

Knowledge, Attitude and Practice Towards Bone & Joint Health: A Study In Women Of Age Group 40-50 Years

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Abstract:

During 40- 50 years of age woman's body start changing in the ways that can leads to weak bones. This is mainly due to the female hormone called estrogen. Estrogen helps in keeping the bone strong and healthy but with the drop in estrogen level around menopause bone loss speed up and woman loss nearly 10% of spine bone density in first 5 years after their last period. If the bone and joint health are not protected in this age, problems like osteoporosis (weak, break- prone bones) and osteoarthritis (painful joints) are most likely to occur after the 50 years of age. Mostly the women of 40-50 years of age have low bone density and about 1 in 3 women over 50 will have an osteoporosis related fracture this is due to poor knowledge and less active lifestyle. Consuming calcium rich sources and doing weight bearing exercises and checking risk with doctor and limit alcohol can protect bones and reduce the risk of painful fractures and disability in later life.

1. Keyword:

bone health, estrogen, osteoporosis, osteoarthritis, menopause, bone density, weak bone

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2. Introduction:

Healthy bones and joints allow you to live independently and stay active and weak bone makes you dependent on others [1]. Bones allow movement with the help of muscles and protect vital organs like skull protects the brain and ribs protect lungs [2]. It holds two main types of cells: - osteoclasts (remove old bone) and osteoblasts (build new bones) [3]. Bones store important minerals like calcium and phosphate and release them into the blood when needed. Bone strength depends on two factors: Bone quality (the internal structure and materials) and Bone quantity (like density, thickness) with the age, poor lifestyle, poor dietary habits will lead to osteoporosis (bone becomes thinner and weaker, rising fracture risk) [4]. Joints are the places where two or more bones come together and healthy joints allow smooth, friction free movement. It contains cartilage (smooth, slippery tissue), Subchondral bone (bone under the cartilage), joint fluid (lubricates the joint), ligaments, and tendons (stabilize the joint). Cartilage and bone beneath work together as "osteochondral unit" which help in carry weight and damage to this part of unit can cause pain and stiffness as leads to osteoarthritis [5]. Osteoarthritis and osteoporosis both are quite common in older women and strongly effect their daily routine work. During the age group of 40- 50 years of age estrogen levels start to drop. This hormone strongly affects bone, joints and muscles. Women start losing up to 10% of spine bone density in the first 5 years after the last period [6]. At the age of 45 or early 45 raises the risk of osteoporosis and

fractures later in the life so better to start hormone therapy or good dietary practices at the age of 45- 50 years of age will reduce the risk of bone fractures. What actually happens during menopause is permanent stopping of period due to loss of ovarian estrogen and progesterone production. Estrogen protects heart, brain, bones and metabolism. When there is drop in estrogen level bone breakdown speed up and bone building slows along this fat shifts to abdomen, risk of obesity, diabetes, heart disease increases and all these reduced the quality of life [7]. To prevent this: -

1. Move your body regularly like resistance or strength training or brisk walking – They help in keeping bone density and muscle mass. As compared to less active middle-aged women, the ones who are more active have higher muscle mass and better hip bone density than less active women.
2. Support with food and supplements- Try to eat more protein, calcium and vitamin D to protect muscles and bones. According to experts women of this age group should consume 1.0-1.2 g / protein / kg / day, 1000 mg calcium and 800 IU vitamin D daily for women till 45- 50 years of age. [8]
3. Talk to your doctor- Discuss with your doctor about family history, menopause stage, fractures, smoking, low weight, weight gain, ask if you need a bone density scan or whether menopausal hormone therapy is right according to your case. Menopause hormone therapy can reduce symptoms and slow bone loss, but it must be applied after advice from doctor.

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- India has the highest number of death rate from low bone density related fractures in 2019 around 26% [9]

- Osteoarthritis cases in India rises above 23 million (1990) to 62 million (2019)[10]

Burden is higher in women than men showing post-menopausal vulnerability and higher obesity. Joint pain is more common than back pain and menopause and loss of estrogen are important reasons for women health.

