

**Role of emotional, physical health, and social support on health-promoting behaviors
among middle-aged women**

A thesis submitted during June 2025 to the Centre for Psychology, School of Medical Sciences, University of Hyderabad in partial fulfillment of the requirements for the award of the degree of Doctor of Philosophy in Psychology

By

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CERTIFICATE

This is to certify that the thesis entitled "*Role of emotional, physical health, and social support on health-promoting behaviors among middle-aged women*" submitted by Ms. Anuradha Nautiyal bearing Registration Number 19CPPH04 in partial fulfilment of the requirements for award of Doctor of Philosophy in the School of Medical Sciences is a bonafide work carried out by her under my supervision and guidance.

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Further, the student has the following publications before submission of the thesis for adjudication and has produced evidence for the same in the form of reprint in the relevant area of her research:

1. Seema, N., Nautiyal, A., & Rana, S. (2025). Role of Health-promoting Behaviours in Minimising Mental Health Vulnerability of Middle-aged Women: Insights from Cluster Analysis. *Annals of Neurosciences*. <https://doi.org/10.1177/09727531251335429> (ISSN No. 0976-3260)
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Further, the student has passed the following courses towards fulfilment of coursework requirement for Ph.D.

Course Code	Name	Credits	Pass/ Fail
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HP 828	Review Paper III	4	Pass
HP 829	Empirical Paper IV	4	Pass

*Research Methodology and Advanced Statistics


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DECLARATION

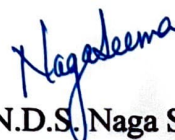
I, Anuradha Nautiyal, hereby declare that this thesis entitled "*Role of emotional, physical health, and social support on health-promoting behaviors among middle-aged women*", submitted by me under the guidance and supervision of Dr. N.D.S. Naga Seema, Associate Professor is a bonafide research work. I also declare that it has not been submitted previously, in part or in full, to this university or any other University or Institution for the award of any degree or diploma. I hereby agree that my thesis can be deposited in the Shodhganga/INFLIBNET. A report on plagiarism statistics from the University Librarian is enclosed.

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Among 17 goals (<https://sdgs.un.org/goals>), under which SDG the work incorporated in the thesis will be addressed: The study signifies the objectives of the Sustainable Development Goals (SDGs)—empowering women of all ages (SDG-5) and ensuring healthy lives and well-being (SDG-3).

How the work incorporated in the thesis addressed the above SDG (in 250 words):

The thesis incorporates the agenda of SDG 3 to promote good health and well-being and SDG 5, empowering women of all ages through focusing on health-promoting behaviours among middle-aged women. The health of middle-aged women is encapsulated holistically along the variables of emotional, physical, and reproductive health, as middle age for women presents unique opportunities and challenges through the transition from regular menstruation, perimenopause, to menopause. The focus on health-promoting behaviors recognizes the agency of women in empowering themselves to promote positive living. The study contributes to the discourse that health-promoting behaviors synonymous with positive health regard, such as nutritious diet, physical activity, spiritual growth, interpersonal relationships, informed health decisions, and stress management, are necessary to deal with the natural menstrual transitions in middle age for women. The results provided new insights into the high health-promoting behaviors cluster, fostering good emotional and physical health. On the contrary, the cluster of low health-promoting behaviors represented impoverished support from family, friends, and significant others and higher psychological distress. The rural and urban geographical settings have been found to be associated with a high prevalence of gynecological and contraceptive morbidities, respectively, among middle-aged women. Perimenopause and regular menstruation render middle-aged women vulnerable and have been shown to be associated with low health-promoting behaviors cluster. Age, employment, and menstrual stage confound the likelihood of women utilising health-enhancing behaviors to lead a better life. Hence, empowerment of women in middle age requires utmost regard for their changing physiology, emotional, physical health, reproductive health, and their ability to engage in health-promoting behaviors.

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गुरु गोविन्द दोऊ खड़े, काके लागूं पांय।
बलिहारी गुरु अपने गोविन्द दियो बताय॥

-Kabir Das

This couplet by the 15th-century poet Sant Kabir Das roughly translates to ‘If God and my teacher are both standing in front of me, and there is a dilemma about whom to greet first, I would first greet my teacher as they have led me to God’. My teacher, Dr. N.D.S. Naga Seema, Associate Professor, Centre for Psychology, has been my guide leading me through her super and superb vision for the past five and half years with patience, kindness, openness, and perseverance. I am eternally grateful to her for nurturing and mentoring me through innumerable opportunities to become a better researcher and person.

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Abstract

For women, middle age brings typical physiological changes that are likely to impede their psychological functioning. Health-promoting behavior acts as protective measures against biopsychosocial midlife challenges. This study explored the profile of health-promoting behaviors, identified the prevalence and pattern of reproductive morbidities, examined the differences and associations between the profile of health-promoting behaviors, emotional, physical health, psychological distress, social support, reproductive morbidities, and confounding variables, and assessed the role of emotional, physical health and social support on health-promoting behaviors among middle-aged women. A simple retrospective design with one group involving middle-aged women ($N = 440$) was used. The participants were administered four standardized measures along with a sociodemographic form. Descriptive statistics, Cluster analysis (k-means), discriminant analysis, Chi-square, correlation, multiple regression analysis (step-wise), One-way ANOVA, and post-hoc analysis (Tukey's HSD) were run. Findings established three meaningful natural clusters—high, medium, and low health-promoting behaviors within a homogenous group of middle-aged women. Symptoms of gynecological and contraceptive morbidities were identified in rural and urban settings, respectively. Symptoms of reproductive morbidities were linked to the perimenopause stage. High health-promoting behaviors cluster fostered good emotional and physical health, whereas low health-promoting behaviors represented impoverished perceived social support and higher psychological distress confounded by age, education, employment, and menstrual stages. Overall, social support enhanced health-promoting behaviors, and poor emotional and physical health minimized health-promoting behaviors in middle-aged women. Limitations, future directions, along with implications, and conclusions were discussed.

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Abbreviations

A/F:	Anxiety/Fear
AT:	Attractiveness
DASS:	Depression, Anxiety, and Stress Scale
DM:	Depressed Mood
HPLP-II:	Health Promoting Lifestyle Profile II (HPLP-II)
HR:	Health Responsibility
IR:	Interpersonal Relations
M/C:	Memory/Concentration
MS:	Menstrual Symptoms
MSPSS:	Multidimensional Scale of Perceived Social Support
PA:	Physical Activity
N:	Nutrition
SB:	Sexual Behavior
SCT:	Social Cognitive Theory
SG:	Spiritual Growth
SM:	Stress Management
SP:	Sleep Problems
SS:	Somatic Symptoms
STRAW:	Stages of Reproductive Aging Workshop
VS:	Vasomotor Symptoms
WHQ:	Women's Health Questionnaire
WHO:	World Health Organization

Chapter I

INTRODUCTION

Women's health is the indicator of a society's development and progress. A healthy woman is free of the burden of disease, lives her life to her utmost potential, and perpetuates a cycle of healthy living across generations. Women undergo natural biological changes that impact their emotional and physical health throughout their lifespan. Especially in middle adulthood, women experience progressive physiological changes that affect future health and increase morbid vulnerabilities. Middle adulthood is the developmental period encompassing fluid age boundaries that begin at 40 to 45 and extend to age 60 to 65. This period of middle age is marked by a decline in physical abilities and extension of responsibilities as the consciousness of transition from young to old age and limited lifetime sets in (Lachman, 2004). Healthy middle age thus comprises harmonizing work and relationship responsibilities amidst aging-related psychological and biological challenges.

During middle age, stress starts impacting health and is commonly linked to diseases and disorders of the immune and cardiovascular systems (Bauer et al., 2009). Moreover, for women as the protective advantage of hormones is lost over the middle age years, they become more vulnerable to chronic non-communicable diseases (Puri et al., 2022). Other issues are faced by women in their middle age, like fertility, pregnancy, transition to menopause, multiple role responsibilities, and career opportunities (Infurna et al., 2020; Peacock et al., 2023). These conditions impede the physiological, psychological, and social functioning of middle-aged women and impact their mental and biological health status. Furthermore, as women age into middle adulthood, their health and life become less of a concern for everyone, including themselves (Brown et al., 2015). However, positive lifestyle modifications and social support can act as countermeasures against multiple challenges for women in middle age (Pataky et al., 2021). Conversely, the life expectancy of women is

increasing globally, and women are likely to lead one-third of their lives after attaining menopause (Lobo & Gompel, 2022). In India, women aged 45 years or older will be numbered 401 million by 2026. This large demography pertains to middle age and is on the threshold of the midlife menstrual transition. Women in India could spend an average of 30 years in the postmenopausal period of their lives (Kundu & Acharya, 2024). Since the quality of life in older years depends on health in middle age, it is pertinent to have a discourse on the health requirements of middle-aged women.

Middle-aged women's health

Women are at a natural disadvantage due to their reproductive aging during middle age. Physiological and psychological health problems manifest in different menstrual stages in middle age, from regular menstruation to menopause. Menopause is the cessation of the menstrual period that occurs in middle age, typically in the late forties and early fifties. The average of experiencing the last menstrual period globally is 51 years. Physiological changes associated with attaining menopause take a transitional course, often ranging over 2-8 years (Santoro, 2016). The transitional period from regular menstrual period to no menstruation that can range over a decade is defined as perimenopause. Perimenopause usually occurs in the forties; however, the thirties can also mark the perimenopausal period (De Franciscis et al., 2019). According to the World Health Organization (WHO, 2024), during the perimenopause stage, women experience various physical symptoms like hot flashes, palpitations, night sweats, headaches, itching, urinary incontinence, and sleep problems. Perimenopausal women may also experience irregularities in menstrual bleeding, such as heavy bleeding or amenorrhea, and painful intercourse due to vaginal dryness. Often, these physical symptoms are accompanied by psychological symptoms of mood swings, anxiety, depression, concentration disorders, nervousness, emotional disturbances, decreased libido, and body image issues. Perimenopause is often considered the period of peak in depression

(Talaulikar, 2022). For health researchers, the period of menopausal transition in middle age holds special attention as it is associated with stress, cardiovascular diseases, and body weight changes.

There are, however, variations at both individual and cultural levels in the experiences of menstrual trajectory in midlife, exemplified by the age of attaining menopause. The age of attaining menopause is considerably lower in India than the global average, possibly due to lower quality of life, stigmatized cultural influences, and health disparities (Prasad et al., 2021). Ahuja (2016), in a pan-India survey, determined the average age for natural menopause as 46.2 ± 4.9 years and the mean age of perimenopause as 44.69 ± 3.79 with variations depending on lifestyle and sociodemographic factors. The onset of menopause at an earlier age is a concern as it demarcates early infertility and increased mortality. Women connect their menstruation to their femininity, cessation of which is seen as a sign of reproductive incapacity and to partake passively in the community (Rehyani et al., 2018; Ussher et al., 2015).

Another prominent development is that fewer pregnancies, decreased lactation time, and age shifts in maternity have increased the duration of menstruation among women. Recent trends have shown that women above 35 years are expected to be first-time mothers now than ever. However, the risks of miscarriage, ectopic pregnancy, and stillbirth increase with age. Research has also revealed that family planning in later years intensifies the risk of cardiovascular diseases, hypertension, diabetes, and heart failure among women. Interestingly, the late age of attaining menopause also pertains to a decreased risk of cardiovascular diseases and a higher risk of developing cancer simultaneously (Van Den Akker, 2012). Furthermore, menstrual cycle irregularities may have larger implications for the psychological and reproductive health of middle-aged women. Nevertheless, another outlook on middle age shows that menopause liberates women from the discomfort of

menses, frees them from social roles as the children are now grown, and increases self-care (Singh & Sivakami, 2020). The juxtaposition of menstrual perception in middle age throws light on its variability and health influences on women. Consequently, negative perceptions and attitudes about the menopausal transition in middle age have hampered its understanding as a natural process with unique individual variations and multidimensional health effects (Dalvi, 2024).

Health behaviors of middle-aged women

It is essential to note that women in India tend to ignore their health issues till they become life-threatening (Shukla, 2020). The understanding of middle-age transitions among Indian women remains low due to a lack of awareness and taboos around reproductive health (Nagaraj et al., 2021). This is especially true for menopausal symptoms, viewed as natural aging processes requiring no unnecessary consideration (Ilankoon et al., 2021). Most women do not know about menopause, let alone the myriad of symptoms associated with menstrual transition in middle age (Harper et al., 2022). According to Durairaj and Venkateshvaran (2022), even when middle-aged women are aware of attaining menopause, the course of action once they reach it is uncertain. Additionally, middle-aged women tend to dissociate their psychosocial and physical problems from their menstrual status. The physical and mental components of middle age are also evident in sociopsychological effects such as inactive lifestyle, stress, smoking, and alcohol consumption. Physical inactivity, unhealthy diet patterns, low health accountability, absence of meaningful relationships, maladaptive stress coping strategies, and poor spiritual health are major contributors to the deteriorating lifestyles of middle-aged women.

Health behaviors are intertwined with existing health conditions and social provisions. Social support, cultural factors, individual behaviors, psychological states, and personality differences heavily influence health behaviors and outcomes. Remarkably, variations in

health behavior lead to reproductive health changes (Van Den Akker, 2012). The overreaching impacts of negative lifestyle behaviors, such as overweightness, tobacco use, alcohol consumption, and exposure to environmental pollution, can be seen in decreasing fertility rates. Women remain ignorant of the fact that eating junk food, persistent abdominal fat, and physical inactivity have a bearing on their fertility and overall health. Even after gaining knowledge, leading a healthy lifestyle is an individual choice that requires personal responsibility to negate the effects of health issues. Researchers agree that middle-aged women's health outcomes are determined by their ability to make their own health decisions (Routray et al., 2017). Additionally, social support in the form of emotional and informational care encourages middle-aged women to live healthily. In contrast, lack of social support can have overbearing effects on women's mental and physical health in middle age. Family, in Indian society, is the source of comfort and challenges for women, whose self-sacrificial nature and multiple responsibilities seldom allow them to focus on themselves. Middle age is also a time when children leave home, and women rely on their husbands or relatives for support. Receiving informational support from close ones helps women deal with midlife transition and challenges. An understanding of emotional and physical health changes and social support in middle age is thus needed as it can impact relationships, sexual functioning, and the educational, social, and work milieu. Health-enhancing activities can significantly contribute to alleviating emotional and physical symptoms associated with middle age. Lifestyle factors and health behaviors are thus increasingly relevant in understanding and combating middle age health issues for women.

The shame and embarrassment regarding sexual and reproductive health inhibit middle-aged women from discussing their emotional and physical problems openly. Limited access to health facilities and the inaptitude of healthcare providers regarding middle-aged women's health further add to the prevailing problems in developing countries (Gopalakrishnan et al.,

2019; Gosalia, 2012; Reed et al., 2000). Agreeably, Srivastava and Upadhaya (2022) caution that unfavorable cultural perceptions toward women's reproductive health, especially in the context of aging, prevent any fruitful public discourse on the topic. It is not surprising that negative social perceptions reveal unmet needs and inadequate readiness for menopause among middle-aged women (Shorey & Ng, 2019). Nevertheless, although middle-aged women often live an inactive life that diminishes health enhancement, particular behaviors uplift their lives to constructive living (Singhania et al., 2020). Studies have shown that women who consciously take care of their lifestyle and enthusiastically participate in productive activities safeguard themselves from morbidities related to midlife changes (Guérin et al., 2017). Research has also shown that health concerns associated with midlife transitions provide a window of opportunity for health promotion and supporting women to make better lifestyle choices (Simpson et al., 2024). Determinately, lifestyle modifications through health-promoting behaviors of nutrition management, physical activity, stress relief, self-care, social relations, and spirituality act as buffers for psychological distress associated with midlife transitions among women (An et al., 2016; Iioka et al., 2014; Marques et al., 2020; Sunny & Raman, 2019). Coping methods, including establishing social support networks and health promotion through diet and exercise, can help middle-aged women live longer, healthier lives (Agarwal et al., 2018). Emotional support from friends and social relations can empower middle-aged women to sail through the transition in their health (Chang & Sohn, 2020).

Scientists have established middle age as a period of increased vulnerability to multimorbidity among women. The alarming increase in multimorbidity among middle-aged women is deeply entrenched in their reproductive, psychological, and social health in the menopausal transition (Puri et al., 2022). Although research has focused on the different aspects of women's health in reproductive years, the holistic biological, psychological, and

social health of women as they go through the trajectory of attaining menopause in middle age is overlooked. Moreover, as research is rising towards the benefits of positive behaviors on health, women beyond the reproductive age are unheeded. Over the last few decades, attention has been given to short-term aspects of women's health, like pregnancy and labor, particularly for those in their prime youth. Even then, the long-term complications arising out of pregnancy or contraception are disregarded (Mann & Stephenson, 2018). Women's health in middle age is associated chiefly with menopause, ignoring the larger ambit of transitioning reproductive health. This subsequently leads to inadequate knowledge, lack of awareness, and unhealthy management among middle-aged women. This, in turn, perpetuates the cycle of behaviors that negatively impact women's health in middle age. Most middle-aged women lack the knowledge and opportunities to enhance their health. Nevertheless, with the rise in life expectancy and possible better quality of life, women are at the forefront of bringing positive changes in their behaviors, which need to be highlighted.

Problem statement

Based on exhaustive literature, it is clear that middle-aged women are at a crucial stage in their reproductive life, undergoing significant hormonal and metabolic changes, which deteriorate their life quality and amplify the risk of chronic ailments. Moreover, WHO (2024) has specified that women's current health status is a function of their previous reproductive and health history as well as their lifestyle and environment. Researchers have recommended adequate profiling to fill the knowledge gaps about women's health behaviors in middle age that impact their overall health (Kar & Roy, 2017).

In India, although women's health in reproductive years is receiving attention, significant questions regarding women's health in middle age are yet to be explored. Hence, this study proposed to investigate whether there is a profile of health-promoting behaviors among middle-aged women, whether there is a prevalence and pattern of symptoms of

reproductive morbidities among middle-aged women across geographical settings and menstrual stages, whether there is any difference or association between health-promoting behaviors, emotional, physical health, psychological distress, social support, reproductive morbidities, and confounding variables, and whether there is any role of emotional, physical health and social support on health-promoting behaviors. Therefore, a simple retrospective design must be aimed at exploring the health-promoting behaviors, identifying the prevalence and pattern of reproductive morbidities, examining the differences and associations between the profile of health-promoting behaviors, emotional and physical health, psychological distress, social support, reproductive morbidities, and confounding variables, and assessing the role of emotional, physical health, and social support on health-promoting behaviors, among middle-aged women.

Health-promoting behaviors

The health-promoting behaviors of women in middle age are conceptualized as their day-to-day actions that have a positive effect on their healthiness and well being. These actions act as protective measures to minimize morbid vulnerability. The health-promotion model, as elicited by Pender et al. (1992), detects unhealthy behaviors and contributes to behavior changes in terms of health-conscious actions and well-being promotion. The model signifies the importance of personal and conditional impacts on health, how their benefits are perceived, barriers to behavioral actions, their affect, and personal agency. Among health-promoting behaviors, making informed health decisions, exercising, healthy diet patterns, developing self, maximizing self-potential, reducing tension, and communicating to have meaningful relationships have a positive bearing on middle-aged women's health. Women's ability to use their skill set and healthy behaviors are requisite in navigating physical, social, and psychological needs in midlife transitions. Lifestyle changes to health-promoting behaviors could prove to be an effective management strategy.

Emotional and physical health

Prominent among the challenges of mid-life transitions are the emotional and physical health challenges in the menstrual trajectory of attaining menopause. Perimenopause with or without symptoms and menopause affect women all over the world. Given the increased longevity of life, menopausal symptoms are grave concerns for the health of middle-aged women. Women's self-perception of emotional and physical health influences their coping with changes associated with middle age. Rural settings with a lack of health care complicate the menstrual and reproductive experiences. However, it can bring about changes in women's resilience and hardiness. Even when women perceive menopause to be a natural event, the onset of menopausal symptoms can be unexpected. Perimenopause itself can last for decades and affect the quality of middle-aged women's lives. The early onset of menopause can be devastating for women trying to conceive. Regional and ethnic diversity may exist in the experience of emotional and physical health symptoms in middle age. Individual perceptions and attitudes about menopause impact women's reactions to menopausal symptomology. Incidentally, menopausal and psychological health have been established as naturally linked via hormonal pathways, especially for the period of perimenopause. Among other reasons for negative menopausal experiences, life incidences in work and family life coinciding with menopausal changes in middle age can be important precursors. Women may find themselves unprepared for the symptoms of menopausal transitions and are likely not to tolerate it well. The symptoms affect their daily lives and often result in abdomen weight gain during perimenopausal and menopausal years (Van Den Akker, 2012). Physiological and psychological symptoms such as mood swings, menstrual irregularities, hot flashes, palpitations, fear, trouble remembering, sexual life, and body image issues impact women's experiential health perceptions in middle age. These cognitive, emotional, and physiological health perceptions affect women's quality of life in middle age during the menstrual

transition from regular menstruation and perimenopause to menopause. Emotional and physical health is thus conceptualized as the women's subjective perception of their general feelings and bodily experiences in middle-age transitions.

Psychological distress

Psychological distress is conceptualized as the presence of negative affective states of depression, anxiety, and stress. The severity of these states manifests as mental health problems negatively affecting the health and well-being of middle-aged women. Impaired mental health and subsequent psychological disorders may result in poor health perceptions, low work-life balance, unhealthy lifestyles, and social isolation among middle-aged women.

Social support

Social support is a multidimensional construct that includes the individual's available psychological and materialistic resources through interpersonal relationships (Rodrigues & Cohen, 1988). Social support consists of emotional, physical, and social comfort and support provided by family, friends, and community. It brings the feeling of being cared for and being a part of a family, group, or society at large. Perceived social support assesses women's perception and satisfaction with support availability in times of need. Support from the significant other acts as an enabler to allow women to partake in positive actions for themselves. Perceiving adequate emotional support from family and friends may fuel the desire of middle-aged women to live positively. Social support has consistently been proven to supplement women's health behaviors. Supportive relationships act as a strong buffer against the multiple demands and responsibilities of mid-life challenges. Perceived social support is thus operationalized as the subjective assessment of the adequacy of received emotional support from various sources of life partners, family, friends, or community in women's lives in middle age.

Menstrual stages

Stages of Reproductive Aging Workshop (STRAW) classifies reproductive aging into three broad stages based on menstrual cycles—reproductive interval (regular menstruation), menopausal transition (irregularities in the monthly period till the final menstrual period), and postmenopause (years after the last menstrual period till demise). To objectively measure menopausal transition, the term perimenopause implies the time when irregularities in the menstrual period start till the first year after the final menstrual period (Soules et al., 2001). Menopause nomenclature has considerable variations and ambiguity in the literature, and attempts to meaningfully classify this stage of reproductive aging are still going on (Ambikairajah et al., 2022). To streamline the course of menstruation for women in middle age, menstrual stages are operationalized as three stages: regular menstruation, denoting regular monthly periods for at least three months; perimenopause, denoting irregularities in monthly periods for 2-12 months; and menopause, marking no menstruation in the last 12 months.

Reproductive morbidities

Morbidities are mostly measured as the condition of disease occurrence or the symptoms of diseases, perception of ill health, or severity of conditions (Van De Wijgert & Elias, 2003). Reproductive morbidities refer to physically morbid conditions, including those outside the childbearing period, such as gynecological morbidities, contraceptive morbidities, and obstetric morbidities (WHO, 1990). Several symptoms are associated with reproductive morbidities among women (Zurayk et al., 1993). Accordingly, reproductive morbidities are defined as any dysfunctions or morbidities that may or may not be a consequence of sexual behavior, contraception, childbirth, or abortion. Thus, reproductive morbidities have been conceptualized in the four domains of gynecological morbidities, contraceptive morbidities, obstetric morbidities—childbirth, and obstetric morbidities—abortion. Gynecological

morbidities include conditions arising out of the sexual practices of women. The symptoms can include excessive vaginal discharge, irregular menstrual period accompanied by heavy bleeding, painful intercourse or dyspareunia, amenorrhea or no bleeding, urinary infection, itching, abdominal or lower back pain, and inguinal swelling. Contraceptive morbidities are health conditions specific to the side effects of contraceptive usage among women. The symptoms associated with hormonal, oral, and surgical contraceptive use can comprise irregular bleeding patterns, weight issues, breast tenderness, nausea, increased vaginal discharge, mood swings, urinary infection, abdominal pain, etc. Obstetric morbidities are maternal morbidities arising from pregnancy and its course of delivery and post-delivery complications. Another component of obstetric morbidities is the complication arising out of miscarriages, failed childbirth, or abortions. Symptoms associated with obstetric or maternal morbidity can include severe bleeding, loosening of pelvic muscles leading to uterine prolapse, severe mood swings, uterine infection, pain, and smelling vaginal discharge (Bhanderi & Kannan, 2010; Bhatia & Cleland, 1995; Van Den Akker, 2012).

Rationale

Research and policies have deluded the women who are incapable of reproduction, focusing mainly on pregnancy-related facets of a woman's life. Consequently, there is a dearth of studies on the reproductive lives of middle-aged women, including its gynecological, obstetric, and contraceptive components. Research about how the emotional and physical components of women's health in middle age impact health behaviors is even more scarce. Literature about years of menstrual transitions to final menopause among middle-aged women is in its infantile stage. Even in menopause, the components of women's psychosocial health are barely understood in the Indian scenario. Moreover, middle-aged women tend to dissociate their health complications from their menstrual stage. However, menopausal transitions in middle age can have insurmountable consequences on women's

bodies unless managed with actions and lifestyles that enhance their overall health. The reviewed studies mostly highlighted the consequences of aging on health, not on overcoming the biopsychosocial challenges of middle age. Nonetheless, the agency of women has enhanced substantially in the last years, and they are societally perceived beyond their fertile role. The identification of women's health status would prove to be an important predictor of health service utilization and health requirements of women in middle age. Hence, this study scientifically investigates the profile of health-promoting behaviors among middle-aged women. It also identifies the pattern and symptoms of reproductive morbidities among middle-aged women across rural and urban settings, as well as the stages of menstruation. Further, the study examines the difference and association between health-promoting behaviors, emotional, physical health, psychological distress, social support, reproductive morbidities, and confounding variables in middle-aged women. Conversely, the study also assesses the role of emotional, physical health, and social support on health-promoting behaviors among middle-aged women.

There is a need to study the health-promoting activities of Indian women in middle age to understand how women are dealing positively with health and age-related challenges in midlife. Further, it is pertinent to identify the morbidities associated with reproductive health in middle age, which have hitherto been overlooked in the literature. Women's health behaviors and lifestyles are mostly a function of their physiological and sociocultural factors. Thus, it is essential to examine whether health-promoting behaviors differ or are associated with biopsychosocial aspects among middle-aged women. Enhancing middle-aged women's ability to partake in health promotion is influenced by various factors. Subsequently, the factors influencing middle-aged women's health-promoting behaviors should be assessed. A quantitative research method will be adopted to evaluate middle-aged women's biopsychosocial health and health-promoting behaviors. The present study will adapt to

previous studies that assessed women's health in menopause but provide new insights regarding health-promoting behaviors of women in middle age, as well as their reproductive, emotional, and physical health, psychological distress, and social support. This study thus aims to bridge the research gap by highlighting how health promotion can lead to health inclusivity among middle-aged women. The results will significantly contribute to health education, the identification of reproductive morbidities, emotional, physical, psychological distress, and social well-being of women in midlife. The findings will be potentially beneficial for future researchers, policy decision-makers, academicians, and health service providers in promoting healthy lifestyles among middle-aged women.

