



Examining the Health-Related Needs of Females during Menopause: A Systematic Review Study

Masoumeh Rostami-Moez¹, Seyedeh Zahra Masoumi², Marzieh Otogara², Farhad Farahani³, Shohreh Alimohammadi⁴, Khodayar Oshvandi⁵

¹Research Center for Health Sciences, Education Development Center, Hamadan University of Medical Sciences, Hamadan, Iran, ²Department of Midwifery, Mother and Child Care Research Center, School of Nursing and Midwifery, Hamadan University of Medical Sciences, Hamadan, Iran, ³Department of Ear, Nose and Throat, School of Medicine, Hearing Disorder Research Center, Hamadan University of Medical Sciences, Hamadan, Iran, ⁴Department of Gynecology, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran, ⁵Department of Medical–Surgical Nursing, School of Nursing and Midwifery, Hamadan University of Medical Sciences, Hamadan, Iran

Menopause is one the most crucial stages in a female's life. Identifying the education gaps regarding menopause is important, thus this study aims to explain the health-related needs of females during menopause. Scopus, PubMed, Scientific Information Database, and Web of Science databases were searched for the available observational (cohort, case-control, and cross-sectional), systematic review, meta-analysis, and clinical trial studies (2007–2021) using keywords, such as 'Educational Needs Assessment,' 'Assessment of Healthcare Needs,' 'menopause,' 'climacteric,' 'premenopause,' and 'postmenopause.' A total of 180 out of 5,705 papers were evaluated after considering the inclusion and exclusion criteria. The educational needs of females during menopause in the reviewed studies include osteoporosis, oral and dental problems, metabolic disorders, cardiovascular diseases, hypertension, lung diseases, infectious diseases, musculoskeletal problems, urinary problems, breast cancer, defecation problems, genital disorders, special diseases such as eye diseases and hypothyroidism and hormone therapy, mental disorders, cognitive function, sleep disorders, sexual disorders, physical activity, supplement consumption, public health issues, health education, fall, and nutrition. The study results reveal that females during postmenopause require training, counseling, and support in all aspects to get through this challenging time, and providing these services, infrastructure, appropriate policy, and the use and support of the medical team's capacity are all required.

Key Words: Education, Health, Menopause, Needs and demand

INTRODUCTION

Promoting health and providing a good feeling in each of a woman's life periods will determine a better quality of life (QoL) for her and will prove fruitful for a society. Menopause is one of the most critical periods in a woman's life [1], defined by World Health Organization as "permanent cessation of menstruation for 12 months due to the loss of ovarian follicular activity." Women reach menopause at different ages and the average menopause is estimated to occur at the age of

about 50–52 years [2]. Despite the increased life expectancy, the onset age of menopause has not changed, and women spend about 30 years or more (more than a third) of their lives in menopause. Menopause develops gradually, usually beginning with changes in the menstrual process in the late one-third of women's lives [3].

Although menopause is part of the natural process of women's lives, its complications can affect their health and QoL. Common changes in menopause fall into three categories: short-term changes including hot flashes, sweating, psychological complaints, insomnia,

Received: September 13, 2022 Revised: March 19, 2023 Accepted: April 11, 2023

Address for Correspondence: Seyedeh Zahra Masoumi, Department of Midwifery, Mother and Child Care Research Center, School of Nursing and Midwifery, Hamadan University of Medical Sciences, Fahmideh St., Hamadan 6517838698, Iran

Tel: 98-9183129058, E-mail: Zahramid2001@gmail.com, ORCID: <https://orcid.org/0000-0002-2045-3707>

and joint aches; medium-term complications including vaginal and urinary symptoms and sexual problems; and long-term symptoms including osteoporosis and cardiovascular disease (CVD) [4].

The main consequences of menopause are related primarily to estrogen deficiency and the main health concerns in postmenopausal women are vasomotor symptoms (VMS), genitourinary atrophy, osteoporosis, CVD, and cancer, decreased cognitive function and sexual problems. Psychosocial problems, including insomnia and fatigue, occur in 30%–40% of postmenopausal women [5]. Depression, anxiety, irritability, poor concentration, and forgetfulness are associated with menopause. Menopause is recognized in a woman's life when it is associated with biological and social changes that can affect her mental health. A variety of studies have dealt with the relationship between menopause and psychological symptoms, especially depression and come up with different results. Women's health is of great importance, because, firstly, women make up about half of the population of each country, secondly, they live longer than men, and thirdly, they encounter more health problems [6]. The lifestyle of postmenopausal women and what they do in their daily lives, i.e., in their work environment, personal life and in their leisure time, can have different effects on their health, as scientific evidence shows that people's lifestyle affects their health and longevity.

General health is the three-fold physical, mental, and social response to internal and external stimuli in order to maintain stability and comfort. Menopausal symptoms are closely related to the general health of women during menopause and can physiologically, psychologically, and socially overshadow their health [7]. Most researchers around the world have found that women's health decreases after menopause, and the majority of women do not receive the required training in this regard so that they have had undesirable health preventive actions and health-promoting behaviors [8]. Education can positively affect a person's health and improve their lifestyle. Menopause is an important time for women and healthcare providers should train them and raise their awareness in postmenopausal women in order to remove the menopausal complications [9].

The first step in developing educational programs is to determine the educational needs of learners. Educational needs assessment includes identifying training needs and prioritizing them based on the needs that should be reduced or eliminated [10].

Considering the observed differences about the menopausal symptoms, it can be stated that cytomatology of menopausal symptoms can be a culturally related phenomenon and the mental, psychological, social, and emotional health of individuals are involved in its experience. The purpose of this study is examining the health-related needs of women during menopause.

MATERIALS AND METHODS

This systematic review study was designed to assess the educational needs associated with women's general health during menopause. The related English and Persian articles were searched from electronic databases in this study. First, titles and abstracts were screened to identify appropriate articles, and articles meeting the inclusion criteria were selected. Inclusion criteria were the articles published in English and Persian from 2007 to 2021 and indexed in the mentioned databases, regardless of the publication status, the total population of observational (cohort, case-control, and cross-sectional) and intervention studies that had addressed the educational needs of postmenopausal women and their full text was available.

Articles without full abstracts or texts and articles reported out of the outcome interest were excluded.

After removing the unrelated and duplicate articles and animal studies, the full texts of the related articles were prepared. The quality of studies was evaluated by two researchers. An electronic data collection form, consisting of the name of the first author, year of publication, title of the article, type of study, sample size, location and research result was designed.

A total of 5,705 studies were obtained in a preliminary review of three major databases, including PubMed, Scientific Information Database (SID), Web of Science, and Scopus by the end of January 2020. After eliminating the irrelevant and duplicate studies, animal studies and those whose only an abstract was available, finally 180 studies were reviewed. When the required data were not available, the articles' corresponding authors were contacted. The possibility of bias error in the research results was examined by two researchers separately. Disagreement between the parties was decided by negotiation. The PRISMA flow diagram is shown in Figure 1.

The following searching term were used: (((Educational Needs Assessment) OR Assessment of Healthcare Needs)) AND (((menopause) OR climacteric) OR

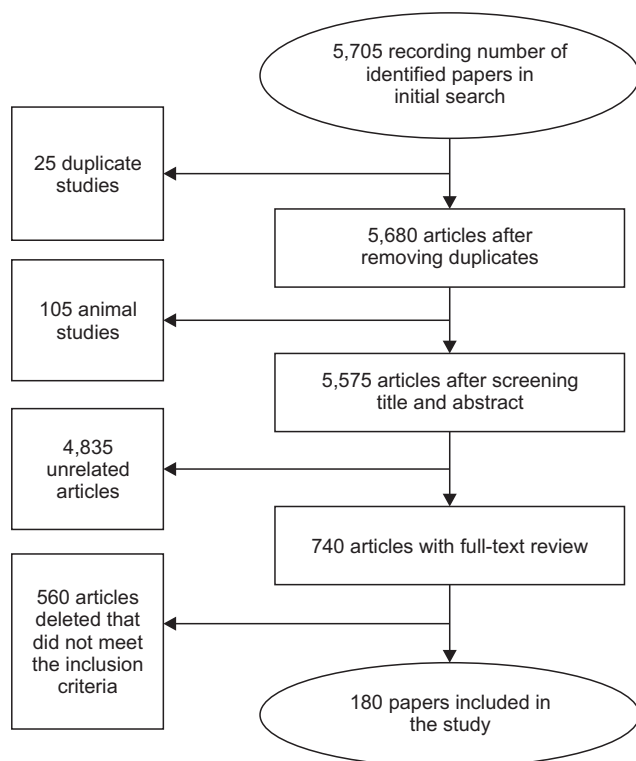


Fig. 1. Flowchart of paper selection process.

premenopause) OR postmenopause).

The methodological quality of the studies was assessed in accordance with the Newcastle and Ottawa Statement Guideline. This guideline provides criteria for the selection of subjects under study, their comparability, as well as exposure and outcome and determines the extent to which a study has addressed the possibility of bias in its design, conduct and analysis. Quality of 140 studies and 40 articles were evaluated as good and medium, respectively.

Ethics approval

This research was approved by National Agency for Strategic Research in Medical Education (IR.NASRME.REC.1400.051).

RESULTS

The results presented in Tables 1–4 [1,4,7,11-177] indicate the major educational needs of postmenopausal women included in the evaluated related articles. A total of 180 studies met the inclusion criteria and 25 educational topics were obtained in this regard. The topics were: osteoporosis, oral and dental problems, bone

health, physical activity, consumption of supplements, metabolic diseases, heart diseases, special diseases, mental health issues, urinary problems, sexual needs, breast cancer, hypertension, excretion problems, lung problems, cognitive function, falls, infectious diseases, genital problems, nutrition, sleep disorders, general health, common treatments, common physical problems, and health education.

Osteoporosis is one of the most common complications among postmenopausal women. In general, this disease is more prevalent among women than men. This is due to women's less bone mass and estrogen deprivation during menopause, so that 50% of postmenopausal women are likely to develop osteoporosis. The importance of behaviors such as regular exercise, adequate calcium intake, and exposure to sunlight to prevent osteoporosis is well known [21]. Studies have shown that proper nutrition can decrease the risk of menopause factors and complications through dietary intake of vitamins, antioxidants and phytoestrogens as well as proper physical activity. One of the factors that may be associated with the severity of menopausal symptoms through changes in hormone secretion is physical activity and exercise. According to studies, postmenopausal women suffer from varying degrees of osteoporosis, and since physical activity, along with vitamin D and calcium intake, has a great effect on bone density, they can use various aerobic exercises. In addition, physical activity can be effective in improving CVD by reducing the serum lipoproteins, body mass index, and fat percentage [121].

Changes that may occur in the mouth and teeth usually occur 5 to 10 years after the onset of menopause. However, these problems occur for many women as early as the onset of menopause. That is why care and prevention are critical [27]. On the other hand, menopause is followed by an increased risk of CVD, which is the leading cause of death among the women in Western countries. Studies on the association between metabolic syndrome and menopause have come up with different results [38]. Menopause increases the risk of CVD, and this effect is due to mechanisms such as shifts in the female-typical body fat distribution to the male-typical body fat distribution, decreased glucose tolerance, impaired blood lipids, increased blood pressure, increased response to the sympathetic system, impaired endothelial system and vascular inflammation. Menopause, obesity, and physical inactivity are independent risk factors for CVD [34].

