A HISTORICAL OVERVIEW
OF
PRENATAL EXERCISE PRACTICES

A Thesis Presented
to
The Graduate Faculty
University of Wisconsin - La Crosse

In Partial Fulfillment
of the Requirements for the
Master of Science Degree

by
Elizabeth A. Burns
December, 1988
Candidate: Elizabeth A. Burns

We recommend acceptance of this thesis in partial fulfillment of this candidate’s requirements for the degree:

Master of Science/Adult Fitness/Cardiac Rehabilitation

The candidate has completed her oral report.

Thesis Committee Chairperson

Thesis Committee Member

Thesis Committee Member

Thesis Committee Member

This thesis is approved for the College of Health, Physical Education and Recreation.

Dean, College of Health, Physical Education and Recreation

Dean of Graduate Studies
ABSTRACT


The primary purpose of the study was to provide a descriptive historical account of exercise practices during pregnancy from 1700 to present day. The secondary purposes examined the influencing factors of the changing attitudes toward exercise in pregnancy including the role of women in society and women's participation in sport activities. The population studied was primarily limited to white, middle and upper income women of the United States. The review of the literature was presented in four sections: (1) the colonial and early national era, 1607-1835; (2) the victorian era, 1835-1910; (3) early to mid-twentieth century, 1910-1960; and (4) 1960 to present day. In addition, each era was categorized into the following three divisions: (1) woman's role in society; (2) sport activities for women; and (3) medical advice during pregnancy. Recommendations for further study were made.
ACKNOWLEDGEMENTS

I would like to extend my sincere appreciation to each of my thesis committee members. To Dr. Bill Van Atta for his editing and grammatical assistance. To Mrs. Anna Culver for her direction in the area of women in sport. To Dr. James Parker for his invaluable guidance and genuine interest in historical research. And to Dr. Philip Wilson, my Committee Chairperson, for his enthusiasm and support of a non-traditional thesis. Special thanks to Mr. Donald Pady, librarian in the History of Medicine Department at Mayo Clinic, for his patience and assistance in locating historical publications and materials. And finally, to my dear friends and family, all to whom I am most grateful, for their continual support, encouragement, and love.
# TABLE OF CONTENTS

## CHAPTER

### I. INTRODUCTION

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>4</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>5</td>
</tr>
<tr>
<td>Limitations</td>
<td>5</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>6</td>
</tr>
</tbody>
</table>

### II. REVIEW OF RELATED LITERATURE

<table>
<thead>
<tr>
<th>Period</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Colonial and Early National Era, 1607-1835</td>
<td>9</td>
</tr>
<tr>
<td>Woman’s Role in Society</td>
<td>9</td>
</tr>
<tr>
<td>Sport Activities for Women</td>
<td>11</td>
</tr>
<tr>
<td>Medical Advice during Pregnancy</td>
<td>13</td>
</tr>
<tr>
<td>The Victorian Era, 1835-1910</td>
<td>19</td>
</tr>
<tr>
<td>Woman’s Role in Society</td>
<td>19</td>
</tr>
<tr>
<td>Sport Activities for Women</td>
<td>21</td>
</tr>
<tr>
<td>Medical Advice during Pregnancy</td>
<td>25</td>
</tr>
<tr>
<td>Early to Mid-Twentieth Century, 1910-1960</td>
<td>31</td>
</tr>
<tr>
<td>Woman’s Role in Society</td>
<td>31</td>
</tr>
<tr>
<td>Sport Activities for Women</td>
<td>34</td>
</tr>
<tr>
<td>Medical Advice during Pregnancy</td>
<td>39</td>
</tr>
<tr>
<td>1960 to Present Day</td>
<td>45</td>
</tr>
<tr>
<td>Woman’s Role in Society</td>
<td>45</td>
</tr>
<tr>
<td>Sport Activities for Women</td>
<td>47</td>
</tr>
<tr>
<td>Medical Advice during Pregnancy</td>
<td>51</td>
</tr>
</tbody>
</table>

### III. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary</td>
<td>65</td>
</tr>
<tr>
<td>Conclusions</td>
<td>65</td>
</tr>
<tr>
<td>Recommendations for Further Study</td>
<td>68</td>
</tr>
</tbody>
</table>

**REFERENCES**.................69
CHAPTER I

INTRODUCTION

The value of physical activity during pregnancy has always been an area of much controversy. Throughout history, expectant mothers have been given advice ranging from vigorous exercise to strict bedrest. In 9 BC, Plutarch stated that the women of Sparta "...should harden their bodies with exercise of running, wrestling, throwing the bar, and casting the dart, so that they, by gathering strength thus by exercise, should more easily away the pains of childbearing" (Shrock). During the third century BC, Aristotle claimed that sedentary lifestyles resulted in difficult childbirth (Vaughan, 1951). Yet by 1788 James Lucas, a surgeon at Leeds General Infirmary in England, presented a paper to the Medical Society of London in which he claimed that prenatal exercise would result in a decreased infant birth size and thereby allow for an easier birth (Kerr, Johnstone, & Phillips, 1954).

The attitudes of the medical profession toward women, along with the social and economic class of the expectant mother, were major factors affecting prenatal exercise practices. Ehrenreich and English (1978) state that "the theories which guided the doctor's practice from the late nineteenth century to the early twentieth century held that woman's normal state was to be sick" (p. 99). They describe how the upper-middle class women were "indisposed" throughout the full nine months of pregnancy:

The medical theory of "prenatal impressions" required her to
avoid all shocking, painful, or unbeautiful sights, intellectual stimulation, angry or lustful thoughts, and even her husband's alcohol and tobacco-laden breath -- lest the baby be deformed or stunted in the womb. Doctors stressed the pathological nature of childbirth itself -- an argument which also was essential to their campaign against midwives. After delivery, they insisted on a protracted period of convalescence mirroring the confinement which preceded birth (Ehrenreich & English, 1978, p. 100).

It seemed that doctors were more concerned about the effects of "prenatal impressions" than they were about prenatal care, such as nutrition and exercise. Confinement and prenatal influences were further described by Richard and Dorothy Wertz in their book "Lying-In: A History of Childbirth in America" (1977):

"...pregnant women of the fashionable classes stayed indoors rather than show changes in their figures. They hesitated to tell even their husbands of their "condition" and worried so much about prenatal influence upon the child of things they had seen, done, read, or even thought about during pregnancy that they sometimes found it safest to do nothing at all (p. 79)."

During the eighteenth and nineteenth centuries pregnancy was an "all too obvious result of sexual intercourse" and that the practice of confinement "expressed the shame and impropriety of exposure during pregnancy" (Wertz & Wertz, 1977, p.79-80). However, that while the woman of the "fashionable class" could shield and isolate herself from society during pregnancy, the lower class or working woman was forced to continue working on the farm or in the factory. She could not afford the "luxury" of confinement.

Another factor that had direct influence on maternal exercise, was the acceptability of women's involvement in recreational sport activities. Women's acceptance into sport depended largely on her social class. "Classism pervades the history of sport as it does every institution. Sports were first socially acceptable and defended for
upper class women. Only gradually did middle class and working class women acquire more equal access to sports" (Boutilier & SanGiovanni, 1983).

Continuing into the early twentieth century advice to pregnant women followed the philosophy of moderate exercise and a need for outdoor air. A 1913 publication, "The Prospective Mother: A Handbook for Women during Pregnancy", contained the following advice by J. Slemmons:

The amount of exercise which the prospective mother should take cannot be stated precisely, but what can be definitely said is this -- she should stop the moment she begins to feel tired...

Women who have laborious household duties to perform do not require as much exercise as those who lead sedentary lives; but they do require just as much fresh air...

Walking is the best kind of exercise... Most women who are pregnant find that a two to three mile walk daily is all they enjoy, and very few are inclined to indulge in six miles, which is generally accepted as the upper limit... (p. 125)

A new approach to prenatal exercise was presented by Kathleen Vaughan (1951) in her book "Exercises before Childbirth". She recommended that exercises be performed in groups or classes so as to gain psychological support from other expectant mothers. "The advantage of attending a class is that you are stimulated by others also engaged in training for motherhood, with whom you make friends and can compare your babies later on" (cited in Artal & Wiswell, 1986, p. 4). Today, prenatal exercise classes have gained greater popularity within hospitals and other community organizations, such as YWCAs.

Throughout most of history, exercise prescriptions for pregnant women were based on "common sense" rather than on scientific research. However, within the last two decades, research in the area of female
exercise physiology has advanced immensely and has brought about a great interest in the effects of exercise during pregnancy on mother and fetus. For the first time a set of guidelines for exercise during pregnancy was published by the American College of Obstetricians and Gynecologists (ACOG) in 1985. Until this recent publication pregnant women were the only population with no prescribed exercise standards (Artal & Wiswell, 1986).

One year later, in 1986, Artal and Wiswell published their book, "Exercise in Pregnancy". This book, the first and only of its kind, included a comprehensive compilation of the research dealing with the physiological adjustments to pregnancy, maternal and fetal responses to exercise, and exercise prescription in pregnancy (based on ACOG's guidelines). However, even though there is a rapidly growing foundation of knowledge in the area of exercise and pregnancy, Artal and Wiswell stress the point that many questions remain unanswered. They concluded by stating:

The guidelines outlined in this text are an attempt to interpret and apply the available literature. Certainly, much work remains to be done to systematically research and establish normative data and standards for exercise in pregnancy (p. 228).

Statement of the Problem

The primary purpose of this study was to provide a descriptive historical account of exercise practices during pregnancy, from the 1700's to present day of white, American, middle-class women. However, the study would be incomplete without including an interpretive history describing why certain events or practices took place and how the ideas
and beliefs behind these practices evolved. Therefore, the secondary purposes of the study investigated the formative influences of the changing attitudes toward exercise in pregnancy. Specifically, these influencing factors include the role of women in society and the initiation of women into sport activities.

Significance of the Study

It appears that no historical analysis on the evolution of prenatal exercise practices has been conducted. Therefore, it is evident that there exists a need for documentation of this type. "One generally accepted criterion of a discipline is that it has a history or tradition" (Thomas & Nelson, 1985, p. 160). A study of the past history of exercise in pregnancy can provide a knowledgeable foundation for further direction. In addition, it is hoped that this study will provide interesting reading for historians, those prescribing prenatal exercise programs, and expectant mothers themselves.

Limitations

For the purpose of this study, the following limitations were made:

1. The dominant ideology and available records focus on middle and upper income white women with little application for either lower income working women or women of color.

2. Information was gathered from a review of the literature, including both primary and secondary sources and confined primarily to the United States.

3. The review of the literature was geographically limited to the
Definition of Terms

For the purpose of obtaining a clear understanding of terminology which may be unfamiliar to the reader, the following terms have been defined:

**Accoucheur.** Term used in past centuries to describe a man who assists during childbirth; man-midwife or obstetrician.

**Accoucheuse.** Woman who assists during childbirth; midwife.

**Antenatal.** Referring to the time period between conception and birth; prenatal.

**Antepartum.** Same as antenatal; prenatal.

**Blood letting.** A common practice in past centuries consisting of draining the blood for medicinal purposes; also referred to as venesection.

**Confinement.** Term used to describe the period of lying-in at childbirth; may also include the period of pregnancy.

**Diastasis recti.** A separation of the midline of the abdominal muscular sheath covering the uterus.

**Eclampsia.** Coma and convulsive seizures between the 20th week of pregnancy and the end of the first week postpartum (Taber, 1981).

**Elixir of vitriol.** A sweetened solution of sulfuric acid; common medicinal remedy used for many ailments during 1600-1800's.

**Gestation.** Pregnancy.
Intrapartum. During labor or delivery.

Kegel exercises. Exercises involving contraction and release of the pelvic floor muscles to enhance muscle tone and prevent incontinence.

Lying-in. The state of being brought to bed for childbirth; confinement.

Man-midwife. A male attendant at birth; accoucheur.

Midwife. A female attendant at birth; accoucheuse.

Multiparavada. A pregnant woman who has been pregnant one or more times previously (Stedman, 1982).

Multiparous. A woman who has borne more than one viable fetus, whether or not the offspring were alive at birth (Taber, 1981).

Parturition. The process of giving birth; labor.

Postpartum. After delivery.

