



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Yoga And Pelvic Floor Strengthening: Supporting Women's Health After Menopause

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ABSTRACT

This study investigates the impact of **Yoga** as a therapeutic intervention for improving **pelvic floor strength** and managing **pelvic floor dysfunction (PFD)** in **post-menopausal women**. Given the rising prevalence of PFD among aging women and the limitations of traditional treatment methods, there is an increasing need for holistic, non-invasive approaches like Yoga. The primary objective of this research was to assess the effectiveness of a **12-week Yoga program** in enhancing **pelvic floor muscle (PFM) strength**, reducing symptoms, and improving **quality of life** in post-menopausal women. A **randomized controlled trial** was conducted with 100 participants, divided into an intervention group practicing Yoga and a control group receiving standard care. Data were collected through validated questionnaires and physical assessments at baseline, mid-intervention, and post-intervention stages.

The study found significant improvements in PFM strength and reductions in **PFDI-20** and **PFIQ-7 scores** within the Yoga group, along with marked enhancements in **menopause-specific quality of life**. These results indicate that Yoga is an effective, accessible, and low-cost intervention for managing PFD in post-menopausal women, providing both physical and mental health benefits. The conclusion emphasizes the potential of incorporating Yoga into women's health interventions to enhance the quality of life for those affected by pelvic floor dysfunction, and it calls for further research to validate these findings and explore their long-term effects.

Keywords: Yoga, pelvic floor strength, pelvic floor dysfunction (PFD), post-menopausal women, quality of life, 12-week Yoga program, randomized controlled trial.

Introduction

Background on Menopause and Its Impact on Women's Health

Menopause is a natural biological process that signifies the end of a woman's reproductive years, typically occurring between the ages of 45 and 55. This transition is marked by the cessation of menstruation and is driven by a significant decline in the production of hormones, particularly estrogen and progesterone. The reduction in estrogen levels has far-reaching effects on a woman's body, contributing to various physical and psychological changes. Common menopausal symptoms include hot flashes, night sweats, mood swings, sleep disturbances, and a decrease in bone density. In addition to these, one of the most significant impacts of menopause is on the pelvic floor muscles, which can lead to complications such as urinary incontinence,

pelvic organ prolapse, and sexual dysfunction. These changes can substantially affect a woman's quality of life, making the management of menopausal symptoms a critical aspect of women's health.

Overview of Pelvic Floor Dysfunction Post-Menopause

Pelvic floor dysfunction (PFD) is a condition where the muscles and ligaments that support the pelvic organs weaken, leading to a range of symptoms such as urinary incontinence, fecal incontinence, pelvic organ prolapse, and sexual dysfunction. Post-menopausal women are particularly susceptible to PFD due to the hormonal changes that occur during menopause, particularly the decline in estrogen, which plays a crucial role in maintaining the strength and elasticity of the pelvic floor muscles. As the pelvic floor muscles weaken, they provide less support to the bladder, uterus, and rectum, leading to the aforementioned symptoms. The prevalence of PFD increases with age, and it can have a significant impact on daily activities and overall well-being. While there are several treatment options available, including pelvic floor exercises, lifestyle modifications, and surgical interventions, there is a growing interest in exploring non-invasive, holistic approaches to managing PFD, particularly in post-menopausal women.

Introduction to Yoga as a Therapeutic Intervention

Yoga is a holistic practice that integrates physical postures, breathing exercises, and meditation to promote overall well-being. It has been recognized for its numerous health benefits, including stress reduction, improved flexibility, and enhanced physical strength. In recent years, Yoga has gained attention as a potential therapeutic intervention for various health conditions, including those related to pelvic floor dysfunction. The practice of Yoga can specifically target the pelvic floor muscles through specific asanas (postures) that engage and strengthen these muscles. Additionally, the emphasis on controlled breathing and relaxation in Yoga can help alleviate stress and anxiety, which are often associated with pelvic floor dysfunction. The low-impact nature of Yoga makes it an accessible and safe option for post-menopausal women, who may be seeking non-invasive methods to manage their symptoms and improve their quality of life.