Table 1. Articles addressing the educational needs of postmenopausal women regarding osteoporosis, oral and dental problems, metabolic disorders, CVD, hypertension, lung diseases, infectious diseases, and musculoskeletal problems

Code	Subject	Reference	Study	Conclusion
1	Osteoporosis	Hwang et al. (2012) [11] Matthews et al. (2011) [12] Naylor (2015) [13] Schürer et al. (2015) [14] Darbà et al. (2015) [15] Aslam et al. (2019) [16] Yu et al. (2020) [17] Sanchez-Rodriguez et al. (2012) [18] Shaki et al. (2018) [19] Mitchell and Cooper (2015) [20] Farrah and Jawad (2020) [21] Ren et al. (2020) [22] Ma et al. (2016) [23] Gudmundsson et al. (2017) [24] Stuenkel et al. (2015) [25]	Clinical trial; Cross-sectional; Cohort; Cohort; Systematic review; Narrative review; Review; Meta-analysis	<ol style="list-style-type: none"> 1) The data show a high prevalence of osteoporosis from the age of 65 onwards. 2) Bilateral thigh measurement using dual energy X-ray absorptiometry. is recommended to fully diagnose osteoporosis. 3) Osteoporosis is inversely associated with soymilk intake to a similar degree as dairy intake. 4) Decreased kidney function in middle-aged people is associated with bone fractures. 5) The attention of the health system is very important in this regard. 6) Not-consumption of milk and consumption of more than 800 grams per day are associated with an increased risk of fractures. 7) Living alone is associated with a high risk of osteoporosis. 8) Patients with major osteoporosis are at a high and imminent risk of subsequent fractures. 9) Public awareness is important and strategies for identifying and managing low bone mineral densities need to be developed and implemented in primary healthcare environments. 10) Oral bisphosphonates are the first-line treatment for osteoporosis. 11) Acupuncture is effective in treating osteoporotic postmenopausal women by improving their estrogen levels. 12) Vibration therapy can provide a significant improvement in reducing bone loss in the lumbar spine in postmenopausal women. 13) Denosumab is a safe and effective option for reducing fracture risk among patients with osteoporosis.
2	Oral and dental problems	Avijit et al. (2019) [26] Kim et al. (2016) [27] Suri and Suri (2014) [28]	Cross-sectional; Observational study; Review	<ol style="list-style-type: none"> 1) Middle-aged women residing in rural area have high oral care need. 2) Tooth loss in postmenopausal women is associated with metabolic syndrome. 3) There is a need for health providers, including gynecologists and dentists, to be aware of oral changes during this period.
3	Metabolic disorders	Shahbazian et al. (2013) [29] Han et al. (2019) [30] Al-safi and Polotsky (2015) [31] Ayhan et al. (2016) [32]	Meta-analysis; A comparative cross-sectional; Cross-sectional	<ol style="list-style-type: none"> 1) The prevalence of metabolic syndrome increases with age and body mass index and this syndrome is more prevalent among women. 2) High levels of calcium in foods are associated with a decreased risk of metabolic syndrome. 3) Hyperandrogenemia is associated with the risk of metabolic syndrome in menopause. 4) Obesity is more prevalent among postmenopausal patients with rheumatoid arthritis than in general population.

In the elderly, the age-related changes have many impacts on various systems, including the respiratory and cardiovascular systems. Age-related changes include decreased physical flexibility of the chest and dorsal spine, increased anterior-posterior diameter of the chest, osteoporosis of the vertebrae, and reduced distance between the vertebrae, resulting in hunchback

or kyphosis, calcification of the rib cartilage, decreased mobility of the ribs and vertebrae, reduced efficiency of respiratory muscles, lung tissue stiffness, natural inflexibility, and consequently reduced alveolar level and gas exchange, and finally the occurrence of secondary cardiovascular problems and atherosclerosis in arteries and reduced blood flow and metabolism in the body

Table 1. Continued

Code	Subject	Reference	Study	Conclusion
4	CVD	Feitosa-Filho et al. (2019) [33] Bondolfi et al. (2020) [34] Bernabe-Ortiz et al. (2012) [35] Joshi et al. (2013) [36] Ra and Kim (2020) [37] Cortés et al. (2020) [38] Zhao et al. (2018) [39] Sekhon and Agarwal (2012) [40] Auro et al. (2014) [41] Afrifa et al. (2019) [42]	Guideline; Systematic review; Cross-sectional; Randomized controlled trial; Prospective cohort; Review; Meta-analysis	1) Risk factors for CVD among postmenopausal women includes diabetes, tobacco use, obesity, sedentary lifestyle, dyslipidemia, depression and anxiety, hyperuricemia, vitamin D deficiency, Coronary calcium score above 100, ankle-brachial index less than 0.9, inactive lifestyle, poor diet, forced smoking abstinence, use of psychiatric drugs, and high stress. 2) Abdominal obesity and low high density lipoprotein cholesterol in women are a risk factor for heart diseases. 3) Strategies to reduce the risk of cardiovascular disorders among the elderly should focus on smoking reduction, early diagnosis, and optimal control of blood pressure. 4) Old age, metabolic syndrome, smoking, depression, and family history were associated with ischemic heart disease 5) Reduction of CVD burden via stress management and coping skills training. 6) Higher levels of testosterone and testosterone/estradiol ratio are associated with an increased risk of developing CVD at an old age. 7) Oxidative stress, iron storage, blood fats and body fat increase when there is an increase in the fat level, especially after menopause. 8) In addition to fat changes, menopause may increase the risk of CVD by affecting amino acid concentrations. 9) Menopause can change the fat profile and increase the risk of CVD.
5	Hypertension	Lee et al. (2019) [43]	Cross-sectional	High uric acid level in the serum of postmenopausal women is the reason for their higher blood pressure.
6	Lung diseases	Fawale et al. (2016) [44] Yoon et al. (2015) [45]	Cross-sectional; Prospective	1) OSA is more prevalent among the elderly. 2) OSA is affected by factors including depression, increased daily sleep, weight gain and age. 3) Public education on the importance of keeping lungs healthy is considered important.
7	Infectious diseases	Negin et al. (2016) [46] Hearn et al. (2015) [47]	Cohort; Cross-sectional	1) Older people are at higher risk for HIV infection. 2) Extensive screening for trichomoniasis in menopausal period is needed.
8	Musculoskeletal problems	Armo and Sainik (2020) [48]	Cross-sectional	1) Joint and muscle problems were the most common problems reported by rural women. 2) Health care providers should give necessary training to menopausal women about improving muscle-skeletal activity.

CVD: cardiovascular disease, OSA: obstructive sleep apnea.

[44]. Gas exchange and diffusion capacity in the lungs of the elderly are reduced, and their reduced ability to cough effectively, reduced activity of the tiny hairs that clear the airways, the increased dead space volume, and the disrupted normal amounts of the lung capacity and volumes make the elderly more vulnerable to respiratory disease, especially respiratory infections [45]. Mood disorders (depression), anxiety disorders, cognitive disorders and sleep disorders are common

psychological diseases in menopause. Depression in the elderly may cause false dementia. Anxiety disorders are the most common type of mental illness. Alzheimer's disease is the most prevalent type of dementia, and women in their 60s are about twice as likely to develop this disease [97].

The effects of relative estrogen reduction make the vagina prone to friction-caused damage and sexually transmitted infections easily invade the body through

Table 2. Articles addressing the educational needs of postmenopausal women regarding urinary problems, breast cancer, defecation problems, genital disorders, special diseases and hormone therapy

Code	Subject	Reference	Study	Conclusion
1	Urinary problems	Vieira et al. (2019) [49] Dieter et al. (2015) [50] Corrêa et al. (2019) [51] Karakoç et al. (2019) [52]	Cross-sectional; Review; Prospective analyses; Case-control	1) Symptoms of pelvic organ prolapse, and urinary incontinence are of clinical significance. 2) Pelvic floor disorders are an important public health issue that affects the lives of millions of adult women. 3) Women with urinary incontinence had poor physical function. 4) Low level of education, chronic illness, urinary incontinence, and continuous drug use are associated with the genitourinary syndrome of menopause, which negatively affects the quality of life and self-care ability in women.
2	Breast cancer	Ekpo et al. (2016) [53] White et al. (2017) [54] Ritvo et al. (2012) [55] Krusinska et al. (2019) [56] Cheng (2018) et al. [57]	Systematic review; Cross-sectional; Case-control	1) Tamoxifen reduces breast mass. 2) Consumption of vegetables, vitamin D and calcium seems to be associated with a decrease in breast disease in premenopausal women. 2) Sleeping difficulty and exposure to artificial light at night are associated with an increased risk of breast cancer. 3) The need to increase the knowledge and awareness of menopausal women about breast cancer screening. 4) The use of vitamins and minerals and regular monitoring of their serum levels should be considered in the prevention of breast cancer. 5) Improving the quality of life during menopause (especially psychosocial and physical domains) and regular exercise are important factors related to breast cancer prevention.
3	Defecation problems	Mundet et al. (2019) [58]	Cross-sectional	Postmenopausal women are more likely to have fecal incontinence.
4	Genital disorders	Kelekci et al. (2016) [59] Edwards and Panay (2016) [60] Nappi et al. (2019) [61] Gebretatayos et al. (2020) [4] Wysocki et al. (2014) [62]	Cross-sectional; Review; Online Internet -based survey	1) Vaginal dermatosis in women over the age of 50 is associated with decreased quality of life. 2) Training about vaginal dryness and encouraging women to use lubricants and moisturizers to relieve discomfort and pain during sexual intercourse are effective for women with mild to moderate vaginal dryness, especially those who are contraindicated in estrogen or do not use estrogen. 3) Symptoms of vulvovaginal atrophy in postmenopausal women show a significant impact on their quality of life and sexual life. 4) Preventive identification of patients with vulvovaginal atrophy and training them.
5	Hormone therapy	Langevin et al. (2011) [63] Pang et al. (2020) [64] Jurgens et al. (2020) [65] Sarri et al. (2017) [66] Stuenkel et al. (2015) [25] Fabion et al. (2015) [67] Seol et al. (2013) [68] Fallahzadeh (2010) [69] Chester et al. (2018) [70] Ghorbani et al. (2016) [71] Cilgin (2019) [72]	Case-control; Cross-sectional; Guideline on menopause; Systematic review; Systematic review and meta-analysis; Narrative review; Cross-sectional; Correlation study	1) Postmenopausal women who had used the hormone for over 5 years showed a protective effect for head and neck carcinoma. 2) Initiation of hormone therapy in early menopause and doing it for a long time may delay the progression of coronary artery calcification. 3) Hormone therapy is the most effective way to treat vasomotor signs. 4) Black cohosh, isoflavones, soy milk and phytoestrogens were included in all five guidelines and these natural products are recommended to be used for the treatment of menopausal symptoms. 5) The use of transdermal estradiol-progesterone is effective in the treatment of vasomotor signs for women who have not undergone a hysterectomy. 6) Women who have premature or early menopause should have hormone therapy and individual counseling. 7) It is important that hormone therapy be considered in the policies of postmenopausal women. In particular, health programs such as hormone replacement therapy, smoking cessation, and the use of oral care products are necessary for women with premature menopause. 8) Menopausal women should receive adequate information about the risks and benefits of hormone therapy.
6	Special diseases	Benitez-del-Castillo (2012) [73] Meng et al. (2021) [74] Nagendiran et al. (2021) [75] Matuszek et al. (2011) [76]	Guideline; Case-control; Qualitative; Guideline	1) Eyelid diseases are prevalent among menopause due to hormonal disorders. 2) Sjogren's Syndrome in the elderly is caused by prior stressful events. 3) Patient education and management of hypothyroidism in the elderly patients should be considered. 4) Every premenopausal woman should undergo thyroid tests.

