23) felt that symptoms were somewhat relieved, and 25% (10) reported that symptoms remained unchanged. No statistical significance was revealed in the relationship of total weekly exercise and the incidence of seeking medical advice. In this sample, it is evident

Table 17

Description of Advice or Treatment Given to a Group of 31
University Women Regarding Menstrual Discomforts

Treatment or Advice	Number	Percent
Analgesics	17	31.50
Birth control pills	10	18.52
Other*	10	18.52
Heating pad	7	12.90
Exercise	6	11.10
Diuretics	2	3.70
Warm bath	2	3.70

*"Have a baby," anti-diarrhea medication, prostaglandin synthesis inhibitor, anti-inflammatory medication.

Table 18

Result of Advice or Treatment Given to a Group of 31 Univer-
sity Women Regarding Menstrual Discomforts

Results	Number	Percent
Did not follow advice or treatment	2	5.0
Symptoms remained the same	10	25.0
Symptoms somewhat relieved	23	57.5
Symptoms greatly relieved	5	12.5

that, though the majority of subjects reported symptoms that were either somewhat relieved or greatly relieved, many women may benefit from some regime/treatment that would further diminish symptoms.

13. What relationship exists between the severity of discomforts and the subjects' participation in training for competition in sports?

Sixteen women (15.8% of 101 respondents) reported training for competition in one or more sporting activities (Table 19). Of these subjects, seven (43.8%) reported less severe symptoms while training, and three (18.8%) felt that symptoms remained the same. Two subjects (12.5%) experienced increased severity of symptoms while training (Table 20). These findings differ from those of Erdelyi (1962) which demonstrated that the majority of athletes studied (84%) experienced no change in symptoms, 11% reported unfavorable change, and 5%, favorable change. Various factors such as level of training, incidence of overtraining, and type of sport trained for, might explain this difference. The sample size must, of course, be considered when evaluating these findings.

One hundred forty-one subjects responded to the question regarding what difference they noticed in symptoms during months when they were more physically active (Table 21). Of these respondents, 39.7% (56) reported symptoms as being less severe, 37% (52) felt that symptoms remained the same, and 19% (27) reported experiencing increased severity in symptoms during the more active months. Twenty-seven (19%) of the subjects reported that they felt no symptoms during active months. The fact that over one-half of

Table 19
 Competitive Sports Training in a Group of
 16 University Women

Sport	Number	Percent
Track/running	5	26.0
Volleyball	3	16.0
Other*	3	16.0
Basketball	2	10.5
Gymnastics	2	10.5
Skiing	2	10.5
Swimming	2	10.5

* Golf, racquetball, dance.

Table 20
 Menstrual Symptoms Change During Sports Training
 in a Group of 16 University Women

Change Noted During Training	Number	Percent
No symptoms experienced	4	25.0
Symptoms less severe	7	43.8
Symptoms the same	3	18.8
Symptoms more severe	2	12.5

Table 21

Menstrual Symptoms Change in More Physically Active Months
in a Group of 141 University Women

Change Noted	Number	Percent
No symptoms experienced	27	19.0
Symptoms less severe	56	39.7
Symptoms the same	52	37.0
Symptoms more severe	6	4.3

Table 22

Nonpharmacological Methods Used for Relief of Menstrual
Symptoms in a Group of University Women

Method	Number	Percent
Heating pad	41	31.0
Warm bath/shower	37	28.0
Exercise	33	25.0
Rest/sleep	10	8.0
Other*	6	4.5
Massage	3	2.0
Warm drinks	2	1.5

* Alcohol, elevate feet, marijuana, sex before period starts, ice packs, external perineal pressure to relieve throbbing.

these women experience fewer and/or less severe symptoms during the months when they are more active indicates a favorable association between increased amounts of exercise and the decreasing incidence of menstrual discomforts (Tables 19 and 20).

Use of several of the nonpharmacological modalities (Table 22) discussed by Loevsky (1978) was reported by subjects in this study, though only two of these methods were among those treatments advised by medical care-givers. The most commonly reported non-pharmacological methods used for symptom relief were heating pads (31%), warm baths (28%), and exercise (25%). The widespread use of these methods for relief of menstrual discomforts may denote, once again, the fact that many women are willing to take responsibility for self-care, and that their interest is not limited to pharmaceutical interventions.

In general, the findings of this study suggest that physical exercise is associated with a decreased incidence of menstrual-related symptoms. A sufficient number of significant relationships have been demonstrated between physical exercise and menstrual discomforts to warrant further research into the question in order to validate or refute the findings of the present study.

