NARCHI BULLETIN

MAMC, Issue 5, March 2022

Midlife and Geriatric Health...Let's not miss the calls!

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From The President's Pen

Greetings from NARCHI Delhi !!

We took over the office of NARCHI (Delhi) in December 2020 and this 16 month long exciting journey now comes to an end. In line with our chosen theme 'Empowered Women: Enriched society',the energetic team of NARCHI office bearers ensured that our endeavors over the past year and a half focused on promoting maternal, child and reproductive health through various activities. I congratulate and thank the NARCHI MAMC team and all esteemed NARCHI members for the successful culmination of this fruitful journey.

One of the highpoints of our tenure, among others, has been the Annual NARCHI Conference, NARCHIDELCON and a presentation on 'Pregnancy and Covid 19' at the FIGO 2021 in collaboration with NARCHI headquarters. I thank Dr.Subrata Dawn, secretary general , NARCHI headquarters, Dr. K.K.Roy, National president, NARCHI, our patrons and advisors, all executive committee members and all sub-committee chairpersons,our outreach partners, NGOs as well as our Trade partners for offering their unflinching and continous support throughout our tenure.

It gives me great pleasure to bring forth this last quarterly issue of the NARCHI bulletin from MAMC; the bulletin being dedicated to 'Midlife and Geriatric Health'. I congratulate the editorial team for their immense effort in conceptualising and shaping this issue which deals with an important phase of a woman's life – a phase of transition and self-discovery.

It is now time to bid farewell and pass on the NARCHI flag to Lady Hardinge Medical College and I take this opportunity to congratulate Dr.Manju Puri and her able team and wish them the best. I am sure they will take NARCHI to even greater heights.

With best wishes

Dr Asmita Muthal Rathore
President NARCHI Delhi

From The Secretary's Desk

Dear Members,

Warm Greetings!

The journey through the tenure was an exhilarating experience despite the challenges thrown by the pandemic. It was our endevour to live up to the theme 'Enpowered women, Enriched Society'.

We kept running the show by resorting to the online media- an innovative means of interacting which we all discovered in the pandemic.

The highlights of the tenure were the virtual conference-Narchidelcon-Annual Conference of the association;the initiation of Caesarean Section Audit, participation in World Population Fortnight, NSV Fortnight and Training of HCW in partnership with DOHFW, Government of NCTD.

We had the privilege of presenting a session in FIGO 2021 on 'Pregnancy and Covid 19' in collaboration with NARCHI headquarters.

Besides the academic events- Webinars and educational series for post-graduates, many outreach activities were organised both online and offline, with special focus on adolescent health, cancer screening and thalassemia.

We went totally green with publication of five e-bulletins and the last of the series is in your hands. The theme addresses a very important segment of women's health- Midlife and geriatric health.

The NARCHI Delhi family has been extended to a total membership of 1156 by addition of 158 new members during our tenure.

Our heartfelt thanks to the headquarters, Dr. Dawn, Secretary General, Dr. K. K. Roy, National President, patrons, office bearers, members, institutions, sponsors and one and all for their continuous participation and support to make this journey meaningful, a tremendous learning experience and most of all, a memorable one.

Our heartiest congratulations to the dynamic team of Lady Harding Medical College for taking over the prestigious office and our best wishes to them for a rocking tenure ahead.

Bon voyage!!

Secretary

Dr Sangeeta Gupta **Dr Niharika Dhiman** **Dr Chetna Arvind Sethi**

From The Editorial Board

Editorial Team

Hello friends

Greetings from the editorial board!

The past year and a half have slipped like sand between fingers and the rigmarole of selection, distribution, collection and editing of articles for the bulletin now comes to an end. We bid adieu with mixed feelings…a feeling of happiness and satisfaction on the completion of a work well done…and, a feeling of sadness… of not wanting to let go. But …..change is the only constant and change it has to be! We are happy to pass on the baton to Dr.ManjuPuri and her team from LHMC and wish them all the best for their term.

Before we move on, our gratitude and thanks to our president Dr. Asmita Rathore for being 'our wall' and offering unconditional support and guidance, always. We would also like to thank our vibrant secretary, Dr. Sangeeta Gupta and her team for all the co-operation received from the secretariat. Our co-editors, Dr. Poonam Kashyap and Dr. Reena Rani have been our strongest pillars of support,from providing succinct updates on 'Women Pathbreakers'to formulating an interesting Qiuz for our young readers. Our admiration and respect for all our esteemed authors for their impressive and insightful articles which has made this journey of editorship a stimulating and rewarding experience for us. Last, but not the least, we thank all our readers for the immense love and appreciation they have showered on us.

We have devoted this final issue to 'Midlife and Geriatric Health'. This is a challenging phase of a woman's life which affects her both physically and mentally. So, we have articles on common health issues faced during menopause, like midlife mental health issues, sexual health and pelvic floor dysfunction, cardiovascular and lipid abnormalities and maintenance of bone health. They have been written by stalwarts in their fields, emphasizing the importance of beginning to take care of oneself early enough as well as the importance of providing optimal health care services through a multi-disciplinary approach. A rarely discussed topic but nonetheless very important- 'ERAS protocols in Obstetrics and Gynecology 'has been discussed in our segment 'In the future'. As always, a Quiz and an ode to 'Women Pathbreakers' are also there. Hope you enjoy reading this final issue!.

The curtains are drawn…..only long enough for dawn to break. For …..the show must go on…!!!.

Wishing you all a memorable read!

Dr Sangeeta Bhasin
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Strenghthening Musculoskeletal System After Menopause

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Introduction

During the menopausal transition, there is a physiological decline of estrogen which continues as age advances causing an overall adverse impact on the musculoskeletal health of women. Primarily affecting the elderly, sarcopenia is the progressive age-related decline in skeletal muscle mass and strength with risk of functional impairment and physical disability leading to a poor quality of life.[1] According to the European Working Group on Sarcopenia in Older People (EWGSOP), a consensus diagnostic criterion classifies age-related sarcopenia broadly into presarcopenia, sarcopenia and severe sarcopenia. In presarcopenia, there is low muscle mass without any impact on the strength of muscle or its physical performance. In sarcopenia, low muscle mass is seen along with either low muscle strength or low physical performance. Whereas, severe sarcopenia occurs when all three criteria are met - low muscle mass, low muscle strength and low physical performance. [2] These stages help in selecting appropriate treatment and recovery objectives.