Table 3. Articles addressing the educational needs of postmenopausal women regarding mental disorders, cognitive function, sleep disorders and sexual disorders

Code	Subject	Reference	Study	Conclusion
1	Mental disorders	Steibliene et al. (2020) [77] Byers et al. (2012) [78] Converso et al. (2019) [79] Schreiber and Dautovich (2017) [80] Zhou et al. (2012) [81] Shafiee et al. (2016) [82] Jasińska et al. (2014) [83]	Prospective cohort; Archival analysis; Case-control; RCT; Cross-sectional	<ol style="list-style-type: none"> 1) Half of the women had symptoms of anxiety, while a third of them had symptoms of depression. 2) Intervention and prevention strategies to reduce depressive symptoms are felt in old age. 3) Emotional fatigue is associated with menopausal symptoms. 4) Psychosocial factors play an important role in the relationship between depressive symptoms and weight. 5) Menopausal syndrome and anxiety-depressive disorders are mostly associated with physical symptoms during this period. 6) Spiritual intervention can effectively reduce the severity of postmenopausal depression. 7) Older women who tend to have more positive mental attitudes experience less tension, stress, and depression.
2	Cognitive function	Liao et al. (2020) [84] Holahan et al. (2019) [85] Brinkman et al. (2014) [86] Sabik (2015) [87] Ji et al. (2014) [88] Wilson et al. (2017) [89] Sakurai et al. (2020) [90] Al-Sari et al. (2017) [91] Wallace et al. (2020) [92]	Descriptive study; Systematic review; Clinical trial; Cross-sectional; Review; Randomized, double-blind, placebo-controlled trial; Cohort	<ol style="list-style-type: none"> 1) Better cognitive performance in the menopausal age is related to taking care of grandchildren, as well as the quality and number of their health care providers. 2) Getting enough glucose before puberty contributes to memory function in old age and middle age. 3) Computer and digital systems have been used to study cognitive disorders in the elderly. 4) Age discrimination is a source of psychological distress for the elderly. 5) In order to delay or even prevent the possible development of different types of dementia, cognitive impairment must be diagnosed in the early stages through appropriate assessments and interventions. 6) Brain functions in the elderly are associated with dietary choices. 7) The results show that Matcha Green Tea supplement may have a positive effect on cognitive improvement in elderly women. 8) Mental and memory problems are associated with an increased risk of falls and fractures. 9) Health care professionals need to pay more attention to improving the daily functioning and QoL of postmenopausal women.
3	Sleep disorders	Cohen et al. (2019) [93] Sargazi et al. (2012) [94] Baker et al. (2018) [95] Cintron et al. (2018) [96] D'Antono and Bouchard (2019) [97]	Review; RCT; Cross-sectional	<ol style="list-style-type: none"> 1) There is a significant relationship between smoking and sleep disorders. 2) Sleep disorders and unhealthy behaviors related to sleep are common among the elderly. In case of severe symptoms of insomnia, health care, improvement of quality of life and examination of mental-physical health in the long term should be considered. 3) Impaired sleep quality is independently associated with greater inflammatory markers (C-reactive protein, interleukin-6, tumor necrosis factor alpha, and myeloperoxidase) in healthy adult men and women.

cuts and tears. While the risk of urinary tract infections (UTIs) in women depends on individual factors such as general health, the incidence of UTIs generally increases with age [4]. During an old age, Vaginal discharge and consequently vaginal acidity will be reduced, and pathogens can easily grow in it. A change in the pH of the vagina from 3.5–4 to 6–8 leads to alkalization of the environment, which paves the way for the coloniza-

tion of a large number of bacteria. The lower part of the urethra may become hard and inelastic, which can lead to diverticulitis and ureteroceles [61]. The physical and psychological changes associated with menopause affect all systems of the female body, including the gastrointestinal tract where the most common changes occur. One of these gastrointestinal disorders, which reduces the QoL in severe cases, is constipation. Constipation is

Table 3. Continued

Code	Subject	Reference	Study	Conclusion
4	Sexual disorders	Sorensen et al. (2017) [98] Starc et al. (2018) [99] Kelley et al. (2019) [100] Hughes et al. (2015) [101] Smith et al. (2019) [102] Kingsberg et al. (2019) [103] Jenczura et al. (2018) [104] Banke-Thomas et al. (2020) [105] Rabathaly and Chattu (2019) [106] Carranza- Liraand and Núñez (2018) [107] Wood et al. (2012) [108] Beigi and Fahami (2012) [109] Jamali et al. (2016) [110] Alavipour et al. (2020) [111] Tiznobeik et al. (2017) [112] Muliira and Muliira (2013) [113] Dienye et al. (2013) [114]	Cross-sectional; Case-control; Qualitative; RCT; Interventional trial; Review;	<ol style="list-style-type: none"> 1) Women with bipolar disorder exhibited a high prevalence of sexual distress. and their sexual function seemed associated with their actual mood symptoms and perception of QoL. 2) Sexual dysfunction increases in elderly women. 3) Postmenopausal women require opportunities to be trained, under physicians' guidance, about the safe and healthy ways to increase their sexual activity. 4) Health care providers' better understanding of how sexual dysfunction affects the quality of life in women in different ages, can help in providing the necessary care recommendations. 5) The most common sexual disorders during menopause are lack of interest in having sex and vaginal dryness. And this sexual dysfunction leads to depression and life dissatisfaction. 6) Education should be given to women about improving sexual and marital satisfaction in menopausal age 7) A decrease in sexual activity and the increased prevalence of sexual disorders were observed in the population of female alcoholics. 8) Low libido in older women should not be automatically attributed to "normal" aging or menopause. Health care providers in treating this disorder should consider a holistic approach including biological, interpersonal, social, and psychological factors. 9) Among postmenopausal women, elderly women have more sexual dysfunction. 10) Teaching how to conduct correct and appropriate counseling and treatment to medical, paramedical and psychiatry students in order to improve sexual and marital satisfaction in menopausal women. 11) Significant sexual dysfunctions in postmenopausal women including dyspareunia and arousal disorder. 12) Group training is recommended to reduce sexual dysfunction in postmenopausal women at health centers. 13) Active and structured counseling effectively improve sexual functions and behaviors in menopausal women and their spouses. 14) These interventions may focus on improving the older woman's sexual health assessment; increasing awareness and knowledge about sexuality in later life; pharmacological and psychotherapeutic therapies; using alternative techniques to achieve better sexual functioning; addressing partner and relationship issues and advocating the importance of sexual health through media and policy development.

QoL: quality of life, RCT: randomized controlled trial.

more prevalent in women than men, and the number of patients suffering from this disease increases with age. However, its pathophysiology is not completely clear [58].

Breast cancer accounts for about one-third of all female cancers and is the second most common cancer after lung cancer and the leading cause of cancer death among women. Women who experience menopause after the age of 55 are at increased risk for breast cancer due to long-term exposure to estrogen and progester-

one. There are other factors that can affect the incidence of breast cancer after menopause. These factors include genetic mutation, obesity, family history, breast tissue density and race [178].

Currently, hormone replacement therapy is recommended for patients who are eligible for treatment to relieve menopausal symptoms. Oral estrogens should also be avoided by women with hypertriglyceridemia, active gallbladder disease, or known thrombophilia such as factor V Leiden (without a personal history)

Table 4. Articles addressing the educational needs of postmenopausal women regarding physical activity, consumption of supplements, public health issues, health education, fall and nutrition

Code	Subject	Reference	Study	Conclusion
1	Physical activity	Pope et al. (2018) [115] Craft et al. (2012) [116] Piva et al. (2014) [117] LaMonte et al. (2017) [118] Bielemann et al. (2014) [119] Carcelen-Fraile et al. (2020) [120] Fuentes-Aparicio et al. (2021) [121] Sydora et al. (2020) [122] Chang et al. (2013) [123] Spencer et al. (2019) [124] Papadopoulou (2020) [125]	Clinical trial; Cross-sectional; Systematic review; Randomized controlled trial; Qualitative; Secondary analysis	1) Increased physical activity and improved health index among breast cancer survivors. 2) The elderly should quit a sedentary lifestyle. 3) Physical activity to improve metabolism and reduce disability and pain. 4) Low levels of physical activity are associated with a reduced incidence of cardiovascular disease in postmenopausal women. 5) Physical activity is important for bone mass at all stages of life. 6) There is evidence supporting physical exercise as a strategy to improve sexual function and quality of sexual life related to menopausal symptoms. 7) The addition of postural instructions to an abdominopelvic exercise program improves the effect of urinary incontinence. 8) The need to design a program to start and maintain the walking habit of middle-aged and postmenopausal women. 9) Nurses' awareness of the benefits of women's physical activities should be increased regardless of the different social and cultural environments of the countries. 10) If there is back pain, the strength of the upper back extensor muscle should be checked. 11) Physical activity and nutrition are the main ways to prevent sarcopenia.
2	Consumption of supplements	Panahande (2019) [126] Vergne et al. (2013) [127] Leiu et al. (2020) [128] Boucher (2012) [129] Ciavattini et al. (2016) [130] de Courten et al. (2015) [131] Cheong et al. (2020) [132] Haring et al. (2016) [133] Sprague et al. (2015) [134] Zhao et al. (2017) [135] Vazquez-Lorente et al. (2022) [136]	Systematic review; Cross sectional; Cohort; Clinical trial; Meta-analysis	1) Increasing the intake of vitamin D in adults worldwide is recommended to improve musculoskeletal health and reduce the risk of chronic diseases. 2) Consumption of supplements and calcium is effective in reducing breast cancer. 3) More milk and dairy products need to be consumed in order to prevent vitamin D deficiency. 4) Experts suggest that 1,000–2,000 IU of vitamin D daily is necessary for older people; In women with fibroids, vitamin D supplementation seems to reduce the progression to an extensive disease. 5) Vitamin D plays a protective role against type 2 diabetes by helping to secrete insulin and reducing insulin resistance, which should be considered important for the prevention and management of type 2 diabetes. 6) Suboptimal vitamin D and zinc deficiency exist among the elderly even with normal nutritional status. These findings require urgent attention and highlight the need for early detection of nutritional deficiencies in the elderly. 7) Sodium intake is associated with increased bone mineral density and decreased pelvic fractures. 8) Vitamin D supplementation is effective in reducing depressive symptoms and improving physical function in older persons. 9) Taking supplements containing calcium, vitamin D, or both was not associated with a lower risk of fractures in the elderly compared with placebo. 10) Magnesium supplementation improved vitamin D status in the postmenopausal women.
3	Falling	Chen et al. (2020) [137] Zhao et al. (2020) [138]	Cross sectional; Meta-analysis	1) Seven predictors include: female gender, living alone, urinary incontinence, perceived pain, past year hospitalization, low activity score and low motor function scores. 2) Awareness of the various risk factors associated with falls in postmenopausal women can help prevent falls.