CHAPTER IV

SUMMARY AND RECOMMENDATIONS

A descriptive correlational methodology was used to investigate the relationship between the type and severity of menstrual discomforts experienced by a sample of undergraduate women and the amount of physical exercise in which they participate. A questionnaire, developed and pilot tested by the investigator, was administered to 150 women, between the ages of 18 and 25, who were enrolled in classes at The University of Utah.

Analysis of data was completed by use of the Statistical Package for the Social Sciences at The University of Utah Computer Center. Frequency distributions and measures of central tendency, Chi-square, Spearman correlation coefficients, and Pearson product-moment correlation coefficients were employed to answer research questions dealing with menstrual discomforts and physical exercise.

Of the total sample, 98.7% reported experiencing one or more symptoms associated with periods; the most common being abdominal swelling (83.3%), abdominal cramping (80%), irritability (78.7%), and weight gain (76.7%). The most frequent symptoms reported only before the onset of the period were weight gain (61%), acne (60%), and irritability (53%). Those most commonly reported only during the menstrual period were abdominal cramping (42.7%),

low backache (33.3%), abdominal swelling (20%), and diarrhea (20%). The symptoms experienced most frequently before and during the period were abdominal swelling (40%), irritability (28.7%), and abdominal cramping (27.3%).

Of the 150 subjects, 96.7% reported participating in one or more physical activities. The most commonly reported activities were walking (68.7%), individualized programs (e.g., calisthenics, stretching, and weight training (50.7%), and jogging (46.7%). Total time of participation (hours per week) varied widely from subject to subject. The mean was 9.97 hours per week and the standard deviation was 9.03 hours.

In general, the results of this study suggest that regular physical activity is associated with fewer and/or less severe menstrual discomforts. Although the Pearson correlation between the total amount of weekly exercise and the occurrence of discomforts, as a whole, demonstrated a nonsignificant negative relationship ($p < .057$), the total amount of exercise per week was demonstrated to be negatively correlated ($p < .022$) with the occurrence of discomforts categorized as pain symptoms (abdominal cramping, low backache, breast tenderness, leg discomfort, and other pain). As amount of exercise increased, the frequency of occurrence of pain symptoms decreased. This suggests that it may be valuable, in the future, to address, separately, specific symptoms or groups of symptoms, in relation to participation in regular physical activity (e.g., how does the relationship between physical exercise and the occurrence of pain symptoms differ from the relationship between physical

exercise and the occurrence of emotional symptoms?).

Of 16 women who reported training for competition in one or more sport activities, 43.8% reported less severe symptoms during training, 25% experienced no symptoms, and 18.8% reported no change in symptoms. Of these athletes, 12.5% reported increased severity of symptoms. In the general sample, 39.7% of 141 respondents reported decreased severity of symptoms during months when they were generally more active. Symptoms remained the same for 37% of these women, while 19% experienced increased severity during the more active months.

The lower incidence of symptoms in women who are physically active may be due to several contributing factors such as differing psycho-social influences which affect attitudes and expectations regarding menstruation and its accompanying discomforts, or the absence or presence of physiological and/or biochemical characteristics which may or may not predispose the woman to menstrual discomforts (Romney et al., 1975, pp. 166-167; Weideger, 1976, p. 46). However, the results of this study indicate that the type and amount of physical exercise in which a woman participates may play an important role in determining the type and severity of discomforts which she experiences.

Of the total sample, 20.7% (31) reported having sought medical advice for relief of symptoms related to their menstrual periods. This percentage represents a large number of women who are seeking help and who might benefit from a program of regular physical activity directed toward the alleviation of menstrual discomforts. It

is important, therefore, for all health care providers to become aware of all feasible modalities for the treatment of menstrual discomforts (including physical exercise), and to incorporate into their practice those methods which will facilitate a client's active and successful participation in a plan of care aimed toward alleviation of menstrual-related symptoms.

Health care is generally concerned with the attainment of one of three goals: (1) prevention of disease, (2) treatment of disease, or (3) health maintenance. All three goals involve, first of all, screening of the clients' past and present health status. This investigator proposes obtaining from each menstruating client a physical activity profile. This would provide an outline of a woman's past and present involvement in physical exercise (type, amount, and regularity), general knowledge concerning benefits of such exercise and attitudes toward and interest in exercise. This information would give the health care provider baseline data with which to plan and initiate an appropriate exercise regime for the individual client.

Secondly, a program of education (either with a classroom orientation or as part of the physical exam and counseling appointment) should be initiated. The purpose of this program would be to familiarize clients, as well as health care providers with various physical activities, the benefits of regular physical exercise, and with particular facilities and resources available locally.

Further research is needed in order to establish prescriptive hypotheses regarding use of physical exercise as a specific

adjunct in the treatment of menstrual discomforts. However, the findings of this study warrant the attention of health care providers as they plan patient involvement in a general health maintenance and health improvement regime, particularly in the area of menstrual discomforts.