In postmenopausal women, withdrawal of the protective effect of estrogen leads to greater bone resorption than bone formation, giving rise to osteoporosis. Both bone mass and bone mineral density decrease, causing fragile bones, prone to falls and fractures.[3] Osteoporosis may be primary or secondary. Primary osteoporosis is more common and includes postmenopausal osteoporosis (type I) and senile osteoporosis (type II) whereas secondary osteoporosis has a distinct etiology. In post-menopausal osteoporosis bone loss occurs at the rate of 1-2% per year and is maximum in the first 5-7 years after menopause. According to 1994 WHO developed specific criteria, Bone mineral density (BMD) of 2.5 standard deviations (SD) or more below the average value for a young healthy woman (T-score of <-2.5 SD) is defined as osteoporosis.[4]. This serves as both a diagnostic and interventional cut-off.

Epidemiology

According to estimates, over 50 million people in India are either osteopenic or osteoporotic.[5] A study conducted in healthy subjects of the Indian population, who were over 50 years, estimated prevalence of osteopenia as 49.5% and osteoporosis as 35.1%, making it a silent pandemic.[6] In United States and Europe, approximately 30% all postmenopausal women have osteoporosis while in India, various studies report prevalence between 25% and 62%.[7] According to a study of 2015, due to the hormonal changes occurring at menopause, 42.5% women suffered from osteoporosis compared to 24.6% men, above the age of 50.[8] Human muscle also shows constant changes with age. In sarcopenia, muscle mass is lost at a rate of 1-2% per year with muscle strength falling precipitously at 1.5-3% per year.[9]

Osteoporosis remains asymptomatic until they present with fragility fractures, especially of the vertebrae and hip, which are the early manifestations. Timely treatment reduces fracture risk and its associated morbidity and mortality.[10] According to Delhi Vertebral Osteoporosis Study (DeVOS) conducted in 2012, out of the 415 female subjects (aged above 50 years) that were enrolled, a high prevalence of 17.1% of vertebral fractures was noted.[11] Rate of hip fractures in Rohtak district of North India were reported to be 159 per 100,000 women (aged above 50 years).[12]

Etiology and Risk Factors

In most elderly population, the etiology of sarcopenia and osteoporosis is multi-factorial. Significant risk factors of sarcopenia include age, gender and level of physical activity. Thus, physical activity plays a role in both protection and management of sarcopenia. Other factors like deficient intake of energy and protein, reduced Vitamin D intake and associated co-morbidities such as obesity, type 2 diabetes and osteoporosis also lead to reduced functionality.[13] Osteoporosis has both modifiable and non-modifiable risks. Modifiable factors include consumption of calcium and vitamin D, nutritional status, physical activity and lifestyle modification, body mass index, smoking, alcohol and medication use.[14]. Non modifiable factors include sex, advancing age, ethnicity, race and genetic factors,

which have a strong influence on peak bone mass. Vitamin D deficiency in adolescence is shown to decrease peak bone mass in adults thus increasing the risk of developing osteoporosis.[15] (Grade A recommendation)

Clinical Presentation of Post Menopausal Musculoskeletal Problems

With decreasing levels of estrogen at menopause, there is a decline seen in muscle mass, muscle strength, locomotory function and bone density with an increase in visceral adiposity. The usual presentations are those of osteoporosis, sarcopenia and osteoarthritis. Acute back pain is the earliest manifestation of osteoporosis. It is usually due to pathological vertebral compression fracture restricting the spinal movement, with flexion reduced more than extension. Coughing and straining can also exacerbate the pain. The patient walks slowly, but the gait is usually normal. Another presentation could be that of thigh or groin pain due a pathologic hip fracture. Hip fractures are seen more in thin patients due to decreased resistance and low bone mass. These fractures are usually caused my minimal trauma and falls in the elderly. [16] Due to low muscle mass and strength in sarcopenic patients, they usually complain of muscle pain with proximal muscle weakness such as difficulty in rising from sitting position, climbing up and down the stairs and in regaining lost balance. They also have difficulty on walking on uneven surfaces. Cartilage degeneration leading to slow progressive joint inflammation is seen in osteoarthritis. This cartilage destruction is accelerated at menopause due to estrogen deficiency and presents with pain, swelling, joint stiffness and crepitus.[17]

DIAGNOSIS

A. HISTORY AND PHYSICAL EXAMINATION

A detailed history helps in selection of appropriate baseline tests and is necessary to rule out secondary causes such as hyperthyroidism, primary hyperparathyroidism, hypercortisolism, myeloma or osteomalacia. It is necessary to identify important risk factors such as history of falls, history of a fracture of the hip, wrist, or vertebra in a first-degree relative; cigarette smoking, history of a fracture after age 40, level of physical activity and nutritional intake among other factors as mentioned above. Patient is usually asymptomatic until they have fragility fractures which presents with sudden onset, severe pain with minimal trauma or chronic pain in mid-back radiating to the abdomen. Generalized bone pain is more suggestive of osteomalacia or metastasis. Patient gives history of difficulty in carrying out activities involving proximal muscles such as squatting or climbing stairs, which is more seen with vitamin D deficiency.

Physical examination includes measurement of BMI annually, checking for balance and gait, eliciting pretibial and sternal tenderness. Woman can be asked to get up from the chair without the help of her arms (get up and go test). [18] Patient with acute osteoporotic fracture presents with radiating back pain with marked tenderness over the involved vertebrae and spasm of paravertebral muscles. Often these fractures are not associated with abnormal neurology. Patient may present with stooped posture following old compression fracture of the thoracic spine (thoracic kyphosis).