Middle age has been globally recognized as a period of physiological changes for women that reduces their reproductive functioning. Recently, research has also shed light on the emotional and physical impact of physiological changes in middle-aged women. Since the primary focus is on women's health and health-promoting behaviors in midlife transition, the current study has been conceptualized under the theoretical framework of Developmental Health Psychology and Reproductive Health Psychology. Six theories—transition theory, theory of adult development, social convoy theory, health belief model, theory of planned behavior, and social cognitive theory have been studied to understand the health of middle-aged women.

Transition theory

The transition theory proposed by Nancy Schlossberg (1984) was perused as a theoretical framework to examine how women understand and deal with transitions in middle age. It is expounded that women in middle age go through a natural transition in terms of their menstrual trajectory. Women's ability to cope with this midlife transition is dependent on their experience of menstrual stages, from regular menstruation and perimenopause to menopause. The incumbent situation of their emotional and physical health determines the

understanding of the triggers and timings of the menstrual transition in middle age. It further affects their self-care and management of symptoms through health-promoting behaviors. Social support provides women the adaptive strategies to deal with menstrual transition in middle age.

Theory of adult development

The theory of adult development formulated by Levinson (1976) explains personality development in the context of life structures. Life structures are fundamental patterns of a person's life at a certain time. Women's *life structure* evolves after the age of 30 as they reevaluate the youthful *dream* of what they hope to achieve in the future. They then settle down and set goals for the time of achieving the dream in middle age. The transition into middle age takes a long time because of emotional and physical health constraints in forming life structures. Middle-aged women anchor their lives in family, occupation, and society, which impacts the requisite social support for dealing with midlife transitions. Middle age is also a time for women to make dramatic changes in life and future commitments toward positive health behaviors as they reflect on the time that has passed and the years ahead.

Social Convoy Model

The social convoy model theorized by Antonucci et al. (2014) looks at social relationships from a lifespan perspective. For middle-aged women, relationships with significant others, family, and friends move throughout the *life course*, significantly influencing health and well-being. The different types of social relations (significant other, family, and friends) evolve over time with life experiences. The convoy model places middle-aged women's relationships into comparative *closeness* depending on the *structure*, *function*, and *quality*. Structure of family size, physical proximity with friends, functional aid through emotional support, and positive quality of social support from close ones impact women's

health-promoting behaviors. *Personal factors*, for instance, age and situational factors like emotional and physical conditions, influence the social convoys of middle-aged women.

Health Belief Model

The health belief model given by Rosenstock (1966) explicates the predictors and precursors of behaviors relating to health. Among middle-aged women, *contextual factors* related to their socio-economic background, psychological health, and social support play an important role in determining health behaviors. These different variables of women's lives impact *health threats* through the *perceived susceptibility* and *perceived severity* of symptoms associated with menstrual and middle age health transitions. *Health expectations* in the form of *perceived benefits*, such as social support and improved emotional health, along with *perceived barriers*, such as deteriorating physical health, reproductive morbidities, and severe menstrual symptoms, can influence women's likelihood of engaging in health risk or health-promoting behaviors. Further, understanding menopause as a part of the menstrual trajectory and understanding the importance of healthy living can influence *cues to action* of health-promoting behaviors.

Theory of Planned Behavior

Ajzen's theory of planned behavior (1991) predicts a person's actions or behaviors. In the context of middle-aged women, a change in their behavior could be predicted by experiences, specific *attitudes*, prevalent *norms*, and *perceived control over behaviors*. *Background factors* related to age and emotional and physical health conditions can influence the *behavioral beliefs* of women regarding their *health outcomes*, *motivation* to partake in health-promoting behaviors, and *perceived power* over their actions. These may affect the attitude towards health behaviors, societal health norms, and perceived power over health conditions among middle-aged women, impacting their *intention* to involve in health-promoting behaviors. *Actual behavior control* through resources and opportunities in the

form of sound emotional and physical health, as well as social support, can help middle-aged women succeed in following health-promoting behaviors. This theory is thus successful in predicting the health behaviors of middle-aged women.

Social Cognitive Theory (SCT):

The social cognitive theory propounded by Albert Bandura (1986) entails reciprocal determinism between the components of experiences, behavior, and environmental attributes. Among middle-aged women, emotional and physical health influence their *cognitive capabilities* and, thereby, their *health behaviors* like physical activity, diet, stress management, etc. The SCT theory is especially beneficial for middle-aged women going through the menopausal transition with *individual experiences* shaped by their reproductive health history, lifestyle, and psychosocial health. *Reciprocal determinism* between distinct experiences, health behavior capabilities, and socio-environmental interactions facilitates health-promoting behaviors through *positive reinforcements* and *observational learning*.

Purpose statement

This study proposes to explore the profile of health-promoting behaviors among middle-aged women. The study also aims to identify the prevalence and pattern of symptoms of reproductive morbidities among middle-aged women across geographical settings and menstrual stages. Additionally, the study aims to examine the differences and associations between the profile of health-promoting behaviors, emotional, physical health, psychological distress, social support, reproductive morbidities, and confounding variables in middle-aged women. Lastly, the study assesses the role of emotional, physical health, and social support on health-promoting behaviors among middle-aged women. Quantitative approach is utilized to address the four main research questions— (1) What is the profile of health-promoting behaviors among middle-aged women? (2) What is the prevalence and pattern of symptoms of reproductive morbidities among middle-aged women across geographical settings and

menstrual stages? (3) What is the difference and association between the profile of health-promoting behaviors, emotional, physical health, psychological distress, social support, reproductive morbidities, and confounding variables in middle-aged women? (4) What is the role of emotional, physical health, and social support on health-promoting behaviors among middle-aged women? This study is grounded on a quantitative approach using a simple retrospective design. Cluster analysis (k-means) was done to answer the first research question to see whether one group of middle-aged women is heterogeneous when their health-promoting behaviors are considered. The second question is approached by using Chi-square analysis to identify the prevalence and pattern of symptoms of reproductive morbidities across geographical settings and menstrual stages. The third question is approached by taking the results of the first objective to examine the difference and association using One-way ANOVA and Chi-square analysis between the profile of health-promoting behaviors, and emotional, physical health, psychological distress, social support, reproductive morbidities, and confounding variables. The fourth question is addressed by using multiple linear regression analysis (step-wise) method for assessing the role of emotional, physical health, and social support on each dimension among health-promoting behaviors.

The thesis is reported as per the standards set by the APA Publication Manual (7th ed). The thesis consists of five chapters. Chapter I addresses an introduction to middle-age transitions for women, health-promoting behaviors, and middle-aged women's health. Chapter II orients empirical and theoretical studies, research questions, and objectives. Chapter III of the study provides the method. Chapter IV presents results comprising statistical analysis, tables, and figures. Chapter V includes a discussion, followed by limitations of the study, future directions, implications, and a conclusion. Thereafter, references and appendixes are attached.

Chapter II

REVIEW OF LITERATURE

This chapter consists of an extensive review of literature on health-promoting behaviors, emotional and physical health, psychological distress, perceived social support, and reproductive morbidities in middle-aged women. The review of literature was conducted using integrative review.

Health-promoting behaviors in middle-aged women

Around the early 2010s, a small-scale research began to emerge towards rising awareness and interventions on health-promoting behaviors of women in middle age. In recent years, Pengpid and Peltzer (2021) found that 32.4% of Indian middle-aged women were physically inactive due to the absence of health-promoting behaviors. This view is supported by Sharma and Suhail (2022), who stated that middle-aged women perceived daily household chores as equivalent to physical activity. Busy life schedules, poor health status, family responsibilities, lack of social support, inefficient knowledge about physical activities, and advancing age were found to be the main reasons for being physically inactive. Middle-aged women belonging to rural and urban areas were found to be physically inactive (Oommen et al., 2019).

Recent attention has focused on health promotion that can bring enormous positive outcomes for middle-aged women. Health promotion with evidence-based interventions can significantly impact women's lived experiences during menopausal transitions (Godoy-Izquierdo et al., 2024). There is a consensus by Lim and Hyun (2021) that health promotion through physical exercises like yoga and pilates have been found to induce a cyclic positive reinforcement pattern for changing adverse health behaviors in women. A cohort study by Larsson et al. (2017) established health-promoting behaviors such as engaging in physical activity, following a nutritious diet, taking conscious actions for one's health, maintaining

emotional connectedness, having a belief system, and actively managing stress with healthy coping strategies are important protective factors against several chronic health conditions and have been shown to increase lifespan markedly among men and women in middle age and later life.

Yoshany et al. (2020) investigated that regular health-promoting behaviors such as exercising, nutritious diet, and avoidance of smoking are linked to diminished severity of menopause symptoms in addition to the duration of menopause in middle-aged women. Similarly, Marin-Jimenez et al. (2020) pointed out that light to moderate physical activities are associated with better emotional roles and vitality among middle-aged women.

Middle-aged women in perimenopausal stage are suggested to maintain better diet and exercise to alleviate severity of menopausal symptoms (Chopra et al., 2022). Sapre and Thakur (2014) emphasized that health-promoting behaviors like regular exercise and a healthy diet are related to a longer reproductive span and late onset of menopause. Tiwari et al. (2020) draws our attention to the fact that women in a postmenopausal phase were at a minimum standard required for nutritional consumption. Lunghar and Senthilkumar (2023) proposed nutrition education and relaxation for middle-aged women to manage their menopausal symptoms, such as irregular menstruation, headaches, and dizziness. Further, the study revealed that women in menopausal transition had a moderate knowledge of nutrition uptake. To examine this issue, Kundu and Acharya (2024) conclusively reported the National Family Health Survey analysis (2019-2021) that middle-aged women are consciously engaging in healthy eating to minimize the incidence of premature menopause and maintain overall health. According to Naragatti and Nagesh (2023), spiritual practices integrating positive thinking, soul searching, and meditation have been found to complement mental health-promoting strategies among middle-aged women.

Emotional and physical health of middle-aged women

In their review, Shah and Prajapati (2024) discussed that an average of 63% of middle-aged women experience symptoms of depression, anxiety, irritability, exhaustion, and forgetfulness. A meta-analysis carried out by Yadav et al. (2021) reports that there is a high burden of depression among Indian women in the perimenopause and menopause stages, with a prevalence rate of 42.47%. Khatoon et al. (2018) reported a high prevalence of depressed mood, mental exhaustion, anxiety, and irritability among middle-aged women. A study conducted by Bansal et al. (2015) revealed that women in middle age experienced mild to severe forms of depression and anxiety at substantial levels. This view is supported by Archana et al. (2017), who found major depression among rural middle-aged women. It showed an increasing trend with age up to 55 years, followed by a small decline in subsequent years. Previously, the findings of Sharifi et al. (2014) indicated that increased psychological concerns, burden of roles, and undesirable physical and psychological changes hamper women's mental health in middle age.

Middle-aged women reported physical exhaustion, joint and muscular discomfort, hot flashes, sleep problems, and mental exhaustion (Kalhan et al., 2020; Khatoon et al., 2018). Further, Gaikwad et al. (2020) concluded that 83.03% of middle-aged women reported vasomotor symptoms of hot flashes, and 81.81% reported physical symptoms of muscle aches, which were associated with their menopausal stage.

Selvamani and Singh (2018) established that women above 50 years were underweight due to nutrition deficiencies. Nutritional deficiencies were found to significantly affect their self-rated health, cognitive function, and quality of life. However, a growing trend of weight gain was noticed among middle-aged women, which is linked with an increased risk of chronic morbidities and decreased odds of healthy living (Zheng et al., 2017). More than two-thirds of women in middle age were found to be inactive and obese (Nagarkar et al., 2018).

A cohort study by Solomon et al. (2020) noticed a substantial deterioration in women's physical healthiness and functioning in mid-life. According to Lange-Maia et al. (2020), aging and chronic medical conditions were associated with the decline in physical functioning among middle-aged women. This was also supported by Dias et al. (2020), who focused on middle age as a period marked with functional limitations and disability transition due to the amplified risk of osteoporosis and cardiovascular disorders among women. However, a study by Karlamangla et al. (2017) reported that memory and processing speed deteriorate in middle-aged women, leading to cognitive aging.

Taylor et al. (2016) concluded that frequent shifts in sleep timing had adverse consequences on the metabolic health of women in mid-life. Polo-Kantola et al. (2014) stressed that one-fourth of middle-aged women were not satisfied with their sleep quality, which impacted their health-related quality of life. Likewise, sleep problems, such as sleep deprivation, insomnia, and sleep disturbances, are linked to depression, cardiovascular diseases, infertility, anxiety, and menopause among middle-aged women (Lateef & Akintubosun, 2020; Saha et al., 2024). Further factors like mood disorders, symptoms of menopause, and hormonal changes affect the sleep of women in middle age (Salari et al., 2023).

Dhillon and Gammage (2023) posit that middle-aged women of South Asian origin have body image issues prevalent around the ideas of managing weight and looking thin without visible signs of aging. Anxiety about changing appearances in middle age significantly affects women's attitude towards menopause. Jackson et al. (2014) stated that middle-aged women who felt unattractive reported significantly higher levels of depressive symptoms.

Thomas et al. (2019) pointed out that stressful life events related to self, family, and close friends impacted women in middle age. Sassarini (2016) draws a similar finding that

social factors, such as changes in family structure, empty nest syndrome, work variations, and caregiving responsibilities, contribute to depression in middle-aged women.

In a cross-sectional survey, Nguyen et al. (2022) outlined the quality of life in Vietnamese women in their perimenopausal stage. It was observed that exercise, entertainment, recreational activities, and social support not only improved the quality of life but also minimized the risk of depression, negative thoughts, and guilt.

Mohta and Halder (2020) identified that female friends and relatives are a vital source of comfort, support, and information sharing. Social support in the forms of emotional and informational provisions helped women to effectively manage their menopause-related stress, thereby reducing their psychological and physiological ailments. Women who receive less social support perceive their menopausal symptoms to be more severe (Divya et al., 2024).

Social support and ego resiliency have a significant effect on the stress of middle-aged women. Women with higher level of social support tend to get less stressed. The findings suggest that family support can act as a stress buster; sometimes, family support could be seen as a stressor (Kim & Park, 2018). According to Kulkarni et al. (2024), social relationships often go through a crisis mode due to menopause-induced depression and anxiety. Women leave the workforce earlier, have trouble maintaining meaningful relationships, and even believe themselves to be engaging in inadequate parenting. According to a narrative review by Sathiyaseelan et al. (2024), women's relationships with their families are increasingly impacted by hormonal fluxes. This has a huge impact on their family dynamics and social roles. Support from family is vital for women to have a positive perception of menopause. Women in middle age may also experience a loss of attractiveness and feel less desirable, which can exacerbate their sense of loneliness and lead to social detachment. A decrease in sexual intimacy with the spouse due to negative self-perception can impact women's well-being in middle age. Schmidt et al. (2022) studied that middle-aged

men and women have fewer but more meaningful friendships, which impacts their satisfaction with life. Ahmadi (2015) concluded that emotional closeness forms an important component of women's relationships, and they are more likely to depend on female friends than spouses in times of stress.

Reproductive health of middle-aged women

Natural, physical, psychological as well and environmental factors directly impact a woman's reproductive health status throughout the life course (Ara et al., 2022). In this line, Alspaugh et al. (2020) emphasized the need for a clinical and positive outlook on middle-aged women's health in mid-life. Maki et al. (2019) revealed that psychological disorders like depression and menopausal symptoms such as sleep problems and vasomotor symptoms are intertwined with each other.

Drawing on a meta-analysis, Fang et al. (2024) mention that the prevalence of menopausal symptoms as a reproductive health condition is manifested in the form of psychological symptoms such as depression, anxiety, irritability, mood swings, and mental and physical exhaustion. In contrast, the symptoms of hot flashes, joint and muscular pain, sleep problems, headaches, and heart discomfort were higher in the perimenopause stage. The somatic and urogenital symptoms, such as sexual problems, vaginal dryness, and urinary problems, increased with the advancing stages of premenopause to postmenopause. Likewise, Singh et al. (2023) found that Indian middle-aged women in the postmenopausal stage reported more complaints in the psychological domain than women in premenopause stage. Ahlawat et al. (2019) also found that the prevalence and severity of depression were higher among young postmenopausal women.

In the same vein, Singh et al. (2023) reported that women in later years of menopausal transitions experience urinary incontinence, weakness, and vaginal dryness symptoms much more than younger middle-aged women. Dasgupta et al. (2022) estimated that physical

symptoms are more prevalent in younger years, and vasomotor and urogenital symptoms are more prevalent in later years of life. Karmakar et al. (2017) found that urinary frequency and vaginal dryness increased among perimenopausal and postmenopausal women. Mediboina et al. (2024) concluded that musculoskeletal problems were the main prevalent symptoms, followed by sleep disturbances among postmenopausal women. In a recent study by Hanson et al. (2022), muscular pain, weight gain, and insomnia were the most prevalent symptoms experienced by menopausal women. Tandon et al. (2022) pointed out that there is a higher incidence of disorders related to sleep as women go from perimenopause to postmenopause stages. Further, Kingsberg et al. (2023) stated that sleep disturbances in menopause are a consequence of vasomotor symptoms like hot flashes among women. A prior study by Armo and Sainik (2020) showed high incidences of menopausal symptoms, such as muscle and joint pain due to lower nutritional status, bladder problems, and mental and physical exhaustion among middle-aged women. Symptoms of hot flashes and sweating were quite prevalent among women who have attained menopause and were suggested as leading to emotional disturbances, poor concentration, and sleep problems. In a study by Cherian et al. (2022), sleep problems were associated with bodily changes such as low mineral density and increased risks of osteoporosis among women who attained menopause. In a longitudinal study, Kalleinen et al. (2021) established that sleep does not worsen from regular menstruation to menopause in middle age; in fact, sleep is affected by multiple factors, including increasing age and hormone levels.

Vidia et al. (2021) suggested that menopausal symptoms, such as hot flashes, vaginal dryness, and body image issues, were associated with sexual problems. Meeta et al. (2021) stated that sexual functioning declines from premenopause to the postmenopause stage with diminished interest and satisfaction. Further, the study reported higher incidences of vaginal

dryness and itching which significantly contributed to lower sexual functioning due to painful intercourse.

Jain et al. (2019), in an analysis conducted on women who had attained menopause, reported that 81% of women experienced sexual dysfunction. The associated factors of decline in sexual health were found to be aging, menopause duration, low education status, joint family, and lower socioeconomic status. Sunila (2015) also found that sexual health had a deteriorating connotation with menopause among Indian women. Nayak et al. (2024) discuss that although Indian women accepted menopause as a natural event, it was deemed as a period when all their beauty had faded. Mohta and Halder (2020) discuss that women who had attained menopause had higher self-esteem compared to menstruating women, although sexual intimacy centered on self-perception was found to be significantly lower among menopausal women. Women invested more in their appearances in the menopause stage.

Vikram (2021) stated that women's sexual wellbeing and reproductive morbidities are linked to the age of marriage, with early marriages related to poorer health of women in middle age. Pascoal et al. (2018) asserted that sexual beliefs and dysfunction are associated with cognitive factors, thus highlighting the need to measure these components in the context of age and the overall health of women.

A review study by Sathiyaseelan et al. (2022) points to cognitive decline among middle-aged women going through menopause. Forgetfulness was found to be a common complaint during the period of perimenopause. According to Rulu et al. (2021), women in all stages of menopause experience several symptoms, such as difficulty concentrating, body aches, and tiredness. In the study, women in the premenopause stage reported concentration as a major complaint; perimenopausal women complained most about lack of energy and hot flashes, whereas women who had attained menopause reported tiredness and muscle pain as the most common symptoms.

Sivasubramanian et al. (2024), in a study on rural Indian women, found that women in rural areas had higher than previously estimated knowledge and positive attitudes about menopause in middle age. Age, education, occupation, and income were also found to influence women's understanding of menopausal experiences. Similar results were reported in a previous study by Kannur and Itagi (2018) found correlations between rural and urban settings, age, education, and employment of middle-aged women and their menopausal problems. Employment was positively associated with fewer menopausal symptoms, while increasing age, lower socio-economic status, and lower education were predictors of more menopausal symptoms among middle-aged women.

Yerra et al. (2021) found that among urban middle-aged women, vasomotor domains of menopausal symptoms were significantly associated with formal education and employment status. Women from high socio-economic backgrounds and those who were working experienced lesser menopausal symptoms. Raj et al. (2020) found similar results, stating that menopausal women from lower socio-economic backgrounds, no formal employment, lower education status, and no support from partners significantly experienced more severe menopausal symptoms and lower quality of life.

Wijeratne and Fiander (2018) opined that gynecological diseases severely impact women beyond reproductive years in low or middle-income countries. Chauhan et al. (2015) reported a prevalence of reproductive morbidities among 44% of Indian women. Further, 32% of women were detected with gynecological morbidities like vaginal infection, genital fungal infection, cervical erosion, and inflammation of the cervix. Aging, obesity, and no education were the major factors associated with gynecological morbidities among women. However, sociodemographic characteristics and access to health services were not associated with the prevalence of gynecological reproductive morbidities.

Susila and Roy (2014) also reported a high prevalence of gynecological morbidities among Indian middle-aged women, with the majority seeking no treatment for reproductive health issues. The symptoms included vaginal bleeding, foul-smelling vaginal discharge, uterine prolapse, mood swings, and painful intercourse.

According to Desai et al. (2023), gynecological morbidities, including excessive menstrual bleeding and cysts/fibroids, are also associated with hysterectomy (surgical removal of the uterus) among middle-aged women, increasing their vulnerability to chronic health conditions. Sreelatha et al. (2017) found that abnormal vaginal bleeding was more common among women aged 40-44 years. The stigma around menstrual bleeding led to inadequate knowledge about bleeding after menopause among women. Sindhuri and Dongre (2021) identified that the majority of women did not seek treatment for post-menopausal bleeding and attributed it to normal aging, nutrition level, uterine problems, cancers, etc. The majority were not aware of the problem itself. The experiences of abnormal vaginal bleeding among middle-aged women are fraught with uncertainty and ambiguity about symptom management (DeStephano et al., 2022). Paul et al. (2023) suggested that bleeding after menopause should be cautiously checked as it is linked with uterine cancers. They found bleeding to be most prevalent in women above 50 years who had attained menopause. Various medical studies have reported abnormal bleeding, including heavy bleeding among women as they go through from regular menstruation to postmenopause (Nidhi et al., 2022; Samal et al., 2020).

Since the 1990s, women in their 40s and 50s have been reported to have higher incidences of pregnancies, associated with a higher risk of maternal mortality (Sauer, 2015). As per Grandi et al. (2022), menopausal transition is not a guarantee for safe contraception. Instead, the period of perimenopause can itself benefit from the use of modern contraceptive methods. The benefits are beyond safety, from sexually transmitted infections to unintended

pregnancies and reduction in migraines, vasomotor symptoms, and better control of the menstrual cycle.

The increasing education and work opportunities for women have led to a rise in the use of contraceptive methods all over India (New et al., 2017). Narzary and Ao (2019) outlined that the majority of women are unaware of the morbidities associated with contraceptive use. Thus, they suffer silently, which severely impacts their health. The common symptoms of contraceptive morbidities include body pain, irregular periods, dizzy spells, decreased libido, weight gain, nausea, breast tenderness, high fever, infection, etc. Dandannavar et al. (2023) suggest that perimenopause is perceived as a period not requiring contraception, thus risking unwanted pregnancies.

Filippi et al. (2018) explored that obstetric morbidities can begin during pregnancy and may last till after the woman's reproductive phase of life ends. Singh et al. (2023) studied that the median age for last childbirth has decreased considerably among midlife Indian women during the last few decades, which implies a pertinent role in women's reproductive health components related to obstetric morbidities. Chauhan et al. (2015) discussed that the prevalence of chronic obstetric morbidities among women with symptoms like uterine prolapse, chronic pelvic inflammation disorder, infertility, and vaginal fistulas are associated with advancing age. Other symptoms of childbirth and abortion-related chronic obstetric morbidities included severe mood swings, excessive vaginal bleeding, secondary infertility, reproductive tract inflammation, urinary incontinence, foul-smelling vaginal discharge, headache, backache, and chronic body pain (Singh & Kumar, 2014; Sreegiri et al., 2021; Vyas et al., 2016). As per Chen et al. (2023), fertility history impacts middle-aged women's multimorbidity. Hence, it is pertinent to assess the obstetric complications among women throughout their lifespan.

Summary

The evidence presented in this section suggests that women's health is affected by multiple factors during middle age. Reviews highlighted the beneficial effects of physical activity and diet. Taken together, these studies provide important insights into the physical and emotional health of women in general. However, such studies remain narrow in focus globally, dealing only with women in general and neglecting middle-aged women in particular. This review has demonstrated the shortcomings of health-enhancing behaviors such as social relations, spiritual development, stress management, and health responsibilities, and reproductive morbidities through the menstrual stages in middle-aged women. Social support is indicated to be a strong link between emotional and physical health in middle-aged women. These studies provided evidence for the usefulness of exploring the prevalence and symptoms of gynecological morbidities in perimenopausal, postmenopausal, and regular menstruating women. Three important themes emerged from the studies discussed so far: 'health-promoting behaviors in middle-aged women, emotional and physical health of middle-aged women, and reproductive health of middle-aged women.' Together, these studies provide important insights into the biopsychosocial and reproductive health of women in middle age. To conclude this section, the literature identifies key variables such as health-promoting behaviors, reproductive morbidities, emotional and physical health, psychological distress, and social support in the trajectory of women in middle age.

Research Questions

There are four main research questions.

- 1) What is the profile of health-promoting behaviors among middle-aged women?
- 2) What is the prevalence and patterns of symptoms of reproductive morbidities among middle-aged women across geographical settings and menstrual stages?
- 3) What is the difference and association between the profile of health-promoting

behaviors, emotional, physical health, psychological distress, social support, reproductive morbidities, and other confounding variables in middle-aged women?

4) What is the role of emotional, physical health and social support on health-promoting behaviors among middle-aged women?

Objectives

The primary objectives of the study are

- 1) To explore the profile of health-promoting behaviors among middle-aged women
- 2) To identify the prevalence and pattern of symptoms of reproductive morbidities among middle-aged women across geographical settings and menstrual stages
- 3) To examine the difference and association between the profile of health-promoting behaviors, emotional, physical health, psychological distress, social support, reproductive morbidities, and confounding variables in middle-aged women
- 4) To assess the role of emotional, physical health and social support on health-promoting behaviors among middle-aged women

Chapter III

METHOD

This chapter entails five sections. Firstly, the design of the study is explained. The pilot study is added as a second section. In the third section, the details of the participants, exclusion and inclusion criteria, sampling technique, sample size, and the characteristics of the participants are mentioned. The fourth section includes the details of the measures and their psychometric properties. The fifth section describes the procedure for conducting the study.

Design

The study utilized a simple retrospective design with one group (Rana et al., 2021) involving middle-aged women ($N = 440$). The study included the following variables—health-promoting behavior of middle-aged women, emotional and physical health, psychological distress, the prevalence of reproductive morbidities, and perceived social support. The health-promoting behaviors had six dimensions, such as ‘health responsibility, physical activity, interpersonal relations, nutrition, spiritual growth, and stress management,’ which were also treated as criterion variables. Emotional and physical health included nine dimensions, such as ‘depressed mood, somatic symptoms, memory/concentration, vasomotor symptoms, anxiety/fear, sexual behavior, sleep problems, menstrual symptoms, and attractiveness,’ which were also treated as predictor variables. Psychological distress included three dimensions—‘depression, anxiety, and stress.’ Reproductive morbidities included four domains: gynecological morbidities, contraceptive morbidities, obstetric morbidities (childbirth), and obstetric morbidities (abortion). Perceived social support included three domains—“significant other, family, and friends”—also treated as predictor variables. In addition, geographical settings and menstrual stages were included. Menstrual stages

comprised of three stages such as regular menstruation, perimenopause, and menopause.