Limitations

Limitations of this study include: (1) use of a nonexperimental methodology, (2) sample limited to women 18 to 25 years of age, (3) incomplete or incorrect answering of questionnaires, and (4) possible subject bias in completion of questionnaires. Use of a descriptive study disallows control and manipulation of critical variables, thus making study results less reliable than in an experimental study. The effect of extraneous variables cannot be avoided. This fact, however, does not discount the value of descriptive research in contribution to the overall body of research data.

The sample size in this study and restriction of subjects to the 18 to 25 year age range prevented the inclusion of a large group of women of childbearing age. It would be beneficial to include all women of childbearing age in future studies dealing with menstruation and physical exercise, recognizing the large body of additional information that could be gleaned from this population (influence of parity, certain birth control methods, etc., on the occurrence of menstrual discomforts).

Though the problem of incomplete or incorrect answering of

questionnaires is unavoidable to some extent, consideration should be given to this topic in order to minimize its occurrence in future studies. One must consider the depth and thoroughness with which questions are written and instructions for questionnaires are given. The problem may be lessened by using a larger sample for the pilot study and by having several qualified persons review the questionnaires for clarity before administration. Attention should be given to thorough and complete instruction to subjects, especially in regards to sections of the questionnaire which involve the greatest time and effort by the subject (e.g., providing the number of minutes, days, months, years of exercise participation).

Subject bias is always a concern in regard to questionnaire completion. For example, the subject may report a high amount of physical activity, even though she does not participate in a regular program of exercise, in order to give what she perceives as the expected or most favorable response. Also, if a subject is uncomfortable with or embarrassed by the topic, she may give incorrect information or fail to answer questions. To minimize the chances of this occurring, questions should be revised to assure neutrality in presentation and clarity for ease of understanding.

Suggestions for Future Research

The present study has identified several areas which warrant further research. Valuable information could be gleaned from investigation of: (1) the difference in incidence of menstrual symptoms in women participating in regular aerobic exercise in contrast

to women participating in regular nonaerobic exercise; (2) the relationship between specific types of exercise and the incidence of specific symptoms (e.g., how does the incidence of edema-related symptoms vary between a group of long-distance runners and a group of swimmers?); and (3) the incidence and specific timing of symptoms in a group of athletes in contrast to a group of nonathletes. Nurse-midwifery, a profession which encourages patient education and patient involvement in self-care, will benefit from further study in any area which will provide for better understanding of, and help to assure, the fulfillment of particular patient needs. Menstrual discomforts are a common annoyance for a large number of women. When research provides some prescriptive hypotheses concerning a self-care modality of treatment for this problem (such as a physical exercise regime), health care providers will be more willing to encourage women to rely on their own strengths and abilities to confront and deal with their discomforts. A patient's involvement in her own care fosters better compliance with the treatment regime (Hoepful-Harris, 1980; Puckett & Russell, 1978). When a person is allowed to discover and cultivate her potentials such as her ability to control the amount of discomfort and/or well-being she experiences, growth takes place and progress can be made.

APPENDIX A

POSTING FORM

(To Be Posted With Sign-Up Sheets)

Experiment Code: _____

Number of Credits (to nearest 1/4 hours): _____

Description of Study:

Optional Procedure for Receiving _____ Hours Credit:

This experiment and the option for it has been received and approved
by the Psychology Department Research Participation Committee:

Quarter and Year: _____

APPENDIX B

QUESTIONNAIRE

Menstrual Discomforts and Physical Exercise

General Information

1. What is your age? _____ years. (If your age is below 18 years or if you are 26 years old or older, please do not complete this questionnaire. Instead, please return it to me. Thanks.)

2. How old were you when you started menstruating for the first time? _____ Years

3. Have you ever experienced any discomforts associated with your period? _____ Yes _____ No

If yes, at what age(s)? _____

4. Do you now experience discomforts associated with your period? _____ Yes _____ No

5. Have you ever received advice or treatment for your menstrual discomforts from a physician or other health care provider?

- _____ a. No (if you chose 'no,' go on to Question #7)
 _____ b. Yes (if you chose 'yes,' describe the advice/treatment received)

6. If you did receive treatment and/or advice, what results did you obtain?

- _____ a. Decided not to take part in the recommended treatment
 _____ b. Symptoms remained the same
 _____ c. Symptoms were somewhat relieved
 _____ d. Symptoms were greatly relieved

7. Do you use birth control pills? _____ Yes _____ No
 Have you ever used birth control pills? _____ Yes _____ No
 If yes, did you ever experience any side effects caused by the pill (bloating, weight gain, headaches, etc.)? _____ Yes _____ No
 (please describe symptoms): _____

8. Do you use an I.U.D. (Intrauterine Device for Birth Control)? _____ Yes _____ No

9. How many times have you been pregnant?

- a. None
- b. (Give the number of pregnancies) _____
 How many of these pregnancies ended in:
- 1) Delivery of a full-term infant _____
- 2) Miscarriage _____
- 3) Abortion _____
- 4) Premature infant (less than 5 1/2 pounds) _____

Current Menstrual Information

The following set of questions deal with your menstrual period during the last six months.