Prenatal. Occurring or existing after conception but before birth (International Dictionary of Medicine and Biology, 1986).

Prenatal care. Care of the woman during the period of gestation. This consists of periodic examinations for determination of blood pressure, weight, changes in the size of the uterus, condition of the fetus; urinalysis; instruction in nutrition requirements, preparation for labor and delivery, care of the newborn; and provision of suggestions and support to deal with the discomforts of pregnancy (Taber, 1981).

Prenatal exercise. May consist of maternal exercise, such as recreational and aerobic exercise or may consist of birth preparation exercises, such as breathing and relaxation exercises and Kegel
exercises.

**Prolapsed Uterus.** Descent of the uterus into the vagina (International dictionary of medicine and biology, 1986).

**Puerperium.** "The period of 42 days following childbirth..." (Tabers, 1981).

**Relaxin.** A hormone produced during the later stages of pregnancy that softens all of the body's ligaments. Its primary function is to soften the ligaments of the pelvis in preparation for birth.

**Trimester.** Pregnancy is divided into three trimesters; each is 12 weeks, or 3 months, in length.

**Venesection.** The draining of blood for medicinal purposes, common in past centuries; also referred to as blood letting.
CHAPTER 2

The primary purpose of the study was to provide a descriptive historical account of prenatal exercise practices in the United States, from the 1700's to present day for middle and upper income women. The secondary purposes were to include a brief overview of the changing roles of women in society and their participation in recreational sport activities. A summary of the literature is presented in four sections: (1) the colonial and early national era, 1607-1835; (2) the victorian era, 1835-1910; (3) early to mid-twentieth century, 1910-1960; and (4) 1960 to present day. In addition, each era is categorized into the following three subdivisions: (1) woman's role in society; (2) sport activities for women; and (3) medical advice during pregnancy.

The Colonial and Early National Era, 1607-1835

Woman's Role in Society

The life of women in the colonial and early national era was greatly restricted by social class and society's expectations of the female role. Women were generally confined to the subservient role of mother and housewife, and their purpose was to bear and raise children, manage the home, and serve their husband. However, Ehrenreich and English (1978) note that "...although woman is always subordinate...she is far from being a helpless dependent.... She knew the herbs that healed, the songs to soothe a feverish child, the precautions to be taken during pregnancy" (p. 7).
Contrary to expectations, women participated in every kind and type of labor and economic enterprise available. Moreover, given the fact that the economy was primarily agricultural, women's roles, for the vast majority, were never confined to homemaker, but were an integral part of the productive process. In addition, before the introduction of industrialization, women were responsible for the manufacture of many products:

"It was the wife's duty, with the assistance of daughters and women servants, to plant the vegetable garden, breed the poultry, and care for the dairy cattle. She transformed milk into cream, butter and cheese, and butchered livestock as well as cooked the meals. Along with her daily chores the husbandwoman slated, pickled, preserved, and manufactured enough beer and cider to see the family through the winter.

Still, the woman's work was hardly done. To clothe the colonial population, women not only plied the needle, but operated wool carders and spinning wheels--participated in the manufacture of thread, yarn and cloth as well as apparel. Her handwrought candles lit the house; medicines of her manufacture restored the family to health; her homemade soap cleansed her home and family... (Ehrenreich & English, 1978, p. 31)

Women also devoted a significant part of their lives to the biological process of pregnancy, birth, and postpartum recovery. During a time with no means of birth control other than abstinence, "most married women, and some unmarried women, had to face the physical and psychological effects of recurring pregnancies, confinements, and postpartum recoveries, which all took their toll on their time, their energy, their dreams, and on their bodies" (Leavitt, 1986, p. 14). Fertility rates were high. According to Leavitt (1986), white American women bore an average of more than seven live children at the beginning of the nineteenth century. However, this implies even more than seven pregnancies since many terminated in miscarriage or still births. The
high rate of fertility continued throughout the nineteenth century and for many women, especially within the non-white and lower-class socioeconomic groups, on into the twentieth century (Gordon, 1976).

The cycle of reproduction was referred to as "the shadow of maternity" not only because of the high rate at which pregnancies occurred, but also because of the great risk of death of the mother and/or child. Deaths from maternity-related causes were approximately 65 times greater at the end of the 1800's than they are today (Leavitt, 1986). The extent to which pregnancy and childbirth dominated women's lives and the associated physical risk involved, is well documented in the diaries of Mary Vial Holyoke (cited in Ehrenreich & English, 1978). In 1759, Mary Vial married into a wealthy New England family. Ten months later, in 1760, she gave birth to her first child. The second child was delivered in 1762 and five more births occurred between 1765 and 1770. At this point, Mary Vial Holyke had experienced seven pregnancies and births during the first ten years of marriage. In the next twelve years, she gave birth to five more children. Of twelve children, only three lived to adulthood. So, Mary Vial Holyke endured not only a continual cycle of physical stress from recurrent pregnancies, births, postpartum recoveries, and child nursings, but also a cycle of emotional stress from the death of nine children.

Sport Activities for Women

Considering the strict confines of both the household and society's mores, it seems unlikely that the colonial woman had either the time, energy, or societal approval to participate in many leisure or sporting activities. There were however, a few activities, such as dancing,
horseback riding, and in some areas, ice skating, that women enjoyed and were considered proper for the "delicate nature of the weaker sex". The middle and upper-class women in particular were discouraged from participating in vigorous exercise and outdoor exposure. Not only were women considered to be incapable of strenuous activity (although the household tasks were apparently a convenient exception), but participation in sports that required visible physical effort on the part of the female was deemed aesthetically unappealing. Furthermore, the fashionable garments and corsets worn by women restricted both physical movement and respiration.

Dancing was perhaps the most popular activity for women of all ages and social class. It was not too strenuous an activity and it also provided a pleasurable means of socialization. In addition, dance classes were highly recommended to girls in school. Mrs. Emma Willard, a well-known teacher and advocate of physical exercise, stated in an 1819 speech that "exercise is needful to the health of recreation to the cheerfulness and contentment of youth... Dancing is exactly to this purpose..." (cited in Lee, 1983, p. 25).

Another popular activity, horseback riding, was widely practiced from the beginning of the settlements in North America. Males and females of all ages and classes enjoyed horseback riding, particularly in the rural districts where everyone was expected to ride and "some women became fearless riders" (Holliman, 1931, p. 169). The sport was advocated by most of the medical professionals as especially healthful for women because it required the use of many muscles of the body and it "forced air into the lungs" (Howell, 1982). In the early 1800's,
several riding schools were established for society's elite population and there were certain days set aside for "ladies" only from which men were excluded (Gerber, Felshin, Berlin, & Wyrick, 1974).

Medical Advice during Pregnancy

During the eighteenth and nineteenth centuries most of the books written on obstetrics and gynecology were published in Europe and Britain. In 1724 Nicholas Culpeper, an English physician and astrologer, wrote his "Directory for Midwives: or, A Guide for Women, In their Conception, Bearing, and Suckling their Children". In the second chapter, "Of the Government and Diet of Women with Child," Culpeper advised on diet and exercise, as well as warning against prenatal impressions, or influences:

Let her avoid all evil Scents, as of Rue [strongly scented plant used in medicine], Penny-royal [herb used medicinally], Mints, Castor [pungent substance secreted by glands in the groin of the beaver, used in medicine], and Brimstone [sulfur]... let them not look upon terrible Things, nor hear great Noise of Guns.

...When the Child is bigger, let her Diet be more; for it is better for Women with Child to eat too much than too little, lest the Child should want Nourishment.

Let her drink moderately of clear Wine, not Exercise too much, nor Dance, nor ride in a Coach that shakes; let her not lift any great Weights in the first and last Months. In the ninth Month let her move a little more or dilate the Parts, and stir up natural Heat. (p.278)

While Culpeper advised only easy to moderate exercise throughout most of gestation, he encouraged more exercise in the last month to hasten labor and delivery.

When certain conditions existed during pregnancy, women were warned against exercise. Francis Mauriceau (1736) discussed the condition of a prolapsed uterus and the precautions to take:

Many Women with Child find an extraordinary Weight at the bottom of their Bellies, which... bears down upon the Neck [of the bladder], and
sometimes so low, that they cannot walk without Pain and Stradling.

... From what Cause soever this bearing-down proceeds, the best Remedy for a big-belly'd Woman is to keep her Bed, because the Weight of it doth more and more relax the Ligaments when she is up: And if she hath neither the Means nor Convenience so to take her Rest, at least let her... wear a Swathe [abdominal support] very broad and fit for the purpose, that by this means the Burden being a little supported, the Ligaments may not be so much stretched and lengthened. (p. 100)

Exercise was also seen as a useful means of prevention and remedy for several ailments occurring during pregnancy. Charles White, a surgeon and man-midwife at the Manchester Infirmary in England, was considered by many to be a pioneer in midwifery. He was especially concerned with the prevention and management of diseases during pregnancy and postpartum, and he made "outstanding progress in preventing puerperal fever" (Cutter & Viets, 1964, p. 101). In 1773, he wrote "A Treatise on the Management of Pregnant and Lying-In Women". In his chapter on "General Directions for the Prevention of Many Disorders Peculiarly Incident to the Pregnant State", he gave advice to attending physicians and midwives on medicinal remedies, diet and exercise, and even suggested clothing apparel for the pregnant woman. For cases of nausea and vomiting, White stated that "exercise, bark, elixir of vitriol [sweetened solution of sulfuric acid], and pyrmont waters, joined with cold bathing..." produces "the best effect". In the case of a possible miscarriage "riding on horseback, and indeed all kind of exercise must be avoided...total rest and a recumbent posture are undoubtedly of the greatest consequence" (White, 1773, p. 71-72).

Many women continued to wear corsets during pregnancy, believing that this would prevent the child from riding too high and obstructing the diaphragm, thereby inhibiting respiration. However, even more
important to women was the fact that corsets helped to conceal the protruding abdomen. White was a strong opponent of the use of corsets, particularly during pregnancy:

Lacing the stays tight has been practiced not merely in conformity to the rules of fashion, but from a mistaken notion that by pressing the children lower down, the mothers would have better times. This I will venture to say is one of those vulgar errors which have not the least foundation in either fact or reason. (1773, p. 77-78)

Venesection, or blood letting, was used as a common remedy for many ailments. Although many physicians routinely prescribed venesection for the expectant mother to relieve such symptoms and conditions as swelling in the legs, varicose veins, hemorrhoids, headaches, and backaches, White believed that bleeding was "too indiscriminately used, and too often repeated." He stated that in plethoric cases, or an excess of blood in the system, "asses milk, seltzer water, elixir of vitriol and an active life answer the same purpose as bleeding" (White, 1773, p. 71-72).

Although White prescribed moderate exercise during pregnancy, in the later stages he recommended that women rest more often. "In the latter months of pregnancy, the frequent lying down upon a couch or bed... will give great relief to the muscles... preventing those pains of the belly, back, hips and thighs, and those swellings of the legs which are so usual at that period" (White, 1773, p. 80). This is in direct opposition to the earlier teachings of Culpeper (1724) who suggested an increase of activity in the ninth month to quicken the process of labor and delivery.