Geographical settings included two levels: rural and urban.

Pilot study

A pilot study was conducted involving middle-aged women ($n = 114$). The objective of the pilot study was to assess the viability and parsimony of the main study. The pilot study provided practical understanding of the methods of data collection, the suitability of the research instruments, and the accessibility of the required participants. It also gave insights into the time duration needed to assess each individual and the language to be used for better comprehension and interaction. Through the pilot study, the instruments were verified and found to be accurate to assess the objectives of the main study. Further, the data obtained allowed for checking the appropriateness of the predetermined statistical techniques.

Participants

The study represented Indian middle-aged women ($N = 440$). The participants in the age range of 35 to 65 years experiencing three menstrual stages— 31.8% in regular menstruation ($n_1 = 140$), 31.8% in perimenopause ($n_2 = 140$), and 36.36% in menopause ($n_3 = 160$) and 31.13 % belonged to rural ($n_1 = 137$) and 68.86% to urban ($n_2 = 303$) settings were chosen under inclusion criteria. Women in the category of young adults below 35 years, older adults above 65 years, and middle-aged women who were expectant during the time of the study or diagnosed with psychological disorders were excluded from the study. Participants were selected through the purposive sampling method as they had certain unique characteristics of middle age with specific menstrual stages. In addition, convenient sampling was also used to reach out to participants. Out of 465, 25 participants omitted a few items in the research measures. As a result, they were excluded from the final data set. The remaining 440 participants' responses were considered for further data analysis.

Measures

Four standardized measures were utilized in the study. In addition to these, a socio-demographic form containing details about demographics, family history, and reproductive health history was also used (*See Appendix I*).

Health-Promoting Lifestyle Profile II

Health-Promoting Lifestyle Profile II, developed by Walker et al. (1987), was administered to middle-aged women to measure health-promoting behaviors. The questionnaire contained 52 health-promoting statements with six dimensions—health responsibility, spiritual growth, physical activity, interpersonal relationships, nutrition, and stress management. The overall scale has a Cronbach's coefficient alpha value of .94 and coefficient alpha values ranging from .79–.87 for the six subscales, showcasing acceptable reliability and validity of the measure. The questionnaire and scoring procedure are appended. (*See Appendix II*).

Women's Health Questionnaire

The Women's Health Questionnaire (WHQ) developed by Myra Hunter (1992) was administered to assess the perceptions of middle-aged women towards their emotional and physical health. The scale consisted of 37 statements with nine dimensions. The nine dimensions were—depressed mood, somatic symptoms, memory/concentration, vasomotor symptoms, anxiety/fear, sexual behavior, sleep problems, menstrual symptoms, and attractiveness. The test-retest reliability indicated an adequate reliability value of 0.75, ranging from 0.96 to 0.78. The details of the questionnaire and its scoring procedure are detailed (*See Appendix III*).

Depression, Anxiety, and Stress Scale

The Depression, Anxiety, and Stress Scale (DASS-21), in its 21-item version established by Lovibond and Lovibond (1995), was used to measure negative emotional states. The scale comprised 21 items, with seven items from each dimension—depression, anxiety, and stress. The depression, anxiety, and stress subscales showcased satisfactory reliability (Cronbach's $\alpha = 0.81, 0.89, \& 0.78$, respectively). The questionnaire and the scoring are detailed (*See Appendix IV*).

Multidimensional Scale of Perceived Social Support

Zimet et al. (1988) established the Multidimensional Scale of Perceived Social Support (MSPSS). The MSPSS measures perceived social support. The scale comprised 12 items with three domains—significant other, family, and friends. The test-retest reliability coefficient was reported to be .85. The questionnaire and the scoring can be referred to (*See Appendix V*).

Procedure

Due procedure was followed in the present study. Initially, ethical approval was obtained from the Institutional Ethics Committee of the University of Hyderabad. Participants from rural and urban settings across India were contacted based on the inclusion and exclusion criteria. The investigator also contacted the authorities of private clinics and government and private hospitals to interact with participants coming for doctor consultations. Accordingly, informed consent was obtained from the participants, who expressed their willingness to participate in the study. Furthermore, owing to the Covid-19 pandemic and lockdown, participants were contacted online using an online survey. This online survey gave access to large and geographically distributed populations. Hence, the researcher considered both direct data collection ($n_1 = 327$) and an online survey ($n_2 = 114$).

Four standardized measures and a socio-demographic form containing details about demographics, family history, and reproductive health history were administered to the participants individually. Each participant individually answered the items of the standardized measures. The duration of the administration took approximately 40-50 minutes. During this process, doubts pertaining to the measures were individually explained and addressed. At the end, participants were thanked, and a debriefing session was held as an essential component of reflection on the experiences of the participants and the investigator.

Chapter IV

RESULTS

This chapter encapsulates the findings and data analysis using the IBM SPSS Statistics 20.0 software. The obtained data was entered into the software, and data cleaning was done to find inconsistencies and eliminate any missing data. All the research objectives and hypotheses were considered while employing the relevant statistical tests. Primarily descriptive statistics, Cluster profile analysis using k-means, discriminant analysis, One-way ANOVA, post-hoc analysis using Tukey's HSD, Chi-square, Pearson's r , and multiple regression analysis using step-wise method were used for statistical analysis. The assumptions for these statistical tests were inspected, and a .05 alpha level was used for all tests. Cohen's criteria was used for effect size (Cohen, 1988).

Based on the objectives of the study, the data analysis has been divided into four sections: (1) to explore the profile of health-promoting behaviors among middle-aged women, (2) to identify the prevalence and pattern of symptoms of reproductive morbidities among middle-aged women across geographical settings and menstrual stages, (3) to examine the difference and association between the profile of health-promoting behaviors, emotional, physical health, social support, reproductive morbidities, and confounding variables in middle-aged women (4) to assess the role of emotional, physical health and social support on health-promoting behaviors among middle-aged women. Each section contains information about the type of data, statistical tests, and their testing assumptions in the first paragraph; thereafter, the analysis of results is described using tables and figures.

Profile of health-promoting behaviors among middle-aged women

The *first main objective* was to explore the profile of health-promoting behaviors among middle-aged women. Descriptive statistics (M , SD) and cluster analysis using k-means were run to check whether the homogenous group of middle-aged women formed discrete

groups based on score similarity on the six dimensions of health-promoting behaviors, i.e., health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. The scores on the six dimensions were on the interval scale, which meets the assumptions of k-means analysis of having continuous variables. The user specifies k , denoting the number of clusters, and the algorithm randomly assigns k initial centers. In k-means cluster analysis, cluster centroids are calculated. Cluster centroids are “the average point in space for the cluster” (Han et al., 2012). Computation is done to measure the Euclidean distance between centroids and individual cases. The k-means aims to minimize within-cluster variation. The sum of squared errors between all cases and centroids was measured by Euclidean distance. Based on the distance, the cases shift from their initial clusters to the ones with the nearest center distance. This process is repeated till no new reassignment takes place. This culminates the process as the algorithms seem to have converged, and the clustering solution is provided in the final clusters. The k-means clustering tries to make the resulting k -clusters compact and distinguished from each other, thus highlighting ‘high intracluster similarity and low intercluster similarity’ (Rana et al., 2021).

Cluster analysis (k-means) was used to examine how middle-aged women clustered together based on the six dimensions of health-promoting behaviors—health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. In the initial stage, the exploratory phase was followed using the k-means procedure of cluster analysis. After that, different cluster solutions were run, including two-cluster, three-cluster, and four-cluster solutions. The greatest amount of variance was explained by the three-cluster solution in the clustering variable of health-promoting behaviors and, hence, was considered to be the best fit. Convergence criteria were fulfilled after 14 iterations in the three-cluster solution, as no further changes in cluster centers were found. In addition to

statistical vigor, the three-cluster solution gave the clusters a robust theoretical meaning. To further check the accuracy, discriminant analysis was conducted to classify k-means clustering. Discriminant analysis is a statistical analysis that predicts the accuracy of a given classification system. The study tested the three-cluster solution as the dependent variable, with the six dimensions of health-promoting behaviors as the independent variable using discriminant analysis. The predicted and final group classifications of individual cases across the three clusters were cross-validated. The discriminant analysis results showed high sensitivity and specificity, with 97.3% of initially grouped cases correctly classified. It supported the reliability of the results of k-means clustering classification. Table 1 presents the values of mean and standard deviation of six dimensions of health-promoting behaviors in the three emerging clusters.

In the three-cluster solution, the clusters were identified as ‘high,’ ‘medium,’ and ‘low,’ each denoting the scores of all six dimensions of health-promoting behaviors as high, medium, and low. The high levels of health-promoting behavior across all six dimensions constituted the smallest cluster and was labeled as ‘high health-promoting behavior’ sub-group with 13% ($n_1 = 57$). The medium cluster labeled as the ‘medium health-promoting behavior’ sub-group comprised 40% ($n_2 = 176$) and was categorized by medium values on all six dimensions of health-promoting behavior. The largest cluster was characterized by low values on all six dimensions of health-promoting behaviors and was labeled as ‘low health-promoting behavior’ sub-group with 47% ($n_3 = 207$). *Figure 1* depicts the profile of health-promoting behavior of middle-aged women using the mean values of all the six dimensions of health-promoting behaviors across the three emerged clusters.

The ***second main objective*** was to identify the prevalence and pattern of symptoms of reproductive morbidities among middle-aged women across geographical settings and menstrual stages. The second objective was further divided into four sub-objectives.

Table 1

Mean values of health-promoting behaviors and its dimensions defining clusters, total sample, and by cluster of middle-aged women

Dimensions	Total	Cluster of health-promoting behaviors		
		High	Medium	Low
Health responsibility	2.48 (0.36)	2.84 (0.36)	2.61 (0.25)	2.28 (0.25)
Physical activity	2.41 (0.35)	2.87 (0.36)	2.48 (0.25)	2.22 (0.28)
Nutrition	2.50 (0.32)	3.03 (0.26)	2.51 (0.22)	2.35 (0.28)
Spiritual growth	2.68 (0.40)	3.35 (0.32)	2.76 (0.24)	2.42 (0.24)
Interpersonal relations	2.71 (0.41)	3.42 (0.25)	2.83 (0.27)	2.42 (0.21)
Stress management	2.60 (0.34)	3.13 (0.26)	2.70 (0.22)	2.37 (0.22)
<i>N</i>	440	57	176	207
% of the total sample	100	13	40	47

Note. Figures in parentheses are standard deviations.

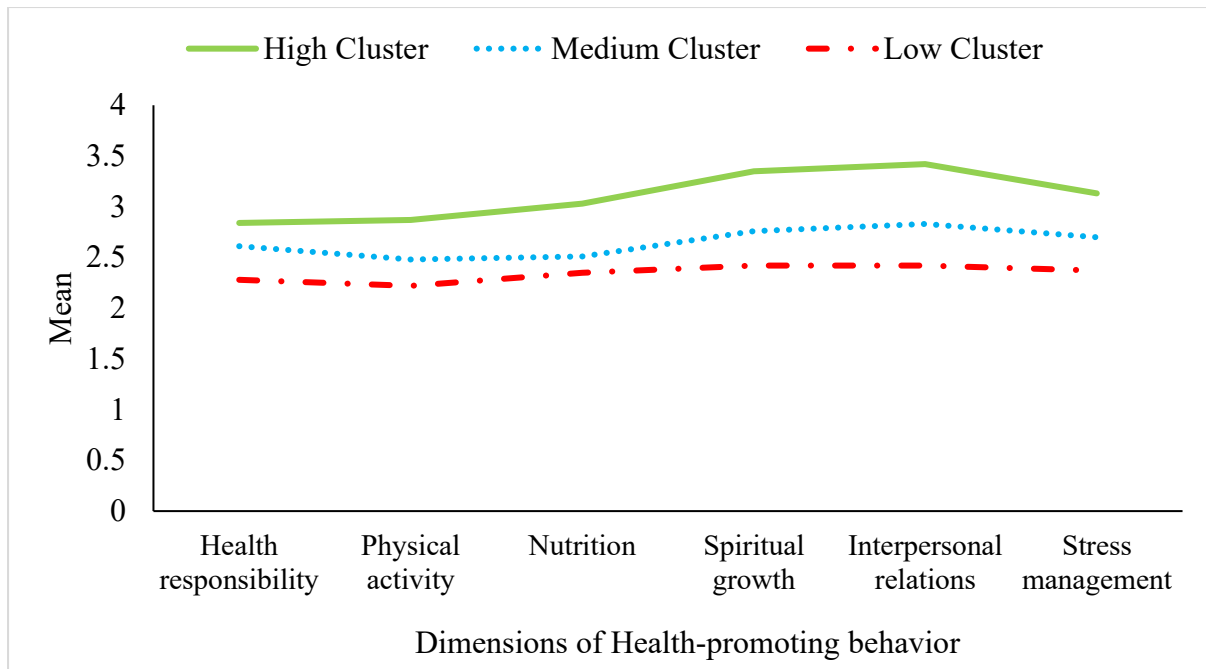


Figure 1. Mean scores of the six dimensions of health-promoting behaviors across the emerged three clusters—high, medium, and low

The *first sub-objective* was to identify the prevalence of symptoms of reproductive morbidities among middle-aged women across geographical settings. The four domains of reproductive morbidities are gynecological morbidities, contraceptive morbidities, obstetric morbidities (childbirth), and obstetric morbidities (abortion). The geographical settings are categorized as rural and urban. The reproductive morbidities were identified through a symptoms checklist. The responses were noted as 'Presence' and 'Absence' of symptoms. A score of '0' demarcated 'if the symptoms were absent,' and a score of '1' indicated 'showing the presence of at least one symptom.' The data thus generated was nominal. Therefore, the Chi-square was calculated to identify the prevalence of symptoms of reproductive morbidities among middle-aged women across geographical settings. The expected frequency of at least five per cell was checked as an assumption of the Chi-square. Table 2 presents the crosstabulation of the prevalence of symptoms of four domains of reproductive morbidities—gynecological morbidities, contraceptive morbidities, obstetric morbidities (childbirth), and obstetric morbidities (abortion) across rural and urban settings using Chi-square, frequencies, and percentages.

The Chi-square analysis results revealed a significant association between the prevalence of symptoms of reproductive morbidities domain gynecological morbidities and geographical settings, $\chi^2 = 7.55, p < .05$. The middle-aged women belonging to rural settings reported a higher presence (98.5%) of symptoms of gynecological morbidities in comparison to the middle-aged women belonging to urban settings (91.7%). *Figure 2* displays the percentage of middle-aged women reporting symptoms of gynecological morbidities across geographical settings. Similarly, the results also suggested was a significant association between the prevalence of symptoms of contraceptive morbidities and geographical settings, $\chi^2 = 6.36, p < .05$. The middle-aged women belonging to urban settings reported a higher

Table 2

Prevalence of symptoms of reproductive morbidities among middle-aged women across geographical settings (N = 440)

Reproductive morbidities	Rural ($n_1 = 137$)		Urban ($n_2 = 303$)		Total ($N = 440$)		χ^2
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	
Gynecological morbidities							7.55*
Presence	135	98.5	278	91.7	413	93.9	
Absence	2	1.5	25	8.3	27	6.1	
Contraceptive morbidities							6.36*
Presence	82	59.9	218	71.9	300	68.2	
Absence	55	40.1	85	28.1	140	31.8	
Obstetric morbidities (Childbirth)							0.04
Presence	115	83.9	252	83.2	367	83.4	
Absence	22	16.1	51	16.8	73	16.6	
Obstetric morbidities (Abortion)							0.04
Presence	57	41.6	123	40.6	180	40.9	
Absence	80	58.4	180	59.4	260	59.1	

Note. * $p < .05$.

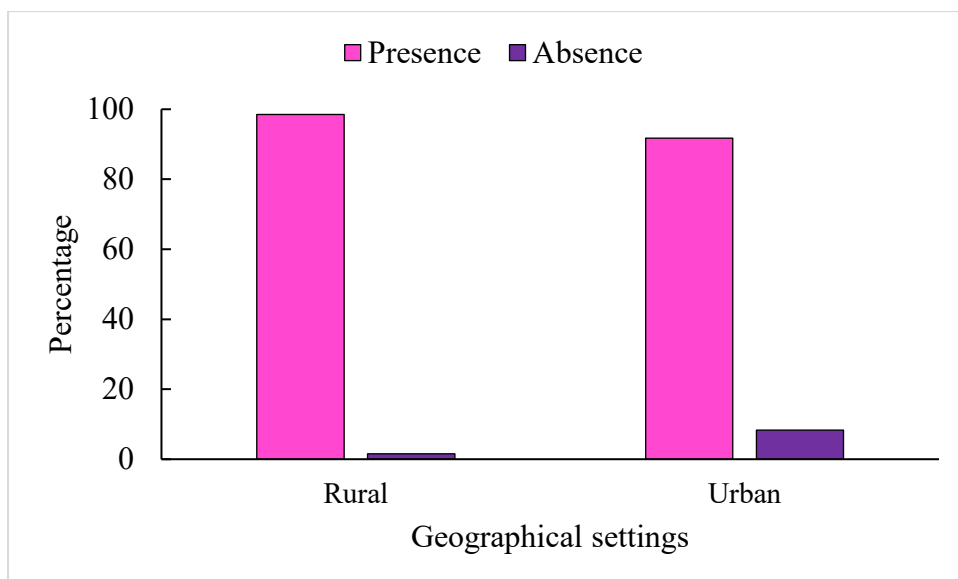


Figure 2. Percentage of middle-aged women reporting symptoms of gynecological morbidities across geographical settings

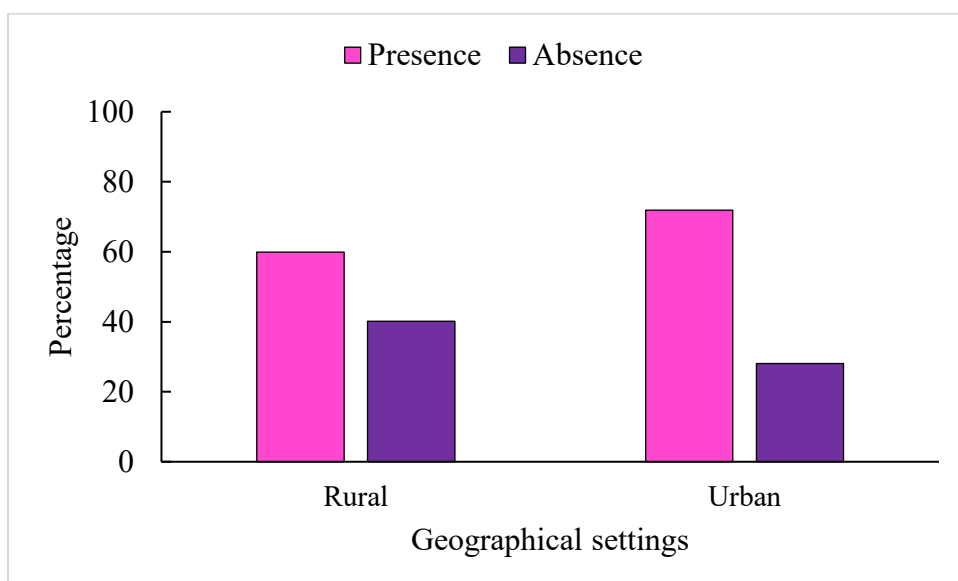


Figure 3. Percentage of middle-aged women reporting symptoms of contraceptive morbidities across geographical settings

presence (71.9%) of symptoms of contraceptive morbidities in comparison to the middle-aged women belonging to rural settings (59.9%). *Figure 3* shows the percentage of middle-aged women reporting symptoms of contraceptive morbidities across geographical settings. Overall, a significant association was found between the presence of gynecological morbidities and contraceptive morbidities across rural and urban middle-aged women.

The *second sub-objective* was to identify the prevalence of symptoms of reproductive morbidities among middle-aged women across menstrual stages. The four domains of reproductive morbidities—gynecological morbidities, contraceptive morbidities, obstetric morbidities (childbirth), and obstetric morbidities (abortion) were cross-tabulated with the menstrual stages. The menstrual stages are categorized into three stages—regular menstruation, perimenopause, and menopause. The assumptions of Chi-square were met. The results of Chi-square, frequencies, and percentages are demonstrated in Table 3.

The Chi-square analysis results suggested a significant association between the prevalence of symptoms of gynecological morbidities and menstrual stages, $\chi^2 = 8.07, p < .05$. The presence of symptoms of gynecological morbidities in middle-aged women belonging to the perimenopause stage was higher (97.7%) in comparison to middle-aged women in the regular menstruation stage (94.3%) and menopause stage (90%). *Figure 4* shows the percentage of middle-aged women reporting symptoms of gynecological morbidities across menstrual stages. There was a significant association between the prevalence of symptoms of contraceptive morbidities and menstrual stages, $\chi^2 = 34.98, p < .001$. The presence of symptoms of contraceptive morbidities in middle-aged women belonging to the perimenopause stage was higher (85%) in comparison to the middle-aged women in the regular menstruation stage (68.6%) and menopause stage (53.1%). *Figure 5* shows the percentage of middle-aged women reporting symptoms of contraceptive morbidities across menstrual stages. Similarly, the results showed a significant association

Table 3

Prevalence of symptoms of reproductive morbidities among middle-aged women across menstrual stages (N = 440)

Reproductive morbidities	Regular menstruation ($n_1 = 140$)		Perimenopause ($n_2 = 140$)		Menopause ($n_3 = 160$)		χ^2
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	
Gynecological morbidities							8.07*
Presence	132	94.3	137	97.7	144	90.0	
Absence	8	5.7	3	2.1	16	10.0	
Contraceptive morbidities							34.98***
Presence	96	68.6	119	85.0	85	53.1	
Absence	44	31.4	21	15	75	46.9	
Obstetric morbidities (Childbirth)							16.48***
Presence	120	85.7	128	91.4	119	74.4	
Absence	20	14.3	12	8.6	41	25.6	
Obstetric morbidities (Abortion)							22.18***
Presence	39	27.9	54	38.6	87	54.4	
Absence	101	72.1	86	61.4	73	45.6	

Note. * $p < .05$, *** $p < .001$.

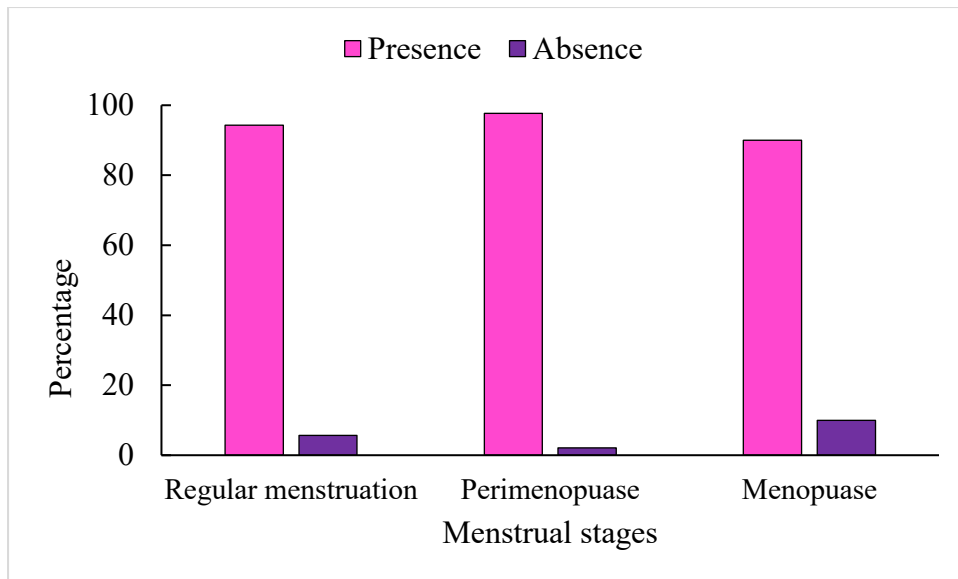


Figure 4. Percentage of middle-aged women reporting symptoms of gynecological morbidities across menstrual stages

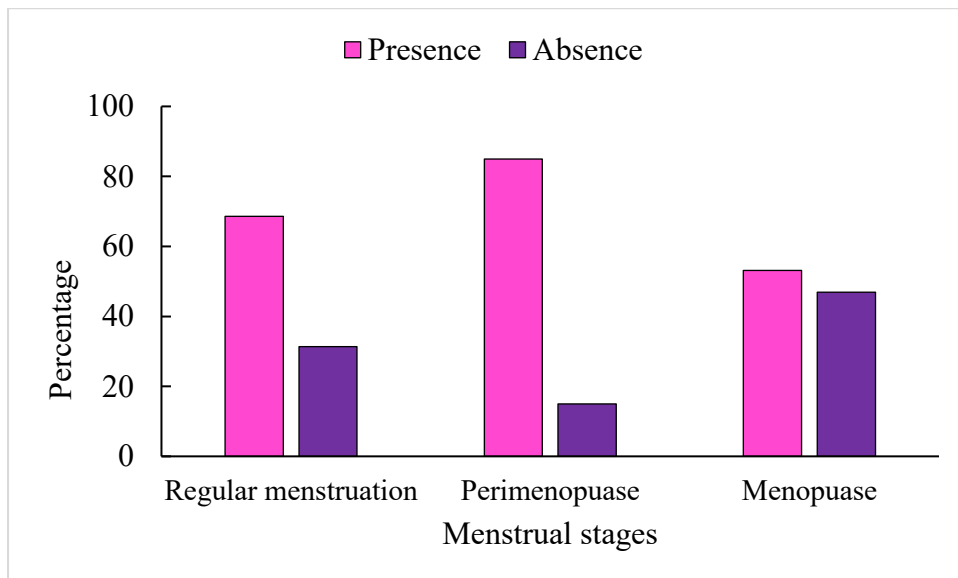


Figure 5. Percentage of middle-aged women reporting symptoms of contraceptive morbidities across menstrual stages

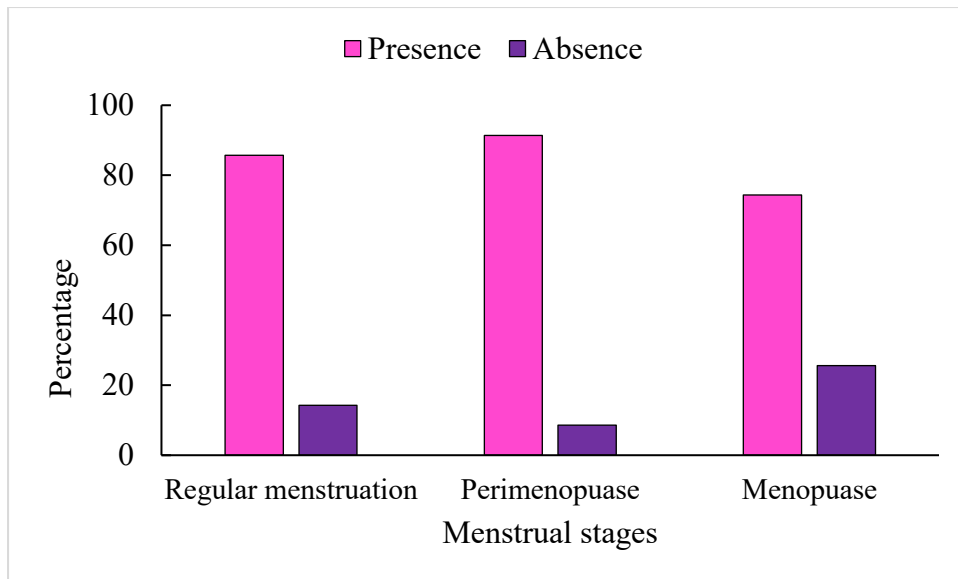


Figure 6. Percentage of middle-aged women reporting symptoms of obstetric morbidities (childbirth) across menstrual stages

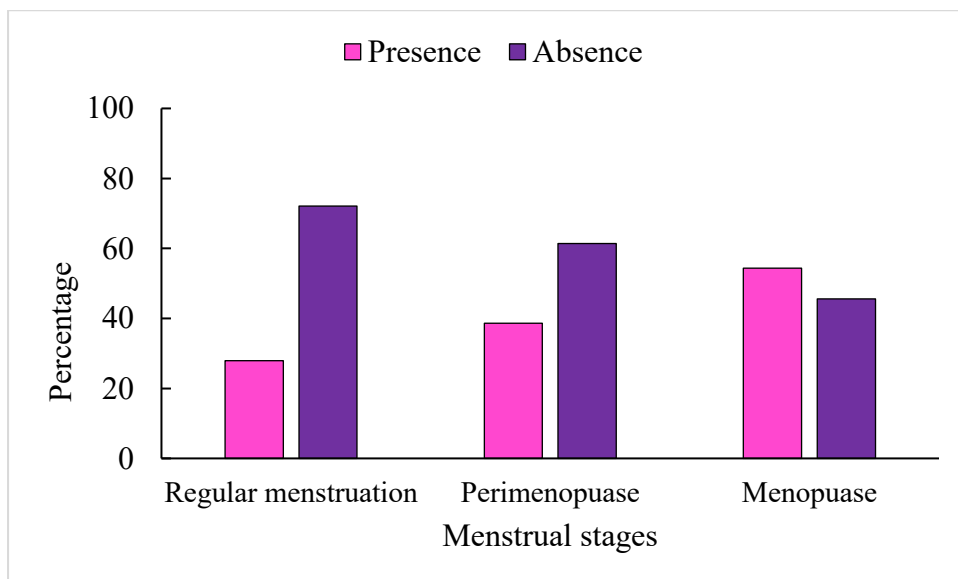


Figure 7. Percentage of middle-aged women reporting symptoms of obstetric morbidities (abortion) across menstrual stages

between the prevalence of symptoms of obstetric morbidities (childbirth) and menstrual stages, $\chi^2 = 16.48, p < .001$. The middle-aged women in the perimenopause stage reported a higher presence (91.4%) of symptoms of obstetric morbidities (childbirth) in comparison to the middle-aged women in the regular menstruation stage (85.7%) and menopause stage (74.4%). *Figure 6* displays the percentage of middle-aged women reporting symptoms of obstetric morbidities (childbirth) across menstrual stages. In the domain obstetric morbidities (abortion), a similar trend was seen in the results. There was a significant association between the prevalence of symptoms of obstetric morbidities (abortion) and menstrual stages, $\chi^2 = 22.18, p < .001$. The middle-aged women in the menopause stage reported the presence of symptoms of obstetric morbidities (abortion) (54.4%), which was higher in comparison to the middle-aged women in the perimenopause stage (38.6%) and regular menstruation stage (27.9%). *Figure 7* shows the percentage of middle-aged women reporting symptoms of obstetric morbidities (abortion) across menstrual stages.