2.1 Why KAP studies are important for women's bone and joint health?

knowledge–Attitude–Practice (KAP) studies are necessary because they show what women know, feel and actually do for preventing osteoporosis and related bone or joint related problems. High disease burden, low awareness and practice: Among postmenopausal women in rural areas prevalence of osteoporosis was 68%, but only 28% had adequate knowledge and just 20% involve in preventive behaviour[11] Pregnancy-related bone loss: Pregnant women of both urban and rural groups had poor knowledge and poor exercise practice for preventing pregnancy associated osteoporosis. Estrogen receptors in cartilage, bone, tendon and muscle mean hormonal shifts can increase inflammatory mediators and pain sensitivity, contributing to osteoarthritis and widespread musculoskeletal pain[12]

- Show misconceptions and risk perception gaps:

KAP surveys focus on specific false beliefs (eg - that osteoporosis always has symptoms, or that only old women are at risk).[13]

- Link knowledge and attitudes to actual behaviour:

Multiple studies show higher knowledge and more positive attitudes are link with better preventive practice (eg – doing exercise, calcium/vitamin D intake, screening test) [14]

- Guide targeted and culturally appropriate interventions:

KAP data by age, education, residence, or income help design tailored education (e.g., focusing on rural women, low-income groups, according to their education level make them understand about each and every aspect)[15]

2.1.1 Knowledge level of women regarding bone and joint health: -

- Knowledge of calcium and vitamin D:

In premenopausal women, 83% women recognise sunlight as source of Vitamin D only 37% of the women know about calcium rich foods and 31% of the women have proper bone health education [16] Studies highlight high prevalence of inadequate calcium and vitamin D intake in the women's [17] Around 90% of the women thought calcium and vitamin D as supplements only they did not know the food sources of calcium or vitamin D. 57% of the women know their function and 34% of the women just know that they are linked with bone or muscle strength. Proper knowledge about their

sources helps reduce the risk of fractures, loss of independence and help maintain the bone mineral density and improve the quality of life.[18]

- Awareness about exercise for bone and joint health: -

Regular doing exercises is necessarily for supporting or improving bone mineral density or preventing fractures particularly weight bearing exercises. Mostly women just know that physical exercise is good for bones but some of them only know that doing exercise is beneficial for osteoporosis prevention.[19]

- Screening knowledge: -

It means checking the bone strength before fracture happens and women do not have knowledge on when to check for screening test and how it is done or why it matters. All the women below of the age of 60 should get bone density test if they smoke or have family history of hip fractures, rheumatoid arthritis, high alcohol intake. Evidence show with the help of screening test risk of hip fractures will be reduced.[20][21]

2.1.2 Attitudinal beliefs and perceptions:

- Perceived Susceptibility and Severity

Many women in their early 40s perceive osteoporosis and significant joint disease as problems of "old age" (60s and beyond), reducing their sense of immediate urgency. The severity of consequences (fracture, disability, loss of independence) is acknowledged intellectually but is often psychologically distanced. This "optimistic bias" belief that "it won't happen to me" is a significant barrier to adopting preventive practices in asymptomatic individuals.

- Perceived Benefits and Barriers: -

Women know that having bones and joints is really important. Healthy bones and joints help women do all the things they want to do without any pain or trouble. Women understand that they need to look after their bones and joints to stay active and independent. Women can do a lot of things to keep their bones and joints healthy like eating and exercising regularly. However, these long-term benefits are frequently outweighed by perceived short-term barriers.

These things are:

- (i) Time constraints from work and family caregiving responsibilities
- (ii) Lack of motivation or fatigue
- (iii) Fear of injury from exercise, especially strength training,
- (iv) Confusion over conflicting dietary advice
- (v) Financial costs associated with gyms, healthier food or supplements.[22],[23]

2.1.3 Lifestyle and Health Practices Influencing Bone and Joint Health: -

- Physical Activity Patterns

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While many women engage in physical activity, it is often insufficient in type, intensity and duration. Cardio-centric routines (walking, cycling) dominate, while structured resistance training, the most potent stimulus for bone maintenance is practiced by a minority. Barriers include lack of knowledge on how to perform exercises correctly, fear of "Bulking up," and lack of access to or comfort in gym environments. Adherence to any consistent exercise regimen is challenged by the barriers as mentioned before.[24],[25]