Another influential obstetrician in the late 1700's was Alexander
Hamilton, physician and professor of midwifery at the University of Edinburgh. In 1781 he published his "Treatise of Midwifery" in which he advised pregnant women to exercise in moderation and to avoid "agitation of the body from violent or improper exercise, as jolting in a carriage, riding on horseback, dancing and whatever disturbs the body or mind" (Kerr, Johnstone, & Phillips, 1954). Thirteen years later, in 1794, Hamilton wrote another book, published in America, entitled "Outlines of the Theory and Practice of Midwifery." In his section on management during pregnancy, he lists the following rules for expectant "ladies":

1. The strictest temperance and regularity in diet, sleeping, exercise, and amusement, are necessary to be observed by those who have reason to dread abortions.
2. Overheating, irregular passions, and costiveness should be constantly guarded against.
3. The hazard of shocks, from falls in walking or riding, from bruises in crowds, or frights from bustle, should be avoided with the utmost circumspection.
4. The dress of pregnant women ought to be loose and easy. Tight lacing is injurious at every period of gestation. Jumps [abdominal support], without knots, buckles, or whalebone, secured with straps of broad tape or ribbon, should be had recourse to soon after conception, and worn constantly.
5. Pregnant women require free, pure air; their inclinations should be gratified by every reasonable indulgence; and their spirits kept up by cheerful company and variety of objects, that their minds may be always composed and happy.
6. If complaints then occur, they should be treated nearly as at other times, with the precautions formerly suggested of avoiding all great evacuations and violent exertions. Drastic purges, stimulating gysters, emetics [to induce vomiting] towards the term of quickening, or any other critical period, strong diaphoretics or diuretics, shocks from electricity or the cold bath to those who have not been accustomed to them, the hazard of accidents from riding or falling...ought to be carefully guarded against. In the early months, abortions might be readily occasioned from such hazardous expedients; and in the latter, the most alarming and dangerous floodings.
7. Lastly, With [sic] a view to prevent abortion in cases of habitual predisposition, in plethoric habits [excessive habits such as overeating or attending too many parties], or in those of an opposite temperament, occasional causes must be obviated, and particular fault in the constitution corrected. (Hamilton, 1794, p.
While Hamilton encouraged moderate exercise and plenty of fresh air, he strongly cautioned against vigorous activity, such as horseback riding, especially in the early months for fear of miscarriage, and in the latter months for fear of premature labor. He also cautioned against overheating and tight lacings. Physicians were frequently also concerned with the mental state of their patients. As Hamilton stated "... their inclinations should be gratified... and their spirits kept up by cheerful company... that their minds may be always composed and happy" (1794, p. 140).

There was clearly a controversy regarding whether or not a woman should exercise in the final months of pregnancy. Some believed that vigorous activity at this time would promote a quick and easy birth (Culpeper, 1724; Kerr, Johnstone, & Phillips, 1954), while others believed that strenuous activity could result in a dangerous premature birth (Hamilton, 1794; White, 1773). In a 1788 manual entitled "The Ladies Friend, and Family Physical Library," S. Freeman stated that a woman should be very careful towards the time of her delivery and "those midwives are very bad counsellors [sic], who, for the sake of promoting what they call a good time [an easier birth], advise to the contrary practice" (p. 245-246). He believed that riding on horseback, or even in a carriage or wagon, was dangerous at any time during pregnancy, but especially "during the first and last months of it: during the first, because it may occasion abortion; and during the last, because it may render the labour difficult and dangerous, by forcing the child into a wrong situation" (1788, p. 246). Throughout the nine months of
gestation Freeman felt that "too much rest is here better than too much exercise... for more hard labours are occasioned by activity in the time of pregnancy, than by any other cause." In fact, he even cautioned the expectant mother against raising "her arms too high; for which reason she ought not to dress her own head [style her own hair]" (1788, p. 246).

On the other hand, a very popular London physician in clinical midwifery, Thomas Denman, was in complete disagreement with the philosophy of Freeman. Denman's essays and texts were published several times over and served as guides and manuals for many practitioners (Cutter & Viets, 1964). His text, "An Introduction to the Practice of Midwifery," was highly read and an American edition was published in 1821, edited by John W. Francis, teacher of midwifery in New York city. Denman was aware that the different lifestyles of the rich and poor had a significant effect on pregnancy and outcome, surprisingly much to the advantage of the poor:

Pregnant women are not only encouraged to live more luxuriously, but more indolently also, exercise being thought improper, unless towards the conclusion of pregnancy, when it has been supposed to procure a more favorable delivery. Great care may in some cases be necessary, but in general the contrary method of proceeding is the most eligible and proper: for the lower class of women, who are by necessity obliged to follow laborious occupations in the open air, and who are exposed to all the vicissitudes of the weather, not only pass the time of their pregnancy with fewer complaints than the affluent, but have also more easy labours. Much allowance must be made to former habits of living; but those who are in possession of all the advantages of rank and fortune, which the eyes of inferiors are apt to look at with envy, must use them with the most cautious moderation, or they will suffer for every unreasonable indulgence. (1807, p. 125-126)

Denman was also careful to point out the importance of a healthy lifestyle of proper diet and exercise not only during pregnancy, but at
all times. He felt that a woman who was physically fit from the time of conception was one who could better handle the stress of pregnancy and birth and recover faster during postpartum:

... such as the state of the body is at the time of conception, such will it probably be during pregnancy; and, according to the state in pregnancy, will be that at the time of parturition; and on this again will depend the recovery from childbed... if there has been indulgence in improper habits, or if exercise has been neglected at all other times, there is little cause to expect advantage from unfit and extraordinary efforts towards the conclusion of pregnancy... (1807, p. 126)

The Victorian Era, 1835-1910

Woman's Role in Society

"In many ways the Victorian ideal of women was the antithesis of Victoria the woman" (Gerber et al., 1974, p. 9). Queen Victoria was a very strong and determined person. Contrary to the norms of society, it was she that proposed marriage to her husband, and later, after his death, she ruled alone for forty years (Gerber et al., 1974). In contrast, the "ideal" Victorian woman was frail and delicate, gentle, passive, subservient to and dependent upon her husband, not overly intelligent, and above all, outwardly charming and beautiful. It was very much a patriarchal society, in which men ruled and set the standards for themselves and women.

... the Victorians had attempted... to compensate women for their increased domestic and pedagogic responsibilities by enveloping them in a mystique which asserted their higher status while at the same time guaranteeing their actual inferiority... Victorians taught women to think of themselves as a special class... [They] believed they had accorded women a higher and more honorable estate than had any previous generation... (O'Neill, 1971, p. 4-8)

There was considerable pressure on women married to middle income men to
uphold the perfect Victorian image. To be otherwise -- to be assertive, independent, to show intelligence, or physical strength -- would be considered unwomanly. However, the majority of women, white and non-white, were lower income working women and so did not fulfill this ideology.

Because it was considered feminine to be weak and frail, it became quite fashionable for women to be sick. This of course, applied only to the women of the upper class who had the leisure time necessary for confinement. Physicians reinforced this behavior by claiming that middle and upper-class women were sickly due to their delicate nature and leisurely lifestyle, while the working-class women were robust and hardy, therefore less prone to disease or illness. "The theory of innate female sickness, skewed so as to account for class differences in ability to pay for medical care, meshed conveniently with the doctors' commercial self-interest" (Ehrenreich & English, 1978, p. 103-104).

The medical profession was very influential in forming the opinions of society regarding the medical, social, and sexual status of women. "The late nineteenth century was an era of contention over female sexuality, physiology, health, dress, and exercise, and one in which medical opinion had become an authoritative sector of public opinion" (Cott, 1979, p. 162). This was the time of the "medical experts". Women were encouraged to seek happiness through marriage and family, and any divergence from this pursuit, such as education, was highly discouraged.

Women's lives... had to be spent with the uterus and its requirements always in mind; at puberty, and during menstruation and pregnancy, it was advisable that all activity, and especially mental activity, should
cease altogether; the rest of the time intellectual stimulation was, at the very least, a threat to women's health and injurious of national well-being. (Oakley, 1981, p. 121)

Dr. Edward H. Clarke was a strong opponent of higher education for women. He claimed that mental activity in women caused the uterus to atrophy (Clarke, 1873). His book, ironically entitled "Sex and Education: or a Fair Chance for the Girls" considering his hypothesis, was very popular in America and went through seventeen editions.

Despite the strong disapproval from most of the male sector, some women did pursue an education. In 1849, Elizabeth Blackwell became the first female to receive a medical degree in the United States (Leavitt, 1986). She graduated from the New York Medical College. The following year, in 1850, the first medical school for women was founded -- the Female Medical College of Philadelphia (later called the Woman's Medical College of Pennsylvania). By the year 1900, sixteen additional medical colleges for women had opened, however the Woman's Medical College of Pennsylvania is the only one still in existence (Leavitt, 1986).

Unfortunately, even though more women were pursuing an education, some women were still unsure about their actions. Martha Carey Thomas, president of Bryn Mawr College, founded in 1889, expressed her doubts: "The passionate desire of the women of my generation for higher education was accompanied throughout its course by the awful doubt, felt by women themselves as well as by men, as to whether women as a sex were physically and mentally fit for it" (cited in Oakley, 1981, p. 123).

Sport Activities for Women

In keeping with the Victorian image of the female sex, most women avoided more than a limited or moderate participation in recreational or
sporting activities. "By avoiding exercise and cultivating a pale face and an incapacity to do work, one had the appearance of gentility -- always a desired image" (Gerber et al., 1974, p. 10). However, as women increasingly ventured into sport, it became more apparent to the medical profession that exercise could be very beneficial to women.

While physicians became more accepting and supportive of physical activity for women, society still held fast to the belief that sports participation threatened a woman's femininity. Minna Thomas Antrim argued against this theory in her satirical article, "The Masculization of Girls," published in the Lippincott Monthly Magazine, 1911:

Does our Maid of Now flinch when on the Field of Glory a Sportsman is knocked out? Rather is she the first to "Root" for the joyful Sub. Has she not a stunning vocabulary -- of slang? Wists she not of the sustaining power of a "puff or two"?... She loves to walk, to row, to ride, to motor, to jump and run, not daintily, with high heeled, silk-lined elegance, but as Man walks, jumps, rows, rides, motors, and runs. So, with muscles tense and blood aflame, she plays the manly role. What cares she that her face and arms are Indian brown, or her feet encased in boots two sizes larger than Dame Nature willed? She is alive, and thanks the God who gave her legs, and wind as sound as man's. ... Shall it not be concluded, then, that in spite of her manly mien and masculine methods, Miss Now is very woman? ... So much for the "Masculized Girl of to-day." (p. 564-566)

Dr. Dudley Sargent was a great proponent and advocate of exercise for women. As director of the Hemenway Gymnasium at Harvard University, Sargent admitted women into the Hemenway summer sessions in 1887 (Twin, 1979). Many of the first female physical educators attended this program. "Sargent's gymnastics, involving light props, offered late-nineteenth-century women some of the most vigorous exercise available... His belief that women's athletics should be modified versions of men's represented the growing consensus of physical educators and other professionals" (Twin, 1979, p. 52).
The female pioneers in physical education were of major significance in the promotion and gradual acceptance of women in sport. In 1883, Dr. Eliza Mosher, resident physician at Vassar College and director of the women's physical education department, became the first to administer physical examinations for female students (Lee, 1983). Later, in 1896, Mosher accepted a position at the University of Michigan to organize a physical education program for women, and became the first female in the United States to be granted the rank of full professor (Lee, 1983). Another leader, Dr. Delphine Hanna, devised anthropometric charts for women which were widely used in colleges (Gerber, et al., 1974). In 1889, Mary Hemenway founded the Boston Normal School of Gymnastics, and employed Amy Morris Homans as director. The school was a leader in the training of female physical educators, and later became the Department of Hygiene and Physical Education at Wellesley College in 1909 (Lee, 1983).

The proliferation of athletic clubs in the late nineteenth century also played an important role in women's participation in sport. Women were members of bowling, tennis, golf, skating, and archery clubs across the country. If women did not have their own clubs and facilities they were often permitted membership in men's clubs, although sometimes only as "honorary" or "associate" members (Gerber et al., 1974).

Perhaps the greatest influence in women's sport during the Victorian era was the sudden and overwhelming popularity of the bicycle. "By 1900 bicycling was the fashion of the day among all classes of people -- it was, indeed, the biggest sports craze of the late nineteenth and early twentieth centuries" (Lee, 1983, p. 61). With the
coming of the bicycle, came a turning point for women in both dress reform and participation in sport activity. According to Gerber et al. (1974), the bicycle "marked the beginning of women's emancipation from restrictive clothing and therefore has been credited by historians as being one of the important hallmarks of the feminist movement" (p. 33).

Although the medical profession initially believed that bicycling was harmful to the reproductive organs (Fenton, 1896; Krauss, 1896), after the invention of the pneumatic tire, physicians were generally in favor of the bicycle as a healthful means of exercise for women (Brown, 1896; Richardson, 1893). Several articles appeared in medical publications advocating the positive effects of the bicycle. Dr. George Brown (1896) stated: "There is no evidence, so far as I know, to substantiate the theory that the bicycle will deform the pelvis... On the other hand, it develops all the pelvic muscles, and must, by the general good health it induces, make the girl stronger in every way" (p. 501).