The *third sub-objective* was to identify the pattern of symptoms of reproductive morbidities among middle-aged women across geographical settings. The geographical settings are categorized as rural and urban. Participants were asked to identify and report the symptoms listed in the symptom checklist. Table 4 illustrates the pattern of symptoms themed under gynecological morbidities, contraceptive morbidities, obstetric morbidities (childbirth and abortion), and further common pattern of symptoms identified across four domains of reproductive morbidities with geographical settings.

The Chi-square analysis revealed that the most common pattern of symptoms—vaginal discharge, as a reproductive morbidity was significantly associated with geographical settings ($\chi^2 = 8.90, p < .01$). This suggests that middle-aged women belonging to rural settings (68.6%) experienced vaginal discharge as the only pattern of symptoms in respect of reproductive morbidities than the urban participants (53.5%).

Table 4

Pattern of symptoms of reproductive morbidities and its domains among middle-aged women across geographical settings (N = 440)

Reproductive morbidities	Rural ($n_1 = 137$)		Urban ($n_2 = 303$)		Total ($N = 440$)		χ^2
	f	%	f	%	f	%	
Gynecological morbidities							
Painful intercourse							0.60
Presence	22	16.1	58	19.1	80	18.2	
Absence	115	83.9	245	80.9	360	81.8	
Contraceptive morbidities							
Dizziness							0.21
Presence	22	16.1	54	17.8	76	17.3	
Absence	115	83.9	249	82.2	364	82.7	
Breast tenderness							1.19
Presence	27	19.7	47	15.5	74	16.8	
Absence	110	80.3	256	84.5	366	83.2	
Decreased libido							1.41
Presence	17	12.4	51	16.8	68	15.5	
Absence	120	87.6	252	83.2	372	84.5	
Weight gain							0.04
Presence	18	13.1	42	13.9	60	13.6	
Absence	119	86.9	261	86.1	380	86.4	
Nausea							0.78
Presence	14	10.2	40	13.2	54	12.3	
Absence	123	89.8	263	86.8	386	87.7	
Severe mood swings							0.14
Presence	6	4.4	11	3.6	17	3.9	
Absence	131	95.6	292	96.4	423	96.1	

“Table 4 (continued)”

Reproductive morbidities	Rural		Urban		Total		χ^2
	$(n_1 = 137)$		$(n_2 = 303)$		$(N = 440)$		
	f	%	f	%	f	%	
Obstetric morbidities (Childbirth and Abortion)							
Severe mood swings							0.97
Presence	34	24.8	89	29.4	123	28.0	
Absence	103	75.2	214	70.6	317	72.0	
Uterine prolapse							2.73
Presence	14	10.2	49	16.2	63	14.3	
Absence	123	89.8	254	83.8	377	85.7	
Common pattern of symptoms across four domains of reproductive morbidities							
Body pain							0.49
Presence	115	83.9	262	86.5	377	85.7	
Absence	22	16.1	41	13.5	63	14.3	
Abnormal vaginal bleeding							0.05
Presence	100	73.0	218	71.9	318	72.3	
Absence	37	27.0	85	28.1	122	27.7	
Urinary infection							0.01
Presence	84	61.3	187	61.7	271	61.6	
Absence	53	38.7	116	38.3	169	38.4	
Vaginal discharge							8.90**
Presence	94	68.6	162	53.5	256	58.2	
Absence	43	31.4	141	46.5	184	41.8	

Note. Obstetric morbidities (childbirth) and obstetric morbidities (abortion) reported the common pattern of symptoms and are included under a single heading.

** $p < .01$

The *fourth sub-objective* was to identify the pattern of symptoms of reproductive morbidities among middle-aged women across menstrual stages. Menstrual stages are categorized as regular menstruation, perimenopause, and menopause. Table 5 depicts the pattern of symptoms themed under gynecological morbidities, contraceptive morbidities, obstetric morbidities (childbirth and abortion), and further common pattern of symptoms identified across four domains of reproductive morbidities with menstrual stages.

In the domain of gynecological morbidities, the Chi-square analysis revealed that painful intercourse as a pattern of symptom was significantly associated with the menstrual stages ($\chi^2 = 24.28, p < .001$). This indicated that the presence of painful intercourse as a symptom was higher in the middle-aged women belonging to the perimenopause stage (31.4%) compared to the menopause stage (12.5%) and the regular menstruation stage (11%). In the domain of contraceptive morbidities, the Chi-square results showed that severe mood swings as a symptom was significantly associated with menstrual stages ($\chi^2 = 7.10, p < .05$). This states that middle-aged women in the regular menstruation stage (5.7%) and perimenopause stage (5.7%) equally reported the presence of severe mood swings than middle-aged women in their menopause stage (0.6%).

The common patterns of symptoms across the four domains of reproductive morbidities are body pain, abnormal vaginal bleeding, and vaginal discharge, found to be significantly associated with menstrual stages. The Chi-square analysis revealed that the body pain as a symptom was significantly associated with menstrual stages ($\chi^2 = 8.90, p < .01$). This indicated that middle-aged women in the regular menstruation stage (90%) and perimenopause stage (90%) equally reported the body pain as a symptom than middle-aged women in their menopause stage (78.1%). Similarly, abnormal vaginal bleeding as a symptom was significantly associated with menstrual stages ($\chi^2 = 17.47, p < .001$). x

Table 5

Patterns of symptoms of reproductive morbidities and its domains among middle-aged women across menstrual stages (N = 440)

Reproductive morbidities	Regular menstruation ($n_1 = 140$)		Perimenopause ($n_2 = 140$)		Menopause ($n_3 = 160$)		χ^2
	f	%	f	%	f	%	
Gynecological morbidities							
Painful intercourse							24.28***
Presence	16	11.4	44	31.4	20	12.5	
Absence	124	88.6	96	68.6	140	87.5	
Contraceptive morbidities							
Dizziness							2.70
Presence	23	16.4	30	21.4	23	14.4	
Absence	117	83.6	110	78.6	137	85.6	
Breast tenderness							3.22
Presence	17	12.1	27	19.3	30	18.8	
Absence	123	87.9	113	80.7	130	81.3	
Decreased libido							1.02
Presence	19	13.6	25	17.9	24	15.0	
Absence	121	86.4	115	82.1	136	85.0	
Weight gain							3.73
Presence	14	10.0	25	17.9	21	13.1	
Absence	126	90.0	115	82.1	139	86.9	
Nausea							1.74
Presence	17	12.1	21	15.0	16	10.0	
Absence	123	87.9	119	85.0	144	90.0	
Severe mood swings							7.10*
Presence	8	5.7	8	5.7	1	0.6	
Absence	132	94.3	132	94.3	159	99.4	

“Table 5 (continued)”

Reproductive morbidities	Regular menstruation (<i>n</i> ₁ = 140)		Perimenopause (<i>n</i> ₂ = 140)		Menopause (<i>n</i> ₃ = 160)		χ^2
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	
Obstetric morbidities (Childbirth and Abortion)							
Severe mood swings							2.45
Presence	36	25.7	46	32.9	41	25.6	
Absence	104	74.3	94	67.1	119	74.4	
Uterine prolapse							2.80
Presence	23	16.4	23	16.4	10.6	17	
Absence	117	83.6	117	83.6	143	89.4	
Common pattern of symptoms across four domains of reproductive morbidities							
Body pain							11.70**
Presence	126	90.0	126	90.0	125	78.1	
Absence	14	10.0	14	10.0	35	21.9	
Abnormal vaginal bleeding							17.47***
Presence	87	62.1	118	84.3	113	70.6	
Absence	53	37.9	22	18.0	47	29.4	
Urinary infection							5.84
Presence	87	62.1	96	68.6	88	55.0	
Absence	53	37.9	44	31.4	72	45.0	
Vaginal discharge							15.99***
Presence	65	46.4	98	70.0	93	58.1	
Absence	75	53.6	42	30.0	67	41.9	

Note. Obstetric morbidities (childbirth) and obstetric morbidities (abortion) reported the common pattern of symptoms and are included under a single heading.

* $p < .05$, ** $p < .01$, *** $p < .001$.

between the prevalence of symptoms of obstetric morbidities (childbirth) and menstrual stages, $\chi^2 = 16.48, p < .001$. The middle-aged women in the (84.3%) in comparison with the menopause stage (70.6%) and the regular menstruation stage (62.1%). Lastly, vaginal discharge as a symptom was significantly associated with menstrual stages ($\chi^2 = 15.99, p < .001$). Middle-aged women reported vaginal discharge as a common pattern of symptom during the perimenopause stage (70%) than in the menopause stage (58.1%) and regular menstruation stage (46.4%).

The *third main objective* was to examine the difference and association between the profile of health-promoting behaviors, emotional, physical health, psychological distress, social support, reproductive morbidities, and confounding variables in middle-aged women. The third objective was divided into five sub-objectives, and the results were presented accordingly.

The *first sub-objective* was to examine the difference between the profile of health-promoting behaviors across the dimensions of emotional and physical health in middle-aged women. Descriptive statistics and One-way ANOVA were used with continuous data in the nine dimensions of women's emotional and physical health—depressed mood, somatic symptoms, memory/concentration, vasomotor symptoms, anxiety/fear, sexual behavior, sleep problems, menstrual symptoms, and attractiveness. Out of the nine dimensions, the sexual behavior dimension was dropped as 53 participants did not respond to items number 31 and 34 relating to sexual behaviors. Hence, these 53 cases are considered as non-concerned group as per the scoring procedure (*See Appendix III*). The remaining ($440 - 53 = 387$) participants are taken for One-way ANOVA with three clusters of health-promoting behaviors ($N = 387$). Wherever One-way ANOVA revealed significant differences between clusters, follow-up with post-hoc analysis using Tukey's HSD was done to assess the difference in clusters' means. Before computing the One-way ANOVA, its major assumptions, like homogeneity of

variance and normal distribution were tested. The independent variable was the profile of health-promoting behaviors, with three distinct clusters of high, medium, and low health-promoting behaviors. The dependent variables were the nine dimensions of women's emotional and physical health. Table 6 presents the means, standard deviations, and One-way Analysis of variance across the three clusters of health-promoting behaviors and nine dimensions of emotional and physical health.

Table 6 shows that there was a statistically significant difference between the three clusters of health-promoting behaviors and nine dimensions of emotional and physical health. The results yielded significant main effects of three clusters $F(2,437) = 35.19, p < .001$, with large effect size (partial $\eta^2 = .14$), indicating that about 14% of the variance of depressed mood scores was due to the differences in the three clusters of health-promoting behaviors. As the results of One-way ANOVA were significant, post-hoc comparison using Tukey's HSD test was computed for multiple comparisons between the clusters, and the results are showed in Table 7. The results suggest that the depressed mood scores of middle-aged women belonging to the high cluster ($M = .09, SD = .11$) were significantly lower than women in the medium ($M = .23, SD = .19$, Tukey's HSD = $-.15, p < .001$) and low clusters ($M = .32, SD = .22$, Tukey's HSD = $-.24, p < .001$). Also, the depressed mood scores in the medium cluster were significantly lower than the low cluster group (Tukey's HSD = $-.09, p < .001$). *Figure 8* displays the mean scores of dimensions of emotional and physical health across three clusters of health-promoting behaviors.

One-way ANOVA results yielded significant main effects of three clusters $F(2,437) = 21.6, p < .001$, with large effect size (partial $\eta^2 = .09$), demonstrating that about 9% of the variance of somatic symptoms scores was due to the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed that the somatic symptoms scores of middle-aged women belonging to the low cluster ($M = .47, SD = .22$) were significantly

Table 6

Means, Standard Deviations, and One-way Analysis of Variance across the three clusters of health-promoting behaviors and nine emotional and physical health dimensions

Emotional and physical health	Clusters of health-promoting behaviors						<i>F</i> (2,437)	Partial
	High (<i>n</i> ₁ = 57)		Medium (<i>n</i> ₂ = 176)		Low (<i>n</i> ₃ = 176)			η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Depressed mood	.09	.11	.23	.19	.32	.22	35.19***	.14
Somatic symptoms	.29	.25	.36	.22	.47	.22	21.60***	.09
Memory/concentration	.16	.23	.32	.31	.31	.28	7.80***	.03
Vasomotor symptoms	.16	.30	.30	.39	.46	.38	18.37***	.09
Anxiety/fears	.16	.29	.29	.30	.41	.29	18.32***	.07
Sexual behavior ^a	.25	.27	.41	.27	.50	.29	^b 17.77***	.09
Sleep problems	.20	.33	.33	.34	.45	.33	16.03***	.07
Menstrual symptoms	.30	.31	.41	.29	.52	.29	16.30***	.07
Attractiveness	.12	.26	.47	.39	.44	.37	21.34***	.09

Note. ^a*N* = 387 (High *n*₁ = 51, Medium *n*₂ = 151, Low *n*₃ = 185)

^b*F*(2,384) = 17.77

****p* < .001

Table 7

Multiple comparisons using Tukey's HSD post-hoc test for emotional and physical health dimensions

Dimensions	High ~ Medium	High ~ Low	Medium ~ Low
Depressed mood	-.15***	-.24***	-.09***
Somatic symptoms	-.07	-.18***	-.12***
Memory/concentration	-.17***	-.15**	.01
Vasomotor symptoms	-.14**	-.31***	-.17***
Anxiety/fears	-.13**	-.25***	-.12***
Sexual behavior	-.16**	-.26***	-.09**
Sleep problems	-.13*	-.26***	-.13***
Menstrual symptoms	-.11*	-.23***	-.12***
Attractiveness	-.35***	-.32***	.03

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

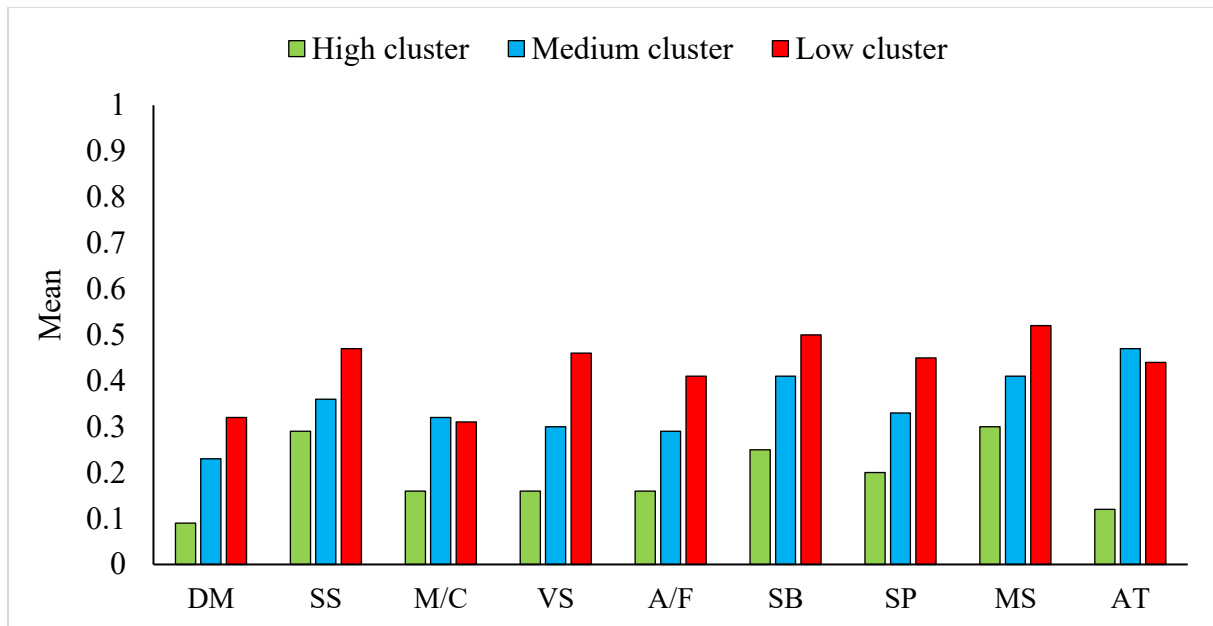


Figure 8. Mean scores of dimensions of emotional and physical health—depressed mood (DM), somatic symptoms (SS), memory/concentration (M/C), vasomotor symptoms (VS), anxiety/fear (A/F), sexual behavior (SB), sleep problems (SP), menstrual symptoms (MS) and attractiveness (AT) across three clusters of health-promoting behaviors

higher than the women in the high cluster ($M = .29$, $SD = .25$, Tukey's HSD = $-.18$, $p < .001$) and medium cluster ($M = .23$, $SD = .19$, Tukey's HSD = $-.09$, $p < .001$).

Further, the results yielded significant main effects of three clusters $F(2,437) = 7.8$, $p < .001$, with small effect size (partial $\eta^2 = .03$), showing that about 3% of the variance of memory/concentration symptoms scores was explained by the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed that the memory/concentration scores of middle-aged women belonging to the high cluster ($M = .16$, $SD = .23$) were significantly lower than the medium cluster ($M = .32$, $SD = .31$, Tukey's HSD = $-.17$, $p < .001$) and low cluster ($M = .31$, $SD = .28$, Tukey's HSD = $.15$, $p < .01$).

Similarly, the results yielded significant main effects of three clusters $F(2,437) = 18.37$, $p < .001$, with medium effect size (partial $\eta^2 = .09$), signifying that about 9% of the variance of vasomotor symptoms scores was due to the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed that the vasomotor symptoms scores of middle-aged women belonging to the high cluster ($M = .16$, $SD = .30$) were significantly lesser than the medium ($M = .30$, $SD = .39$, Tukey's HSD = $-.14$, $p < .001$) and low clusters ($M = .46$, $SD = .38$, Tukey's HSD = $-.31$, $p < .001$). Also, the vasomotor symptoms scores in the medium cluster were significantly lesser than in the low cluster (Tukey's HSD = $-.17$, $p < .05$).

In addition, the results yielded significant main effects of three clusters $F(2,437) = 18.32$, $p < .001$, with medium effect size (partial $\eta^2 = .07$), signifying that about 7% of the variance of anxiety/fears scores was explained by the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed the anxiety/fears scores in the high clusters ($M = .16$, $SD = .29$) were significantly lesser than the medium ($M = .29$, $SD = .30$, Tukey's HSD = $-.13$, $p < .001$) and low clusters ($M = .41$, $SD = .29$, Tukey's HSD = $-.25$, $p < .001$). Also, the anxiety/fears scores in the medium cluster were significantly lesser than the low cluster (Tukey's HSD = $-.12$, $p < .01$).

Further, the results yielded significant main effects of three clusters $F(2,387) = 17.77, p < .001$, with medium effect size (partial $\eta^2 = .09$), suggestive that about 9% of the variance of sexual behavior scores was explained by the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed that the sexual behavior scores in the high cluster ($M = .25, SD = .27$) were significantly lesser than that of the medium ($M = .41, SD = .27$, Tukey's HSD = $-.16, p < .01$) and low clusters ($M = .50, SD = .29$, Tukey's HSD = $-.26, p < .001$). Also, the sexual behavior scores in the medium cluster were significantly lesser in the low cluster (Tukey's HSD = $-.09, p < .01$).

The results yielded significant main effects of three clusters $F(2,437) = 16.03, p < .001$, with medium effect size (partial $\eta^2 = .07$), suggesting that about 7% of the variance of sleep problems scores was explained by the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed that the sleep problems scores in the high cluster ($M = .20, SD = .33$) were significantly lesser than that of the medium ($M = .33, SD = .34$, Tukey's HSD = $-.13, p < .001$) and low clusters ($M = .45, SD = .33$, Tukey's HSD = $-.26, p < .001$). Also, the sleep problems scores in the medium cluster were significantly lesser in the low cluster (Tukey's HSD = $-.13, p < .05$).

Additionally, the results yielded significant main effects of three clusters $F(2,437) = 16.30, p < .001$, with medium effect size (partial $\eta^2 = .07$), suggesting that about 7% of the variance of menstrual symptoms scores was explained by the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed that the menstrual symptoms scores in the high clusters ($M = .30, SD = .31$) were significantly lesser than the medium ($M = .41, SD = .29$, Tukey's HSD = $-.11, p < .05$) and low clusters ($M = .52, SD = .29$, Tukey's HSD = $-.23, p < .001$). Also, the menstrual symptoms scores in the medium cluster were significantly lesser than the low cluster (Tukey's HSD = $-.12, p < .001$).

Lastly, the results yielded significant main effects of three clusters $F(2,437) = 21.34, p < .001$, with medium effect size (partial $\eta^2 = .09$), suggesting that about 9% of the variance of attractiveness scores was explained by the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed that the attractiveness scores in the high clusters ($M = .12, SD = .26$) were significantly lesser than the medium ($M = .47, SD = .39$, Tukey's HSD = $-.35, p < .001$) and low clusters ($M = .44, SD = .37$, Tukey's HSD = $-.32, p < .001$).

The *second sub-objective* was to examine the difference between the profile of health-promoting behaviors across the dimensions of psychological distress in middle-aged women. Descriptive statistics and One-way ANOVA were utilized with continuous data in the three dimensions of women's psychological distress—depression, anxiety, and stress. Wherever One-way ANOVA revealed significant differences between clusters, follow-up with post-hoc analysis using Tukey's HSD was done to assess the difference in clusters' means. The independent variable was the profile of health-promoting behaviors, with three distinct clusters of high, medium, and low health-promoting behaviors. The dependent variables were the three dimensions of women's psychological distress. Table 8 presents the means, standard deviations, and One-way Analysis of variance across the three clusters of health-promoting behaviors and three dimensions of psychological distress.

Table 8 shows that there was a statistically significant difference between the three clusters of health-promoting behaviors and the three dimensions of psychological distress. The results yielded significant main effects of three clusters $F(2,437) = 76.93, p < .001$, with large effect size (partial $\eta^2 = .26$), suggesting that about 26% of the variance of depression scores was due to the differences in the three clusters of health-promoting behaviors. As the results of were significant, post-hoc comparison using Tukey's HSD test was computed for multiple comparisons between the clusters, and the results are shown in Table 9. The results suggest that the depression scores of middle-aged women belonging to the high cluster ($M =$

Table 8

Means, Standard Deviations, and One-way Analysis of Variance across the three clusters of health-promoting behaviors and psychological distress dimensions

Psychological distress	Clusters of health-promoting behaviors						<i>F</i> (2,437)	Partial
	High (<i>n</i> ₁ = 57)		Medium (<i>n</i> ₂ = 176)		Low (<i>n</i> ₃ = 176)			η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Depression	6.18	6.47	15.33	9.18	20.83	7.57	76.93***	.26
Anxiety	10.21	7.92	16.80	9.13	21.57	7.31	47.63***	.18
Stress	11.23	9.04	17.48	8.99	23.32	7.70	53.96***	.20

Note. ****p* < .001.

Table 9

Multiple comparisons using Tukey's HSD post-hoc test for psychological distress dimensions

Dimensions	High ~ Medium	High ~ Low	Medium ~ Low
Depression	- 9.15***	- 14.66***	- 5.50***
Anxiety	- 6.59***	- 11.36***	- 4.78***
Stress	- 6.25***	- 12.10***	- 5.85***

Note. ****p* < .001.