B. DIAGNOSTIC TOOLS

Early diagnosis in the asymptomatic period by early screening and timely management helps prevent the associated morbidity and mortality.

1. Laboratory work up

This includes complete blood count (CBC), 24-hour urine collection of calcium and creatinine excretion; serum calcium, phosphate, alkaline phosphatase, parathyroid hormone (PTH), thyroid function tests, urinary free cortisol, creatinine and 25-hydroxy vitamin D3, serum protein electrophoresis and random blood sugar. This helps in ruling out secondary causes and co-morbidities such as hyperparathyroidism, hyperthyroidism, Cushing's syndrome, multiple myeloma and type 2 diabetes. Results of routine laboratory tests remains usually normal in asymptomatic postmenopausal osteoporotic women and do not indicate the prognosis. In severe osteoporosis, serum calcium, inorganic phosphorus, and alkaline phosphatase remain normal, although alkaline phosphatase may rise transiently for several weeks after a fracture. [7]

2. Bone turnover markers (BTMs)

These are reliable and cost-effective biochemical markers used in the initial evaluation (Grade A) and treatment monitoring for osteoporosis. Bone formation and resorption are in continuous balance promoting adequate bone remodeling. The dynamics of bone turnover in metabolic bone disorders can be assessed

based on increase or decrease of these markers. Bone formation marker include serum procollagen, type 1 Nterminal propeptide (PINP), and bonespecific alkaline phosphatase while bone resorption marker includes C-terminal telopeptide fragment of type 1 collagen (CTX). Along with baseline monitoring, check markers at six months after treatment initiation [18] (Grade B recommendations).

3. Dual-energy X-ray absorptiometry scan (DXA)

This is the gold standard for the diagnosis of osteoporosis. It uses x-ray technique for measurement of BMD at skeletal sites like lumbar spine, wrist and hip. The lowest BMD measured from all these sites is used for diagnosis (Grade A recommendations). BMD is expressed as T-score (standard deviations above or below BMD of age matched controls) and Z-score (standard deviations above or below BMD of young normal mean). Screening for secondary osteoporosis is done if history or examination shows low Zscores on DXA or evidence of a systemic disease (Grade A recommendations).[18] This technique is less expensive, requires less radiation, and has better reproducibility. It is seen that many patients with fractures have BMD in normal range.

The WHO criteria for defining osteoporosis by BMD measurement expressed as T-scores done by DXA scan are given in Table 1.

Table 1: WHO criteria for osteoporosis [4]

	T – score
Normal	-1.0 and above
Osteopenia	Between -1.0 and -2.5
Osteoporosis	-2.5 and below
Severe (established) osteopenia	- 2.5 and below along with one or more fragility fractures

Screening criteria for osteoporosis in post-menopausal women by DXA as recommended by the Indian Menopause Society (IMS) [18] (grade B recommendations) are:

- More than 5 years of menopause in all postmenopausal women.
- Less than 5 years of menopause in postmenopausal women along with risk factors of smoking, low BMI, steroid use, prior history of fragility fracture, rheumatoid arthritis, and parental history of hip fracture
- Women undergoing menopause transition along with secondary causes
- Presence of vertebral compression fracture with radiological evidence of osteopenia
- Fragility fractures in women
- Ideally before starting pharmacotherapy for osteoporosis.

Measurement of BMD can also be done by radiogrammetric parameters, peripheral quantitative computerized tomography (p QCT) and heel ultrasound (for screening purpose).[19]

4. Bioimpedance analysis (BIA)

Since it is more portable than DXA, it is used for immobile, bedridden patients for sarcopenia diagnosis. One way to asses muscle strength is grip strength, which can be done using a hydraulic dynamometer while a reliable measure of muscle performance in clinical practice is gait speed.[2]

5. Radiography

X-ray abnormality is evident when patient has advanced bone disease. By the time osteopenia becomes visible on X-ray, bone loss would have been significant. Lateral radiograph of spine in a patient with back pain may reveal vertebral fractures. X-rays are recommended in all diagnostic protocols of osteoporosis.[7]

6. Trabecular Bone Score

It is a readily available, non-invasive technology that helps in accurately and clinically evaluating the skeletal microstructure. The underlying principle is that multiple, connected and less sparse trabeculae indicate a high trabecular bone score, while a low trabecular number and connectivity and high trabecular separation indicate a low trabecular bone score.[7]

7. Other risk assessment tools

Simple Calculated Risk Estimation Score (SCORE) and Osteoporosis SelfAssessment Tool (OSTA) for Asians are simple tools for screening women at risk for osteoporotic fracture.[20]

Differential Diagnosis

Main two differentials are Osteoporosis and osteomalacia. In Osteoporosis, there is decrease in density of a normally mineralized bone whereas, in osteomalacia, bone density maybe normal or decreased (most common) and matrix is insufficiently mineralized. Osteoporosis is more common in elderly and postmenopausal women, and remains

asymptomatic until fracture occurs. Osteomalacia is difficult to diagnose clinically and is seen in all age groups. Common causes include renal failure, malabsorption, Vitamin D deficiency and hypophosphatemia. Osteoporosis presents with fragility fractures and sudden onset of severe pain, whereas osteomalacia can cause generalized bone pain and tenderness. Radiological features of both might be similar but axial changes predominate in osteoporosis and appendicular changes predominate in osteomalacia. Routine laboratory tests are usually normal in osteoporosis but deranged in osteomalacia. [16]

Management

1. Lifestyle modifications

Lifestyle management is an essential component which includes a balanced diet, physical activity, adequate sunlight exposure and avoiding alcohol, smoking, caffeine (<3cups/ day) and excess salt (limit to 5g/ day) (Grade B recommendations). Protein intake must be 0.8-1 g/kg body weight. RDA of calcium for postmenopausal woman is 800 mg/day and if needed supplements are used to correct deficiency.[18]

Physical activity is needed for bone health. Resistance, weight-bearing and core-stabilizing exercises are advised to maintain bone health (Grade A recommendations) and balance exercises to prevent falls. Brisk walking 4–5 times a week for 30 min is part of maintaining health but on its own may not be sufficient for bone health.

