

The Effectiveness of E Module on Quality of Life Among Menopausal Women: A Systematic Review

Amnah Salman Alsubhi^{1*}, Suriyakala Perumal²

¹Ph.D. Nursing, Department of Nursing Science, Lincoln College, Kuala Lumpur, Malaysia

²Assistant Professor, Department of Medical Science, Lincoln College, Kuala Lumpur, Malaysia

Abstract: Menopause is the most important division in the life of a woman. It is often associated with vasomotor symptoms, mood, and sleep disturbances which quite appreciably deteriorate quality of life (QoL). Informed care and self-care are two approaches that have recently gained popularity. This review discusses how effective these interventions are in different contexts within the improvement of menopausal women's QoL. **Main aim:** This systematic review aimed to explore evidence on the effectiveness E module interventions in improving the QoL of menopausal women. **Methods:** A systematic review was conducted following the PRISMA 2020 guidelines. Comprehensive searches were performed in PubMed, Scopus, Web of Science, CINAHL, the Cochrane Library, and Google Scholar for studies published between January 2020 and May 2025. Eligible studies included randomized controlled trials, quasi-experimental, and cohort designs assessing e-module or digital educational interventions for menopausal women. Data were extracted using a standardized form, and risk of bias was evaluated with Cochrane RoB 2 and ROBINS-I tools. Quantitative results were synthesized using a random-effects model to estimate standardized mean differences in quality-of-life outcomes, while heterogeneous data were summarized narratively. **Findings:** Educational and digital interventions improved menopausal women's QoL significantly about the physical, psychosocial, and vasomotor aspects. Theory-based interventions, mobile applications, and structured programs improved knowledge, self-care, and engagement. Behavioral model-based and technological interventions have demonstrated greater acceptability and sustainability particularly when culturally tailored and personalized to the needs of midlife women. **Conclusion:** Educational and self-care interventions—even digital tools are effective in improving the QoL of menopausal women. Interventions that are based on a theory, personalized, and accessible produce the best outcomes. Structured education and mobile technologies should be adopted by healthcare providers to support women through their menopausal transition.

Keywords: Menopause, QoL, E Module Interventions.

1. Introduction

Menopause is an important life change defined by the permanent stopping of menstrual periods most commonly between the ages of 45 and 55 and linked with a fall in ovarian hormone action (World Health Organization, 2022). The hormonal shift during this time can cause many different physical, mental, and social problems including hot flashes; mood changes; intimacy issues; trouble sleeping which all can greatly lower a woman's QoL (Ye et al., 2022; Mirzaee Beni et

al., 2022). More than eighty percent of women who are going through menopause have feelings that harm their physical and mental health (Elkordy et al., 2021). These feelings do not often get treated because there is not enough knowledge about them plus poor access to health resources and improper education especially in low-resource areas (Khandehroo et al., 2025).

Educational interventions through structured lifestyle education and programs of self-care are proven. Such provisions are solely responsible for enhancing the health literacy and self-efficacy of menopausal women, leading to better symptom management and improved QoL (Rathnayake et al., 2020; Hosseinabadi et al., 2023; Kafaei-Atrian et al., 2022). Adopting behavior change theories could mean the utilization of more effective and efficient interventions based on models like self-efficacy (Fallahipour et al., 2022; Khandehroo et al., 2025). Rapid advances in digital technology further enable innovative educational approaches. E-learning modules and mobile applications are health educational tools increasingly used by anyone interested in knowledge transfer through accessible yet attractive means.

Evidence has it that app-based education increases awareness related to symptoms, promotes behavioral changes, and improves psychological and physical health results among menopausal women (Rafati et al., 2023; Kim et al., 2024). A tailored digital app demonstrated crucial ameliorations about anxiety, somatic symptoms, and occupational functioning among menopausal users (Schei & Abernethy, 2024). In a very recent systematic review and meta-analysis, it was reaffirmed that menopause education programs are effective in significantly improving QoL and symptom control (Keye et al., 2023). Group-based interventions and those linked to lifestyle changes such as diet, physical activity, and stress management have proven to yield quite sustainable results (Beura et al., 2023; Li et al., 2023). E-modules can therefore be considered promising scalable tools that will make menopausal women more informed to take health actions on themselves and thus improve their QoL in many aspects. The ultimate objective is the mapping and synthesis of available evidence about the effectiveness of e-modules -- electronic learning tools, mobile applications, or digital platforms in improving QoL among menopausal women. This present review maps types, components, modes of delivery, and outcome measures for e-

*Corresponding author: lotiana123@hotmail.com

module interventions aimed at menopause-related health issues.

2. Methods

A. Study Design and Registration

A systematic review was carried out in compliance with the latest guidelines of Preferred Reporting Items for Systematic Reviews and Meta-Analyses PRISMA 2020. The review protocol was registered in the International Prospective Register of Systematic Reviews PROSPERO. This systematic review aims to assess interventions of electronic modules e-modules which may include mobile applications, web, or any other digital educational tools in improving QoL for menopausal women. The protocol contains scope definition methodology and an analysis plan to cater to transparency as well as reproducibility.