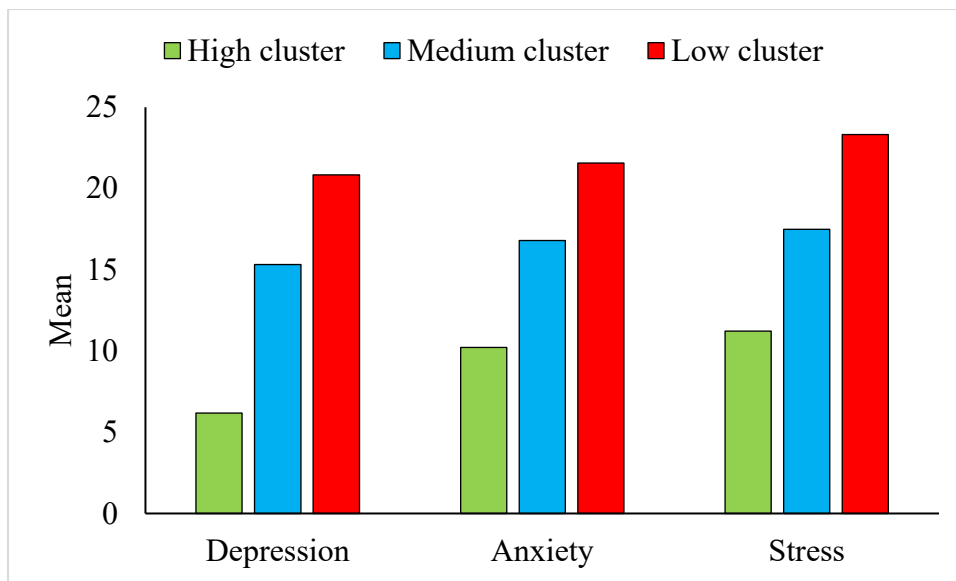


Figure 9. Mean scores of dimensions of psychological distress—depression, anxiety, and stress' across three clusters of health-promoting behaviors

6.18, $SD = 6.47$) were significantly lower than women in the medium ($M = 15.33$, $SD = 9.18$, Tukey's HSD = -9.15, $p < .001$) and low clusters ($M = 20.83$, $SD = 7.57$, Tukey's HSD = -14.66, $p < .001$). Also, the depression scores in the medium cluster were significantly lower than the low cluster group (Tukey's HSD = -5.50, $p < .001$). *Figure 9* displays the mean scores of dimensions of emotional and physical health across three clusters of health-promoting behaviors.

Further, One-way ANOVA results yielded significant main effects of three clusters $F(2,437) = 47.63$, $p < .001$, with large effect size (partial $\eta^2 = .18$), indicating that about 18% variance of anxiety scores was explained by the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed that the anxiety scores of middle-aged women belonging to High cluster ($M = 10.21$, $SD = 7.92$) were significantly lower than women in the medium ($M = 16.80$, $SD = 9.13$, Tukey's HSD = -6.59, $p < .001$) and low clusters ($M = 21.57$, $SD = 7.31$, Tukey's HSD = -11.36, $p < .001$). Also, the anxiety scores in the medium cluster were significantly lower than the low cluster group (Tukey's HSD = -4.78, $p < .001$).

Lastly, the results yielded significant main effects of three clusters $F(2,437) = 53.96$, $p < .001$, with large effect size (partial $\eta^2 = .20$), suggesting that about 20% of the variance of stress scores was due to the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed that the stress scores of middle-aged women belonging to the high cluster ($M = 11.23$, $SD = 9.04$) were significantly lesser than the medium ($M = 17.48$, $SD = 8.99$, Tukey's HSD = -6.25, $p < .001$) and low clusters ($M = 23.32$, $SD = 7.70$, Tukey's HSD = -12.10, $p < .001$). Also, the vasomotor symptoms scores in the medium cluster were significantly lesser than in the low cluster (Tukey's HSD = -5.85, $p < .05$).

The *third sub-objective* was to examine the difference between the profile of health-promoting behaviors across the domains of perceived social support in middle-aged women. One-way ANOVA was run with the three domains of perceived social support—significant

other, family, and friends. Wherever One-way ANOVA revealed significant differences between clusters, follow-up with post-hoc analysis using Tukey's HSD was done to assess the difference in clusters' means. Table 10 represents means, standard deviations, and One-way Analysis of variance across the three clusters of health-promoting behaviors and domains perceived social support.

Table 10 shows a statistically significant difference between the three clusters of health-promoting behaviors and the domains of perceived social support in middle-aged women. The results yielded significant main effects of three clusters, $F(2,437) = 139.54, p < .001$, with large effect size (partial $\eta^2 = .39$), suggesting about 39% of the variance of perceived social support—significant other was due to the differences in the three clusters of health-promoting behaviors. As the results of One-way ANOVA were significant, post-hoc comparison using Tukey's HSD test was computed for multiple comparisons between the clusters. The results are shown in Table 11. The results presented that the perceived social support from significant other was found to be higher in the high cluster ($M = 5.83, SD = .78$) compared to the medium cluster ($M = 4.34, SD = .91$, Tukey's HSD = 1.49, $p < .001$) and the low cluster ($M = 3.58, SD = .95$, Tukey's HSD = 2.25, $p < .001$). Also, women belonging to the medium cluster significantly perceived social support from their significant other than the low cluster group (Tukey's HSD = .76, $p < .001$).

Further, the results yielded significant main effects of three clusters, $F(2,437) = 128.27, p < .001$, with large effect size (partial $\eta^2 = .37$), suggesting that about 37% of the variance of perceived social support—family was due to the differences in the three clusters of health-promoting behaviors. Tukey's HSD revealed that the perceived social support from family in the high cluster ($M = 5.81, SD = .84$) was significantly higher than the medium cluster ($M = 4.43, SD = .90$, Tukey's HSD = 1.38, $p < .001$), and the low cluster ($M = 3.61, SD = 1.0$,

Table 10

Means, Standard Deviations, and One-way Analysis of Variance across the three clusters of health-promoting behaviors and perceived social support domains

	Clusters of health-promoting behaviors						<i>F</i> (2,437)	Partial
Perceived social support	High		Medium		Low			η ²
	<i>(n</i> ₁ = 57)		<i>(n</i> ₂ = 176)		<i>(n</i> ₃ = 176)			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Significant other	5.83	.78	4.34	.91	3.58	.95	139.54***	.39
Family	5.81	.84	4.43	.90	3.61	1.0	128.27***	.37
Friends	5.29	.97	4.40	.92	3.45	.93	107.20***	.33

Note. ****p* < .001

Table 11

Multiple comparisons using Tukey's HSD post-hoc test for perceived social support domains

Perceived social support	High ~ Medium	High ~ Low	Medium ~ Low
Significant other	1.49***	2.25***	.76***
Family	1.38***	2.19***	.82***
Friends	.89***	1.85***	.95***

Note. ****p* < .001

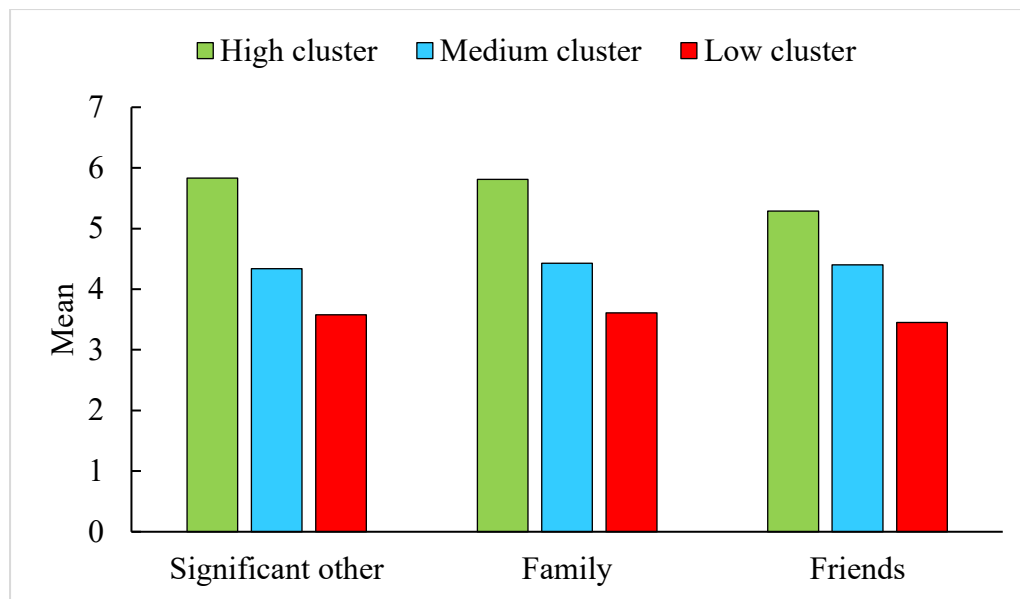


Figure 10. Mean scores of domains of perceived social support—significant other, family, and friends across three clusters of health-promoting behaviors

Tukey's HSD = 2.19, $p < .001$). Also, the perceived social support from family in the medium cluster was significantly higher than the low cluster (Tukey's HSD = .82, $p < .001$).

Lastly, there was a statistically significant difference between the three clusters of health-promoting behaviors and perceived support from friends in middle-aged women. The results yielded significant main effects of three clusters, $F(2,437) = 107.2$, $p < .001$, with large effect size (partial $\eta^2 = .33$), indicating that about 33% of the variance of perceived social support—friends was due to the differences in the three clusters of health-promoting behaviors. Tukey's HSD showed that the perceived social support from friends in the high clusters ($M = 5.29$, $SD = .97$) was significantly higher than the medium cluster ($M = 4.40$, $SD = .92$, Tukey's HSD = .89, $p < .001$), and the low cluster ($M = 3.45$, $SD = .93$, Tukey's HSD = 1.85, $p < .001$). Also, the perceived social support from friends in the medium cluster was significantly higher than the low cluster (Tukey's HSD = .95, $p < .001$). *Figure 10* displays the mean scores of domains of perceived social support—significant other, family, and friends across three clusters of health-promoting behaviors.

The *fourth sub-objective* was to examine the association between the profile of health-promoting behaviors and the prevalence of symptoms of four domains of reproductive morbidities among middle-aged women. The Chi-square test of association was computed across the three distinct clusters of high, medium, and low health-promoting behaviors and the prevalence of symptoms of four domains of reproductive morbidities (gynecological morbidities, contraceptive morbidities, obstetric morbidities—childbirth, and obstetric morbidities—abortion) among middle-aged women. Table 12 shows frequencies and Chi-square results across the three clusters of health-promoting behaviors and the prevalence of symptoms of domains of reproductive morbidities.

Table 12

Frequencies and Chi-square results across the three clusters of health-promoting behaviors and prevalence of symptoms of reproductive morbidities

		Clusters of Health-promoting behaviors						χ^2
Reproductive morbidities		High ($n_1 = 57$)		Medium ($n_2 = 176$)		Low ($n_3 = 176$)		
		f	%	F	%	f	%	
Gynecological morbidities								65.91***
	Presence	40	70.2	168	95.5	205	99.0	
	Absence	17	29.8	8	4.5	2	1.0	
Contraceptive morbidities								24.65***
	Presence	27	47.4	110	62.5	163	78.7	
	Absence	30	52.6	66	37.5	44	21.3	
Obstetric morbidities (Childbirth)								19.72***
	Presence	40	70.2	138	78.4	189	91.3	
	Absence	17	29.8	38	21.6	18	8.7	
Obstetric morbidities (Abortion)								0.63
	Presence	21	36.8	71	40.3	88	42.5	
	Absence	36	63.2	105	59.7	119	57.5	

Note. *** $p < .001$.

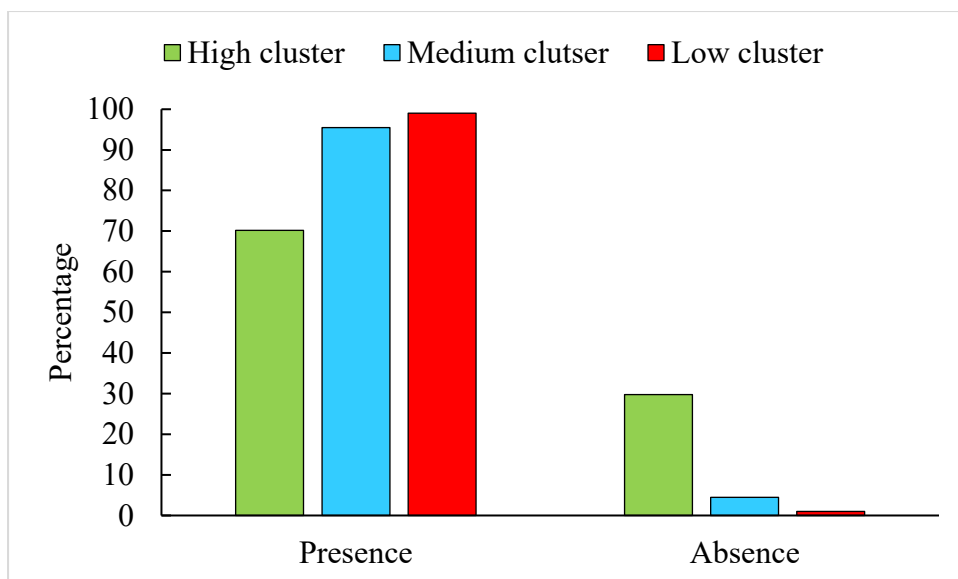


Figure 11. Percentage of middle-aged women across the three clusters of health-promoting behaviors reporting symptoms of gynecological morbidities

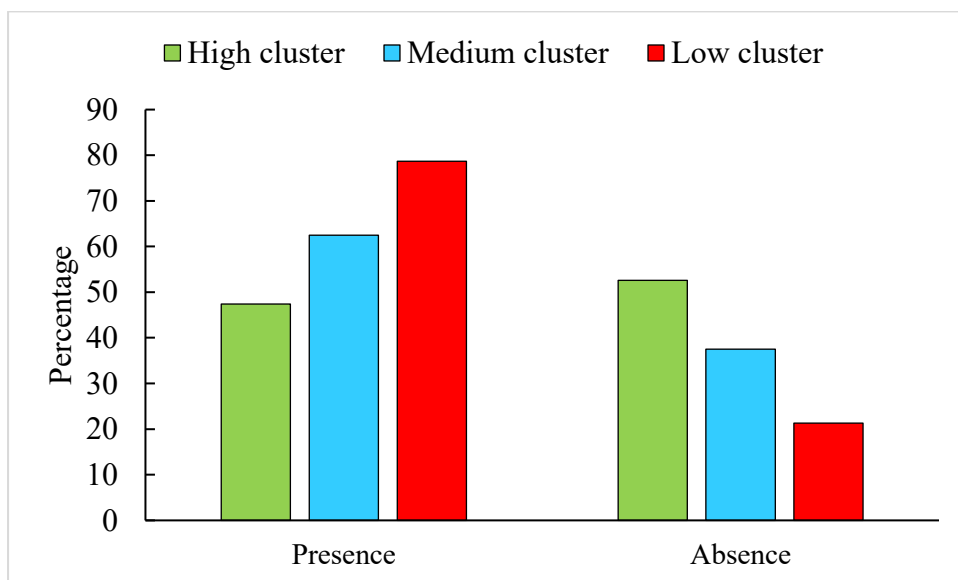


Figure 12. Percentage of middle-aged women across the three clusters of health-promoting behaviors reporting symptoms of contraceptive morbidities

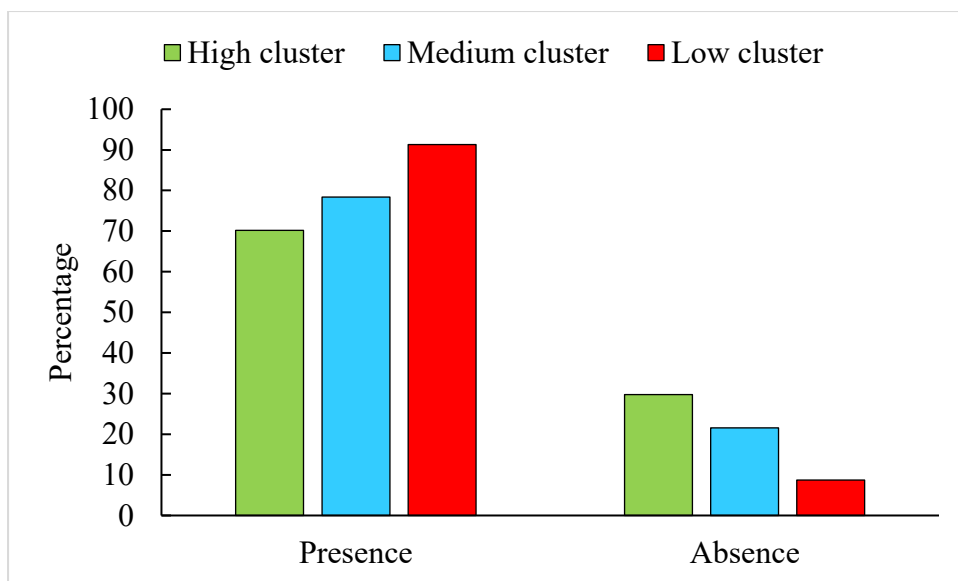


Figure 13. Percentage of middle-aged women across the three clusters of health-promoting behaviors reporting symptoms of obstetric morbidities (childbirth)

From Table 12, the Chi-square analysis results revealed a significant association between the profile of health-promoting behaviors and the prevalence of symptoms of gynecological morbidities, $\chi^2 = 65.91, p < .001$, contraceptive morbidities, $\chi^2 = 24.65, p < .001$, and obstetric morbidities (childbirth), $\chi^2 = 19.72, p < .001$. Middle-aged women in the low health-promoting behaviors cluster indicated a 99% presence of symptoms of gynecological morbidities than the medium cluster (95.5%) and high cluster (70.2%). Similarly, middle-aged women in the low health-promoting behaviors cluster indicated a 78.7% presence of symptoms of contraceptive morbidities than the medium cluster (62.5%) and high cluster (47.4%). Also, middle-aged women in the low health-promoting behaviors cluster reported 91.3% of the presence of symptoms of obstetric morbidities during childbirth compared to the medium cluster (78.4%) and high cluster (70.2%).

Figure 11, Figure 12, and Figure 13 displays the percentage of middle-aged women across the three clusters of health-promoting behaviors reporting the prevalence of symptoms of gynecological morbidities, contraceptive morbidities, and obstetric morbidities (childbirth).

The *fifth sub-objective* was to examine the difference and association between the profile of health-promoting behaviors with age, education, employment, and menstrual stages in middle-aged women. Table 13 presents the means, standard deviations, and One-way Analysis of variance across the three clusters of health-promoting behaviors and age. There was a statistically significant difference across the three clusters of health-promoting behaviors of middle-aged women and their age. The results yielded significant main effects of three clusters $F(2,437) = 11.14, p < .001$, with small effect size (partial $\eta^2 = .05$), suggesting that about 5% of the variance of age was explained by the differences in the three clusters of health-promoting behaviors. Since the results were significant, follow-up with post-hoc analysis using Tukey's HSD was done to assess the difference in clusters' means,

Table 13

Means, Standard Deviations, and One-way Analysis of Variance across the three clusters of health-promoting behaviors and age

	Clusters of health-promoting behaviors						<i>F</i> (2,437)	Partial η ²
	High		Medium		Low			
	<i>(n</i> ₁ <i> = 57)</i>		<i>(n</i> ₂ <i> = 176)</i>		<i>(n</i> ₃ <i> = 176)</i>			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Age	47.67	5.69	47.36	5.89	45	4.69	11.14***	.05

Note. *** $p < .001$

Table 14

Multiple comparisons using Tukey's HSD post-hoc test for age

	High ~ Medium	High ~ Low	Medium ~ Low
Age	.31	2.63**	2.32***

Note. ** $p < .01$, *** $p < .001$

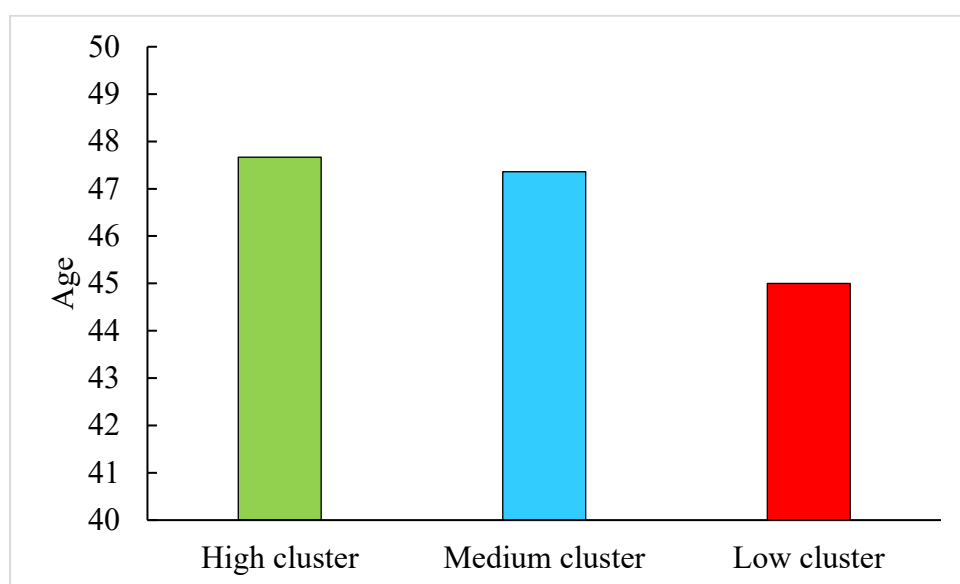


Figure 14. Mean age across three clusters of health-promoting behaviors

as presented in Table 12. The results suggest that the age in the low cluster ($M = 45$, $SD = 4.69$) was statistically significant than the high cluster ($M = 47.67$, $SD = 5.69$, Tukey's HSD = 2.63, $p < .01$) and medium cluster ($M = 47.36$, $SD = 5.89$, Tukey's HSD = 2.32, $p < .001$).

Figure 14 displays the mean age across the three clusters of health-promoting behaviors.

Table 15 shows the frequencies and Chi-square results across the three clusters of health-promoting behaviors and education status, employment status, and menstrual stages. Education status was categorized under class X, Class XII, graduation, and postgraduation. The Chi-square results suggested a significant association between the profile of health-promoting behaviors and education status of middle-aged women, $\chi^2 = 48.57$, $p < .001$. Class X as an education status was strongly associated with the three clusters of health-promoting behaviors. This indicates that middle-aged women with class X education belonged to the low health-promoting cluster (56.3%) than the medium (37.5%) and high cluster (6.3%). Class XII as an education status was strongly associated with the three clusters of health-promoting behaviors. This indicated that middle-aged women with class XII education belonged to the low health-promoting cluster (59.8%) than the medium (36.4%) and high cluster (3.8%). Graduation as an education was also strongly associated with the three clusters of health-promoting behaviors. This indicated that middle-aged women with graduation belonged to the low health-promoting cluster (44.9%) than the medium (41.7%) and high cluster (13.4%). Postgraduation as an education status was strongly associated with the three clusters of health-promoting behaviors. This indicated that middle-aged women with postgraduation belonged to the medium health-promoting cluster (42.2%) than the high (40%) and low cluster (1.8%). *Figure 15* displays the percentage of middle-aged women across the three clusters of health-promoting behaviors and education status.

Another confounding variable, employment status was classified as homemaker, self-employed, and salaried. The Chi-square results were significant, showing an association

Table 15

Frequencies and Chi-square results across the three clusters of health-promoting behaviors and education status, employment status, and menstrual stages

Variable	Clusters of health-promoting behaviors						χ^2
	High		Medium		Low		
	$(n_1 = 57)$		$(n_2 = 176)$		$(n_3 = 176)$		
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	
Education status							48.57***
Class X	1	6.3	6	37.5	9	56.3	
Class XII	5	3.8	48	36.4	79	59.8	
Graduation	33	13.4	103	41.7	111	44.9	
Postgraduation	18	40.0	19	42.2	8	1.8	
Employment status							19.61**
Homemaker	23	12.8	73	40.6	84	46.7	
Self-employed	8	7.1	37	33.0	67	59.8	
Salaried	26	17.6	66	44.6	56	37.8	
Menstrual stages							37.47***
Regular menstruation	22	15.7	57	40.7	61	43.6	
Perimenopause	6	4.3	41	29.3	93	66.4	
Menopause	29	18.1	78	48.8	53	33.1	

Note. ** $p < .01$, *** $p < .001$.

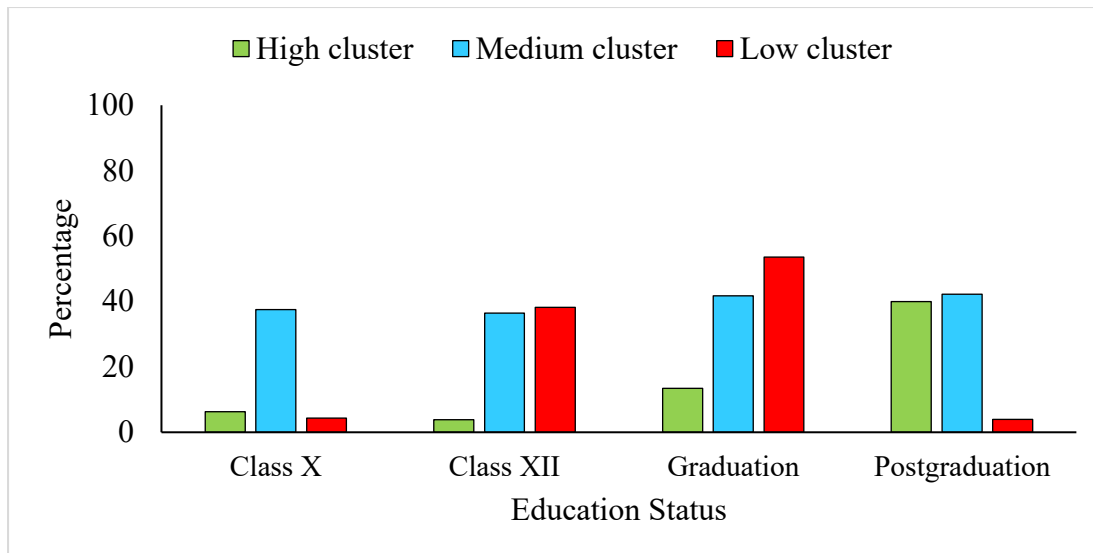


Figure 15. Percentage of middle-aged women across the three clusters of health-promoting behaviors and education status

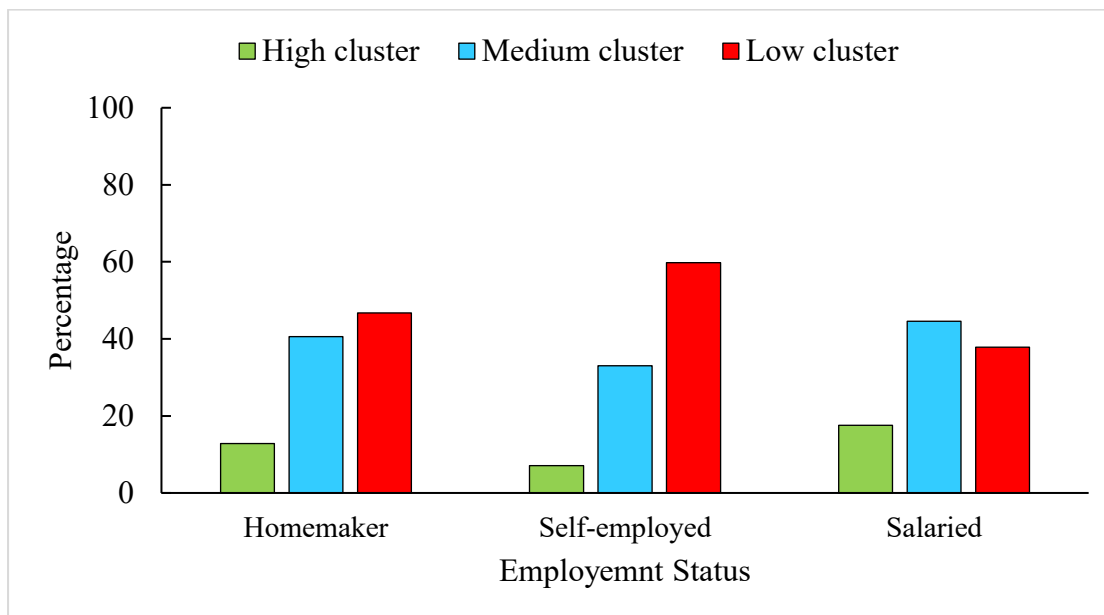


Figure 16. Percentage of middle-aged women across the three clusters of health-promoting behaviors and employment status

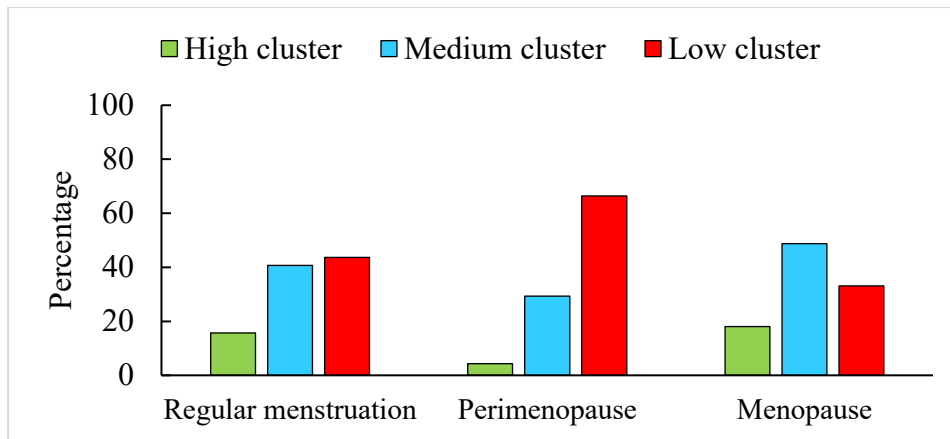


Figure 17. Percentage of middle-aged women across the three clusters of health-promoting behaviors and menstrual stages

between the profile of health-promoting behaviors and the employment status of middle-aged women, $\chi^2 = 19.61$, $p < .01$. Middle-aged women in the category of homemakers belonged to the low health-promoting behaviors cluster (46.7%) than the medium (40.6%) and high cluster (12.3%). Middle-aged women in the category of self-employed belonged to the low health-promoting behaviors cluster (59.8%) than the medium (33%) and high cluster (7.1%). Middle-aged women in the category of salaried belonged to the medium health-promoting behaviors cluster (44.6%) than the low (37.8%) and high cluster (17.6%). *Figure 16* displays the percentage of middle-aged women across the three clusters of health-promoting behaviors and employment status.

