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Premenstrual Symptoms and Academic Stress in Emerging Adulthood Women

Abstract

Premenstrual symptoms are a universal event during a woman's reproductive life but little is known about the experience of emerging adulthood women aged 18-25 years. The purpose of this study was to determine feasibility of daily symptom data collection via an electronic diary and to examine the relationship between premenstrual symptom perception, severity and distress with academic stress. This sample consisted of 50 women with a mean age of 20(\pm .9) years living in campus housing of a private undergraduate rural college. Results determined it is feasible to utilize an electronic diary for daily prospective symptom and academic demand data collection. Surprisingly, in this sample of healthy undergraduate women, there were significantly higher numbers of symptoms perceived (7.16 \pm 3.8 follicular and 6.18 \pm 3.3 luteal, p =.001 and higher distress (.39 \pm .3 follicular and .31 \pm .3 luteal, p =.003) in the follicular phase than in the luteal phase. Academic stress findings indicated mild stress as measured by the Student-life Stress Inventory (Gadzella, 1991) and students overall perceived stress levels fell in the minimal to mild range. The academic demand component of academic stress measured daily frequency and distress associated with assignments, papers, projects/presentation and time studying. Within the follicular phase number of assignments due was significantly correlated to symptom perception and distress (.31, .37, respectively) and the number of projects/presentations due was correlated to symptom distress (.25) at p <.05. There were significant correlations between follicular phase symptom perception and distress, and luteal phase symptom distress with academic demand distress for assignments, papers, projects/presentations and time studying, indicating a relationship between distress components of symptom experience and some components of academic stress. These premier results about the relationship between symptom distress and academic stress warrants further exploration and development of a clearer conceptual definition of academic stress and clear and consistent operationalization of this phenomena.

Keywords

academic stress, emerging adulthood, premenstrual symptoms, symptom distress

Disciplines

Nursing

Comments

- A dissertation submitted to the faculty of the College of Nursing of the University of Arizona in partial fulfillment for the degree of DOCTOR OF PHILOSOPHY
- Dr. Judith Berg, Committee Chairperson
- © 2009 Pamela Lou Hulstein

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PREMENSTRUAL SYMPTOMS AND ACADEMIC STRESS IN EMERGING
ADULTHOOD WOMEN

by

Pamela Lou Hulstein

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A Dissertation Submitted to the Faculty of the

COLLEGE OF NURSING

In Partial Fulfillment of the Requirements
For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College

THE UNIVERSITY OF ARIZONA

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THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

As members of the Dissertation Committee, we certify that we have read the dissertation prepared by Pamela Lou Hulstein entitled Premenstrual Symptoms and Academic Stress and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy

Judith Berg, PhD, RNC, WHNP, FAANP, FAAN Date: April 6, 2009

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Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copies of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

Dissertation Director: Judith Berg, PhD, RNC, WHNP, FAANP, FAAN Date: April 6, 2009

STATEMENT BY AUTHOR

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SIGNED: Pamela Lou Hulstein

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DEDICATION

To my husband, Mike, for his never ending support and encouragement along my educational journey. To my children, Amanda, Andrew, Aaron, Alan and Aimee who never seemed to tire of their mom the student. Each of you has supported me with hugs and words of encouragement that will always be dear to my heart.

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ABSTRACT

Premenstrual symptoms are a universal event during a woman's reproductive life but little is known about the experience of emerging adulthood women aged 18-25 years. The purpose of this study was to determine feasibility of daily symptom data collection via an electronic diary and to examine the relationship between premenstrual symptom perception, severity and distress with academic stress. This sample consisted of 50 women with a mean age of $20(\pm.9)$ years living in campus housing of a private undergraduate rural college. Results determined it is feasible to utilize an electronic diary for daily prospective symptom and academic demand data collection. Surprisingly, in this sample of healthy undergraduate women, there were significantly higher numbers of symptoms perceived (7.16 ± 3.8 follicular and 6.18 ± 3.3 luteal, $p=.001$) and higher distress ($.39\pm .3$ follicular and $.31\pm .3$ luteal, $p=.003$) in the follicular phase than in the luteal phase. Academic stress findings indicated mild stress as measured by the Student-life Stress Inventory (Gadzella, 1991) and students overall perceived stress levels fell in the minimal to mild range. The academic demand component of academic stress measured daily frequency and distress associated with assignments, papers, projects/presentation and time studying. Within the follicular phase number of assignments due was significantly correlated to symptom perception and distress (.31, .37, respectively) and the number of projects/presentations due was correlated to symptom distress (.25) at $p<.05$. There were significant correlations between follicular phase symptom perception and distress, and luteal phase symptom distress with academic demand distress for assignments, papers, projects/presentations and time studying, indicating a relationship

between distress components of symptom experience and some components of academic stress. These premier results about the relationship between symptom distress and academic stress warrants further exploration and development of a clearer conceptual definition of academic stress and clear and consistent operationalization of this phenomena.

CHAPTER 1: INTRODUCTION

Problem Statement

Symptoms experienced by women premenstrually vary, but most experience some symptoms that signal menstruation is approaching. Stress, particularly chronic stress, is known to negatively affect both prevalence and severity of premenstrual symptoms. A functional definition of stress is the number of stressors endorsed (Lazarus, 1994). Chronic stressors have been implicated in the development of certain somatic illnesses and for women the dimension of chronicity has been shown to account for a significant amount of variation in psychological and physical well-being (Burks & Martin, 1985). However, the role of academic stress as a possible chronic stressor for students is not well understood. Academic stress involves multiple stressors particular to students such as academic, financial, time, health related and self-imposed types of stressors. Initial study of the phenomena promises to provide insight to the best method to conduct research about the prevalence and severity of premenstrual symptoms and their possible relationship to academic stress in emerging adulthood women in a rural undergraduate academic setting.

Introduction

Menstruation is typically a universal event during a woman's reproductive life, and up to 90% report perceiving one or more symptoms during the days before menstruation (Campagne & Campagne, 2007). More than 200 premenstrual symptoms have been identified over the last 50 years, which encompass three main factors: negative mood, pain and discomfort, and bloating (Steiner, Haskett, & Carroll, 1980). Nearly all

components of normal functioning for women can be affected by the changes related to phase of the menstrual cycle in either a negative or a positive way (Campagne & Campagne, 2007). Prevalence ranges from reports that suggest 5-20% have moderate to severe clinically relevant premenstrual complaints and up to 75% of all women of fertile age may experience symptoms of premenstrual syndrome (Locke, 2003; Yonkers, O'Brian, & Eriksson, 2008). Premenstrual symptoms associated with premenstrual syndrome (PMS) may impair the overall physical health of a woman as well as interpersonal relationships, daily routine, and work productivity (Dean & Borenstein, 2004). Premenstrual symptoms are the cycle changes that a woman perceives as troublesome or problematic which escalate before menstruation, whereas PMS is a diagnostic term used for the cyclic recurrence of psychological and and/or physical symptoms within the luteal phase of menstrual cycle (Davis, 2000). The etiology of the premenstrual experience has progressed from a supposed hormonal imbalance (Rubinow & Schmidt, 1992) to psychological (Bailey & Cohen, 1999) to a more recent multi-causal origin (Campagne & Campagne, 2007).

Premenstrual symptoms have been associated with perceived stress, whereby perceived stress was the strongest predictor of Premenstrual Syndrome (Deuster, Adera, & South-Paul, 1999) and had a significant positive correlation to all premenstrual symptom groups (Woods, Lentz, Mitchell, Shaver, & Heitkemper, 1998). Perceived stress in the college/university setting may take the form of academic stress. Negative health outcomes, including depression and physical illness (MacGeorge, Samter, & Gillihan, 2005) have been associated with academic stress. In addition women may

display greater behavioral and physiological reactions to academic stressors (Misra & Castillo, 2004). Any possible link between premenstrual symptoms and academic stress has not been investigated. Yet stress that had an academic impact was identified by student respondents (n=20,507) as the leading impediment to academic performance for college students. The category stress (32.9%) out ranked other impediments to learning such as, sleep difficulties (25.4%), cold/flu/sore throat (24.8%), concern for friend or family (18.1%) and depression/anxiety disorders (15.5%) (ACHA, 2007). Of the 8.8 million women aged 18-23 years old (NCES, 2003) attending undergraduate colleges, 8-10% will experience multiple premenstrual symptoms to a severe degree while 25-40% of women overall report mild to moderate perimenstrual symptoms (Woods, Most, & Dery, 1982). In addition it has been well established that approximately 60% of premenstrual syndrome occurs in women aged 15-30, lessening thereafter (Abraham, 1982).

The focus of this research was to investigate emerging adulthood women in a rural undergraduate college setting who experience premenstrual symptoms. Symptom severity and perception were investigated along with academic stress to determine the nature of the symptoms and their relationship to academic stress. Acknowledgement of their rural college context was considered, although it was not a prominent feature of this study.

Definition of Terms

Understanding the purpose of this study requires clarification of common terminology associated with this topic. The following list of terms was used throughout:

Academic Demands: Summation of the number of exams, projects or papers due for student during a specified period of time (Weidner, Kohlmann, Dotzauer, & Burns, 1996).

Academic Stress: Stressors affecting students that are categorized as academic, financial, time or health related and self-imposed (Goodman, 1993).

Emerging Adulthood: Individuals in an industrialized country between the ages of 18-25 years. It is a distinct life course in terms of demographics, subjectivity and identity exploration (Arnett, 2000).

Follicular Phase of Menstrual Cycle: The follicular phase spans the length of time between the first day of menstruation and the moment of ovulation.

Luteal Phase of Menstrual Cycle: The time period beginning with the day after ovulation to the first day of the next menstrual period, generally consistent from cycle to cycle and averages about 14 days for most women.

Molimina: The set of normal experiences that tells a woman that her period is coming and that she has ovulated (CeMCOR, 2008).

Perimenstrual Phase or Perimenstruum: The days after ovulation through the first 1-3 days of menstruation.

Premenstrual Dysphoric Disorder (PMDD): A diagnostic term for a condition marked by severe depression, irritability, and tension before menstruation. These symptoms are more severe than those seen with premenstrual syndrome (Lindberg, 2008).

Premenstrual Symptoms: Cyclic changes that a woman perceives as troublesome, or problematic and that escalate before menstruation and subside after menstruation begins (Woods, Mitchell, & Lentz, 1999).

Premenstrual Syndrome (PMS): A diagnostic term defined as the cyclic recurrence of psychological (affective) symptoms and/or physical (somatic) symptoms restricted to the luteal phase of a woman's menstrual cycle. It includes impairment/dysfunction in social or work-related performance in the symptomatic woman (Davis, 2000).

Background

Premenstrual Symptoms

By early 1990 it became clear one of the striking characteristics of perimenstrual symptomatology was the variability in symptoms women experience and in symptom prevalence (Woods, Taylor, Lentz, & Mitchell, 1992). Therefore analysis of individual symptom patterns as well as aggregate symptoms was necessary to understand symptom phenomena in the premenstrual cycle phase (Taylor, 1994). Taylor (1999) demonstrated that women with symptoms of premenstrual syndrome experienced resultant deterioration of interpersonal relationships and personal health and function. This study looked at prospective symptom patterns over time to understand the phenomena of premenstrual symptoms in a sample of emerging adulthood women.

Premenstrual Symptoms and Stress

Generally more stressful life events, or stressful life context, were related to perimenstrual symptoms (Woods, Most, & Longenecker, 1985). Stress viewed as a chronic phenomena has been found to contribute a significant amount of variance in

perimenstrual symptoms and higher variance in general health scores (Gannon, Luchetta, Pardie, & Rhodes, 1989). Perceived stress has been implicated as influencing the premenstrual symptom experience. Use of the Cohen Perceived Stress Scale indicated perceived stress to be the one of the primary factors associated with premenstrual syndrome; ahead of physical activity and dietary patterns (Deuster, Adera, & South-Paul, 1999). A prospective subjective global perceived stress measure was correlated across three types of premenstrual symptom groups (Woods, Lentz, Mitchell, Shaver, & Heitkemper, 1998). The relationship between stressful life context and/or perceived types of stress with the premenstrual symptom experience had not been studied specifically in an academic setting with an emerging adulthood population.

Academic Stress

Anecdotally women residing in a residential academic setting reported increased premenstrual symptoms during times of increased academic demands. Academic demand is a component of a broader phenomena identified as academic stress (Weidner, Kohlmann, Dotzauer, & Burns, 1996). Previous research had not investigated the relationship between premenstrual symptom experience and academic stress for emerging adulthood women in the college context. Academic stress was a factor in educational self-efficacy for 549 first year college undergraduate (Rayle, Arredondo, & Kurpius, 2005). For these women educational self-efficacy and self-esteem were negatively related to academic stress. Academic stress, viewed as a chronic stress due to the nature of academic demands; was associated with negative health outcomes of depression and physical illness (MacGeorge, Samter, & Gillihan, 2005). It is therefore conceived that

academic stress experienced by female college students may be implicated as negatively affecting the premenstrual symptom experience. The uniqueness of the dynamic between academic setting and individual perception, severity and distress of the symptoms experiences warrants investigation.

Emerging Adulthood

Female students enrolled in college may be typified as part of an important time in human development known as emerging adulthood. These women, between the ages of 18 and 25, are in a distinct life course related to demographics, subjectivity and identity exploration (Arnett, 2000). In industrialized countries, such as the United States, people at this point in their life obtain a level of education and training that will provide the foundation for later occupational achievements. Women at this juncture of their human development were the focus of this study.