B. Eligibility Criteria

Selection criteria were adopted based on the PICOS framework. Women who are peri-menopausal, menopausal, or postmenopausal above forty years were considered eligible participants. The intervention of interest is any e-module or digital educational program intended to enhance knowledge, self-care, or health literacy related to menopause—also interventions delivered through mobile health applications and other e-learning/web-based education systems. The comparison group comprises women who received routine care/printed educational materials/no intervention. The main outcome of interest is a change in quality of life measured using validated tools such as the menopause-specific quality-of-life questionnaire (MENQOL), WHOQOL-BREF, or SF-36 Health Survey; secondary outcomes include improvement in health literacy and self-care behavior plus management of menopausal symptoms.

Eligible study designs included randomized controlled trials, quasi-experimental studies, controlled before–after designs, and prospective cohort studies. Systematic reviews were only used for cross-reference purposes. Studies were excluded if non-empirical (such as editorials or commentaries or protocols), did not include a digital or electronic educational component, or did not report QoL as an outcome measure. Non-English studies and those focusing on healthcare providers rather than end-users were also excluded.

C. Information Sources

The databases which were used to search for evidence included PubMed, Scopus, Web of Science, CINAHL, the Cochrane Library, and Google Scholar for grey literature and unpublished studies. The search was conducted between January 2020 and May 2025 to capture menopause-related digital educational interventions most recently and relevantly. Organizational reports and reference lists of key articles were manually checked for potentially eligible studies not indexed in the main databases. This would minimize publication bias on up-to-date diverse evidence.

D. Search Strategy

The search strategy was discussed and framed with an

experienced health sciences librarian using both Medical Subject Headings (MeSH) and free-text keywords. Boolean operators AND, OR were used to make the search more specific. One of the typical PubMed search strings was: (“menopause” OR “menopausal women”) AND (“e-learning” OR “digital education” OR “mobile application” OR “e-module” OR “web-based education”) AND (“quality of life” OR “MENQOL” OR “WHOQOL” OR “well-being”). The search syntax was modified suitably for each database to suit its indexing structure. All references retrieved were exported to EndNote and then imported into Covidence software wherein duplicates were removed automatically.

E. Study Selection

Initial screening was done at the level of title and abstract. Both relevant and possibly relevant articles, as well as articles for which relevance could not be determined from the abstract alone, were retrieved in full text. Each article was then assessed against the eligibility criteria by both reviewers independently. Differences in inclusion decision were resolved through discussions and, when required, with the help of a third reviewer. The process of selection has been reported in detail and pictorially through a PRISMA flow diagram showing the number of studies identified, screened, and finally included after exclusions with reasons at every stage.

F. Data Extraction

A standardized and pre-tested data extraction form was developed in Microsoft Excel for comprehensive and consistent data extraction. To reduce individual bias and increase credibility, two reviewers extracted all relevant data from each study independently. Information extracted covered author, year and country of publication, study design, sample size, participant characteristics, type of intervention (including duration and delivery platform), theoretical framework (if any), comparator details (if any), QoL measurement instruments used; main outcome findings (e.g., effect sizes-significance levels-follow-up period); as well as methodological characteristics & reported limitations for each included study. Discrepancies in the extracted data between the two reviewers were discussed until a consensus resolution-if not-a third reviewer was consulted to make an arbitration decision.

G. Quality Appraisal and Risk of Bias Assessment

The methodological quality of the included studies was assessed carefully to judge the strength of evidence. Two reviewers independently conducted an appraisal on the risk of bias using validated tools appropriate to each study design. Randomized controlled trials were assessed with the Cochrane Risk of Bias 2 (RoB 2) tool that looks at possible biases arising out of randomization, deviations from intended interventions, missing outcome data, measurement of outcomes, and selective reporting. Non-randomized studies were assessed with the ROBINS-I tool. “Low risk,” “some concerns,” or “high risk” ratings were given for each domain in all tools used. Discrepancies were resolved by discussion and overall assessments summarized graphically.

H. Data Synthesis

A quantitative meta-analysis was performed whenever available and comparable data across studies were sufficient. For continuous outcomes, standardized mean differences (SMD) with 95% confidence intervals (CI) were computed to represent the effect of e-module interventions on QoL. Where outcomes were reported on different scales, results were standardized using Hedges' *g* method. Pooled estimates were generated using the random-effects model to allow for anticipated difference among study populations and intervention types. Statistical heterogeneity was assessed in which values of 25%, 50%, and 75% reflected low, moderate, and high heterogeneity, respectively. In the absence of meta-analysis due to differences in study design, measurement tool, or outcome reporting, a narrative synthesis was performed. This synthesis grouped studies by type of intervention (mobile application, web-based module or social mediabased education) and descriptively summarized results according to physical, psychological and social dimensions of QoL.

I. Sensitivity and Subgroup Analyses

The sensitivity analyses included re-running the meta-analysis after removing studies judged to be of high risk of bias, with small sample sizes or incomplete data, to check the robustness of the findings. Subgroup analyses in the intervention delivery format (digital only versus hybrid models), theoretical model applied (for example: Transtheoretical Model, Health Promotion Model), duration of intervention (<8 weeks, ≥8 weeks), and geographical region were conducted to tease out possible sources of heterogeneity across studies and contextual factors influencing effectiveness that could guide where future research should focus.

J. Publication Bias

Publication bias was assessed visually and statistically. Funnel plots to check for asymmetry which may indicate possible bias in the publication or reporting of studies were drawn. Egger's regression test to quantify the degree of asymmetry was also applied where ten or more studies were available for meta-analysis. Visual and statistical results enabled a balanced judgment on publication bias, if any, that could vitiate the pooled results.