While the physical educators and medical professionals positively influenced the acceptance of women into sport by advocating physical exercise as a health benefit for women, they also limited women's participation in sport by claiming that too much exercise could be harmful. However, despite the fact that female participation in sport activities was somewhat limited by the restrictions of society, women had made great strides in their acceptance into sport and "by the end of the nineteenth century the American sportswoman had arrived" (Kenney, 1982, p. 138).
Medical Advice during Pregnancy

During the Victorian era, particularly towards the end of this period, a gradual change began to take place in the physician's philosophy of pregnancy. Rather than view pregnancy as a pathological condition, or a "nine-months' disease," as was the attitude of the colonial period, physicians began to view pregnancy as a normal physiological condition (Bowen, 1901; Hypes, 1899; Spiegelberg, 1887; Williams, 1903). "Pregnancy is a natural physiological function. In a state of perfect health it should be accomplished without disease or suffering" (Hypes, 1899, p. 134). At the same time however, physicians also realized that during the pregnant state, the female body was more susceptible to illness and disease. According to Williams (1903), "...when we recall the manifold changes that occur in the maternal organism, it is apparent that the border-line between health and disease is less distinctly marked during gestation than at other times..." (p. 175). In viewing pregnancy as a normal physiological state, doctors therefore no longer believed that the pregnant woman should significantly alter her lifestyle. Rather than prescribe plenty of rest for their patients, doctors were now more inclined to advise women to continue their normal mode of living, while making appropriate modifications as necessary depending on the particular needs of the individual. "It is true that in most cases a pregnant woman fares best, when in her new condition she adheres to the same mode of life as suited her well before" (Spiegelberg, 1887, p. 167).

Physicians also began to recognize the need for a standard system of prenatal care, as expressed by Dr. Hypes (1899):
My observation and experience leads me to think that this is a field in obstetric practice that needs cultivation by us as physicians... In viewing this subject from a practical standpoint the inquiry naturally arises, In what does the care of a pregnant woman consist? Can such a practical course of management be adopted that it will meet with the approbation of the profession and become a feature of our routine practice? (p. 134)

Hypes believed that prenatal care should start with conception so that the physician could better manage a woman's pregnancy and labor. The purpose of prenatal care was not to "dose" the woman with medicine, Hypes stated, but to advise and instruct her "as to the duties and dangers of pregnancy" (1899, p. 134).

Gradually a standardized system of prenatal care began to emerge. By 1910 doctors learned to treat eclampsia, a common condition during the puerperal period leading to maternal shock, with diet, rest, and drugs. They also "could take her blood pressure and examine the urine for albumin, which served as positive diagnoses for the beginning of eclampsia" (Wertz & Wertz, 1977, p. 140). Furthermore, the introduction of the Wassermann test provided a diagnosis for maternal syphilis which could be treated with the new "Salversan," an arsenic compound, and thereby prevent congenital syphilis in the newborn (Wertz & Wertz, 1977).

It was generally agreed upon that as a component of prenatal care, exercise was very important. Physical activity was considered a preventative measure for physical and mental illness, a preparatory measure for the process of birth, and also an aid for quicker recovery during postpartum. Furthermore, it was believed that healthy mothers produced healthy children.

During the 1830's a popular practice of medicine widely accepted
among the working class people and known as the Thomsonian method, introduced by Dr. Samuel Thomson, held that exercise was an effective cure for the mental distress commonly experienced during pregnancy (Comfort, 1845). The Thomsonian system of medicine was based on a theory of folk medicine which used roots and herbs for healing and which strongly believed in preventative measures of illness such as diet, exercise, and "proper habits" (Ehrenreich & English, 1978). In 1845, Dr. Comfort published a book on the "Thomsonian Practice of Midwifery." He noted that during pregnancy, women were more susceptible to periods of depression or anxiety, and that a combination of fresh air and "gentle exercise" is "the best tonic for the nerves" (Comfort, 1845, p. 6).

In 1876 "Smellie's Treatise on the Theory and Practice of Midwifery" was published, edited by Alfred McClintock. Although Dr. William Smellie (1698-1763) taught and practiced midwifery during the 1700's, his methods and theories were still very much in use. "Probably no single individual contributed so much to the development of midwifery as did Smellie" (Cutter & Viets, 1964, p. 26) and he is perhaps remembered best for his development and use of forceps (Litoff, 1978). Smellie believed that "diet, air, and exercise, ought to be regulated according to the constitution, custom, and complaints of the patient" (McClintock, 1876, p. 153). For cases of edema, a common problem during pregnancy, he prescribed venesection, along with intermittent periods of rest and exercise such as walking (McClintock, 1876). Smellie also believed that a lack of exercise could cause problems during pregnancy: "The bellies of those that are indolent and use no exercise ought to be
moderately compressed, so that the uterus may not rise too high, and occasion difficulty in breathing, and vomiting, in the last months..." (McClintock, 1876, p. 153).

Not only could inactivity cause problems during the period of gestation, but many physicians felt that a lack of exercise also resulted in difficult childbirth. A "reason why many women need aid in parturition, is, the inefficiency of the system, produced by a want of proper exercise..." (Curtis, 1846, p. 48). During a medical symposium on obstetrical care in 1900, Dr. Tucker suggested that walking and abdominal exercises could be employed during the later stages of pregnancy to help position the fetal head in preparation for birth:

The walking should be increased more and more toward the end of the pregnancy. If at the end of eight-and-a-half months the head is not engaged the daily walk should be increased one-half mile each day, until the patient is walking at least six miles. Another exercise that is of great service is for the woman to lie in bed and lift herself up to a sitting position without support. This brings into play her abdominal muscles. It increases their functional capacity, makes them of more service during the actual labor itself and presses the head well down into the pelvis before labor begins. ("Discussion of," 1900, p. 73)

This advice was similar to that of some of the earlier physicians who believed that vigorous exercise near the end of gestation would bring about a quick and easy birth (Culpeper, 1724; Denman, 1807).

However, during the late nineteenth and early twentieth centuries, most physicians were more conservative in their views on exercise in pregnancy.

The American Journal of Obstetrics published an article in 1901, authored by Dr. Sinclair Bowen, on the "best methods" of conducting prenatal care. In the section on exercise during pregnancy, Bowen cautioned against exercising during the first trimester and last weeks
of pregnancy. During the interval period however, he encouraged outdoor exercise to the "point of slight fatigue," and added that when walking was uncomfortable, driving "over smooth roads" was an effective substitute to obtain fresh air. Of the activities to avoid Bowen lists "dancing, bicycling, horseback riding, skating, sewing machine, driving over rough roads, heavy lifting, unnecessary trips up and down stairs, and all violent exercise" (1901, p. 827).

Dr. J. W. Ballantyne, a physician at the Royal Maternity Hospital in Edinburgh and a lecturer at the Medical College for Women, questioned whether women should be permitted to work during their last month of pregnancy. "It is doubtful whether women who are within a month of their confinement should be allowed to do hard manual labour of any kind; it ought to be obligatory upon them to rest in the last four weeks of gestation." He also noted that "in Switzerland this is insisted on by law" (Ballantyne, 1902, p. 475). In terms of sports activity, Ballantyne advised the pregnant woman "to take sufficient exercise to keep her body in health; but excessive exertion, whether in the form of bicycling, or of walking, or of golfing, or of dancing... should be forbidden" (1902, p. 475).

In 1903 an obstetrical textbook was published, intended for the use of medical students and practitioners. The author, Dr. J. Whitridge Williams, was considered by many to be the "leading figure in American obstetrics during the first three decades of the twentieth century" (Litoff, 1978, p. 20). Williams was a professor of obstetrics at Johns Hopkins University, obstetrician-in-chief to the Johns Hopkins Hospital, and gynecologist at the Union Protestant Infirmary in Baltimore.
Maryland. In his chapter on "The Management of Normal Pregnancy," Williams suggested that the pregnant woman should not significantly change her lifestyle and daily activities. He believed as much outdoor exercise as possible was beneficial, "though in individual cases it is often difficult to specify the exact amount -- a safe rule being to instruct her to desist while still feeling that she could do more without tiring herself" (Williams, 1903, p. 175). The recommended "exercises" were walking, driving, and sea-bathing, while the "ordinary sports" were ruled out.

Although moderate exercise and plenty of fresh air were generally prescribed to pregnant women, this was still a time when many people frowned upon the appearance of a "woman with child" in public. It was therefore questionable how many women limited their outdoor activity and confined themselves to the home for fear of ridicule and embarrassment. Isadora Duncan, a pioneer of modern dance, became pregnant in 1906 and was said to have continued her dance performances in America and Europe only until she could no longer hide her figure in her loosely flowing costumes (Sorel, 1984). She then retired to a small Dutch village for the remainder of her pregnancy. In her autobiography, Isadora Duncan expresses her conflicting feelings about her changing body and her perception of people's attitudes toward pregnancy:

... It was strange to see my beautiful marble body softened and broken and stretched and deformed... Sleepless nights, painful hours. But joy too. Boundless, unlimited joy, when I strode every day over the sands between Nordwyck and Kadwyck... I grew to dread any society. People said such banalities. How little is appreciated the sanctity of the pregnant mother. I once saw a woman walking alone along the street, carrying a child within her. The passers-by did not regard her with reverence, but smiled at one another derisively, as though this woman, carrying the burden of coming life, was an excellent joke. (Duncan,
A significant contribution to "the emergence of pregnancy from confinement was the appearance in 1904 of the first maternity clothes" (Wertz & Wertz, 1977, p. 148). By 1910, maternity clothes for outdoor wear became available. An advertisement for Lane Bryant maternity wear asked:

Sunshine or Shadow? Which, dear mother, will you choose?... The choice is not easy, we know. Embarrassment tempts you to seek the shadows... Pride forces you to unhealthful dress... [however] you can face the world without embarrassment. You can continue your social activities. You can go out into the health-giving air and sunshine right up to the day of confinement... for your own sake -- for your baby's sake -- take the first step on the road to health and happiness. Order now, TO-DAY, the garments that you need to drive the shadows from your life and to bring the sunshine in. (cited in Wertz & Wertz, 1977, p. 149)

**Early to Mid Twentieth Century, 1910-1960**

**Woman's Role in Society**

Between the years 1910 and 1960 many significant events took place which had enormous influence in defining and redefining women's role in American society. Events such as World War I, the economic boom of the 1920's, the depression of the 1930's, and World War II had profound effects on all individuals and served to mold social attitudes. "For women, some of this country's greatest tragedies have caused fuller participation in the rights and responsibilities of the nation" (Gerber et al., 1974, p. 17). During times of stress and hardship, society depended more on "the other half" of its population and women were viewed more as an integral part of the working mechanisms of the political and economical spheres. Women's social roles therefore
changed significantly in accordance with specific events in American history.

The era of World War I and the 1920's saw the culmination of a century long campaign for women's rights in the political arena. In 1920, the Nineteenth Amendment to the Constitution granted women suffrage which symbolized the beginning of equality between the sexes. The 1920's was a decade of economic prosperity, social decadence, and a new found freedom for women.

War, prosperity, and suffrage all had a positive effect on the increased numbers of women in college and industry. Although it appeared that women were achieving a more equal role in society, the persistence of inequality between the sexes remained pervasive. Women still received extraordinarily low wages and in college they were "ghettoized", working toward careers that were typically deemed appropriate for women, such as nursing, teaching, or clerical jobs, all low paying professions. In addition, the majority of women continued to focus exclusively on marriage and family as their goal, rather than a career. "Even when she is more emancipated, she is led to prefer marriage to a career because of the economic advantages held by men..." (de Beauvoir, 1952, p. 430). Nonetheless, the attitudes toward the American woman were gradually changing.