Table 4. Continued

Code	Subject	Reference	Study	Conclusion
4	Nutrition	Whittaker et al. (2019) [139] Rigi et al. (2021) [140] Rozenberg et al. (2016) [141] Yamaguchi et al. (2020) [142] Alquaiz et al. (2014) [143] Potter et al. (2016) [144] Geyer (2017) [145] Mangano et al. (2021) [146] Ventura et al. (2014) [147]	Consortium mission statement; Case control; Systematic review; Cross-sectional; Case study	<ol style="list-style-type: none"> 1) Physical activity and nutrition are effective in the healthy ageing process. 2) Following a vegan diet is associated with a reduced risk of breast cancer, while an unhealthy plant-based diet is associated with an increased risk of it. 3) Intake of up to three servings of dairy products per day appears to be safe and may confer a favorable benefit with regard to bone health. A balanced diet, avoidance of fatty foods and undergoing blood cholesterol tests are directly associated with women's physical health. 4) Combinatorial strategies are required for promoting physical activity and healthy diets to improve lifestyle. 5) High quality of food in the postmenopausal period is effective in reducing the risk of breast, colorectal and head and neck cancers. 6) A combination of dietary changes; modification of calcium supplement and addition of vitamin K2; increased weightlifting exercises, yoga and strength training were associated with a gradual improvement in spinal bone density. 7) Dairy consumption and adequate and optimal levels of vitamin D are associated with increased bone mineral density. 8) Women have a low-quality diet, which is probably due to low intake of vegetables and fruits and excessive intake of sodium.
5	Public health	Leung et al. (2020) [148] Whillans et al. (2016) [149] Smith et al. (2012) [150] Feitisa-Fiho et al. (2019) [33] Zhu et al. (2019) [151] Makuwa et al. (2015) [152] Jundt et al. (2015) [153]	Cross-sectional; Cohort; Systematic reviews; Cross-sectional and qualitative; Review	<ol style="list-style-type: none"> 1) Improving health behaviors may control or alleviate the prevalence of obesity and chronic kidney disease. 2) Visual impairment in the elderly, given the rapid growth of their population, requires focus and policy-making in this area. 3) Obesity and its determining behaviors, lack of physical activity and improper diet cause disturbances in cardio-respiratory health. 4) There is a need to change behavior and receive training on how to perform physical activity. 5) Health programs such as hormone therapy, non-smoking and use of oral care products are needed for women who have premature menopause. 6) Women's health programs and promotion of their health information should be designed for all women regardless of race. 7) Conservative treatment of pelvic floor dysfunction consists mainly of lifestyle changes, physiotherapy, and medication.

and venous thromboembolism. Hormone therapy has had negative impacts after the age of 60 at which no new manifestation of menopausal symptoms has been seen [56].

DISCUSSION

The results of this systematic review of studies addressing the educational needs of postmenopausal women showed that osteoporosis, oral problems, metabolic disorders, CVD, hypertension, lung disease, infectious diseases, musculoskeletal problems, urinary system problems, genital disorders, sexual disorders, excretion problems, breast cancer, special diseases, hormone therapy, mental and cognitive dysfunction, sleep

disorders, physical activity, consumption of supplements, public health issues, health education, falls and nutrition are some of the important menopause-related issues which should be considered and about which women need to receive adequate education. One of the things that is important during menopause is training and counseling for exercising during this period. One of the most common problems among the elderly is the fear of falling and the inability to perform daily activities. Most women do not exercise at menopausal age, while inactivity is one of the aggravating factors of osteoporosis. Regular and sustained physical activity can be effective in maintaining physical independence and reducing the fear of falling in the elderly [138]. Researchers and scientists believe that daily physical

Table 4. Continued

Code	Subject	Reference	Study	Conclusion
6	Health education	Kim et al. (2015) [154] Harder et al. (2019) [155] Heidari et al. (2019) [156] Stachowiak et al. (2015) [157] Singhania et al. (2020) [158] Pathak et al. (2019) [59] Yoshany et al. (2018) [160] Shukla et al. (2018) [161] Noroziet al. (2011) [162] Seifi et al. (2018) [163] Parsa et al. (2017) [1] Atrian et al. (2018) [164] Ozcan (2019) [165] Joseph et al. (2014) [166] Samuel et al. (2016) [167] Stacey et al. (2015) [168] Yisma et al. (2017) [169] Hajifoghaha et al. (2019) [170] Bustami et al. (2016) [171] Souza Guerra (2019) [172] Yazdkhasti et al. (2015) [173] Kwak et al. (2014) [174] Koyuncu et al. (2015) [175] Masjoudi et al. (2017) [176] Haung et al. (2019) [177] Smail et al. (2019) [7]	Cross-sectional; Qualitative; Short review; Narrative review; Randomized controlled trial; Cross Sectional; Review; Mixed-methods; Semi-experimental; Intervention; Mixed-method	1) There is a need for training about the safety and positive effects of hormone therapy. 2) Having an intimate partner and good physical health are key factors for continuation of sexual activity and satisfaction. Further sexual education for healthcare professionals is needed to raise awareness about sexuality and sexual difficulties in later life. 3) Empowerment and training of coping skills; modifications in life-style, with moderate physical activity and a healthy diet as a priority, should still be the first recommendation for all patients with post-menopausal metabolic disorders. 4) There is a need for a multidisciplinary approach to women's health to prevent obesity. 5) Domestic violence is common for women over 45 years of age. 6) Training menopausal health to husbands can increase women's marital satisfaction in the period of menopausal transition. 7) Creating support groups to adopt positive attitudes and healthy behaviors during menopause; Need for health literacy against disasters 8) Group counseling promotes self-care behaviors and metabolic indices in menopausal diabetic patients. 9) Training and empowerment for self-care of postmenopausal women 10) A need for further studies about complementary and alternative medicine. 11) A need for more menopausal clinics to raise awareness, diagnose early and treat menopausal diseases 12) Midwives can improve postmenopausal women's attitudes and self-esteem to promote sexual health. 13) When making decisions about body weight management, women's needs were "getting information" and "getting support." 14) It is imperative that midwives have comprehensive knowledge and the skills necessary for providing optimal care from menopausal women. 15) Proper health education programs regarding menopause are strongly recommended. 16) It is necessary to raise public's awareness and develop a public health policy on the impacts of smoking on women's reproductive health. 17) Severe symptoms of menopause, poor sleep quality, increased body mass index are the most common factors associated with poor QoL. More attention should be paid to the QoL of women with climacteric symptoms. 18) Empowering postmenopausal women ensures their health in the last one-third of their lives. 19) Improving the Middle Age Women's Symptom Index and managing menopausal challenges is an appropriate strategy for a successful transition to menopause. 20) Health education is an effective way to deal with menopausal symptoms. 21) Menopause is a physiological process in the life of women. But due to many symptoms and complications, it needs culture-appropriate education, proper coping with problems, and promotion of mental health in this sexual crisis.

QoL: quality of life.

activity and regular exercise, especially weight-bearing exercises, reduce the rate of bone loss [2]. Based on the results of our study, regular daily exercise, especially

walking and swimming, under the supervision of experienced trainers is emphasized.

Nutrition and paying attention to the diet, getting all

the essential nutrients and vitamins as well as vitamins play a very important role in the health of the body during menopause. Most women do not get adequate vitamin D due to their lack of knowledge about the importance of vitamin D and its sources and their inadequate sunlight exposure due to their lack of awareness and fear of its side effects. The severity of osteoporosis was higher in women who had not taken vitamin D supplements or had used steroids for some reason [128]. Consuming white meat, dairy products, vegetables and having a Mediterranean diet pattern and proper weight reduce the symptoms of menopause, while excessive consumption of high-protein diet, especially red meat, oil and salt increases the risk of osteoporosis as a major complication of menopause. In addition, eating foods such as soy and legumes, adequate calcium intake, omega-3 fatty acids and vitamins D, E, B2, B1, C, consumption of natural antioxidants and doing regular physical activity can reduce the effects of menopause, especially hot flashes. Accordingly, lifestyle modification in women, including the implementation of proper nutrition programs, calorie control and use of food sources containing vitamins, minerals and antioxidants can be effective in reducing the incidence of menopausal complications, which usually emerge as mild, moderate or severe depending on other factors [132]. Based on the results of this study, education and counseling are recommended to have healthy and varied diet rich in fruits, fresh vegetables, whole grains, nuts, protein, consumption of calcium-rich foods, adequate absorption of vitamin D, and the use of supplements and vitamins.

During menopause, due to aging, some diseases increase. One of these diseases is cardiovascular diseases. Changes in the level of lipoproteins that occur after menopause are also among the risk factors for CVD. Age also affects changes in lipoproteins. Decreased high density lipoprotein cholesterol increased systolic blood pressure and elevated total cholesterol and triglycerides are seen in postmenopausal women. These changes are associated with risk factors for CVD, including components of the metabolic syndrome. Metabolic syndrome is a grouping of atherosclerotic cardiovascular disease risk factors, which include increased levels of abdominal circumference, blood pressure, serum triglycerides and glucose, and low-density lipoprotein cholesterol, with a significant increase in coronary heart disease and its prevalence increasing with age and after menopause [118]. A variety of studies have shown that when

women start menopause, they show an increase in atherosclerosis and CVD as the increased risk of heart attack. Lifestyle change with emphasis on greater physical activity and slight weight loss are the main and basic factors in preventing CVD [42]. Inactivity with aging reduces bowel movements and causes constipation. Constipation affects QoL, social functioning and the ability to perform daily activities. In postmenopausal women, constipation is a risk factor for CVD. Planning and taking preventive measures in this regard involves knowledge about gastrointestinal risks and problems, including constipation and related factors [58].

Respiratory disorders are also common during this period. Aging cannot be treated, but the respiratory complications, can be reduced by modifying the functional pattern of breathing and improving the dominant pattern in the elderly. Respiratory rehabilitation treatments to maintain the proper function of the elderly's respiratory system include regular exercise, proper nutrition, modification of breathing pattern and exercises to increase lung volume and improve the elasticity of lung tissue and most importantly add daily breathing exercises to the elderly's exercise program to maintain their respiration-affected basal metabolism [44]. Obviously, quitting smoking and improving one's respiratory health are also very important and helpful. Improving the condition and reasonable treatment of kyphosis in the elderly is another way to treat their progressive respiratory complications [45].

Urogenital diseases are also another complication of menopause. After menopause, the vagina becomes susceptible to bacteria and the person gets a bacterial vaginal infection [92]. The most common symptom and complaint in postmenopausal women is itching of the external genitalia. However, genital dystrophy also causes itching. Estrogen deficiency makes vaginal vulnerability easier. Three types of lesions, namely erosion, ectropion, and cervical ulcer, are more common during the postmenopausal period, which creates problems in Pap smear sampling test and colposcopy. The incidence of uterine prolapse, cystocele, and rectal prolapse increases, but there is limited evidence that it is caused by estrogen deprivation [60]. Urinary syndrome is the most common problem of postmenopausal women with urethral changes. This syndrome includes dysuria and frequent urination, difficulty urinating, nocturia, and urinary urgency. When these symptoms are associated with negative urine culture, urethral syndrome is diagnosed. Urinary incontinence can be caused by

UTIs, gynecological infections, stool accumulation, the use of certain medications, or even loosening of the pelvic floor and abdominal muscles. This is often improved by estrogen treatment. Estrogen deficiency reduces the tonicity of the pelvic floor muscles, and the reduction of blood circulation in the genitourinary muscle area is followed by a decrease in resistance and loosening and consequently the sagged muscles in the area [51]. Examination by a specialist to check health of body organs and perform relevant paraclinical tests is definitely recommended.