Purpose of Study

The purpose of this study was to investigate the perception and severity of premenstrual symptoms in emerging adulthood women who reside in a rural college setting. The overall goal of this program of research was to improve the health of women residing in college settings by increasing understanding of premenstrual symptoms and academic stress for this emerging adulthood population.

Research Aims

The following aims were the focus of this study.

Specific Aim: To determine feasibility of daily symptom data collection via an electronic symptom diary across one complete menstrual cycle.

Exploratory Aim 1: To describe follicular and luteal phase symptom perception, severity and distress in emerging adulthood women located in a rural undergraduate college setting.

Exploratory Aim 2: To describe academic stress (student-life stress, and number of academic demands) in this sample.

Exploratory Aim 3: To explore the relationship between follicular and luteal phase symptom perception, severity and distress with academic demand and academic demand distress among emerging adulthood women in the rural college context.

Significance to Women's Health and to Nursing

Premenstrual symptom research has provided solid evidence as to general prevalence, severity and patterns of symptoms. The relationship between symptom experience and stressful life context has been explored. However, an important omission from extant literature is identification and description of premenstrual symptoms in narrower age ranges of women, such as 18-25 year old emerging adulthood women. In addition there is no published data about the relationship between academic stress and premenstrual symptoms. This group of women is severely underrepresented in research about premenstrual symptoms.

As these women navigate their emerging adulthood roles, premenstrual symptoms and academic stress may affect their ability to achieve their goals. The ability to complete the rigors required of earning an academic degree may be hindered by premenstrual symptom experience and academic stress. A unique setting and sample were involved

which focused on the emerging adulthood population within the context of a residential academic community.

Nurses and advanced practitioners are frequently the first line of contact with this population via a campus health clinic. These health care providers are called upon to educate and provide resources for women on campus, thus could contribute to early identification and intervention for women negatively impacted by their premenstrual symptom experience and academic stress.

An additional unique aspect of this study was to gather prospective daily symptom and academic demand data via an electronic format while investigating premenstrual symptoms in concert with academic stress. Feasibility determination of an electronic symptom data collection method could be foundational to future research with this population.

Summary

Chapter One identified premenstrual symptoms and their association with stress. Academic stress, a phenomena unique to the college context, is posited to negatively affect premenstrual symptom experience in emerging adulthood women. Background information provided an overview of premenstrual symptoms and stress, academic stress and the emerging adulthood woman. The purpose of this study and related exploratory research aims were stated, as well as the study's significance to women's health and to nursing.

In Chapter Two, underpinnings of Aday's Framework for Studying Vulnerable Populations and its application to research aims are presented. A literature review of

research related to premenstrual symptoms, premenstrual symptoms and stress, and academic stress is presented. Research was reviewed and critiqued to present extant knowledge related to premenstrual symptoms and academic stress. The final section summarizes theoretical applications and knowledge gaps that supported the aims of this study.

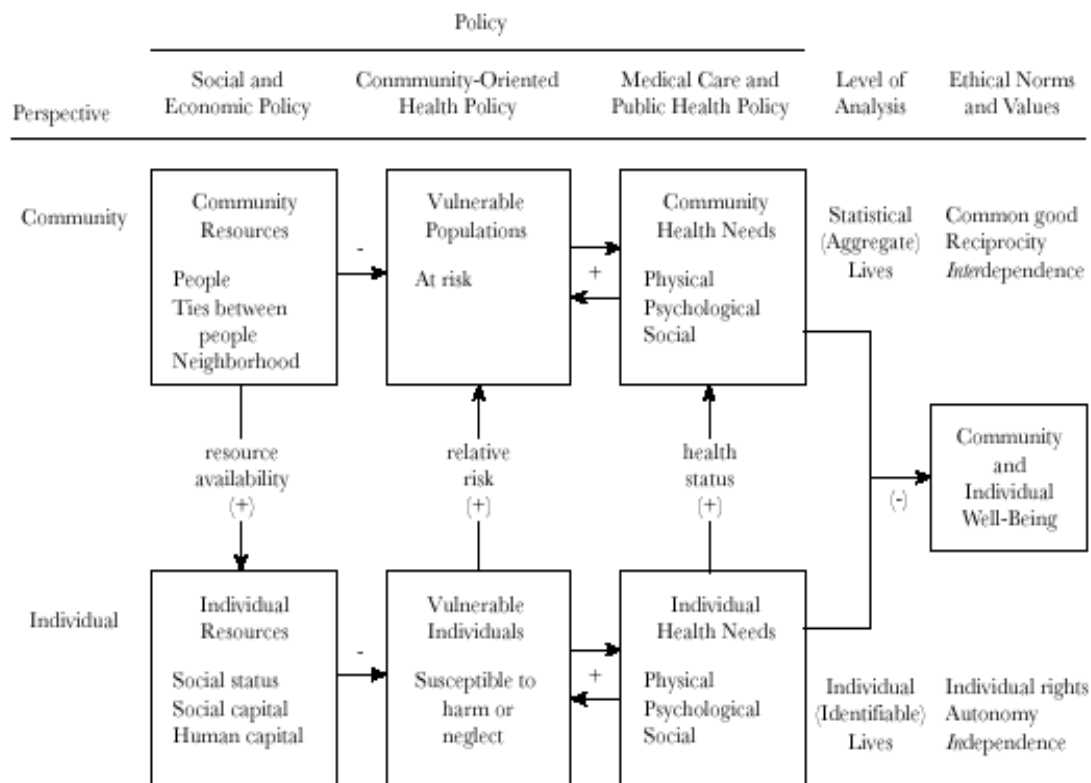
CHAPTER 2: THEORETICAL FRAMEWORK/REVIEW OF THE LITERATURE

Theoretical Framework

Aday's Framework for Studying Vulnerable Populations (Aday, 2001) provided theoretical scaffolding for this study along with recent discourse to support the distinct time in human development referred to as emerging adulthood. Additional theoretical background includes acknowledgement of the concept of context and the campus community. The following section presented the theoretical framework which undergirded this research and its applicability to the study. This is followed by support for emerging adulthood as a distinct time in human development and for the campus community as a unique context.

Aday's Framework

Vulnerable populations share characteristics in common such as: increased risk of poor physical, psychological and or social health (Aday, 2001). These social groups also experience health disparities as a result of a lack of resources and/or increased exposure to risk (Flaskerud et al., 2002). Women who attend institutions of higher learning will likely experience premenstrual symptoms and the severity or distress of this symptom experience could increase their vulnerability leading to deleterious effects on academic success. Aday (Aday, Quill, & Reyes-Gibby, 2001) further asserts that as member of the human community everyone is potentially vulnerable. Aday's Framework for Studying Vulnerable Populations depicts interrelationships between resources, relative risk and health Status between community and individual levels within a vulnerable population. See figure 1 below.



Note: A plus sign indicates a direct relationship (the likelihood of outcomes increases as the predictor increases). A minus sign indicates an inverse relationship (the likelihood of outcomes decreases as the predictor increases).

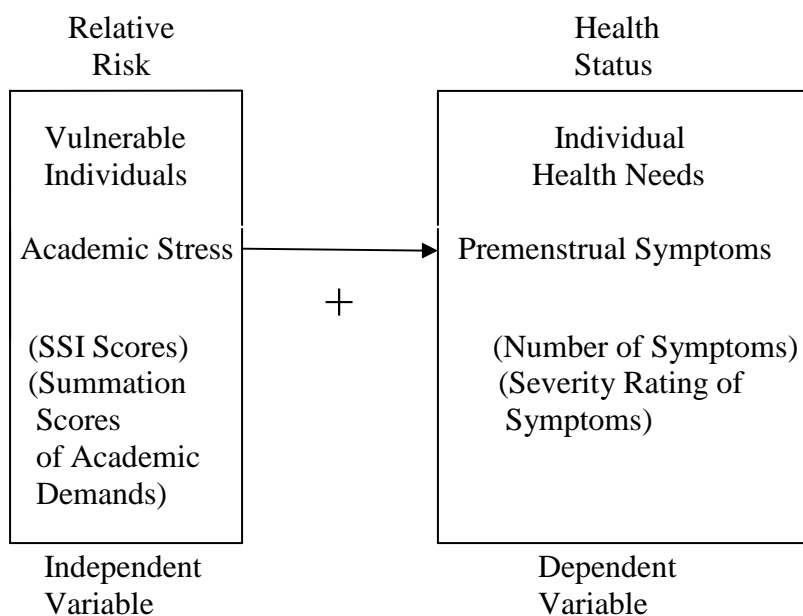
From Aday, L. A. (2001). *At risk in America: The health and health care needs of vulnerable populations in the United States* (2nd ed.). San Francisco, California: Jossey-Bass A Wiley Company.

FIGURE 1. Aday's Framework for Studying Vulnerable Populations

Background and Influences

The purpose of Aday's framework for studying the health and health care of vulnerable populations was to examine ethical, conceptual, and political contributions of the community (macro) and the individual (micro) perspectives and their interrelationships. In short the framework assisted in studying the origin and consequences of vulnerability to poor health (Aday, 1994). This study was concerned

with premenstrual symptom prevalence, severity and distress; and academic stress from an individual (micro) perspective. Academic stress was theorized to increase an individual's vulnerability which may increase relative risk. The increased relative risk was theorized to affect premenstrual symptoms negatively, which according to the framework affects the health status of an individual. This study was concerned with the relationship between premenstrual symptoms and academic stress at the level of the individual as depicted in figure 2.



Academic stress can lead to vulnerability which can increase relative risk for an individual.

Premenstrual symptom experience is an individual health need which is one aspect of health status.

Academic stress was theorized to have a direct positive relationship with premenstrual symptoms whereby increased academic stress would be correlated to increased symptom perception, severity, and distress.

FIGURE 2. Application of Theoretical Perspective for This Study

Concepts and Definitions

A number of concepts were consistently used within Aday's framework. A concise synopsis of the central framework concepts of resource availability, relative risk and health status; is provided in Table 1.

TABLE 1. Central Concepts Within Aday's Framework for Studying Vulnerable Populations

Concept	Description	Applicability to Study
Resource Availability	Originates at the community level. The availability and distribution of community resources. Individual risk varies with available resources	A campus community setting has specific resources related to student: age, gender, race, ethnicity; ties between friends and campus community
Relative Risk	Indicates differences in vulnerability when negative or stressful life events Occur which hurts some people more than others	Emerging adulthood women attending college may have differences in vulnerability related to their developmental stage of emerging adulthood and experience of academic stress
Health Status	Health is along a continuum with dimensions related to Magnitude of seriousness: 1) Based on clinician's judgment 2) The patient's perception, and 3) Observed or reported levels of functioning	Premenstrual symptom perception, severity and distress is based on the individual's perception, thereby illuminating the magnitude of seriousness of the health issue from this dimension

Other conceptual aspects within the framework included: risk factors, community characteristics, individual characteristics, equity, and ethical norms and values. Concepts central to the framework were presented in the section following.

Resource Availability

Resource availability originated from the community (macro) level and is the availability and distribution of community resources. More specifically resources at the community level included the age, gender, race and ethnicity of the people; nature of the ties between family members, friends, and neighbors; and finally the schools, jobs, incomes and housing that characterize neighborhoods in which people reside (Aday, 1994, 2001). Although resource availability is a central concept within the framework, it was not assessed as part of the current study.

Relative Risk

Relative risk was theorized as the ratio of the risk of poor health among groups that are exposed to risk factors versus those groups that were not exposed to the same risk factors. The notion of relative risk included the idea of “differences in vulnerability” where negative or stressful life events-unemployment, divorce, or death of a loved one-hurt some people more than others (Aday, 2001). The concept of risk within the framework suggested there is always a chance of an adverse health-related outcome and everyone is potentially at risk of poor physical, psychological, and social health at different time in their lives (Aday, 1994). For this study academic stress was theorized to increase vulnerability in an individual which may increase relative risk.

Health Status

Health status, the third central concept with Aday’s framework, revolved around a definition of health viewed as “a state of complete *physical, mental, and social* well-

being” (World Health Organization, 1948). Health can be measured along a continuum of seriousness (Aday, 2001) with good health at the positive end and defined by numerous indicators of physical, mental and social health and death at the opposite end of the continuum. Various dimensions were inherent with magnitude of seriousness; these dimensions could be defined and measured in the following ways: 1) based on clinicians’ judgment, 2) the patients’ perceptions or 3) observed or reported levels of functioning. For this population of emerging adulthood women health status was conceptualized as being measured by individual perception of premenstrual symptoms and academic demand as self-reported in a daily electronic diary.

Community and Individual Levels

The framework’s three central concepts (resource availability, relative risk and health status) negotiate between the community and individual levels. This study looked at one relationship between vulnerable individuals and individual health needs. The study sought to gather new knowledge at the individual level about academic stress and the relationship it had to individual health needs, namely premenstrual symptom perception, severity and distress.

Application of Aday’s Framework

For the phenomena of interest, college women experiencing premenstrual symptoms; vulnerability was evident in terms of the developmental transitions occurring while emerging into adulthood (Creasey, 2002b) and the experience of academic stress. Health risks increased for these women when living in community settings, separated from traditional support systems, frequent financial burdens, and poor life style choices

(alcohol, sleep deprivation, sexual activities, etc.) (Arnett, 2000). Academic stress was an additional potential burden these women faced (ACHA, 2006). Of particular interest for this study were those women who experience increased academic stress that would disproportionately hinder their ability to manage premenstrual symptoms.