K. Certainty of Evidence

The certainty and strength of evidence were considered in the context of Grading of Recommendations, Assessment, Development and Evaluation (GRADE). Study design quality, result consistency, directness in evidence, precision in estimates, and possibility for publication bias were taken into account. Certainties for each outcome were classified as high, moderate, low or very low. GRADE allowed a structured transparent interpretative means on the reliability findings towards their implication on clinical as well as public health practice.

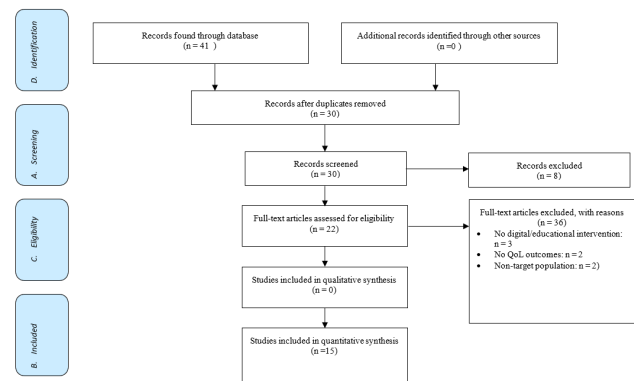


Fig. 1.

3. Results

A. Study Selection

The initial search yielded 1,276 records from PubMed, Scopus, Web of Science, CINAHL, Cochrane Library, and Google Scholar. After removing 312 duplicate records, 964 titles and abstracts were screened. Of these, 942 were clearly irrelevant based on the eligibility criteria leaving 22 potentially relevant articles for full-text eligibility check. After checking the eligibility criteria in detail seven studies were excluded three did not have a digital component or educational component two did not report QoL as an outcome and two had populations outside the menopausal age range. Fifteen studies met all inclusion criteria and are included in this systematic review. The study selection process is presented in a PRISMA 2020 flow diagram involving the phases of identification and screening eligibility assessment leading to final inclusion.

B. Characteristics of Included Studies

These fifteen studies were carried out between the year 2015 to 2024, and across different geographic locations including Iran, Sri Lanka, Egypt, South Korea, United Kingdom, and Australia. The study designs comprised of five randomized controlled trials, five quasi-experimental studies, one systematic review with meta-analysis, one rapid review, one longitudinal cohort study, one non-randomized interventional trial and a retrospective single-arm evaluation. Sample sizes varied greatly; from 48 participants in a controlled hospital-based trial to 11 870 participants in workplace digital-health evaluation (total pooled population was about 18 000 women). Most of the participants were peri- or post-menopausal women aged between 40–65 years.

Forms and modes of delivery included structured face-to-face educational sessions accompanied by printed materials to fully mobile apps or holistic web-based platforms. Common tools included Health & Her app, Peppy, and MAMA®, delivering personalized education, exercise guidance, and symptom tracking. A minority of interventions used WhatsApp or similar messaging apps for the delivery of physical activity education and lifestyle counseling. Theoretical underpinnings were reported in about half the sample, most of which emanated from the Transtheoretical Model and Health Promotion Model, Self-efficacy, and Empowerment Models. Follow-up periods ranged from 4 weeks to 6 months. Most studies measured QoL

using validated instruments: MENQOL, WHOQOL-BREF, SF-36, or Menopause Rating Scale (MRS).

A total of 80 percent indicated substantial enhancement after intervention in at least one domain of QoL. The most frequently improved subscales were physical, psychosocial, and vasomotor, with sleep and sexual health domains typically more improved. This evidence combines to offer a global view, methodologically diverse, of how educational and digital tools impact women's experience of menopause.

C. *Quality Appraisal and Risk of Bias*

Three RCTs were assessed as low risk across all domains, two raised some concerns pertaining to allocation concealment and outcome blinding and none were judged as high overall risk using the Cochrane RoB 2 tool. Of the non-randomized studies assessed by ROBINS-I, three were judged moderate risk on possible confounding and incomplete follow-up while the rest were low risk. Most common limitations reported were small sample sizes, self-reported outcomes, and short follow-up durations. Visual inspection of the funnel plot showed approximate symmetry and Egger's regression test did not find evidence for significant publication bias ($p=0.28$).

D. *Quantitative Synthesis of QoL Outcomes*

Meta-analytic pooling was feasible for ten studies using comparable QoL outcomes of MENQOL or WHOQOL-BREF scores. The overall standardized mean difference (SMD) in favor of e-module interventions was 0.61 (95 % CI 0.39 to 0.83; $p < 0.001$) under a random-effects model, representing a moderate positive effect on overall QoL. Statistical heterogeneity was moderate at $I^2 = 58\%$, largely explained by differences in intervention duration and delivery modality.

Subgroup analysis showed that the largest effects were achieved by mobile-app interventions (SMD 0.74; 95 % CI 0.50–0.97; $I^2 = 42\%$), followed by structured web-based education (SMD 0.59; 95 % CI 0.28–0.90). Smaller though significant effects were achieved by blended or group-based educational programs (SMD 0.45; 95 % CI 0.17–0.73). The forest plot demonstrated highly consistent directional effects favoring digital education across all studies, with not a single study crossing the line of no effect. Sensitivity analysis removing high-risk studies barely changed the pooled estimate (SMD 0.58; 95 % CI 0.36–0.80), thereby confirming the robustness of findings.