Psychological disorders are a common problem during menopause. In addition to hormonal changes, women's lack of mental readiness for menopause makes this period very challenging. Insomnia is a sleep disorder characterized by difficulty falling asleep, inability to stay asleep, or waking up early in the morning. As women get older, the transition between being asleep and awake also becomes far more abrupt, and hot flashes and night sweats exacerbate these problems [95].

As life expectancy and aging index increase in the population of countries, the incidence of various cancers is expected to increase in the coming years and a lot of human and financial capital will be wasted. According to the guidelines of Iran Endocrine Society (IES), the risk of affliction with CVD and breast cancer should be calculated before hormone therapy [22].

Many menopausal women use medical and hormonal treatments to prevent or reduce complications during this period. Non-hormonal treatment is recommended for symptomatic women who have a more than 10% risk of heart disease in the next 10 years as well as for symptomatic women who have a moderate to severe risk of breast cancer. For women with uterus who are at moderate risk for heart disease, transdermal estrogen along with progesterone is recommended. Menopausal hormone therapy can be used as a safe treatment for healthy and symptomatic women under 60 years of age who have gotten menopause for less than 10 years and do not have the contraindications of the mentioned hormone therapy [72].

Mouth burning, mouth dryness and changes in taste, pain, tooth decay are the most common problems that can occur during menopause. However, hormonal changes do not cause oral problems in some women. This could be due to previous care as well as their genetics [26].

Sexual disorders also occur with aging. Previous studies have shown a significant decrease in desire, arousal,

orgasm, and sexual activity, and a significant increase in vaginal dryness and painful intercourse during menopause. Although sexual function during menopause is greatly affected by biological changes, women's ethnic, social, and cultural backgrounds also play an important role in their sexual function [61]. Therefore, menopause can create, double, or eliminate the sexual problems of the fertility period [111]. Examination of psychological issues by a psychiatric specialist is recommended if there is a problem.

Due to complications and problems threatening women's health such as severe hot flashes, sudden sweating, fatigue, dizziness, as well as its physiological complications that lead to osteoporosis, ovarian atrophy, decreased female sex hormones, weight gain and sometimes urinary incontinence and depression, it is very important to pay attention to the health of postmenopausal women. Therefore, knowing the effective factors and symptoms of menopause will make life easier for postmenopausal women and reduce their mental and psychological problems. Given the role of women's knowledge, attitude, and practice towards menopausal health, it is important to focus on changing their behavior and practice with the help of health education experts and relevant experts in this field using behavior change theories and new techniques [105]. For climacteric and menopausal women, it is necessary to avoid smoking, limit alcohol and caffeine consumption, and manage stress and excitement for a healthy life.

Limitation

Some limitations, such as the risk of bias in some of the included RCTs, were significant. In addition, selection biases may exist. In some studies, the results of blinding participants, intervention providers, and evaluators are almost impossible. Most studies were limited by the outcome questionnaire and sample size. Most of the study questionnaires were self-report and some trials had a small sample size. Since most trials focused on the short-term effects, the long-term effects of such interventions are not good. Restricting systematic reviews to English only is a limitation of our study, which can reduce the lead to generalizability.

CONCLUSION

Women's health is a crucial component of community health. The findings of this study show that postmenopausal women require education, appropriate informa-

tion, counseling, support from their husbands and children, and social support and health services available with appropriate charges for all to get through this difficult time. According to the opinions of veterans, it is necessary to provide infrastructure, appropriate policy and support the medical team's capacity to promote and improve the provision of services to postmenopausal women.

FUNDING

The study, including the design, data collection, analysis and interpretation of data and writing the manuscript, was funded by National Agency for Strategic Research in Medical Education (NO, 983875).

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

- Parsa P, Tabesh RA, Soltani F, Karami M. Effect of group counseling on quality of life among postmenopausal women in Hamadan, Iran. *J Menopausal Med* 2017; 23: 49-55.
- El Hajj A, Wardy N, Haidar S, Bourgi D, Haddad ME, Chammas DE, et al. Menopausal symptoms, physical activity level and quality of life of women living in the Mediterranean region. *PLoS One* 2020; 15: e0230515.
- Hamoda H, Moger S. Developing the Women's health strategy: The British Menopause Society's recommendations to the department of health and social care's call for evidence. *Post Reprod Health* 2022; 28: 13-8.
- Gebretatyo H, Ghirmai L, Amanuel S, Gebreyohannes G, Tsighe Z, Tesfamariam EH. Effect of health education on knowledge and attitude of menopause among middle-age teachers. *BMC Womens Health* 2020; 20: 232.
- Rathnayake N, Alwis G, Lenora J, Mampitiya I, Lekamwasam S. Effect of health-promoting lifestyle modification education on knowledge, attitude, and quality of life of postmenopausal women. *Biomed Res Int* 2020; 2020: 3572903.
- Ali AM, Ahmed AH, Smail L. Psychological climacteric symptoms and attitudes toward menopause among Emirati women. *Int J Environ Res Public Health* 2020; 17: 5028.
- Smail L, Jassim G, Shakil A. Menopause-specific quality of life among Emirati women. *Int J Environ Res Public Health* 2019; 17: 40.
- Thomas A, Daley AJ. Women's views about physical activity as a treatment for vasomotor menopausal symptoms: a qualitative study. *BMC Womens Health* 2020; 20: 203.
- Khavandzadeh Aghdam S, Kazemzadeh R, Mahfouzi Y. Effectiveness of education on life style in menopausal women. *J Ilam Univ Med Sci* 2018; 26: 43-51.
- Byamugisha J, Munabi IG, Mubuuke AG, Mwaka AD, Kagawa M, Okullo I, et al. A health care professionals training needs assessment for oncology in Uganda. *Hum Resour Health* 2020; 18: 62.
- Hwang HJ, Park SY, Lee SH, Han SB, Ro KH. Differences in bone mineral density between the right and left hips in postmenopausal women. *J Korean Med Sci* 2012; 27: 686-90.
- Matthews VL, Knutsen SF, Beeson WL, Fraser GE. Soy milk and dairy consumption is independently associated with ultrasound attenuation of the heel bone among postmenopausal women: the Adventist Health Study-2. *Nutr Res* 2011; 31: 766-75.
- Naylor KL. Epidemiology of fracture in adults with kidney disease [dissertation]. London: The University of Western Ontario; 2015.
- Schürer C, Wallaschofski H, Nauck M, Völzke H, Schober HC, Hannemann A. Fracture risk and risk factors for osteoporosis: results from two representative population-based studies in North East Germany (Study of Health in Pomerania: SHIP-2 and SHIP-Trend). *Dtsch Arztebl Int* 2015; 112: 365-71.
- Darbà J, Kaskens L, Pérez-Álvarez N, Palacios S, Neyro JL, Rejas J. Disability-adjusted-life-years losses in postmenopausal women with osteoporosis: a burden of illness study. *BMC Public Health* 2015; 15: 324.
- Aslam H, Holloway-Kew KL, Mohebbi M, Jacka FN, Pasco JA. Association between dairy intake and fracture in an Australian-based cohort of women: a prospective study. *BMJ Open* 2019; 9: e031594.
- Yu X, Zhang Y, Han P, Fu L, Chen X, Hou L, et al. Effects of different living conditions on the risk of osteoporosis in Chinese community-dwelling elderly: a 3-year cohort study. *J Int Med Res* 2020; 48: 300060520943450.
- Sánchez-Rodríguez MA, Zacarías-Flores M, Arronte-Rosales A, Correa-Muñoz E, Mendoza-Núñez VM. Menopause as risk factor for oxidative stress. *Menopause* 2012; 19: 361-7.
- Shaki O, Rai SK, Kashid M, Chakrabarty BK. Prevalence of osteoporosis in peri- and post-menopausal women in slum area of Mumbai, India. *J Midlife Health* 2018; 9: 117-22.
- Mitchell PJ, Cooper C, Dawson-Hughes B, Gordon CM, Rizzoli R. Life-course approach to nutrition. *Osteoporos Int* 2015; 26: 2723-42.
- Farrar Z, Jawad AS. Optimising the management of osteoporosis. *Clin Med (Lond)* 2020; 20: e196-201.
- Ren C, Li P, Chen HZ. Letter by Ren et al regarding article, "Aromatase inhibitors and the risk of cardiovascular outcomes in women with breast cancer: a population-based cohort study?"