10. How many days are there between the start of one of your periods and the start of the next period? _____ Days

11. How many days does your period last? _____ Days

12. Which of the following best describes the regularity of your periods:

- a. Seldom or never miss a period
- b. Occasionally miss a period
- c. Frequently miss a period

13. Which of the following best describes the amount of 'flow' that you have with the heaviest part of your period?

- a. Light (1-5 tampons or pads in a 24-hour period)
- b. Moderate (6-14 tampons or pads in a 24-hour period)
- c. Heavy (15 or more tampons or pads in a 24-hour period)

14. Which of the following do you usually use during your period? (Check the one(s) you use during the heaviest part of your period and circle the size that you use).

- a. Tampons (regular, super, super plus)
- b. Pads (regular, super)
- c. Mini-pads

15. Indicate which of the following symptoms you experience before and/or during your period. (Check all that apply to you.)

	<u>Before Period</u>	<u>During Period</u>
a. Abdominal swelling, bloating	_____	_____
b. Weight gain	_____	_____
c. Increased irritability and/or nervousness	_____	_____
d. Abdominal cramping	_____	_____
e. Low backache	_____	_____
f. Depression	_____	_____
g. Diarrhea	_____	_____
h. Constipation	_____	_____
i. Nausea	_____	_____
j. Vomiting	_____	_____
k. Sudden mood changes	_____	_____
l. Breast fullness/tenderness	_____	_____
m. Discomfort in legs	_____	_____
n. Acne	_____	_____
o. Pain (other than those described above). Describe:	_____	_____

p. Other (describe) _____	_____	_____

q. No symptoms experienced	_____	_____

16. Which of the following best describes the severity of your symptoms?

- _____ a. No symptoms experienced
 _____ b. Mild
 _____ c. Moderately uncomfortable
 _____ d. Severe

17. How often do you experience these symptoms?

- a. No symptoms experienced
 b. Occasionally
 c. With most periods
 d. With every period

18. Around the time of your period, on how many days do you:

- a. Miss work and/or school due to menstrual discomforts?
 _____ Days
 b. Need to lie down due to menstrual discomforts?
 _____ Days

19. What kind of medication do you take around the time of your period to help relieve menstrual discomforts and how many times do you take each medication during one period?

- a. No medication taken
 b. Name of medication (or kind) Number of times taken
 1. _____ 1. _____
 2. _____ 2. _____
 3. _____ 3. _____

20. What methods, other than medications, do you use to help relieve discomforts associated with your period?

- a. None
 b. (Describe/name each method, for example, heating pads, warm baths, exercises) _____

Physical Activity

The following group of questions deal with the type and amount of physical exercise in which you participate.

21. In which of the following activities to you presently participate regularly.

	How many days per week? <u>days</u>	How long each time? <u>minutes</u>	How long participated in regularly? <u>mons. or yrs.</u>
a. Jogging/running	_____	_____	_____
b. Walking/hiking	_____	_____	_____
c. Swimming	_____	_____	_____
d. Bicycling	_____	_____	_____
e. Stationary cycling (exercise bike)	_____	_____	_____
f. Skiing: Downhill	_____	_____	_____
Cross-country	_____	_____	_____
g. Racquetball/squash	_____	_____	_____
h. Tennis	_____	_____	_____
i. Individualized exer- cise program (des- cribe)	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
j. _____ None of the above (If you answered 'none,' do not answer the following questions. Return your questionnaire. Thank you very much for your time.)			

22. What change, if any, do you notice in your symptoms during the months when you are most active?

- a. No symptoms experienced
 b. Symptoms remain the same
 c. Symptoms are less severe
 d. Symptoms are more severe

23. Do you avoid taking part in sports or strenuous activities during your period? _____ Yes _____ No

24. Do you train for competition (for an organized club/school team? in any sport activity(ies)? (If 'no,' do not answer the following question. Please return questionnaire. Thank you.)

- a. No
 b. Yes (What sport(s))? _____
-

25. When you are training/competing, how do your menstrual symptoms vary from when you are not training/competing?

- a. No symptoms experienced
 b. Symptoms remain the same
 c. Symptoms are less severe
 d. Symptoms are more severe

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