Severe osteoporosis patients should avoid forward and side -bending exercises and lifting heavy weights as these exert compressive forces on the spine. [21] (Grade A recommendations).

Patients should receive a multifactorial risk assessment and interventions to prevent falls.

2. Pharmacological treatment

Indications for treatment:

a. Fragility fractures (clinical or asymptomatic) (Grade A recommendations)
b. BMD Tscores less than −2.5 at any site after appropriate evaluation by DXA (Grade A recommendations)
c. Low bone mass on DXA with one major or two minor risk factors / based on clinical risk assessment tools such as OSTA for Asians, FRAX, and SCORE (Grade A recommendations)
d. 10year hip fracture probability ≥3% and 10 years major osteoporotic fracture probability ≥20% based on FRAX, OSTA and SCORE. [18]

Prognosis and Complications

The prognosis for osteoporosis is good, provided bone loss is detected early and proper intervention is taken to prevent its complications such as fractures and its associated morbidity. Preventing falls in osteoporotic patients also help prevent fractures of hip, wrist, spine, or other part of the skeletal system. Most common fractures are vertebral compression fractures causing inability to carry out activities of daily living ultimately leading to disability.

Risk Calculator: Frax Score (grade C)

Fracture risk assessment tool (FRAX) is a widely used tool that helps in identifying patients who would benefit from pharmacological therapy to reduce fracture risk. It takes into account nine factors – age, body mass index (BMI), bone mineral density (BMD), use of steroids, smoking, alcohol intake, prior fragility fracture, parental history of hip fracture, rheumatoid arthritis. It helps predicting the 10 year probability of major osteoporotic fracture (MOF) and hip fracture (HF). more than 20% for MOF and >3% for HF is the threshold considered for intervention initiation in osteoporosis. [7]. However it does include all predictors of fracture risk such as vitamin D deficiency, physical activity, likelihood of fall assessment, rate of bone loss and ethnicity.

Clinical Challenges / Points of Contention

With increasing life expectancy, and thus the elderly population, there has been an alarming rise in overall incidence of osteoporosis especially in women. Thus, there is a need of optimizing peak bone mass in young adults. Changing lifestyle also contributes to early osteoporosis. Lack of awareness among the general population about musculoskeletal health and their consequences is a major challenge in its management and calls for reduction in the treatment gap. Despite adequate medical intervention, reversing bone loss still remains a challenge. Poor coordination of healthcare systems with inadequate access to diagnostic tools, lack of compliance and low adherence to medications are few other challenges. [22] Hence there is a need for

Table 2 : Drugs recommended for postmenopausal osteoporosis [7, 18]

DRUG	INDICATION	DOSE	PRECAUTIONS	INTERACTION
Calcium	First-line, prevents bone loss and osteoporotic fractures	1200 mg orally combined with 1000-2000 IU Vitamin D	High doses can cause kidney stones thus used cautiously in kidney and heart patients, sarcoidosis and bone tumors.	Decreased absorption with foods rich in phytates, tannins, oxalic acid
Vitamin D	First line, Reduces fracture risk	Cholecalciferol 60000 IU orally once a week for 8 weeks/ IM injection of 600,000 IU followed by maintenance dose of 60,000 IU once a month.	Risk of hypercalcemia and hypercalciuria leading to impairment of renal function and nephrocalcinosis	Bile acid sequestrants and lipase inhibitors interfere with absorption. Antiepileptics, statins and steroids interfere with metabolism
Bisphospho-nates	First line, Early postmenopausal women with low or moderate fracture risk.	In India, oral alendronate (5-10mg daily), risedronate (35mg weekly) ibandronate (150mg monthly, and zoledronate (5mg iv) yearly	Esophagitis and jaw necrosis. Contraindicated in stage 4 and 5 kidney disease (eGFR below 30 to 35 mL/min), Upper GI disease which delay esophageal emptying such as achalasia are at risk of aspiration.	Antacids containing Magnesium or Aluminium or calcium supplements decrease absorption.
Teriparatide	Second line in severe osteoporosis with very low BMD	20 mcg/day subcutaneously (SC) is given for 18-24 months	Hypocalcemia, vit D status, hypersensitivity, hypercalciuria, renal side effects	
Denosumab	First line	60 mg SC once in 6 months	Risk of hypersensitivity and hypocalcemia. It can be used safely in renal diseases.	
Calcitonin	Second line for acute painful spine fractures	200 IU single-daily intranasal spray	Hypersensitivity reactions	
Hormone Replacement Therapy	First line, with menopausal symptoms. MHT should not be started at age >60 or >10 years post-menopausal solely for bone protection.	Various regimens	Blood clots, uterine, endometrial and breast cancer, heart and liver disease, stroke, increase risk of gall stones.	
Selective estrogen receptor modulators (SERM)	Prevention and treatment of osteoporosis, especially with an increased risk of breast cancer	Raloxifene 60 mg orally	Risk of thromboembolic disease and stroke	
Tibolone	First line	2.5 mg orally	Thrombo-embolism, stroke, MI, breast and endometrium cancer, active liver disease	Drug interactions with warfarin

dedicated geriatric clinics in both private and public hospitals and shared decision making with optimal medical and non-medical treatment.