- Circulation 2020; 142: e156-7.
23. Ma CX, Sanchez C, Gao F, Crowder R, Naughton M, Pluard T, et al. A phase I study of the AKT inhibitor MK-2206 in combination with hormonal therapy in postmenopausal women with estrogen receptor-positive metastatic breast cancer. *Clin Cancer Res* 2016; 22: 2650-8.
 24. Gudmundsson A, Aspelund T, Sigurdsson G, Harris T, Launer LJ, Gudnason V, et al. Long-term hormone replacement therapy is associated with low coronary artery calcium levels in a cohort of older women: the age, gene/environment susceptibility-Reykjavik study. *J Am Geriatr Soc* 2017; 65: 200-6.
 25. Stuenkel CA, Davis SR, Gompel A, Lumsden MA, Murad MH, Pinkerton JV, et al. Treatment of symptoms of the menopause: an endocrine society clinical practice guideline. *J Clin Endocrinol Metab* 2015; 100: 3975-4011.
 26. Avasthi A, Veerasha KL, Bilal D. Oral health status of middle-aged (45-55 years) rural women: a cross-sectional study from North India. *Contemp Clin Dent* 2019; 10: 595-9.
 27. Kim S, Song JA, Kim ME, Hur MH. Effects of aromatherapy on menopausal symptoms, perceived stress and depression in middle-aged women: a systematic review. *J Korean Acad Nurs* 2016; 46: 619-29.
 28. Suri V, Suri V. Menopause and oral health. *J Midlife Health* 2014; 5: 115-20.
 29. Shahbazian H, Latifi SM, Jalali MT, Shahbazian H, Amani R, Nikhoo A, et al. Metabolic syndrome and its correlated factors in an urban population in South West of Iran. *J Diabetes Metab Disord* 2013; 12: 11.
 30. Han D, Fang X, Su D, Huang L, He M, Zhao D, et al. Dietary calcium intake and the risk of metabolic syndrome: a systematic review and meta-analysis. *Sci Rep* 2019; 9: 19046.
 31. Al-Safi ZA, Polotsky AJ. Obesity and menopause. *Best Pract Res Clin Obstet Gynaecol* 2015; 29: 548-53.
 32. Ayhan FF, Ataman Ş, Rezvani A, Paker N, Taştekin N, Kaya T, et al. Obesity associated with active, but preserved joints in rheumatoid arthritis: results from our national registry. *Arch Rheumatol* 2016; 31: 272-80.
 33. Feitosa-Filho GS, Peixoto JM, Pinheiro JES, Afíune Neto A, Albuquerque ALT, Cattani ÁC, et al. Updated geriatric cardiology guidelines of the Brazilian Society of Cardiology - 2019. *Arq Bras Cardiol* 2019; 112: 649-705.
 34. Bondolfi C, Taffe P, Augsburg A, Jaques C, Malebranche M, Clair C, et al. Impact of incarceration on cardiovascular disease risk factors: a systematic review and meta-regression on weight and BMI change. *BMJ Open* 2020; 10: e039278.
 35. Bernabe-Ortiz A, Benziger CP, Gilman RH, Smeeth L, Miranda JJ. Sex differences in risk factors for cardiovascular disease: the PERU MIGRANT study. *PLoS One* 2012; 7: e35127.
 36. Joshi K, Devi S, Lanjekar P. Evaluation of biochemical marker for bone turnover in post menopausal women. *J Lumbini Med Coll* 2013; 1: 57-9.
 37. Ra JS, Kim SO. Beneficial effects of breastfeeding on the prevention of metabolic syndrome among postmenopausal women. *Asian Nurs Res (Korean Soc Nurs Sci)* 2020; 14: 173-7.
 38. Cortés YI, Conant R, Catov JM, Matthews KA, Crawford SL, Hedderson MM, et al. Impact of nulliparity, hypertensive disorders of pregnancy, and gestational diabetes on vasomotor symptoms in midlife women. *Menopause* 2020; 27: 1363-70.
 39. Zhao D, Guallar E, Ouyang P, Subramanya V, Vaidya D, Ndumele CE, et al. Endogenous sex hormones and incident cardiovascular disease in post-menopausal women. *J Am Coll Cardiol* 2018; 71: 2555-66.
 40. Sekhon LH, Agarwal A. The menopause and oxidative stress. In: Agarwal A, Aziz N, Rizk B, editors. *Studies on women's health*. Springer Science+Business Media; 2013. pp. 181-203.
 41. Auro K, Joensuu A, Fischer K, Kettunen J, Salo P, Mattsson H, et al. A metabolic view on menopause and ageing. *Nat Commun* 2014; 5: 4708.
 42. Afrifa J, Botchway FA, Opoku YK, Badohu J, Ocran HE, Asare KK, et al. Assessment of cardiovascular risk in post-menopausal women in Ghana. *F1000Research* 2019; 8: 845.
 43. Lee JH, Go TH, Lee SH, Kim J, Huh JH, Kim JY, et al. Association between serum urate and risk of hypertension in menopausal women with XDH gene. *J Clin Med* 2019; 8: 738.
 44. Fawale MB, Ibigbami O, Ismail I, Mustapha AF, Komolafe MA, Olamoyegun MA, et al. Risk of obstructive sleep apnea, excessive daytime sleepiness and depressive symptoms in a Nigerian elderly population. *Sleep Sci* 2016; 9: 106-11.
 45. Yoon S, Kim JM, Kang HJ, Bae KY, Kim SW, Shin IS, et al. Associations of pulmonary function with dementia and depression in an older Korean population. *Psychiatry Investig* 2015; 12: 443-50.
 46. Negin J, Gregson S, Eaton JW, Schur N, Takaruzza A, Mason P, et al. Rising levels of HIV infection in older adults in Eastern Zimbabwe. *PLoS One* 2016; 11: e0162967.
 47. Hearn LE, Whitehead NE, Dunne EM, Latimer WW. Correlates of *Trichomonas vaginalis* among middle age and older adults who use drugs. *Subst Use Misuse* 2015; 50: 1501-9.
 48. Armo M, Sainik S. Assessment of menopausal symptom using modified menopause rating scale among rural women of Rajnandgaon in Chhattisgarh, a Central India region. *J South Asian Fed Obstet Gynaecol* 2020; 12: 209-14.
 49. Vieira MCA, da Câmara SMA, Moreira MA, Pirkle CM, Vafaei A, Maciel ÁCC. Symptoms of urinary incontinence and pelvic organ prolapse and physical performance in middle-aged women from Northeast Brazil: a cross-sectional study. *BMC Womens Health* 2019; 19: 94.
 50. Dieter AA, Wilkins ME, Wu JM. Epidemiological trends and

- future care needs for pelvic floor disorders. *Curr Opin Obstet Gynecol* 2015; 27: 380-4.
51. Corrêa LCAC, Pirkle CM, Wu YY, Vafaei A, Curcio CL, Câmara SMAD. Urinary incontinence is associated with physical performance decline in community-dwelling older women: results from the International Mobility in Aging Study. *J Aging Health* 2019; 31: 1872-91.
 52. Karakoç H, Uçtu AK, Özerdoğan N. Genitourinary syndrome of menopause: effects on related factors, quality of life, and self-care power. *Prz Menopauzalny* 2019; 18: 15-22.
 53. Ekpo EU, Brennan PC, Mello-Thoms C, McEntee MF. Relationship between breast density and selective estrogen-receptor modulators, aromatase inhibitors, physical activity, and diet: a systematic review. *Integr Cancer Ther* 2016; 15: 127-44.
 54. White AJ, Weinberg CR, Park YM, D'Aloisio AA, Vogtmann E, Nichols HB, et al. Sleep characteristics, light at night and breast cancer risk in a prospective cohort. *Int J Cancer* 2017; 141: 2204-14.
 55. Ritvo P, Edwards SA, Glendon G, Mirea L, Knight JA, Andrulis IL, et al. Beliefs about optimal age and screening frequency predict breast screening adherence in a prospective study of female relatives from the Ontario site of the Breast Cancer Family Registry. *BMC Public Health* 2012; 12: 518.
 56. Krusinska B, Wadolowska L, Biernacki M, Slowinska MA, Drozdowski M. Serum 'vitamin-mineral' profiles: associations with postmenopausal breast cancer risk including dietary patterns and supplementation. A case-control study. *Nutrients* 2019; 11: 2244.
 57. Cheng WL. The roles of menopausal-specific quality of life on breast cancer screening beliefs in menopausal and postmenopausal women. *J Menopausal Med* 2018; 24: 188-95. Erratum in: *J Menopausal Med* 2019; 25: 108.
 58. Mundet L, Cabib C, Ortega O, Rofes L, Tomsen N, Marin S, et al. Defective conduction of anorectal afferents is a very prevalent pathophysiological factor associated to fecal incontinence in women. *J Neurogastroenterol Motil* 2019; 25: 423-35.
 59. Kelekçi KH, Özyurt S, Özkan B, Karaca Ş, Karakuzu A, Bilgin İ. The impact of inflammatory and infectious diseases of vulvar on quality of life. *J Menopausal Med* 2016; 22: 131-8.
 60. Edwards D, Panay N. Treating vulvovaginal atrophy/genitourinary syndrome of menopause: how important is vaginal lubricant and moisturizer composition? *Climacteric* 2016; 19: 151-61.
 61. Nappi RE, Martini E, Cucinella L, Martella S, Tiranini L, Inzoli A, et al. Addressing vulvovaginal atrophy (VVA)/genitourinary syndrome of menopause (GSM) for healthy aging in women. *Front Endocrinol (Lausanne)* 2019; 10: 561.
 62. Wysocki S, Kingsberg S, Krychman M. Management of vaginal atrophy: implications from the REVIVE survey. *Clin Med Insights Reprod Health* 2014; 8: 23-30.
 63. Langevin SM, Grandis JR, Taioli E. Female hormonal and reproductive factors and head and neck squamous cell carcinoma risk. *Cancer Lett* 2011; 310: 216-21.
 64. Pang KL, Low NY, Chin KY. A review on the role of denosumab in fracture prevention. *Drug Des Devel Ther* 2020; 14: 4029-51.
 65. Jurgens T, Chan B, Caron C, Whelan AM. A comparative analysis of recommendations provided by clinical practice guideline for use of natural health products in the treatment of menopause-related vasomotor symptoms. *Complement Ther Med* 2020; 49: 102285.
 66. Sarri G, Pedder H, Dias S, Guo Y, Lumsden MA. Vasomotor symptoms resulting from natural menopause: a systematic review and network meta-analysis of treatment effects from the National Institute for Health and Care Excellence guideline on menopause. *BJOG* 2017; 124: 1514-23.
 67. Faubion SS, Kuhle CL, Shuster LT, Rocca WA. Long-term health consequences of premature or early menopause and considerations for management. *Climacteric* 2015; 18: 483-91.
 68. Seol GH, Lee YH, Kang P, You JH, Park M, Min SS. Randomized controlled trial for *Salvia sclarea* or *Lavandula angustifolia*: differential effects on blood pressure in female patients with urinary incontinence undergoing urodynamic examination. *J Altern Complement Med* 2013; 19: 664-70.
 69. Fallahzadeh H. Quality of life after the menopause in Iran: a population study. *Qual Life Res* 2010; 19: 813-9.
 70. Chester RC, Kling JM, Manson JE. What the Women's Health Initiative has taught us about menopausal hormone therapy. *Clin Cardiol* 2018; 41: 247-52.
 71. Ghorbani M, Azhari S, Esmaily HA, GhanbariHashemabadi BA. Investigation of the relationship between personality characteristics and vasomotor symptoms in menopausal women. *Iran J Nurs Midwifery Res* 2016; 21: 441-7.
 72. Çilgin H. Predictors of initiating hormone replacement therapy in postmenopausal women: a cross-sectional study. *ScientificWorldJournal* 2019; 2019: 1814804.
 73. Benitez-Del-Castillo JM. How to promote and preserve eyelid health. *Clin Ophthalmol* 2012; 6: 1689-98.
 74. Meng F, Ren S, Meng Y, Tao N, Zhang J. Association between stressful life events and female primary Sjogren's syndrome and their role in disease activity: a retrospective case-control study in China. *Neuropsychiatr Dis Treat* 2021; 17: 213-20.
 75. Nagendiran A, Kalaimani K, Anantharani K. Assessment of knowledge, practice and treatment adherence of patients with hypothyroidism in endocrinology department. *Int J Nutr Pharmacol Neurol Dis* 2021; 11: 189-93.
 76. Matuszek B, Nowakowski A, Paszkowski T. Chosen endocrinopathies in menopause – practical guidelines in diagnostics. *Przegląd Menopauzalny* 2011; 4: 289-94.
 77. Steibliene V, Aniuliene R, Aniulis P, Raskauskiene N, Adomai-