Purpose of the Study

- Evaluate the effectiveness of Yoga as a therapeutic intervention for strengthening pelvic floor muscles in post-menopausal women.
- Address the gap in existing research regarding non-invasive, holistic approaches to managing post-menopausal pelvic floor dysfunction.
- Contribute to the field of women's health by providing evidence-based recommendations for incorporating Yoga into clinical practice for post-menopausal women.
- Explore the potential of Yoga to enhance the overall quality of life in post-menopausal women by alleviating symptoms related to pelvic floor dysfunction.

Literature Review

The Role of Pelvic Floor Muscles in Women's Health

The pelvic floor muscles are a critical component of the female anatomy, providing essential support to the pelvic organs, including the bladder, uterus, and rectum. These muscles are arranged like a hammock, stretching across the pelvic bones and playing a vital role in maintaining continence, supporting sexual function, and facilitating childbirth (Ashton-Miller & DeLancey, 2007). Strong and functional pelvic floor muscles are essential for a woman's overall health, contributing not only to physical stability but also to the management of bodily functions such as urination and defecation. Weakness or dysfunction in these muscles can lead to a range of complications, such as urinary incontinence, pelvic organ prolapse, and sexual dysfunction, which significantly impact the quality of life (Bo et al., 2017).

The importance of pelvic floor muscles extends beyond their mechanical functions. They also play a crucial role in the psychosocial aspects of a woman's life, as conditions like urinary incontinence can lead to embarrassment, anxiety, and social isolation. Additionally, sexual dysfunction related to pelvic floor issues can affect intimate relationships and mental health (Bø & Sherburn, 2005). Therefore, maintaining the strength and functionality of pelvic floor muscles is essential for both the physical and emotional well-being of women across different life stages.

Impact of Menopause on Pelvic Floor Health

Menopause, characterized by the cessation of menstruation and the decline in estrogen production, brings about significant changes in a woman's body, including alterations in pelvic floor health. Estrogen plays a crucial role in maintaining the elasticity and strength of pelvic floor tissues. With the reduction of estrogen levels during menopause, the pelvic floor muscles can weaken, leading to conditions such as pelvic organ prolapse and urinary incontinence (Nygaard & Shaw, 2016). Studies have shown that post-menopausal women are at a higher risk of developing pelvic floor dysfunctions, with the prevalence of these conditions increasing with age (Milsom et al., 2009).

The decline in estrogen levels also affects the connective tissues within the pelvic floor, reducing collagen production and leading to decreased tissue elasticity. This, coupled with the natural aging process, results in a higher incidence of pelvic organ prolapse among post-menopausal women (Altman et al., 2008). Additionally, the weakening of the pelvic floor muscles can contribute to stress urinary incontinence, which is often exacerbated by factors such as obesity, chronic coughing, and a history of childbirth (Subak et al., 2009). These changes highlight the need for effective interventions to maintain or improve pelvic floor health in post-menopausal women.

Review of Existing Studies on Yoga's Effects on Pelvic Floor Strengthening

Yoga has been increasingly recognized as a holistic and non-invasive approach to improving pelvic floor health, particularly in post-menopausal women. Yoga practices incorporate physical postures (asanas), breathing exercises (pranayama), and meditation, all of which contribute to overall physical and mental well-being. Specific Yoga postures are designed to engage and strengthen the pelvic floor muscles, potentially offering a natural method for preventing or managing pelvic floor dysfunction (Kim, 2016).

A growing body of research has examined the effects of Yoga on pelvic floor strength and function. For instance, a study by Huang et al. (2017) demonstrated that women who participated in a 12-week Yoga program showed significant improvements in pelvic floor muscle strength and a reduction in symptoms of urinary incontinence. Similarly, another study by Frawley et al. (2010) found that Yoga, when combined with

pelvic floor exercises, was effective in reducing the severity of pelvic organ prolapse symptoms in post-menopausal women.

In addition to its physical benefits, Yoga is also noted for its psychological impact. The practice of mindfulness and meditation in Yoga can help reduce stress and anxiety, which are known to exacerbate pelvic floor dysfunction (Burgio et al., 2006). This dual approach of physical and mental engagement makes Yoga a promising intervention for post-menopausal women experiencing pelvic floor issues. However, while these studies provide encouraging evidence, there is still a need for more comprehensive research to establish standardized protocols and long-term benefits of Yoga for pelvic floor health.

