

**Navigating Menopause: To what extent do Menopausal Attitudes, Exercise Frequency,
and Symptom Severity associate with Mental Well-Being during Menopause?**

Lara – Sophie Pawellek (s2706806)

Department of Psychology, University of Twente

M12 Bachelor Thesis PCPT

202000384: BSc Thesis PSY (2024)

1st supervisor: Gerko Schaap

2nd supervisor: Dr. Marcel Pieterse

Date: 3rd of July, 2024

APA: 7th Edition

Abstract

The menopausal transition affects millions of women worldwide, highlighting the importance of understanding factors influencing menopausal well-being. This cross-sectional study examined the impact of menopausal attitudes, menopausal symptom severity, and exercise frequency, on the mental well-being of menopausal women, and the interaction between these variables. Data were collected via an online survey, including the Attitudes Toward Menopause Scale (ATM), Menopause Rating Scale (MRS), Menopause Health Questionnaire (MHQ), and the Mental Health Continuum-Short Form (MHC-SF). The sample of 114 participants aged 40 to 60 ($M_{Age} = 51.89$, $SD_{Age} = 5.61$) consisted mainly of Dutch (61.40%), highly educated (73.68% holding a bachelor's degree or higher) and working (78.95%) women. Pearson correlations and multiple variable linear regressions revealed no significant relationships between menopausal attitudes and mental well-being, nor between exercise frequency and symptom severity, and no significant interaction among these variables. A significant, moderately strong negative correlation was found between symptom severity and mental well-being ($r(112) = -.35$, $p < .01$), indicating that as symptom severity increases, mental well-being decreases. Additionally, a low main effect was observed ($b = -.49$, 95% CI [-0.39, 0.53], $p < .05$), further supporting the relationship. These findings highlight the need for targeted symptom management strategies for menopausal women. Future research should include additional variables and utilise longitudinal, culturally sensitive, and mixed methods designs to gain a greater understanding of mental well-being during menopause. This could pave the way towards more effective interventions and policies to improve the mental well-being of menopausal women.

Keywords: Menopause, Mental Well-Being, Menopausal Attitudes, Exercise Frequency, Symptom Severity, Cross-Sectional, Multivariable Regression, Moderation Analysis

Contents

Introduction	4
Menopausal Well-Being.....	5
The Relationship of Menopausal Attitudes and Menopausal Symptomatology	6
The Relationship of Exercise Frequency and Symptom Severity	7
The Current Study	8
Methods.....	10
Design.....	10
Participants	10
Procedure.....	12
Materials.....	12
Symptom Severity	12
Attitudes towards Menopause	13
Exercise Frequency	14
Mental Well-Being	14
Data analysis.....	15
Results.....	16
Descriptive Statistics.....	16
Bivariate Relationships.....	18
Inferential Statistics.....	19
Impact of Attitudes Towards Menopause on the Relationship Between Symptom Severity and Mental Well-Being	19
Impact of Exercise Frequency on the Relationship of Symptom Severity on Mental Well-Being.....	20
Discussion	20
Strengths & Limitations	23
Future Recommendations.....	24
Conclusion.....	25
Reference List	26
Appendix A: Flow Diagram for Inclusion and Exclusion of Participants	42
Appendix B: Visualisations of Well-Being Scores.....	43
Appendix C: Visualisations of Attitude Scores	45
Appendix D: Visualisations of Menopausal Symptom Severity.....	49
Appendix E: Visualisations of Exercise Frequency.....	52
Appendix F: Assumption Diagnostics H ₄	54
Appendix G: Interaction Effect H ₄	56
Appendix H: Additional Analysis for H ₄	57
Appendix I: Assumptions Diagnostics H ₅	58
Appendix J: Interaction Effect H ₅	60
Appendix K: Additional Analysis H ₅	61

Introduction

Menopause is a part of the natural and biological ageing process of women. By 2030, the female population experiencing menopause is anticipated to reach 1.2 billion (Ahmed & Hardcastle, 2023), highlighting the relevance of this topic. Menopausal changes occur between the ages of 45 and 55 and signify the end of a woman's reproductive years after menstrual period has ceased for more than a year (National Institutes of Aging, 2021). Physiological processes involving the decline in hormonal levels of oestrogen and the loss of ovarian function induce menopause (Bachmann & Leiblum, 2004; Burger et al., 2008).

Throughout the menopausal journey, women go through three distinct phases: pre-menopause, characterised by regular periods; perimenopause, characterised by irregular cycles and hormonal fluctuations; and post-menopause, beginning after a year without menstruation (Gatenby & Simpson, 2024; Ortmann et al., 2020). Each stage presents unique challenges for women, affecting their quality of life in various domains over several years (Genazzani et al., 2006; National Institutes of Aging, 2021).

One of these challenges can be the experience of menopausal symptoms. During the menopausal transition, women can experience a range of complaints, including physical and psychological symptoms (Greenblum et al., 2013). How commonly experienced these symptoms are, was illustrated in a study revealing that up to 80% of menopausal women experience menopause-related symptoms (Stearns et al., 2002). Physical menopausal symptoms include vasomotor symptoms such as hot flashes and night sweats, incontinence, sleep problems, vaginal dryness, and changes in bodily and sexual functioning (Gracia & Freeman, 2018; National Institute on Aging, 2021). Further, psychological symptoms include irritability, anxiety, depression, and insomnia (Bryant et al., 2012; Gracia & Freeman, 2018; Santoro et al., 2020). These findings emphasise the significant impact menopause can have on the quality of life and mental well-being of menopausal women.

Menopausal Well-Being

Menopause can impact mental well-being. *Mental well-being* includes psychological, emotional, and social health, resilience and a sense of fulfilment (World Health Organization [WHO], 2022). It encompasses dimensions such as hedonic (pleasure) and eudemonic (meaning) well-being (Huppert & So, 2011; Ryff, 1989). Although the concept of mental well-being is growing in importance, a notable research gap specifically addressing well-being outcomes during menopause persists. This becomes apparent as the negative effects of menopause have been extensively studied (Bromberger et al., 2010, 2011; Cohen et al., 2006), while research findings into menopausal well-being remain limited (Brown & Bryant et al., 2015; Deeks & McCabe, 2004). Nonetheless, menopause has also been associated with personal growth and increased well-being (Busch et al., 2003; Dennerstein et al., 2002; Holloway, 2022), and in turn, well-being correlates with improved physical health, positive lifestyle choices, and decreased symptomatology (Diener et al., 2018; Paredes et al., 2021; Zhang & Zhao, 2022). These findings underscore the importance of exploring factors associated with mental well-being to promote quality of life during different stages of life, such as menopause.

Integrating well-being perspectives into menopausal research could improve menopausal care and intervention design. As stated by Kalra et al. (2022), the quality of life of menopausal women can be enhanced through holistic approaches to menopausal management, considering the physical, psychological, and social needs of women. To achieve this, menopausal research should consistently integrate well-being perspectives into research designs (Hunter & Rendall 2007). Further, as positive psychological research progresses, its findings become increasingly important in influencing policy decisions (Diener et al., 2018). Thus, integrating well-being perspectives into menopausal research is crucial to improving menopausal understanding and care and to increase well-being.

The Relationship of Menopausal Attitudes and Menopausal Symptomatology

It is not only necessary to integrate well-being perspectives into menopausal research. To further broaden menopausal understanding, experiences of menopausal symptomatology should be investigated, especially, as symptom severity can impact the well-being and social and personal lives of women (Holloway, 2022; Hooper et al., 2022; Lu et al., 2023; Waidyasekera et al., 2009). Symptom variability includes differences in symptom severity, frequency and patterns (Avis et al., 2001; Soules et al., 2005). So far, suggested starting points to study factors influencing symptom variety are social, lifestyle, and psychological factors (Baker et al., 1997; Deeks & McCabe, 2004; Hunter & Rendall, 2007).

A psychological factor related to menopausal experience is *menopausal attitudes*, which encompass how a woman perceives, defines, and holds ideas about menopause and accompanying changes (Dashti et al., 2021). These attitudes vary, as menopause can be considered freeing from menstrual cycles, or as undesirable, for example, when wishing for children (Aksu et al., 2011). A study by Inayat et al. (2017), revealed that post-menopausal women generally hold more positive menopausal attitudes than peri-menopausal women, as they often perceive menopause as a natural ageing process and not a medical condition. In addition to the menopausal stage, other factors potentially impacting menopausal attitudes include symptomatology, socioeconomic status, and cultural background, among other psychosocial factors (Dashti et al., 2021; Freeman & Sherif, 2007; Morrison et al., 2010).

Research has established an interconnected relationship between menopausal symptoms and attitudes. Ayers et al. (2010) found that women without severe menopausal symptoms tend to hold more positive menopausal attitudes. Further, negative menopausal attitudes have been linked to the experience of heightened psychological symptoms such as psychological distress (Ali et al., 2020; Avis & McKinlay, 1991; Ayers et al., 2010; Wilbur et al., 1995), while positive menopausal attitudes were correlated with lower depressive

symptoms and more positive body image, leading to greater well-being (Batoool et al., 2017; Wilbur et al., 1995). However, although the relationship between menopausal attitudes and symptomatology is commonly acknowledged in menopausal research, few studies have specifically investigated it (Hunter & Rendall, 2007; Hunter et al., 2009). Therefore, as stated by Dashti et al. (2021), research should further investigate the bidirectional relationship between menopausal symptomatology and psychological factors, such as menopausal attitudes, to gain a greater understanding of menopausal experiences and to improve menopausal well-being.

The Relationship of Exercise Frequency and Symptom Severity

In addition to psychological factors, lifestyle factors influence the menopausal experience. Negative lifestyle choices such as sedentary behaviour, smoking, and an unhealthy diet have been associated with increased menopausal symptoms (Blümel et al., 2016; Sabia et al., 2008; Gold et al., 2004). Conversely, adopting a healthier lifestyle can lead to positive menopausal attitudes, reduced symptoms, and greater menopause-specific and overall quality of life (Rathnayake et al., 2020; Simkin-Silverman et al., 2003; Yoshany et al., 2020). These findings suggest that healthy habits such as regular exercise can reduce menopausal symptom severity and improve the mental well-being of menopausal women.

In terms of exercise frequency, the WHO (2020), recommends adults to exercise at least three to five times per week, to maintain and improve overall health. Research supports that regular exercise leads to improved mood, quality of life, self-perceived health, and reduced symptoms such as fatigue, and vasomotor symptoms (Bailey et al., 2016; Lee & Kim, 2008; Mishra 2020; Wu et al., 2023). A study conducted by Zhang and Zhao (2023) on a sample of 600 menopausal women revealed that a combined psychological and exercise intervention reduced symptoms, such as depression and anxiety, increased life satisfaction and improved the mental health of menopausal women. Additionally, Hajj et al. (2020) found

that certain types of exercise might be more effective in alleviating menopausal symptomatology than others. Further, Lee & Kim (2008), revealed that depressive symptoms can be reduced if menopausal women exercise at least three times a week. These findings suggest that exercising regularly could buffer against the negative effects of menopausal symptoms on mental well-being. However, considering that middle-aged women tend to reduce their exercise frequency during menopause (Evenson et al., 2002), effective interventions to promote symptom management and exercising are necessary. Therefore, while exercising was established to be a lifestyle modification effective in alleviating menopausal symptom severity, further research is needed to explore the relationship between these variables and how exercising can be used effectively to improve menopausal well-being.

The Current Study

While research has already explored the relationship between menopause and well-being and its correlates, menopausal research remains predominately deficit-oriented. Further, existing psychological literature on menopause primarily focuses on individual variables rather than examining their potential interconnectedness. The variables of menopausal attitudes, exercise frequency, symptom severity, and different dimensions of well-being have not been researched in one study yet. A greater understanding of the variables' relationships is necessary to address the challenges women face during menopause holistically and effectively. This leaves the question: To what extent do menopausal attitudes, symptom severity and exercise frequency associate with mental well-being during menopause?

H₁: Having positive menopausal attitudes is correlated with higher levels of mental well-being among menopausal women.

H₂: Higher exercise frequency is correlated with lower severity of menopausal symptoms among menopausal women.

H₃: Higher menopausal symptom severity is correlated with lower levels of mental well-being among menopausal women.

H₄: The relationship between menopausal attitudes and mental well-being is moderated by symptom severity, such that higher symptom severity negatively influences the relationship between menopausal attitudes on mental well-being (see Figure 1).

H₅: The relationship between menopausal symptom severity and mental well-being is moderated by exercise frequency, such that higher exercise frequency positively influences the relationship between symptom severity on mental well-being (see Figure 2).

Figure 1

Hypothesised Moderation Model of Menopausal Symptom Severity on the Relationship between Menopausal Attitudes and Mental Well-being

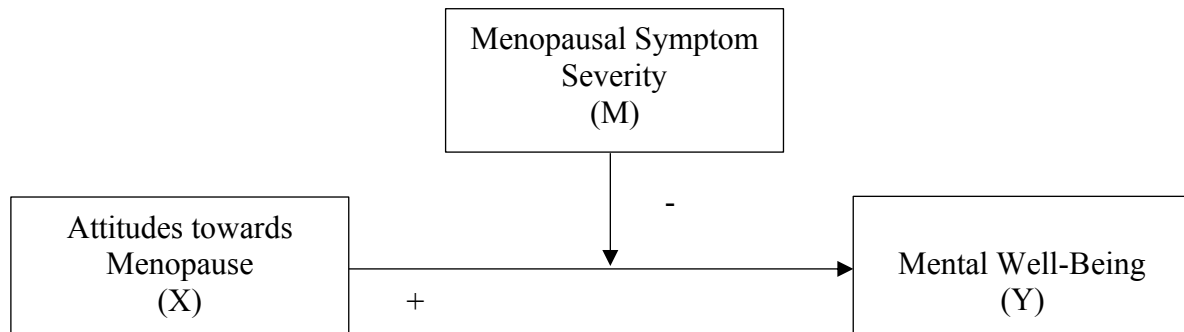
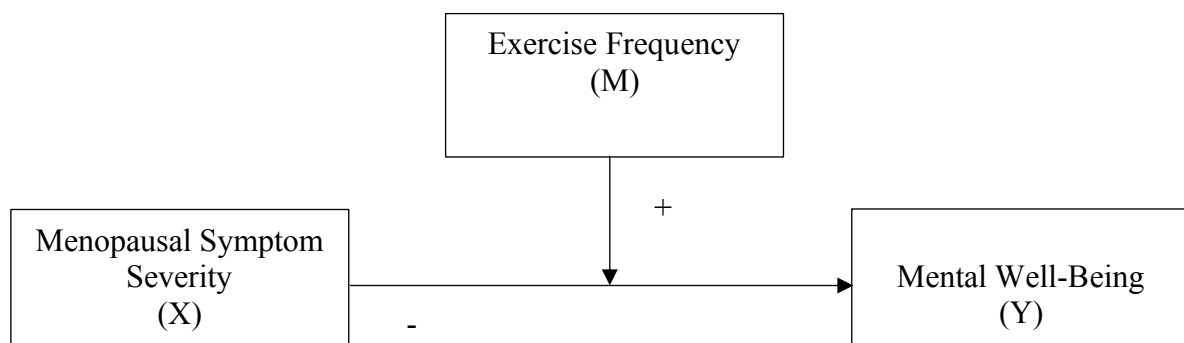


Figure 2

Hypothesised Moderation Model of Exercise Frequency on the Relationship Between Menopausal Symptom Severity and Mental Well-being



Methods

Design

This cross-sectional study used the first wave of a longitudinal research project investigating mental well-being throughout the life span, which collected both quantitative and qualitative data. The University of Twente's Faculty of Behavioural, Management, and Social Sciences (BMS) Ethics Committee, Domain of Humanities and Social Sciences (HSS), approved the research protocol (Ethical Approval Number: 231487).