Unfortunately, before the attitudes of the 1920's were firmly established, the Great Depression of the 1930's struck and American society returned to a view of conservatism. Unemployment became a critical problem and therefore, women were discouraged from seeking work because "it was argued that they would be taking away jobs from the
traditional breadwinner, the male. In some cases married women were even banned from employment" (Howell, 1982, p. 236). As a result, women returned to the home and, according to Gerber et al. (1974) were generally accepting of their situation:

The further in time from the end of organized feminism -- defined as the movement for women's political and social rights which began in Seneca Falls [first American women's suffrage convention, 1848] and culminated in suffrage -- the greater was the increase in women's return to domesticity and dependence... The new, post-depression domesticity was of a different and more tolerable sort... The social restrictions were not as great; women did have legal rights and were no longer owned by their husbands; and many women continued to work. Therefore no organized "rebellion" took place. (p. 21)

With the onset of World War II in 1939 opportunities for women again expanded. As men left to fight in the war, women took their place in industrial employment. They proved their ability to perform manual labor and to withstand long working hours. They were not merely capable, they were successful. At the conclusion of the war in 1945, however, women again were forced to return to a domestic lifestyle when the men returned and reasserted their position in both society and the home. But by this time, women had developed new attitudes, had built a new economic strength, and had gained a greater sense of self-worth, confidence, and independence. According to Gerber et al. (1974), of the women who had worked during the war, 75% had expressed a desire to continue in their work.

During the 1950's there were rapidly increasing numbers of young married women, many with children, in the workforce. Still, even though more education and work opportunities existed for women, society was slow to respond and clung to conservative views. "The belief that women were healthiest and happiest when fulfilling their roles in life as
wives and mothers was prevalent in the 1950's, and this message was generally highlighted by the media and literature" (Howell, 1982, p. 237).

**Sport Activities for Women**

As in previous centuries, female participation in sport during the early to mid-1900's was affected greatly by societal and medical attitudes. Many events took place between 1910 and 1960 that influenced the views of society toward women. The stereotypical female role was prescribed in accordance with the needs of society at various times in history. For example, during World War I and II women were needed to replace men in the workplace and were therefore viewed as being strong, independent, and intelligent. However, with the return of American men from war, women were again needed in the home, and were therefore viewed as being weak, dependent, and subservient. Societal images of women experienced cyclical patterns of change that paralleled the changing status of the nation. In turn, the fluctuating attitudes toward women also had a great impact on women's participation in sport. "The social acceptability of a sport is predicted on an ideal image of what a woman should be" (Boutilier & SanGiovanni, 1983). Therefore, female participation in sport between 1910 and 1960 experienced a sporadic growth that was directly related to the various events of the period.

Another influential factor in the acceptability of women in particular sport activities was that of the medical attitudes toward women. The popular medical opinion of physical activity for women for health purposes that was so prevalent during the late 1800's and early 1900's began to take on a new perspective. As it became apparent that
women were becoming more interested in the competitive aspect of sport, the medical profession began to question the safety of women's participation in competitive sport (Gerber et al., 1974). Anything of a competitive nature was considered masculine and inappropriate for the female sex. And so the medical practitioners now influenced women's participation in sport in a negative and inhibiting way. Several medical issues began to focus on the possible risks of sports participation in terms of injury to the reproductive system. A 1925 publication of the Journal of the American Medical Association discussed the risks associated with playing basketball during menstruation:

... our young girls, in this age of feminine freedom, are also overdoing athletics. A girl should not be coddled because she is menstruating, but common sense... at such a period should be exercised... The uterus is physiologically congested and temporarily abnormally heavy and hence, liable to displacement by the inexcusable strenuosity and roughness of this particular game. ("Extracts," 1925, p. 524)

The medical beliefs affected the kinds of sport activities available to women. For example, sports involving endurance, such as long distance running, or those involving contact, such as football, were not considered feminine activities. Basketball rules were modified for female participation to decrease contact and risk of injury.

Despite medical opposition however, several female athletes and organizations began to emerge, opening the door to amateur and professional sport for women. In addition, more middle and working class females were exposed to sport through an increase in community, industrial, and collegiate recreational and sport activities such as tennis, golf, bowling, softball, swimming, diving, and ice skating. Boutilier and SanGiovanni (1983) refer to the period between 1917 and
1936 as being the first female athletic era.

Although most colleges had physical education programs by 1900, these were informal programs organized by the students themselves and it was not until the 1910's that sports were accepted as a regular part of the curriculum (Lee, 1983). An increased variety of sports offered was evident in the 20's, with the most popular being basketball, softball, field hockey, swimming, archery, track and field, and soccer. Dress codes were also changing in the schools.

Women's organized amateur sport developed with the first involvement of the Amateur Athletic Union (AAU) in 1914 when female swimmers were registered (Gerber et al., 1974). Then in 1921, Harry E. Stewart formed the National Women's Track Athletic Association and sent the team to Paris to compete. The American team was so successful that one year later, AAU took over control of women's track and field and the National Indoor and Outdoor Championships for women were initiated. Finally, in 1923, the AAU approved registration for women in all sports under their jurisdiction (Gerber et al., 1974).

An increase in the number and size of the Young Women's Christian Associations (YWCA's) occurred during this era and in 1911, the first National Conference of YWCA Health Education Directors took place which helped to establish an emphasis on physical fitness rather than home economics (Lee, 1983). Physical education departments became standard and swimming programs grew in popularity. The Centennial Report of 1916 showed a participation of 65,000 females in swimming classes. The number of participants increased steadily and by 1945, 380,965 females were enrolled in classes (Lee, 1983).
The decade of the 1920's served as a catalyst for women in sport. The economic boom, liberal social behaviors, and decreased working hours all served as positive influences for women's participation in sport. In addition, "the social upheaval of the twenties fostered changes in fashions for both women and men, making sport clothing available to all. Special costumes for tennis, winter sports, basketball, and swimming made the sports more enjoyable, especially for women" (Spears & Swanson, 1978, p. 231).

The 1920's were also a time of publication and exploitation of sport heroines such as Gertrude Ederle, Amelia Earhardt, Glenna Collett, and Helen Wills. One of the few important women athletes to come from working class parents was Gertrude Ederle who in 1926 became the first woman to swim the English channel, while claiming the new overall record with a two hour lead on the previous male record holder (Lucas & Smith, 1982). Amelia Earhardt was the first woman to fly across the Atlantic in 1928 and disappeared in 1937 during an attempt to fly across the Pacific (Gerber et al., 1974). Glenna Collett won six national amateur golf championships and Helen Wills was perhaps the most publicized female tennis player of the 1920's (Lucas & Smith, 1982).

The depression of the 1930's brought about changes in the attitudes of society toward sport activities in general. With the dramatic increase in unemployment, sport was now considered an important use of leisure time. People not only had more time for sport, but they also had a strong need for enjoyable activities. There was a dramatic increase in the number of sport facilities and programs available for men, women, and children within the community. However, it is also
clear that during the depression fewer women worked or went to college, and therefore had limited freedom. Although there was a "buildup of municipal and national recreation facilities, there is little evidence to show that increased numbers of women utilized them" (Gerber et al., 1974, p. 21).

After the attack of Pearl Harbor on December 7, 1941, the American men went to war and the women were again in the workplace. Women not only took men's place in industry, but also in sport. In 1943, Philip K. Wrigley, Chicago Cubs owner, organized the All-American Girls Baseball League to help baseball survive the season (Spears & Swanson, 1978). Initially the rules were modified for the female players, but as the women's skill improved, major league rules were used and the only difference was a five foot shorter basepath. The games were regularly scheduled in Chicago and other midwestern cities and were well supported by numerous fans. For over ten years the women's professional league was successful, until finally in 1954 it ended, with the popularization of television and men's professional baseball (Spears & Swanson, 1978).

Although women were not yet firmly established or accepted unquestionably in the realm of sport, significant advances had been made during the early to mid-1900's. Because of the female pioneers of sport and the increased women's athletic organizations, attitudes toward women in sport were slowly changing for the better. By the end of the 1950's, many people still questioned the femininity of the female athlete, but at the same time, more opportunities than ever before existed for women in sport.
Medical Advice during Pregnancy

Although women made significant advances in the area of sport during the period 1910 to 1960, the medical advice concerning exercise in pregnancy did not change significantly from the Victorian period. "Moderation and the need for outdoor air were the two themes of the early 20th century" (Artal & Wiswell, 1986, p. 2). The advice given in a 1913 obstetrical text sounds very much like that given one hundred years earlier:

Violent exercise, of course, is to be avoided. It is not possible to build up a strong muscular system during pregnancy. That should have been done before. To be avoided are jolts, running, sudden motions, lifting great weight, going up and down stairs quickly, horseback riding, cycling, riding over rough roads, golf, tennis dancing, and swimming... To be encouraged are walks, up to two miles... and carriage drives. Housework is desirable, unless too strenuous... If a woman has a known tendency to abort, she must be very careful, and had better even go to bed at the usual time of her menstrual periods.

Emphasis was usually placed on what a woman should not do during pregnancy, rather than what a woman could do. Surprisingly, the same kinds of monotonous and limited exercise routines were continually prescribed in the 1930's, 40's, and 50's. In addition to daily walking and fresh air, housework was also highly recommended although potentially more strenuous than many sports that were prohibited. Morton(1937) also added light swimming and golf to the list of permissible activities:

All forms of violent exercise, such as tennis, climbing or horseback riding should be interdicted, since they may produce abortion. Walking is the best form of exercise for the gravida... Four or five blocks and back are usually adequate. Swimming is permissible up to the seventh month, but should consist of paddling around rather than strenuous stroking. Golf is not contraindicated, provided it does not tire the patient. Light housework is permissible and desirable, as it serves to keep the mind occupied... (p. 228)
Fifteen years later Eastman (1957), in a much publicized book, "Expectant Motherhood," echoed the same advice of regular walking, fresh air, and housework. He advised a mile walk per day and "light" housework as a "helpful form of activity" and he disapproved of horseback riding, tennis, and skating (p. 73-75).

A notable exception to this conservative way of thinking was that of Phyllis D. Cilento, who in 1937 published an article on the "Practical Methods of Maintaining Muscular Tone in Pregnancy." Cilento states that a "general flaccidity and loss of tone among women who have borne children" is an all too common occurrence. Furthermore, this "is palpably wrong and is an instance in which prevention should be the ideal, rather than attempts at correction by later operative interference" (Cilento, 1937, p. 828). Cilento believed that exercise was essential at all phases of life for health and fitness, and that the modern conveniences of everyday life consequently led to inactivity and poor muscular conditions:

There is no doubt that the conditions of modern life, and especially of city life, tend to destroy the tone of the body, and of the abdominal musculature in particular. One of the first principles of physiology is that deterioration of function follows lack of use; and this most readily takes place in undernourished tissues. The sedentary occupations followed by so many young women and girls before marriage militate against good muscular development and tone... [they] do not get enough active exercise and little outdoor sport.

Furthermore, Cilento noted that inactivity was more common and could lead to more complications during pregnancy. Because of the changing center of gravity in pregnancy, Cilento believes that a "sort of physical uncertainty that limits muscular movement" resulted (1937). A woman "can overcome her sense of insecurity and gain her lost poise
only by free use of her muscles and readaptation of the muscular sense to the new conditions by graduated exercises" (Cilento, 1937, p. 830).

According to Cilento the complications of inactivity during pregnancy could lead to weight gain, "loss of figure" and general appearance, undue stress on the pelvic floor muscles and lower back, permanent stretching of the fascia of the abdominal wall, varicose veins, edema, and even a prolapsed uterus. In prescribing exercise, rather than list several activities to avoid, Cilento encouraged the pregnant female to partake in sport activities in which she was accustomed to and that involved the whole muscular system. It was also advised that a woman "listen" to her body and modify exercise sessions with the progression of pregnancy:

Exercise in pregnancy should stimulate the whole muscular system and in addition be directed to special muscles on which the strain of both pregnancy and confinement will fall... It should never fatigue, but rather stimulate, and should be graduated so that the muscles become educated in suppleness and endurance.