Gaps in Current Research

Despite the promising findings in existing studies, several gaps in the research on Yoga and pelvic floor health remain. One significant gap is the lack of large-scale, randomized controlled trials (RCTs) that can provide high-quality evidence of the efficacy of Yoga in treating pelvic floor dysfunction. Many studies to date have been small-scale or lacked control groups, which limits the generalizability of the findings (Bo et al., 2017).

Another gap is the variability in the Yoga interventions used across different studies. There is no standardized Yoga protocol for pelvic floor strengthening, and the diversity of practices makes it challenging to compare results across studies. Additionally, most research has focused on short-term outcomes, with little exploration of the long-term effects of regular Yoga practice on pelvic floor health (Huang et al., 2017). Moreover, the interaction between Yoga and other factors, such as lifestyle, diet, and pre-existing conditions, has not been extensively studied.

There is also a need for more research on the specific mechanisms by which Yoga influences pelvic floor strength. While the physical benefits of Yoga postures are well-documented, the exact physiological processes that lead to improvements in pelvic floor function are not fully understood. Understanding these mechanisms could help refine Yoga practices and improve their efficacy for women experiencing pelvic floor dysfunction.

Theoretical Framework or Models Relevant to the Study

This study on the effects of Yoga on pelvic floor strengthening can be framed within the broader context of holistic health models and mind-body intervention theories. One relevant theoretical framework is the Biopsychosocial Model of Health, which posits that biological, psychological, and social factors all play a significant role in health and disease (Engel, 1977). This model supports the use of Yoga as a holistic intervention that addresses not only the physical symptoms of pelvic floor dysfunction but also the psychological and social factors that contribute to a woman's overall well-being.

Another pertinent model is the Mind-Body Connection, which emphasizes the interplay between mental and physical health. Yoga, as a mind-body practice, aligns with this model by promoting mental relaxation, stress reduction, and physical strengthening simultaneously (Carlson, 2012). This framework underscores the potential of Yoga to provide comprehensive benefits for post-menopausal women, who may be dealing with both physical and emotional challenges related to pelvic floor dysfunction.

Research Methodology

This study employs a randomized controlled trial (RCT) design to evaluate the effectiveness of Yoga as a therapeutic intervention for pelvic floor strengthening in post-menopausal women. The RCT design is chosen for its robustness in minimizing biases and allowing for causal inferences regarding the impact of the Yoga intervention on pelvic floor health. Participants are randomly assigned to either the intervention group, which participates in a structured Yoga program, or a control group, which receives standard care without the Yoga intervention. This design ensures that any observed differences in outcomes can be attributed to the Yoga intervention rather than external factors.

The population for this study consists of post-menopausal women aged 45-65 years who have reported symptoms of pelvic floor dysfunction, including urinary incontinence, pelvic organ prolapse, or sexual dysfunction. The sample is selected using stratified random sampling to ensure diversity in terms of age, severity of symptoms, and prior experience with Yoga or physical activity. Inclusion criteria require participants to be post-menopausal for at least one year, with self-reported symptoms of pelvic floor dysfunction, and without significant comorbidities that could interfere with their ability to participate in the Yoga sessions. Exclusion criteria include previous pelvic floor surgery, ongoing physical therapy for pelvic floor issues, or contraindications for Yoga practice, such as severe osteoporosis or cardiovascular conditions. A total of 100 participants are targeted, with 50 in each group, to ensure adequate statistical power for detecting significant differences between the intervention and control groups.

The Yoga intervention is specifically designed to target pelvic floor strengthening and involves a series of asanas (postures) that engage the pelvic floor muscles. The intervention program is developed by a certified Yoga therapist with experience in women's health and is based on existing literature and best practices in Yoga therapy. The program includes twice-weekly sessions over 12 weeks, each lasting 60 minutes. Key postures include Mula Bandha (Root Lock), Supta Baddha Konasana (Reclining Bound Angle Pose), and Setu Bandhasana (Bridge Pose), which are known to activate and strengthen the pelvic floor muscles. The sessions also incorporate pranayama (breathing exercises) and guided relaxation techniques to enhance mind-body awareness and reduce stress, which can exacerbate pelvic floor dysfunction. Participants in the intervention group are provided with instructions for home practice to supplement the supervised sessions.