Lastly, the menstrual stages comprised regular menstruation, perimenopause, and menopause. A significant association was observed between the profile of health-promoting behaviors and the three menstrual stages in middle-aged women, $\chi^2 = 37.47$, $p < .001$. Middle-aged women in the regular menstruation stage were associated with the low health-promoting behaviors cluster (43.6%) than the medium (40.7%) and high cluster (15.7%). Whereas middle-aged women in the perimenopause stage were also associated with the low health-promoting behaviors cluster (66.4%) than the medium (29.3%) and high cluster (4.3%). In the case of middle-aged women who attained menopause stage, significantly associated with the medium health-promoting behaviors cluster (48.8%) than the low (33.1%) and high clusters (18.1%). *Figure 17* displays the percentage of middle-aged women across the three clusters of health-promoting behaviors and menstrual stages.

The ***fourth main objective*** was to assess the role of emotional, physical health, and social support on health-promoting behaviors among middle-aged women. The objective was subdivided into two sub-objectives.

The *first sub-objective* was to assess the relationship between emotional, physical health, perceived social support, and health-promoting behaviors among middle-aged women.

As the obtained scores in all variables were on an interval scale, Pearson's product-moment correlation (r) was calculated. Major assumptions were tested. The predictor variables included the eight dimensions of emotional and physical health—depressed mood, somatic symptoms, memory/concentration, vasomotor symptoms, anxiety/fear, sleep problems, menstrual symptoms, and attractiveness, along with the three domains of perceived social support—significant other, family, and friends. Initially, there were nine dimensions of emotional and physical health; however, the sexual behavior dimension was dropped from the analysis as there were 53 participants reported to be non-concerned with dimension items no. 31 and 34 (*See Appendix III*). Therefore, this dimension was dropped. The criterion consisted of the six dimensions of health-promoting behaviors—health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. Pearson's product-moment correlation (r) between the predictors and the criterion is displayed in Table 16.

From Table 16, it can be derived that there was a significant negative correlation between the emotional and physical health dimensions and the dimensions of health-promoting behaviors in which depressed mood was negatively correlated with—'health responsibility ($r = -.17, p < .001$), physical activity ($r = -.24, p < .001$), nutrition ($r = -.26, p < .001$), spiritual growth ($r = -.35, p < .001$), interpersonal relations ($r = -.37, p < .001$), and stress management ($r = -.32, p < .001$).' Similarly, somatic symptoms was negatively correlated with 'health responsibility ($r = -.24, p < .001$), physical activity ($r = -.25, p < .001$), nutrition ($r = -.19, p < .001$), spiritual growth ($r = -.23, p < .001$), interpersonal relations ($r = -.26, p < .001$), and stress management ($r = -.35, p < .001$).' A negative correlation was found between memory/concentration and 'nutrition ($r = -.13, p < .01$), spiritual growth ($r = -.14, p < .01$), interpersonal relations ($r = -.10, p < .05$), and stress management ($r = -.11, p < .05$).' Vasomotor symptoms was also found to be negatively

Table 16

Intercorrelations for emotional and physical health, perceived social support and dimensions of health-promoting behaviors among middle-aged women (N = 440)

	Dimensions of health-promoting behaviors					
	HR	PA	N	SG	IR	SM
Emotional and physical health						
Depressed Mood	-.17***	-.24***	-.26***	-.35***	-.37***	-.32***
Somatic Symptoms	-.24***	-.25***	-.19***	-.23***	-.26***	-.35***
Memory/Concentration	-.03	-.09	-.13**	-.14**	-.10*	-.11*
Vasomotor Symptoms	-.21***	-.16**	-.17***	-.21***	-.32***	-.23***
Anxiety/Fears	-.25***	-.31***	-.23***	-.18***	-.27***	-.30***
Sleep Problems	-.21***	-.23***	-.21***	-.20***	-.23***	-.31***
Menstrual symptoms	-.28***	-.17***	-.17***	-.14**	-.21***	-.26***
Attractiveness	-.05	-.14**	-.21***	-.24***	-.23***	-.11*
Perceived social support						
Significant Other	.32***	.28***	.47***	.56***	.64***	.46***
Family	.38***	.33***	.47***	.55***	.66***	.45***
Friends	.38***	.31***	.41***	.51***	.62***	.44***

Note. HR: Health responsibility, PA: Physical activity, N: Nutrition, SG: Spiritual growth, IR: Interpersonal relations, SM: Stress management.

* $p < .05$, ** $p < .01$, *** $p < .001$.

correlated with ‘health responsibility ($r = -.21, p < .001$), physical activity ($r = -.16, p < .01$), nutrition ($r = -.17, p < .001$), spiritual growth ($r = -.21, p < .001$), interpersonal relations ($r = -.32, p < .001$), and stress management ($r = -.23, p < .001$).’ Similarly, a negative correlation was found between anxiety/fears and ‘health responsibility ($r = -.25, p < .001$), physical activity ($r = -.31, p < .001$), nutrition ($r = -.23, p < .001$), spiritual growth ($r = -.18, p < .001$), interpersonal relations ($r = -.27, p < .001$), and stress management ($r = -.30, p < .001$).’ A negative correlation was found with sleep problems and ‘health responsibility ($r = -.21, p < .001$), physical activity ($r = -.23, p < .001$), nutrition ($r = -.21, p < .001$), spiritual growth ($r = -.20, p < .001$), interpersonal relations ($r = -.23, p < .001$), and stress management ($r = -.31, p < .001$).’ Further, menstrual symptoms was also negatively correlated with ‘health responsibility ($r = -.28, p < .001$), physical activity ($r = -.17, p < .001$), nutrition ($r = -.17, p < .001$), spiritual growth ($r = -.14, p < .01$), interpersonal relations ($r = -.21, p < .001$), and stress management ($r = -.26, p < .001$).’ Lastly, a negative correlation was found between attractiveness and ‘physical activity ($r = -.14, p < .01$), nutrition ($r = -.21, p < .001$), spiritual growth ($r = -.24, p < .001$), interpersonal relations ($r = -.23, p < .001$), and stress management ($r = -.11, p < .05$).’

Further, Table 16 displayed a significant positive correlation between perceived social support domains and health-promoting behaviors dimensions. A positive correlation was noted between support from significant other and ‘health responsibility ($r = .32, p < .001$), physical activity ($r = .28, p < .001$), nutrition ($r = .47, p < .001$), spiritual growth ($r = .56, p < .001$), interpersonal relations ($r = .64, p < .001$), and stress management ($r = .46, p < .001$).’ Similarly, support from family was positively correlated with ‘health responsibility ($r = .38, p < .001$), physical activity ($r = .33, p < .001$), nutrition ($r = .47, p < .001$), spiritual growth ($r = .55, p < .001$), interpersonal relations ($r = .66, p < .001$), and stress management ($r = .45, p < .001$).’ Lastly, support from friends was also positively correlated with ‘health responsibility

($r = .38, p < .001$), physical activity ($r = .31, p < .001$), nutrition ($r = .41, p < .001$), spiritual growth ($r = .51, p < .001$), interpersonal relations ($r = .62, p < .001$), and stress management ($r = .44, p < .001$).’

The *second sub-objective* was to assess the role of emotional, physical health, and perceived social support on health-promoting behaviors among middle-aged women. Multiple linear regression analysis using the step-wise method was computed separately for each dimension of health-promoting behaviors—health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. Major assumptions of multiple linear regression analysis using the step-wise method, such as normal distribution, linear relationship, and multi-collinearity, were met. The eight dimensions of emotional and physical health and three domains of perceived social support were entered as predictors, and each of the six dimensions of health-promoting behaviors was considered as a criterion to compute the multiple regression analysis (step-wise method) individually.

Table 17 presents the results of the summary of multiple linear regression analysis (step-wise method) for emotional and physical health dimensions and perceived social support domains predicting health responsibility. The table contains the number of steps, unstandardized regression coefficients (B), standardized regression coefficients (β), R^2 , R^2 -change (ΔR^2), constant (C), standard error of beta (SEB), and t -value with levels of significance.

The analysis gave rise to three models. The analysis demonstrated that in the initial step of the model, support from family was entered ($\beta = .38, t = 8.57, p < .001$) into the step-wise model as a significant predictor. Support from family explained a 14% statistically significant variance in predicting health responsibility, $R^2 = .14, F = (1,438), p < .001$.

Table 17

Summary of multiple linear regression analysis (step-wise method) for emotional, physical health, and perceived social support predicting health-promoting behavior (health responsibility) (N = 440)

	<i>C</i>	<i>R</i> ²	ΔR^2	<i>B</i>	<i>SEB</i>	<i>B</i>	<i>T</i>
Step 1	2.03	.14	-				
Family				.11	.01	.38	8.57***
Step 2	2.19	.18	.04				
Family				.10	.01	.34	7.66***
Menstrual symptoms				-.23	.05	-.21	-4.74***
Step 3	2.24	.19	.01				
Family				.09	.01	.32	7.08***
Menstrual symptoms				-.20	.05	-.18	-4.00***
Anxiety/Fears				-.14	.05	-.13	-2.80**

Note. ** $p < .01$, *** $p < .001$.

The predictor menstrual symptoms was added in Step 2 of the model ($\beta = -.21$, $t = -4.74$, $p < .001$), and it explained 4% more significant variance. Hence, the model including predictors of support from family and menstrual symptoms explained an 18% statistically significant variance in predicting health responsibility, $R^2 = .18$, $F = (1,437)$, $p < .001$.

In the final Step 3, the predictor anxiety/fears was included in the model ($\beta = -.13$, $t = -2.80$, $p < .05$), and it explained 1% more significant variance. Hence, the model including support from family, menstrual symptoms, and anxiety/fears explained a 19% statistically significant variance in predicting health responsibility, $R^2 = .19$, $F = (1,436)$, $p < .001$.

Hence, the three significant predictors support from family ($\beta = .38$, $t = 8.57$, $p < .001$), menstrual symptoms ($\beta = -.21$, $t = -4.74$, $p < .001$), and anxiety/fears ($\beta = -.13$, $t = -2.80$, $p < .05$), predicted health responsibility in middle-aged women.

Table 18 depicts the results of the summary of multiple linear regression analysis (step-wise method) for emotional and physical health dimensions and perceived social support domains predicting physical activity. The analysis gave rise to three models. The analysis showed that in the first step of the model, support from family was entered ($\beta = .33$, $t = 7.25$, $p < .001$) into the step-wise model as a significant predictor. Support from family explained a 11% statistically significant variance in predicting physical activity, $R^2 = .11$, $F = (1,438)$, $p < .001$.

The predictor anxiety/fears was added in Step 2 of the model ($\beta = -.25$, $t = -5.62$, $p < .001$), and it explained 5% more significant variance. Hence, the model including support from family and anxiety/fears explained 16% statistically significant variance in predicting physical activity, $R^2 = .16$, $F = (1,437)$, $p < .001$.

Finally, the predictor attractiveness was included in Step 3 ($\beta = -.12$, $t = -2.70$, $p < .01$), and the model described 1% more significant variance. Hence, the model including

Table 18

Summary of multiple linear regression analysis (step-wise method) for emotional, physical health, and perceived social support predicting health-promoting behavior (physical activity)

(N = 440)

	<i>C</i>	<i>R</i> ²	ΔR^2	<i>B</i>	<i>SEB</i>	β	<i>T</i>
Step 1	2.0	.11	-				
Family				.10	.01	.33	7.25***
Step 2	2.17	.16	.05				
Family				.08	.01	.27	6.03***
Anxiety/Fears				-.29	.05	-.25	- 5.62***
Step 3	2.23	.17	.01				
Family				.08	.01	.26	5.78***
Anxiety/Fears				-.30	.05	-.26	- 5.76***
Attractiveness				-.11	.04	-.12	- 2.70**

Note. ** $p < .01$, *** $p < .001$.

support from family, anxiety/fears, and attractiveness explained 17% statistically significant variance in predicting physical activity, $R^2 = .17$, $F = (1,436)$, $p < .001$.

Therefore, the three significant predictors of support from family ($\beta = .33$, $t = 7.25$, $p < .001$), anxiety/fears ($\beta = -.25$, $t = -5.62$, $p < .001$), and attractiveness ($\beta = -.12$, $t = -2.70$, $p < .01$) predicted physical activity in middle-aged women.

Table 19 depicts the results of the summary of multiple linear regression analysis (step-wise method) for emotional and physical health dimensions and perceived social support domains predicting nutrition. The analysis gave rise to four models. The analysis showed that in the first step of the model, support from family was entered ($\beta = .47$, $t = 11.27$, $p < .001$) into the step-wise model as a significant predictor. Support from family explained 22% statistically significant variance in predicting nutrition, $R^2 = .22$, $F = (1,438)$, $p < .001$.

The predictor support from significant other was added in Step 2 of the model ($\beta = .26$, $t = 4.15$, $p < .001$), and it explained 3% more significant variance. Hence, the model including support from family and support from significant other explained 25% statistically significant variance in predicting nutrition, $R^2 = .25$, $F = (1,437)$, $p < .001$.

The predictor attractiveness was added in Step 3 of the model ($\beta = -.15$, $t = -3.71$, $p < .001$), and it explained 2% more significant variance. Hence, the model including support from family, support from significant other, and attractiveness explained 27% statistically significant variance in predicting nutrition, $R^2 = .27$, $F = (1,436)$, $p < .001$.

Finally, in the Step 4, the predictor anxiety/fears was included in the model ($\beta = -.12$, $t = -2.81$, $p < .01$), and it explained 1% more significant variance. Hence, the model containing support from family, support from significant other, attractiveness, and anxiety/fears explained 28% statistically significant variance in predicting nutrition, $R^2 = .28$, $F = (1,435)$, $p < .001$.

Table 19

Summary of multiple linear regression analysis (step-wise method) for emotional, physical health, and perceived social support predicting health-promoting behavior (nutrition) (N = 440)

	<i>C</i>	<i>R</i> ²	ΔR^2	<i>B</i>	<i>SEB</i>	<i>B</i>	<i>T</i>
Step 1	1.95	.22	-				
Family				.13	.01	.47	11.27***
Step 2	1.88	.25	.03				
Family				.08	.02	.29	4.64***
Significant Other				.07	.02	.26	4.15***
Step 3	1.96	.27	.02				
Family				.08	.02	.29	4.76***
Significant Other				.06	.02	.23	3.81***
Attractiveness				-.13	.04	-.15	-3.71***
Step 4	2.04	.28	.01				
Family				.08	.02	.28	4.66***
Significant Other				.06	.02	.21	3.36**
Attractiveness				-.14	.04	-.16	-3.89***
Anxiety/Fears				-.13	.05	-.12	-2.81**

Note. ** $p < .01$. *** $p < .001$.

Therefore, the four significant predictors of support from family ($\beta = .47$, $t = 11.27$, $p < .001$), support from significant other ($\beta = .26$, $t = 4.15$, $p < .001$), attractiveness ($\beta = -.15$, $t = -3.71$, $p < .001$) and anxiety/fears ($\beta = -.12$, $t = -2.81$, $p < .01$), predicted nutrition in middle-aged women.

Table 20 presents result of the summary of multiple linear regression analysis (step-wise method) for emotional and physical health dimensions and perceived social support domains predicting spiritual growth. The analysis gave rise to five models. In the initial step of the model, the predictor support from significant other was entered ($\beta = .56$, $t = 14.01$, $p < .001$) into the step-wise model as a significant predictor. Support from significant other explained 31% statistically significant variance in predicting spiritual growth, $R^2 = .31$, $F = (1,438)$, $p < .001$.

The predictor support from family was added in next step of the model ($\beta = .30$, $t = 5.19$, $p < .001$), and it explained 4% more significant variance. Hence, the model including predictors support from significant other and support from family explained 35% statistically significant variance in predicting spiritual growth, $R^2 = .35$, $F = (1,437)$, $p < .001$.

The predictor attractiveness was added next in the Step 3 of the model ($\beta = -.17$, $t = -4.34$, $p < .001$), and it explained 3% more significant variance. Hence, the model containing predictors such as support from significant other, support from family, and attractiveness explained 38% statistically significant percentage of variance in predicting spiritual growth, $R^2 = .38$, $F = (1,436)$, $p < .001$.

The predictor depressed mood was added in Step 4 of the model ($\beta = -.14$, $t = -3.41$, $p < .01$), and it explained 1% more significant variance. Hence, the model including predictors support from significant other, support from family, attractiveness, and depressed mood explained 39% statistically significant variance in predicting spiritual growth, $R^2 = .39$, $F = (1,435)$, $p < .001$.

Table 20

Summary of multiple linear regression analysis (step-wise method) for emotional, physical health, and perceived social support predicting health-promoting behavior (spiritual growth) (N = 440)

	<i>C</i>	<i>R</i> ²	ΔR^2	<i>B</i>	<i>SEB</i>	β	<i>T</i>
Step 1	1.89	.31	-				
Significant Other				.19	.01	.56	14.01***
Step 2	1.78	.35	.04				
Significant Other				.11	.02	.34	5.85***
Family				.10	.02	.30	5.19***
Step 3	1.88	.38	.03				
Significant Other				.11	.02	.31	5.49***
Family				.10	.02	.30	5.35***
Attractiveness				-.18	.04	-.17	-4.34***
Step 4	2.02	.39	.01				
Significant Other				.10	.02	.29	5.15***
Family				.09	.02	.27	4.74***
Attractiveness				-.17	.04	-.16	-4.13***
Depressed mood				-.26	.08	-.14	-3.41**
Step 5	1.99	.40	.01				
Significant Other				.09	.02	.26	4.49***
Family				.06	.02	.19	2.75**
Attractiveness				-.17	.04	-.16	-4.30***
Depressed Mood				-.25	.08	-.13	-3.24**
Friends				.05	.02	.13	1.97*

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Finally, the predictor support from friends was added in Step 5 of the model ($\beta = .13$, $t = 1.97$, $p < .05$), and it explained 1% more significant variance. Hence, the model including predictors support from significant other, support from family, attractiveness, depressed mood, and support from friends explained 40% statistically significant variance in predicting spiritual growth, $R^2 = .40$, $F = (1,434)$, $p < .001$.

Therefore, the five significant predictors, support from significant other ($\beta = .56$, $t = 14.01$, $p < .001$), support from family ($\beta = .30$, $t = 5.19$, $p < .001$), attractiveness ($\beta = -.17$, $t = -4.34$, $p < .001$), depressed mood ($\beta = -.14$, $t = -3.41$, $p < .01$), and support from friends ($\beta = .13$, $t = 1.97$, $p < .05$) predicted spiritual growth in middle-aged women.

Table 21 depicts the results of the summary of multiple linear regression analysis (step-wise method) for emotional and physical health dimensions, and perceived social support domains predicting interpersonal relations. The analysis gave rise to five models. In the first step of the model, support from family was entered ($\beta = .66$, $t = 18.34$, $p < .001$) into the step-wise model as a significant predictor. Support from family explained 43% statistically significant variance in predicting interpersonal relations, $R^2 = .43$, $F = (1,438)$, $p < .001$.

The predictor support from significant other was entered in Step 2 ($\beta = .34$, $t = 6.60$, $p < .001$), and the model explained 5% more significant variance. Hence, the model containing support from family and support from significant other explained 48% statistically significant variance in predicting interpersonal relations, $R^2 = .48$, $F = (1,437)$, $p < .001$.

The predictor attractiveness was entered in Step 3 of the model ($\beta = -.15$, $t = -4.36$, $p < .001$), and it explained 3% more significant variance. Hence, the model including predictors such as support from family, support from significant other, and attractiveness explained 51% statistically significant variance in predicting interpersonal relations, $R^2 = .51$, $F = (1,436)$, $p < .001$.

Table 21

Summary of multiple linear regression analysis (step-wise method) for emotional, physical health, and perceived social support predicting health-promoting behavior (interpersonal relations) (N = 440)

	<i>C</i>	<i>R</i> ²	ΔR^2	<i>B</i>	<i>SEB</i>	β	<i>t</i>
Step 1	1.75	.43	-				
Family				.23	.01	.66	18.34***
Step 2	1.62	.48	.05				
Family				.14	.02	.41	8.03***
Significant Other				.12	.02	.34	6.60***
Step 3	1.71	.51	.03				
Family				.14	.02	.41	8.25***
Significant Other				.11	.02	.31	6.25***
Attractiveness				-.16	.04	-.15	-4.36***
Step 4	1.68	.52	.01				
Family				.10	.02	.29	4.74***
Significant Other				.09	.02	.27	5.19***
Attractiveness				-.17	.04	-.16	-4.67***
Friends				.07	.02	.20	3.42**
Step 5	1.79	.53	.01				
Family				.10	.02	.27	4.49***
Significant Other				.09	.02	.26	4.97***
Attractiveness				-.16	.04	-.15	-4.47***
Friends				.07	.02	.18	3.19**
Depressed mood				-.21	.07	-.11	-2.93**

Note. ** $p < .01$, *** $p < .001$.

The predictor support from friends was added in Step 4 of the model ($\beta = .20$, $t = 3.42$, $p < .01$), and it explained 1% more significant variance. Hence, the model containing support from family, support from significant other, attractiveness, and support from friends explained 52% statistically significant variance in predicting interpersonal relations, $R^2 = .52$, $F = (1,435)$, $p < .001$.

Finally, the predictor depressed mood was added in Step 5 ($\beta = -.11$, $t = -2.93$, $p < .01$), and the model explained 1% more significant variance. Hence, the model including support from family, support from significant other, attractiveness, support from friends, and depressed mood explained 53% statistically significant variance in predicting interpersonal relations, $R^2 = .53$, $F = (1,434)$, $p < .001$.

Therefore, the five significant predictors support from family ($\beta = .66$, $t = 18.34$, $p < .001$), support from significant other ($\beta = .34$, $t = 6.60$, $p < .001$), attractiveness ($\beta = -.15$, $t = -4.36$, $p < .001$), support from friends ($\beta = .20$, $t = 3.42$, $p < .01$), and depressed mood ($\beta = -.11$, $t = -2.93$, $p < .01$) predicted interpersonal relations in middle-aged women.

Table 22 depicts the results of the summary of multiple linear regression analysis (step-wise method) for emotional and physical health dimensions, and perceived social support domains predicting stress management. The analysis gave rise to six models. In the first step of the model, support from significant other was entered ($\beta = .46$, $t = 10.94$, $p < .001$) into the step-wise model as a significant predictor. Support from significant other explained a statistically significant 21% proportion of variance in predicting stress management, $R^2 = .21$, $F = (1,438)$, $p < .001$.

The predictor somatic symptoms was entered in Step 2 of the model ($\beta = -.24$, $t = -5.71$, $p < .001$), and explained 6% more variance. Hence, the model including predictors support from significant other and somatic symptoms explained 27% statistically significant variance in predicting stress management, $R^2 = .27$, $F = (1,437)$, $p < .001$.

Table 22

Summary of multiple linear regression analysis (step-wise method) for emotional, physical health, and perceived social support predicting health-promoting behavior (stress management) (N = 440)

	<i>C</i>	<i>R</i> ²	ΔR^2	<i>B</i>	<i>SEB</i>	<i>B</i>	<i>T</i>
Step 1	2.04	.21	-				
Significant Other				.13	.01	.46	10.94***
Step 2	2.26	.27	.06				
Significant Other				.12	.01	.40	9.45***
Somatic symptoms				-.35	.06	-.24	-5.71***
Step 3	2.31	.29	.02				
Significant Other				.11	.01	.38	9.02***
Somatic symptoms				-.27	.07	-.19	-4.22***
Sleep problems				-.15	.04	-.15	-3.44**
Step 4	2.23	.30	.01				
Significant Other				.07	.02	.25	4.13***
Somatic symptoms				-.26	.06	-.18	-3.99***
Sleep problems				-.14	.04	-.14	-3.22**
Family				.05	.02	.19	3.12**
Step 5	2.29	.31	.01				
Significant Other				.07	.02	.23	3.85***
Somatic symptoms				-.27	.06	-.18	-4.16***
Sleep problems				-.15	.04	-.15	-3.45**
Family				.05	.02	.19	3.12**
Attractiveness				-.08	.04	-.09	-2.24*
Step 6	2.35	.32	.01				
Significant Other				.06	.02	.21	3.52***
Somatic symptoms				-.24	.07	-.17	-3.70***
Sleep problems				-.14	.04	-.14	-3.18**
Family				.05	.02	.19	3.16**
Attractiveness				-.09	.04	-.10	-2.46*
Menstrual symptoms				-.11	.05	-.10	-2.36*

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

The predictor sleep problems was added in Step 3 of the model ($\beta = -.15$, $t = -3.44$, $p < .01$), and explained 2% more variance. Hence, the model containing support from significant other, somatic symptoms, and sleep problems explained 29% statistically significant variance in predicting stress management, $R^2 = .29$, $F = (1,436)$, $p < .001$.

The predictor support from family was added in Step 4 of the model ($\beta = .19$, $t = 3.12$, $p < .01$), and explained 1% more variance. Hence, the model including support from significant other, somatic symptoms, sleep problems, and support from friends explained 30% statistically significant variance in predicting stress management, $R^2 = .30$, $F = (1,435)$, $p < .001$.

The predictor attractiveness was added in Step of the model ($\beta = -.09$, $t = -2.24$, $p < .05$), and explained 1% more variance. Hence, the model including support from significant other, somatic symptoms, sleep problems, support from family, and attractiveness explained 31% statistically significant variance in predicting stress management, $R^2 = .31$, $F = (1,434)$, $p < .001$.