As every woman has a different capacity for exercise and a different response, her own feelings should be her guide to some extent. Anticipatory fatigue, however, should be no bar to the institution of the exercises. Many types of sport to which the woman is accustomed might well be continued during the early months, unless, or until, she feels some discomfort in playing them. (Cilento, 1937, p. 832)

Even when physicians were concerned about excessive weight gain in their patients during pregnancy, exercise was rarely mentioned as a preventative factor, rather a decreased intake of calories was recommended as the solution. In fact, in a 1946 publication in the American Journal of Obstetrics and Gynecology, the author advises a restricted caloric intake to accommodate for a decreased activity level during pregnancy:

... a strict dietary regime... is important because in the latter months
of pregnancy, as the woman becomes more sedentary, she is apt to put on excessive weight. The weight allowance is 15 pounds for the average woman; however, the larger the woman the less gain permitted and for the unfortunate obese, the ideal sought is no gain whatsoever. (Loughran, 1946, p. 613)

During the 1930's and 1940's a new form of prenatal exercise was introduced which focused on birth preparation. Kathleen Vaughan initiated a series of exercises to improve joint flexibility, muscular tone of the pelvic region, and muscular relaxation of the lower back area. She claimed that the squat exercise would help widen the pelvis for an easier birth, and the tailor-sitting exercise (sitting cross-legged) combined with pelvic floor exercises would help to prevent tears of the perineum during birth. She also taught breathing and posture exercises for relaxation and to reduce lower back strain (Artal & Wiswell, 1986).

One of the first prenatal education programs was offered at the Chicago Lying-In Hospital in 1935 (DeLee, 1965). In addition to classes on maternal and fetal physiology, hospital procedures at the time of birth, and infant care, classes on exercise and relaxation techniques were also offered. These exercises were very similar to those taught by Vaughan, and the purpose was to prepare the pelvic floor muscles for the birth process and to speed up the rate of recovery afterward. Breathing exercises were also included to aid in the reduction of pain during labor and birth. Another important aspect of these prenatal classes was to provide the expectant mother with a support group atmosphere, particularly helpful to first-time mothers. As Vaughan (1951) pointed out: "The advantage of attending a class is that you are stimulated by others also engaged in training for motherhood, with whom you make
friends and can compare your babies later on" (p. 29).

It was during the 1940's that Dr. Fernand Lamaze introduced his psychoprophylaxis technique of childbirth preparation which is widely taught today (Artal & Wiswell, 1986). This technique involved a series of breathing and relaxation exercises for dissociation during labor and birth to help reduce pain. In addition, the exercises developed by Dr. Arnold Kegel also became popular at this time. The purpose of the Kegel exercises, mainly contractions of the pelvic floor muscles, were to decrease urinary stress incontinence and thereby prevent surgical correction of the external sphincter muscles. These exercises were incorporated into Elizabeth Noble's book, "Essential Exercises for the Childbearing Year" (1976).

The prenatal birth preparatory courses gradually became a standard part of a system of prenatal care in the United States. While the prenatal care system had been fairly well established in the early 1900's, a recognized need for further improvement was still evident. In the United States from 1928-1933 over 70,000 women died from related causes to childbirth. A study comparing the United States with sixteen other countries showed that only Scotland had a higher maternal death rate than the United States (Hunter, 1935). It was believed that maternal mortalities could be significantly reduced with an improved prenatal care system made available to the poor and working class women as well as the middle and upper class.

This same concern was echoed by several physicians in the late 1930's (Atlee, 1937; Bolt & Geib, 1935; Eades, 1936; and Irving, 1936). One physician however, believed that with the assistance of
organizations such as the American Gynecological Society, the American Pediatric Society, and American Child Health Association, the health care available to pregnant women in the United States was superior to that of other countries. According to Dr. Fred Taussig (1937) "we have succeeded in this country in developing one of the best organized systems for prenatal care in the world. It is a chapter in our obstetric development of which we have reason to be proud" (p. 738). Dr. Taussig however, failed to substantiate his statements with statistical evidence.

Toward the end of the mid-twentieth century, a few researchers began to investigate the area of exercise and pregnancy. They were concerned with the question of the effects of maternal exercise on pregnancy and birth outcome. One of the earliest studies of maternal cardiovascular response to exercise was performed by Widlund in 1945. A submaximal step test was used to measure heart rate, blood pressure, and oxygen uptake in 157 pregnant females. Although it was determined that at higher workloads, the pregnant group had a 10% increased oxygen cost and a 15% higher oxygen debt than did the control group, it was also concluded that exercise was well tolerated in the pregnant group (cited in Artal & Wiswell, 1986). Then in 1955 and 1956 two studies were conducted to determine the effects of a non-weight bearing exercise during pregnancy. Both of these studies evaluated the effects of cardiac output, blood pressure, heart rate, and total peripheral resistance during supine bicycling and found no significant differences between pregnant and non-pregnant women (Bader, Bader, Rose, & Braunwald, 1955; Rose, Bader, & Bader, 1956). The studies seemed to
support the idea that exercise was not harmful during pregnancy and that pregnant women could tolerate exercise quite well. These original investigations yielded surprising information in support of exercise during pregnancy and they opened the door to further scientific investigation.

1960 to Present

Woman's Role in Society

Since the post-World War II era, the dominant social view was that women were happiest and most useful to society when they were in the home, working as wives and mothers. This perspective remained intact until the beginning of the 1960's, when the feminist movement accelerated. According to Barbara Easton, the "new feminists reversed the priorities of their predecessors: while they recognized the importance of continuing to fight for equality in the public arena, their central concern was the question of women's subordination within the family" (1979, p. ).

In 1952, Simone de Beauvoir stated that "woman's work within the home gives her no autonomy; it is not directly useful to society... it produces nothing" (p. 456). Building on this philosophy, Betty Friedan, in 1963, wrote "The Feminine Mystique," which challenged women to confront this question of their autonomy and identities. Friedan claimed that women were living their lives under the influence of the "feminine mystique" which heralded the idea that women could only find true fulfillment in the role of wife and mother. "Over and over women heard in voices of tradition that they could desire no greater destiny
than to glory in their own femininity" (Friedan, 1963, p. 15). The book addressed the majority of American women -- white, college educated, middle-class women -- who had married at an early age and whose experience of domestic life fell short of their expectations. Friedan believed that the solution to this problem was to first seek one's own identity through professional employment, and then integrate family into one's life.

A major contribution to women's rights was the establishment of the Presidents' Commission on the Status of Women in 1961 (Sochen, 1973) for the purpose of investigating current laws affecting women in American society. The first meeting of the Commission was in February, 1962, in which an investigation relating to equal pay for equal work was recommended. This resulted in the signing of the Equal Pay Act on June 10, 1963 (Sochan, 1973).

Another contribution to the effort toward women's rights was the formation of the National Organization for Women (NOW) in 1966. Originally led by Betty Friedan, this group dedicated itself to fighting for legal changes to provide women with equal rights and opportunities in all institutions of society. In 1969 the NOW Bill of Rights listed the following priorities of concern:

I. Equal Rights Constitutional Amendment  
II. Enforce Law Banning Sex Discrimination in Employment  
III. Maternity Leave Rights in Employment and in Social Security Benefits  
IV. Tax Deduction for Home and Child Care Expenses for Working Parents  
V. Child Care Day Centers  
VI. Equal and Unsegregated Education  
VII. The Right of Women to Control Their Reproductive Lives  
(Sochen, 1973, p. 254)
The feminist issue was also a movement toward an increased self awareness of bodily function and reproductive freedom. The feminists promoted programs to educate women about female anatomy and physiology because "to demystify health care would liberate them from doctors' control" (Rothman, 1978, p. 282). This was the basis of the popular book, "Our Bodies, Ourselves" (Boston Women's..., 1976). This book also claimed that bodily knowledge would promote a realization of the ideology of woman as a person.

The availability of oral contraceptives in the mid-1960's and legalized abortion in 1973 increased women's reproductive freedom. Women could now effectively plan how many children they wanted, if any, and when they wanted them. Birth control and particularly legalized abortion prompted much controversy. Although the Supreme Court ruled that a woman in her first trimester of pregnancy could obtain an abortion and that state interference would be unconstitutional, this did not imply that individual physicians or hospitals were required to provide these services. In 1974 and 1975 less than half of all private hospitals and approximately one third of public hospitals in the state of New York performed abortions (Rothman, 1978).

Sport Activities for Women

As social attitudes toward women began to change in the 1960's, women's participation in sport was also affected dramatically. One result was a women's athletic revolution in which increasing numbers of women from all social classes began to view sport and recreation as a lifetime pursuit (Boutilier & SanGiovanni, 1983). Most of the traditional sports were still popular along with several new sports,
such as kayaking, jogging, skiing, weight lifting, and martial arts. Many of the new sports, such as hang gliding, rock climbing, parachuting, surfing, and skiing, were "not only vigorous but eustressing, that is, involve pleasurable stress that comes from controlling the danger involved" (Gerber et al., 1974, p. 8). In addition, there was a sudden interest in wilderness sports, perhaps as a means of escape from the stressors of urban life.

The contemporary era of women in sport was signified by advances in scientific research and professional sport opportunities for women, as well as specific historical events such as the running of Kathy Switzer in the Boston Marathon of 1967, the passing of Title IX into legislation in 1972, and the King verses Riggs tennis tournament of 1973. During the 1970's the field of "physical education was transforming itself from primarily a profession to an academic discipline" (Birrell, 1988, p. 404). Sport research advanced dramatically in the areas of history, psychology, and sociology of sport, as well as exercise physiology, kinesiology, and motor learning. Only with an increased knowledge of women and sport could researchers begin to dispel the persisting myths which continued to hinder women's participation in sport.

Another important factor in the last thirty years for women in sport has been the phenomenal advances in the opportunities now available for professional female athletes. Perhaps one of the most significant female athletes in women's professional sport was Billie Jean King, who in 1973 became the first woman to win $100,000 in a triumphant match against a male tennis player, Bobbie Riggs. Not only did King win significantly more money than any other female athlete, but
she also proved that a female could defeat a male in sport.

By 1975, female tennis players were receiving the same prize monies as were males in the United States Open Tournament. Another professional sport in which women have become highly successful is that of golf. In 1978 earnings of over $100,000 were won by four women, with Nancy Lopez winning $189,913 (Boutilier & SanGiovanni, 1983). Other professional sports, while not as lucrative as tennis or golf but, now available to women include bowling, horse racing, car racing, racketball, surfing, bicycling, running, volleyball, and even wrestling and boxing.

A major reason for women's success in professional sport was because of their marketability. In other words, women were an effective marketing tool in selling products for the companies that sponsored sporting events. According to Boutilier and SanGiovanni (1983), the "media focus on women athletes for non-athletic reasons.... Women gain attention for being good looking, feminine, well-dressed, ladylike, petite, and controversial rather than for their athletic achievements" (p. 44-45).

Within the female population perhaps the fastest growing sport in the contemporary era was that of running. In 1980 it was estimated that six and one half million women jogged on a regular basis (Boutilier & SanGiovanni, 1983). A historical turning point which marked women's entry into competitive running occurred in 1967, when Kathy Switzer became the first woman to run in the Boston Marathon, despite several attempts by male individuals to physically restrain her from competing. Five years later, in 1972, the AAU sanctioned women's marathons and the
The first women's minimarathon was held in New York City with 78 entrants. Two years later, the number of participants had increased substantially to 5,289, representing women from 38 states and 5 countries (Boutilier & SanGiovanni, 1983).

Women's and girls' athletic programs improved when Title IX of the Educational Amendments was passed into legislation in 1972:

No person in the United States shall on the basis of sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any educational program or activity receiving Federal financial assistance... (Spears & Swanson, 1978, p. 283)

Title IX stated that both males and females must be provided with comparable facilities, course offerings, financial assistance, and athletic opportunities (with the exception of prohibiting a member of the "excluded" sex from trying out for a team of a contact sport, i.e. a female could not try out for the male football team). As a result of this legislative action, the budgets for girls' and women's athletic programs increased somewhat, but still did not come close to the budget for boys' and men's athletics. By 1974, the University of Georgia had increased their women's budget from $15,000 to $80,000 and the University of California at Los Angeles increased their budget from $60,000 to $180,000 for women's athletics (Spears & Swanson, 1978).

"With all the changes, the biggest one is the growth of sport for women in comparison to men" (Gerber et al., 1974, p. 8). Comparatively more women than at any other time in history, now took part in some form of regular exercise for various reasons. Women participated in sport for fun, play, relaxation and stress management, health, weight control, socialization, competition, professional titles, fame, and money. The
feminist belief that there was nothing that women could not do, was now certainly well supported in the area of sport.

Medical Advice during Pregnancy

As a direct result of the changing medical and societal attitudes toward women in society and sport, the medical advice concerning exercise during pregnancy advanced at a phenomenal rate from 1960 through the 1980's. Until very recently, advice to pregnant women was based largely on "common sense" and acceptable practices of society. With changing attitudes increased scientific investigations, present day exercise prescriptions for pregnant women was changed dramatically from the standard advice of moderate walking and plenty of fresh air.