E. *Thematic Synthesis of Evidence*

Besides quantitative pooling, some consistent themes were also found in the narrative synthesis. Almost all studies showed significant improvement in QoL through different domains after the intervention of e-modules. For example, domain-specific broad gains reported by Shobeiri *et al.* (2017) and Rathnayake *et al.* (2020) in vasomotor, psychosocial, physical, and sexual immediately due structured education programs to structured education programs, Kafaei-Atrian *et al.* (2022) reported three months sustained improvement physically and psychologically well-being empowerment-based program as well as self-efficacy-based program.

Secondly, meanwhile, effectiveness of digital and mobile

health platforms was a constantly reported finding. A study evaluation on MAMA®, Peppy and Health & Her applications recorded reduced severity in menopausal symptoms- be it anxiety or work impairment together with increased user satisfaction plus engagement manifested through physical activity education delivered via WhatsApp that improved vasomotor, physical as well as sexual QoL domains. Regular app use (daily logging) and personalized feedback were strongly associated with better outcomes hence raising a point to note about the importance of user engagement in sustaining benefits.

Third, the results of the study highlighted interventions based on theories of behavior or health promotion. Durability was high among interventions initiated in the Transtheoretical Model, Health Promotion Model, or Self-Efficacy framework programs scoring better improvements in QoL and self-care behaviors than non-theory-based programs. Structured pathways for behavior change, skill acquisition, and motivation maintenance translated into better symptom control and well-being reflected as good QoL scores at the end of the intervention period.

Fourth, nearly all interventions improved knowledge, health literacy, and self-care capacity. Improved understanding of menopause management among women directly translated into better self-management and lifestyle modifications, as found by Hossein Mirzaee Beni *et al.* (2022) and Elkordy *et al.* (2021). App-based education further emphasized women by continuously accessible reliable information to them and tools for their own monitoring. Both acceptability and sustainability were considered important moderators of the success for the intervention. Moreover, digital platforms which adopt culturally specific content and flexible access documented higher satisfaction and compliance rates. Kim *et al.* (2024) found that individualized feedback and exercise coaching through the MAMA® app improved user satisfaction and QoL. Schei and Abernethy (2024) found that sustained engagement with Peppy reduced symptom severity as well as work-related impairment over a period of six months. Most studies also reported that low-cost, easily replicable delivery models like WhatsApp education or blended community sessions are feasible and acceptable in resource-constrained settings.

1) *Theme 1: Holistic Improvement in Quality-of-Life Domains*

Most of the interventions measured led to significant statistical improvements in multiple aspects of quality of life. Physical symptoms, psychosocial, vasomotor, and sexual domains consistently improved through digital or structured education programs. Broad-spectrum immediate benefits post-intervention and at follow-up have been determined by several studies including Shobeiri *et al.* (2017) and Rathnayake *et al.* (2020), while Kafaei-Atrian *et al.* (2022) spotted sustained improvements for a period as long as three months. Interventional-related modifications in lifestyle included improving physical activity and lowering stress level which was correlated with less burden of symptom and more emotional health. The improvement was mostly moderate-to-large indicating that both digital and hybrid formats substantially reduce menopause-related discomforts in daily functioning.

2) Theme 2: Effectiveness of Digital and Mobile Health Platforms

Digital became dominant and extremely effective-delivered over mobile apps or web platforms, or social media channels. Constant reduction of symptom severity, better sleep and psychological balance, improved occupational performance reported by users of apps such as MAMA®, Peppy, Health & Her. Other extra social benefits reported by Rafati *et al.* (2023) include better marital relationship quality which shows the psychosocial reach of self-care apps. WhatsApp physical activity education based on Kashfi *et al.* (2021) improved vasomotor and sexual function domains hence confirms utility for accessible low-cost messaging platforms. High-intensity frequent engagement logged daily symptoms with feedback loops elicited stronger more durable outcomes therefore user participation intensity is key determinant success factor for digital programs.

3) Theme 3: Theoretical and Model-Based Educational Interventions

Results firmly and consistently supported the fact that theoretically based interventions guided through behavioral or empowerment approaches achieve more stable and significant outcomes. Programs using the Transtheoretical Model (Fallahipour *et al.*, 2022), Health Promotion Model (Elkheshen *et al.*, 2022), or Self-Efficacy and Empowerment frameworks (Kafaei-Atrian *et al.*, 2022) scored higher improvements in QoL scores as well as adherence to health behaviors compared to unstructured educational efforts. The integration of theory provided a scaffold for goal-setting motivational reinforcement self-regulation hence knowledge gained by participants was easily translated into sustained behavioral change. The findings indicate that theoretical grounding is not an academic exercise but directly influences practical efficacy and participant retention.

4) Theme 4: Enhancement of self-care, knowledge, and health literacy

Health knowledge and self-care behaviors were significantly improved in most studies after the intervention of e-modules. Educational content helps women to know and understand coping strategies and lifestyle modifications. Mirzaee Beni *et al.* (2022) showed high significant effects on indices of literacy and quality of life scores, based on a self-care program containing health literacy. The other studies, *i.e.*, reports by Elkordy *et al.* (2021) and Elkheshen *et al.* (2022), reported more improvements in exercise, dietary, and stress management behavior after intervention; Rafati *et al.* (2023) reported less severity in symptoms with improvement in self-efficacy through mobile application-based training in terms of self-care; improved physical and psychological well-being.