Participants

The inclusion criteria for participation were speaking English, Dutch, or German, having a minimum age of 18 years, having a functional internet connection, and having a working e-mail address. The provision of informed consent was necessary to sign up for the study and to get access to the questionnaire. Out of the 253 participants in the original sample, 114 women between the ages of 40 and 60 gave informed consent and responded to all the questions on the scales to be analysed and were included (see Appendix A for the flow diagram of participant inclusion and exclusion). This chosen age range for inclusion was based on a literature review concerning the well-being of menopausal women, consistent with the focus of this research (Agarwal et al., 2019; Allahverdipour et al., 2019; Brown et al., 2015; Khoei et al., 2013; Lu et al., 2023). The mean age of women included in the study was $M = 51.89$ years ($SD = 5.61$). Notably, more than half of the participants were Dutch ($n = 70$, 61.40%) and married or in a registered partnership ($n = 67$, 58.77%). Further, more than half of the sample reported having either obtained a Bachelor in (applied) sciences or Master in (applied) sciences, or PhD ($n = 84$, 73.68%) and working either full- or part-time ($n = 90$, 78.95%). Lastly, a large portion of the included participants indicated that they live with their partner and children ($n = 48$, 42.11%). Further sociodemographic information, including age,

gender identity, marital status, living arrangements, educational background, employment status, and nationality, was analysed and can be found in *Table 1*.

Table 1

Sociodemographic Characteristics of Participants (n = 114)

Characteristic	Menopausal Woman (n = 114)	
	n	%
Age, M (SD)	51.89	5.61
Marital Status		
Married/registered partnership	67	58.77
Divorced/separated	23	20.18
Widowed	5	4.39
Never been married	19	16.67
Living Arrangements		
Living alone	18	15.79
Living with partner	29	25.44
Living with a partner and children	48	42.11
Living with children	16	14.04
Living with others	1	0.88
Educational Background		
Primary school	3	2.63
Secondary school	8	7.02
Vocational secondary education	19	16.67
Bachelor in (applied) sciences	41	35.96
Master in (applied) sciences, or PhD	43	37.72
Employment Status		
Full-time	35	30.70
Part-time	55	48.25
Unemployed and looking for work	4	3.51
A homemaker or stay-at-home parent	11	9.65
Student	2	1.75
Retired	7	6.14
Nationality		
Dutch	70	61.40
German	24	21.05
Belgian	2	1.75
Turkish	14	12.28
Moroccan	4	3.51

Note. Frequencies (n), and percentages (%)

Procedure

Convenience and snowball sampling were employed to recruit participants through social media platforms and by sending out recruitment messages. These non-probability sampling approaches were chosen because they increase participation willingness among respondents, although limitations such as lower generalisability, external validity, and reliability should be considered (Schreuder et al., 2001). The English and German recruitment messages included a link to the application form for the online survey on the Qualtrics XM[®] platform (www.qualtrics.com). After filling out the application, including the provision of informed consent, demographic questions, and a summary of the study and its purpose, the participants could fill out the survey in English, Dutch, or German to accommodate their language preferences. Withdrawal from the study was possible at any time. The completion of the questionnaire was expected to take about 30 to 45 minutes. Data was gathered between January and March of 2024.

Materials

Symptom Severity

The *Menopause Rating Scale* (MRS) (Hauser et al., 1994; Schneider et al., 2000), was used to assess menopause-specific symptom experience and severity and to monitor symptom variation among the participants. Participants rate the presence and severity of symptoms to the question ‘Which of the following symptoms apply to you at this time?’ on a 5-point Likert scale. This included somatic symptoms (hot flashes, heart discomfort, sleep problems, joint and muscular discomfort), psychological symptoms (depressive mood, irritability, anxiety, and physical and mental exhaustion), and urogenital symptoms (sexual problems, bladder problems, and dryness of the vagina). Each of the 11 items was scored by participants from *none* (0) to *mild* (1) to *very severe* (4). The average symptom severity experienced by participants was assessed with mean scores. Mean scores were calculated by summing the

scores of the items and dividing them by the number of total items, resulting in a mean score range of 0 (signifying absence of symptoms) to 4 (indicating severe symptoms experience). Therefore, a higher mean score indicated greater symptom severity. In prior research, the MRS scale demonstrated good psychometric qualities in different countries and domains with robust internal consistency (Heinemann et al., 2004; Susanti et al., 2019). In the present study, the measure of Cronbach's alpha for the MRS was $\alpha = .83$, which indicated a high level of internal consistency among the items.

Attitudes towards Menopause

Menopausal attitudes were measured using the *Attitudes Towards Menopause Scale* (ATM) by Neugarten et al., (1963). Participants indicate their agreement with 35 general statements about sexuality, menopausal recovery, and the negative effect of menopause, among others, using a 4-point Likert scale between *disagree strongly* (1) and *agree strongly* (4) (Aksu et al., 2011). The ATM-Scale includes 16 positive statements, such as 'Life is more interesting for a woman after the menopause', and 19 negative statements, such as 'Menopause is an unpleasant experience for a woman'. Before calculating total scores, the negative statements were reverse-coded to ensure consistent interpretation. Total scores were divided by the number of items, resulting in a mean score ranging from 1 (indicating low agreement with the presented attitudes) to 4 (indicating high agreement with the presented attitudes), representing the average agreement of participants with the provided menopausal attitudes across all items. Higher mean scores indicated greater overall agreement with the provided attitudes, reflecting more positive menopausal attitudes. Research by Bahri et al. (2023) and Thapa & Yang (2022) revealed that the ATM scale has strong internal reliability in different languages and countries. In the present study, Cronbach's alpha of $\alpha = .86$ indicated high internal consistency

Exercise Frequency

Participants' current level of exercise frequency was assessed with an item from the *Menopause Health Questionnaire* (MHQ; The North American Menopause Society, 2005). The MHQ is commonly used by healthcare professionals as an intake form. Only some items of the MHQ were included in the questionnaire, namely items about exercise frequency and type, dietary habits, smoking habits, and beverage consumption. In the present study, only one question about exercise frequency was analysed. Participants indicated how frequently they are physically active, with responses ranging from *almost daily* (0) to *never* (5) on a 5-point Likert scale. A higher score indicates less frequent exercise.

Mental Well-Being

The *Mental Health Continuum Short Form* (MHC-SF; Keyes, 2005) was used to obtain measures of participants' mental well-being. The MHC-SF assesses the mental well-being of individuals among the dimensions of the social, psychological, and emotional well-being during the past months. Respondents provided answers to 14 items on a 6-point Likert scale ranging from *never* (0) to *every day* (5), with a higher mean score (0–5) indicating greater well-being. The dimensions are measured with questions such as, 'During the past month, how often do you feel that you had experiences that challenged you to grow and become a better person?' for psychological well-being, 'During the past month, how often do you feel happy?' for emotional well-being, and 'During the past month, how often do you feel that you had something important to contribute to society' for social well-being (Lamers et al., 2010). Good psychometric qualities, such as high internal consistency and convergent validity, have been established for the MHC-SF, offering a nuanced assessment of mental well-being among different populations (Lamers et al., 2010; Luijten et al., 2019). In the present study, the calculated Cronbach's alpha at $\alpha = .90$ shows that the items of the MHC-SF have a high internal consistency.

Data analysis

Statistical analyses were performed using the open-source programme R Studios, Version 4.4.0, to analyse the dataset, stored as a .sav file. For the analyses, the following packages were used: broom (v1.0.6, Robinson et al., 2024), car (v3.1-2, Fox et al., 2023), dplyr (v1.1.4, Wickham et al., 2023), foreign (v0.8-86, R Core Team et al., 2021), ggplot (v3.5.1, Wickham et al., 2024), haven (v2.5.4, Wickham et al., 2024), janitor (v2.2.0, Firke, 2023), lmtest (v0.9-40, Zeileis & Hothorn, 2022), psych (v2.4.3, Revelle, 2024), sjPlot (v2.8.16, Lüdtke, 2024), tidyr (v1.3.1 Wickham & Girlich, 2024), and tidyverse (v2.0.0, Wickham et al., 2023). The significance level for all analyses was set at $p < .05$, using two-tailed p-values.

Several analyses were conducted to analyse the relationships among menopausal attitudes, symptom severity, exercise frequency, and mental well-being. Descriptive statistics, like means and standard deviations, were calculated for an overview of participant characteristics, and visualisations were created for an overview of the result distributions. All analyses met the necessary parametric assumptions. See Appendices I and J for the tests of assumptions regarding homogeneity of variance, linearity, multicollinearity, and normality of the moderation models.

To explore the associations between the variables Pearson correlations were calculated. Further, a multivariable linear regression analysis was conducted with menopausal attitudes and menopausal symptom severity as the predictors, mental well-being as the outcome, and an interaction term attitude * symptoms as a moderator. Additionally, a multivariable linear regression analysis was performed with symptom severity and exercise frequency as the predictor, mental well-being as the outcome, and an interaction term of symptom * exercise as a moderator. Both hypothesised moderation models were visualised with interaction plots. To enhance the clarity of the plots, high and low levels of symptom

severity and exercise frequency were selected, rather than the full range of the values (See Appendix G and J). To analyse the impact of potentially influencing variables, supplementary analysis was performed with both moderation models by including additional variables (age, marital status, educational level, employment status, living situation, and nationality). The primary model's estimates and significance level remained consistent, with none of the additional factors showing statistical significance. The results of the additional analysis for the first model can be found in Appendix H and for the second model in Appendix K.

Results

Descriptive Statistics

The results revealed varying levels of well-being among participants. The overall mean for mental well-being was calculated at $M = 3.15$ ($SD = 0.71$), suggesting a moderate level of mental well-being across the sample. Psychological well-being exhibited the highest mean score ($M = 3.40$, $SD = 0.76$), closely followed by emotional well-being ($M = 3.32$, $SD = 0.95$). Conversely, participants scored the lowest on the dimension of social well-being ($M = 2.73$, $SD = 0.77$). Detailed visualisations of the well-being scores of participants are provided in Appendix B.

For attitudes, participants demonstrated a moderate level of agreement with the statements, with a mean score of 2.1 ($SD = 0.31$) on the scale. Responses ranged from a minimum of 1.31 to a maximum of 2.78, indicating a relatively narrow distribution of agreement with the presented attitudes around the mean. The item with the highest mean score ($M = 3.17$, $SD = 0.73$), reflecting the greatest agreement among participants, was item 34 ('Women should expect some trouble during the menopause'). The distribution of responses reflected this agreement, with 100 participants (87.8% of the sample) indicating that they '(strongly) agree'. The item with the second highest agreement, reflected in the mean score of 3.09 ($SD = 0.93$), was item 8 ('The thing that causes women all their trouble

at menopause is something they can't control — changes inside their bodies'). Of the participants, 88 (77.2% of the sample) indicated that they 'agree (strongly)'. The item with the lowest mean score ($M = 1.25$, $SD = 0.56$), reflecting the least agreement, was item 4 ('Women who have trouble with the menopause are usually those who have nothing to do with their time'). Of the sample, 109 of the participants (95.6 %) indicated that they 'disagree (strongly)', with item 4. Distributions of attitude agreement are provided in Appendix C.

Participants reported mainly mild or moderate symptomatology ($M = 2.10$, $SD = 1.13$). Among the participants, the symptom most commonly reported was sleep problems ($M = 2.54$, $SD = 1.21$), while the least reported symptom item was dryness of the vagina ($M = 1.78$, $SD = 1.09$). The mean scores were $M = 2.18$ ($SD = 0.79$) for somatic symptoms, $M = 2.13$ ($SD = 0.91$) for psychological symptoms and $M = 1.96$ ($SD = 0.83$) for urogenital symptoms. This suggests that, on average, participants reported experiencing more psychological symptoms than somatic and urogenital symptoms, with scores falling between mild and moderate severity levels. See Appendix D for visualisations of the menopausal symptomatology.

The mean exercise frequency among participants was $M = 2.27$ ($SD = 0.998$), indicating that respondents engage in exercise at a level between '*occasionally*' and '*at least 3 times a week*'. This interpretation is supported by the distribution of responses, as 27 participants (23.68% of the sample) reported that they exercise 'almost daily'; 44 participants (38.60%) reported that they exercise 'at least three times a week'; 31 participants (27.19%) reported exercising 'occasionally', 9 participants (7.89%) indicated exercising 'rarely', and 5 participants (2.63%) reported 'never' exercising. The exercise frequency of participants was visualised and can be found in Appendix E.

Bivariate Relationships

To analyse the relationships between variables, a Pearson correlation test was conducted. A very weak negative and non-significant correlation ($r(112) = -.17, p = .066$) was found between mental well-being and menopausal attitudes. Consequently, H_1 was rejected. A very weak, non-significant, positive correlation between exercise frequency and menopausal symptom severity was found ($r(112) = .003, p = .98$). Therefore, H_2 was rejected. Further, a statistically significant moderate and negative correlation was found between menopausal symptom severity and mental well-being ($r(112) = -.35, p < .01$), indicating that higher menopausal symptom severity is associated with lower mental well-being. Hence, H_3 was accepted. Lastly, a weak statistically significant negative correlation was found between menopausal symptom severity and menopausal attitudes ($r(112) = .28, p < .01$), indicating that higher symptom severity was associated with a greater agreement with menopausal attitudes. Table 2 displays the results of the Pearson correlation analysis.

Table 3

Descriptive Statistics and Pearson Correlations for Study Variables

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Mental Well-Being	3.15	0.71	1.00			
2. Menopausal Attitudes	2.99	0.22	-0.17	1.00		
3. Menopausal Symptom Severity	2.10	1.13	-0.35*	0.28*	1.00	
4. Exercise Frequency	2.27	1.00	-0.12	0.14	0.003	1.00

Note. $n = 114$; *M* = Mean, *SD* = Standard Deviation; Asterisks (*) signify statistically

significant results ($p < .05$.)

Inferential Statistics

Impact of Attitudes Towards Menopause on the Relationship Between Symptom Severity and Mental Well-Being

Results revealed a non-significant main effect of menopausal attitudes on mental well-being ($p = .060$). While there was an observed main effect of menopausal symptom severity on mental well-being ($p = .034$), as the confidence interval includes zeros, this result should be interpreted with caution. Further, no significant interaction was found between symptom severity and menopausal attitudes ($p = .095$; see all results in Table 3). Based on the results, H_4 was rejected. The interaction between the variables can be seen in Appendix G.

Table 3

Moderation Estimates of the Moderation Analysis of Symptom Severity on the Relationship Between Menopausal Attitudes and Mental Well-Being

Effect	Estimate	SE	95% CI		t	p
			LL	UL		
Intercept	6.65	1.48	3.71	9.59	4.48	< .001
Attitudes	-1.3	0.68	-2.64	0.06	-1.90	.060
Symptoms	-0.49	0.23	-0.95	-0.04	-2.14	.034
Attitudes * Symptoms	0.17	0.1	-0.03	0.38	1.69	.095

Note. $n = 114$; SE = Standard Error; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; Attitudes derived from ATM; Symptoms derived from MRS; Mental Well-Being derived from MHC-SF

Impact of Exercise Frequency on the Relationship of Symptom Severity on Mental Well-Being

Results indicated non-significant main effects for symptom severity ($p = .427$) and exercise frequency ($p = .76$) on mental well-being. Further, no significant interaction was found between exercise frequency and menopausal symptom severity ($p = .477$; see Table 4 for all results). Therefore, H_5 was rejected. Appendix J contains a visualisation of the interaction between the variables.

Table 4

Moderation Estimates of the Moderation Analysis of Exercise Frequency on the Relationship Between Menopausal Symptom Severity and Mental Well-Being

Effect	Estimate	SE	95% CI		t	p
			LL	UL		
Intercept	3.73	0.56	2.61	4.84	6.62	< .001
Symptoms	-0.07	0.08	-0.23	0.10	-0.80	.427
Exercise Frequency	0.07	0.23	-0.39	0.53	0.30	.762
Symptoms * Exercise Frequency	-0.02	0.03	-0.09	0.04	-0.71	.477

Note. $n = 114$; SE = Standard Error; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; Symptoms derived from MRS; Exercise Frequency derived from MHQ; Mental Well-Being derived from MHC-SF

Discussion

The key objective of this study was to investigate the impact of menopausal attitudes, menopausal symptom severity, and exercise frequency on mental well-being in women aged 40 to 60. The study's findings indicate that menopausal symptom severity has a moderately strong negative relationship with mental well-being. However, no relationships and interactions were found between menopausal attitudes and mental well-being, nor between

exercise frequency and menopausal symptom severity, therefore, the influence of the variables on mental well-being appears to be less prominent and may be affected by additional factors.