Vulnerability for these women was viewed as a dynamic process according to their changing/emerging circumstances while residing in a college community. In addition the opportunity for positive or negative influence on their immediate and long term health was apparent. Aday's framework was a good fit as a vulnerable population was viewed as having a contextual component wherein vulnerability is rooted in the "bonds of communities" (Aday, 2001, p. 1). The new knowledge about individual health needs from symptom experiences and identification of the relationship with academic stress can inform future research about a college's community level health needs. This in turn could aid in resource allocation and policy decisions that affect female campus community dwellers.

Emerging Adulthood

As a distinct and important time in human development, emerging adulthood referred to individuals between the ages of 18 and 25 years old (Arnett, 2000). Within industrialized countries emerging adulthood is a distinct life course in terms of demographics, subjectivity and identity exploration. It is during these years that young people in industrialized countries obtain a level of education and training that provides the foundation for later occupational achievements. The historical timing of marriage and parenthood in recent decades has been delayed, allowing for a period of emerging

adulthood, more typical for young people in industrialized countries. For many in this developmental time frequent changes occur as various possibilities in love, work, and worldviews are explored. As a time of transition (Creasey, 2002a) and characterized by change (Arnett, 2000) the emerging adult encompasses the traditional time period when initial college experiences occur.

The time of emerging adulthood is neither adolescence nor young adulthood. Contemporary scholars identified the adolescent period beginning at age 10 or 11 and ended by age 18-19. Adolescents typically live with their parents, experience changes of puberty, attend secondary school and are part of a school-based peer culture. These types of experiences do not remain normative after age 18 (Arnett, 2000). Young adulthood implies that adulthood has been reached. Interestingly people in the 18-25 year old age range did not see themselves as having reached adulthood. Adulthood moreover signifies accepting responsibility for one's self, making independent decisions, and becoming financially independent.

A key feature of emerging adulthood is the opportunity for identity exploration. Identity formation is gradually moving toward making enduring decisions. For the emerging adult exploration in love becomes more intimate and serious, taking place as couples rather than as shared recreation such as parties and dances. An implicit question emerges that given the kind of person the emerging adult is, what kind of person they wish to partner with through life (Arnett, 2000).

Similar events occurred for the emerging adult in regard to work. The tentative and transient explorations of adolescence became more serious and focused. While most

adolescents find employment in service jobs, the emerging adult's work is focused on preparation for adult work roles. Work related experiences during this emerging time lays the groundwork for jobs the individual will have through adulthood (Arnett, 2000).

In terms of worldview, college offers a prime opportunity for individuals to examine and explore worldviews that are new to them. Whether attending college or not, this period of life includes the re-examination of the beliefs an individual has learned from his/her family and the formulation of a set of beliefs that is the product of their own independent reflection. This worldview exploration may lead to the rejection of childhood beliefs without the construction of something more compelling in its place (Arnett & Jensen, 1999).

Risk behavior is well documented in the adolescent; however, less research is available for emerging adulthood. There was a prevalence of several types of risk behavior that peak in emerging adulthood, namely unprotected sex, substance use, and risky driving behaviors (Arnett, 1992). These types of risk behavior can be understood as part of their identity explorations in an attempt to obtain a wide range of experiences before settling down into the roles of adult life. Another aspect of this risk behavior was its sensation seeking or desire for novel and intense experiences (Arnett, 2000). For emerging adults there are less parental supervisions and role responsibility creating an opportunity to pursue novel and intense experiences more readily. While less parental supervision may be implicated in opportunity for risk behavior, family support seems to be a key to facilitating the emerging adult's emotional adjustment to college. In addition nearly 80 percent of college freshmen attended college in their home state with 20

percent citing the desire to live near home as rationale for choosing the college they attend (Adams & Berzonsky, 2006).

Context and the Campus Community

While a campus community in a rural setting was not an emphasis within the study, it was a unique context for the emerging adulthood women. Community context is an emerging field of inquiry wherein measurements are in development that are appropriate for a particular society and historical period that adequately reflect the ways in which human needs are met in a particular place (Hillemeier, Lynch, Harper, & Casper, 2003). Acknowledgement of the unique context of rural residential campus living provided the backdrop from which to view this population of emerging adulthood women.

Contextual influences on health may first be conceptualized by considering what humans need in order to live a healthy life within a given socio-economic and socio-cultural context. The familiar Maslow's hierarchy beginning with air, water, food and culminating in personal relationships and involvement in group activities provides one such framework (Macintyre, Ellaway, & Cummins, 2002). In addition measures of context should be appropriate for a particular society and historical period to adequately reflect the ways in which these human needs are met in a particular place. The theoretical base from which to conceptualize contextual characteristics of a community of interest continues to be developed. This study with a population of campus community dwelling women acknowledged the likelihood of a relationship between contextual influences and health.

Review of the Literature

Three overarching categories emerged from within the literature in regard to premenstrual symptoms and academic stress in undergraduate emerging adulthood women: 1) premenstrual symptoms, 2) premenstrual symptoms and stress, and 3) academic stress.

Early Premenstrual Symptom Research

Information on symptoms associated with the menstrual cycle had historically been gathered via retrospective self-reports utilizing a variety of instruments (Brooks, Ruble, & Clark, 1977; Woods, Most, & Dery, 1982). This early work focused on prevalence and type of perimenstrual symptoms along with demographic variables. By 1992 it became clear one of the striking characteristics of perimenstrual symptomatology was its variability in symptoms women experience and in symptom prevalence. Perimenstrual symptoms did not “fit” into just one perimenstrual pattern such as premenstrual syndrome. Until the research of Woods and colleagues emerged, all perimenstrual symptoms were typically studied as discrete syndromes rather than “symptoms” that individual women experienced (Woods, Taylor, Lentz, & Mitchell, 1992). This was an important distinction in the literature as it framed the focus and methodology of later work.

A landmark report by Mitchell et al (Mitchell, Woods, & Lentz, 1994) identified three perimenstrual symptom patterns. Three different symptom severity patterns were typified from 30 possible symptoms severity patterns in a population of 142 regularly menstruating women, between the ages of 18-45, via retrospective self-report. Women on

oral contraceptives were excluded to avoid confounding sample results with effects of exogenous hormones. The typology of severity patterns were identified via two-way discriminate analysis and included: premenstrual syndrome (PMS), premenstrual magnification (PMM) and low symptom (LS) (Woods, N. Lentz, M., Mitchell, E., shaver, J., & Heitkemper, M., 1998). Interestingly, the majority of the women enrolled exhibited a LS pattern (n=91) and had less psychological distress and less years of education than women in the PMS pattern (n=26). In addition women with PMM patterns were found to have higher perceived stress in their lives than women with PMS patterns and more negative effects from stressful life events and were younger than women with a LS pattern. Clearly differentiation of premenstrual patterns is an important aspect for menstrual symptoms researchers working to inform diagnosis and treatment of women with bothersome premenstrual symptoms.

Symptoms are experienced by individual women with variations across time, therefore analysis of individual symptom patterns is critical to understanding symptom phenomena such as perimenstrual symptoms (Taylor, 1994). Taylor's research with five women experiencing severe premenstrual syndrome via interrupted time-series design provided data on treatment with use of a multi-modal approach to premenstrual symptoms. Baseline prospective premenstrual symptom data supported the identification of three perimenstrual patterns: classic premenstrual syndrome, premenstrual magnification, and a social week pattern. Here is further evidence that premenstrual symptoms cannot be relegated to a discrete aggregate category, such as premenstrual syndrome, but warrant exploration from and individual level of analysis.

The research specifically aimed at identifying symptoms of the premenstrual experience has been limited in contrast to the vast amounts of research literature in the public domain about premenstrual syndrome as a discrete category for multiple symptoms. Sample sizes used were relatively small, however appropriate to the statistical analyses utilized as multiple data points were gathered for individual women. Finally the age range of women included in the previously mentioned research ranged from 18 to 45 years, decreasing the ability to apply research findings to smaller age ranged categories.

Recent Premenstrual Symptom Research

More recent premenstrual symptom research focused on cognitive functioning and premenstrual syndrome symptomatology (Spangenberg & Venter, 2003). One study found assessment of subjective symptomatology was high and 38 participants, aged 20-24 years, performed significantly more poorly premenstrually than postmenstrually with regard to the cognitive functions of visual perception ($p=0.000$), visual memory ($p=0.000$), immediate auditory recall ($p=0.026$), working memory ($p=0.000$), cognitive flexibility ($p=0.000$), planning ability ($p=0.000$) and integration of cognitive responses. The participants self-identified themselves as having severe PMS. This was significant as it supported the somewhat controversial body of research that reported deterioration of cognitive functions during the premenstrual phase (Boyle, 1997; Brugger, Millicevic, Regard, & Cook, 1993; Resnick, Perry, Parry, Mostofi, & Udell, 1998), and other reports indicating no cognitive deterioration during the premenstrual phase (Gordon & Lee, 1993; Richardson, 1991; Walker, 1997). While the Spangenberg and Venter (2003) study

adds to the body of research on premenstrual symptoms it fell short in its use of prospectively gathered symptom data for individual women.

Emergence of Psychosocial Premenstrual Symptom Research

Menstrual-related problems and psychological distress (Strine, Chapman, & Ahluwalia, 2005) was studied in women aged 18-55 and researchers considered a wide range of menstrual related problems including PMS. The large multi-state sample (n=11,933) self-reported PMS retrospectively when interviewed via telephone during the National Health Interview Survey (NHIS). The study provided data that menstrual-related problems were prevalent among women of reproductive age, are associated with substantial psychological distress and suggested that menstrual-related problems are associated with differences in social and occupational functioning. However, it did not determine severity or frequency of symptoms, and was unable to determine if the psychological distress and adverse health behaviors were related to dysmenorrhea or premenstrual symptoms.

Psychosocial factors, such as perfectionism, need for approval, timidity, and social support from key individual; were explored in relation to premenstrual symptoms (Haywood, Slade, & King, 2007). Premenstrual symptoms were assessed with daily ratings for 63 days via the Calendar of Premenstrual Experiences and a questionnaire to assess psychological factors. This sample of 154 non-treatment seeking women, age 20-43, reported higher levels of psychological than physical symptoms. Perfectionism was positively associated with physical premenstrual distress. Perceived low levels of social support from a participant's mother were associated with higher levels both physical and

psychological premenstrual distress. Perceived support from the participant's partner was not significantly associated with either psychological or physiological premenstrual symptoms. This latter finding was a unique contribution to premenstrual symptom assessment as previous research had not considered the role of the woman's partner in premenstrual symptoms.

Age Specific Premenstrual Symptom Research

A small body of research focused on adolescents, age 13-18, and premenstrual syndrome. Vichnin et al provided support that PMS is common in adolescence with 31% of 94 participants meeting criteria for PMS. Most severe symptoms reported included mood swings, anxiety, and irritability. The greatest impairment for this sample of women was in the home/family domain (Vichnin, Freeman, Lin, Hillman, & Bui, 2006). However the report of premenstrual symptoms was gathered retrospectively. A prospective approach would have assisted to confirm the PMS criteria and further corroborate symptom findings. In addition respondents were not screened for other possible diagnoses for their reported PMS symptoms. There were no studies that focused exclusively on premenstrual symptom perception and severity in emerging adulthood women, and this study provided initial data for this age category of women.

Premenstrual Symptoms and Stress

Research since the 1980s has demonstrated that premenstrual syndrome is associated with varying types of stress (Deuster, Adera, & South-Paul, 1999; Gannon, Luchetta, Pardie, & Rhodes, 1989; Woods, Dery, & Most, 1982). In particular, Woods et al (Woods, Dery, & Most, 1982) considered stressful social context and the experience of

perimenstrual symptoms in a group community sample age 18-35. Findings suggested that stressful life events are related to perimenstrual symptoms, but that the relationship is in part due to the influence of health-related events. A later report found that a generally more stressful life context was more influential in the experience of premenstrual symptoms than episodes of stressful experiences (Woods, Most, & Longenecker, 1985). Gannon et al (Gannon, Luchetta, Pardie, & Rhodes, 1989) were concerned with the relationship between patterns of stress and selected lifestyle variables and perimenstrual symptoms. For this sample of 211 women, between the ages of 18 and 39, stress accounted for a significant amount of the variance in perimenstrual symptoms and an even greater amount of variance in general health scores.

This body of literature supports research aimed at illuminating stressful life context variables that could potentially be influential on perimenstrual symptoms as well as the perceived student-life stress of women attending an undergraduate college. One such stressful life context may be the academic stress experienced by women enrolled in undergraduate institutions.

Perceived Stress and Premenstrual Symptoms

Duester et al (1999) found that in a large population based sample, 874 women age 18-44; perceived stress (Cohen Perceives Stress Scale) was the strongest predictor of PMS after controlling for a variety of biological, social and behavioral factors. Additional research (Woods, Lentz, Mitchell, Shaver, & Heitkemper, 1998) with a sample of 522 women investigated perceived stress, epinephrine, norepinephrine, cortisol, and premenstrual symptoms. Differences between low premenstrual symptom pattern,

premenstrual syndrome pattern and premenstrual magnification symptom patterns were analyzed in lieu of an aggregate symptom analysis. Perceived stress was significantly positively correlated across all symptom groups, suggesting a relationship that is distributed broadly among women regardless of symptom pattern. When intra-individual analyses were completed, there were significant cross-correlations between perceived stress and the stress arousal indicators when stress hormones were assayed from urine sample obtained purposefully in the late afternoon in order to reflect the consequences of stressors occurring during the day.

While it is reasonably clear that perceived stress negatively impacts premenstrual symptoms, evidence to support the identification of the type of stress that impacts premenstrual symptoms remains sporadic. Academic stress and its relationship to premenstrual symptoms had not been reported in the extant literature. Therefore a study aimed at describing the relationship between premenstrual symptoms and academic stress, namely perceived student-life stress and academic demands; provided new knowledge to begin to fill this gap in research.