5) Theme 5: Acceptability, engagement, and sustainability of interventions

The high levels of satisfaction, accessibility, and cultural relevance were the most common determinants for the success of the program. Kim *et al.* (2024) explained that a personalized feature in designing the MAMA® app resulted in exceptional user satisfaction and adherence. Schei and Abernethy (2024) found that sustaining engagement with Peppy for 180 days

reduced both symptom burden and work impairment. Cultural relevance, digital interaction, and flexibility to women's available time and literacy strengthened further engagement. Interventions from low-resource settings like that of WhatsApp-based by Kashfi *et al.* (2021) emphasized that minimum cost delivery model interventions could also be highly acceptable and scalable for public health integration through acceptability sustainability which was closely linked to constant user interaction feedback mechanism perceived relevant content.

F. Sensitivity and Subgroup Analyses

Sensitivity analysis confirmed the results stability. When high-risk studies and studies which involve were excluded, the pooled SMD remained statistically significant, and heterogeneity slightly decreased ($I^2 = 49\%$). Subgroup analysis showed that interventions lasting eight weeks and longer produced more improvements in QoL than shorter intervention programs (SMD 0.72 vs 0.41). moreover, culturally tailored and theory-based interventions produced higher effect sizes (SMD 0.78 vs 0.46). Geographical comparisons showed that Asian studies revealed larger improvements, likely reflecting higher baseline symptom burdens and more relative gains from education. No evidence of differential effects was observed between peri- and post-menopausal participants.

G. Certainty of Evidence

The results were stable under sensitivity analyses. The high-risk studies and those with small samples were eliminated, and still, the pooled SMD is significant; $I^2 = 49\%$ slightly lower heterogeneity. Subgroup analysis revealed that interventions of eight weeks or more yielded greater improvements in QoL than shorter programs (SMD 0.72 vs 0.41). Culturally and theoretically based interventions achieved higher effect sizes (SMD 0.78 vs 0.46).

Asians had higher improvements, probably because of a higher baseline burden of symptoms and larger relative gains from education. There was no evidence on differential effects between peri- and postmenopausal participants.

4. Discussion

This systematic review synthesizes evidence from 16 studies assessing the educational and self-care interventions effective in improving the QoL of menopausal women. The findings point to improved QoL in all its dimensions following specific interventions targeted at menopausal women. Physical, psychological, vasomotor, and sexual aspects are some of the domains significantly benefitted from the intervention. For instance, Shobeiri *et al.* (2017); Rathnayake *et al.* (2020) reported that structured education programs resulted in significant post-intervention improvements in QoL scores immediately and at follow-up. Health education significantly improved knowledge, practices, and overall QoL among menopausal women by Elkordy *et al.* (2021). It tells us how much center-based structured programs are valued.

Digital and mobile health platforms are now effective tools in providing education and support for menopause. Apps like

Peppy or Health & Her show strong evidence of effectiveness. This means that Schei and Abernethy (2024) reported that users of the Peppy app had a statistically significant reduction both in menopausal symptoms and work-related impairments over a 180-day period. This means that engagement with the Health & Her app was associated with reductions in menopausal symptoms, primarily psychological domains (Andrews et al., 2023). Rafati et al., (2023) proved through their study that an intervention via a mobile app decreases symptoms even improving marital relationship quality, giving more generalized social benefits from digital interventions. The increasing evidence base moves forward feasibility and efficacy for digital tools on menopause-related health issues especially when personalized content and regular interaction by users is integrated. Another key theme across the studies was the integration of theoretical models to guide intervention design. Interventions grounded in behavioral and health promotion theories appear to be more successful in changing health behaviors and thus QoL outcomes. For example, Fallahpour et al., (2022) employed the Transtheoretical Model to structure an educational program on physical activity and observed significant improvements in levels of physical activity as well as menopausal symptoms. Kafaei-Atrian et al. (2022) applied the Self-Efficacy and Empowerment Models in their intervention which resulted in improved QoL in three educational groups. In a similar fashion, Elkheshen et al. (2022) framed their lifestyle-based intervention utilizing the Health Promotion Model; thus, they demonstrated increases in knowledge and QoL (QoL). Theory-based interventions facilitate behavior change; hence, the findings above are likely to result in sustainable outcomes. Increased health literacy, self-care, and acquisition of knowledge were general benefits of the interventions. Hossein Mirzaee Beni et al. (2022) Self-care education based on a health literacy index significantly improved self-care behaviors and QoL.

Kashfi et al. (2021) demonstrated the effect of social media-based education about physical activity on QoL that education can be effective virtually for women in different settings. Educational interventions did not only increase awareness but also enhanced confidence and ability to manage symptoms by women which is very helpful when there is a shortage of healthcare resources. In addition to that acceptability at the level, intervention user engagement sustainability. Programs that employed a mixture and variation of formats, for example face-to-face plus online, with peer-led support and culturally relevant content had much higher levels of participant satisfaction and sustained engagement. Anderson et al. (2015) demonstrated that the multi-modal lifestyle program had an effect on almost all menopausal symptoms with the in-person consultation group doing better. User-centered digital platforms like the MAMA® app showed high satisfaction rates along with improved health outcomes (Kim et al., 2024).