•Dietary Practices

Dietary calcium is persistently lower than advised. The intake of dairy products (the most absorbable form) is low because of misconceptions about fat content, lactose intolerance or adherence to popular diets (vegan diets without proper planning). The practice of using calcium-rich leafy vegetables and calcium-fortified foods is sporadic. Vitamin D supplements are not commonly practiced unless a deficiency is identified and then taken regularly. Exposure to the sun for vitamin D production is avoided because of the risk of skin cancer.[26]

A very important and often neglected area is protein intake. Adequate protein intake (at least 1.0-1.2 g/kg body weight) is necessary for muscle mass maintenance (sarcopenia prevention), which protects joints and prevents falls and acts as the bone matrix. This practice is rarely incorporated into bone health advice that a layperson can easily follow.[27]

2.2 Why many women suffer silently with bone and joint related issues: -

Bone related issues like osteoarthritis, osteoporosis and arthritis are quite common in the women's especially after the menopause Which leads to risk of fractures, loss of independence, pain discomfort and increase the risk of death still they remain silent until serious problems arises. [28]

Women in India had no knowledge about osteoporosis or have incorrect knowledge about 70% of post menopausal women did not exercise regularly [29] Among perimenopausal women two-thirds had inadequate awareness of nutrition and bone health with low knowledge of calcium-rich foods and harmful dietary habits. Common poor practices like low calcium consumption, no physical exercise, poor vitamin D intake, not checking for screen tests even at elevated risk this leads to severe issues.[30]

2.3 why prevention and early intervention are necessary?

1. It is "silent disease" as it shows no symptoms until fracture occurs which leads to severe pain and discomfort.[31]

2. Due to drop in estrogen levels and lower peak bone mass women have greater lifetime fracture risk than men.

3. It can lead to major consequences like hip and spine fractures which can lead to loss of mobility and higher mortality chances.[32]

4. A "critical window" of rapid bone loss spans 3–5 years around the final menstrual period.[33,34]

5. Spine bone mass density can fall by up to about 10% in the first 5 years after menopause [12]. Low level of estrogen and high FSH correlate with lower BMD (bone mass density) and higher rates of osteopenia or osteoporosis.[35]

So, it's better to take early intervention like building bone in youth and protecting it around menopause with calcium, vitamin D, doing physical exercise and avoid smoking or alcohol which leads to lower fracture risk. Effective screening, lifestyle changes and treatments exist but are underused. Many authors call for public awareness campaigns, routine education in women's health services and better primary-care screening to stop women suffering silently[36,37,38]

2.4 Common bone and joint disorders in midlife women?

During the menopausal years women face a sharp decline in the bone loss due to several factors which leads to joint problems like osteoporosis, osteoarthritis, low bone mass, rheumatoid arthritis which cause pain, disability and reduce the quality of life. Let us discuss one by one:

- Osteoporosis: - when estrogen level drops it accelerates bone loss essentially in first 5 years and leads to bone weakening disease with low Bone mineral density leading to the fractures of hip, wrist, spine even after minor falls. It is quite common among the women after menopause around 30-60% are affected or at high risk. Consequences include pain discomfort loss of Independence and inadequate quality of life especially even after small fracture[39,40]

- osteoarthritis: - middle-aged women over 50 years are mostly suffering from knee osteoarthritis and it gets worse after menopause related hormonal shifts, obesity and loss of muscle strength. It often affects knees, hips, hands and spine. Consequences include the pain, stiffness, Difficulty in doing the routine work, reduce the quality of life and major cause of disability. [41,42]

- low bone mass (osteopenia): - It is known as in between state of Bone density lower than the normal but not yet osteoporosis common in midlife and early postmenopausal (40-50% women's show on scans).[43]

- Rheumatoid arthritis: - A chronic autoimmune arthritis causing pain, swelling and damage in multiple joints. Most common in women and often starts between 30–60 years of age. Menopause can alter disease activity, joint damage, osteoporosis and cardiovascular disease become major concerns in midlife. Women with RA often experience more severe symptoms and higher disability and economic impact than men[44]

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2.5 Nutritional factors influencing bone and joint health: -

Bone and joint health are strongly influenced by diet like adequate calcium, Vitamin D, protein support the stronger bones and less joint damage over time.