During the 1960's, research in the area of exercise in pregnancy continued at a very slow, but gradual pace. Seitchik (1967) examined the effects of exercise in 34 nonpregnant women, 133 pregnant women, and 28 postpartum women and reached the following conclusions:

1. Pregnancy does not significantly alter ventilation.

2. Maximum exercise efficiency occurs at 24-35 weeks gestation, when cardiac output and blood volume reach their peaks.

3. Exercise should not be restricted during pregnancy because of any identifiable physiological reasons, except in the later stages of pregnancy when certain physiologic parameters, such as cardiac output, are decreased (Seitchik, 1967).

Although this study and others (Dahlstrom & Irhman, 1960, cited in Wallace, Wiswell, & Artal, 1986; Ueland, Novy, & Peterson, 1969) supported the theory that exercise could be beneficial during pregnancy, the medical textbooks of obstetrics generally did not reflect the
current findings in research. The standard advice differed very little from past centuries, except that golf and swimming in the early months of pregnancy were now usually considered permissible. Davis and Rubin, editors of the 1962 edition of "DeLee's Obstetrics for Nurses," suggested walking throughout pregnancy, as well as golf and "swimming in clear water" during the first half of gestation. They advised against horseback riding, tennis, and skating because of the danger of falls. In addition, housework was still advocated as an effective form of exercise: "Regular household chores can be good exercise if properly done. Bending and squatting are good exercises during pregnancy and aid in preparing the body for delivery" (Davis & Rubin, 1962, p. 126).

Another obstetrical text agreed that some sports such as tennis, bicycling, and horseback riding were not intrinsically harmful to the mother or fetus but should be avoided anyway because of the dangers of tripping or falling (Reid, 1962). In the thirteenth edition of "Williams Obstetrics," editors Eastman and Hellman (1966) remind the reader that pregnancy is not a pathological condition and therefore most sports should not be restricted during this time, although precautions should be taken to avoid overfatigue and injury from more dangerous activities:

There need be no limitation of exercise for the pregnant woman, provided she does not become excessively fatigued. For the many American girls who are enthusiasts about sports, marked restriction of such activities shifts the emphasis during pregnancy from a normal physiologic experience toward an abnormal state bordering on illness. Regarding pregnancy as a malady necessitating abandonment of a habitual sport is obviously undesirable; on the other hand, dangerous activities that carry a risk of bodily injury should be prohibited. (p. 329)

An interesting article was published in the editorial section of a
1968 Obstetrics and Gynecology journal. The author, Canadian physician Michael Bruser, challenged the current guidelines for sports activities during pregnancy. In reference to the standard recommendations of textbooks, Bruser stated that they "have little to say... beyond stressing the need for caution and for common sense" (1968, p. 721). He then pointed out that there was no precise definition of the phrase "common sense." When the texts cautioned the pregnant women to avoid fatigue, Bruser responded: "And what does fatigue mean? Is there any reason why a pregnant woman should avoid fatigue" (1968, p. 721)? Bruser cited some specific examples of pregnant women who participated in various sporting activities and who experienced safe pregnancies and deliveries such as two 1952 Olympic athletes, a diver and a skier, both three and one half months pregnant, and two pregnant women in the 1956 Olympics, one in discus, and the other in weightlifting. In each case, the pregnancies and births proceeded normally.

Bruser (1968) also proposed that the true rationale for conservative advice to pregnant women on the part of the physician was not for the concern of mother and child, but for the concern of the physician himself. By withholding recommendations for exercise guidelines, the physician could not be held liable for any problems or complications of pregnancy which may have arisen:

There remains only one valid reason for our customary caution: the law. Ordinarily, the legal implications of giving advice to pregnant women are based on what is usual and customary. If a patient develops any of the above conditions with no physical effort, then we simply accept it. But if this should happen at any time following a bout of physical effort as recommended to her by her physician or her trainer, then there might develop serious legal problems, even with no actual proof of a cause-and-effect relationship.
The decade of the 1970's was one in which changing attitudes toward exercise and pregnancy began to develop. With the fitness boom well under way, it was natural for women to want to continue their exercise programs into their pregnancy. If exercise could help keep weight under control, improve levels of fitness, and improve self esteem, wouldn't these factors be especially beneficial during pregnancy? However, many times when a woman would turn to her physician for guidance and support in continuing an exercise program, she would not necessarily receive the assurance that she may have hoped for. A 1978 issue of Runner's World magazine addressed this problem: "Running during pregnancy is a relatively new phenomenon, and some pregnant runners are going to find their caregivers hesitant -- if not downright disapproving -- of their activity" (Wirth, Emmons, & Larson, 1978, p. 57). Many times the pregnant woman who wished to continue running had to deal with both social and medical criticism and prejudice.

One woman who decided to continue running during both of her pregnancies described the reactions of people around her and her way of dealing with the situation:

My friends, relatives and neighbors were surprised but relatively supportive of my newly acquired running habit throughout the first trimester. But once I began to "show," the eyebrows hit the hairlines and the truth came out. My husband's concern was veiled by his enthusiasm for my emerging fitness, but our parents, grandparents and would-be doting aunts were candid and to the point: Pregnant women are to be pampered; they are not athletes... The best advice is to ignore it and not let it discourage you. (Wirth et al., 1978, p. 58)

A round table discussion on sports during pregnancy introduced some interesting questions and opinions concerning pregnancy and sport competition (Round table, 1976). When asked about the advisability of
strenuous sport during pregnancy and the effects of pregnancy on sport performance, Dr. Erdelyi stated that there was no difference in performance during the first two or three months. Furthermore, "I wouldn't object to competition until about the third month. After that I would probably judge the situation on an individual basis" (Round table, 1976, p. 84). Dr. Gendel, on the other hand, believed that the dangers of disturbing the pregnancy were greatest during the first trimester and that after this time "the pregnancy is stabilized" and "the danger to both the mother and fetus is less" (p. 84).

The question of participation in team sports during pregnancy was also examined. Dr. Albohm commented on the psychological effects of the player, teammates, opposition team, and officials:

... When an athlete is competing when she is pregnant, you have to consider the psychological effect the pregnancy may have on her own team or on the opposing team. In a team sport where there is contact, such as in basketball... does the opposition then stay away from her or do things that they would not normally do to protect her? How do her own teammates react with her on the team? (Round table, 1976, p. 85)

Another area of concern was the effect of a vigorous exercise regime on the outcome of labor and childbirth. One theory was that intensive sport activities make the muscles of the perineum and the pelvic floor more rigid which would therefore result in a difficult birth. The other theory stated that sport activities helped to strengthen the abdominal muscles which would decrease the length of the second stage of labor. Gerber et al. (1974) agreed with the second theory claiming a beneficial effect of exercise on labor and birth and they commented on the results of a study which overwhelmingly support this theory (Zaharieva, 1965, cited in Gerber et al., 1974, p. 512).
Female athletes from the Tokyo Olympics were examined to determine the effects of vigorous exercise on labor and birth outcome. It was determined that 87.2% of the athletes had quicker deliveries than average, and the average time of the second stage of labor was reduced by approximately 50%. In addition, there were 50% fewer Caesarean sections in the athletes than the normal population.

Increasing numbers of studies continued to support the idea that exercise could be beneficial during pregnancy and childbirth. Dressendorfer (1978) conducted a case study over four years on a female runner who experienced two pregnancies and observed that: (1) both pregnancies were uncomplicated and the subject remained healthy throughout the study; (2) treadmill testing of up to 95% of the nonpregnant maximal heart rate, even one week prior to term, did not produce any harmful effects; (3) there were no apparent discomforts that resulted from the jogging program except during the first trimester when nausea was experienced; and (4) during postpartum an increased maximal oxygen uptake was observed with a comparable increase in exercise performance. During the first trimester of the second pregnancy, a decreased maximal oxygen uptake was observed.

Dressendorfer concluded by stating: "... during normal pregnancy and lactation, maximal oxygen uptake and endurance performance can be improved by physical training without harmful effects on the mother or child" (1978, p. 80).

As research continued to add to the growing foundation of knowledge in exercise and pregnancy, exercise prescriptions became more specific. A physician, nurse, and graduate student gave the following advice for
monitoring exercise intensity in a Runner's World publication (1978):

1. The pregnant woman should listen to her body and modify her exercise according to how she feels.

2. She should exercise at a slower pace; pregnancy is not a time to train for competition.

3. She should exercise at her "safe heart rate" (SHR). This is set at 60% of predicted maximal heart rate.

By the end of the 1970's an increasingly positive attitude toward exercise in pregnancy was adopted by many health professionals. In a publication on exercise and pregnancy the Committee on the Medical Aspects of Sports stated that "there is no medical or scientific rationale for restricting the normal female from participation in vigorous noncontact sports, and many reasons to encourage such participation" (President's Council on Physical Fitness & Sports, 1978).

With the continually increasing numbers of women taking part in sport activities and a greater knowledge of exercise physiology and pregnancy, more and more pregnant women were participating in regular forms of exercise. In addition, several community prenatal exercise programs were offered in fitness centers, YWCA's, and hospitals. The growth rate of prenatal exercise programs and research continued to escalate into 1980's.

The benefits of exercise during pregnancy were recognized and generally agreed upon by the early 1980's:

1. to control weight gain
2. to decrease backache
3. to decrease "postpartum belly"
4. to decrease varicose veins
5. to decrease constipation
6. to increase energy to enjoy daily life
7. to sleep better at night
8. to decrease daily tension
9. to improve appearance, especially posture
10. to be better able to cope with the physical stress of pregnancy

(Jopke, 1983, p. 139)

While many studies focused on the acute physiological exercise during pregnancy or the effect of exercise on birth outcome, no study examined the long-term training effect of an aerobic exercise program during pregnancy until that of Collings, Cutet, and Mullin in 1983. At the Madison General Hospital in Wisconsin twelve pregnant women participated in an aerobic exercise program and eight pregnant women served as controls. A baseline maximal oxygen consumption was obtained on a bicycle ergometer and submaximal tests were performed at the second and third trimesters. The aerobic exercise program consisted of bicycling, walking, jogging, and rowing. At the third trimester an 18% improvement and a 4% decline in absolute aerobic capacity (liters of oxygen per minute) were observed in the exercise and control groups, respectively. Relative aerobic capacity (milliliters of oxygen per kilogram per minute) increased 8% in the exercise group and decreased 10% in the control group. Pregnancy outcome showed no significant differences between the two groups in labor duration, Apgar scores, or fetal growth. It was concluded that an aerobic exercise program could benefit the pregnancy women by improving aerobic capacity while having no detrimental effect on labor duration or fetal growth.

This study prompted the initiation of an ongoing prenatal exercise program at Madison General Hospital according to Ellen Brewster, exercise physiologist at Madison General (personal communication, July
19, 1988). The exercise sessions were supervised and both maternal and fetal heart rates were monitored before, during and after exercise. The "Exercise for Two Program" became a well established prenatal exercise program that was a model for other developing programs in hospital and community settings.

During the mid-1980's the YWCA/YMCA developed a national standardized training program for instructors of prenatal exercise classes. The "You and Me, Baby" prenatal exercise sessions developed by Susan Regnier, R.N., included a warmup of stretching and strengthening exercises, a low impact aerobic session, and a cooldown of stretching and relaxation exercises (Melpomene Institute, 1986).

In addition to the physical benefits of exercise for the pregnant woman, the psychological benefits were also considered to be very important during pregnancy when it was believed that a woman was more susceptible to low self-esteem, poor body image, or depression. "Mental health -- that is, the struggle to keep it -- is probably the most compelling reason women keep running [or bicycling, swimming, etc.] through pregnancy and the early days of motherhood" (Heinonen, 1985, p. 45).

Despite the increased research in the area of exercise and pregnancy, it was likely that the majority of physicians still knew little about prescribing prenatal exercise programs. In a 1985 edition of the medical text "Williams Obstetrics," it appeared that exercise was then more acceptable for pregnant women, but no specific advice was given regarding guidelines for exercise except to caution against fatigue and to list three contraindications to exercise:
In general, it is not necessary for the pregnant woman to limit exercise, provided she does not become excessively fatigued or risk injury to herself or her fetus. The current enthusiasm for jogging has also attracted a number of pregnant women to the endeavor. In fact, several women, even late in pregnancy, have run in marathons of considerable distance without apparent harm to themselves or their fetuses.