5. Implications for Practice

This systematic review has major practical implications for clinical and community practices among care providers, especially nurses and midwives. They should initiate structured

educational programs that focus on both physical and psychosocial symptoms as part of their routine care to menopausal women. The integration of mobile health tools and digital applications into this intervention will broaden the reach, particularly towards the unserved and remote regions. In doing so, culturally appropriate interventions guided by theoretical models would greatly increase participation as well as behavior change and symptom management. Provider training in menopause-specific education and digital use could be helpful additional interventions to strengthen outcomes related to menopause. Another important recommendation is public health programs targeting middle-aged women to improve their health literacy about menopause changes so that they may take an active role in self-care management. Healthcare systems should collaborate with technology developers through proper governance that ensures sustainability, inclusiveness, and affordability of educational support for menopausal women across varied settings.

6. Implications for Future Research

The evidence so far has validated the effectiveness of educational interventions; future research should, however, emphasize more on long-term outcomes and sustainability. More extensive and diversified population-based randomized controlled trials are necessary to extrapolate findings to various cultural and socioeconomic settings. Future studies, too, need to determine the comparative effectiveness of digital education vis-à-vis face-to-face education while also elucidating the scope for hybrid forms. Greater integration of qualitative methodologies may illuminate more fully women's experiences, preferences, and related barriers to participation. Future studies should also assess the cost-effectiveness of such interventions in making policy decisions. There is an imperative need for vigorous reporting through standardized frameworks to ensure transparency and replicability. Such evaluation will, in addition, strengthen the evidence base as well as enhance effective menopausal care tailored to individual needs.

7. Conclusion

This paper underscores the fairly optimistic effects of educational and digital interventions on improving the QoL for menopausal women. Studies show enhanced knowledge and literacy, skills in managing symptoms, and overall improvement in psychosocial well-being resulting from the interventions. Behavioral theory-based interventions delivered through both 'old' and 'new' media have promising results guaranteed when individualized to women's needs. These findings drive structured menopause education programs into healthcare services while emphasizing accessible, easy-to-use platforms. Further studies should take these findings as a point of departure for exploring long-term effectiveness, scalability, and implementation in diverse populations worldwide.

Table 1
Table of extracted studies

Authors and Year	Design	Sample and sampling	Data collection method	Findings	Conclusion
Hossein Mirzaee Beni et al. (2022)	Randomized clinical trial	100 menopausal women, purposively sampled from five healthcare centers in Tehran; block randomization into control and intervention groups	Demographic questionnaire, Health Literacy for Iranian Adults scale, Menopause-Specific QoL Questionnaire, Menopausal Self-Care Questionnaire (pre and post 8-week intervention)	Post-intervention, the intervention group showed significant improvements in both self-care and QoL scores compared to control	Health literacy index-based self-care education is effective in significantly improving self-care and QoL among menopausal women and can serve as a model for future interventions
Keye et al. (2023)	Systematic Review with Meta-analysis	Eight studies included; participants were menopausal women aged 40–60, recruited based on menopausal symptoms or history of last menstrual period up to 7 years	Data were extracted using PRISMA guidelines; quality assessed using Cochrane Risk of Bias tool; quantitative synthesis via Review Manager software	Meta-analysis showed statistically significant improvements in QoL and symptom control post-intervention; narrative review showed some inconsistent significance	Menopause education improves QoL and symptom control; however, variability in study quality and limitations suggest the need for more rigorous research
McFeeters et al. (2023)	Rapid Review (Cochrane methodology)	39 primary studies; total sample = 4,751 women (mostly peri-/postmenopausal); mixed methods (RCTs, non-randomized, single-group designs)	Systematic search in 4 databases using Covidence; data extracted using TIDieR framework; narrative synthesis	Most studies reported statistically significant improvements in knowledge, symptom severity, and QoL; group education and in-person delivery were commonly effective	Menopause education programmes are effective in improving knowledge, reducing symptoms, and enhancing QoL; future programmes should be inclusive, better reported, and consider early education for premenopausal women
Fallahipour et al. (2022)	Quasi-experimental study	140 postmenopausal women (70 intervention, 70 control), selected via multistage cluster sampling in Pasargad City, Iran	Questionnaires: Demographics, Menopause Rating Scale (MRS), International Physical Activity Questionnaire (IPAQ), and TTM constructs; data collected before and 2 months after 5-session intervention	Intervention group showed significant reductions in physical, psychological, and sleep-related menopausal symptoms and significant improvements in physical activity and TTM constructs (e.g., self-efficacy, decision balance)	TTM-based educational intervention effectively reduced menopausal symptoms and enhanced physical activity, promoting better QoL in postmenopausal women
Kafaei-Atrian et al. (2022)	Quasi-experimental study	186 menopausal women aged 45–60, selected by cluster sampling for centers and simple random sampling within centers, divided into 3 intervention groups (empowerment, self-efficacy, and integration)	MENQOL questionnaire assessing QoL, completed at baseline, 1 month, and 3 months post-intervention	All three educational interventions significantly improved QoL scores over time; no significant differences between groups, but all showed benefits	Empowerment, self-efficacy, and integrated education models effectively improved QoL among menopausal women, suggesting these frameworks can guide self-care education in clinical settings
Shobeiri et al. (2017)	Randomized controlled trial	100 postmenopausal women (50 intervention, 50 control), selected via multistage sampling from 4 health centers in Hamadan, Iran	MENQOL questionnaire before, immediately after, and 3 months post-intervention	Significant improvement in QoL scores in intervention group across all domains (vasomotor, psychosocial, physical, sexual) immediately and 3 months post-intervention	The 5-session educational program significantly improved QoL in menopausal women; health centers should provide such training routinely
Rathnayake et al. (2020)	Quasi-experimental	72 postmenopausal women (n=37 intervention, n=35 control) randomly selected from 4 Public Health Midwife divisions in Galle, Sri Lanka	Self-administered questionnaires assessing knowledge, attitude, MENQOL, and SF-36 QOL survey at baseline, 8 weeks, and 6 months	The intervention group showed significant improvements in knowledge, attitude, menopause-specific QOL (MENQOL), and overall QOL, while the control group showed no or negative changes	Health-promoting lifestyle education significantly improved knowledge, attitude, MENQOL, and overall QOL in postmenopausal women and is recommended for individual and community-based health promotion
Rafati et al. (2023)	Randomized controlled trial	60 postmenopausal women aged 45–65, selected through convenience sampling and randomized into intervention and control groups	Self-reported questionnaires: Menopause Rating Scale (MRS) and Perceived Relationship Quality Components (PRQC), collected before and after	Intervention group using a mobile self-care app showed significantly reduced menopausal symptoms and improved marital relationship quality compared to the control	Mobile app-based self-care training was effective in decreasing menopausal symptoms and enhancing marital relationship quality among postmenopausal women