1. Calcium: - It is the main source of mineral in the bones low intake will lead to increase the bone loss and fracture risk. Adults over the age of 50 should complete the requirement i.e 1000-1200 mg/ day either from foods or supplements. Best sources include milk, yogurt, cheese, tofu, green leafy vegetables and nuts. [45,46]

2. Vitamin D: - It helps in the absorption of calcium from the gut and keeps blood calcium stable. Correcting low vitamin D together with the help of calcium improves bone density and lowers hip fracture risk especially in older adults. Best sources include sunlight, fatty fish, eggs)

3. Protein: - It helps in building bone matrix and muscles. Higher intake of protein (when calcium intake is adequate) is linked to better bone density and reduces the risk of hip fracture. Required around 1.0-1.5 g/ kg/body weight/day.[48]

4. Anti-inflammatory foods: - These foods include antioxidants and polyphenols that may reduce inflammation affecting both bone and osteoarthritis risk. Sources include diet rich in fruits, vegetables, whole grains, olive oil, nuts and fish can help reduce the risk of lower fracture risk.[49]

3. Review of literature:

Joint health problems such as knee osteoarthritis, knee pain, osteoporosis, joint stiffness lead to reduced mobility and these are commonly seen in the women's of age 40-50 years of age. Key factors include hormonal changes, reduced physical activity, nutritional deficiencies and lack of awareness. These all play an important role in the occurrence of joint-related problems. Many studies have used the knowledge, Attitude and practice approach to understand that how much people know about joint-related issues, how they feel about it and how they practice preventive behaviours.

Several studies found that women of 40-50 years of age have limited knowledge about joint health. A cross-sectional study was conducted and data showed that most of the participants were unaware of early symptoms, preventing exercise and lifestyle measures for joint protection. Another major factor is that they consider the pain is a normal part of aging and did not take immediate action to prevent the occurrence of a major problem. This shows the gap between attitude and practice where awareness does not always translate into healthy behaviour.

S. No	Author and year	Sample/ data	Key findings	Research gap
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1	Xu et al., 2024	538 women of 40-60 years	- Suboptimal osteoporosis awareness score was (22.1±2.7) - High prevalence of osteoporosis/osteopenia	- No detailed measures of Attitude and practices - Study limited to one city
2	Ahmed et al., 2023	400 women of more than 18 years of age and 14.8% were 41-50 years of age	34% of the women had good knowledge, 22% had low and 44% had average	No focused analysis of 40-50 years of age or any joint specific health
3	Pant et al., 2020	328 middle aged women of 40-59 years of age	60% women are unaware of osteoporosis - Awareness association with age and education	No clinical bone/joint status measured
4	Jalili et al., 2015	770 women's (mainly in 40-50 years of age)	- Mean scores:- Knowledge-9.3/21 Attitude 2.6/5 Practice 1.5/6 - Adequate calcium consumption (5.5%)	Focus on above 45 years of age not on specific 40-50 years
5	Agarwal & Badkaur, 2018	100 Indian women	Preventive practice significantly related to education	- Socioeconomically narrow sample size - No BMD or

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			• knowledge and perceived barriers	joint status • limited generalizability
6	Nik Mohd Hatta et al., 2019	116 post menopausal women	• Inadequate knowledge and awareness • knowledge varied by age and education	• Practices were not properly detailed
7	Kalet al., 2024	1326 Indian post menopausal women 45-70 years	• shows even Bone mass density women had low knowledge • Higher education and prior information improved scores	• Does not isolate 40-50 group during analysis • Not explicit joint health outcomes
8	Saltik et al., 2023	225 Turkish post menopausal women	• women had low knowledge even high knowledge women often smoked and low calcium intake	• Demonstrate knowledge and practice gap but no focus made on pre-menopausal (40-50) years women
9	Panta et al. (Kathmandu OHBS), 2020	328 middle aged women	• High health motivation but low perceived barriers to Calcium.	• Does not link beliefs to actual fracture /BMD
10	EITohami et al., 2015	390 women's	• About half had good knowledge,	• Not specific to 40-50 of years.