Generally, this study's sample reported mild to moderate symptom severity. When comparing these findings to the results of a large multinational survey by Heinemann et al. (2004), it emerges that, except for urogenital symptoms, this study's sample reported lower somatic and psychological symptoms. This comparison underscores the variability in menopausal experiences, and the necessity to understand factors influencing menopausal symptom severity and well-being. Further, women in this study experiencing higher symptom severity reported lower levels of mental well-being, highlighting the need for effective menopause-specific symptom management strategies. This result aligns with existing research (Holloway, 2022; Hooper et al., 2022; Lu et al., 2023; Waidyasekera et al., 2009), thus adding to the robustness and validity of earlier findings. However, although a relationship between the variables was found, the effect size was relatively small, suggesting a limited direct impact. Nonetheless, small effect sizes remain important in research addressing complex phenomena like menopausal well-being (Götz et al., 2021), as mental well-being during menopause is likely to be influenced by a multitude of factors and small effects. Therefore, interventions should consider multifaceted approaches by including different psychological, social and lifestyle factors beyond symptom severity.

Surprisingly, this study did not find exercise frequency to impact menopausal symptom severity or its relationship with mental well-being, challenging previous findings (Bailey et al., 2016; Lee & Kim, 2008; Wu et al., 2023; Zhang & Zhao, 2023). Participants reported exercising 'at least 3 times a week' and 'occasionally', aligning with findings that menopausal women do not exercise enough (Evenson et al., 2002). As Wu et al. (2023) proposed the benefits of exercise on menopausal symptomatology to be dose-dependent, the

sample potentially did not exercise enough to establish a relationship between the variables. However, this study's result implies that exercise alone may not be sufficient to mitigate the impact of menopausal symptomatology on mental well-being. Therefore, symptom management strategies solely focusing on exercise should be re-evaluated.

Further, this study found no relationship between menopausal attitudes and mental well-being, nor that menopausal symptom severity influenced this relationship, contradicting previous findings suggesting an interconnectedness between the variables (Ali et al., 2020; Ayers et al., 2010; Batool et al., 2017; Ghazanfarpour et al., 2015; Wilbur et al., 1995). Notably, most participants agreed that menopause is challenging (89%) and uncontrollable (77.2%), possibly indicating that symptoms and experienced life changes impact participants more than they reported on this study's measures. These findings underscore a need for increased menopausal support and resources than those currently offered to improve menopausal well-being. For this purpose, educational approaches have been shown to be effective in improving menopausal attitudes, in turn leading to greater reported quality of life (Gebretatyos et al., 2020; Koyuncu et al., 2018; Rathnayake et al., 2020). This suggests that prompting more menopausal education and public dialogues could be effective in improving menopausal attitudes and well-being across different populations of women.

The value of this study's findings about menopausal attitudes and exercise frequency lies in contradicting earlier research about their impact on well-being, and the discrepancy highlights the need for further investigate associated factors. Future research should explore different types of exercise with precise measurements (Hajj et al., 2020; Wu et al. 2023) and include other lifestyle factors when investigating menopausal symptom severity and mental well-being (Blümel et al., 2016; Gold et al., 2004; Sabia et al., 2008; Sternfeld et al., 2014). This broader approach could help design effective symptom management strategies and interventions tailored to different lifestyles. The same applies to menopausal attitudes, as the

lack of association suggests the investigation of additional psychological and sociocultural factors (Ayers et al., 2010; Freeman & Sherif, 2007; Morrison et al., 2010), to improve menopausal education and support and symptom management strategies.

Lastly, participants exhibited similar mental well-being to a sample of 50–60-year-old Dutch women in a study by Lamers et al. (2010), with moderate levels of mental well-being, and higher psychological and emotional well-being than social well-being. This implies that further research into well-being should investigate the reasons behind lower social well-being. General practitioners and gynaecologists should utilise insights from this, as well as other existing and future studies, to move towards more personalised menopausal care. This could include the incorporation of well-being assessments like the MHC-SF and MRS in every check-up to ensure early and specific intervention. Further, practitioners could increase feelings of social support by informing and teaching effective management strategies to work against the belief that menopause is challenging and uncontrollable. These implications are also relevant for policymakers as they should establish guidelines to pave the way towards more holistic menopausal care and help women navigate through the menopausal journey.

Strengths & Limitations

This study's strengths include the analysis of various variables, allowing for a holistic analysis to gain a greater understanding of the included variables and their relationships. Further, the study utilised validated measures that demonstrated high internal reliability and consistency in this study, strengthening the finding's reliability and validity.

However, several limitations of this study have to be acknowledged. One limitation includes the cross-sectional design of the study and chosen analysis, not allowing for observation of changes in the variables over time or the establishment of causal relationships (Setia, 2016; Wang & Cheng, 2020). Further, the reliance on self-report measures may have introduced response biases and social desirability effects that could affect the validity of

results (Rosenman et al., 2011). Moreover, the application procedure and length of the survey could have led to increased drop-out rates and declines in response rates, negatively impacting the quality of the data (Braitman et al., 2022). Additionally, despite efforts to limit biases emerging from non-probability sampling techniques, the sample was notably homogenous in socio-demographic characteristics. This homogeneity, combined with the relatively small sample size, limits the ability to generalise findings to broader populations (Galloway, 2005), and has to be considered as attitudes, symptom experience, and well-being are influenced by cultural factors (Hunter & Rendall, 2007; Freeman & Sherif, 2007; Kowalcek et al., 2005; Melby et al., 2005). Finally, the chosen age range as inclusion criteria may have led to the exclusion of younger and older women who are certain of being in menopause and the inclusion of women not experiencing menopausal changes yet. Therefore, including an item to determine the menopausal stage could increase the generalisability and reliability of findings.

Future Recommendations

Based on the study's findings, strengths, and limitations, several recommendations for future research emerge. Future research should utilise longitudinal designs (Collins 2002; Dennerstein, 2000; Lee and Lee, 2022), to capture variations in symptom severity, menopausal attitudes, exercise frequency, and mental well-being accurately. Studies investigating menopausal well-being and associated factors should aim to recruit larger and more diverse samples of different age groups, backgrounds, and menopausal statuses (Chan et al., 2020; Collins, 2002; Wellons & Richard-Davis, 2013). This diversity would enhance the applicability and relevance of findings. An ideal sampling technique to achieve this could be stratified sampling to ensure the recruitment of specific subgroups within the menopausal population and to ensure an understanding of different experiences (Elfil & Negida, 2017). Further, research designs investigating menopausal well-being could benefit from combining

different sampling techniques with triangular data sourcing to gain a better understanding of the variables. This could entail combining quantitative surveys with qualitative interviews to allow for a comprehensive analysis of the menopausal experience (Zhang & Zhao, 2023), adding depth and context to the data. Specifically, ecological momentary assessments could be utilised to limit self-report biases and memory recall errors. Collecting participant data on mental well-being, symptom experience and attitudes in real-time and natural environments, could improve the objectivity and ecological validity of data and findings (Crawford et al., 2022). Conclusively, combining different types of sampling and data collection techniques could offer better insights into how menopausal well-being is influenced by various factors such as menopausal attitudes, symptom severity and exercise frequency.

Conclusion

In conclusion, this study contributes to the understanding of the impact of menopausal attitudes, symptom severity, and exercise frequency on the mental well-being of menopausal women. Symptom severity was revealed to be associated with mental well-being during menopause, while attitudes towards menopause and exercise frequency, as well as the interaction between the variables, did not emerge as predictors. Therefore, effective management strategies for menopausal symptomatology as well as educational approaches emerge as central to fostering mental well-being during menopause. Unexpected findings highlight that further research is needed, incorporating additional factors, to improve health policies and move towards personalised and holistic care. Future research should utilise longitudinal, experimental, culturally sensitive, and mixed methods approaches to gain a greater menopausal understanding. Ultimately, multifaceted approaches, addressing physical as well as psychological needs are required to safeguard and foster mental well-being during menopause.

Reference List

- Agarwal, A., Kiron, N., Gupta, R., & Sengar, A. (2019). A Cross-Sectional Study for Assessment of Menopausal Symptoms and Coping Strategies among the Women of 40-60 Years Age Group Attending Outpatient Clinic of Gynaecology. *International Journal of Medicine and Public Health*, 9(1), 13–19. <https://doi.org/10.5530/ijmedph.2019.1.4>
- Ahmed, S. B., & Hardcastle, L. (2023). Menopause: time for a paradigm shift. *Mayo Clinic Proceedings*, 98(6), 818–820. <https://doi.org/10.1016/j.mayocp.2023.04.014>
- Aksu, H., Sevinçok, L., Küçük, M., Sezer, S. D., & Oğurlu, N. (2011). The attitudes of menopausal women and their spouses towards menopause. *Clinical and Experimental Obstetrics & Gynecology*, 38(3), 251-255. <https://doi.org/10.1002/jclp.20692>
- Ali, A. M., Ahmed, A. H., & Smail, L. (2020). Psychological Climacteric Symptoms and Attitudes toward Menopause among Emirati Women. *International Journal of Environmental Research and Public Health (Online)*, 17(14), 5028. <https://doi.org/10.3390/ijerph17145028>
- Allahverdipour, H., Karimzadeh, Z., Alizadeh, N., Jafarabadi, M. A., & Javadivala, Z. (2019). Psychological well-being and happiness among Middle-aged women: A cross-sectional study. *Health Care for Women International*, 42(1), 28–42. <https://doi.org/10.1080/07399332.2019.1703990>
- Avis, N., & McKinlay, S. (1991). A longitudinal analysis of women's attitudes toward the menopause: results from the Massachusetts Women's Health Study. *Maturitas*, 13(1), 65–79. [https://doi.org/10.1016/0378-5122\(91\)90286-y](https://doi.org/10.1016/0378-5122(91)90286-y)
- Avis, N. E., Stellato, R. K., Crawford, S. L., Bromberger, J. T., Ganz, P. A., Cain, V. S., & Kagawa-Singer, M. (2001). Is there a menopausal syndrome? Menopausal status and

symptoms across racial/ethnic groups. *Social Science & Medicine*, 52(3), 345–356.

[https://doi.org/10.1016/s0277-9536\(00\)00147-7](https://doi.org/10.1016/s0277-9536(00)00147-7)

Ayers, B., Forshaw, M., & Hunter, M. (2010). The impact of attitudes towards the menopause on women's symptom experience: A systematic review. *Maturitas*, 65(1), 28–36. <https://doi.org/10.1016/j.maturitas.2009.10.016>

Bachmann, G., & Leiblum, S. R. (2004). The impact of hormones on menopausal sexuality: a literature review. *Menopause*, 11(1), 120–130.

<https://doi.org/10.1097/01.gme.0000075502.60230.28>

Bahri, N., Sajjadi, M., Hunter, M. S., & Mohammadzadeh, F. (2023). Translation, cross-cultural adaptation, and validation of the Persian version of the Attitude Towards Menopause scale. *Menopause*, 30(9), 933–939.

<https://doi.org/10.1097/gme.0000000000002221>

Bailey, T. G., Cable, N. T., Aziz, N., Dobson, R., Sprung, V. S., Low, D. A., & Jones, H. (2016). Exercise training reduces the frequency of menopausal hot flashes by improving thermoregulatory control. *Menopause*, 23(7), 708–

718. <https://doi.org/10.1097/gme.0000000000000625>

Baker, A. A., Simpson, S. H., & Dawson, D. (1997). Sleep disruption and mood changes associated with menopause. *Journal of Psychosomatic Research*, 43(4), 359–369.

[https://doi.org/10.1016/S0022-3999\(97\)00126-8](https://doi.org/10.1016/S0022-3999(97)00126-8)

Batool, S., Kausar, R., Naqvi, G., Javed, A., & Tufail, H. (2017). Menopausal Attitude and Symptoms in Peri and Post-Menopausal Working Women. *Pakistan Journal of Psychological Research*, 32(1), 55–

75. <https://www.pjprnip.edu.pk/index.php/pjpr/article/view/608>

Blümel, J. E., Fica, J., Chedraui, P., Mezones-Holguín, E., Zúñiga, M. C., Witis, S., Vallejo, M. S., Tserotas, K., Sánchez, H., Onatra, W., Ojeda, E., Mostajo, D., Monterrosa, Á.,

- Lima, S., Martino, M., Hernández-Bueno, J. A., Gómez, G., Espinoza, M. T., Flores, D., . . . Aedo, S. (2016). Sedentary lifestyle in middle-aged women is associated with severe menopausal symptoms and obesity. *Menopause*, *23*(5), 488–493.
<https://doi.org/10.1097/gme.0000000000000575>
- Busch, H., Barth-Olofsson, A. S., Rosenhagen, S., & Collins, A. (2003). Menopausal transition and psychological development. *Menopause*, *10*(2), 179–187. <https://doi.org/10.1097/00042192-200310020-00011>
- Braitman, A. L., Strowger, M., Shipley, J. L., Ortman, J., MacIntyre, R. I., & Bauer, E. A. (2022). Data quality and study compliance among college students across 2 recruitment sources: Two Study investigation. *JMIR Formative Research*, *6*(12), e39488. <https://doi.org/10.2196/39488>
- Bromberger, J. T., Schott, L. L., Kravitz, H. M., Sowers, M., Avis, N. E., Gold, E. B., Randolph, J. F., & Matthews, K. A. (2010). Longitudinal change in reproductive hormones and depressive symptoms across the menopausal transition. *Archives of General Psychiatry*, *67*(6), 598. <https://doi.org/10.1001/archgenpsychiatry.2010.55>
- Bromberger, J. T., Kravitz, H. M., Chang, Y., Cyranowski, J. M., Brown, C., & Matthews, K. A. (2011). Major depression during and after the menopausal transition: Study of Women's Health Across the Nation (SWAN). *Psychological Medicine*, *41*(9), 1879–1888. <https://doi.org/10.1017/s003329171100016x>
- Brown, L., Bryant, C., & Judd, F. K. (2015). Positive well-being during the menopausal transition: a systematic review. *Climacteric*, *18*(4), 456–469. <https://doi.org/10.3109/13697137.2014.989827>
- Brown, L. D., Bowden, S. C., Bryant, C., Brown, V. M., Bei, B., Gilson, K., Komiti, A., & Judd, F. (2015). Validation and utility of the Attitudes to Ageing Questionnaire: Links

- to menopause and well-being trajectories. *Maturitas*, 82(2), 190–196. <https://doi.org/10.1016/j.maturitas.2015.06.042>
- Bryant, C., Judd, F., & Hickey, M. (2012). Anxiety during the menopausal transition: A systematic review. *Journal of Affective Disorders*, 139(2), 141–148. <https://doi.org/10.1016/j.jad.2011.06.055>
- Burger, H. G., Hale, G. E., Dennerstein, L., & Robertson, D. (2008). Cycle and hormone changes during perimenopause. *Menopause*, 15(4), 603–612. <https://doi.org/10.1097/gme.0b013e318174ea4d>
- Busch, H., Barth-Olofsson, A. S., Rosenhagen, S., & Collins, A. (2003). Menopausal transition and psychological development. *Menopause*, 10(2), 179–187. <https://doi.org/10.1097/00042192-200310020-00011>
- Chan, S., Gomes, A., & Singh, R. S. (2020). Is menopause still evolving? Evidence from a longitudinal study of multiethnic populations and its relevance to women's health. *BMC Women's Health*, 20(1). <https://doi.org/10.1186/s12905-020-00932-8>
- Cohen, L. S., Soares, C. N., Vitonis, A. F., Otto, M. W., & Harlow, B. L. (2006). Risk for new onset of depression during the menopausal transition. *Archives of General Psychiatry*, 63(4), 385. <https://doi.org/10.1001/archpsyc.63.4.385>
- Collins, A. (2002). Sociocultural issues in menopause. *Medical science symposia series*, 17, 339–344. https://doi.org/10.1007/978-1-4615-1061-1_40
- Crawford, J. L., English, T., & Braver, T. S. (2022). Incorporating ecological momentary assessment into multimethod investigations of cognitive aging: Promise and practical considerations. *Psychology and Aging*, 37(1), 84–96. <https://doi.org/10.1037/pag0000646>