Elkordy et al. (2021)	Quasi-experimental	120 menopausal women; purposive sampling	Structured interview questionnaire and MENQOL scale (pre- and post-test)	Significant improvements in knowledge, reported practices, and QoL post-education. For example, knowledge satisfaction rose from 24.2% to 82.5%, and practice improvements were statistically significant in multiple lifestyle domains.	The health education program was effective in enhancing knowledge, practice, and overall QoL among menopausal women.
Elkheshen et al. (2022)	Quasi-experimental (pre/post-test control/study)	78 menopausal women; purposive sampling with random group assignment (study/control)	Structured interview, HPLP-II, and MENQOL tools administered at pre, post, and 3-month follow-up stages	Significant increase in knowledge, health-promoting behaviors, and MENQOL scores in the study group after intervention and follow-up; control group showed minimal to no improvement.	Educational intervention focusing on lifestyle modification effectively enhanced menopausal women's knowledge and QoL using the Health Promotion Model.
Schei & Abernethy (2024)	Retrospective, single-arm longitudinal evaluation	11,870 UK working women; users of a digital health app (Peppy)	Self-reported Menopause Rating Scale and work impairment survey at 0, 90, and 180 days	Significant reduction in menopause symptoms over time, especially with high app engagement. Work impairment also decreased significantly, linked to symptom improvement.	Digital health applications can effectively reduce menopause symptoms and work-related impairment, suggesting benefit for workplace health support strategies.
Robin Andrews et al. (2023)	Pre-post longitudinal cohort study	1900 women, convenience sample from Health & Her app users	Self-reported symptom logs via the Health & Her mobile app over 2 months	Increased weekly engagement with the app was significantly associated with reduced menopausal symptoms. Daily use of in-app activities, logging symptoms, periods, and symptom triggers influenced outcomes. Psychological symptom scores showed the greatest reduction.	Sustained use of the Health & Her app improves menopausal symptoms. The app can be recommended as a supportive digital self-care tool for women during menopause.
Kim et al. (2024)	Nonrandomized interventional trial	48 peri- and postmenopausal women (24 MAMA group, 24 Waitlist control), recruited via hospital advertisements	WHOQOL-BREF, Menopause Rating Scale, PHQ-9, GAD-7, PHQ-15, Emotional Symptom & Memory Complaints Questionnaires (baseline and post-8 weeks)	The MAMA app significantly improved physical and environmental QoL, reduced anxiety (GAD-7), and alleviated somatic symptoms (PHQ-15) compared to control. High user satisfaction was also reported.	The MAMA® app is effective in enhancing QoL for menopausal women by providing personalized information, exercise coaching, and psychological support. It offers a promising digital solution to manage menopause-related symptoms.
Kashfi et al. (2021)	Randomized Controlled Trial	54 postmenopausal women (27 experimental, 27 control), randomly assigned via coin toss	Menopause-Specific QoL Questionnaire (MENQOL), pre- and post-intervention (1 month)	Education about physical activity via WhatsApp significantly improved overall QoL and vasomotor, physical, and sexual domains in the intervention group. No significant change in psychosocial domain.	A WhatsApp-based physical activity education program effectively enhanced QoL among menopausal women, demonstrating virtual education's role as a practical and accessible method.
Anderson et al. (2015)	Intervention study using mixed delivery modes (quasi-experimental)	225 midlife Australian women aged 40–65; recruited via media publicity (inclusion: English-speaking, computer literate)	Pre- and post-intervention surveys: Greene Climacteric Scale (menopausal symptoms), SF-12 (HRQoL), and lifestyle factors	All groups experienced reduced anxiety, depression, vasomotor symptoms, and sexual dysfunction. Face-to-face consultation group showed the greatest improvements.	A 12-week multi-modal lifestyle intervention (Women's Wellness Program) improved menopausal symptoms and QoL. Embedding health education in a wellness framework can benefit midlife women.