Strength of Recommendation and Level of Evidence (LOE):

Strength of recommendation	Description
Grade A	Good quality patient-oriented evidence
Grade B	Limited quality patient-oriented evidence
Grade C	Based on other evidence- consensus, usual practice, disease-oriented evidence

References

1. Santilli V, Bernetti A, Mangone M, Paoloni M. Clinical definition of sarcopenia. Clin Cases Miner Bone Metab. 2014 Sep;11(3):177-80.
2. Cruz-Jentoft AJ, Baeyens JP, Bauer JM, Boirie Y, Cederholm T, Landi F, Martin FC, Michel JP, Rolland Y, Schneider SM, Topinková E, Vandewoude M, Zamboni M; European working group on sarcopenia in older people. sarcopenia: European consensus on definition and diagnosis: report of the European working group on sarcopenia in older people. Age Ageing. 2010 Jul;39(4):412-23.
3. Ji MX, Yu Q. Primary osteoporosis in postmenopausal women. Chronic Dis Transl Med. 2015 Mar 21;1(1):9-13.
4. Assessment of fracture risk and its application to screening for postmenopausal osteoporosis. Report of a WHO Study Group. Geneva, World Health Organization, 1994 (WHO Technical Report Series, No. 843).
5. Mithal A, Kaur P. Osteoporosis in Asia: A Call to Action. Current Osteoporosis Rep. 2012;10(4):245-7.
6. Marwaha R, Tandon N, Garg M, Kanwar R, Narang A, Sastry A, Saberwal A, Bhadra K, Mithal A. Bone health in healthy Indian population aged 50 years and above. Osteoporosis International. 2011;22(11):2829-36.
7. Paul T, Rajan R, Paul J, Kapoor N, Cherian K. Postmenopausal osteoporosis – An Indian perspective. Current Medical Issues, 2020;18(2):98.
8. Thulkar J, Singh S. Overview of research studies on osteoporosis in menopausal women since the last decade. J Midlife Health. 2015;6(3):104-7.
9. von Haehling S, Morley JE, Anker SD. From muscle wasting to sarcopenia and myopenia: update 2012. J Cachexia Sarcopenia Muscle. 2012 Dec;3(4):213-7.
10. Arceo-Mendoza RM, Camacho P. Prediction of fracture risk in patients with osteoporosis: a brief review. Women's Health. 2015:477-484.
11. Marwaha RK, Tandon N, Gupta Y, Bhadra K, Narang A, Mani K, Mithal A, Kukreja S. The prevalence of and risk factors for radiographic vertebral fractures in older Indian women and men: Delhi Vertebral Osteoporosis Study (DeVOS). Arch Osteoporos. 2012;7:201-7.
12. Dhanwal DK, Siwach R, Dixit V, Mithal A, Jameson K, Cooper C. Incidence of hip fracture in Rohtak district, North India. Arch Osteoporos. 2013;8:135.
13. Mithal A, Bansal B, Kyer CS, Ebeling P. The Asia-Pacific regional audit-epidemiology, costs, and burden of osteoporosis in India 2013: A report of International Osteoporosis Foundation. Indian J Endocrinol Metab. 2014 Jul;18(4):449-54.
14. Khadilkar AV, Mandlik RM. Epidemiology and treatment of osteoporosis in women: an Indian perspective. Int J Womens Health. 2015 Oct 19;7:841-50.
15. Pouresmaeili F, Kamalidehghan B, Kamarehei M, Goh YM. A comprehensive overview on osteoporosis and its risk factors. Ther Clin Risk Manag. 2018;14:2029-49.
16. Cosman F, de Beur SJ, LeBoff MS, et al. Clinician's guide to prevention and treatment of osteoporosis [published correction appears in Osteoporos Int. 2015 Jul;26(7):2045-7]. Osteoporos Int. 2014;25(10):2359-81.
17. Khadilkar SS. Musculoskeletal Disorders and Menopause. J Obstet Gynecol India. 2019;69:99-103.
18. Meeta M, Harinarayan CV, Marwah R, Sahay R, Kalra S, Babhulkar S. Clinical practice guidelines on postmenopausal osteoporosis: an executive summary and recommendations - update 2019-2020. J Midlife Health. 2020;11:96.
19. Jain S, Arora S, Gupta S, Sharma S, Bansal N, Ranjan S. Assessment of bone quality using radiogrammetric parameters of proximal humerus in India: defining the osteoporotic fracture risk limit value and its reliability. Indian J Orthop. 2020;54(Suppl 2):307-15.
20. Koh LK, Sedrine WB, Torralba TP, Kung A, Fujiwara S, Chan SP. A simple tool to identify Asian women at increased risk of osteoporosis. Osteoporos Int. 2001;12:699705.
21. Sinaki M. Exercise for patients with osteoporosis: Management of vertebral compression fractures and trunk strengthening for fall prevention. PM R. 2012;4:882–8.
22. Lems WF, Raterman HG. Critical issues and current challenges in osteoporosis and fracture prevention. An overview of unmet needs. Ther Adv Musculoskelet Dis. 2017;9(12):299-316.

Maintaining Sexual Health and Pelvic Supports Post-Menopause

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The female genital tract and pelvic floor muscles are derived from a common embryological precursor.[1] Thus, they have estrogen receptors which drive their quality, function and health. Menopause is natural cessation of menstruation secondary to permanent termination of ovarian function. Loss of ovarian function is succeeded by chronic hypoestrogenism with up to 90% reduction in estradiol and 70% reduction in estrone.[2] Consequentially, all the genitourinary organs and the pelvic floor undergo several changes leading to ageing and a constellation of symptoms grouped together as genitourinary syndrome comprising of sexual and urinary dysfunction. Further, there is a predisposition towards pelvic organ prolapse. The discomfort associated with these changes can significantly impact general health and quality of life. Early detection and individually tailored treatment are paramount for improving quality of life and preventing the exacerbation of symptoms in women with these issues. Preventive and corrective measures to maintain pelvic support and mucosal health form the cornerstone for maintenance of quality of life amongst post-menopausal women.