Premenstrual Symptoms and Cycle Phase

While the link between stress and perimenstrual symptoms is not fully understood, there is evidence that marked differences in stress response occur not only according to sex, but with the phase of the menstrual cycle (Kajantie & Phillips, 2006). This recent, extensive review was concerned with providing a systematic and comprehensive description of human studies assessing how sex and hormonal status affect the hypothalamic-pituitary-adrenal axis and autonomic nervous system

responsiveness to acute psychological stressors. Research which used standardized stress protocols brought to light considerable variation between menstrual cycle phases, with enhanced adrenal sensitivity in the luteal phase. While studies in this review showed clear differences between cycle phases and stress response, others have shown no difference in response. From a methodological point of view, the review indicated the importance of taking into account the menstrual phase of subjects when contemplating study design to assist in explaining why some studies show no difference in stress responsiveness according to sex.

Literature readily supported a connection between negative effects of stress on premenstrual symptoms. Stressful life context and perceived stress are worthy avenues of inquiry for premenstrual symptom research. Menstrual cycle phase and individual analysis of symptoms patterns are crucial to describing any relationship between a stressor, such as academic stress and premenstrual symptom, perception and severity, in a population of emerging adulthood women in a college setting. This study considered premenstrual cycle phase symptoms and prospectively recorded perceived academic stress recorded as academic demand frequency and distress. In addition a baseline of student life perceived stressors and reactions to stressors were measured to provide additional data as to the nature of the relationship between premenstrual symptoms and academic stress for a population of women who resided in a college setting.

Academic Stress

Currently the author has not identified any body of research investigating premenstrual symptoms and their relationship to academic stress in the college/university

setting. Perceived stress was the leading impediment to academic performance for a sample of 54, 111 college students in 71 schools as it out ranked other impediments to learning such as cold/flu/sore throat, sleep difficulties, concern for friend or family, and depression/anxiety disorders (ACHA, 2006). Clearly academic stress is a prominent occurrence in this population encompassing 61.2% female and 34.7% male students. Previous research investigating academic stress utilized a variety of instruments to measure academic stress and provided a rich groundwork identifying sources of stress among college students. At the same time there has not emerged specific instruments used as a measure of academic stress and the concept of academic stress is not used consistently from one research report to another. Simple recording of academic tasks (number of papers, exams, presentations due in a specified time period) to more sophisticated measurement of perception and response to student life stressors have been used to measure academic stress.

Academic Stress Predictors

In 2005, Dusselier et al, reported that college women experienced greater stress than male student counterparts (Dusselier, Dunn, Wang, Shelley, & Whalen, 2005) who were living in a college residential setting. Significant predictors of stress included: frequency of experiencing chronic illness, depression, anxiety disorder, seasonal affective disorder, mononucleosis, and sleep difficulties. In addition to these health predictors, conflict and a satisfactory relationship with roommate, as well as conflict with a faculty or staff members were also significant predictors of stress. This research supports approaching academic stress as a contextual phenomena depicted by multiple predictors.

Perception of Academic Stress

Academic stress was considered a possible predictor of educational self-efficacy among a sample of 549 female undergraduates. Perceived academic stress was measured via the College Stress Scale (CSS). The more these women and their families valued education, the higher their overall levels of self-esteem, the greater their levels of self-efficacy and the lower their levels of academic stress. A sample limitation within the study is it consisted of only first semester female undergraduate students. However this research added to the understanding of female undergraduate self-efficacy in which academic stress is a factor (Rayle, Arredondo, & Kurpius, 2005). This body of work and that of Dusselier and colleagues (2005) provides support for further research about the predictors of academic stress as well as perceived academic stress.

Health Outcomes and Academic Stress

The concern that academic stress is associated with a variety of negative health outcomes, including depression and physical illness prompted researchers to examine the role of supportive communication as a buffer between academic stress and health (MacGeorge, Samter, & Gillihan, 2005). The view that academic stress was a chronic stress for students undergirded the study design in which 516 females participated. Academic stress was positively associated with symptoms of depression and physical illness. In addition, findings indicated the association between academic stress and depression was decreased as supportive communication (informational and emotional) increased. This positive association between academic stress and symptoms of physical illness supports a line of inquiry in which academic stress may be positively associated

with increased perception and severity of premenstrual symptoms in women residing in settings where academic stress is a potential predominant stressor.

Other academic stress research has focused on a comparison of academic stressors and reactions to stressors between American and international students (Misra & Castillo, 2004). American participants reported a statistically significant higher level of academic stress from self-imposed stress. An interesting finding included differences between men and women after controlling for age. Male participants reported more stress due to conflict, while women displayed greater behavioral and physiological reactions to academic stressors. This latter finding provides evidence that academic stress could be a factor influencing a woman's premenstrual symptoms. The literature in this area provided substantial evidence that academic stress is involved in a dynamic relationship between the person and the environment and the individual's perception and response to academic stressors.

Summary

Chapter Two identified Aday's Framework for studying vulnerable populations as a good theoretical fit in which premenstrual symptoms and academic stress are individual level health needs affecting health status and in turn community health needs. This study focused on one level of the framework, namely individual health needs. Study exploratory aims were accomplished from data gathered at the individual level about premenstrual symptoms and academic stress from a community of residential undergraduate female students.

Literature reviewed and critiqued identified the need to approach menstrual symptom research from an individual level to determine symptoms patterns. Inherent in this was the need to record symptoms prospectively in terms of perception, severity and distress. In addition there was a gap in the literature for data on emerging adulthood women and premenstrual symptoms. There also was a gap in the literature concerned with premenstrual symptoms and stress, namely the stressful life context of emerging adulthood women with premenstrual symptoms in the college setting. The literature provided sufficient evidence that academic stress was associated with negative health outcomes and women display greater behavioral and physiological reactions to academic stressors. This study provided essential groundwork for preliminary investigation of premenstrual symptoms and academic stress in a sample of emerging adulthood women residing in a campus community. New knowledge produced by this study added to existing premenstrual symptom research as well as provided new evidence about the relationship between premenstrual symptoms and academic stress.

Chapter Three presents the methodology utilized for this study. The research design, sample criteria and setting, and procedures for instrument used and reliability and content validity are discussed within the chapter. Procedures for collecting participant response data and data management were presented. In addition data analysis procedures were outlined as they related to the study aims along with procedures for protecting the rights of human subjects.

CHAPTER 3: METHODS

Study Design

A descriptive longitudinal feasibility study was utilized to answer the study specific aim and exploratory aims.

Specific Aim: To determine feasibility of daily symptom data collection via an electronic symptom diary across one complete menstrual cycle.

Exploratory Aim 1: To describe follicular and luteal phase symptom perception, severity and distress in emerging adulthood women located in a rural undergraduate college setting.

Exploratory Aim 2: To describe academic stress (student-life stress, and number of academic demands) in this sample.

Exploratory Aim 3: To explore the relationship between follicular and luteal phase symptom perception, severity and distress with academic demand and academic demand distress among emerging adulthood women in the rural college context.

Setting

The setting for this study was a rural undergraduate campus in northwest Iowa with an average annual enrollment of 1300 students. This private college's campus was home to 95% of the student body. The student population was comprised of 49.4% women and 50.6% men. Of the 1313 students in academic year 2007-2008 White/Caucasian accounted for 1244 students, Asian 29 students, Hispanic/Latino 18 students, African American 14 students and Other 8 students. Predominant undergraduate

enrollment majors included: business administration, elementary education, and engineering (Bos, 2007).

Sample

The final sample of 50 was obtained from the population of 642 full time enrolled female undergraduate students who resided in campus residential housing during the 2008-2009 academic year. There was representation from freshman, sophomore, junior and senior status students. Inclusion criteria were: 1) had a menstrual period in the last 34 days, 2) age 18-25 years, 3) enrolled full-time in undergraduate studies, 4) daily access to a computer with internet capabilities, and 5) residing in campus housing. Exclusion criteria were: 1) currently pregnant, 2) history of chronic illness, diabetes, high blood pressure, heart disease, or current depression and/or anxiety, and 3) currently using a hormonal method of contraception.

Recruitment

Participants were recruited from colorful single sheet announcements posted in female residence halls and e-mail invitation to participate sent to female students via the campus listserv. Participants were offered a small gift for their participation at the completion of their data collection (\$20.00 gift card to a local business) as incentive. Additional recruitment was achieved via study fliers placed in student mailboxes. In all recruitment, interested women contacted the primary investigator.

Procedures

Interested participants contacted the principal investigator via telephone or email. Verbal screening for inclusion/exclusion criteria was conducted via telephone or email

and qualified women were given appointments for an initial interview with the primary investigator. Informed consent was obtained as mandated by the University of Arizona Institutional Review Board. Consented and enrolled participants completed baseline questionnaires electronically on the study computer. This procedure oriented participants to electronic data collection. Baseline data included information received from a demographic and medical history questionnaire and the Student-life Stress Inventory/SSI (Gadzella, 1991).

Next participants were oriented to the electronic diary and completed the first daily diary at this visit. This ensured participants had working knowledge of how to use the electronic format for entering daily diary information. Participants were instructed to complete the daily diary and press the submit button. If the diary could not be submitted, participants were advised to check the diary for missing data, remedy the missing data or place a (.) in the spot to indicate it was intentionally missing, then press the submit button. At the conclusion of the initial interview, each participant was provided with a 3 X 5 card to take with them giving complete directions for accessing their electronic diary from any computer with internet access. Participants were instructed to complete a daily diary entry from this day forward through their first menstrual period until two days after their next period. This procedure provided one complete menstrual cycle of daily diaries plus additional luteal phase data prior to the first menstrual period in the study.

Participants were provided with a designated phone number and an e-mail address which the primary investigator monitored. The phone line or e-mail address could be

used for any questions that arose during the course of the participant's enrollment in the study.

It was anticipated the sample would accrue at 5-6 participants per week. Data collection began during the first week of September 2008 and enrollment closed the first week of November. Enrollment closed at this time to ensure participation completion before the second week in December when students typically leave campus at the end of the semester until mid January. At the conclusion of a participant's enrollment in the study they were sent via campus mail a local merchant gift card.

Electronic Data Collection

Data were collected via the baseline questionnaires and continuous electronic Diary entries across one full menstrual cycle. Lengthy explanation and instructions about how to enter the data were avoided on the electronic data collection sheets by providing verbal instruction at the initial interview and practice at data entry electronically. The rationale for limiting instructions on the electronic data sheets is this allows participants to move more quickly between pages (Sweet & Russell, 1996). Succinct instructions were provided to assist participants in navigating smoothly through the electronic diary pages. Prior to the go live date for data collection, mock data were entered as pilot data by the principal investigator to strengthen usability of the electronic diary. Face validity was demonstrated when three 18-25 year old undergraduate students viewed the instrument and successfully navigated through it.

Variables and Instruments

Demographic characteristics and health history data were collected to describe the sample. Feasibility data were collected for the specific aim and exploratory aims data included the independent variable of academic stress (student-life stress; number of academic demand and academic demand distress) and the dependent variable of menstrual symptom experience (perception, severity and distress). See Table 2 below for study concepts, variables, outcome measures and analysis.

TABLE 2. Study Variables

Variable	Measurement	Outcome Measure	Analysis
Dependent: Premenstrual Symptom Experience	aily Electronic Diary 1) Perception	Present or Not Present If perceived, rated Minimal to Extreme	Descriptive
	2) Severity	Rated as 1-5 from minimal to extreme	Descriptive Means by phase Paired sample <i>t</i> tests
	3) Distress	Rated from 0-10	
Independent: Academic Stress	Baseline data Student-life Stress Inventory (SLSI)	Perceived student- life stress and responses to student-life stress	Overall perceived stress score, total stress score, Chronbach's α Pearson's Product Moment correlation
	Daily electronic diary Academic demands Academic demand distress	Number of demands Rated from 0-10	Descriptive Item totals meaned across phases Paired sample <i>t</i> test

Demographic and Health History Form

The Demographic and Medical History Questionnaire was developed by the primary investigator specifically for this study (Appendix C). It consisted of 24 items of which 11 were demographic questions: age, ethnicity, marital status, number of children, city population of permanent address, size of graduating high school class, current year in college, employment status, current grade point average, academic major, daily access to computer with internet. The medical history section consisted of 13 questions: current exercise, financial concerns, oral contraceptive status, seven menstrual history questions (frequency, last period, age of menarche, length, flow, premenstrual symptoms status), chronic or major illnesses and smoking status.

Academic Stress-Student-life Stress Inventory (SSI)

The Student-life Stress Inventory (SSI) (Gadzella, 1991) was used with permission of the author (Appendix D). It was administered electronically during the initial interview. The inventory reflected students' life stress experiences. It consisted of 51 items describing five categories of stressors (Frustrations, Conflicts, Pressures, Changes, and Self-imposed) and four categories of reactions to stressors (Physiological, Emotional, Behavioral, and Cognitive appraisal). Responses to the 51 items were made on a 5-point Likert scale from 1=never, 2=seldom, 3=occasionally, 4=often, and 5=most of the times.

The SSI provided an overall perceived stress value by initially asking, "Rate your overall level of stress: mild, moderate, or severe". This was the student's perception prior to their responses and was treated as such. This overall perceived stress value was compared to Total Stress scores in the inventory. To score the SSI the values for each

item were added together. Next the values for each category were summed. Then values within each of the nine categories were added together (e.g. there are 7 items in the Frustration category). Next values for each category were added together. Finally the summation of the values in the categories produced a Total Stress score. Pearson's product moment coefficients were used to determine correlations between inventory categories and initial overall perceived stress rating.