Finally, the predictor menstrual symptoms was added in Step 6 of the model ($\beta = -.10$, $t = -2.36$, $p < .05$), and explained 1% more variance. Hence, the model including support from significant other, somatic symptoms, sleep problems, support from family, attractiveness, and menstrual symptoms explained 32% statistically significant variance in predicting stress management, $R^2 = .32$, $F = (1,433)$, $p < .001$.

Therefore, the six significant predictors, support from significant other ($\beta = .46$, $t = 10.94$, $p < .001$), somatic symptoms ($\beta = -.24$, $t = -5.71$, $p < .001$), sleep problems ($\beta = -.15$, $t = -3.44$, $p < .01$), support from family ($\beta = .19$, $t = 3.12$, $p < .01$), attractiveness ($\beta = -.09$, $t = -2.24$, $p < .05$), and menstrual symptoms ($\beta = -.10$, $t = -2.36$, $p < .05$) predicted stress management in middle-aged women.

Chapter V

DISCUSSION AND CONCLUSION

This chapter includes a detailed discussion after outlining the results based on the research questions and objectives. Further, key findings and conclusions are drawn from the study. Major limitations, future directions, and implications of the study are also presented.

The *first main objective* was to explore the profile of health-promoting behaviors among middle-aged women.

The findings of the first objective revealed that middle-aged women were clustered into three meaningful natural sub-groups or clusters—high, medium, and low health-promoting behaviors sub-groups, based on the six dimensions of health-promoting behaviors. Thus, women who initially formed a homogenous group are divided into three clusters when their health-promoting behaviors in all six dimensions—health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management were taken into consideration. This implies that health-promoting behaviors are not present consistently within a homogenous group of middle-aged women. Strikingly, the findings reveal that the variances in the health-promoting behaviors of middle-aged women formed diverse heterogeneous groups in the form of clusters. This indicated that middle-aged women belonging to low health-promoting behaviors cluster rarely pay attention to their health, never involved in health education or sought professional help for their health problems, physical inactivity, improper nutrition intake, disturbed work-life balance, ineffective in personal communication, and inability to manage stress. However, middle-aged women with high health-promoting behaviors cluster are routinely engaged in monitoring health through media consumption, doctor consultations, exercising vigorously or moderately, consuming balanced diet, adequate sleep and relaxation time, shared thoughts and feelings in personal relationships, and maintain constructive future orientation. This finding broadly supports the

work of Kopanidis and Reid (2024), on high, medium, and low proactive health and well-being behaviors in a homogenous population of middle-aged women. In accord with the present findings, Thomas et al. (2020) reported that health-risk behaviors and health-promoting behaviors among middle-aged men and women constituted different behavior drives, developments, and changes, and recommended a need to identify factors underpinning such different behaviors.

The *second main objective* was to identify the prevalence and pattern of symptoms of reproductive morbidities among middle-aged women across geographical settings and menstrual stages. The objective was segmented into four sub-objectives.

The *first sub-objective* was to identify the prevalence of symptoms of reproductive morbidities among middle-aged women across geographical settings. Gynecological morbidity is any symptom condition, disease or dysfunction of the reproductive system. A significant association was noted between the prevalence of symptoms of gynecological morbidities and contraceptive morbidities among middle-aged women across rural and urban settings. The findings revealed that the presence of symptoms of gynecological morbidities was higher among rural middle-aged women compared to urban middle-aged women.

The possible explanation for this finding can be attributed to middle-aged women from rural settings who reported symptoms such as body pain, abnormal vaginal bleeding, urinary infection, and painful intercourse. Further, there is also a possibility that due to lack of access to healthcare services, rural middle-aged women report these symptoms more frequently than urban middle-aged women. In case of contraceptive morbidities, to limit fertility, urban women engage in usage of contraceptives which results in experience of symptoms such as dizziness, breast tenderness, vaginal discharge, severe mood swings. etc. Urban women are more aware of the usage of contraceptives and, thus, are more likely to report side effects associated with their use.

The findings are corroborated with the existing literature indicating that the symptoms associated with gynecological problems were high among both rural and urban women in middle age. However, the severity of such morbidities is more complex among rural middle-aged women (Sharma & Mahajan, 2015). In line with the results, Goyal et al. (2017) found that rural women who had attained menopause reported comparatively more symptoms of gynecological morbidities than urban women. The plausible reasons were the lack of access to healthcare facilities in rural areas, knowledge gaps, and low treatment-seeking behaviors among rural women. Consistent with the findings, Ross (2021) reported a higher prevalence of contraceptive morbidities among urban women. Studies on contraceptive health among women suggested that urban women had higher awareness about contraceptive methods and hence, use contraceptive methods more frequently than rural women (Renu et al., 2023). This is a plausible reason for the higher prevalence of contraceptive morbidities in urban areas.

The *second sub-objective* was to identify the prevalence of symptoms of reproductive morbidities among middle-aged women across menstrual stages. The four domains of reproductive morbidities are significantly associated with menstrual stages of middle-aged women. The prevalence of symptoms of gynecological morbidities, contraceptive morbidities, and obstetric morbidities (childbirth) were reported by middle-aged women in the perimenopause stage compared to the regular menstruation and menopause stages. Whereas, the prevalence of symptoms of obstetric morbidities (abortion) was majorly reported by middle-aged women who attained menopause.

Perimenopause is a period of transition to menopause. This condition is intertwined with severe physical and emotional problems. As a result, middle-aged women in the perimenopause stage reported to experience symptoms of abnormal vaginal bleeding, painful intercourse, severe mood swings, and dizziness. Middle-aged women in the menopause stage

who experienced obstetric morbidities (abortion) reported symptoms of uterine prolapse, severe mood swings, and body pain.

The above findings are consistent with the outcomes of past studies on symptoms of reproductive morbidities among middle-aged women. Several reports have shown that the severity of menopausal symptoms are intrinsically linked to the reproductive health history of middle-aged women (Larroy et al., 2019). Perimenopause was associated with increased gynecological morbidities (Pradhan et al., 2023; Sujatha et al., 2022). Contraceptive use and related morbidities influence the transition from premenopause to postmenopause. Further, oral contraceptive use was linked to a later age of attaining menopause (Lay et al., 2019). The findings of Sharami et al. (2022) illustrated that menopausal women with a history of abortions reported higher severity of symptoms of urogenital, psychological, and somatic symptoms.

The *third sub-objective* was to identify the patterns of symptoms of reproductive morbidities among middle-aged women across geographical settings. The findings suggested that middle-aged women belonging to rural settings experienced vaginal discharge as the only pattern of symptoms in respect of reproductive morbidities than middle-aged women residing in urban settings. These associations can be explained in terms of rural middle-aged women's lack of understanding of the symptoms, non-compliance to healthcare access, and presence of preexisting reproductive health problems.

The above finding is in accordance with the research by Durai et al. (2019), stating that, in rural women, vaginal discharge is attributed to preexisting menstrual disorders, and are vulnerable to develop reproductive tract infections. A similar finding by Amabebe and Anumba (2018) evidenced that the incidence of abnormal vaginal discharge was correlated with psychosocial stress. Mammen et al. (2017) also posited that not all vaginal discharge is

pathological in nature. It is not even related to menstrual hygiene. In fact, anxiety can be a causative factor for perceived symptoms of excessive vaginal discharge among rural women.

The *fourth sub-objective* was to identify the pattern of symptoms of reproductive morbidities among middle-aged women across menstrual stages. Menstrual stages were classified as regular menstruation, perimenopause, and menopause. The pattern of symptoms of reproductive morbidities, such as painful intercourse, abnormal vaginal bleeding, and vaginal discharge, was significantly associated with the perimenopause stage. Further, severe mood swings as a symptom of contraceptive morbidities and body pain as a symptom of reproductive morbidities were significantly associated with the perimenopause stage and regular menstruation stage in middle-aged women.

These results are in accordance with previous studies, which denoted that women's reproductive health is related to the vagina due to the influence of hormones (Shen et al., 2022). Waetjen et al. (2015) outlined that painful intercourse due to vaginal dryness was associated with the perimenopause stage. Similarly, Vitale et al. (2022) postulated that abnormal uterine bleeding was a significant symptom of perimenopause and negatively affected quality of life. Body pain for middle-aged women was linked to the declining levels of estrogen impacting bone density (Watt, 2018). Musculoskeletal pain was reported more by perimenopausal women than by premenopausal or postmenopausal women (Lu et al., 2020).

Akhtar et al. (2018) posited that symptoms of vaginal dryness, painful intercourse, backache, and urinary problems manifested in postmenopausal women in middle age. Likewise, Paudel et al. (2015) reported that the prevalence of gynecological problems are higher among postmenopausal women. Singh et al. (2020) also reported a higher prevalence of symptoms of vaginal dryness and consequent painful intercourse among postmenopausal women. Thakur et al. (2021) pointed out that irrespective of perimenopausal or postmenopausal status, middle-aged women experienced genitourinary symptoms. In a study

spanning five European countries, the incidence of vaginal dryness was found to decrease with menopausal stages and age (Constantine et al., 2016). Similarly, in a study conducted on Japanese women, experiences of abnormal vaginal discharge were reported less by women in their perimenopausal ages than the women of reproductive age (Kawai et al., 2024). Nevertheless, late perimenopause and early postmenopause were linked with a decrease in symptoms of mood disorders (Sander & Gordon, 2021).

The *third main objective* was to examine the difference and association between the profile of health-promoting behaviors, emotional, physical health, psychological distress, social support, reproductive morbidities, and confounding variables in middle-aged women. The third objective was separated into five sub-objectives.

The *first sub-objective* was to examine the difference between the profile of health-promoting behaviors and the dimensions of emotional and physical health. The dimensions of emotional health and physical health are depressed mood, somatic symptoms, memory/concentration, vasomotor symptoms, anxiety/fear, sexual behavior, sleep problems, menstrual symptoms, and attractiveness. The findings posited that there was a significant difference between the three clusters of health-promoting behaviors and the dimensions of emotional and physical health in middle-aged women.

The results revealed that the women in middle age under the high-health-promoting behaviors cluster reported significantly low levels of somatic symptoms, depressed mood, memory/concentration, anxiety/fears, sleep problems, vasomotor symptoms, menstrual symptoms, attractiveness, and showed concern towards sexual behavior compared to the middle-aged women in medium and low health-promoting behavior clusters. A likely explanation is that middle-aged women in high health-promoting behaviors cluster actively engage in 'health responsibilities, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management.' As a result, they experienced lower levels of depressed

mood, somatic symptoms, vasomotor symptoms, anxiety/fears, sleep problems, menstrual symptoms, enhanced memory/concentration, and attractiveness, and showed concern towards sexual behavior than the medium and low health-promoting behaviors clusters.

The results are in line and suggested that health-promoting behaviors like physical activity, yoga, and health literacy had a positive impact on cognitive functioning, sexual health, vasomotor symptoms, psychological symptoms and overall quality of life among middle-aged women (Khandehroo et al., 2020; Kumar et al., 2022; Shepherd-Banigan, 2017). The findings of Verburgh et al. (2020) showed that middle-aged women partaking in health-promoting behavior—physical exercises, intimate conversations with their loved ones about their problems, and taking time for themselves—experience positive changes in physical health. Nutrition strategies can contribute to lowering of vasomotor symptoms, tackling weight gain, and managing psychological health among middle-aged women (Laudisio et al., 2020). Participating in physical activities like stretching, walking, and exercising significantly improved reaction time in middle-aged women (Murmu & Saha, 2020). Health-promoting behaviors have been utilized as an intervention to improve the menopausal symptomology of middle-aged women both in India and other countries (Nazari et al., 2016). Physical activity has a substantial positive effect on sleep quality and self-esteem of middle-aged women (Dabrowska-Galas & Dabrowska, 2021). The study on rural Indian middle-aged women by Malik et al. (2018) showed that intervention based on health-promoting domains of spiritual growth, stress management, interpersonal relations, health responsibility, nutrition, and physical activity significantly improved the vasomotor, somatic, and psychological symptoms. John et al. (2022) demonstrated the efficacy of mindfulness-based therapy in decreasing vasomotor and psychological symptoms among middle-aged women.

In the case of low health-promoting behaviors cluster, middle-aged women reported depressed mood, somatic symptoms, memory/concentration, vasomotor symptoms,

anxiety/fears, sleep problems, menstrual symptoms, attractiveness, and were non-concerned with sexual behavior. Recent studies supported our finding, according to Lee and Oh (2022), physical activity levels determined the sleep quality of middle-aged women as well as their chronic symptoms of neck/back/shoulder aches. Middle-aged adults who do not engage in relaxation and light physical activities such as walking reported poorer sleep quality and are at risk of higher health morbidities (Saha et al., 2023). Poor compliance with health-promoting behaviors impedes healthy living and complicates the symptoms of depression, mood disorders, sleep problems, and social conflicts among middle-aged women (Ganapathy & Furaikh, 2018).

Contrary to our findings, several studies outlined that there were no significant difference in depression levels for moderate to high levels of physical activity (Denche-Zamorano et al., 2022; Galan-Arroyo et al., 2022). Kim et al. (2014) found that there was no association between vasomotor and sexual domains and physical activity in women aged 44-56 years. Wong et al. (2018) argued that health-enhancing behaviors like mindfulness-based stress reduction do not necessarily improve somatic, vasomotor, and urogenital symptoms among middle-aged women, though they can positively impact the psychological health of menopausal women. The findings of Witkowski et al. (2024) showed that even an hour of physical activity instead of sitting increases the subjective reporting of hot flush symptoms among middle-aged women.

The *second sub-objective* was to examine the difference between the profile of health-promoting behaviors and the dimensions of psychological distress in middle-aged women. The three dimensions of psychological distress are depression, anxiety, and stress. The findings revealed that difference between the three clusters of health-promoting behaviors and the dimensions of psychological distress in middle-aged women was significant. The results revealed that middle-aged women falling under the high-health-promoting behavior

sub-group reported significantly low levels of depression, anxiety, and stress. Remarkably, middle-aged women under the low health-promoting behaviors cluster reported higher levels of depression and were more anxious and stressed. A possible interpretation of these findings is that middle-aged women in low health-promoting behaviors cluster experienced negative feelings, agitation, lack of energy, nervousness, excessive breathing difficulties, and panic.

The results align with previous studies that suggested health-promoting behaviors act as protective barriers against mental distress for women in middle age (Cybulska et al., 2020). Studies suggested that depression was found to be associated with unhealthy behaviors and acts as a barrier to health promotion among middle-aged women (Cramer et al., 2019). Jeon et al. (2020) concluded that health anxiety impacts the quality of life among middle-aged women. Physical activity was linked to decreased stress among middle-aged women (Kaur et al., 2020). Similarly, Sharifirad et al. (2015) proposed that health-promoting behaviors are necessary to enhance the psychological health of middle-aged women.

The *third sub-objective* was to examine the difference between the profile of health-promoting behaviors and the domains of perceived social support in middle-aged women. The three domains of perceived social support comprised significant other, family, and friends. The findings revealed that difference between the three clusters of health-promoting behaviors and the domains of perceived social support in middle-aged women was significant. The results revealed that middle-aged women falling under the high-health-promoting behavior sub-group reported significantly high levels of perceived social support from their significant other, family, and friends. Interestingly, middle-aged women under the low health-promoting behaviors cluster reported lower levels of perceived social support from their significant other, family, and friends. A possible interpretation of these findings is that middle-aged women in low health-promoting behaviors cluster hardly engage in physical activity like exercise or walking, inability to cope with stress, difficulty maintaining

interpersonal relations, follow unhealthy dietary practices, do not consult doctors, and are negatively oriented about themselves.

Similar patterns of results were reported by previous studies highlighting the need for support from family and friends towards physical activity among middle-aged adults (Van Dyck et al., 2015). By engaging in social roles, middle-aged women manage their stress effectively (Atal & Foster, 2020). It was also recommended that a husband or a life partner is the closest source of support in this time of stress for middle-aged women, who can help women with information, emotional guidance, exercise, and relaxation (Namazi et al., 2019). According to Sathiyaseelan et al. (2024) meaningful social relationships have been linked with effective management of stress among middle-aged women: Whereas, marital and familial conflict increases health risk behavior. Self-motivation and having friends who support physical activity increases the consistency of physical activity among middle-aged women (Janssen et al., 2013). Women who could talk with their families about their health problems sought care for ailments associated with middle age (Fritel et al., 2013). Further, reviews suggested that exercise and physical activeness increased social interaction among middle-aged women, which determined their quality of life and self-image. Moreover, loneliness and low social engagement due to a lack of interpersonal relations can decrease physical activity and increase health risk behaviors (Barati et al., 2021; Luo et al., 2020). Contrary to the findings, Pieroth et al. (2017) determined that there is no significant association between diet quality and social support among middle-aged women.

The *fourth sub-objective* was to examine the association between the profile of health-promoting behaviors and the prevalence of symptoms of four domains of reproductive morbidities among middle-aged women. The results revealed that the profile of health-promoting behaviors of middle-aged women was strongly associated with the prevalence of symptoms of gynecological morbidities, contraceptive morbidities, and obstetric morbidities

related to childbirth. Further, the low health-promoting behaviors cluster was observed to be higher in percentage of the presence of symptoms of gynecological morbidities, contraceptive morbidities, and obstetric morbidities (childbirth) than the medium and high health-promoting behaviors clusters. It can be interpreted that middle-aged women in low-health promoting behaviors cluster do not exercise, are unaccountable for their own health, avoid seeking treatment, live an inactive lifestyle, eat unhealthy food, do not talk about their problems in relationships, and lack the ability to cope with stress. Hence, it is likely that they experience symptoms of vaginal discharge, severe mood swings, dizziness, urinary infection, and abnormal vaginal bleeding. Therefore, a strong association existed between low health-promoting behaviors and three domains of reproductive morbidities.

This finding broadly supports the work of several other studies linking health-promoting behaviors with reproductive morbidities. Meander et al. (2021) recommend that higher physical activity and a decrease in the sedentary lifestyle lead to better obstetric health outcomes among women. A nutritional diet positively influenced gynecological disorders among middle-aged women (Chauhan et al., 2022). Kalliala et al. (2017) underlined the risk of obstetric and gynecological outcomes based on fat levels among inactive women. However, reducing sitting time and increasing physical activity have been found to positively impact patients with gynecological cancers (Zainordin et al., 2021). Women who took responsibility for their health, such as consulting doctors frequently were likely to seek treatment for urogenital problems (Waetjen et al., 2015). Malik et al. (2021) investigated that low health responsibility and low interpersonal relationships were associated with not reporting or discussing unusual signs of gynecological problems. The study also stated that spiritual growth in terms of finding each day interesting, long-term goals, and new experiences played an important role among women with gynecological problems.

The *fifth sub-objective* was to examine the difference and association between the profile of health-promoting behaviors with age, education, employment, and menstrual stages in middle-aged women. Significant difference was found between the three clusters of health-promoting behaviors and age. Moreover, the findings also indicated significant associations between the three sub-groups of health-promoting behaviors with education, employment, and menstrual stages in middle-aged women. This finding may be clarified by the fact that a small variance of age, i.e., women in the age of 45 years belonged to the low health-promoting behaviors cluster compared to women in the age range of 47, respectively, belonging to medium and high health-promoting behaviors clusters. Hence, the difference between the three health-promoting behaviors and age remains marginal.

Similar to the present findings, Kopanidis and Reid (2024) found that older women were more motivated to improve their health by engaging in health-promoting behaviors than younger women in mid-life. Older women prioritize their health by following a better diet and demonstrated higher levels of physical activity (Alnjadat et al., 2024). This outcome is contrary to that of Amirabadizeh et al. (2016) who reported that in midlife women's health-promoting behaviors are not related to their age. Similarly, Park (2019) concluded that there were no age differences in the health-enhancing behaviors of women in midlife.

Further, the findings on education status revealed that out of the three clusters, the medium health-promoting behaviors cluster belonged to education status—postgraduation. Nevertheless, the low health-promoting behaviors cluster was associated with education status—class X, XII, and graduation. This signifies that middle-aged women with higher levels of education engage in “health responsibilities, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management.” Despite the challenges of middle age, women with postgraduation as an education status enable themselves in following

healthy behaviors. In case of low education, due to lack of awareness and access to health information contributes to health risk behaviors.

This finding broadly supports the work of other studies associating education with health-promoting behaviors. Education has been found to be effective in increasing health-promoting behaviors to decrease multimorbidity among women in mid-life (Hoseini et al., 2020). Women with higher education are more aware of their symptoms as well as the strategies to deal with them through adopting a healthier lifestyle (Namazi et al., 2019). Higher education was found to be the strongest predictor of choosing health-enhancing behaviors such as exercise or mind-body therapies to overcome menopausal symptoms (Vanden Noven et al., 2023). On the contrary, recent work of Alnjadat et al. (2024) found that women having graduation and postgraduation levels of education did not adhere to healthy diet and exercise, whereas women with primary or secondary education adhered to health-promoting behaviors.

Moving on, employment status was found to be a strong confounding variable and associated with the three clusters of health-promoting behaviors among middle-aged women. The findings revealed that the salaried women belonged to medium health-promoting behaviors cluster. Whereas, homemakers and self-employed women represented low health-promoting behaviors. This suggested that middle-aged women with better employment status are more ingenious in terms of maintaining health regimes such as bodily activity, nourishment, spiritual uplift, maintaining interpersonal relations, and managing stress effectively. Secure employment seems to empower women to adopt health-promoting behaviors in middle age. With respect to low health-promoting behaviors, it is likely that women who are homemakers or self-employed are subjected to multiple social roles and demands from the domestic front and lack the time or financial provisions to engage in health-promoting behaviors.

In line with the findings, Enjezab et al. (2014) concluded that women who are financially dependent on their husbands may not indulge in exercise and diet or seek medical attention as per their own will. Solhi et al. (2022) conferred employment as a motivator for healthy aging among middle-aged women. Homemakers faced menopausal complications in middle age (Barati et al., 2021). Also, Alnjadat et al. (2024) suggested that employment increased women's feeling of empowerment and utilization of health services. In contrast to the findings, Du et al. (2020) found that unemployed women were more likely to seek healthcare services. Ryan and Gatrell (2024) suggested that due to aging, middle-aged women were perceived as deficient and unreliable by their employers. Palermo et al. (2024) elucidated that due to health conditions women struggled to cope with work demands.

Lastly, menstrual status was found to be another strong confounding variable and was associated with the three clusters of health-promoting behaviors in middle-aged women. The findings revealed that women who attained menopause belonged to medium health-promoting behaviors cluster. Whereas women in regular menstruation and perimenopause stage represented the low health-promoting behaviors cluster. A possible explanation for this finding is that middle-aged women who attained menopause were open to adapt with the transition of menopause through consultations with health professionals, exercising moderately or vigorously, following a nutritious diet, sociable, gaining new experiences, and indulging in relaxation to manage stress compared to women belonging to regular menstruation. Women in menopause stage feel liberated from monthly menstruation and thus indulge in more self-care compared to women in regular menstruation and perimenopause stages. Women in perimenopause and regular menstruation stages likely feel overburdened with emotional, physical, and social challenges and lack the knowledge of menopausal transitions across the stages, fail to cope with the menstrual transitions in middle age, and hence fell under the low health-promoting behaviors cluster.

Consistent with the findings, Jayabharathi and Judie (2014) reported that women in menopause stage showed marked improvements in the spiritual, physical, and social quality after engaging in health-enhancing activities like yoga. Nayak et al. (2024) concluded that women with better social relations sailed through the menopausal transitions easily. In a study by Rathnayake et al. (2020) health-promoting behaviors were established as an effective strategy for improving the attitude, knowledge, and quality of life of women in menopausal transitions. On the other hand, perimenopausal women performing moderate physical activity reported significantly fewer physical symptoms (Kim et al., 2014). MacLellan et al. (2023) posited that lack of knowledge about the perimenopause phase and symptoms related to menopausal transition impacted consultation-seeking behavior. Moreover, Augoulea et al. (2021) investigated that stress management strategies—breathing exercises and muscle relaxation—markedly improved menopausal symptoms in perimenopausal and postmenopausal stages. In case of interpersonal relations, Mohta and Halder (2020) concluded that social intimacy and social networks of friends were found to be lower in premenopause stage.

In contradiction to the findings, Ashgar et al. (2023) outlined that women who attained menopause reported poor health-promoting behaviors. Sundararajan and Srinivasan (2023) found that the majority of women in the postmenopause stage did not seek any healthcare services for symptom management. Mohta and Halder (2020) delineated that women after menopause reported poor emotional intimacy and poor interpersonal relations. Taskiran and Ozgul (2021) concluded that there was no link between physical activity and menopausal stages. Another research suggested by Tariq et al. (2023) that women in perimenopause stage manage symptoms through health-promoting behaviors—exercise or dietary change—than women in the postmenopause stage. In addition, McArthur et al. (2014) reported that menopausal symptoms are not a barrier to regular exercise among middle-aged women.

Rather, daily routines, multiple responsibilities, intrinsic motivation, and self-sacrifice affected women's exercise regime.

The *fourth main objective* was to assess the role of emotional, physical health and perceived social support on health-promoting behaviors among middle-aged women. The objective was further divided into two sub-objectives.

The *first sub-objective* was to assess the relationship between emotional, physical health, perceived social support, and health-promoting behaviors among middle-aged women. The results revealed a significant negative relationship between the emotional, physical health dimensions, and the dimensions of health-promoting behaviors. Depressed mood, somatic symptoms, vasomotor symptoms, anxiety/fears, sleep problems, and menstrual symptoms—decreased—with low health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. Whereas, poor memory/concentration decreased with a healthy diet, meaningful relations, spiritual development, and effectively managing stress. Finally, the dimension attractiveness lessened with physical inactivity, poor nutrition, spiritual progress, interpersonal relations, and coping with stress. It can be interpreted that middle-aged women lose interest in daily life, experience bodily discomfort, hot flashes, heavy bleeding, nervousness, sleep disturbances, and poor physical attractiveness, significantly reducing their health-promoting behaviors.

In line with the present findings, Singhania et al. (2020) confirmed that somatic and vasomotor symptoms are linked to unhealthy diet and physical inactivity patterns among middle-aged women. Park (2019) reported a negative relation between physical, sexual, and psychological symptoms and health-promoting behaviors of middle-aged women. Similarly, Hajj et al. (2020) reported an inverse relationship between vasomotor, psychosocial domains, and physical activity among middle-aged women.

In addition, the findings of the study also indicated that the domains of perceived social support—significant other, family, and friends were positively related to the dimensions of health-promoting behaviors. This specified that the presence of social support from significant other, family, and friends significantly increased health-promoting behaviors such as health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management among middle-aged women. A plausible reason can be that women who received adequate support from their loved ones indulged in doctor consultation, physical activity, healthy eating, purposeful living, sharing feelings, and healthy sleep. The results are corroborated by previous studies showing that activities with friends and families increased physical activity among middle-aged women (Huxhold et al., 2013). Positive connections with family members and friends increase communication efficiency, reduce anxiety, and help women manage pressures (Harandi et al., 2017).

The *second sub-objective* was to assess the role of emotional, physical health, and perceived social support on health-promoting behaviors among middle-aged women.

The emotional and physical health dimensions, anxiety/fears and menstrual symptoms, together with the domains of perceived social support—family—significantly predicted health responsibility. Supported by family, seeking health care at regular intervals was scheduled due to the presence of nervousness, tension, discomfort, heavy bleeding, and cramps. In line with the results, a previous report by Lu et al. (2020) suggested that menstrual symptom severity and anxiety affected women's health-seeking behavior in middle age. Another study by Ohashi et al. (2014) reaffirmed that having support from family helped in seeking health amenities among middle-aged women.