Genitourinary Syndrome of Menopause

Introduction

The multitude of symptoms resulting secondary to the effect of hypoestrogenism of menopause on the vulvovaginal mucosa and lower urinary tract are collectively termed as genitourinary syndrome of menopause (GSM). The term is relatively novel and was adopted by the consensus of North American Menopause Society and International Society for the Study of Women's Health in 2014.[3] It includes the previously more commonly used terms - vulvovaginal atrophy, atrophic vaginitis and urogenital atrophy. GSM is a progressive hypoestrogenic condition with external genital, urological, and sexual implications. Vaginal dryness and dyspareunia are the two most common symptoms and are present in around 90% women with GSM. Other vaginal symptoms such as discharge, burning, itching and irritation may also be present. Urinary complaints include dysuria, urgency and recurrent urinary tract infections; and may be seen in one third of the patients (Table 1). Stress urinary incontinence, although less common, may also be reported. Physical examination may reveal several findings (Table 2), the severity of which do not essentially correlate with the degree of symptoms. Introital narrowing secondary to prolonged atrophy, posterior fissuring, absence of rugosity, dryness, inflammation and petechiae, all contribute to dyspareunia and decreased sexual desire. Retraction of the clitoral hood and exposure of the glans may also make any sexual stimulation painful. Sometimes, the GSM may be associated with bleeding, shifting the focus and line of investigation to ruling out malignancy instead of treating GSM. Urogenital infections and dermatological disorders like eczema or psoriasis form the important differential diagnosis and must be ruled out conclusively before making a diagnosis of GSM.

Table 1. Genitourinary Syndrome of Menopause - Symptoms[4]

Genital symptoms • Dryness • Irritation/itching/burning • Discharge
Urinary symptoms • Urinary urgency • Dysuria • Nocturia • Recurrent urinary tract infections
Sexual symptoms • Dyspareunia • Diminished arousal/lubrication • Delayed or decreased orgasm • Postcoital bleeding

Table 2. Genitourinary Syndrome of Menopause – Signs[4]

Vulva • Thinning and loss of pubic hair • Thinning or fusion of labia • Clitoral hood retraction or fusion • Posterior fissuring

Vagina • Retraction of the introitus • Petechiae, erythema or pallor • Decreased rugosity • Loss of hymenal remnants • Leukorrhea • pH > 5 • Diminished vaginal and cervical secretions
Urethra • Prominence of urethral meatus or caruncle

Epidemiology

Up to 50% of post-menopausal women report symptoms of GSM. However, the actual incidence may be even higher.[5] There are several factors which amount to under-reporting of GSM. Most women may perceive the symptoms as a part and parcel of menopause and do not categorize them as a medical problem. Further, there is a social discomfort on the part of patients to initiate discussion on GSM, which is further exaggerated by the inadequate sensitization of the healthcare workers. Thus, it is essential on the part of the clinician to actively screen for GSM. The reported prevalence of GSM, thus, varies widely from place to place in view of socio-cultural determinants. A study from China by Geng et al found a prevalence of 31%[6], while 45% women reported symptoms in an international online survey of post-menopausal women aged 55 to 65 years.[7] Studies including physical examination findings for diagnosis of GSM, report a higher incidence. One such study from Spain reported a 70% prevalence of GSM amongst 430 post-menopausal women.[8] A staggering 79.1% prevalence was reported by a multicentric observational study involving 913 women, the diagnosis of GSM being made based on presence of vaginal dryness, local signs and a vaginal pH > 5.[9]

Pathophysiology

A state of estrogen deficiency is central to the pathophysiology of GSM. In the pre-menopausal state, estrogen is responsible for maintenance of urogenital health via its actions on the blood vessels, epithelium, and the underlying cells.[10] Estrogen is responsible for adequate lubrication through its action on the Bartholin and the endocervical glands. Further, being a vasoactive hormone, estrogen leads to vasodilatation and transudative lubrication in the vaginal mucosa. The normal vaginal epithelium is a three-layered structure comprised of a superficial glycogen rich layer, an intermediate layer and a parabasal layer. The glycogen acts as a substrate for lactobacilli resulting in production of organic acids and acidic pH, which in turn protects from vulvo-vaginal infections. With decrease in estrogen after menopause, the glycogen layer becomes less prominent leading to shift in pH and microbiome, predisposing to infections. Estrogen further maintains the structural integrity of the vaginal wall by enhancing production of mucopolysachharides and hyaluronic acid and helps in the maintenance of vaginal wall thickness and elasticity.[10] Menopause is thus a state of estrogen deficiency which leads to the plethora of clinical manifestations of the genitourinary syndrome.

Clinical assessment

The diagnosis of GSM is a clinical one after ruling out the other differential diagnoses including vaginal lichen sclerosis, vaginal lichen planus, hyperkeratosis, contact dermatitis, vulval cancer and vaginal infections.[11] Once a diagnosis is made, further assessment of severity can be made using various objective and subjective assessment tools. These tools may also be used to gauge the response to therapy. Amongst the subjective tools, visual analog scale of GSM symptoms, female sexual function index (which assesses 6 domains of sexuality: desire, arousal, lubrication, orgasm, satisfaction and pain), and 12 item short form survey based on overall quality of life are commonly used.[11] Other specific questionnaires like 'Vaginal Symptom Questionnaire', 'Day to day Impact of Vaginal Atrophy questionnaire' and 'Vulvovaginal Atrophy Questionnaire (VAQ)' have also been used.[4] The Food and Drug Administration have also recommended recording the most bothersome symptom.[4]

The commonly used objective tools include Vaginal Health Index (VHI) and Vaginal Maturation Index (VMI).[11] VHI is based on 5 variables, 4 of which are dependent on the subjective evaluation by the physician (vaginal elasticity, fluid volume, epithelial integrity, and moisture). Vaginal pH measurement is an objective measure and part of the VHI. A vaginal pH of >4.6 in absence of bacterial vaginosis indicates vulvovaginal atrophy.[12] The VMI assesses the proportion of the superficial, intermediate and parabasal layers in the vaginal epithelium. A proportion of >15% of superficial layer is considered normal and a value of less than 5% is typically considered indicative of GSM.[13] There is an unmet need for developing a standardized and uniform assessment tool for better evaluation and foster clinical research.