Validity and Reliability of the SSI has been reported in numerous studies (Gadzella, 1994; Gadzella & Baloglu, 2001; Gadzella & Carvalho, 2006; Gadzella & Fullwood, 1992). Validity was assessed in several studies in which the three groups of subjects reported their overall perceptions of stress (mild, moderate, or severe) and were compared to their scores with each of the nine categories as well as the Total Stress score. With 530 subjects (Gadzella, Fullwood, & Tomcala, 1992), 87 subjects (Gadzella & Guthrie, 1993), and 290 subjects (Gadzella, 1994) research results have established significant differences among the three groups (mild, moderate and severe) on all nine categories and Total Stress scores.

Reliability was reported with Chronbach's alphas and Person product-moment correlations for responses on the SSI by 95 subjects (Gadzella, Fullwood, & Ginther, 1991). Internal constancy values ranged from .52 alpha (Frustrations) ($p < .05$) to .85 alpha (Changes) ($p < .05$). Test-Retest reliability reported values for two responses to the SSI obtained within 3 weeks. For this study 87 subjects had total group correlations of .78 ($p < .05$), for men .92 ($p < .05$) and for women .72 ($p < .05$) (Gadzella & Guthrie, 1993). Gender differences between men and women on their stress scores had been reported.

Two hundred ninety subjects (106 men and 184 women) reported significantly higher scores on Pressures and Changes (stressors), Physiological, Emotional, and Behavioral (reactions to stressors), and the total Stress, whereas men reported significantly higher scores on Cognitive appraisal (reaction to stressors) (Gadzella, 1994).

Academic Stress-Academic Demand

Daily diaries included a section on which participants recorded number of assignments due, number of papers due, and number of projects/presentation due. A total score for the number of these daily items was created daily and then a mean was created across the menstrual cycle for each participant. In addition, participants rated distress about each of these (number of assignments due, number of papers due, number of projects/presentations due daily on a scale of 0-10 (0=no distress and 10-extreme or the most distress). A daily distress score (range 0 to 30) was created followed by a mean distress score across the menstrual cycle for each participant. To account for time spent studying, each day participants recorded hours and minutes spent as well the distress caused by studying on a scale of 0-10 (0=no distress and 10-extreme or the most distress). These were quantified by creating a mean for time studying across the menstrual cycle and distress about studying across the menstrual cycle.

Premenstrual Symptom Experience

The premenstrual symptom experience was measured as perception (presence or absence of a symptom), severity (how severe the symptom was rated on a scale of 1=minimal severity, 2=moderate severity, 4=extreme severity) and distress (how

distressing or bothersome the symptom on a scale from 0 to 10, with 0=no distress-10=extreme or the greatest distress.

Menstrual Symptom Severity List (MSSL)

Perception of symptoms, severity of symptoms, and symptom distress were measured by the MSSL, which was developed by Woods and colleagues (Woods, Lentz, Mitchell, Taylor, & Lee, 1986). It consisted of 47 symptoms rated as 0=not present, 1=minimal, 2=mild, 3=moderate, and 4=extreme. All symptoms marked "0" were considered not perceived. If the symptoms was perceived a severity and distress rating were requested. A daily summated score for the number of symptoms perceived was created (range=0-47) and a mean for each participant was created for the menstrual cycle. Symptom severity for the instrument could range from 1-188 with higher scores equaling greater severity. A daily symptoms severity score was calculated for each participant and then a mean created across the menstrual cycle. Symptom distress for each of the 47 symptoms was rated as 0=no distress to 10=extreme or the greatest distress. A summated score of distress was created daily for each participant that could range from 0-470 with higher scores equaling greater distress. As well, a mean distress score was created across the menstrual cycle.

The MSSL is a self-report symptom checklist which has been highly reliable for obtaining data on symptom and mood patterns for particular populations of women and has been an effective means for studying perimenstrual symptoms (Taylor, 1988, 1994; Woods, Lentz, Mitchell, Taylor, & Lee, 1986). Factor analysis of MSSL data from a community-based sample of healthy women revealed consistent factors across menstrual

cycle phases an internal consistency reliability with coefficient alphas above .70 (Woods, Mitchell, & Lentz, 1996). The MSSL has demonstrated sensitivity to change in an intervention study of women with severe perimenstrual negative affect (Taylor, 1996).

Data Management Plan

A secure web site was created to gather daily diary data. A unique URL for the project was developed. The URL was not linked to or from any other web pages (Van Donselaar, 2008). Each participant accessed the site with a numeric individual user name (study number) and password from a computer with internet access to guarantee confidentiality since participants needed to enter some form of identification before receiving the baseline questionnaire and daily diary (Sweet & Russell, 1996).

The baseline questionnaire data and the electronic diary information were kept on the Dordt College server until the conclusion of the study. At that point in time the data were transferred via flat file disc to the primary investigator. The primary investigator opened the flat file and electronically populated the individual participant data files previously created in an Excel spreadsheet. Movement of the data into the Excel file was accomplished electronically as the data flat file produced comma delineated data points for all data entered by each participant.

With the data in an Excel spreadsheet, the data was explored with consultation from Dr. Alice Pasvogel, assistant research scientist at the University of Arizona. Missing items on instruments were assigned a mean score as long as <20% of items were missed. A single item was considered across the cycle for a particular variable. Mean score substitution was done by either follicular phase or luteal phase depending where the

missing item was in the cycle. If >20% of items on an instrument were missed, the instrument or entire daily diary was counted as missing. To avoid loss of confidentiality, data were reported in the aggregate and all computer files had participant numbers rather than names. Only the principal investigator kept a password protected electronic file that linked participant names to participant numbers. Following data analysis and completion of manuscripts, this electronic file was deleted. Computer research files were password protected. The flat file data disc was kept in a locked cabinet only accessible to the research personnel who had human subjects' training.

Data exploration included analyses via boxplots, quantile-quantile plots, density plots, and matrix scatterplots. These were reviewed to determine sampling distribution and identify distributional anomalies such as non-normality, heterogeneity of variance, potential outliers and the need for transformations (Field, 2005). Data points exhibiting unusual distributional properties were reviewed for validity and corrected.

Transformations were based on visual inspection and substantive theory. Internal consistency reliability (Cronbach's α) was calculated on all instruments and subscales.

Data Analysis Plan

Specific Aim of the Study

To determine feasibility of daily symptom data collection via an electronic symptom diary across one complete menstrual cycle the following outcome measures were used. Feasibility was determined by: 1) 65 % of the sample completing the study across one menstrual cycle, and 2) the sample was obtained within 6 months of the first day of study enrollment.

Exploratory Aim 1

Describe premenstrual symptom perception, severity and distress in emerging adulthood women located in a rural undergraduate setting. The premenstrual luteal time period was calculated to include symptom data from the first day of menses counting back 14 days. The days from the first day of the first menstrual cycle in the study to the first day of the calculated beginning of the luteal phase was the follicular phase. Symptom perception as recorded in the daily MSSL was measured by generating symptom summation scores and mean participant scores for the follicular and luteal phases of the cycle. In addition, a mean symptom severity score and mean distress score was calculated for the luteal phase days and the follicular phase. Paired Sample *t* Tests were used to determine if there was a difference in symptom perception, severity and distress between follicular and luteal cycle phases.

Exploratory Aim 2

Describe academic stress (Student-life stress, and number of academic demands) in this sample. The Student-life Stress Inventory scores on individual items were summated. Then values for each category were summed. Values for each category were summed and added together. The values for each category were summed to provide a Total Stress score at baseline. Cronbach's α was used to determine internal consistency by categories for the total group. Pearson's product moment coefficients were used to determine correlations between inventory categories and initial perceived stress rating.

Academic demands were described by daily total item scores meaned across the entire menstrual cycle. In addition follicular and luteal phase cycle academic demands

were summed and meaned across these time periods, and a summated score for the entire menstrual cycle was reported. Daily distress scores for academic demands were also reported for both follicular and luteal phases and the overall menstrual cycle. Hours and minutes spent studying during follicular and luteal phases plus the overall cycle days were reported. Distress ratings were detailed for follicular and luteal phases and the overall menstrual cycle. A Paired Sample *t* Test was used to determine the difference between follicular and luteal phases with numbers of academic demands and distress about the demand.

Exploratory Aim 3

To explore the relationship between premenstrual symptom, perception, severity and distress; and academic stress among emerging adulthood women in the rural college context. Pearson product moment correlation coefficients were used to compare SSI Total Stress scores at baseline with follicular and luteal phase symptom totals, severity and distress scores. Pearson product moment coefficients were used to assess the relationship between academic demand scores and distress scores with follicular and luteal phase symptom perception, severity and distress scores. Higher academic stress scores (SSI Total Stress, academic demand totals and distress scores) were theorized to correlate with higher symptom totals, severity scores and distress scores for the luteal phase of the cycle.

Human Subjects Protection

This study received approval from the Institutional Review Board at The University of Arizona and Dordt College. Participants were identified by a code number

that linked their baseline data with their electronic diary entries. Participants were de-identified to protect anonymity.

CHAPTER 4: RESULTS

Introduction

This chapter described the sample and study results by specific aims. The study specific aims were to:

Specific Aim: To determine feasibility of daily symptom data collection via an electronic symptom diary across one complete menstrual cycle.

Exploratory Aim 1: To describe follicular and luteal phase symptom perception, severity and distress in emerging adulthood women located in a rural undergraduate college setting.

Exploratory Aim 2: To describe academic stress (student-life stress, and number of academic demands) in this sample.

Exploratory Aim 3: To explore the relationship between follicular and luteal phase symptom perception, severity and distress with academic demand and academic demand distress among emerging adulthood women in the rural college context.

Sample

Eighty-three women were screened to determine eligibility. Six were ineligible due to current use of oral hormonal contraception (n=5; 83.3%) and being under age 18 (n=1; 16.7%). Therefore, 77 women (92.8%) of women screened were study eligible. These women met study criteria, completed informed consent procedures and were enrolled. Enrolled participants completed two initial questionnaires and their first daily diary entry. Of the 77 women enrolled, one dropped out due to not having a period for 60 days, three dropped out due to being “too busy” to complete the daily diaries, and 23 were excluded

due to too many missing daily diary entries. These resulted in a drop-out rate of 35.1%. Participants included in the final analysis (n=50; 64.9% of enrolled women) had sufficient numbers of daily diaries across one complete menstrual cycle with fewer than 30% missing days during the luteal phase and fewer than 40% missing days during the follicular phase. The final sample size was 50 women whose mean age was 20 ($\pm .9$) years. Ethnic background of the sample was White (n=49; 98%) and Asian-Pacific Islander (n=1; 2%). Participants were unmarried (n=32; 64%) or in a relationship (n=18; 36%). Participants' permanent address was in areas with populations of 500,000 or greater (n=6; 12%), 100,000-499,999 (n=7; 14%), 25,000-99,999 (n=8; 16%), 10,000-24,999 (n=12; 24%), less than 10,000 (n=17; 34%). Mean size of participants' high school graduating class was 115.34 (± 115.47). All participants were currently enrolled in college as freshmen (n=3; 6%), sophomores (n=15; 30%), juniors (n=22; 24%), or seniors (n=10; 20%). Participants were currently employed part-time (n=43; 86%), unemployed (n=4; 8%), or employed full-time (n=3; 6%). They reported their current grade point average (GPA) as 2.5-2.99 (n=7; 14%), 3.0-3.49 (n=10; 20%), 3.5-4.0 (n=29; 58%). Four participants could not list their current college GPA as three were freshmen and one failed to disclose a current GPA. Fifteen academic majors were reported and the top four were as follows: Education (n=14; 28%), Nursing (n=9; 18%), Social Work (n=8; 16%), and Biology (n=3; 6%).

Hours of exercise per week averaged 4.28 ± 3.1 . Participants wrote in their exercise of choice. The majority chose running as their primary exercise of choice (n=23; 46%), followed by walking (n=12; 24%).

Participants rated financial concerns about tuition, books/supplies, housing, and food on a five point Likert scale from minimal concern=1 to extreme concern =5. These concerns are detailed in Table 3.

TABLE 3. Student Financial Concerns

Concern	%(n) Tuition	%(n) Books/Supplies	%(n) Housing	%(n) Food
Minimal	10(5)	28(14)	48(24)	36(18)
Mild	28(14)	42(21)	32(16)	16(8)
Moderate	36(18)	20(10)	18(9)	36(18)
Great	20(10)	8(4)	0(0)	10(5)
Extreme Concern	6(3)	2(1)	2(1)	2(1)

Menstrual cycles were described as usually having a period once a month (n=45; 90%), and not once a month (n=5; 10%). Menarche ranged from age 9-14 with a mean age of 12 (\pm .9). Average length of participants' menstrual cycles ranged from 20-60 (Mean 31.2) days with bleeding days ranging from 3-7 (Mean 5.1). Forty-seven women (94%) usually experienced premenstrual symptoms and three (6%) did not usually experience premenstrual symptoms. When asked to describe premenstrual symptoms they had experienced, most documented more than one symptom for an overall total of 117 different symptoms. The most frequently reported premenstrual symptom was pain (cramping, breast tenderness, body aches) (n=37; 32%), followed by mood swings (n=28; 24%), water retention (n=22 ;19 %), other (nausea, diarrhea, constipation) (n= 17;15%), fatigue (n=7;6%), headaches (n=6 ;5%), cravings (n=4; 3%), and energy bursts (n=2; 2%).