- Dashti, S., Bahri, N., Najafi, T. F., Amirideli, M., & Roudsari, R. L. (2021). Influencing factors on women's attitudes toward menopause: a systematic review. *Menopause*, 28(10), 1192–1200. <https://doi.org/10.1097/gme.0000000000001833>
- Deeks, A., & McCabe, M. P. (2004). Well-being and menopause: An investigation of purpose in life, self-acceptance and social role in premenopausal, perimenopausal and postmenopausal women. *Quality of Life Research*, 13(2), 389–398. <https://doi.org/10.1023/b:qure.0000018506.33706.05>
- Dennerstein, L., Dudley, E. C., Hopper, J. L., Guthrie, J. R., & Burger, H. G. (2000). A prospective population-based study of menopausal symptoms. *Obstetrics & Gynecology*, 96(3), 351-358. [https://doi.org/10.1016/S0029-7844\(00\)00930-3](https://doi.org/10.1016/S0029-7844(00)00930-3)
- Dennerstein, L., Lehert, P., & Guthrie, J. R. (2002). The effects of the menopausal transition and biopsychosocial factors on well-being. *Archives of Women's Mental Health*, 5(1), 15–22. <https://doi.org/10.1007/s007370200018>
- Diener, E., Oishi, S., & Tay, L. (2018). Advances in subjective well-being research. *Nature Human Behaviour*, 2(4), 253–260. <https://doi.org/10.1038/s41562-018-0307-6>
- Elfil, M., & Negida, A. (2017). Sampling methods in Clinical Research; an Educational Review. *DOAJ (DOAJ: Directory of Open Access Journals)*, 5(1), e52. <https://doaj.org/article/a5a27ed2b7fc4138a0261efdcd63fff9>
- Evenson, K. R., Wilcox, S., Pettinger, M., Brunner, R., King, A. C., & McTiernan, A. (2002). Vigorous Leisure Activity through Women's Adult Life: The Women's Health Initiative Observational Cohort Study. *American Journal of Epidemiology*, 156(10), 945–953. <https://doi.org/10.1093/aje/kwfl32>
- Freeman, E. W., & Sherif, K. (2007). Prevalence of hot flushes and night sweats around the world: a systematic review. *Climacteric*, 10(3), 197–214. <https://doi.org/10.1080/13697130601181486>

- Firke, S. (2023). *janitor: Simple tools for examining and cleaning dirty data* (Version 2.2.0) [R package]. CRAN. Retrieved from <https://cran.r-project.org/packages/janitor/index.html>
- Fox, J., Weisberg, S., Price, B., Adler, D., Bates, D., Baud-Bovy, G., et al. (2023). *car: Companion to Applied Regression* (Version 3.1-2) [R package]. Retrieved from <https://cran.r-project.org/web/packages/car/index.html>
- Galloway, A. (2005). Non-Probability sampling. In *Elsevier eBooks* (pp. 859–864). <https://doi.org/10.1016/b0-12-369398-5/00382-0>
- Gatenby, C., & Simpson, P. (2024). Menopause: Physiology, definitions, and symptoms. *Best Practice & Research Clinical Endocrinology & Metabolism*, 38(1), 101855. <https://doi.org/10.1016/j.beem.2023.101855>
- Gebretatyos, H., Ghirmai, L., Amanuel, S., Gebreyohannes, G., Tsighe, Z., & Tesfamariam, E. H. (2020). Effect of health education on knowledge and attitude of menopause among middle-age teachers. *BMC Women's Health*, 20(1). <https://doi.org/10.1186/s12905-020-01095-2>
- Genazzani, A. R., Pluchino, N., Luisi, S., & Luisi, M. (2006). Estrogen, cognition and female web ageing. *Human Reproduction Update*, 13(2), 175–187. <https://doi.org/10.1093/humupd/dml042>
- Ghazanfarpour, M., Kaviani, M., Abdollahian, S., Bonakchi, H., Khadijeh, M. N., Naghavi, M., & Khadivzadeh, T. (2015). The relationship between women's attitude towards menopause and menopausal symptoms among postmenopausal women. *Gynecological Endocrinology*, 31(11), 860–865. <https://doi.org/10.3109/09513590.2015.1056138>
- Gold, E. B., Block, G., Crawford, S. L., Lachance, L., FitzGerald, G., Miracle, H., & Sherman, S. S. (2004). Lifestyle and Demographic Factors in Relation to Vasomotor

Symptoms: Baseline Results from the Study of Women's Health Across the Nation. *American Journal of Epidemiology*, 159(12), 1189–1199.

<https://doi.org/10.1093/aje/kwh168>

Götz, F. M., Gosling, S. D., & Rentfrow, P. J. (2021). Small Effects: the indispensable foundation for a cumulative psychological science. *Perspectives on Psychological Science*, 17(1), 205–215. <https://doi.org/10.1177/1745691620984483>

Gracia, C. R., & Freeman, E. W. (2018). Onset of the menopause transition. *Obstetrics and Gynecology Clinics of North America*, 45(4), 585–597.

<https://doi.org/10.1016/j.ogc.2018.07.002>

Greenblum, C. A., Rowe, M. A., Neff, D. F., & Greenblum, J. S. (2013). Midlife women: symptoms associated with menopausal transition and early postmenopause and quality of life. *Menopause*, 20(1), 22–27.

<https://doi.org/10.1097/gme.0b013e31825a2a91>

Hajj, A. E., Wardy, N., Haidar, S., Bourgi, D., Haddad, M. E., Chammas, D. E., Osta, N. E., Khabbaz, L. R., & Papazian, T. (2020). Menopausal symptoms, physical activity level and quality of life of women living in the Mediterranean region. *PloS One*, 15(3), e0230515. <https://doi.org/10.1371/journal.pone.0230515>

Hauser, G. A., Huber, I. C., Keller, P. J., Lauritzen, C., & Schneider, H. P. (1994).

[Evaluation of climacteric symptoms (Menopause Rating Scale)]. *Zentralbl Gynakol*. 1994, 116(1), 16–23. <https://pubmed.ncbi.nlm.nih.gov/8147175>

Heinemann, K., Ruebig, A., Potthoff, P., Schneider, H. P. G., Strelow, F., Heinemann, L., & Thai, D. M. (2004). The Menopause Rating Scale (MRS) scale: a methodological review. *Health and Quality of Life Outcomes*, 2(1), 45. <https://doi.org/10.1186/1477-7525-2-45>

- Holloway, D. (2022). The menopause: symptoms, treatments and implications for women's health and well-being. *Primary Health Care*, 32(3), 32–41.
<https://doi.org/10.7748/phc.2022.e1759>
- Hooper, S. C., Marshall, V. B., Becker, C. B., LaCroix, A. Z., Keel, P. K., & Kilpela, L. S. (2022). Mental health and quality of life in postmenopausal women as a function of retrospective menopause symptom severity. *Menopause*, 29(6), 707–713. <https://doi.org/10.1097/gme.0000000000001961>
- Hunter, M., & Rendall, M. (2007). Bio-psycho-socio-cultural perspectives on menopause. *Best Practice & Research in Clinical Obstetrics & Gynaecology*, 21(2), 261–274.
<https://doi.org/10.1016/j.bpobgyn.2006.11.001>
- Hunter, M. S., Gupta, P., Papitsch-Clark, A., & Sturdee, D. W. (2009). Mid-Aged Health in Women from the Indian Subcontinent (MAHWIS): a further quantitative and qualitative investigation of experience of menopause in UK Asian women, compared to UK Caucasian women and women living in Delhi. *Climacteric*, 12(1), 26–37. <https://doi.org/10.1080/13697130802556304>
- Huppert, F. A., & So, T. T. C. (2011). Flourishing across Europe: Application of a new conceptual Framework for defining Well-Being. *Social Indicators Research*, 110(3), 837–861. <https://doi.org/10.1007/s11205-011-9966-7>
- Inayat, K., Danish, N., & Hassan, L. (2017). Symptoms of menopause in Peri and postmenopausal women and their attitude towards them. *PubMed*, 29(3), 477–480. <https://pubmed.ncbi.nlm.nih.gov/29076687>
- Kalra, S., Yadav, J. S., Ajmera, P., Sindhu, B., & Pal, S. (2022). Impact of physical activity on physical and mental health of postmenopausal women: a systematic review. *Journal of Clinical and Diagnostic Research*.
<https://doi.org/10.7860/jcdr/2022/52302.15974>

- Keyes, C. L. M. (2005). Mental Illness and/or Mental Health? Investigating Axioms of the Complete State Model of Health. *Journal of Consulting and Clinical Psychology*, 73(3), 539–548. <https://doi.org/10.1037/0022-006x.73.3.539>
- Khoei, E. M., Sheikhan, F., Shamsalizadeh, N., Haghani, H., Pasha, Y. R. Y., & Killeen, T. K. (2013). Menopause negatively impacts sexual lives of Middle-Aged Iranian women: a Cross-Sectional study. *Journal of Sex & Marital Therapy*, 40(6), 552–560. <https://doi.org/10.1080/0092623x.2013.796577>
- Kowalcek, I., Rotte, D., Banz, C., & Diedrich, K. (2005). Women's attitude and perceptions towards menopause in different cultures. *Maturitas*, 51(3), 227–235. <https://doi.org/10.1016/j.maturitas.2004.07.011>
- Koyuncu, T., Unsal, A., & Arslantas, D. (2018b). Evaluation of the effectiveness of health education on menopause symptoms and knowledge and attitude in terms of menopause. *Journal of Epidemiology and Global Health*, 8(1–2), 8. <https://doi.org/10.2991/j.jegh.2018.08.103>
- Lamers, S., Westerhof, G. J., Bohlmeijer, E. T., Klooster, P. M. T., & Keyes, C. L. M. (2010). Evaluating the psychometric properties of the mental health Continuum-Short Form (MHC-SF). *Journal of Clinical Psychology*, 67(1), 99–110. <https://doi.org/10.1002/jclp.20741>
- Lee, Y., & Kim, H. (2008). Relationships between menopausal symptoms, depression, and exercise in middle-aged women: A cross-sectional survey. *International Journal of Nursing Studies*, 45(12), 1816–1822. <https://doi.org/10.1016/j.ijnurstu.2008.07.001>
- Lee, J., & Lee, J. (2022). Psychological well-being of midlife women: a structural equation modeling approach. *Menopause*, 29(4), 440–449. <https://doi.org/10.1097/gme.0000000000001933>

- Lu, J., Li, K., Zheng, X., Liu, R., Chen, M., Jian, X., Tu, S. J., & Xie, L. (2023). Prevalence of menopausal symptoms and attitudes towards menopausal hormone therapy in women aged 40–60 years: a cross-sectional study. *BMC Women's Health*, 23(1). <https://doi.org/10.1186/s12905-023-02621-8>
- Luijten, C. C., Kuppens, S., Van De Bongardt, D., & Nieboer, A. P. (2019). Evaluating the psychometric properties of the mental health continuum-short form (MHC-SF) in Dutch adolescents. *Health and Quality of Life Outcomes*, 17(1). <https://doi.org/10.1186/s12955-019-1221-y>
- Lüdecke, D. (2024, May 13). *Data Visualization for Statistics in Social Science [R package sjPlot version 2.8.16]*. Retrieved from <https://cran.r-project.org/web/packages/sjPlot/index.html>
- Melby, M. K., Lock, M., & Kaufert, P. (2005). Culture and symptom reporting at menopause. *Human Reproduction Update*, 11(5), 495–512. <https://doi.org/10.1093/humupd/dmi018>
- Mishra, R., Jha, S. K., Fidwi, F., Sethiya, D., & Sethia, S. (2020). A Study On Effect Of Aerobic And Pelvic Floor Exercises In Perimenopausal Housewives. *International Journal of Physiotherapy and Research/International Journal of Physiotherapy Research*, 8(1), 3350–3353. <https://doi.org/10.16965/ijpr.2019.200>
- Morrison, L. A., Sievert, L. L., Brown, D. E., Rahberg, N., & Reza, A. (2010). Relationships between menstrual and menopausal attitudes and associated Demographic and health characteristics: the Hilo Women's Health Study. *Women & Health*, 50(5), 397–413. <https://doi.org/10.1080/03630242.2010.507721>
- National Institute on Aging. (2021). *What is menopause?* National Institute of Health. Retrieved from <https://www.nia.nih.gov/health/menopause/what-menopause>

Neugarten, B. L., Wood, V., Kraines, R. J., & Loomis, B. (1963). Women's Attitudes Toward the Menopause. *Human Development*, 6(3), 140–151.

<https://doi.org/10.1159/000269714>

Ortmann, O., Beckermann, M. J., Inwald, E. C., Strowitzki, T., Windler, E., & Tempfer, C. (2020). Peri- and postmenopause—diagnosis and interventions interdisciplinary S3 guideline of the association of the scientific medical societies in Germany (AWMF 015/062): short version. *Archives of Gynecology and Obstetrics*, 302(3), 763–777.

<https://doi.org/10.1007/s00404-020-05682-4>

Paredes, M. R., Apaolaza, V., Fernández-Robin, C., Hartmann, P., & Yáñez, D. (2021). The impact of the COVID-19 pandemic on subjective mental well-being: The interplay of perceived threat, future anxiety and resilience. *Personality and Individual Differences*, 170, 110455. <https://doi.org/10.1016/j.paid.2020.110455>

R Core Team, Bates, D., Chambers, J., Dalgaard, P., Gentleman, R., & Hornik, K., et al. (2021). *foreign: Read Data Stored by Minitab, S, SAS, SPSS, Stata, Systat, Weka, dBase.*. (Version 0.8-86) [R package]. <https://cran.r-project.org/web/packages/foreign/index.html>

Rathnayake, N., Alwis, G., Lenora, J., Mampitiya, I., & Lekamwasam, S. (2020). Effect of Health-Promoting Lifestyle Modification Education on knowledge, attitude, and quality of life of postmenopausal women. *BioMed Research International (Print)*, 2020, 1–11. <https://doi.org/10.1155/2020/3572903>

Revelle, W. (2024). *psych: Procedures for psychological, psychometric, and personality research* (Version 2.4.3) [R package]. CRAN. Retrieved from <https://cran.r-project.org/web/packages/psych/index.html>