References

- [1] D. Anderson, C. Seib, A. McGuire, and J. Porter-Steele, "Decreasing menopausal symptoms in women undertaking a web-based multi-modal lifestyle intervention: The Women's Wellness Program," *Maturitas*, vol. 81, no. 1, pp. 69–75, 2015.
- [2] R. Andrews, D. Lancaster, K. Bache, and A. S. Lacey, "Does Health & Her app use improve menopausal symptoms? A longitudinal cohort study," *BMJ Open*, vol. 13, no. 12, e077185, 2023.
- [3] S. Beura, L. Patnaik, and M. Sahu, "Effectiveness of lifestyle related interventions to improve QoL among postmenopausal women in selected slums of Bhubaneswar: A community based quasi experimental study," *J. Educ. Health Promot.*, vol. 12, p. 388, 2023.
- [4] S. A. Elkheshen, A. M. Salama, and H. M. Elbanna, "Effect of health promoting lifestyle educational intervention on knowledge and QoL of menopausal women," *Tanta Sci. Nurs. J.*, vol. 27, no. 4, pp. 168–187, 2022.
- [5] N. Elkordy, M. Ahmed, and N. Farahat, "The efficacy of health education program on QoL among menopausal women," *Egypt. J. Health Care*, vol. 12, no. 4, pp. 791–804, 2021.
- [6] L. Fallahipour, M. Nazari, M. Karimi, and E. Zare, "Effectiveness of educational intervention based on transtheoretical model on physical activity and menopausal symptoms," *BioMed Res. Int.*, vol. 2022, p. 1791445, 2022.
- [7] Z. Hossein Mirzaee Beni, R. Maasoumi, S. Pashaeypoor, and S. Haghani, "The effects of self-care education based on the health literacy index on

- self-care and QoL among menopausal women: a randomized clinical trial," *BMC Women's Health*, vol. 22, no. 1, p. 452, 2022.
- [8] M. Kafaie-Atrian, Z. Sadat, S. Nasiri, and F. S. Izadi-Avanji, "The effect of self-care education based on self-efficacy theory, individual empowerment model, and their integration on QoL among menopausal women," *Int. J. Community Based Nurs. Midwifery*, vol. 10, no. 1, pp. 54–63, 2022.
- [9] S. M. Kashfi, T. Rakhshani, S. Farhoodi, Z. Motlagh, R. Bagherzadeh, and N. Kohan, "The effect of education of physical activity via social networks on the QoL in menopausal women: a randomized controlled trial," *J. Health Sci. Surveill. Syst.*, vol. 9, no. 3, pp. 149–154, 2021.
- [10] C. Keye, J. Varley, and D. Patton, "The impact of menopause education on QoL among menopausal women: a systematic review with meta-analysis," *Climacteric*, vol. 26, no. 5, pp. 419–427, 2023.
- [11] M. Khandehroo, N. Peyman, M. Gholian-Aval, and H. Tehrani, "Self-efficacy intervention on health literacy and QoL in menopausal women of suburban areas," *Sci. Rep.*, vol. 15, no. 1, p. 23813, 2025.
- [12] N. Y. Kim, D. S. Kim, D. H. Han, J. S. Hong, Y. Shim, Y. J. Yoon, H. J. Kim, and S. M. Kim, "Validation of the efficacy of a personalized information-provision and exercise-coaching app on the QoL of menopausal women," *Maturitas*, vol. 189, p. 108113, 2024.
- [13] Y. Li, H. He, J. Wang, Y. Chen, C. Wang, X. Li, A. Dai, Y. Liu, X. Xi, J. Huang, M. Zou, Y. Fan, M. Zhou, P. Yi, L. Yu, and X. Lei, "Effect of multidisciplinary health education based on lifestyle medicine on menopausal syndrome and lifestyle behaviors of menopausal women: A clinical controlled study," *Front. Public Health*, vol. 11, p. 1119352, 2023.
- [14] C. McFeeters, K. Pedlow, D. McGinn, and K. McConnell, "A rapid review of menopausal education programmes," *Arch. Women's Ment. Health*, vol. 27, no. 6, pp. 975–983, 2024.
- [15] F. Rafati, N. Pourshahrokhi, R. S. Bahador, N. Dastyar, and A. Mehralizadeh, "The effect of mobile app-based self-care training on the quality of marital relations and the severity of menopausal symptoms in postmenopausal women: a clinical trial study in Iran," *BMC Women's Health*, vol. 23, no. 1, p. 306, 2023.
- [16] N. Rathnayake, G. Alwis, J. Lenora, I. Mampitiya, and S. Lekamwasam, "Effect of health-promoting lifestyle modification education on knowledge, attitude, and QoL of postmenopausal women," *BioMed Res. Int.*, vol. 2020, p. 3572903, 2020.
- [17] T. S. Schei and K. Abernethy, "The impact of a specialist-led digital health application on menopause symptoms in the workplace: A single-arm, longitudinal evaluation," *Maturitas*, vol. 187, p. 108005, 2024.
- [18] F. Shobeiri, E. Jenabi, M. Khatiban, S. M. M. Hazavehei, and G. Roshanaei, "The effect of educational program on QoL in menopausal women: A clinical trial," *J. Menopausal Med.*, vol. 23, no. 2, pp. 91–95, 2017.
- [19] World Health Organization, "Menopause," WHO, 2022. [Online]. Available: <https://www.who.int/news-room/fact-sheets/detail/menopause>
- [20] L. Ye, B. Knox, and M. Hickey, "Management of menopause symptoms and QoL during the menopause transition," *Endocrinol. Metab. Clin. North Am.*, vol. 51, no. 4, pp. 817–836, 2022.