Management

The treatment of GSM involves shared decision making between the patient and the physician to achieve individualized therapy/ clinical goals. Open discussion and frank communication are essential for identifying symptoms and defining goals according to ones own needs. Treatment options include the use of (i) lubricants and moisturizers; (ii) topical hormonal therapies; (iii) oral treatment with ospemifene; (iv) adjuvant lifestyle modification therapies; (v) laser and radiofrequency ablation based therapies which are still evolving.[4] Vaginal moisturizers and lubricants are the first line therapy for treating the most common symptoms of GSM including vaginal dryness and dyspareunia. Lubricants are to be used immediately before coitus and work by reducing friction. They may be aqueous or mineral, silicone or plant based oils. Moisturizers are intended for long term use and act by rehydrating the vaginal tissue, stimulating vaginal secretions and lowering vaginal pH. However, GSM may continue to progress despite long term use of moisturizers. Topical lignocaine-based lubricants, may be especially useful for women who suffer severe pain and dyspareunia. However, they may affect the partner's as well as the subject's sexual sensations.

Locally applied estrogen is the most effective treatment for GSM.[14] Estrogen restores the vaginal epithelium, vaginal pH, microbiome and improves epithelial thickening, elasticity and vaginal secretions. Topical estrogen also improves urge urinary incontinence and occurrence of recurrent urinary tract infections.[14] The role of topical estrogen for treatment of stress urinary incontinence is still less well defined. Oral estrogen or combined estrogen-progesterone therapy is not indicated for symptoms of GSM alone.[15] Local preparations are available in various estrogen formulations in the form of creams, tablets, soft gel capsules and rings (Table 3). Estradiol rings are inserted for a duration up to 3 months and may be preferred by some. The type of formulation can be chosen as per personal preference after appropriate discussion. All forms are considered equivalent in terms of efficacy towards vaginal atrophy.[16] Due to the minimal absorption in the blood stream, these preparations pose little systemic risks associated with systemic estrogens. Endometrial surveillance and progesterone replacement is also not required. However, it is preferable to offer non-hormonal therapies as first line to patients with history of breast carcinoma. Approach to treatment involves initial frequent applications depending on the patient's symptoms and then a prolonged maintenance phase with 2-3 times weekly applications. Initial response to therapy takes 4 to 6 weeks and this should be clearly highlighted to those who initiate therapy. Local daily inserts of prasterone/ dehydroepiandrosterone (DHEA) have also been approved for severe vaginal atrophy in view of their urogenital effects similar to local estrogens.

Table 3. US FDA approved local hormonal formulations for GSM.[4]

Product	Dosing
17β estradiol cream (0.1 mg/g)	Initial: 2-4 g/day for 1-2 weeks followed by Maintenance: 1 g/ 1-3 times a week
Conjugated estrogen cream (0.625 mg/g)	0.5-2 g/day for 21 days then twice a week
17β estradiol ring (7.5 µg/d)	Inserted for 3 months without interruption
Estradiol hemihydrate tablet (10 µg/d)	Initial: 1 tablet/day for 2 weeks Maintenance: 1 tablet twice a week
Estradiol soft gel insert (4 µg or 10 µg)	Initial: 1 insert/day for 2 weeks Maintenance: 1 insert twice a week
DHEA (Prasterone) 6.5 mg insert	1 insert per day

Oral ospemifene is a selective estrogen receptor modulator, which acts as an estrogen agonist in the vagina, with no estrognenic effects on breast and endometrium. In a dose of 60 mg/day it has been approved for treatment of dyspareunia. However, in view of association of hot flushes and slightly increased risk of thrombosis it requires counselling before initiation. Lifestyle management for maintenance of sexual health also forms an important part of management of GSM.[4] Women should be encouraged to have open discussion with their partners regarding their sexual health, their needs and other pertinent issues. Regular sexual activity in itself helps in maintaining vaginal health by improving vascularity and elasticity of the vaginal tissues. Mindfulness exercises and pelvic floor physical therapy may be used for teaching relaxation to patients with dyspareunia on penetration. Pelvic floor exercises have a more defined role in management of urinary incontinence. Dilators may be helpful for patients with long standing dyspareunia, vaginismus, labial fusion, vaginal introitus narrowing and vaginal strictures.

Lasers and radiofrequency devices have been made available recently for the treatment of GSM and their role is still evolving. These work on the principle of controlled injury followed by tissue repair and

remodelling, which leads to improved function.[18] The therapy involves 2-3 sessions of treatment spread over 6-9 months. Although, there are several observational studies citing the efficacy of these therapies, these therapies should be considered experimental at present.[18, 19] In view of lack of randomized controlled studies and data on long term safety, most international bodies have cautioned against their use.[17-19] It is better to consider their use in a trial setting and larger studies are warranted before regularizing their use.

Urinary incontinence and menopause

Urinary incontinence (UI) is defined by International Continence Society (ICS) as any involuntary leakage of urine. Prevalence and severity of UI increases with age. There are 3 major types of UI which affect post-menopausal women: (i) stress UI (SUI), (ii) urge UI associated with detrusor overactivity and (iii) mixed type. Most women will present with the mixed type, and it is often difficult to ascertain the relative contribution of each subtype. The occurrence of UI in post-menopausal women is a complex process occurring secondary to effects of both estrogen deficiency and ageing. Prevalence studies across different age groups show a bimodal distribution with peaks at age 45-54 followed by another peak after the age of 70 years.[20] The increased incidence of lower urinary tract symptoms (LUTS) and SUI after menopause raises suspicion regarding causative association with estrogen deficiency. Similar to its effects on vaginal epithelium, estrogen also improves urethral epithelium with increase in loose vascular and collagenous tissue in the submucosal layer.[21] This contributes to passive closure by coaptation and improves continence. Estrogen also has significant effects on neural modulation in the pelvis.[22] The hypoestrogenic state of menopause may lead to bladder irritability, overactivity and urge incontinence. Further, the weakening of the pelvic floor muscles due to hypoestrogenic state may also contribute to the development of stress and mixed UI. Lastly, change in vaginal microbiome predispose to recurrent urinary tract infections which are associated with LUTS, dysuria and urge UI.