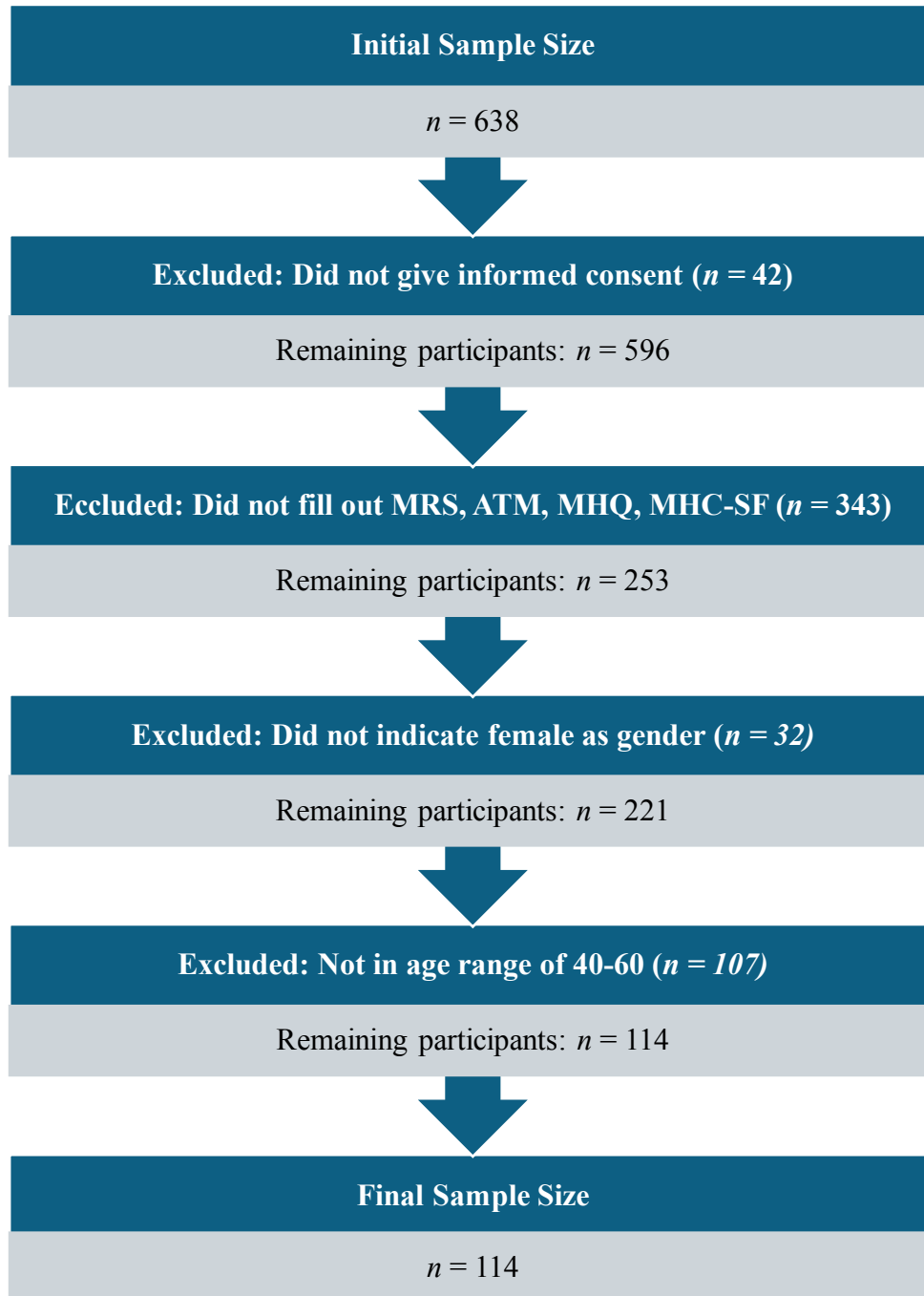
- Robinson, D., Hayes, A., Couch, S., Posit Software, PBC, Patil, I., & et al. (2024). broom: Convert Statistical Objects into Tidy Tibbles (Version 1.0.6) [R package]. Retrieved from <https://cran.r-project.org/web/packages/broom/index.html>
- Rosenman, R., Tennekoon, V., & Hill, L. G. (2011). Measuring bias in self-reported data. *International Journal of Behavioural and Healthcare Research*, 2(4), 320. <https://doi.org/10.1504/ijbhr.2011.043414>
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 57(6), 1069–1081. <https://doi.org/10.1037/0022-3514.57.6.1069>
- Sabia, S., Fournier, A., Mesrine, S., Boutron-Ruault, M., & Clavel-Chapelon, F. (2008). Risk factors for onset of menopausal symptoms. *Maturitas*, 60(2), 108–121. <https://doi.org/10.1016/j.maturitas.2008.04.004>
- Santoro, N., Roeca, C., Peters, B. A., & Neal-Perry, G. (2020). The Menopause Transition: Signs, symptoms, and management options. *The Journal of Clinical Endocrinology and Metabolism*, 106(1), 1–15. <https://doi.org/10.1210/clinem/dgaa764>
- Schneider, H. P. G., Heinemann, L., Rosemeier, H. P., Potthoff, P., & Behre, H. M. (2000). The Menopause Rating Scale (MRS): reliability of scores of menopausal complaints. *Climacteric*, 3(1), 59–64. <https://doi.org/10.3109/13697130009167600>
- Schreuder, H. T., Gregoire, T. G., & Weyer, J. P. (2001). For What Applications Can Probability and Non-Probability Sampling Be Used? *Environmental Monitoring and Assessment*, 66(3), 281–291. <https://doi.org/10.1023/a:1006316418865>
- Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology/Indian Journal of Dermatology*, 61(3), 261. <https://doi.org/10.4103/0019-5154.182410>

- Simkin-Silverman, L. R., Wing, R. R., Boraz, M. A., & Kuller, L. H. (2003). Lifestyle intervention can prevent weight gain during menopause: Results from a 5-year randomized clinical trial. *Annals of Behavioral Medicine, 26*(3), 212–220. https://doi.org/10.1207/s15324796abm2603_06
- Soules, M. R. (2005). Development of a staging system for the menopause transition: a work in progress. *Menopause, 12*(2), 117–120. <https://doi.org/10.1097/00042192-200512020-00001>
- Stearns, V., Ullmer, L., López, J. F., Smith, Y. R., Isaacs, C., & Hayes, D. F. (2002). Hot flushes. *Lancet, 360*(9348), 1851–1861. [https://doi.org/10.1016/s0140-6736\(02\)11774-0](https://doi.org/10.1016/s0140-6736(02)11774-0)
- Sternfeld, B., Guthrie, K. A., Ensrud, K. E., LaCroix, A. Z., Larson, J. C., Dunn, A. L., Anderson, G. L., Seguin, R. A., Carpenter, J. S., Newton, K. M., Reed, S. D., Freeman, E. W., Cohen, L. S., Joffe, H., Roberts, M., & Caan, B. J. (2014). Efficacy of exercise for menopausal symptoms. *Menopause, 21*(4), 330–338. <https://doi.org/10.1097/gme.0b013e31829e4089>
- Susanti, H. D., Chang, P., & Chung, M. H. (2019). Construct validity of the Menopause Rating Scale in Indonesia. *Climacteric, 22*(5), 454–459. <https://doi.org/10.1080/13697137.2019.1574737>
- Thapa, R., & Yang, Y. (2022). Attitude toward and associating factors of menopause: A study on Cambodian women. *SAGE Open, 12*(4), 215824402211292. <https://doi.org/10.1177/21582440221129256>
- The Nort American Menopause Society. (2005). *Menopause Health Questionnaire*. <https://www.menopause.org/publications/clinical-practice-materials/menopause-health-questionnaire>

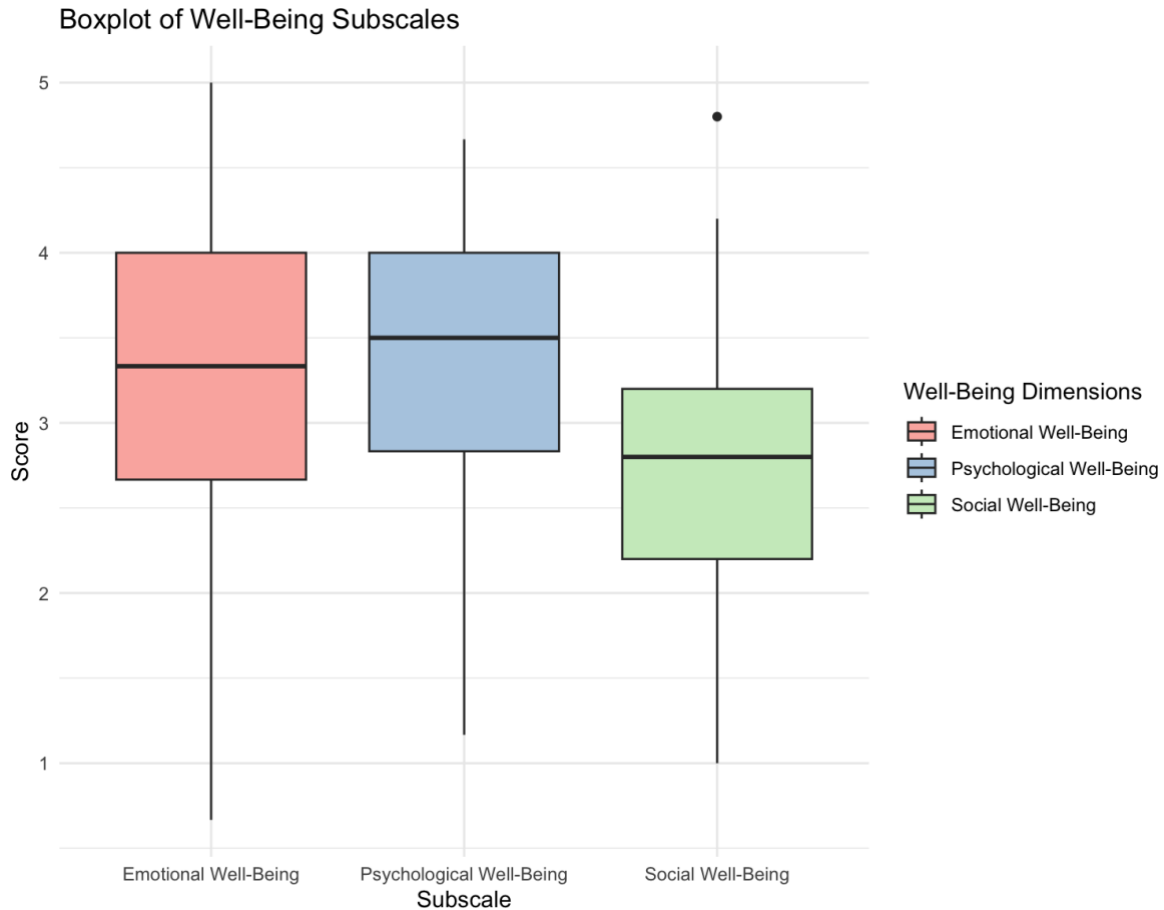
- Wang, X., & Cheng, Z. (2020). Cross-Sectional Studies: Strengths, Weaknesses, and Recommendations. *Chest*, *158*(1), S65–S71. <https://doi.org/10.1016/j.chest.2020.03.012>
- Waidyasekera, H., Wijewardena, K., Lindmark, G., & Naessén, T. (2009). Menopausal symptoms and quality of life during the menopausal transition in Sri Lankan women. *Menopause*, *16*(1), 164–170. <https://doi.org/10.1097/gme.0b013e31817a8abd>
- Wellons, M., & Richard-Davis, G. (2013). Racial and ethnic differences in the physiology and clinical symptoms of menopause. *Seminars in Reproductive Medicine*, *31*(05), 380–386. <https://doi.org/10.1055/s-0033-1348897>
- Wickham, H., Chang, W., Henry, L., Pedersen, T. L., Takahashi, K., Wilke, C., Woo, K., Yutani, H., Dunnington, D., & RStudio. (2023). *ggplot2: Create elegant data visualisations using the grammar of graphics* (Version 3.5.1) [R package]. CRAN. Retrieved from <https://cran.r-project.org/web/packages/ggplot2/index.html>
- Wickham, H., François, R., Henry, L., Müller, K., Vaughan, D., & Wilke, C., et al. (2023). *dplyr: A Grammar of Data Manipulation* (Version 1.1.4) [R package]. Retrieved from <https://cran.r-project.org/web/packages/dplyr/index.html>
- Wickham, H., et al. (2023). *tidyverse: Easily Install and Load the 'Tidyverse'* (Version 2.0.0) [R package]. CRAN. Retrieved from <https://cran.r-project.org/web/packages/tidyverse/index.html>
- Wickham, H., & Girlich, M. (2024). *tidyr: Tidy Messy Data* (Version 1.3.1) [R package]. CRAN. Retrieved from <https://cran.r-project.org/web/packages/tidyr/index.html>
- Wickham, H., Miller, E., & RStudio. (2023). *haven: Import and export 'SPSS', 'Stata' and 'SAS' files* (Version 2.5.4) [R package]. CRAN. Retrieved from <https://cran.r-project.org/web/packages/haven/index.html>

- Wilbur, J., Miller, A. M., & Montgomery, A. C. (1995). The influence of demographic characteristics, menopausal status, and symptoms on women's attitudes toward menopause. *Women & Health, 23*(3), 19–39. https://doi.org/10.1300/j013v23n03_02
- World Health Organization. (2020). *WHO guidelines on physical activity and sedentary behaviour: at a glance* Retrieved from. <https://www.iptop-physio.org/wp-content/uploads/2020/12/WHO-Guidelines-on-Physical-Activity-and-Sedentary-Behaviour.pdf>
- World Health Organization: WHO. (2022, June 17). *Mental health*. <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>
- Wu, S., Shi, Y., Zhao, Q., & Men, K. (2023). The relationship between physical activity and the severity of menopausal symptoms: a cross-sectional study. *BMC Women's Health, 23*(1). <https://doi.org/10.1186/s12905-023-02347-7>
- Yoshany, N., Mahmoodabad, S. S. M., Bahri, N., Moor, M. K., & Hanna, F. (2020). Association between Lifestyle and Severity of Menopausal Symptoms in Postmenopausal Women. *Electronic Journal of General Medicine, 17*(5), em222. <https://doi.org/10.29333/ejgm/7885>
- Zeileis, A., & Hothorn, T. (2022). *lmtree: Testing linear regression models* (Version 0.9-40) [R package]. CRAN. Retrieved from <https://cran.r-project.org/web/packages/lmtree/index.html>
- Zhang, Z., & Zhao, M. (2023). Comparison of physical exercise and psychological intervention in the healthcare of menopausal women. *International Journal of Healthcare Information Systems and Informatics, 18*(1), 1–9. <https://doi.org/10.4018/ijhisi.325238>

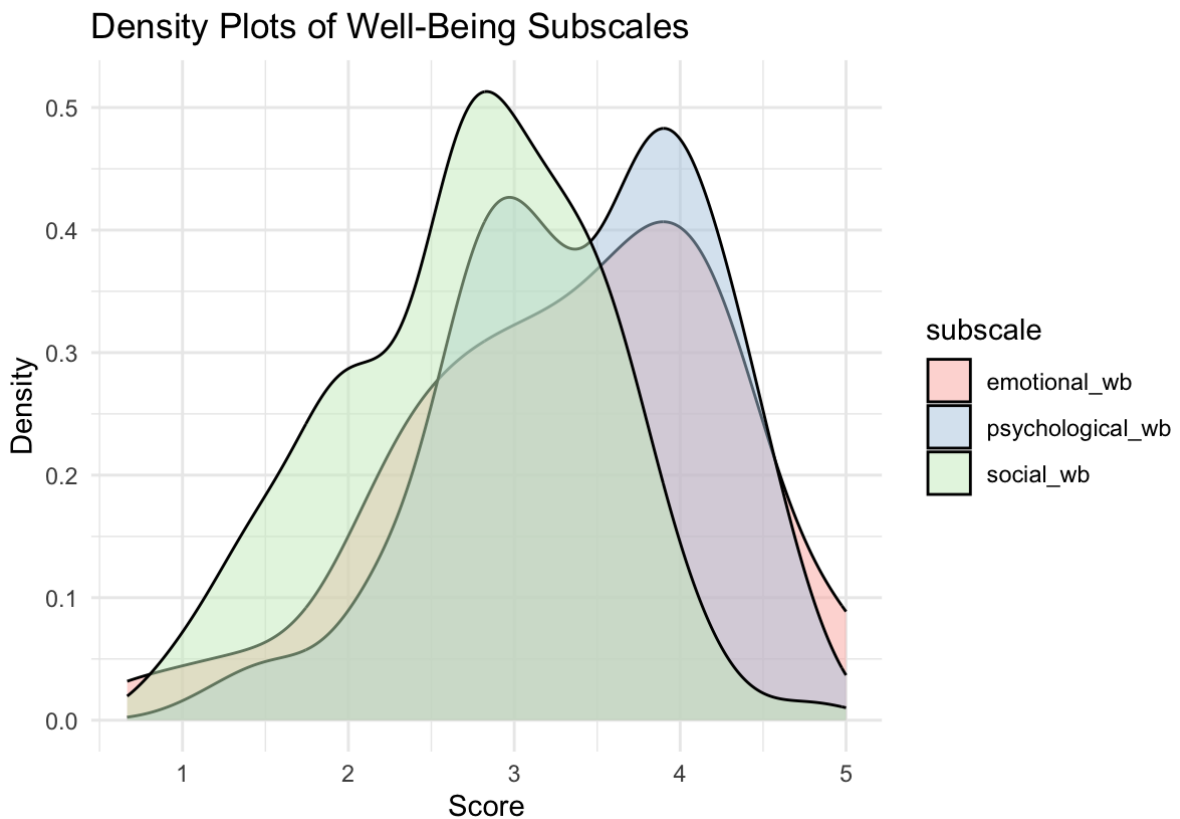
Zhao, D., Lv, G., Qi, M., Xie, Z., Zhang, Y., Zhou, M., Wang, Q., & Li, P. (2022). The structure of menopausal syndrome: Using network analysis to understand unique symptomatic relationships. *International Journal of Gynecology & Obstetrics*, *160*(1), 289–296. <https://doi.org/10.1002/ijgo.14353>

Appendix A: Flow Diagram for Inclusion and Exclusion of Participants**Figure 3***Flow Diagram of Participant Inclusion and Exclusion Criteria*

Note. The initial sample size was $n = 638$ participants. Participants were excluded at various stages. The final sample size included in the analysis was $n = 114$ participants.