A variety of strategies were used to manage premenstrual symptoms. Many used more than one strategy. Participants recorded a total of 52 different strategies. The most commonly used strategy was anti-prostaglandins (n= 21; 40%), followed by heat (n= 10; 19%), sleep/laying down (n=9; 17%), acetaminophen (n=8;15%), eating chocolate (n=2; 4%), exercise (n=1; 2%) and massage (n=1; 2%). Only four participants (8%) had ever sought medical care for their premenstrual symptoms.

This was an overall healthy group of participants. No one was being treated for a chronic illness such as diabetes, high blood pressure, or heart disease. Two participants (4%) were previously treated for depression. Three (6%) had previously sought treatment for anxiety.

Specific Aim Feasibility

Feasibility of daily symptom data collection via an electronic symptom diary across one complete menstrual cycle was set at 65%. Previous studies utilizing various forms of electronic diary collections were included in a systematic review of electronic diaries (Burton, Weller, & Sharpe, 2007) and adherence rates ranged from 71% to 100%. With this under consideration, and inconsistency in duration of diary entries, type of electronic device used, and sample size within published reports; an appropriate feasibility rate of 65% was determined for this study. For this sample of 77 women using desktop computers to record in a daily diary, feasibility was achieved as 64.9% of the sample completed the study across one complete menstrual cycle. The sample was obtained within 5 months of the first day of study enrollment.

Exploratory Aim 1, Symptom Perception, Severity and Distress

For this sample the mean follicular phase was 14.76 ± 4.7 days, with 7.16 ± 3.8 symptoms perceived, with $1.94 \pm .3$ severity, and $.39 \pm .3$ distress. The luteal phase for all participants was calculated as 14 days. The mean number of symptoms perceived in this phase was 6.18 ± 3.3 , with $1.90 \pm .4$ severity, and $.31 \pm .3$ distress. A significant difference in symptom perception ($p=.001$) occurred with a higher number of symptoms perceived in the follicular phase. In addition there was a significant difference in symptom distress ($p=.003$) where higher symptom distress occurred in the follicular phase.

Exploratory Aim 2, Academic Stress

During the initial interview, all were asked to rate their overall perceived stress as mild=1, moderate=2 or severe=3. The overall stress score mean was $1.76 \pm .52$ which fell in the mild category. At the same time, students were asked to report the number of hours spent studying and working per week. The mean hours spent studying and working were $19.25 (\pm 11.5)$ and $8.3 (\pm 5)$ respectively.

Also during the initial interview, participants completed the Student-life Stress Inventory (SSI) (Gadzella, 1991). The 51 items on the SSI are divided between Stressors (23 items) or Reactions to Stressors (28 items) and participants rated each item on a five point scale where 1=never, 2=seldom, 3=occasionally, 4=often, 5=most of the time. Higher scores in the Stressors, Reaction to Stressors and Total Stress scores represent higher student stress. The summated mean for the 23 Stressor items (frustrations, conflicts, pressures and changes) category was $66.0 (\pm 9.5)$ with a possible range from 23 -115. The summated mean for the 28 items in the Reactions to Stressors category

(physiological, emotional, behavioral and cognitive appraisal) was 61.7 (± 9.8) with a possible range from 28-140. The Total Stress score from both categories was 109.3 (± 15.0) with a possible range from 51-255.

Internal consistency, as determined by Cronbach's Alpha calculations, for the SSI in this sample was high. Overall internal consistency was .87, while it was .84 for the Stressors (23 items) category and .80 for the Reactions to Stressors (28 items) category. Correlations between participants' own overall perceived stress rating and SSI categories were calculated using Pearson's Product Moment Correlation Coefficients and are shown in table 4.

TABLE 4. Correlations Between Overall Perceived Stress to Stressors, Reactions to Stressors and Total Stress Score

Category	Overall Perceived Stress
Stressors	.45*
Reactions to stressors	.24
Total stress score	.39*

* $p < .01$, 2-tailed.

Significant correlations were noted between the Overall Perceived Stress and the Stressors category as well as the Total Stress Score. Not surprisingly there was no significant correlation between Overall Perceived Stress rating and the Reactions to Stressors.

Academic demands and academic demand distress (0=no distress to 10=extreme distress) were recorded in the daily electronic diary and Table 5 details these for the follicular and luteal phases.

TABLE 5. Academic Demands by Follicular Phase, Luteal Phase and Distress Level

Academic Demand	M(SD) Follicular	M(SD) Distress	M(SD) Luteal	M(SD) Distress
Assignments	1.04(.74)	1.40(1.42)	.85(.62)	1.22(1.25)
Papers	.36(.49)	.83(1.18)	.36(.51)	.81(1.25)
Projects/presentations	.40(.51)	1.10(1.44)	.33(.51)	.82(1.24)
Time studying	156.12(95.33)	1.30(1.11)	151.81(122.46)	1.23(1.23)

Exploratory Aim 3, Relationship Between Symptoms and Academic Demand and Academic Stress

Pearson Product Moment Correlation Coefficients were used to explore the relationship between follicular phase and luteal phase symptom perception, severity and distress with academic demand and academic demand distress. Table 6 and table 7 detail these exploratory relationships.

TABLE 6. Correlations Between Follicular Phase and Luteal Phase Symptom Perception, Severity and Distress with Academic Demand

Phase (Minutes)	<u>Academic Demand</u>			
	Assignment	Papers	Projects/Presentations	Time Studying
Follicular				
Perception	.31*	.11	.09	.06
Severity	-.02	-.14	-.14	.13
Distress	.37**	.22	.25*	.20
Luteal				
Perception	.12	.02	-.13	.01
Severity	-.07	-.04	-.01	.19
Distress	.24	.03	-.02	.20

*Correlation is significant at the 0.05 level, 1-tailed

**Correlation is significant at the 0.01 level, 1-tailed.

Within the follicular phase, number of assignments due was significantly correlated to symptom perception and distress (.31, .37 respectively) and the number of projects/presentations due was correlated to symptoms distress (.25). There were no statistically significant correlations between academic demand and luteal phase symptom perception, severity, or distress.

TABLE 7. Correlations Between Follicular Phase and Luteal Phase Symptom Perception, Severity and Distress with Academic Demand Distress

Phase (Minutes)	<u>Academic Demand Distress</u>			
	Assignment	Papers	Projects/Presentations	Time Studying
Follicular				
Perception	.35**	.26*	.29*	.24*
Severity	.02	-.01	-.14	.13
Distress	.55**	.47**	.51*	.40**
Luteal				
Perception	.17	.13	.04	.23
Severity	-.07	-.04	-.01	.00
Distress	.43**	.38**	.26*	.47**

*Correlation is significant at the 0.05 level, 1-tailed

**Correlation is significant at the 0.01 level, 1-tailed.

Within the follicular phase, distress from the academic demands of assignments, papers, projects/presentations and time studying were significantly correlated to symptom perception and distress. Within the luteal phase distress from the academic demands of assignments, papers, projects/presentations and time studying were significantly correlated to symptom distress.

Summary

Feasibility of daily symptom data collection via an electronic symptom diary across one complete menstrual cycle was achieved. Symptom perception, severity and distress were described for follicular and luteal phases for this sample. Academic stress (student-

life stress and academic demand) were described for this sample. The Overall Perceived Stress was mild, and the Student-life Total Stress score for this sample was low. The overall perceived stress was significantly correlated with the Stressors category and the Total stress score of the Student-life Stress Inventory. The relationship between follicular phase symptom perception with number of assignments was significant as well as the follicular phase symptom distress with number of assignments and projects/presentations. There were no significant correlations between luteal phase symptom perception, severity or distress with any of the academic demands. Follicular phase symptoms perception and distress were both significantly correlated to each type of academic demand's distress (assignments, papers, projects/presentations, time studying). In addition, luteal phase symptom distress was significantly correlated to each type of academic demand's distress (assignments, papers, projects/presentations, time studying).

CHAPTER 5: DISCUSSION

Introduction

This chapter elaborated upon the research findings, examined how the specific aim and exploratory aims were addressed, and discussed the implications of this research for the nursing profession and patient outcomes.

Discussion

Sample

Seventy-seven of the 83 women screened for study eligibility were enrolled. Given the specificity of the study inclusion/exclusion criteria the number qualified was high. This particular college context was a private institution that is guided by a religious conviction which encourages students to refrain from sexual intercourse until marriage. Therefore the recruitment of women residing in this context who were not using hormonal contraception may have been easier. This finding will guide future recruitment and screening efforts for research with this population. This was a highly homogenous sample as 98% of participants indicated their ethnic background was White, all were unmarried, and all were enrolled at the same undergraduate college and resided in campus housing. This finding was not surprising as the study location was a private rural residential undergraduate campus that has no married housing on campus and has a predominantly White student population. This was a college setting bound sample where the majority (58%) had a grade point average (GPA) between 3.5 and 4.0 on a 4.0 grading scale. Perhaps this high GPA is somehow related to the education characteristics of the sample, as all were currently enrolled in an undergraduate program of study at a

private institution. Education has been linked to premenstrual symptom experience in a more diverse sample (Woods, Most, Dery, 1982; Mitchell, Woods, & Lentz, 1994). However future study could consider the role of GPA and symptom experience with a stratified sample that includes women with lower GPAs.

Part-time work is prevalent for students enrolled at the college as part of a student work-study program that assists students financially. For this sample financial concerns were mainly mild to moderate. This was probably due to a combination of factors as students have access to financial assistance for tuition, housing and food; maintain academic scholarships based on GPA; and may have strong family social support.

The wide variety of the symptoms reported (n=117) by 94% of participants was consistent with the work of Taylor (1994) and suggests that such wide variation in symptoms should include analyzing individual symptom patterns to yield richer results. Future symptom work with this setting should include analysis of individual symptoms across a longer period of time. Symptom description may need to include data collection across several menstrual cycles to adequately describe individual symptom experience as well as aggregate, particularly when intervention research for symptoms occurs.

This sample also used a variety of strategies, 52 in all, to self-manage their symptoms while only four participants had ever sought medical care for their premenstrual symptoms. Although many experienced premenstrual symptoms, few sought medical care for them. This may be due to appropriate self-management of symptoms, or lack of perceived severity about their symptoms. Students have access to care for symptom management while residing in this rural college setting via the campus

health service; however they chose to self-manage. Adequate self-management strategies for menstrual symptoms have been noted in a similar aged Afrikaans speaking sample of White university students in South Africa (Cronje & Kritzinger, 1991).

Specific Aim Feasibility

The specific aim was to determine the feasibility of symptom data collection via an electronic symptom diary across one complete menstrual cycle. Feasibility was achieved at the *a priori* level of 65%. The electronic diary was set to allow information to be entered once every 24 hours. So if a day was missed, it was indeed missed. This was done to keep the diary entries prospective compared to recalling over the last week or month symptom dynamics and academic demands.

The diary was also developed to take less than 5 minutes to navigate from log in to log out so each entry could be done quickly. Each participant completed one diary entry with enrollment so all participants were capable in accessing and utilizing the electronic diary. With the first entry occurring at study enrollment, all participants began their diary entries wherever they happened to be in their current menstrual cycle. This led to varying numbers of diary entries from 27 to 60 per participant, although only the diaries from the onset of one menstrual cycle to the onset of the next menstrual cycle were analyzed for the present study. Reasons for missing entries may have been related to the busyness of full-time undergraduate students, forgetting for one day and not being able to “go back” and enter missed data, and lack of preset daily reminders.

To the author’s knowledge, this was the first time a study was done using an electronic method for collecting menstrual symptom data. While it is exciting to realize

feasibility, insights were gained that can be used to increase data collection consistency with subsequent use of an electronic method for collecting symptom data in a similar sample. Implementation of a daily reminder system via e-mail, a personal phone call periodically during data collection (Berg, 2004) as well as a process whereby a missed day's data could be entered within a preset time limit could decrease missed entries. In addition, it would have been useful to include a qualitative methodology to further identify study participants experience with the electronic diary (Stone et al., 2003). Exit interviews would have been useful to ask participants what would help them increase their adherence to the data collection protocol.

Exploratory Aim 1, Symptom Perception, Severity and Distress

This exploratory aim involved a description of follicular and luteal phase symptom perception, severity and distress in emerging adulthood women. For this sample the follicular phase was slightly longer than the luteal phase, which was expected, as the luteal phase was set at 14 days prior to the second recorded menses date. However the significant increase in symptom perception and symptom distress in the follicular phase over the luteal phase was a surprising finding. Prior research suggested peak symptom levels occur three days before and two days after the onset of menses (Meaden, 2005). However, additional symptom prevalence analysis could reveal a similar pattern if the first two follicular days were included in the 14 luteal days used for this analysis, or if a separate analysis were done on the perimenstrual interval that consisted of three days prior to and two days following onset of menses.

Participants' severity scores were similarly low between the two phases. This was a surprise finding as previous research suggested that peak in severity of symptoms appears to coincide with the time when physical awareness of menses is likely to occur (Meaden, 2005). In the present study physical awareness of menses did not seem to influence severity of symptoms. This finding may have occurred as overall the sample indicated minimal to mild severity of their symptoms. Symptom findings could also be skewed due to the lack of diversity in this healthy, similar aged, highly educated sample in which symptom severity was not screened. It also remains unknown as to the role of religiosity in symptom experience. Future study of this population should include screening for high symptom perception and severity or stratification based on number of perceived symptoms and level of symptom severity. This would facilitate broader description of the symptom experience of this population.

This sample experienced low levels of distress between the follicular and luteal phases (.39 and .31 respectively on a scale from 0=no distress and 10=extreme distress). This group was not very distressed about their symptom experience, but this could be explained by their overall low symptom perception and severity. The significance between the symptom distress by phase may be linked to the fact they perceived more symptoms, even though the severity scores were low in the follicular phase. Therefore it appears for this sample symptom distress was more linked to symptom perception than symptom severity. Using symptom severity as screening criteria for study entry may result in different findings.