- tiene V. Affective symptoms and health-related quality of life among women with stress urinary incontinence: cross-sectional study. *Neuropsychiatr Dis Treat* 2020; 16: 535-44.
78. Byers AL, Vittinghoff E, Lui LY, Hoang T, Blazer DG, Covinsky KE, et al. Twenty-year depressive trajectories among older women. *Arch Gen Psychiatry* 2012; 69: 1073-9.
 79. Converso D, Viotti S, Sottimano I, Loera B, Molinengo G, Guidetti G. The relationship between menopausal symptoms and burnout. A cross-sectional study among nurses. *BMC Womens Health* 2019; 19: 148.
 80. Schreiber DR, Dautovich ND. Depressive symptoms and weight in midlife women: the role of stress eating and menopause status. *Menopause* 2017; 24: 1190-9.
 81. Zhou B, Sun X, Zhang M, Deng Y, Hu J. The symptomatology of climacteric syndrome: whether associated with the physical factors or psychological disorder in perimenopausal/postmenopausal patients with anxiety-depression disorder. *Arch Gynecol Obstet* 2012; 285: 1345-52.
 82. Shafiee Z, Zandiyeh Z, Moeini M, Gholami A. The effect of spiritual intervention on postmenopausal depression in women referred to urban healthcare centers in Isfahan: a double-blind clinical trial. *Nurs Midwifery Stud* 2016; 5: e32990.
 83. Jasińska M, Żułtak-Bączkowska K, Mroczek B, Kotwas A, Kemicer-Chmielewska E, Karakiewicz B, et al. Health behaviors of postmenopausal women. *Prz Menopauzalny* 2014; 13: 22-6.
 84. Liao S, Qi L, Xiong J, Yan J, Wang R. Intergenerational ties in context: association between caring for grandchildren and cognitive function in middle-aged and older Chinese. *Int J Environ Res Public Health* 2020; 18: 21.
 85. Holahan MR, Tzakis N, Oliveira FA. Developmental aspects of glucose and calcium availability on the persistence of memory function over the lifespan. *Front Aging Neurosci* 2019; 11: 253.
 86. Brinkman SD, Reese RJ, Norsworthy LA, Dellaria DK, Kinkade JW, Bengte J, et al. Validation of a self-administered computerized system to detect cognitive impairment in older adults. *J Appl Gerontol* 2014; 33: 942-62.
 87. Sabik NJ. Ageism and body esteem: associations with psychological well-being among late middle-aged African American and European American women. *J Gerontol B Psychol Sci Soc Sci* 2015; 70: 191-201.
 88. Ji C, Miller MA, Venezia A, Strazzullo P, Cappuccio FP. Comparisons of spot vs 24-h urine samples for estimating population salt intake: validation study in two independent samples of adults in Britain and Italy. *Nutr Metab Cardiovasc Dis* 2014; 24: 140-7.
 89. Wilson DW, Nash P, Buttar HS, Griffiths K, Singh R, De Meester F, et al. The role of food antioxidants, benefits of functional foods, and influence of feeding habits on the health of the older person: an overview. *Antioxidants (Basel)* 2017; 6: 81.
 90. Sakurai K, Shen C, Ezaki Y, Inamura N, Fukushima Y, Masuoka N, et al. Effects of Matcha Green Tea Powder on cognitive functions of community-dwelling elderly individuals. *Nutrients* 2020; 12: 3639.
 91. Al-Sari UA, Tobias JH, Archer H, Clark EM. Do subjective memory complaints predict falls, fractures and healthcare utilization? A two-year prospective study based on a cohort of older women recruited from primary care. *Int J Geriatr Psychiatry* 2017; 32: 968-76.
 92. Wallace SL, St Martin B, Lee K, Sokol ER. A cost-effectiveness analysis of vaginal carbon dioxide laser therapy compared with standard medical therapies for genitourinary syndrome of menopause-associated dyspareunia. *Am J Obstet Gynecol* 2020; 223: 890.e1-890.e12.
 93. Cohen O, Strizich GM, Ramos AR, Zee PC, Reid KJ, Mani V, et al. Sex differences in the association between smoking and sleep-disordered breathing in the Hispanic Community Health Study/Study of Latinos. *Chest* 2019; 156: 944-53.
 94. Sargazi M, Salehi S, Naji SA. An investigation on sleep behaviors of the elderly hospitalized in Zahedan. *Iran J Nurs Midwifery Res* 2012; 17: 58-63.
 95. Baker FC, de Zambotti M, Colrain IM, Bei B. Sleep problems during the menopausal transition: prevalence, impact, and management challenges. *Nat Sci Sleep* 2018; 10: 73-95.
 96. Cintron D, Lahr BD, Bailey KR, Santoro N, Lloyd R, Manson JE, et al. Effects of oral versus transdermal menopausal hormone treatments on self-reported sleep domains and their association with vasomotor symptoms in recently menopausal women enrolled in the Kronos Early Estrogen Prevention Study (KEEPS). *Menopause* 2018; 25: 145-53.
 97. D'Antonio B, Bouchard V. Impaired sleep quality is associated with concurrent elevations in inflammatory markers: are postmenopausal women at greater risk? *Biol Sex Differ* 2019; 10: 34.
 98. Sørensen T, Giraldi A, Vinberg M. Sexual distress and quality of life among women with bipolar disorder. *Int J Bipolar Disord* 2017; 5: 29.
 99. Starc A, Jukić T, Poljšak B, Dahmane R. Female sexual function and dysfunction: a cross-national prevalence study in Slovenia. *Acta Clin Croat* 2018; 57: 52-60.
 100. Kelley EL, Cannell MB, Gass M, Sealy-Jefferson S, Woods NF, Bird CE, et al. Is interpersonal abuse associated with sexual (dis)satisfaction among postmenopausal women? *Womens Health Issues* 2019; 29: 299-307.
 101. Hughes AK, Rostant OS, Pelon S. Sexual problems among older women by age and race. *J Womens Health (Larchmt)* 2015; 24: 663-9.
 102. Smith L, Yang L, Veronese N, Soysal P, Stubbs B, Jackson SE. Sexual activity is associated with greater enjoyment of life in older adults. *Sex Med* 2019; 7: 11-8.
 103. Kingsberg SA, Schaffir J, Faught BM, Pinkerton JV, Parish SJ,

- Iglesia CB, et al. Female sexual health: barriers to optimal outcomes and a roadmap for improved patient-clinician communications. *J Womens Health (Larchmt)* 2019; 28: 432-43.
104. Jenczura A, Czajkowska M, Skrzypulec-Frankel A, Skrzypulec-Plinta V, Drosdzol-Cop A. Sexual function of postmenopausal women addicted to alcohol. *Int J Environ Res Public Health* 2018; 15: 1639.
 105. Banke-Thomas A, Olorunsaiye CZ, Yaya S. "Leaving no one behind" also includes taking the elderly along concerning their sexual and reproductive health and rights: a new focus for Reproductive Health. *Reprod Health* 2020; 17: 101.
 106. Rabathaly PA, Chattu VK. An exploratory study to assess primary care physicians' attitudes toward talking about sexual health with older patients in Trinidad and Tobago. *J Family Med Prim Care* 2019; 8: 626-33.
 107. Carranza-Lira S, Núñez FDC. Sexual dysfunction prevalence in a group of pre- and postmenopausal Mexican women. *Prz Menopauzalny* 2018; 17: 39-42.
 108. Wood A, Runciman R, Wylie KR, McManus R. An update on female sexual function and dysfunction in old age and its relevance to old age psychiatry. *Aging Dis* 2012; 3: 373-84.
 109. Beigi M, Fahami F. A comparative study on sexual dysfunctions before and after menopause. *Iran J Nurs Midwifery Res* 2012; 17(2 Suppl 1): S72-5.
 110. Jamali S, Javadpour S, Mosalanejad L, Parnian R. Attitudes about sexual activity among postmenopausal women in different ethnic groups: a cross-sectional study in Jahrom, Iran. *J Reprod Infertil* 2016; 17: 47-55.
 111. Alavipour N, Masoumi SZ, Kazemi F, Parsa P. Randomized controlled trial protocol for evaluating the effect of group education on postmenopausal sexual dysfunction. *J Menopausal Med* 2020; 26: 112-20.
 112. Tiznobek A, Mirmolaei ST, Momenimovahed Z, Kazemnejad A, Taheri S. Effect of counseling on sexual function and behavior in postmenopausal women and their spouses: a randomized, controlled trial (RCT) study. *Prz Menopauzalny* 2017; 16: 99-103.
 113. Muliira JK, Muliira RS. Sexual health for older women: implications for nurses and other healthcare providers. *Sultan Qaboos Univ Med J* 2013; 13: 469-76.
 114. Dienye PO, Judah F, Ndukwu G. Frequency of symptoms and health seeking behaviours of menopausal women in an outpatient clinic in Port Harcourt, Nigeria. *Glob J Health Sci* 2013; 5: 39-47.
 115. Pope ZC, Zeng N, Zhang R, Lee HY, Gao Z. Effectiveness of combined smartwatch and social media intervention on breast cancer survivor health outcomes: a 10-week pilot randomized trial. *J Clin Med* 2018; 7: 140.
 116. Craft LL, Zderic TW, Gapstur SM, Vaniterson EH, Thomas DM, Siddique J, et al. Evidence that women meeting physical activity guidelines do not sit less: an observational inclinometry study. *Int J Behav Nutr Phys Act* 2012; 9: 122.
 117. Piva SR, Susko AM, Khoja SS, Josbeno DA, Fitzgerald GK, Toledo FG. Links between osteoarthritis and diabetes: implications for management from a physical activity perspective. *Clin Geriatr Med* 2015; 31: 67-87, viii.
 118. LaMonte MJ, Lewis CE, Buchner DM, Evenson KR, Rillamas-Sun E, Di C, et al. Both light intensity and moderate-to-vigorous physical activity measured by accelerometry are favorably associated with cardiometabolic risk factors in older women: The Objective Physical Activity and Cardiovascular Health (OPACH) Study. *J Am Heart Assoc* 2017; 6: e007064.
 119. Bielemann RM, Domingues MR, Horta BL, Menezes AM, Gonçalves H, Assunção MC, et al. Physical activity throughout adolescence and bone mineral density in early adulthood: the 1993 Pelotas (Brazil) Birth Cohort Study. *Osteoporos Int* 2014; 25: 2007-15.
 120. Carcelén-Fraile MDC, Aibar-Almazán A, Martínez-Amat A, Cruz-Díaz D, Díaz-Mohedo E, Redecillas-Peiró MT, et al. Effects of physical exercise on sexual function and quality of sexual life related to menopausal symptoms in peri- and postmenopausal women: a systematic review. *Int J Environ Res Public Health* 2020; 17: 2680.
 121. Fuentes-Aparicio L, Balasch-Bernat M, López-Bueno L. Add-on effect of postural instructions to abdominopelvic exercise on urinary symptoms and quality of life in climacteric women with stress urinary incontinence. A pilot randomized controlled trial. *Int J Environ Res Public Health* 2021; 18: 928.
 122. Sydora BC, Turner C, Malley A, Davenport M, Yuksel N, Shandro T, et al. Can walking exercise programs improve health for women in menopause transition and postmenopausal? Findings from a scoping review. *Menopause* 2020; 27: 952-63.
 123. Chang SJ, Chee W, Im EO. Menopausal symptoms and physical activity in multiethnic groups of midlife women: a secondary analysis. *J Adv Nurs* 2013; 69: 1953-65.
 124. Spencer L, McKenna L, Fary R, Jacques A, Briffa K. Upper back pain in postmenopausal women and associated physical characteristics. *PLoS One* 2019; 14: e0220452.
 125. Papadopoulou SK. Sarcopenia: a contemporary health problem among older adult populations. *Nutrients* 2020; 12: 1293.
 126. Panahande SB, Maghbooli Z, Hossein-Nezhad A, Qorbani M, Moeini-Nodeh S, Haghi-Aminjan H, et al. Effects of French maritime pine bark extract (Oligopin®) supplementation on bone remodeling markers in postmenopausal osteopenic women: a randomized clinical trial. *Phytother Res* 2019; 33: 1233-40.
 127. Vergne Y, Matta J, Morales L, Vargas W, Alvarez-Garriga C, Bayona M. Breast cancer and DNA repair capacity: association with use of multivitamin and calcium supplements. *Integr Med (Encinitas)* 2013; 12: 38-46.