Appendix B: Visualisations of Well-Being Scores**Figure 4***Boxplot of Well-Being Subscales*

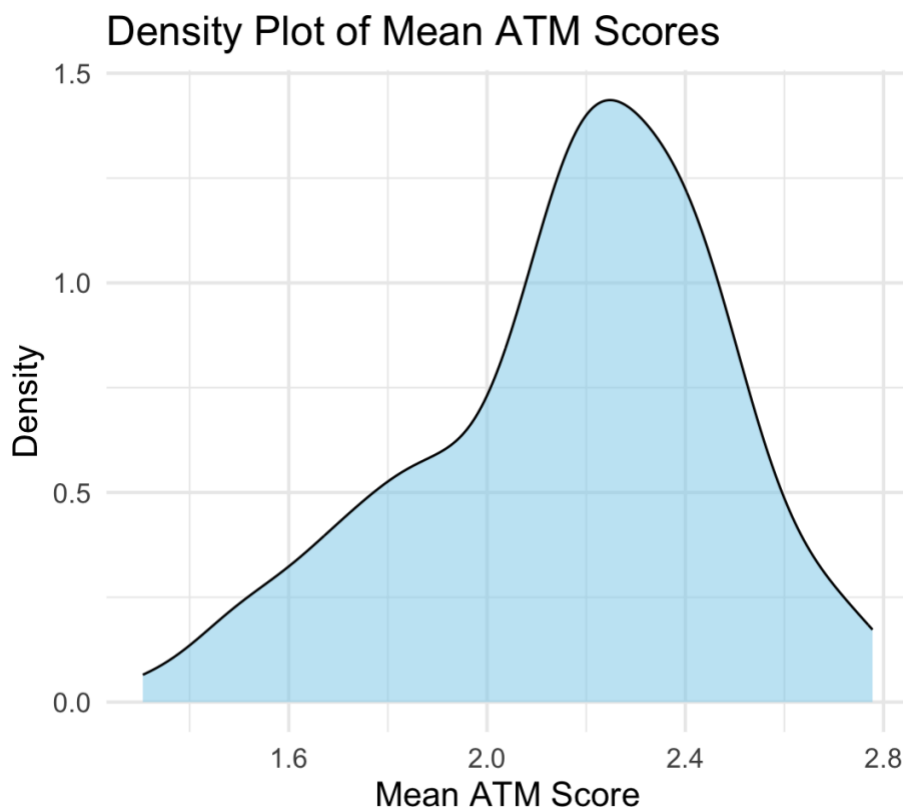
Note. This boxplot illustrates the distribution of scores for three subscales of mental well-being: Emotional Well-Being, Psychological Well-Being, and Social Well-Being. Each box represents the interquartile range (IQR) of scores, with the line inside the box indicating the median score. The whiskers extend to 1.5 times the IQR. The chart highlights variations in the scores across the different dimensions of well-being among participants.

Figure 5*Density Plots of Well-Being Subscales*

Note. This density plot shows the distribution of scores for the three subscales of mental well-being. Each curve represents the density of scores within each subscale, providing a visual representation of how frequently different scores occurred. The plot highlights the relative concentration and spread of well-being scores across the different dimensions

Appendix C: Visualisations of Attitude Scores**Figure 6**

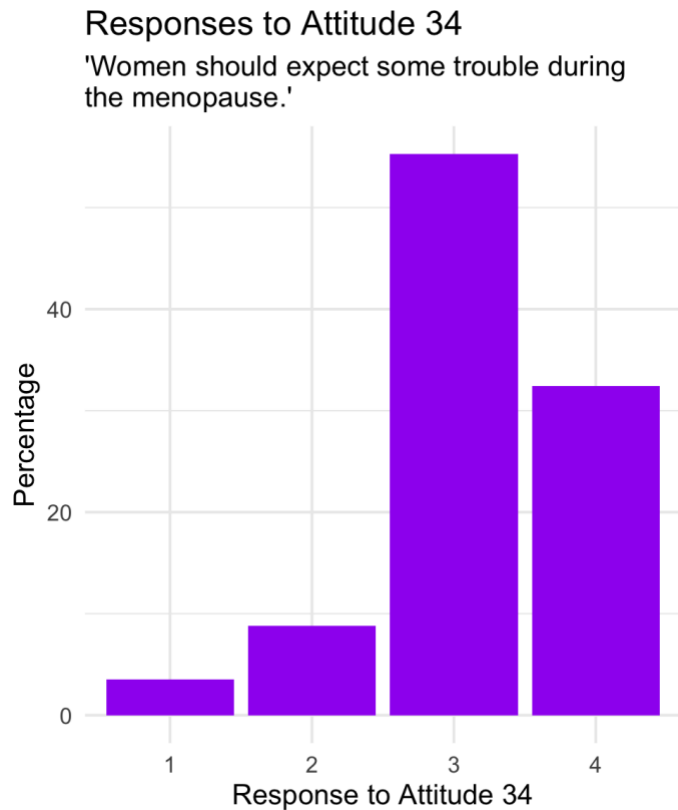
Density Plot of Mean Attitudes Towards Menopause (ATM) Scores



Note. This density plot shows the distribution of mean scores on the Attitudes Towards Menopause (ATM) scale for the entire sample. The mean ATM score reflects participants' overall agreement with general statements about menopause, with higher scores indicating more positive attitudes. The peak of the density plot indicates the most common mean score range among participants, providing insight into the general agreement on the provided menopausal attitudes within the sample.

Figure 7

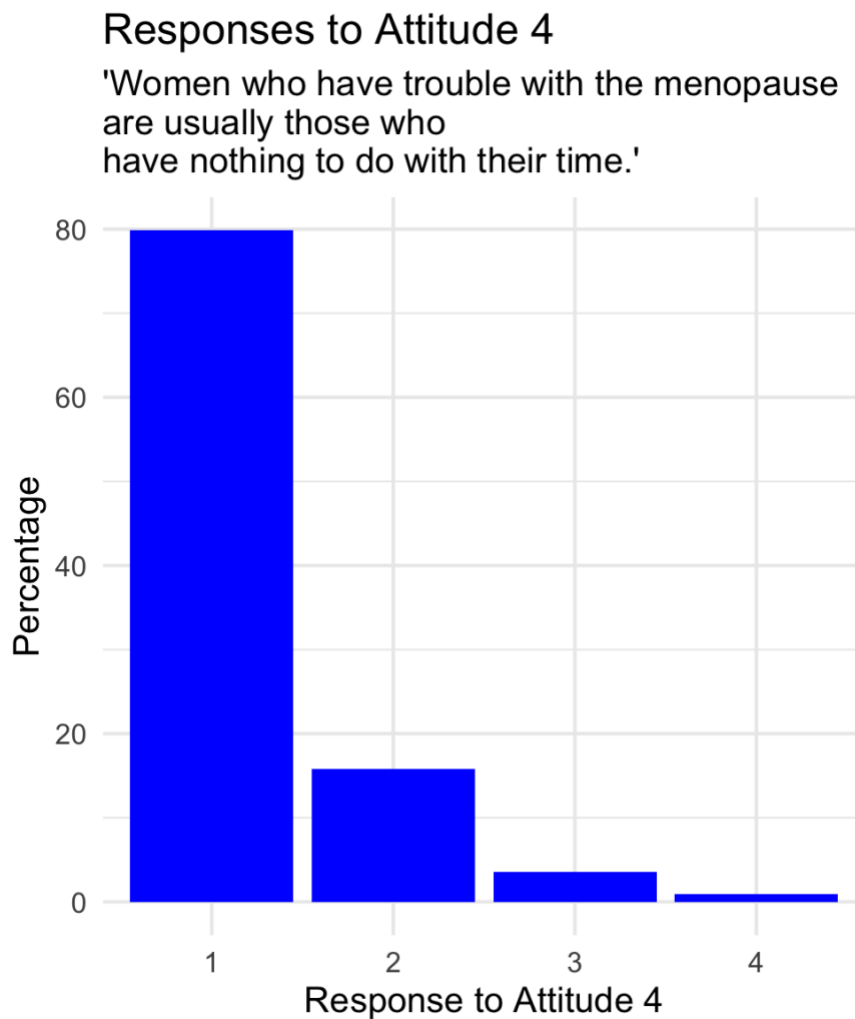
Responses to Attitude 34 by Age Group



Note. This bar chart shows the distribution of responses to Attitude 34, 'Women should expect some trouble during the menopause,' across the sample. Responses range from 1 (*disagree strongly*) to 4 (*agree strongly*). The majority of respondents tend to agree with the statement, with the highest percentage indicating a moderate agreement.

Figure 8

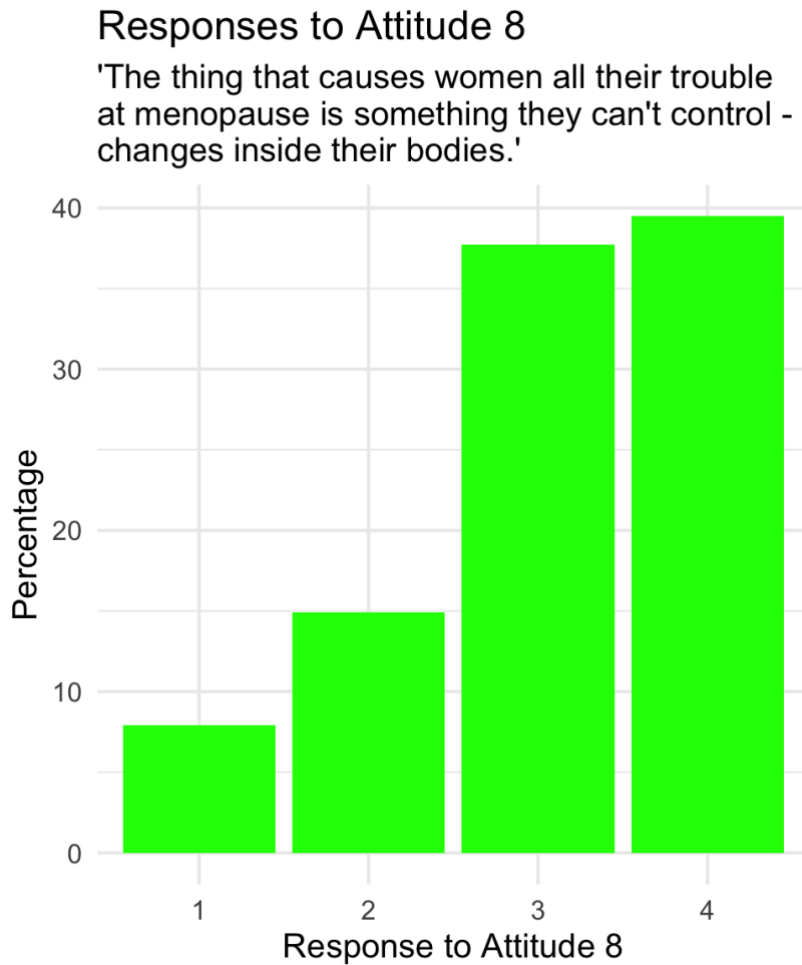
Responses to Attitude 4 by Age Group



Note. This bar chart shows the responses to Attitude 4, 'Women who have trouble with the menopause are usually those who have nothing to do with their time,'. Responses range from 1 (*disagree strongly*) to 4 (*agree strongly*). It highlights the general disagreement with this statement across the sample.

Figure 9

Responses to Attitude 4 by Age Group



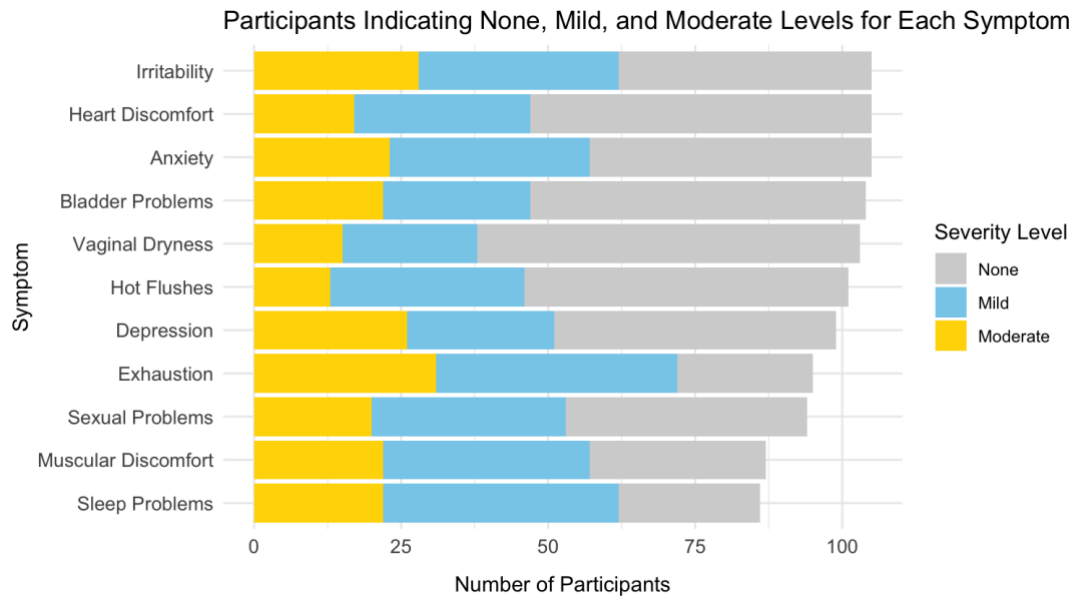
Note. This bar chart shows the responses to Attitude 8, 'The thing that causes women all their trouble at menopause is something they can't control - changes inside their bodies.'

Responses range from 1 (*disagree strongly*) to 4 (*agree strongly*). It highlights a general agreement with this statement across the sample.

Appendix D: Visualisations of Menopausal Symptom Severity

Figure 10

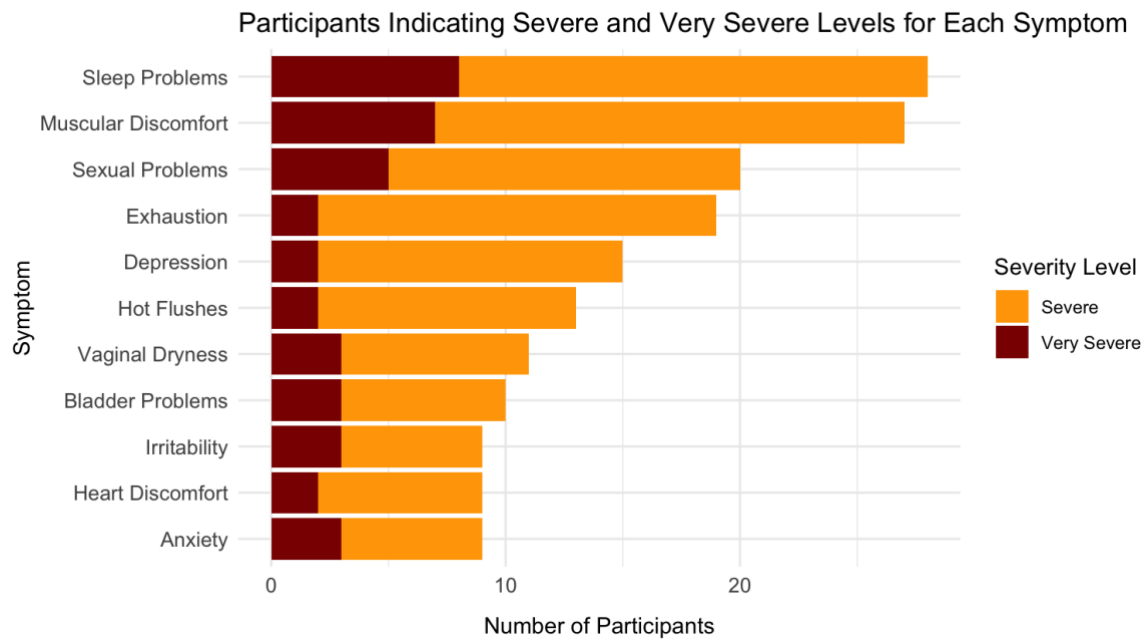
Participants Indicating Severity Levels 'none', 'mild' and 'moderate' for Each Symptom



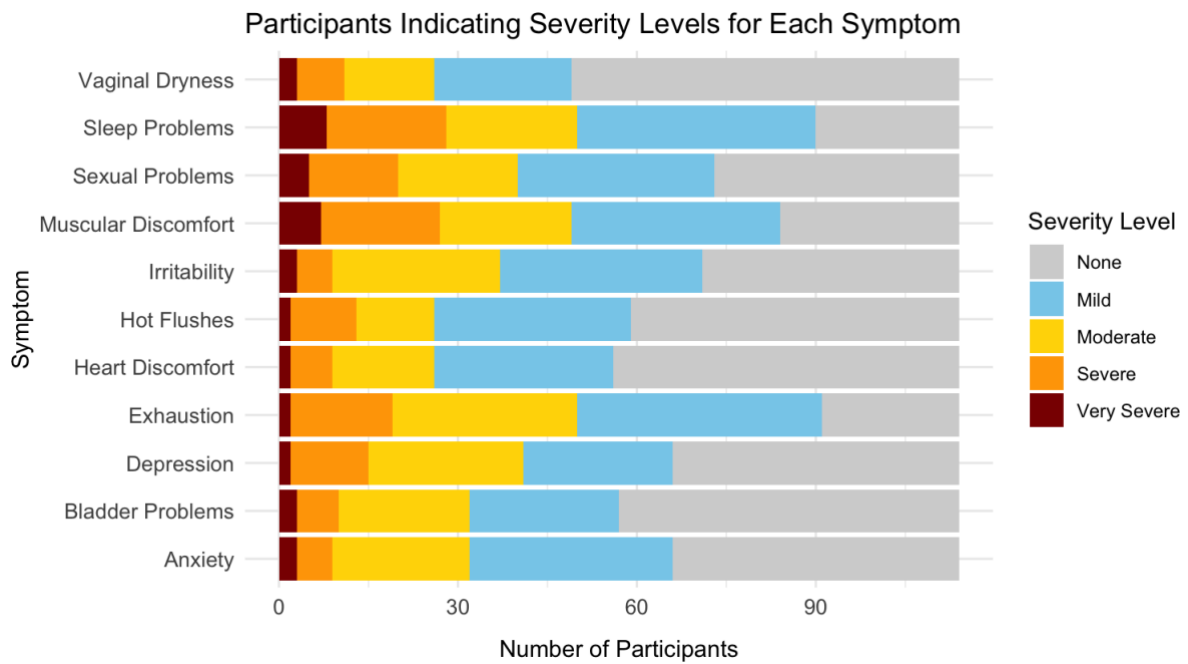
Note. This graph shows the responses how many participants indicated experiencing *none*, *mild* and *moderate* symptomatology across the 11 items. It highlights the mild symptomatology across the sample.