This description of premenstrual symptoms in a sample of healthy 18-22 year old women supported findings that demonstrated low symptom severity scores most closely resemble those for healthy samples (Mitchell, Woods, & Lentz, 1994). In addition findings of low symptom distress for this sample of undergraduate women supported evidence that amount of education differentiates women with premenstrual syndrome and premenstrual magnification from those with low symptoms where women with the least formal education had higher levels of psychological distress with their symptoms (Woods, Most & Longenecker, 1985). This was the first research I am aware of that focused on the menstrual symptom experience of a discrete sample of 18-22 year old women. Prior menstrual symptom research has included women in broader age categories rather than those distinctly within emerging adulthood. It may be that relatively young women have fewer symptoms than older women, or it may be that better educated women have fewer symptoms than women in the general population who represent wider diversity of education, age, and economic circumstances.

Exploratory Aim 2, Academic Stress

The purpose of this exploratory aim was to describe academic stress for this sample by way of student-life stress and academic demands. The Student-life Stress Inventory (Gadzella, Fullwood, & Ginther, 1991) indicated an overall perceived stress score in the mild category for this sample as participants were being enrolled in the study. The significant correlations between the overall perceived stress score and the Stressors and Total Stress score would indicate this sample's perceived overall mild stress was positively correlated to Stressors (frustrations, conflicts, pressures and changes) in

student-life, and subsequently also statistically correlated to the Total Stress Score. However, no statistical significance between the overall perceived stress and the Reactions to stressors (physiological, emotional, behavioral and cognitive appraisal) was not surprising as this sample indicated only mild overall stress at the time the Student-life Inventory was completed. As well, perceived stress and reactions to stressors appear to be two different concepts that are not related to each other.

Prospectively experienced academic demands and associated distress were recorded within the daily electronic diary. Overall there were increased number of assignments, papers, projects/presentation and time spent studying during the follicular phase for this sample. This may be due to the follicular phase being longer than the luteal phase. The distress related to these academic demands was also higher in the follicular phase than in the luteal phase. It is interesting that perceived distress from academic demands may be consistent with increased number of demands including the amount of time spent studying. Further exploration of a possible relationship between academic demand and perceived distress warrants investigation to enhance understanding of how this relationship may influence female students. In addition the concepts of academic stress along with academic demand need further clarification and elucidation within extant literature. Future study of academic demands should be preceded by clarification of specific demands. Based on the number of questions participants had about categorizing academic demands, future study should be preceded by creation of an instrument with appropriate psychometric properties that categorizes academic demand. Prospective

academic demand and associated distress were measured based on a review of the literature (Weidner, Kohlmann, Dotzauer, & Burns, 1996).

Exploratory Aim 3, Relationship Between Symptoms and Academic Demand and Academic Distress

This final exploratory aim was to explore the relationship between follicular and luteal phase symptom experience with academic demand for emerging adulthood women in an undergraduate setting. The statistically significant relationships between follicular phase symptom perception and symptom distress with the academic demand of number of assignments due indicates that for this sample as follicular symptom perception and distress occurred so did distress with the number of assignments due. The significant relationship between the follicular phase symptom distress and academic demand of project/presentations also indicates that symptom distress related to the number of projects/presentations due. Interestingly, both follicular phase symptom perception and distress were positively correlated to the academic demand distress for all types of academic demands (assignments, papers, projects/presentations and time studying). This may indicate the number of symptoms and their associated distress are somehow linked to the distress experienced by academic demands.

It is important to note that luteal phase symptom distress was also positively correlated to academic demand distress for all types of academic demands (assignments, papers, projects/presentations and time studying). This supports a premise that symptom experience, particularly symptom distress, is somehow linked to academic demand. However further research is necessary to clarify the nature of this relationship and tease

out other variables that may impact the relationship such as timing within an academic semester, financial concerns, relationship stress, etc. This study provides an initial glimpse of the possible relationship between menstrual symptoms and academic stress as no reports to date have proposed even an initial investigation of this relationship. There is reason to continue this line of inquiry as it has been reported that college women experienced greater stress than male student counterparts with various health predictors such as chronic illness and sleep difficulties (Dusselier, Dunn, Wang, Shelley, & Whalen, 2005). The experience of menstrual symptoms and academic stress may be part of the dynamic contextual phenomena that impacts health for college women.

Aday's Framework

Aday's framework for studying vulnerable populations (Aday, 1994) provided an appropriate theoretical perspective for this study wherein the context was a rural residential college campus. Premenstrual symptoms were viewed as an individual health need within the framework, and academic stress as increasing relative risk for vulnerable individuals. Increased academic stress was theorized to have a direct positive relationship with premenstrual symptoms where increased academic stress correlated to increase symptom perception, severity and distress. This study provided support that symptom perception and distress was positively correlated to academic stress by way of academic distress for all types of academic demands (assignments, papers, projects/presentations and time studying) across both follicular and luteal phases. While the overall level of academic stress from academic demand distress scores appeared low, the relationship with follicular and luteal phase symptom distress was statically significant. Aday's

framework provided a guide to theorize additional individual level processes by suggesting that individual resources influence vulnerable individuals. This could be explored with further research. In addition, the college campus was theorized as a community within Aday's framework, providing a unique contextual issue. The campus community level's relationship to the individual student level is also fertile ground for additional research as it will be important, according to the framework, to ascertain resource availability, relative risk and health status to inform decisions that impact the campus community and individual students' well being. Secondary analysis of these data in future work could utilize this framework for development of specific aims that would include analysis of community contextual features. Future study should include exploration of the relationship between age, residence, campus community setting, and size of population of permanent residence while not at college, to elucidate possible contextual issues that may influence symptom experience.

Limitations

This feasibility study was conducted with an under-researched population of rural undergraduate women. However, this in itself limits generalization to women in diverse undergraduate settings and geographic locations. Another limitation is the sample consisted of primarily White women, however race and ethnicity were not an inclusion or exclusion criteria during sample selection. Future study of undergraduate women should include more ethnic diversity, as a way to better understand the relationship between academic demand and stress, and symptom perception, severity and distress. Previous

symptom research revealed differences in perimenstrual and perimenopausal symptom experience among ethnic groups (Taylor, 1996; Beyene, 1986; Berg, 1999)

The sample size was small, although *a priori* power analysis for the exploratory aims was achieved with the final sample size (n=50). A larger sample size would allow for more robust analysis and further investigation related to the exploratory aims. The description of premenstrual symptoms and academic stress along with exploration of the nature of the relationship between the two would be enhanced with a larger sample.

Missing daily diary entries was a limitation. While the process developed to gather the diary entries worked very well, the issue of consistency in completing entries was a drawback when determining which participant's data would be suitable for inclusion in the final analysis. In addition data was collected across one complete menstrual cycle, whereas consistent data collection over two or more cycles would enhance the reliability of the study. However the feasibility of longer data collection within an academic setting would need to be determined.

A simple straightforward method whereby the menstrual cycle was divided between follicular and luteal phases may have influenced analysis compared to use of another method that examined the perimenstruum (last three days of the luteal phase coupled with the first two days of the follicular phase) as likely high frequency symptom days. This consideration may be useful before further investigation of the relationship between premenstrual symptoms and academic stress takes place.

Significance of Research Findings

The findings of this research are highly significant. It is possible to collect data on the menstrual symptom experience and academic stress by way of a daily electronic diary in a sample of undergraduate women. The electronic diary provided an easy way for participants to prospectively record their data. In addition this process was an enormous time-saver as no data entry was necessary since the thousands of diary data points were electronically moved into excel spreadsheets and then into a statistical program for analysis. Baseline data from the demographic and health history instrument and the Student-life Stress Inventory was also submitted electronically thereby eliminating the time consuming research step of data entry. Electronic transfer of data virtually eliminated concern of inaccuracies that can occur with a manual data entry process.

This study provided an appropriate initial description of symptom perception, severity and distress for a sample that heretofore had not been included in this type of research. The initial symptom findings were consistent with other symptom research done with broader age categories of women.

While the relationship between premenstrual symptom perception, severity and distress for women residing in undergraduate college settings experiencing academic stress is still unclear, this study will inform future research on premenstrual symptoms and research in the field of academic stress. Health care providers working in campus health centers could benefit from information that clearly identified individual level health needs of women in a campus setting related to either premenstrual symptoms or

academic stress. This information would in turn assist in determining the broader campus community health needs.

This study was an initial attempt to prospectively describe academic demands and its relationship to symptoms. It will be used as a springboard for future research that will include instrument development and examination of psychometric properties to better describe academic demand.

Implications for Future Research

Electronic diary data collection holds much promise for collecting prospective data from busy, computer savvy populations. Qualitative methods should be included with future studies utilizing the electronic diary to ascertain usability and reasons for discontinuation. Future menstrual symptom research should be done to refine the process and incorporate suggestions to increase feasibility as it would be useful to collect data across a longer time frame. In addition, carefully consideration of how to differentiate the phases of a menstrual cycle must be incorporated into future research of this nature. Recruitment of a more diverse sample is implicated. Women with high levels of symptom severity and distress could be part of a future recruitment strategy, as well as those on hormonal contraception. This type of research would expand understanding of menstrual symptoms beyond healthy, non-hormonal contraceptive using emerging adulthood women. Further works needs to be done to refine the conceptual and operational definitions of academic stress. This is paramount if further work into exploring the relationship between premenstrual symptoms and academic stress is to evolve.

Summary

Through this research feasibility of using an electronic daily diary for collection of prospective premenstrual symptom data and academic stress was determined. In this sample there were more symptoms in the follicular than luteal phase and there was greater distress about symptoms in the follicular versus luteal phase. A description of symptom perception, severity and distress for emerging adulthood women pressed the issue of how to determine the best way to differentiate between follicular and luteal phases. It appeared this sample was not particularly distressed by the array of 117 symptoms experienced and most did not seek medical treatment for them. While an initial look at academic stress indicates that perceived student-life stress was mild and student reaction to stressors was not significantly correlated, there was a significant relationship between stressors and the inventory's total stress score for the sample. Academic demand and distress about the demands was significantly related to symptom distress in both follicular and luteal phases. This research indicates the need for further exploration to illuminate important aspects of the relationship between premenstrual symptoms and academic stress. Guided by Aday's framework individual health needs, premenstrual symptom experiences; and increased relative risk from academic stress were viewed as having the potential to influence each other. This specific nature of this relationship remains unclear. The framework may be utilized to guide future research that would include consideration of individual resources and contextual issues for women in undergraduate college communities. The new knowledge generated from this research may serve to impact individuals and their health needs as the groundwork has been

provided to inform ongoing research that seeks to positively impact health and well-being during the emerging adulthood time in a woman's life.

APPENDIX A:
IRB HUMAN SUBJECT APPROVALS AND CONSENT FORM

APPROVED BY UNIVERSITY OF AZ IRB.
THIS STAMP MUST APPEAR ON ALL
DOCUMENTS USED TO CONSENT SUBJECTS.
DATE 09-01-08 EXPIRATION 08-12-09

Informed Consent

Premenstrual Symptoms and Academic Stress in Emerging Adulthood Women

Introduction

You are being invited to take part in a research study. The information in this form is provided to help you decide whether or not to take part. Study personnel will be available to answer your questions and provide additional information. If you decide to take part in the study, you will be asked to sign this consent form. A copy of this form will be given to you.

What is the purpose of this research study?

The purpose of this preliminary study is to determine the ability to collect electronic premenstrual symptom data with emerging adulthood women (aged 18-25 years) who reside on a rural college campus. The study will also include 3 exploratory aims: 1) Describe premenstrual symptoms in terms of perception, severity and distress, 2) Describe academic stress for this group of women, and 3) Explore the relationship between premenstrual symptoms and academic stress for these women. The relationship between premenstrual symptoms and academic stress has not been previously investigated. This study will be dissertation research for the principal investigator.

Why are you being asked to participate?

You are being invited because you are an 18-25 year old female undergraduate student enrolled full-time residing on a rural college campus in Northwest Iowa, have had a menstrual period in the last 34 days, and have daily access to a computer with internet capabilities

How many people will be asked to participate in this study?

Approximately 75 women will be asked to participate in this study.

What will happen during this study?

The research design takes place over a period time. Information will be collected across a period of time using electronic means to gather demographic information (i.e. age, ethnicity, etc.) as well as information about menstrual symptoms and academic stress for 18-25 year old women.

At the time of the initial interview your will be provided with informed consent. Should you choose to consent to participate in the study you will be asked to enter data into a computer file for a 21 item Demographic and Health History Questionnaire developed specifically for this study and a 51 item Student-life Stress Inventory (SSI). Your familiarity and comfortableness with using a computer to enter information will

be assessed at this time. As students at the college, you will have a working e-mail account which can be used as a primary means of communication during the study.

An electronic diary will allow you to record menstrual symptom perception, severity and distress. This daily electronic diary, entitled "My Diary" will be accessed by each woman from a secure web site in which the project URL is not linked to or from any other web pages. You will be asked to enter the site with a numeric individual user name (study number) each day. You will be asked to enter data across on complete menstrual cycle. This means you will enter data today, until you have the first day of a period and continue entering information daily until two days into the next period. The initial diary entry will take place during the initial interview to assure that you will be comfortable with entering your information in the electronic diary. In summary information entered daily into your "My Diary", and once for the Demographic/Health questionnaire and Student-life Stress Inventory will be your participation in the study.

How long will I be in this study?