128. Leiu KH, Chin YS, Mohd Shariff Z, Arumugam M, Chan YM. High body fat percentage and low consumption of dairy products were associated with vitamin D inadequacy among older women in Malaysia. *PLoS One* 2020; 15: e0228803.
129. Boucher BJ. The problems of vitamin d insufficiency in older people. *Aging Dis* 2012; 3: 313-29.
130. Ciavattini A, DI Giuseppe J, Clemente N, Moriconi L, Carpini GD, Montik N, et al. Thickness of preperitoneal fat as a predictor of malignancy in overweight and obese women with endometrial polyps. *Oncol Lett* 2016; 11: 2278-82.
131. de Courten B, Mousa A, Naderpoor N, Teede H, de Courten MP, Scragg R. Vitamin D supplementation for the prevention of type 2 diabetes in overweight adults: study protocol for a randomized controlled trial. *Trials* 2015; 16: 335.
132. Cheong M, Chew STH, Oliver J, Baggs G, Low YL, How CH, et al. Nutritional biomarkers and associated factors in community-dwelling older adults: findings from the SHIELD study. *Nutrients* 2020; 12: 3329.
133. Haring B, Crandall CJ, Wu C, LeBlanc ES, Shikany JM, Carbone L, et al. Dietary patterns and fractures in postmenopausal women: results from the Women's Health Initiative. *JAMA Intern Med* 2016; 176: 645-52.
134. Sprague BL, Stout NK, Schechter C, van Ravesteyn NT, Cevik M, Alagoz O, et al. Benefits, harms, and cost-effectiveness of supplemental ultrasonography screening for women with dense breasts. *Ann Intern Med* 2015; 162: 157-66.
135. Zhao JG, Zeng XT, Wang J, Liu L. Association between calcium or vitamin D supplementation and fracture incidence in community-dwelling older adults: a systematic review and meta-analysis. *JAMA* 2017; 318: 2466-82.
136. Vázquez-Lorente H, Molina-López J, Herrera-Quintana L, Gamarra-Morales Y, Quintero-Osso B, López-González B, et al. Erythrocyte Zn concentration and antioxidant response after supplementation with Zn in a postmenopausal population. A double-blind randomized trial. *Exp Gerontol* 2022; 162: 111766.
137. Chen PL, Lin HY, Ong JR, Ma HP. Development of a fall-risk assessment profile for community-dwelling older adults by using the National Health Interview Survey in Taiwan. *BMC Public Health* 2020; 20: 234.
138. Zhao J, Liang G, Huang H, Zeng L, Yang W, Pan J, et al. Identification of risk factors for falls in postmenopausal women: a systematic review and meta-analysis. *Osteoporos Int* 2020; 31: 1895-904.
139. Whittaker AC, Asamane EA, Aunger JA, Bondarev D, Cabbia A, Doody PD, et al. Physical activity and nutrition influences in ageing: current findings from the PANINI project. *Adv Geriatr Med Res* 2019; 1: e190005.
140. Rigi S, Mousavi SM, Benisi-Kohansal S, Azadbakht L, Esmailzadeh A. The association between plant-based dietary patterns and risk of breast cancer: a case-control study. *Sci Rep* 2021; 11: 3391.
141. Rozenberg S, Body JJ, Bruyère O, Bergmann P, Brandi ML, Cooper C, et al. Effects of dairy products consumption on health: benefits and beliefs--a commentary from the Belgian Bone Club and the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases. *Calcif Tissue Int* 2016; 98: 1-17.
142. Yamaguchi Y, Yamada M, Hapsari ED, Matsuo H. The influence of social isolation on the preventive behaviors for non-communicable diseases in community-dwelling older adults in Japan. *Int J Environ Res Public Health* 2020; 17: 8985.
143. Alquaiz AM, Siddiqui AR, Qureshi RH, Fouda MA, Almuneef MA, Habib FA, et al. Women Health in Saudi Arabia: a review of non-communicable diseases and their risk factors. *Pak J Med Sci* 2014; 30: 422-31.
144. Potter J, Brown L, Williams RL, Byles J, Collins CE. Diet quality and cancer outcomes in adults: a systematic review of epidemiological studies. *Int J Mol Sci* 2016; 17: 1052.
145. Geyer C. Postmenopausal osteoporosis: the role of lifestyle in maintaining bone mass and reducing fracture risk. *Am J Lifestyle Med* 2016; 11: 125-8.
146. Mangano KM, Noel SE, Dawson-Hughes B, Tucker KL. Sufficient plasma vitamin C is related to greater bone mineral density among postmenopausal women from the Boston Puerto Rican Health Study. *J Nutr* 2021; 151: 3764-72.
147. Ventura Dde A, Fonseca Vde M, Ramos EG, Marinheiro LP, Souza RA, Chaves CR, et al. Association between quality of the diet and cardiometabolic risk factors in postmenopausal women. *Nutr J* 2014; 13: 121.
148. Leung YS, Lee JJW, Lai MMP, Kwok CKM, Chong KC. Association between obesity, common chronic diseases and health promoting lifestyle profiles in Hong Kong adults: a cross-sectional study. *BMC Public Health* 2020; 20: 1624.
149. Whillans J, Nazroo J, Matthews K. Trajectories of vision in older people: the role of age and social position. *Eur J Ageing* 2016; 13: 171-84.
150. Smith KJ, Blizzard L, McNaughton SA, Gall SL, Dwyer T, Venn AJ. Daily eating frequency and cardiometabolic risk factors in young Australian adults: cross-sectional analyses. *Br J Nutr* 2012; 108: 1086-94.
151. Zhu D, Chung HF, Dobson AJ, Pandeya N, Giles GG, Bruinsma F, et al. Age at natural menopause and risk of incident cardiovascular disease: a pooled analysis of individual patient data. *Lancet Public Health* 2019; 4: e553-64.
152. Makuwa GN, Rikhotso SR, Mulaudzi FM. The perceptions of African women regarding natural menopause in Mamelodi, Tshwane district. *Curationis* 2015; 38: 1531.
153. Jundt K, Peschers U, Kentenich H. The investigation and treatment of female pelvic floor dysfunction. *Dtsch Arztebl Int* 2015;

- 112: 564-74.
154. Kim MK, Ahn CW, Nam JS, Kang S, Park JS, Kim KR. Association between nonalcoholic fatty liver disease and coronary artery calcification in postmenopausal women. *Menopause* 2015; 22: 1323-7.
 155. Harder H, Starkings RML, Fallowfield LJ, Menon U, Jacobs IJ, Jenkins VA. Sexual functioning in 4,418 postmenopausal women participating in UKCTOCS: a qualitative free-text analysis. *Menopause* 2019; 26: 1100-9.
 156. Heidari M, Ghodusi M, Rezaei P, Kabirian Abyaneh S, Sureshjani EH, Sheikhi RA. Sexual function and factors affecting menopause: a systematic review. *J Menopausal Med* 2019; 25: 15-27.
 157. Stachowiak G, Pertyński T, Pertyńska-Marczewska M. Metabolic disorders in menopause. *Prz Menopauzalny* 2015; 14: 59-64.
 158. Singhanian K, Kalhan M, Choudhary P, Kumar T. Association of menopausal symptoms with overweight and obesity among rural middle aged women in North India: a population based study. *J Midlife Health* 2020; 11: 137-43.
 159. Pathak N, Dhairyawan R, Tariq S. The experience of intimate partner violence among older women: a narrative review. *Maturitas* 2019; 121: 63-75.
 160. Yoshany N, Bahri N, Morovati Sharif Abad M, Mihanpour H, Delshad Noghabi A. Effects of training the menopausal health on knowledge and performance of husbands with women during transitional period to menopause. *J Health* 2018; 9: 27-35.
 161. Shukla R, Ganjiwale J, Patel R. Prevalence of postmenopausal symptoms, its effect on quality of life and coping in rural couple. *J Midlife Health* 2018; 9: 14-20.
 162. Norozi E, Kasiri Dolat Abadi N, Eslami A, Hasanzadeh A, Davari S. Women's knowledge and attitude toward menopause [abstract]. In: *The First International & 4th National Congress on Health Education & Promotion*; 2011 May 16-19; Tabriz, Iran.
 163. Seifi B, Ghanizadeh G, Seyedin H. Disaster health literacy of middle-aged women. *J Menopausal Med* 2018; 24: 150-4.
 164. Atrian MK, Solhi M, Ebadi Fard Azar F, Atoof F. Association of self-care status with some relevant factors in middle-aged women in their early menopausal stage. *J Educ Health Promot* 2018; 7: 104.
 165. Ozcan H. Healthy life style behaviors and quality of life at menopause. *Int J Caring Sci* 2019; 12: 492-500.
 166. Joseph N, Nagaraj K, Saralaya V, Nelliyanil M, Rao PJ. Assessment of menopausal symptoms among women attending various outreach clinics in South Canara District of India. *J Midlife Health* 2014; 5: 84-90.
 167. Samuel CA, Pinheiro LC, Reeder-Hayes KE, Walker JS, Corbie-Smith G, Fashaw SA, et al. To be young, Black, and living with breast cancer: a systematic review of health-related quality of life in young Black breast cancer survivors. *Breast Cancer Res Treat* 2016; 160: 1-15.
 168. Stacey D, Jull J, Beach S, Dumas A, Strychar I, Adamo K, et al. Middle-aged women's decisions about body weight management: needs assessment and testing of a knowledge translation tool. *Menopause* 2015; 22: 414-22.
 169. Yisma E, Eshetu N, Ly S, Dessalegn B. Prevalence and severity of menopause symptoms among perimenopausal and postmenopausal women aged 30-49 years in Gulele sub-city of Addis Ababa, Ethiopia. *BMC Womens Health* 2017; 17: 124.
 170. Hajifoghaha M, Nahidi F, Alizadeh S, Golezar S, Dabiri F, Mokhlesi SS, et al. Midwives' educational needs in Iran: a narrative review. *Iran J Nurs Midwifery Res* 2019; 25: 1-8.
 171. Bustami M, Matalaka KZ, Elyyan Y, Hussein N, Hussein N, Abu Safieh N, et al. Age of natural menopause among Jordanian women and factors related to premature and early menopause. *Risk Manag Healthc Policy* 2021; 14: 199-207.
 172. Souza Guerra GE Júnior, Prates Caldeira A, Piana Santos Lima de Oliveira F, Santos Figueiredo Brito MF, de Oliveira Silva Gerra KD, Mendes D'Angelis CE, et al. Quality of life in climacteric women assisted by primary health care. *PLoS One* 2019; 14: e0211617.
 173. Yazdkhasti M, Simbar M, Abdi F. Empowerment and coping strategies in menopause women: a review. *Iran Red Crescent Med J* 2015; 17: e18944.
 174. Kwak EK, Park HS, Kang NM. Menopause knowledge, attitude, symptom and management among midlife employed women. *J Menopausal Med* 2014; 20: 118-25.
 175. Koyuncu T, Ünsal A, Arslantaş D. Validity and reliability of menopause attitude assessment scale: a study in women aged 40-64 in Eskisehir-Mahmudiye. *TAF Prev Med Bull* 2015; 14: 448-52.
 176. Masjoudi M, Amjadi MA, Leyli EKN. Severity and frequency of menopausal symptoms in middle aged women, Rasht, Iran. *J Clin Diagn Res* 2017; 11: QC17-21.
 177. Huang C, Zheng Y, Zhu L, Li Y, Du L, Tao M, et al. Demands for perimenopausal health care in women aged 40 to 60 years—a hospital-based cross-sectional study in Shanghai, China. *Menopause* 2019; 26: 189-96.
 178. Jacobson M, Mills K, Graves G, Wolfman W, Fortier M. Guideline No. 422f: menopause and breast cancer. *J Obstet Gynaecol Can* 2021; 43: 1450-6.e1.