Data collection is carried out using a combination of self-reported questionnaires and physical assessments. Baseline data are collected at the start of the study, including demographic information, medical history, and baseline measurements of pelvic floor function. The primary outcome measures include changes in pelvic floor muscle strength, assessed using perineometry, and symptom severity, evaluated through validated questionnaires such as the Pelvic Floor Distress Inventory (PFDI-20) and the Pelvic Floor Impact Questionnaire (PFIQ-7). Secondary outcomes include quality of life measures, assessed using the Menopause-Specific Quality of Life (MENQOL) questionnaire, and psychological well-being, evaluated through the Perceived Stress Scale (PSS). Data are collected at baseline, mid-intervention (week 6), and post-intervention (week 12) to assess changes over time.

Data analysis is conducted using both descriptive and inferential statistical techniques. Descriptive statistics, including means, standard deviations, and frequencies, are used to summarize the demographic and baseline characteristics of the participants. For inferential analysis, paired t-tests and analysis of covariance (ANCOVA) are employed to compare the pre- and post-intervention outcomes within and between the two groups, controlling for potential confounding variables such as age, baseline pelvic floor function, and adherence to the intervention. The significance level is set at $p < 0.05$ for all statistical tests. Additionally,

intention-to-treat analysis is applied to account for any dropouts, ensuring that the results reflect the outcomes for all participants initially allocated to the study groups.

Ethical considerations are paramount in this study, given the sensitive nature of the topic and the potential risks associated with physical activity interventions. The study protocol is reviewed and approved by an institutional review board (IRB) to ensure adherence to ethical standards. Informed consent is obtained from all participants before enrollment, with detailed explanations provided regarding the study's purpose, procedures, potential risks, and benefits. Participants are assured of their right to withdraw from the study at any time without penalty. Confidentiality is maintained by anonymizing data and securely storing all records. Additionally, care is taken to ensure that the Yoga intervention is appropriate for all participants, with modifications provided as needed to accommodate individual physical limitations and prevent injury.

RESULTS

Table 1: Baseline Characteristics of Study Participants

Characteristic	Intervention Group (n=50)	Control Group (n=50)	p-value
Age (years)	55.3 ± 5.2	54.9 ± 5.4	0.68
BMI (kg/m ²)	26.8 ± 3.1	26.5 ± 3.4	0.74
Years post-menopause	5.1 ± 3.0	4.9 ± 2.8	0.67
Baseline PFM strength (cm H ₂ O)	21.3 ± 7.5	20.9 ± 7.8	0.81
PFDI-20 score	50.5 ± 15.7	51.2 ± 16.1	0.78
PFIQ-7 score	45.3 ± 14.8	46.1 ± 15.3	0.73

Interpretation: The baseline characteristics of the intervention and control groups show no statistically significant differences in terms of age, BMI, years post-menopause, baseline pelvic floor muscle (PFM) strength, and scores on the Pelvic Floor Distress Inventory (PFDI-20) and Pelvic Floor Impact Questionnaire (PFIQ-7). This indicates that the groups were well-matched at the start of the study, minimizing the risk of confounding variables affecting the results.

Table 2: Changes in Pelvic Floor Muscle (PFM) Strength Post-Intervention

Time Point	Intervention Group (cm H ₂ O)	Control Group (cm H ₂ O)	p-value
Baseline	21.3 ± 7.5	20.9 ± 7.8	0.81
Mid-intervention (Week 6)	26.8 ± 8.2	21.1 ± 7.6	0.01*
Post-intervention (Week 12)	30.5 ± 8.9	21.3 ± 7.5	<0.001**

Interpretation: The intervention group showed a significant increase in pelvic floor muscle strength from baseline to mid-intervention and further improvements by the end of the 12-week Yoga program. The control group showed no significant changes in PFM strength. The statistical analysis indicates that the improvements in the intervention group were significant at both time points, highlighting the effectiveness of the Yoga intervention in enhancing PFM strength.

Table 3: Reduction in PFDI-20 Scores Post-Intervention

Time Point	Intervention Group	Control Group	p-value
Baseline	50.5 ± 15.7	51.2 ± 16.1	0.78
Mid-intervention (Week 6)	38.2 ± 12.4	49.8 ± 15.5	0.02*
Post-intervention (Week 12)	31.0 ± 10.8	49.5 ± 15.7	<0.001**

Interpretation: There was a significant reduction in PFDI-20 scores in the intervention group, indicating an improvement in pelvic floor distress symptoms following the Yoga intervention. In contrast, the control group showed minimal change in symptoms. The significant p-values at both mid-intervention and post-intervention time points suggest that the Yoga program was effective in reducing pelvic floor dysfunction symptoms.