With some pregnancy complications, the mother and her fetus may benefit significantly from a very sedentary existence; for example, women with pregnancy induced hypertension appear to do so, as do women pregnant with two or more fetuses and women suspected of having a growth-retarded fetus. (Fritchard, MacDonald, & Gant, 1985, p. 256)

It became increasingly evident that there existed a great need for specific guidelines for exercise in pregnancy. "Of all the subgroups in the general population, pregnant women were the only ones who had no exercise standards" (Artal & Wiswell, 1986, p. 225). In response to the increased demand for exercise standards, the American College of Obstetricians and Gynecologists (ACOG) formed an eight-member committee, organized by Dr. Harrison Visscher, to develop exercise guidelines for the pregnant woman. As a result, in 1985 ACOG published a bulletin with the following guidelines for exercise during pregnancy and postpartum:

**During Pregnancy and the Postpartum Period:**

1. Regular exercise (at least 3 times per week) is preferable to intermittent activity. Competitive activities should be discouraged.

2. Vigorous exercise should not be performed in hot, humid weather or during a period of febrile illness.

3. Ballistic movements (jerky, bouncy motions) should be avoided. Exercise should be done on a wooden or a tightly carpeted surface to reduce shock and provide a sure footing.

4. Deep flexion or extension of joints should be avoided because of connective tissue laxity. Avoid activities that require jumping, jarring motions or rapid changes in direction because of joint instability.

5. Vigorous exercise should be preceded by a 5-minute period of muscular warm-up. This can be accomplished by slow walking or stationary cycling with low resistance.

6. Vigorous exercise should be followed by a period of gradually declining activity that includes gentle static stretching. Stretches...
should not be taken to the point of maximum resistance, as connective tissue laxity increases the risk of injury.

7. Heart rate should be measured at times of peak activity. Target heart rates and limits established in consultation with the physician should not be exceeded.

8. Care should be taken to gradually rise up from the floor to avoid orthostatic hypotension. Some form of activity involving the legs should be continued for a brief period.

9. Liquids should be taken liberally before, during, and after exercise to prevent dehydration. If necessary, activity should be interrupted to replenish fluids.

10. Women who have led sedentary lifestyles should begin with physical activity of very low intensity and advance activity levels very gradually.

11. Activity should be stopped and the physician consulted if any unusual symptoms appear.

During Pregnancy Only:

1. Maternal heart rate should not exceed 140 beats/minute.
2. Strenuous activities should not exceed 15 minutes in duration.
3. No exercises should be performed in the supine position after the fourth month of gestation is completed.
4. Exercises that employ the Valsalva maneuver should be avoided.
5. Caloric intake should be adequate to meet not only the extra energy needs of pregnancy, but also of the exercise performed.
6. Maternal core temperature should not exceed 38.5 degrees Celsius.

In addition, specific contraindications to exercise in pregnancy were also listed (ACOG, 1985):

Absolute Contraindications:

1. Active myocardial disease
2. Congestive heart failure
3. Rheumatic heart disease (Class II and above)
4. Thrombophlebitis
5. Recent pulmonary embolism
6. Acute infectious disease
7. At risk for premature labor, incompetent cervix, multiple gestations
8. Uterine bleeding, ruptured membranes
9. Intrauterine growth retardation or macrosomia
10. Severe isoimmunization
11. Severe hypertensive disease
12. No prenatal care
13. Suspected fetal distress

Relative Contraindications:

1. Essential hypertension
2. Anemia or other blood disorders
3. Thyroid disease
4. Diabetes mellitus
5. Breech presentation in the last trimester  
6. Excessive obesity or extreme underweight  
7. History of sedentary lifestyle

Immediately upon publication, the guidelines became subject to controversy. Raul Artal, M.D., associate professor of obstetrics and gynecology and of physical education and exercise sciences at the University of Southern California at Los Angeles, was the primary person involved in developing the guidelines. Several people believed that additional persons should have been consulted in the formation of the guidelines. Neither ACOG members outside of the eight-person committee nor members of the American College of Sports Medicine were contacted for their opinions until the guidelines were completed (Gauthier, 1986).

Another complaint was the specification of a maximal maternal heart rate of 140 beats per minute (bpm). Val Lee, director of the prenatal exercise research project at Melpomene Institute, an organization committed to the research of women and sport in St. Paul, Minneapolis, stated that the cutoff point of 140 bpm was not validated by any specific research (personal communication, July 26, 1988). According to Visscher, a heart rate of 140 bpm was "sort of arbitrary, but based on a 25% reduction of the maximum." He added however, that the "guidelines are geared toward the average woman," not the "woman who has a sedentary lifestyle" or the "woman who has a history of exercise" (Gauthier, 1986, p. 166). Artal also agreed that the 140 bpm would not affect a woman who exercised regularly and was physically fit, but that it was better to "err on the safe side rather than the unsafe side" (Gauthier, 1986, p. 167).
The most critical concern perhaps was the fear that the ACOG guidelines may have set a legal standard by which physicians and instructors could be held liable to. According to Gauthier (1986) the "proponents of the guidelines say that physicians who may not have known what advise to give a patient who wanted to exercise can fall back on the guidelines as the established standard" (p. 168). On the other hand, the opponents believed that lawyers could "use the guidelines against those who may advise a patient to do more" (Gauthier, 1986, p. 168). It soon became evident that ACOG's guidelines for exercise during pregnancy were becoming an accepted standard. In a recently published instructor's guide to prenatal exercise programs, the author based her exercise guidelines on ACOG's specifications (Holstein, 1988).

When the future of prenatal exercise programs and guidelines were considered, Artal stated that the present ACOG guidelines were "a reflection of current studies" and would therefore change with additional research. He also added that he believed a more clinical rather than recreational approach to prenatal exercise would take precedence (R. Artal, personal communication, July 27, 1988). A different point of view was expressed by Val Lee of the Melpomene Institute. She believed that hospital-based maternal exercise programs were a "fad" and that they were "started for economics and would end for economics" (V. Lee, personal communication, July 26, 1988). She did however, state that a union of the maternal fitness programs and the birthing preparation classes would help to assure the survival of hospital prenatal exercise programs. What is evident however, it that "much work remains to be done to systematically research and establish
CHAPTER 3
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The primary purpose of the study was to provide a historical account of the common prenatal exercise practices from the 1700's to the present for women of the United States. The secondary purposes examined the influencing factors of the changing attitudes toward exercise in pregnancy. More specifically, these factors included the role of women in society and women's participation in sport activities.

Information was gathered from personal communications and a review of the literature, including both primary and secondary sources. The review of the literature was geographically limited to the cities of La Crosse, Wisconsin; Madison, Wisconsin; Rochester, Minnesota; and Bloomington, Indiana.

A review of the literature was presented in four sections: (1) the colonial era, 1750-1835; (2) the victorian era, 1835-1910; (3) early to mid-twentieth century, 1910-1960; and (4) 1960 to present day. In addition, the literature in each section was categorized into three subsections: (1) woman's role in society; (2) sport activities for women; and (3) medical advice during pregnancy.

Conclusions

In past years the "restrictions on activity during pregnancy were
derived more from the cultural and social biases of each era than from scientific investigations" (Artal & Wiswell, 1986, p. 2). For this reason it was necessary to examine woman's role in society and her participation in sporting activities in order to fully understand the recommended prenatal exercise practices throughout the years.

The role of woman in society has changed considerably since the eighteenth century. The colonial woman was cast into the subservient role of wife, mother, and homemaker. In addition, most women labored in agricultural and industrial work. The "ideal" Victorian woman was frail, delicate, submissive, passive, gentle, and most important, outwardly beautiful. However, very few women actually fulfilled this ideology because most did not have the leisure to do so or simply resisted the ideological expectations. At the same time the early suffragettes were fighting for the vote, which was eventually granted them in 1920. A new feminine movement began in the home as well as equal rights in the community. Betty Friedan wrote "The feminine Mystique" in 1963 which prompted women to question their own identities. With the availability of oral contraceptives in the mid-60's and the legalization of abortion in 1973, women were also experiencing a greater reproductive freedom and bodily control.

"Examining women's experience in sport during the various periods of U.S. history is one way to chronicle women's shifting roles in the entire society" (Boutilier & SanGiovanni, 1983, p. 25). The entry of American women into sport occurred primarily at the end of the nineteenth century. At this time physicians were expressing a concern for women's health and they advocated gentle exercise for the promotion
of better health. At the same time the bicycle was becoming very popular and several women joined the new craze. Although greater numbers of women became involved in various sporting activities, it was not until the latter twentieth century that women were accepted into sport. Societal attitudes gradually changed and the Title IX Enactment helped to ensure equal opportunity for female athletes.

The medical advice to pregnant women concerning exercise was greatly influenced by the societal attitudes and accepted practices. Until the latter twentieth century the standard prescription was plenty of fresh air and walking to the point of "light fatigue." Bruser (1968) asked: "And what does fatigue mean?" The recommendations from various physicians were both conflicting and ambiguous. When considering the advice given for walking, one individual may have prescribed a duration of one to two blocks while another may have advised up to six miles. If any sports were allowed usually these included golfing and "light" swimming. Housework was always considered to be an excellent form of exercise for the pregnant woman regardless of the fact that it may have been more strenuous than many sports. Housework was a necessity and a woman's responsibility, therefore it was labeled as a healthful form of exercise.

With increased research and changing attitudes toward women and sport, a different view of prenatal exercise became evident in the latter twentieth century. Prenatal exercise programs were established in hospitals, YWCA's, fitness centers, and other community organizations. A fitness craze developed in the 1970's and as increasing numbers of women became involved in various sport activities
it became natural to continue their exercise routines throughout pregnancy. It was no longer unusual to see a pregnant woman run, bike, or swim. In 1985 the American College of Obstetricians and Gynecologists published their guidelines for exercise in pregnancy. Although the guidelines were very controversial in terms of their applicability to a general population, they represented the first attempt at providing specific exercise guidelines for pregnant women. "The guidelines are an attempt to interpret and apply the available literature. Certainly, much work remains to be done to systematically research and establish normative data and standards for exercise in pregnancy" (Artal & Wiswell, 1986, p. 228).

Recommendations for Further Study

The following recommendations were made for further study:

1. A survey to evaluate the numbers and types of existing prenatal and postpartum exercise programs in hospitals, YWCA's, and other community organizations. Variables to examine could include structure of program, qualifications of instructors, cost of program, number of participants, physician referral and medical clearance, type of exercise, and method of monitoring exercise intensity.

2. A survey of medical and health professionals involved in exercise prescription of pregnant women to evaluate the opinions of the ACOG guidelines for exercise during pregnancy and postpartum.

3. A survey of medical schools to determine the current extent of exercise physiology education.
REFERENCES


Clark, E. H. (1873). Sex and education or a fair chance for the girls


Press.

Mauriceau, F. (1736). *The diseases of women with child, and in child-

McClintock, A. H. (1876). *Smellie's treatise on the theory and practice


Surgery, 35*, 225-223.


O'Neill, W. L. (1971). *Everyone was brave: a history of feminism in

Paret, J. P. (1901, April 6). Exercise for women. *Harper's Bazar, 932-
936*.


Crofts.

Saunders Company.

Richardson, B. W. (1893). On bicycling for women. *Journal of the

Rose, D., Bader, M., & Bader, R. (1956). Catheterization studies of
cardiac hemodynamics in normal pregnant women with reference to left
ventricular work. *American Journal of Obstetrics and Gynecology, 72*,
233-246.


Round table: Sports during pregnancy, other questions explored. *The
Physician and Sportsmedicine, 4*, 82-85.

Ryan, M. P. (1975). *Womanhood in America: from colonial times to the
Schrock, P. Exercise and physical activity during pregnancy. Source Unknown.


White, C. (1773). *A treatise on the management of pregnant and lying-in women, and the means of curing, but more especially of preventing the principal disorders to which they are liable*. London: Edward and Charles Dilly.