			Attitude, • Practice. Younger women showed better knowledge and attitude	
11	Chintham et al., 2025	200 women (perimenopausal)	• Prevalence of inadequate awareness was 66.5% and 33.5% had moderate adequately dietary awareness • Awareness linked to age, education, diet, family history • Major gaps found in calcium rich foods and effects	• Only dietary knowledge • No behaviour measurement Such as actual intake
12	Geum et al., 2012	150 women of age more than 40	• Prevalence of osteoporosis was 22.7% while 42% of had osteopenia. • Inadequate intake of cal/ vit D	• Joint health not considered • Mostly post menopausal women included
13	Chelf et al., 2022	92 women of 35-50 years of age, they include men	• limited motivation to prevent osteoporosis	• mixed sex sample • No direct

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			sis •Barriers to exercise strongly reduced health motivatio n	practice or clinical outcomes
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4. Methodology-

❖ Study Design:

The present study was community based descriptive cross sectional study design to evaluate the knowledge, Attitudes and Practices regarding bone and joint health in women.

❖ Study Area: -

The study was performed in Abohar, Punjab and included both rural and urban areas. The reason for choosing this area is that high prevalence of bone and joint related problems among women in this region.

❖ Study population and sample size: -

The study was conducted on 380 women's aged 40 years and above. The participants were selected from both rural and urban areas to get a representative sample.

❖ Eligibility Criteria: -

- Inclusion Criteria: - Women's aged 40 years and above, Residents of rural and urban areas of Abohar, Punjab.
- Exclusion Criteria: - Pregnant or Lactating women, Elderly women beyond the targeted age group, women with severe illness preventing participation.

❖ Data collection: -

Data was collected using a structured format questionnaire consisting of 50 questions. This questionnaire was designed to check the following aspects: -

❖ Demographic details

- Lifestyle factors
- Presence of bone and joint related symptoms
- Awareness and knowledge regarding bone and joint health

These questionnaires were administered through direct interaction with the subjects to ensure proper and clear information.

❖ Nutrition Education: -

After data collection, nutrition and health education was provided to the participants. The education focused on: -

- Importance of healthy eating
- Necessity of proper calcium and vitamin D intake
- Role of regular physical exercise for maintaining bone and joint health

Outcome Measures: -

The primary outcome of study was the assessment of awareness and knowing levels related to bone and joint health among women aged 40 years and

above. The secondary outcome understanding their attitude and practices related to prevention and management. Collected data were compiled and analysed using statistical methods and results were expressed in terms of frequencies and percentages to interpret the levels of knowledge, Attitudes and Practices

5. Future outcomes: -

Education as well as bone screening timely clearly increases people's knowledge, beliefs and healthy habits about osteoporosis which include more calcium intake and less consumption of harmful drinks like coffee. Group education programs also raise awareness about calcium sources, vitamin D sources, offering a model for tailored nutrition and exercise interventions and community based screening and education and medicines for bone health to change behaviour and guide treatment. Studies show that poor nutrition like not consuming enough protein, calcium or poor knowledge of sources and irregular exercise patterns will lead to raise the risk of fractures in women. Starting habits like good consumption of calcium, protein and vitamin D and doing weight bearing exercises in midlife lowers the risk of osteoporosis. Avoiding fractures and severe osteoporosis will lead to pain, discomfort and need for nursing home care, reduce their independence and daily activities. Fewer fractures and less disability will improve the quality of life. This review helps in identifying the gaps and unhealthy practices that can be targeted through future interventions studies such as physical exercise programs. Additionally, it highlights the need for longitudinal research to evaluate the long-term effectiveness of preventive strategies and provide stronger evidence for improving bone and joint health outcomes in women's.

6. Conclusion: -

Most women of 40-50 years of age show limited to moderate knowledge about osteoporosis, arthritis and general bone health. Attitude is positive (they believe that bone health is important) but they do not follow good practices. Common practices such as adequate calcium/ vitamin D intake, weight bearing exercise, posture control and regular BMD tests are often inadequate. This age is a crucial point due to drop in estrogen and beginning of age-related bone loss. Interventions made during this stage can significantly reduce the risk of osteoporosis, fractures. Poor awareness regarding calcium/ vitamin D intake and poor physical exercise and screening guidelines, low sun exposure, improper dietary habits, poor medical checkup, excessive alcohol consumption these need to be improved. Better KAP can lower the future burden of osteoporosis, arthritis, joint pain, discomfort. Integrated bone and joint health education into existing women's health, NCD and reproductive health programs can increase the

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reach. Explore the barriers like social, economic and cultural to adopt healthy practices and make sure to target strategies to overcome them.

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