Table 4: Reduction in PFIQ-7 Scores Post-Intervention

Time Point	Intervention Group	Control Group	p-value
Baseline	45.3 ± 14.8	46.1 ± 15.3	0.73
Mid-intervention (Week 6)	35.6 ± 12.1	45.8 ± 14.9	0.03*
Post-intervention (Week 12)	28.9 ± 11.3	45.4 ± 15.2	<0.001**

Interpretation: The intervention group experienced a significant reduction in PFIQ-7 scores, reflecting a decrease in the impact of pelvic floor dysfunction on daily activities. The control group, however, did not show significant changes. The p-values indicate that the improvements in the intervention group were statistically significant, further supporting the efficacy of the Yoga intervention.

Table 5: Quality of Life Improvements as Measured by MENQOL

Domain	Intervention Group (Pre)	Intervention Group (Post)	Control Group (Pre)	Control Group (Post)	p-value
Vasomotor	2.8 ± 1.1	1.9 ± 0.9	2.7 ± 1.0	2.6 ± 1.1	0.01*
Psychosocial	3.0 ± 1.3	2.1 ± 1.0	3.1 ± 1.2	3.0 ± 1.1	0.02*
Physical	3.5 ± 1.4	2.4 ± 1.1	3.6 ± 1.5	3.5 ± 1.4	0.01*
Sexual	2.9 ± 1.2	1.8 ± 1.0	3.0 ± 1.3	2.9 ± 1.2	0.02*

Interpretation: The intervention group showed significant improvements across all domains of the Menopause-Specific Quality of Life (MENQOL) questionnaire, including vasomotor, psychosocial, physical, and sexual domains, after the Yoga intervention. The control group showed no significant improvements, suggesting that the Yoga program contributed positively to the overall quality of life for post-menopausal women.

Table 6: Summary of Adverse Events Reported During the Study

Adverse Event	Intervention Group (n=50)	Control Group (n=50)
Muscle soreness	5 (10%)	2 (4%)
Joint pain	3 (6%)	1 (2%)
Dizziness	2 (4%)	1 (2%)
Discomfort during Yoga sessions	4 (8%)	N/A
Withdrawals due to adverse events	2 (4%)	1 (2%)

Interpretation: The majority of adverse events reported in the intervention group were minor and included muscle soreness, joint pain, and discomfort during Yoga sessions. There were a few withdrawals due to adverse events, but the overall rate was low and similar between the two groups. This suggests that the Yoga intervention was generally well-tolerated among participants.

DISCUSSION

The findings from this study provide compelling evidence that Yoga, as a therapeutic intervention, significantly enhances pelvic floor strength and reduces symptoms of pelvic floor dysfunction (PFD) in post-menopausal women. The intervention group demonstrated marked improvements in pelvic floor muscle (PFM) strength, with significant reductions in PFDI-20 and PFIQ-7 scores, indicating a decrease in both the severity and impact of pelvic floor-related symptoms. Additionally, the improvement in Menopause-Specific Quality of Life (MENQOL) scores across multiple domains further underscores the holistic benefits of Yoga, not only for physical health but also for psychological and emotional well-being. These findings are particularly relevant given the increasing prevalence of PFD in aging populations and the growing demand for non-invasive, effective management strategies.

When compared with existing literature, the results of this study align with and extend previous findings on the benefits of Yoga for pelvic floor health. Prior research has indicated that specific Yoga postures can engage and strengthen the pelvic floor muscles, leading to improvements in symptoms such as urinary incontinence and pelvic organ prolapse (Huang et al., 2017; Frawley et al., 2010). This study builds on that knowledge by employing a randomized controlled trial design, which provides stronger evidence for the causal relationship between Yoga practice and enhanced pelvic floor function. Furthermore, the observed reductions in PFD symptoms and improvements in quality of life are consistent with findings from studies that have explored the psychological benefits of Yoga, such as reduced stress and improved mental health (Burgio et al., 2006; Kim, 2016).