The initial interview may take up to an hour. During this time you will be given informed consent. If you choose to participate you will be asked to enter your responses electronically to the Demographic and Health History Questionnaire and the Student-Life Stress Inventory.

Then about 5 minutes a day for 35-67 days (depending on where you are at in your current menstrual cycle) will be needed to complete the "My Diary" entries.

Are there any risks to me?

The things that you will be doing have little risk other than feeling uncomfortable answering some of the questions. Although we have tried to avoid risks, you may feel that some questions we ask you to do may be stressful or upsetting. If this occurs you can stop participating immediately. We can give you information about individuals who may be able to help you with these problems.

Are there any benefits to me?

You may gain some personal symptom awareness through the process of keeping a daily diary of symptoms.

This study may lead to the future development of interventions to decrease academic stress and premenstrual symptoms. It will expand knowledge of the ability to collect electronic symptom data with college-age women as well provide the foundation for documenting important aspects of premenstrual symptoms. In addition identification of the relationship between premenstrual symptoms and academic stress in emerging adulthood women will be explored.

Will there be any costs to me?

Aside from your time, there are no costs for taking part in the study.

Will I be paid to participate in the study?

You will be given a \$20.00 gift card from a local merchant (Wal-Mart) for your participation.

Will video or audio recordings be made of me during the study?

No.

Will the information that is obtained from me be kept confidential?

The only persons who will know that you participated in this study will be the research team members: 1) the principal investigator-Pamela Hulstein, doctoral student and, 2) Dr. Judy Berg, academic advisor to Pamela Hulstein.

The information you provide will go into a file linked by your unique password and stored on Dordt College's server. After all the information has been given by the women participating in the study, it will given to the primary investigator in a de-identified format (no unique passwords attached) and statistical analyses will be used to interpret the information.

Your records will be confidential. You will not be identified in any reports or publications resulting from the study. It is possible that representatives of the sponsor that supports the research study will want to come to The University of Arizona to review your information. Representatives of regulatory agencies (including The University of Arizona Human Subjects Protection Program) may access your de-identified records.

What if I am harmed by the study procedures?

If any health-related issue is uncovered during the course of the study, you will be REFERRED to appropriate campus and community resources.

May I change my mind about participating?

Your participation in this study is voluntary. You may decide to not begin or to stop the study at any time. Your refusing to participate will have no effect on your student status. You can discontinue your participation with no effect on your student status. Also any new information discovered about the research will be provided to you. This information could affect your willingness to continue your participation.

Whom can I contact for additional information?

You can obtain further information about the research or voice concerns or complaints about the research by calling the Principal Investigator, Pamela

Hulstein, MSN, ARNP, CNM at 712-441-2445. If you have questions concerning your rights as a research participant, have general questions, concerns or complaints or would like to give input about the research and can't reach the research team, or want to talk to someone other than the research team, you may call the University of Arizona Human Subjects Protection Program office at (520) 626-6721. (If out of state use the toll-free number 1-866-278-1455.) If you would like to contact the Human Subjects Protection Program via the web, please visit the following website: <http://www.irb.arizona.edu/contact/>.

Your Signature

By signing this form, I affirm that I have read the information contained in the form, that the study has been explained to me, that my questions have been answered and that I agree to take part in this study. I do not give up any of my legal rights by signing this form.

Name (Printed)

Participant's Signature

Date signed

Statement by person obtaining consent

I certify that I have explained the research study to the person who has agreed to participate, and that he or she has been informed of the purpose, the procedures, the possible risks and potential benefits associated with participation in this study. Any questions raised have been answered to the participant's satisfaction.

Name of study personnel

Study personnel Signature

Date signed

APPENDIX B:
IRB APPROVED RECRUITMENT MATERIALS

Premenstrual Symptoms and Academic Stress-Got Any?

Female students between the ages of 18-25 years old are invited to participate in a research study that will describe:

- 1) Premenstrual symptom perception, severity and distress.
- 2) Academic stress
- 3) What is the relationship between these two?

Time Involvement:

45 minutes initial interview,
Daily Electronic Diary 5min/day for one cycle

If you are interested and would like more information about the possibility of enrolling in the study contact the Principle Investigator (Pam Hulstein) at hulstein@dordt.edu or 712-441-2445.

(All participants completing the study will receive a \$20.00 gift card to Wal-Mart.)

APPENDIX C:
DEMOGRAPHIC AND HEALTH HISTORY FORM

Demographic and Health History Form

1. What is your age? _____ years
2. What is your race or ethnic background?

<input type="checkbox"/> American Indian or Alaskan Native	<input type="checkbox"/> Hispanic/Latina
<input type="checkbox"/> Asian or Pacific Islander	<input type="checkbox"/> Mexican/Mexican American
<input type="checkbox"/> Black	<input type="checkbox"/> South American
<input type="checkbox"/> White	<input type="checkbox"/> Central American
<input type="checkbox"/> Other or unknown	<input type="checkbox"/> _____ Other (Specify)
3. Are you currently: Married Unmarried In a relationship
4. How many children do you have? (if none, indicate 0) _____
5. What is the population of the city, township, or municipality in which your permanent address is?

<input type="checkbox"/> 1, 000,000 or more	<input type="checkbox"/> 25,000 to 49,999
<input type="checkbox"/> 500,000 to 999,000	<input type="checkbox"/> 10,000 to 24,000
<input type="checkbox"/> 250,000 to 499,999	<input type="checkbox"/> 5,000 to 9,999
<input type="checkbox"/> 100,000 to 249,999	<input type="checkbox"/> 4,999 or under
6. What was the size of your high school graduating class? _____
7. What is your current year in college?

<input type="checkbox"/> Freshman	<input type="checkbox"/> Junior	<input type="checkbox"/> _____ Other
<input type="checkbox"/> Sophomore	<input type="checkbox"/> Senior	
8. What is your employment status?

<input type="checkbox"/> Unemployed	
<input type="checkbox"/> Employed Part-time _____	How many hours/week?
<input type="checkbox"/> Employed Full-time	
<input type="checkbox"/> Other	
9. What is your current Grade Point Average? _____
10. What is your current academic major? _____
11. Do you have access to a computer with internet on a daily basis?

<input type="checkbox"/> Yes	<input type="checkbox"/> No
------------------------------	-----------------------------
12. Do you currently Exercise?

If yes <input type="checkbox"/> How many hours/week? _____
What type of Exercise? _____

13. Do you have any financial concerns about the following?

- Tuition
 Books/Supplies
 Housing
 Food

14. List any Medications or Herbals taken on a regular basis?

5. Are you currently taking Oral Contraceptives? Yes No

16. Do you usually have a period/menstruation once a month? Yes No

17. What is the date of your Last Menstrual Period? _____

18. Age of first Menstrual period? _____

19. What is the average length of your cycles? _____

20. Number of days of bleeding? _____

21. Do you usually experience premenstrual symptoms with your periods?

Yes No

22. If yes to number 20:

Have you ever sought medical care for your premenstrual symptoms?

Yes No

What kinds of treatments/remedies have you used in the past?

What kinds of treatments/remedies are you currently using?

23. Do you have any chronic illness? Yes No

Diabetes? Yes No

High Blood Pressure? Yes No

Heart Disease? Yes No

Depression? Yes No

Anxiety? Yes No

24. Do you currently smoke? Yes _____ Number of cigarettes/day _____ No

APPENDIX D:
STUDENT-LIFE STRESS INVENTORY

Student-Life Stress Inventory
Bernadette M. Gadzella, Ph.D., 1991 Copyright
East Texas State University

This inventory contains statements dealing with student-life stress. Read it carefully and respond to each statement as it has related or is relating to you as a student. Use the 5-point scale which indicates the level of your experiences with:

1= never, 2= seldom, 3= occasionally, 4= often, and 5= most of the time

Record your responses on the accompanying answer sheet.

I. STRESSORS: A.

As a student:

1. I have experienced frustrations due to delays in reaching my goal.
2. I have experienced daily hassles which affected me in reaching my goals.
3. I have experienced lack of sources (money for auto, books, etc.)
4. I have experienced failures in accomplishing the goals that I set.
5. I have not been accepted socially (became a social outcast).
6. I have experienced dating frustrations.
7. I feel I was denied opportunities in spite of my qualifications.

B. I have experienced conflicts which were:

8. Produced by two or more desirable alternatives.
9. Produced by two or more undesirable alternatives.
10. Produced when a goal had both positive and negative alternatives.

C. I have experienced pressures:

11. As a result of competition (on grades, work, relationships with spouse and/or friends).
12. Due to deadlines (papers due, payments to be made, etc.)
13. Due to an overload (attempting too many things at one time).
14. Due to interpersonal relationships (family and/or friends expectations, work responsibilities).

D. I have experienced:

15. Rapid unpleasant changes.
16. Too many changes occurring at the same time.
17. Changes which disrupted my life and/or goals.

E. As a person:

18. I like to compete and win.
19. I like to be noticed and be loved by all.
20. I worry a lot about everything and everybody.
21. I have a tendency to procrastinate (put off things that have to be done).
22. I feel I must find a perfect solution to the problems I undertake.
23. I worry and get anxious about taking tests.

II. REACTIONS TO STRESSORS: h

F. During stressful situations, I have experienced the following:

24. Sweating (sweating palms, etc.)
25. Stuttering (not being able to speak clearly).
26. Trembling (being nervous, biting finger-nails, etc.)
27. Rapid movements (moving quickly from place to place)
28. Exhaustion (worn out, burned out)
29. Irritable bowels, peptic ulcers, etc.
30. Asthma, bronchial spasms, hyperventilation
31. Backaches, muscle tightness (cramps), teeth-grinding]
32. Hives, skin itching, allergies.
33. Migraine headaches, hypertension, rapid heartbeat.
34. Arthritis, overall pains.
35. Viruses, colds, flu.
36. Weight loss (can't eat)
37. Weight gain (eat a lot)

G. When under stressful situations, I have experienced:

38. Fear, anxiety, worry
39. Anger
40. Guilt
41. Grief, depression

H. When under stressful situations, I have:

42. Cried
43. Abused others (verbally and/or physically)
44. Abused self (use of drugs, etc.)
45. Smoked excessively
46. Was irritable towards others
47. Attempted suicide
48. Used defense mechanisms
49. Separated myself from others

I. With reference to stressful situations, I have:

50. Thought and analyzed about how stressful the situations were.
51. Thought and analyzed whether the strategies I used were most effective.

APPENDIX E:
DAILY ELECTRONIC DIARY

Daily Electronic Diary

MENSTRUAL SYMPTOM SEVERITY LIST (MSSL)

The following statements refer to feelings or behaviors. Please tell us how severely you have experienced these feelings or how bothersome the behaviors were during the last 24 hours. Please rate “minimal” if you experienced the feelings as very minor or not at all bothersome. Rate the experience as “extreme” if this is the worst you have ever felt or if the experience is the most bothersome. Rate “moderate” if bothersome enough to interfere with your daily function in some way, and rate “mild” if only slightly bothersome or minimal bother. Place an “X” in the box that best describes your experience.

In the far right column, mark how distressed or bothered you are about the symptom with 0=no distress and 10 = extreme distress.

Write in the date (Example: 02/14/2008) and indicate if menses or spotting occurred during the last 24 hours.

Date: ___/___/_____. Menses: yes/no, Spotting: yes/no

Feelings or Behaviors	Not Present	Minimal	Mild	Moderate	Extreme	Distress (0-10)
1. Abdominal bloating						
2. Alcohol craving						
3. Anger						
4. Anxiety						
5. Backache/Neckache						
6. Constipation						
7. Cramps-uterine or pelvic						
8. Depression/felt sad or Blue						
9. Diarrhea						
10. Difficulty concentrating						
11. Difficulty falling asleep						
12. Dizziness						
13. Eating more than usual						
14. Fatigue or tiredness						

15. Feelings of wellbeing						
16. Felt energetic						
17. Forgetfulness						
18. Generalized body aches						
19. Headache						
20. Heart racing or Pounding						
21. Hostility						
22. Impatience						
23. Increased sexual desire						
24. Indigestion/upset stomach						
25. Irritability						

26. Joint pain or stiffness						
27. Loss of appetite						
28. Loss of interest in things						
29. Loss of sexual desire						
30. Nausea/upset stomach						
31. Nervousness						
32. Numbness and tingling						
33. Mood swings						
34. Out of control feelings						
35. Painful or tender breasts						
36. Panic feelings						
37. Shortness of breath						
38. Skin breakout/acne						
39. Swelling of hands or feet						
40. Tearfulness/crying spells						
41. Tension						

42. Urinary frequency/leakage						
43. Vaginal dryness						
44. Waking up during the night						
45. Waking up too early						
46. Weight gain						
47. Weight loss						
48. Anything else:						

Academic Demands

Please indicate a numeric value for the following during the last 24 hours. In the second blank mark how distressed or bothered you are about the academic demand with 0=no distress and 10 = extreme distress:

1. Number of Assignments due: _____, Distress (0-10)_____
2. Number of Papers due: _____, Distress (0-10)_____
3. Number of Projects/Presentations due: _____, Distress (0-10)_____
4. Time spent studying: _____Hours _____Minutes, Distress (0-10)_____

Indicate a numeric value for the following during the last 24 hours:

5. Amount of time spent sleeping (include napping) _____Hours _____Minutes
6. Amount of time spent at work/employment _____Hours _____Minutes
7. Amount of time spent exercising _____Hours _____Minutes

Provide a response for the following:

8. Medications (Prescription or Over the Counter, including herbals) I have taken in the last 24 hours: _____

9. Today I am at my:
 - a. Academic address
 - b. Permanent address
 - c. Other

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