The emotional and physical health dimensions, such as attractiveness and anxiety/fears, together with perceived social support from family, significantly predicted physical activity. A possible explanation to this finding could be that feelings of nervousness, anxiousness,

enthusiasm about fitness, satisfaction with physical appearance, body image, and support and encouragement from family influence middle-aged women to engage in planned or unplanned physical activities. The findings show congruence with previous literature that suggested that higher social support from family was associated with higher levels of physical activity (Smith et al., 2017). Also, psychosocial aspects of women's lives affect their physical activity in middle age (McArthur et al., 2014). Similarly, Khosromanesh et al. (2023) posited that fear of aging and diseases and encouragement from family motivate women to indulge in regular exercise. In the same line, Stacey et al. (2015) concluded that women's physical activity is motivated by their desire to improve their looks and their commitment to family.

The domains of perceived social support from family and significant other, along with emotional and physical health dimensions, such as anxiety/fears and attractiveness, significantly contributed to nutrition. It can be interpreted that engaging oneself in healthy eating through knowledge about healthy diets, the benefits of nutrition through media, and emotional support from family members and significant other play a significant role in middle-aged women's perception of nutrition. In addition, excessive worry about fitness, body image, and attractiveness constantly affected their eating behaviors and dietary regimes. Hence, the above positive and negative factors significantly contributed to middle-aged women's healthy eating behaviors. A similar pattern of results has been reported by previous studies, stating that body weight dissatisfaction impacts the dietary intake of middle-aged women (Chatelan & Carrard, 2021). Women who were dissatisfied with their weight consumed fewer carbohydrates and fiber. Stacey et al. (2015) posited that the motivation to look good positively influences the healthy eating habits of middle-aged women. Conklin et al. (2013) determined that a lack of social support from family can lead to non-nutritious diet

intake in late mid-life. Perry et al. (2016) suggested that a partner's presence influences health behavior of nutritious food intake.

The domains of perceived social support from family members, significant other, and friends, along with emotional and physical health dimensions, such as attractiveness and depressed mood, significantly contributed to spiritual growth. A possible discourse on these findings can be that social support in the form of comfort, being able to discuss problems, and feeling cared for by life partners, family, and friends allow middle-aged women to achieve a sense of purpose and peace in their lives. Due to aging, middle-aged women often worry about their appearance and body image. As a result, they often develop disinterest in life and lose hope and purpose in life. The results are consistent with the research by Rong et al. (2022), who stated that perceived social support from significant other, family, and friends was associated with increased spirituality. Boylan et al. (2023) pointed out that positive social support acts as a mediator between spirituality and mortality. Tiggemann and Hage (2019) highlighted that spirituality is associated with a positive body image through reduced self-objectification and gratitude among women aged 18-69 years. Pimenta et al. (2013) and Shafiee et al. (2016) concluded that menopausal symptoms such as depressed mood lessen in severity with higher spiritual growth.

The domains of perceived social support from family, significant other, and friends, along with emotional and physical health dimensions, such as attractiveness and depressed mood, significantly contributed to middle-aged women's interpersonal relations. The findings suggest that middle-aged women's sense of intimacy and caring, rather than casual relations, is intrinsically linked to their perception of receiving emotional and decisional support and comfort in relationships with their partner, family, and friends. Dissatisfaction with physical appearance, body image, and attractiveness, along with a sense of hopelessness, isolation, and depressed mood, significantly predicted the quality of interpersonal relations maintained by

middle-aged women. The results reflect congruence with previous studies that poor perceived social support leads to lower social functioning as people can appraise the support they get as inadequate (Wang et al., 2018). Higher perceived social support has been linked with feelings of empowerment, personal competence, reassurance, diminished fear, and decreased psychological distress (De Castro, 2014; Freire, 2016; Jalambadani et al., 2020).

The dimensions of emotional and physical health—somatic symptoms, sleep problems, attractiveness, and menstrual symptoms—together with perceived social support—significant other, and family, significantly predicted stress management in middle-aged women. The findings revealed that tiredness, pain, sleep dysfunctions, not feeling attractive, and menstrual discomfort affected women's capacity to relax and cope with stress. However, support from spouses and family members allowed middle-aged women to mobilize psychological and physical resources to control distressing situations and manage stress effectively. The results are consistent with the findings that social support can enhance coping competence through the assurance of having help if needed (Siedlicki et al., 2013). Studies also posited that women sought support when distressed, especially from their close ones (Liddon et al., 2017). Kim and Yang (2021) concluded that perceived physical attractiveness was positively associated with stress control behaviors among middle-aged women. Further, Thomas et al. (2018) suggested that the menopausal symptoms do not impact women's healthy lifestyle; rather, the stress emanating from the symptoms affects the women. Arnot et al. (2021) opined that social support acted as a safeguard against stress among menopausal women.

Limitations and future directions

The present study has a few limitations. As the study included participants with formal education (i.e. a skewed population in India), it excluded middle-aged women who did not have formal education. Thus, future studies may include middle-aged women who are illiterate or do not have formal education to maximize the representation of the sample of the

middle-aged population of India. Moreover, the study was limited to the use of quantitative research methods. However, this leads to an opportunity for future research to conduct qualitative research exploring the lived experiences of middle-aged women's sexual behaviors, menstrual symptoms, health-promoting behaviors, and emotional and physical health. As the study involved a cross-sectional approach, these results may not apply to adolescent girls, women in emerging adulthood, and young adulthood. Hence, understanding these women through their developmental trajectories of menarche and menopause from a biopsychosocial perspective through longitudinal research is a priority for future studies.

Implications

The results of the study have significant implications for the understanding of emotional and physical health, particularly health-promoting behaviors among middle-aged women. Thus, the findings significantly contribute new dimension of knowledge on middle-aged women to the field of developmental psychology and health psychology. The results suggest diversity from a homogenous group. This implies that middle-aged women formed three natural clusters of high, medium, and low health-promoting behaviors despite being homogeneous. The findings suggest that poor emotional and physical health and psychological distress diminish health-promoting behaviors in middle-aged women. Hence, these findings open up avenues for designing biopsychosocial interventions to enhance emotional and physical health and social support, promote healthy behaviors in the low- and medium-health-promoting cluster group, and establish their effectiveness. Support from family is clearly understood in predicting health-promoting behaviors among middle-aged women. This study supports the transition theory in the context of women's health and their menstrual transition from regular menstrual cycle to perimenopausal and menopausal stages. Accordingly, this study helps women transitioning into middle age to understand the significance of developmental trajectories and emotional and physical health in health-

promoting behaviors during the menstrual transition. The study implies that middle-aged women from rural and urban settings should be offered nuanced healthcare to address their reproductive morbidities. Additionally, the study signifies the objectives of sustainable development goals (SDGs)—empowering women of all ages (SDG-5) and ensuring healthy lives and well-being (SDG-3).

Conclusion

The study has explored the profile of health-promoting behaviors among middle-aged women. Hence, the study set out to establish three meaningful natural sub-groups or clusters—high, medium, and low health-promoting behaviors within a homogenous group of middle-aged women. The results provided new insights into the high health-promoting behaviors cluster fostering good emotional and physical health. On the contrary, the cluster of low health-promoting behaviors represented impoverished support from family, friends, and significant others and higher psychological distress. The study identified gynecological morbidities, specifically vaginal discharge, as a common pattern of reproductive morbidity in rural middle-aged women. Whereas, the symptoms of contraceptive morbidities were highest in urban settings. Gynecological morbidities, contraceptive morbidities, and obstetric morbidities (childbirth) are linked to the perimenopause stage. Surprisingly, attractiveness was projected to physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. Anxiety/fears anticipated physical activity and nutrition. Depressed mood counted for spiritual growth and interpersonal relations. Menstrual symptoms and sleep problems are attributed to health responsibility and stress management. Overall, social support enhanced health-promoting behaviors, and poor emotional and physical health minimized health-promoting behaviors in middle-aged women.

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Appendix I
Socio-demographic Form

ID No.

Demographic Details

1. Name : _____
2. Age : _____
3. Educational Status ☐ Class X
☐ Class XII
☐ Graduation
☐ Post graduation and above
4. Geographical Setting ☐ Rural
☐ Urban
5. Employment Status ☐ Homemaker
☐ Self-employed
☐ Salaried
6. Presence of chronic illness ☐ Yes
☐ No

Family History

1. Marital Status ☐ Married
☐ Widow
☐ Separated/Divorced
☐ Unmarried
2. Number of children : _____
3. Number of family members : _____
4. Type of family ☐ Joint family
☐ Nuclear family
☐ Other_____

Reproductive Health History

1. Menstrual stage ☐ Regular menstruation (regular menstruation in the last 3 months)
☐ Perimenopause (irregular period in the past 2-12 months)
☐ Menopause (no period for the past 12 months)
2. Age at menopause : _____
3. Have you experienced abortion/miscarriage? ☐ Yes
☐ No

4. Reproductive morbidities checklist

Instructions: Following are the statements pertaining to your reproductive morbidities and symptoms. There are 4 statements below, each having multiple options. Please read each statement carefully and answer if the option applies to you by putting a check mark (✓) in the correct box. The statement may also require you to fill in the answer based on your experiences. There can be more than one answer; therefore, consider each option honestly. There is no right or wrong answer. Therefore, please be attentive and answer genuinely without hesitation.

1. Please put a tick mark (✓) against the symptoms that apply to you presently ☐ Abnormal vaginal bleeding ☐ Body pain ☐ Painful intercourse ☐ Urinary infection ☐ Vaginal discharge (foul-smelling) ☐ None of the above ☐ Other _____
2. After using contraceptives, did you experience any of the following symptoms? ☐ Not Applicable ☐ Abnormal vaginal bleeding ☐ Body-pain ☐ Breast tenderness ☐ Decreased libido (less desire for sexual activity) ☐ Dizziness ☐ Nausea ☐ Severe mood swings ☐ Urinary Infection ☐ Weight gain ☐ Vaginal discharge ☐ Other _____

3. After childbirth, did you experience any of the following symptoms?

- ☐ Not Applicable
- ☐ Abnormal vaginal bleeding
- ☐ Body-pain
- ☐ Severe mood swings
- ☐ Urinary infection
- ☐ Uterine prolapse (loosening of pelvic muscles)
- ☐ Vaginal discharge
- ☐ Other _____

4. After abortion/miscarriage, did you experience any of the following symptoms?

- ☐ Not Applicable
- ☐ Abnormal vaginal bleeding
- ☐ Body-pain
- ☐ Severe mood swings
- ☐ Urinary infection
- ☐ Uterine prolapse (loosening of pelvic muscles)
- ☐ Vaginal discharge
- ☐ Other _____

Appendix II

Health Promoting Lifestyle Profile II

Instructions: There are 52 statements below about your present way of life or personal habits, each having 4 options such as Never (**N**), Sometimes (**S**), Often (**O**) and Routinely (**R**). Please respond to each item as accurately as possible, and try not to skip any item. Consider each statement honestly in the above way and circle the appropriate abbreviation in the answer to each of the items. There is no right or wrong answer. Therefore, please be attentive and answer genuinely without hesitation.

Circle the “N” for **Never**
Circle the “S” for **Sometimes**
Circle the “O” for **Often**
Circle the “R” for **Routinely**

Statement	Options			
1. Discuss my problems and concerns with people close to me.	N	S	O	R
2. Choose a diet low in fat, saturate fat, and cholesterol.	N	S	O	R
3. Report any unusual signs or symptoms to a physician or other health professional.	N	S	O	R
4. Follow a planned exercise program.	N	S	O	R
5. Get enough sleep.	N	S	O	R
6. Feel I am growing and changing in positive ways.	N	S	O	R
7. Praise other people easily for their achievements.	N	S	O	R
8. Limit use of sugars and food containing sugar (sweets).	N	S	O	R
9. Read or watch TV programs about improving health.	N	S	O	R
10. Exercise vigorously for 20 or more minutes at least three times a week (such as brisk walking, bicycling, aerobic dancing, using a stair climber).	N	S	O	R
11. Take some time for relaxation each day.	N	S	O	R
12. Believe that my life has purpose.	N	S	O	R
13. Maintain meaningful and fulfilling relationships with others.	N	S	O	R
14. Eat 6-11 servings of bread, cereal, rice and pasta each day.	N	S	O	R

Statement	Options			
15. Question health professionals in order to understand their instructions.	N	S	O	R
16. Take part in light to moderate physical activity (such as sustained walking 30-40 minutes 5 or more times a week).	N	S	O	R
17. Accept those things in my life which I cannot change.	N	S	O	R
18. Look forward to the future.	N	S	O	R
19. Spend time with close friends.	N	S	O	R
20. Eat 2-4 servings of fruit each day.	N	S	O	R
21. Get a second opinion when I question my health care provider's advice.	N	S	O	R
22. Take part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling).	N	S	O	R
23. Concentrate on pleasant thoughts at bedtime.	N	S	O	R
24. Feel content and at peace with myself.	N	S	O	R
25. Find it easy to show concern, love and warmth to others.	N	S	O	R
26. Eat 3-5 servings of vegetables each day.	N	S	O	R
27. Discuss my health concerns with health professionals.	N	S	O	R
28. Do stretching exercises at least 3 times per week.	N	S	O	R
29. Use specific methods to control my stress.	N	S	O	R
30. Work toward long-term goals in my life.	N	S	O	R
31. Touch and am touched by people I care about.	N	S	O	R
32. Eat 2-3 servings of milk, yogurt or cheese each day.	N	S	O	R
33. Inspect my body at least monthly for physical changes/danger signs.	N	S	O	R
34. Get exercise during usual daily activities (such as walking during lunch, using stairs instead of elevators, parking car away from destination and walking).	N	S	O	R

Statement	Options			
35. Balance time between work and play.	N	S	O	R
36. Find each day interesting and challenging.	N	S	O	R
37. Find ways to meet my needs for intimacy.	N	S	O	R
38. Eat only 2-3 servings from the meat, poultry, fish, dried beans, eggs, and nuts group each day.	N	S	O	R
39. Ask for information from health professionals about how to take good care of myself.	N	S	O	R
40. Check my pulse rate when exercising.	N	S	O	R
41. Practice relaxation or mediation for 15-20 minutes daily.	N	S	O	R
42. I am aware of what is important to me in life.	N	S	O	R
43. Get support from a network of caring people.	N	S	O	R
44. Read labels to identify nutrients, fats, sodium content in packaged food.	N	S	O	R
45. Attend educational programs on personal health care.	N	S	O	R
46. Reach my target heart rate when exercising.	N	S	O	R
47. Pace myself to prevent tiredness.	N	S	O	R
48. Feel connected with some force greater than myself.	N	S	O	R
49. Settle conflicts with other through discussion and compromise.	N	S	O	R
50. Eat breakfast.	N	S	O	R
51. Seek guidance or counseling when necessary.	N	S	O	R
52. Expose myself to new experiences and challenges.	N	S	O	R

Scoring procedure

Health-Promoting Lifestyle Profile II

The items included on the six subscales are as follows: Health responsibility (items 3, 9, 15, 21, 27, 33, 39, 45, 51), Physical activity (items 4, 10, 16, 22, 28, 34, 40, 46), Nutrition (items 2, 8, 14, 20, 26, 32, 38, 44, 50), Spiritual growth (items 6, 12, 18, 24, 30, 36, 42, 48, 52), Interpersonal relation (items 1, 7, 13, 19, 25, 31, 37, 43, 49), and Stress management (items 5, 11, 17, 23, 29, 35, 41, 47).

The items are scored on a 4-point Likert scale. The responses included “never (N), sometimes (S), often (O), and routinely (R),” with corresponding scores of 1, 2, 3, and 4, respectively. The six subscale scores are obtained by calculating the mean of participant’s responses to subscale items. This is done to retain the 1 to 4 metric of item responses and to allow meaningful comparison of scores across subscales.

Appendix III
Women's Health Questionnaire

Instructions: There are 37 statements below, each having 4 options ranging from 'Yes, definitely' to 'No, not at all'. Please indicate how you are feeling now, or how you have been feeling the last few days, by putting a check mark (✓) in the correct box in the answer to each of the items. There is no right or wrong answer. Therefore, please be attentive and answer genuinely without hesitation.

Statements	Yes, definitely	Yes, sometimes	No, not much	No, not at all
1. I wake up early and then sleep badly for the rest of the night				
2. I get very frightened or panic feelings for apparently no reason at all				
3. I feel miserable and sad				
4. I feel anxious when I go out of the house on my own				
5. I have lost interest in things				
6. I get palpitations in my chest or a sensation of "butterflies" in my stomach				
7. I still enjoy the things I used to				
8. I feel life is not worth living				
9. I feel tense or "wound up"				
10. I have a good appetite				
11. I feel restless and can't keep still				
12. I feel more irritable than usual				
13. I worry about growing old				
14. I have headaches				
15. I feel more tired than usual				
16. I have dizzy spells				
17. My breasts feel tender or uncomfortable				
18. I suffer from backache/or pains in my limbs				
19. I have hot flushes (hot flashes)				

Statements	Yes, definitely	Yes, sometimes	No, not much	No, not at all
20. I feel more clumsy than usual				
21. I feel rather lively and excitable				
22. I have abdominal (stomach) cramps or discomfort				
23. I feel sick or nauseous				
24. I have lost interest in sexual activity				
25. I have feelings of well-being				
26. I have heavy periods (please omit if no periods at all)				
27. I suffer from night sweats				
28. My stomach feels bloated				
29. I have difficulty in getting off to sleep				
30. I often feel pins and needles in my hands and feet				
31. I am satisfied with my current sexual relationship (please omit if not sexually active)				
32. I feel physically attractive				
33. I have difficulty concentrating				
34. As a result of vaginal dryness, sexual intercourse has become uncomfortable (please omit if not sexually active)				
35. I need to urinate more frequently than usual				
36. My memory is poor				
37. Is it very difficult for you to cope with any of the above symptoms? Yes/No. If so, which ones?				

Scoring Procedure

Women's Health Questionnaire

The cluster of items in the nine dimensions are as follows: Depressed mood (items 3, 5, 7, 8, 10, 12, 25), Somatic symptoms (items 14, 15, 16, 18, 23, 30, 35), Memory/concentration (items 20, 33, 36), Vasomotor symptoms (items 19, 27), Anxiety/fears (items 2, 4, 6, 9), Sexual behavior (items 24, 31, 34), Sleep problems (items 1, 11, 29), Menstrual symptoms (items 17, 22, 26, 28), and Attractiveness (items 21, 32)

The items on a 4-point scale included 'yes definitely, yes sometimes, no not much, and no not at all.' There is no weighting of items. The extension of the scoring scale is 0 - 1. For reversed items (item 7, item 10, item 21, item 25, item 31, item 32), new values (1 – previous value) are assigned. All the items are transformed into a dichotomous scale:

If the response is (1) 'Yes definitely' or (2) 'Yes sometimes', then the score is 1.

If the response is (3) 'No, not much' or (4) 'No, not at all,' then the score is 0.

The score in each dimension is the mean of non-missing items of that dimension. The score of dimensions is lost if missing data is there in each dimension as follows: more than two in Depressed mood, more than two in Somatic symptoms, more than one in Memory/concentration, more than zero in Vasomotor symptoms, more than one in Anxiety/fears, more than one in Sexual behavior, more than one in Sleep problems, more than one in Menstrual symptoms, and more than zero in Attractiveness.

For item 31 and item 34, if there is no response by the participant from item 28 to item 36, then items 31 and 34 are missing data. If item 31 and item 34 are missing, but there is at least one response by the participant from item 28 to item 36, then the participant is considered as 'non-concerned.' If the participant is non-concerned by items 31 and 34, then the score of the dimension is considered as missing.

For item 26, if there is no response by the participant from item 14 to item 27, then item 26 is missing data. If there is at least one response by the participant from item 14 to item 27, then the participant is considered as 'non-concerned.' If the participant is non-concerned by item 26, then the missing data is replaced by the value 4, denoting 'No, not at all.'

Appendix IV
Depression, Anxiety, and Stress Scale

Instructions: There are 21 statements below each having 4 options ranging from ‘Did not apply to me at all’ to ‘Applied to me very much, or most of the time’. Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement. The rating scale is as follows:

0 -Did not apply to me at all

1 -Applied to me to some degree, or some of the time

2 -Applied to me to a considerable degree, or a good part of time

3 -Applied to me very much, or most of the time

Statement	Options			
1. I found it hard to wind down	0	1	2	3
2. I was aware of dryness of my mouth	0	1	2	3
3. I couldn't seem to experience any positive feeling at all	0	1	2	3
4. I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5. I found it difficult to work up the initiative to do things	0	1	2	3
6. I tended to over-react to situations	0	1	2	3
7. I experienced trembling (e.g., in the hands)	0	1	2	3
8. I felt that I was using a lot of nervous energy	0	1	2	3
9. I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10. I felt that I had nothing to look forward to	0	1	2	3
11. I found myself getting agitated	0	1	2	3
12. I found it difficult to relax	0	1	2	3
13. I felt down-hearted and blue	0	1	2	3
14. I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15. I felt I was close to panic	0	1	2	3
16. I was unable to become enthusiastic about anything	0	1	2	3
17. I felt I wasn't worth much as a person	0	1	2	3
18. I felt that I was rather touchy	0	1	2	3
19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	0	1	2	3
20. I felt scared without any good reason	0	1	2	3
21. I felt that life was meaningless	0	1	2	3

Scoring Procedure

Depression, Anxiety, and Stress Scale (DASS-21)

DASS-21 includes three subscales—depression, anxiety, and stress each having 7 items. The items in three subscales are as follows: Depression (items 3, 5, 10, 13, 16, 17, 21), Anxiety (items 2, 4, 7, 9, 15, 19, 20), and Stress (items 1, 6, 8, 11, 12, 14, 18). Response choices are in the form of a 4-point Likert-type scale (0 = Did not apply to me at all, 1 = Applied to me to some degree, or some of the time, 2 = Applied to me to a considerable degree or a good part of the time, 3 = Applied to me very much or most of the time). Each of the three subscale scores is derived by summing across the items of the subscale.

Appendix V
Multidimensional Scale of Perceived Social Support

Instructions: There are 12 statements below each having 7 options ranging from Very Strongly Disagree (**VSD**) to Very Strongly Agree (**VSA**). Please read each statement carefully and answer to what extent each statement is true in your case. In other words, how far each one is a description of yourself? Consider each statement honestly in the above way and circle the appropriate number against each item. There is no right or wrong answer. Therefore, please be attentive and answer genuinely without hesitation.

Circle the “1” if you **Very Strongly Disagree**

Circle the “2” if you **Strongly Disagree**

Circle the “3” if you **Mildly Disagree**

Circle the “4” if you are **Neutral**

Circle the “5” if you **Mildly Agree**

Circle the “6” if you **Strongly Agree**

Circle the “7” if you **Very Strongly Agree**

Statement	Options						
1. There is a special person who is around when I am in need.	1	2	3	4	5	6	7
2. There is a special person with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
3. My family really tries to help me.	1	2	3	4	5	6	7
4. I get the emotional help and support I need from my family.	1	2	3	4	5	6	7
5. I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7
6. My friends really try to help me.	1	2	3	4	5	6	7
7. I can count on my friends when things go wrong.	1	2	3	4	5	6	7
8. I can talk about my problems with my family.	1	2	3	4	5	6	7
9. I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
10. There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7
11. My family is willing to help me make decisions.	1	2	3	4	5	6	7
12. I can talk about my problems with my friends.	1	2	3	4	5	6	7

Scoring Procedure

Multidimensional Scale of Perceived Social Support (MSPSS)

The items in three subscales are as follows: Significant Other (items 1, 2, 5, 10), Family (items 3, 4, 8, 11), and Friends (items 6, 7, 9, 12). Response choices are in the form of a 7-point Likert-type scale (1 = very strongly disagree, 2 = strongly disagree, 3 = mildly disagree, 4 = neutral, 5 = mildly agree, 6 = strongly agree, 7 = very strongly agree). Each of the three subscale scores is derived by summing across the items of the subscale, then dividing by four, resulting in a mean subscale score that can be referenced to the 7-point response scale.

Appendix VI

INFORMED CONSENT FORM

University of Hyderabad

Centre for Psychology

ID No.:

Please read this informed consent form carefully. Ask as many questions as you like before you decide whether you want to participate in this research study. You are free to ask questions at any time before, during, or after your participation in this research.

Title of the study: Role of biopsychosocial factors in exploring the effect of health behaviors on reproductive morbidities and health needs of women above the age of 40.

Researchers: Anuradha Nautiyal (UGC SRF Ph.D. Research Scholar) & Dr. N.D.S. Naga Seema (Associate Professor)

Organization: Centre for Psychology, University of Hyderabad, Central University Campus PO, Hyderabad-500046, India, Telephone No. +91-40-23134790

In order to participate in this research study, it is necessary that you give your informed consent. By signing this informed consent statement, you are indicating that you understand the nature of the research study, your role in it, and that you agree to participate in the research study.

There is no right or wrong answer. All information will be kept confidential. There are no known or possible risks for you in this study. Please consider the following points before signing:

- *I understand that I am participating in this psychological research*
- *I understand that my identity will not be linked with my data and that all information I provide will remain confidential.*
- *I understand that I will be provided with an explanation of the research in which I participated and be given the name and e-mail address of the research investigator to contact if I have questions about the research.*
- *I understand that the participation in research is voluntary. If I decide now or at any point to withdraw this consent or stop participating, I am free to do so at no penalty to myself.*

By voluntarily signing this form, I am stating that I am over 18 years of age and that I understand the above information and consent to participate in this study.

NAME: _____

NAME: Ms. Anuradha Nautiyal

Signature of the participant

Date:

Signature of the researcher

Date:

Appendix VII



UNIVERSITY OF HYDERABAD INSTITUTIONAL ETHICS COMMITTEE DECISION LETTER



IEC No.	UH/IEC/2021/177	Date of review	03-05-2022
Application No:			
Project Title:	Role of Biopsychosocial factors in exploring the effect of health behaviours on reproductive morbidities and health needs of women above the age of 40		
Principal Investigator/ Co-PI:	PI: Anuradha Nautiyal CI: N.D. S. Naga Seema		
Participating Institutes if any	----	Approval from Participating Institute	----
Documents received and reviewed	Protocol & ICF		
In case of renewal submission of update	----		
Decision of the IEC:	Approved after the amended protocol submitted Duration: One year from date of approval		
Any other Comments Requirements for conditional Approval	----		
Members Present	Dr. A.S. Sreedhar, Dr. M. Srinivas, Prof. B. R. Shamanna, Dr. M. Varalakshmi, Sri. A. Madhava Rao, Dr. Stalin Choudary, Prof. Pingali Sailaja, Dr. M. K. Aruansree and Dr. Deepa Srinivas		

Please note:

- Any amendments in the protocol must be informed to the Ethics committee and fresh approval taken.
- Any serious adverse event must be reported to the Ethics Committee within 48 hours in writing (mentioning the protocol No. or the study ID)
- Any advertisement placed in the newspapers, magazines must be submitted for approval.
- If the conduct of the study is to be continued beyond the approved period, an application for the same must be forwarded to the Ethics Committee.
- It is hereby confirmed that neither you nor any of the members of the study team participated in the decision making/voting procedures and declared conflict of interest.

A S Sreedhar
03/05/22

Chairman

(Dr. A S Sreedhar)

B R Shamanna
03/05/22

Member Secretary

(Prof. B. R. Shamanna)

M Varalakshmi
03/05/22

Convenor

(Dr. M. Varalakshmi)

Role of emotional, physical health, and social support on health-promoting behaviors among middle-aged women

by Anuradha Nautiyal

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