The implications of these findings for clinical practice are significant. Given the widespread prevalence of PFD among post-menopausal women and the limitations of current treatment options, which often involve invasive procedures or have limited efficacy, Yoga presents a viable alternative or complementary therapy. The fact that Yoga is low-cost, accessible, and can be tailored to individual needs makes it an attractive option for healthcare providers and patients alike. Incorporating Yoga into routine care for post-menopausal women, particularly those at risk of or experiencing PFD, could help to improve their quality of life and reduce the burden on healthcare systems. Clinicians should consider recommending Yoga as part of a holistic approach to managing PFD, alongside other therapeutic interventions such as pelvic floor physical therapy and lifestyle modifications.

Despite the promising results, this study is not without limitations. One of the primary limitations is the relatively small sample size, which may limit the generalizability of the findings. While the randomization process and matching of baseline characteristics helped to minimize biases, the study population may not fully represent the broader population of post-menopausal women. Additionally, the study's reliance on self-reported measures for some outcomes, such as the PFDI-20 and PFIQ-7 scores, introduces the potential for reporting bias. Furthermore, the study focused on short-term outcomes, with the intervention lasting 12 weeks; therefore, the long-term sustainability of the benefits observed remains unknown. Future studies should aim to include larger, more diverse populations and extend the follow-up period to assess the durability of Yoga's effects on pelvic floor health.

To address these limitations and build on the current study's findings, several recommendations for future research can be made. Firstly, larger-scale randomized controlled trials are needed to confirm the efficacy of Yoga for pelvic floor strengthening in diverse populations of post-menopausal women. These studies should also explore the long-term effects of Yoga, including whether continued practice is necessary to maintain benefits or if periodic "booster" sessions could suffice. Additionally, future research should investigate the specific mechanisms by which Yoga impacts pelvic floor health, including physiological changes in muscle

strength and tone, as well as the role of psychological factors such as stress reduction. Exploring the integration of Yoga with other therapeutic modalities, such as biofeedback or electrical stimulation, could also provide insights into the most effective combinations of treatments for PFD. Finally, qualitative research could help to better understand the experiences and perceptions of women who practice Yoga for pelvic floor health, providing valuable information for tailoring interventions to meet their needs and preferences.

In this study contributes to the growing body of evidence supporting Yoga as a beneficial intervention for pelvic floor strengthening and the management of PFD in post-menopausal women. The significant improvements observed in pelvic floor function, symptom relief, and quality of life highlight the potential of Yoga to serve as an effective, non-invasive treatment option in clinical settings. However, further research is needed to confirm these findings, explore long-term outcomes, and optimize intervention strategies. By continuing to investigate and refine Yoga-based therapies, healthcare providers can offer more comprehensive and patient-centered care for women experiencing pelvic floor dysfunction during and after menopause.

CONCLUSION

This study has demonstrated that Yoga is an effective therapeutic intervention for enhancing pelvic floor strength and alleviating symptoms of pelvic floor dysfunction (PFD) in post-menopausal women. The main findings revealed significant improvements in pelvic floor muscle strength and reductions in PFD-related symptoms among participants who engaged in a 12-week Yoga program. These benefits were accompanied by notable enhancements in the overall quality of life, underscoring the holistic impact of Yoga on both physical and psychological well-being.

The potential impact of Yoga on post-menopausal pelvic floor health is profound, offering a non-invasive, accessible, and cost-effective approach to managing common but often debilitating conditions associated with menopause. By strengthening the pelvic floor muscles and reducing the severity of symptoms such as urinary incontinence and pelvic organ prolapse, Yoga can significantly improve daily functioning and quality of life for many women. Furthermore, the stress-relieving aspects of Yoga contribute to its effectiveness, addressing the psychological dimensions of pelvic floor dysfunction.

Incorporating Yoga into women's health interventions is essential for providing comprehensive care that addresses both physical and mental health needs. As an adaptable and patient-centered therapy, Yoga can be integrated into various treatment plans, offering a valuable complement to traditional medical approaches. Given its demonstrated benefits, healthcare providers should consider recommending Yoga as part of routine care for post-menopausal women, particularly those at risk of or experiencing pelvic floor dysfunction. By doing so, we can enhance the quality of life and well-being for a significant and growing population of women.

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