Figure 11

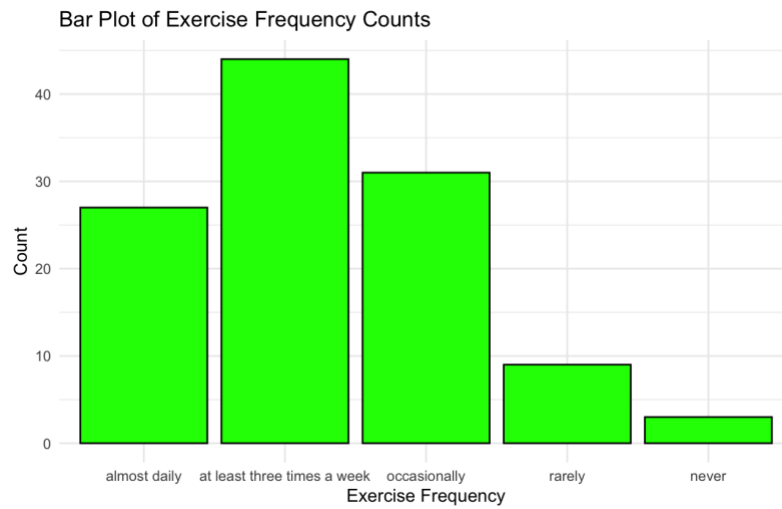
Participants Indicating Severity Levels 'severe, and 'very severe for Each Symptom



Note. This graph shows the responses how many participants indicated experiencing *severe*, and *very severe* symptomatology across the 11 items. It highlights the only few participants experience severe symptomatology.

Figure 12*Participants Indicating Severity Levels for Each Symptom*

Note. This graph shows the responses how many participants indicated experiencing *none*, *mild*, *moderate*, *severe* and *very severe* symptomatology across the 11 items, highlights that the majority of participants experience mild symptomatology.

Appendix E: Visualisations of Exercise Frequency**Figure 13***Bar Plot of Exercise Frequency Counts*

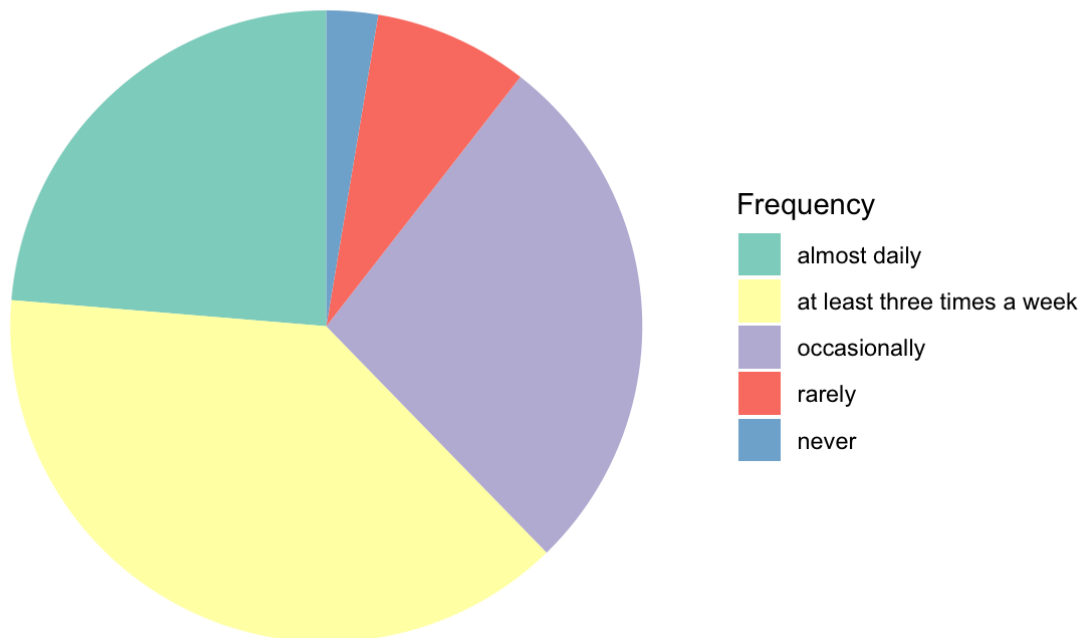
Note. This bar plot displays counts of participants reporting different frequencies of exercise.

The most common response was '*at least three times a week*', followed by '*occasionally*'.

Figure 14

Pie Chart of Exercise Frequency Percentages

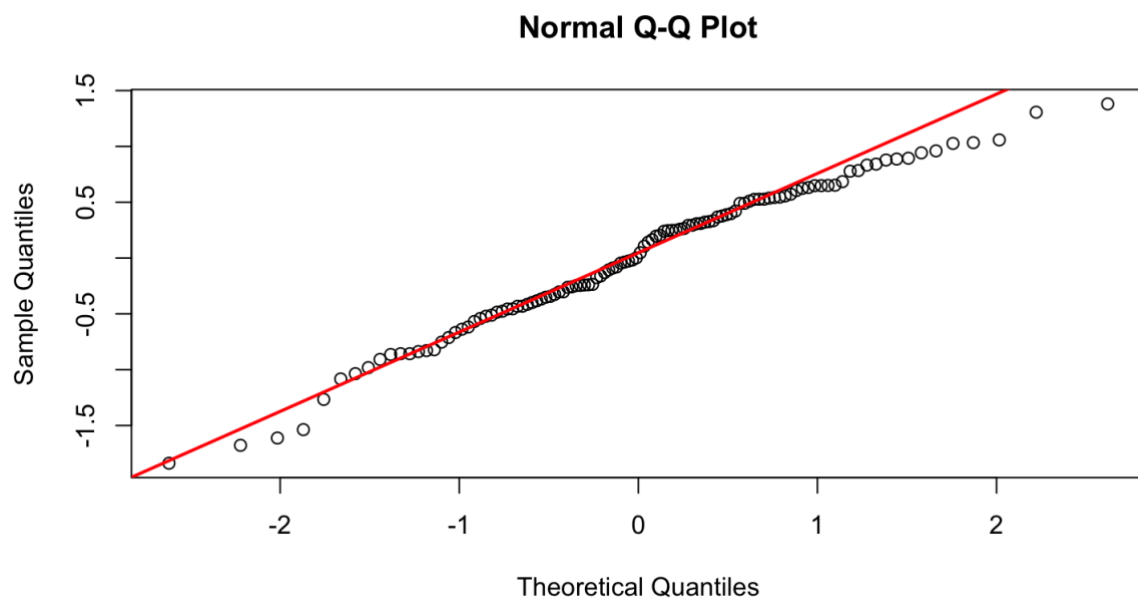
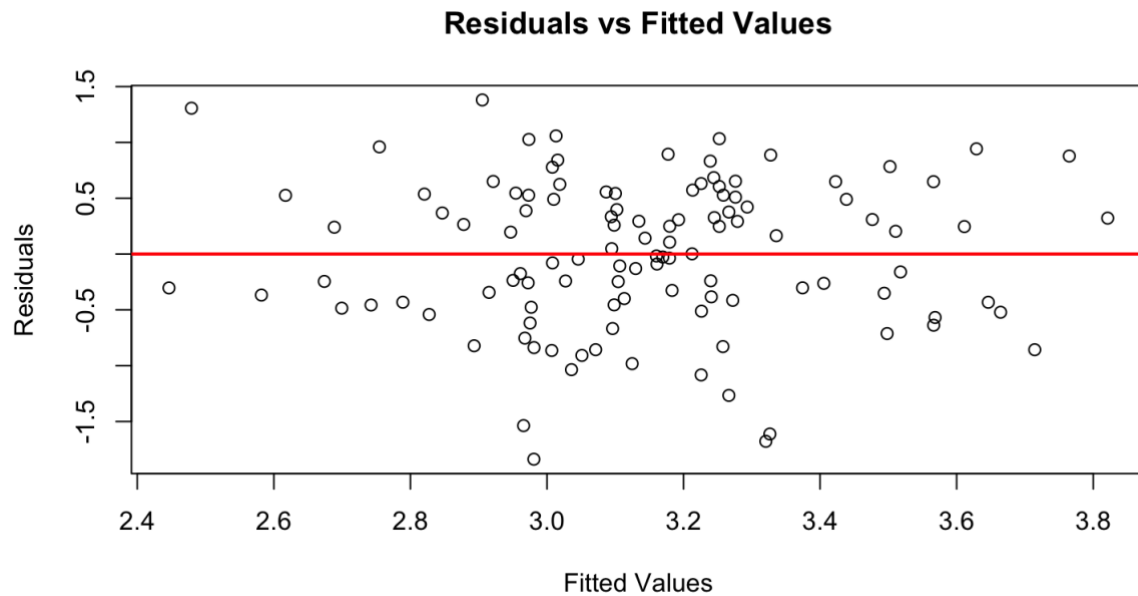
Pie Chart of Exercise Frequency Percentages

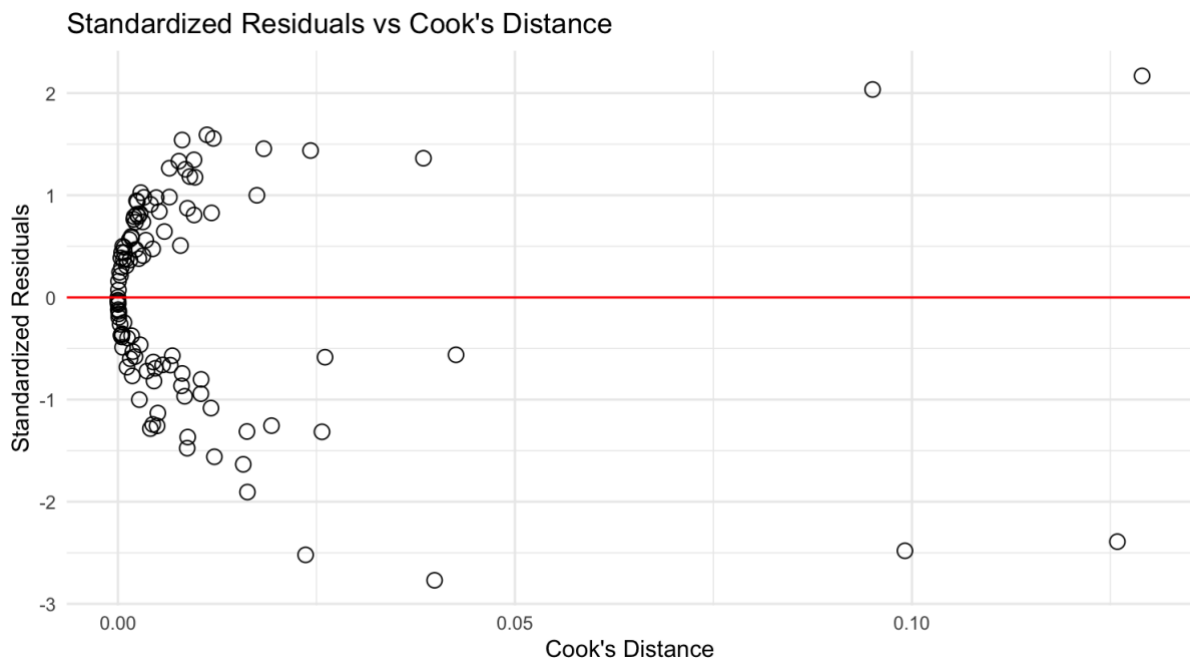
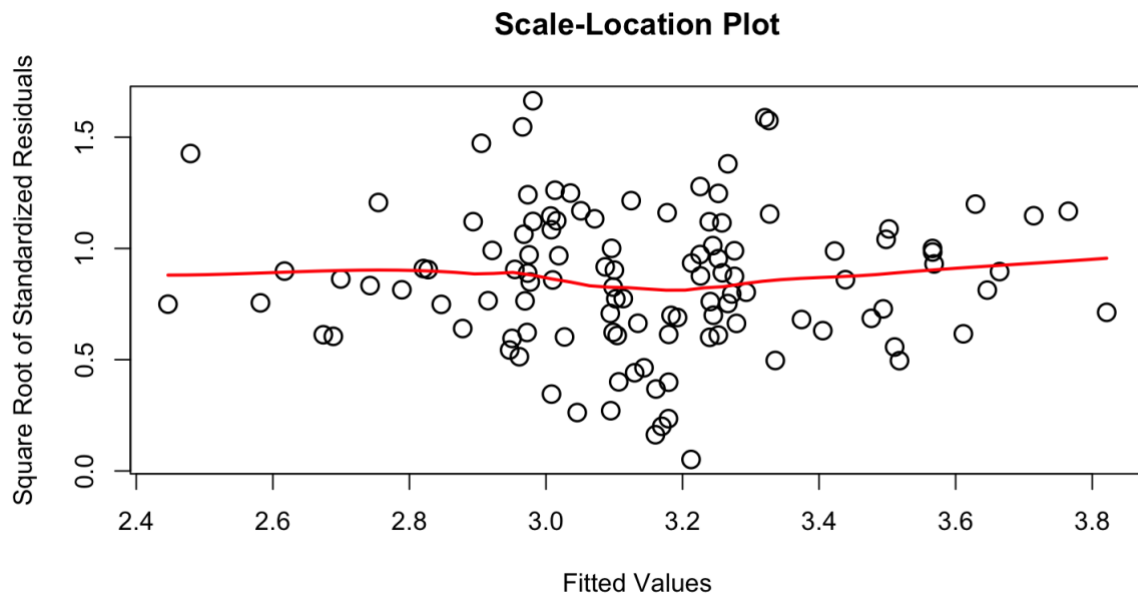


Note. This pie chart depicts the percentage of participants who reported each level of exercise frequency with their respective proportions indicated by the chart. The majority of participants exercise ‘*at least three times a week*’, comprising 38.60% of the sample.

Appendix F: Assumption Diagnostics H4

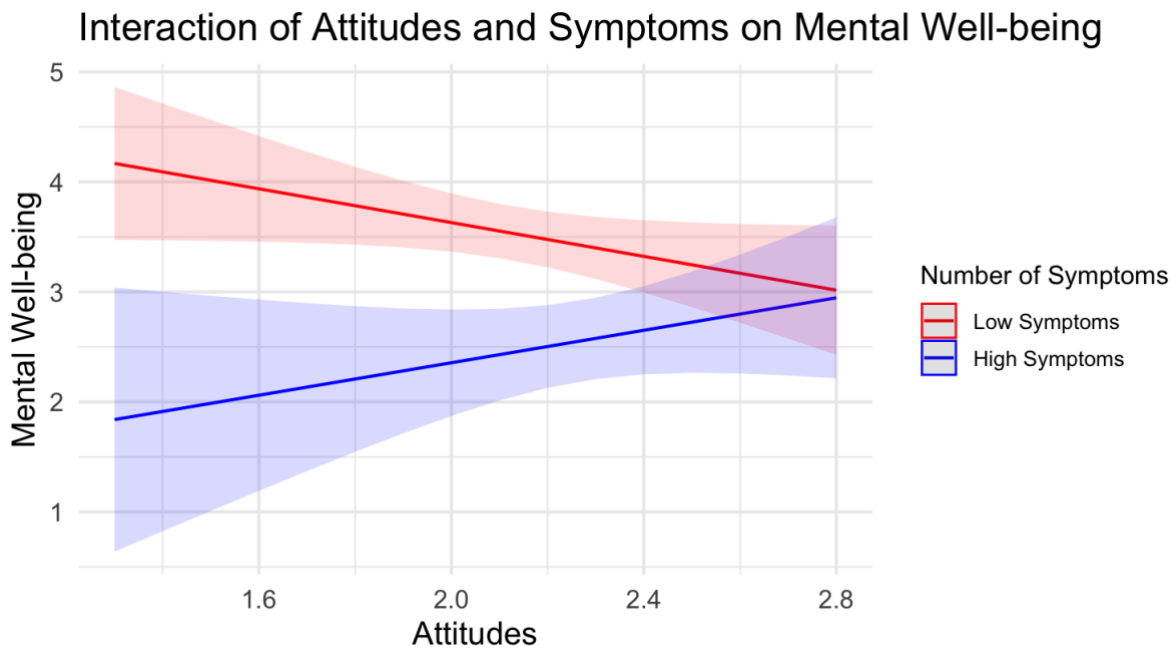
Assumptions Diagnostics for the Regression Model of Mental Well-Being and Attitudes with Symptom Severity as the Moderator





Appendix G: Interaction Effect H₄**Figure 15**

Interaction Effect of Symptoms on the Relationship Between Attitudes and Mental Well-Being moderated by Symptom Severity



Note. The graph shows the interaction between menopausal attitudes and experienced symptomatology on mental well-being. Mental well-being increases with more agreement with the menopausal attitudes. This effect is more pronounced for participants experiencing lower symptomatology (red line) compared to those experiencing more symptoms (blue line).

Appendix H: Additional Analysis for H4**Table 5**

Sensitivity Analysis of the Moderation Analysis of Symptom Severity on the Relationship Between Menopausal Attitudes and Mental Well-Being

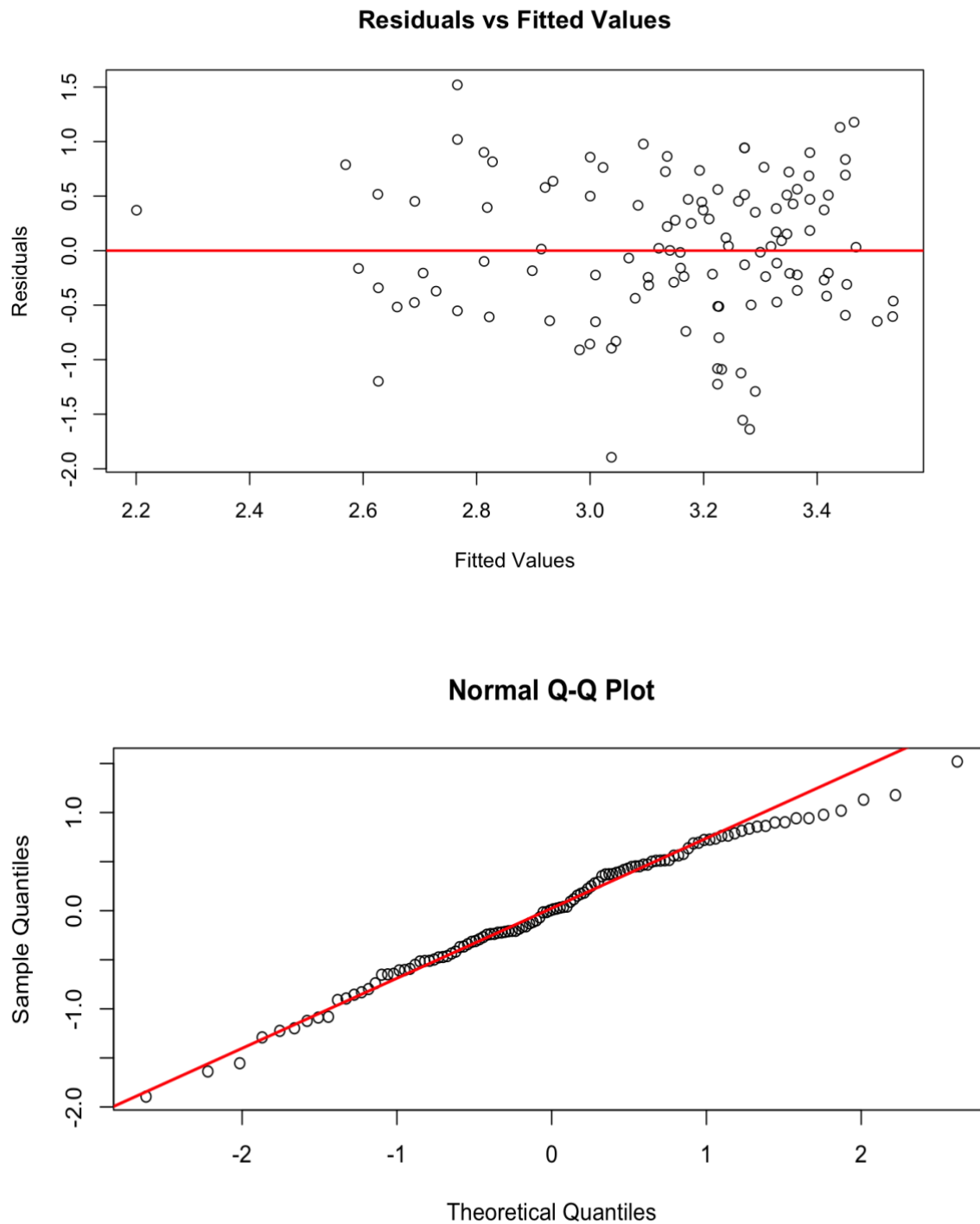
Effect	Estimate	SE	95% CI		t	p
			LL	UL		
Intercept	6.12	1.79	2.57	9.68	3.41	< .001
Attitudes	-1.23	0.69	-2.60	0.14	-1.78	.078
Symptoms	-0.55	0.23	-1.01	-0.09	-2.36	.020
Age	0.02	0.01	-0.01	0.04	1.29	.198
Marital Status	-0.08	0.06	-0.20	0.04	-1.36	.177
Educational Level	0.04	0.07	-0.10	0.18	0.61	.542
Employment Status	-0.05	0.04	-0.13	0.30	-1.35	.180
Living Situation	-0.05	0.07	-0.19	0.08	-0.80	.427
Nationality	-0.09	0.06	-0.20	0.02	-1.54	.127
Attitudes * Symptoms	0.20	0.10	-0.01	0.40	1.88	.063

Note. SE = Standard Error; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; Attitudes derived from ATM; Symptoms derived from MRS; Mental Well-Being derived from MHC-SF.

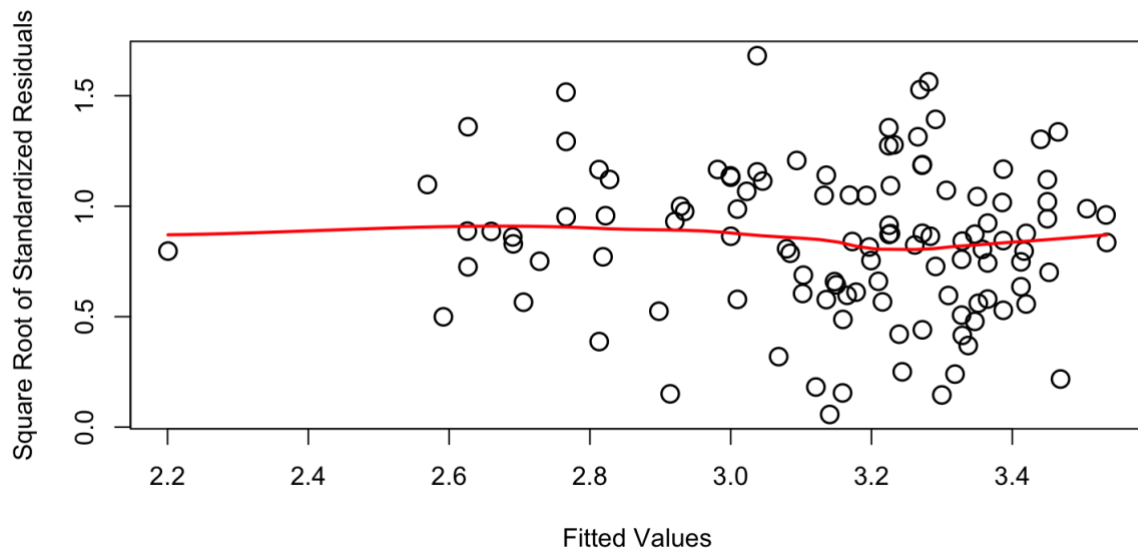
Appendix I: Assumptions Diagnostics Hs

Assumptions Diagnostics for the Regression Model of Mental Well-Being and Symptom

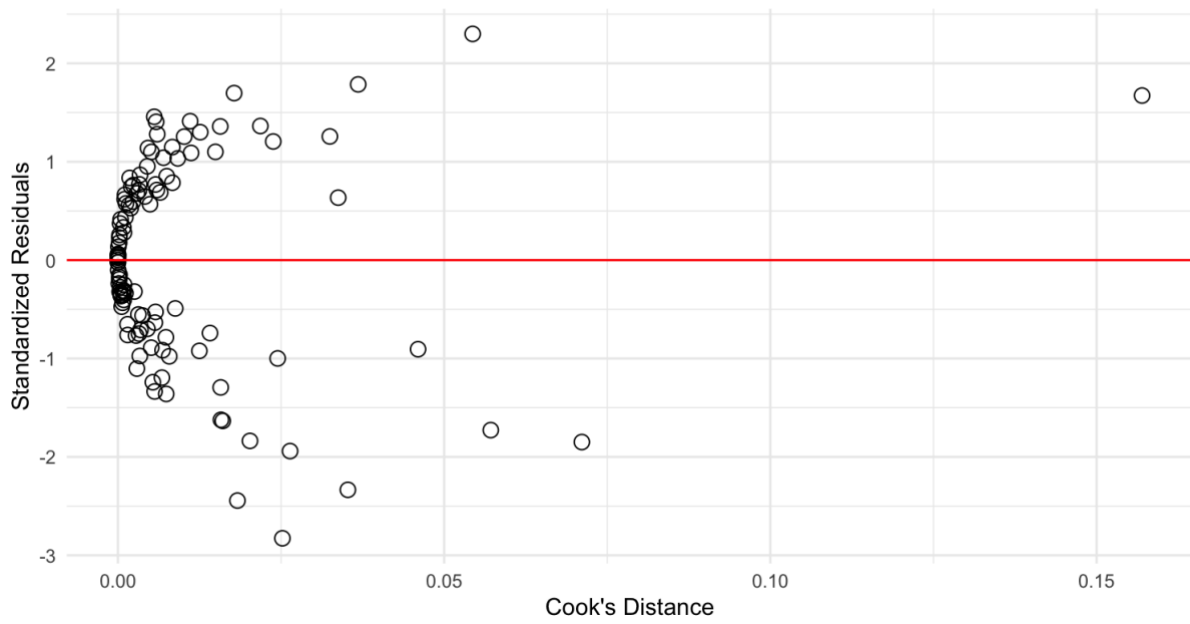
Severity with Exercise Frequency as the Moderator



Scale-Location Plot

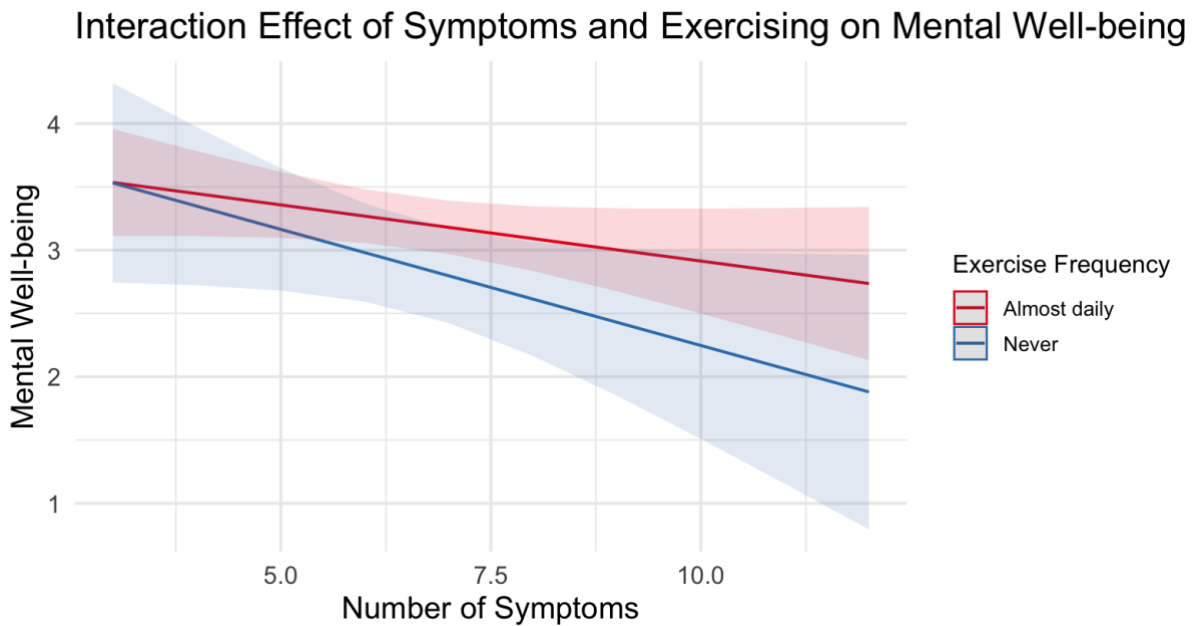


Standardized Residuals vs Cook's Distance



Appendix J: Interaction Effect H₅**Figure 16**

Interaction Effects of Symptoms on the Relationship Between Attitudes and Mental Well-Being moderated by Symptom Severity



Note. This graph shows the interaction effect between the number of symptoms and exercise frequency on mental well-being. The shaded areas around the lines represent the confidence intervals for the predicted values. As shown, mental well-being decreases as the number of symptoms increases, with those exercising ‘*almost daily*’ (red line) experiencing higher mental well-being compared to those who exercise ‘*never*’ (blue line).

Appendix K: Additional Analysis H5**Table 6**

Sensitivity Analysis of the Moderation Estimates of the Moderation Analysis of Exercise Frequency on the Relationship Between Menopausal Symptom Severity and Mental Well-Being

Effect	Estimate	SE	95% CI		t	p
			LL	UL		
Intercept	3.13	1.07	1.00	5.26	2.91	< .005
Symptoms	-0.05	0.08	-0.22	0.11	-0.61	.543
Exercise Frequency	0.16	0.24	-0.31	-0.63	0.67	.503
Age	0.02	0.01	-0.01	0.04	1.21	.230
Marital Status	-0.09	0.06	-0.22	0.03	-1.47	.145
Educational Level	0.04	0.07	-0.10	0.18	0.53	.597
Employment Status	-0.05	0.04	-0.13	0.03	-1.15	.254
Living Situation	-0.07	0.07	-0.21	0.07	-1.01	.317
Nationality	-0.06	0.06	-0.18	0.05	-1.08	.285
Symptoms * Exercise Frequency	0.03	0.03	-0.10	0.04	-0.85	.397

Note. SE = Standard Error; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit;

Symptoms derived from MRS; Exercise Frequency derived from MHQ; Mental Well-Being derived from MHC-SF.