Local estrogen therapy may be beneficial for women suffering with overactive bladder and urge UI, as estrogen reduces recurrent urinary tract infections[4] as well as amplitude and frequency of detrusor muscle contractions.[22] However, estrogens have no role in the management of stress UI. Anti-cholinergic drugs, β_3-adrenergic agonists and serotonin-norepinephrine reuptake inhibitors (SNRIs) are other class of drugs which are often used for management of SUI.[23] Weight loss, pelvic floor muscle training and bladder retraining are important therapies to be considered, especially for stress urinary incontinence.[23] For severe stress UI which is unresponsive to medical therapies and lifestyle modifications, surgical interventions may be considered. Local laser and radiofrequency therapies may have a role in stress UI, however, they remain experimental at present.

Pelvic organ prolapse and menopause

Pelvic organ prolapse (POP) is vaginal protrusion and descent of other pelvic organs into the vaginal canal, secondary to loss of fibromuscular support of the pelvic viscera. Typical presentations include vaginal bulging, pelvic pressure, bleeding, discharge, infections and low back aches.[24] Although, 50% of parous females are estimated to suffer some degree of genital prolapse, it is socially stigmatising to such an extent, that only 10 to 20% seek medical care.[25] Further, lifetime risk of undergoing a surgical procedure for genital prolapse by age of 80 years is approximately 11%.[26] Previous vaginal birth is the single most important risk factor for development of POP secondary to damage to the pelvic floor muscles, with nullipara contributing to only 2% of the total number of cases.[24] Other risk factors include prolonged increase in intra-abdominal pressures, obesity, smoking, ageing and post-menopausal state.[24] The weakening of pelvic floor musculature and supports is a complex multifactorial phenomenon mainly dependent on damage due to previous vaginal birth and ageing. Estrogen influences the maintainence of the collagen content and elasticity of the endopelvic fascia and strength of the pelvic floor musculature. However, the effect of menopause on POP is less well studied. Importantly, neither menopausal status[27,28] nor the length of estrogen deficiency[29,30] is linked with the incidence or severity of POP. Thus, there is no evidence to support use of oral or topical estrogen therapy for the purpose of prevention or treatment of POP.[31]

Prevention of POP entails a multi-pronged approach. Although, vaginal birth is the predominant risk factor for POP, Caesarean deliveries cannot be recommended upfront due to the risk involved.[32] However, women could be screened for major risk factors for prolapse during a shared decision making regarding the mode of delivery. These risk factors include urinary incontinence before pregnancy, ethnicity, age at birth

of first child, body mass index, family history of POP, baby weight > 4 kg and maternal height < 160 cm.[33] Regular pelvic floor muscle training may be helpful in prevention and management of POP. However, the effect size may be small and difficult to demonstrate conclusively in clinical studies.[34,35] Nevertheless, it is still considered as first line therapy for any degree of POP. Modification of other risk factors including smoking, weight loss and treatment of chronic constipation should also be paid attention to.[36] Once POP occurs, management options include conservative therapy with lifestyle modification, pelvic floor muscle training and vaginal pessaries for minor degrees of prolapse.[36] Surgical treatment is reserved for severe degree of prolapse causing significant impairment to quality of life.[36]

Conclusion

Menopause is a natural hypoestrogenic state secondary to cessation of ovarian function which marks a critical transition. Estrogen is central to optimal maintenance of female urogenital health in lieu of its pleomorphic effects. The deleterious effects on the urogenital system secondary to diminished availability of estrogen leads to genitourinary syndrome of menopause. It also contributes to development of stress urinary incontinence and pelvic organ prolapse (which is often multi-factorial), albeit to a much lesser extent. These issues, though they significantly alter quality of life, still remain grossly under-recognized due to the attached social stigma and thus, warrant an aggressive screening approach from the physician. Preventive measures are of limited efficacy and largely pertain to adapting a healthy and active lifestyle. Local estrogen therapy is the cornerstone of management of genitourinary syndrome. An individualized multi-disciplinary approach which involves shared decision making by the patient holds the key to optimal utilization of all the available therapies for ensuring satisfactory quality of life.

References

1. Tan O, Bradshaw K, Carr B. Management of vulvovaginal atrophy related sexual dysfunction in postmenopausal women: an up-to-date review. Menopause 2012; 9: 109–17.
2. Suh DD, Yang CC, Cao Y. Magnetic resonance imaging anatomy of the female genitalia in premenopausal and postmenopausal women. J Urol 2003; 170: 138–44.
3. Portman DJ and Gass MLS. Genitourinary syndrome of menopause: new terminology for vulvovaginal atrophy from the International Society for the Study of Women's Sexual Health and the North American Menopause Society. Menopause 2014; 21: 1063–8.
4. Phillips NA, Bachmann GA. The genitourinary syndrome of menopause. Menopause. 2021; 28(5): 579-88.
5. DiBonaventura M, Luo X, Moffatt M, Bushmakin AG, Kumar M, Bobula J. The association between vulvovaginal atrophy symptoms and quality of life among postmenopausal women in the United States and Western Europe. J Womens Health (Larchmt) 2015; 24: 713-22.
6. Geng L, Zheng Y, Zhou Y, Li C, Tao M. The prevalence and determinants of genitourinary syndrome of menopause in Chinese mid-life women: a single study center. Climacteric 2018; 21: 478-82.
7. Nappi RE, Kokot-Kierepa M. Vaginal Health: Insights, Views & Attitudes (VIVA): results from an international survey. Climacteric 2012; 15: 36-44.
8. Moral E, Delgado JL, Carmona F, et al. Genitourinary syndrome of menopause. Prevalence and quality of life in Spanish postmenopausal women. The GENISSE study. Climacteric 2018; 21: 167-73.
9. Palma F, Volpe A, Villa P, Cagnacci A; Writing group of AGATA study. Vaginal atrophy of women in post menopause. Results from a multicentric observational study: the AGATA study. Maturitas 2016; 83: 40-4.
10. Qi W, Li H, Wang C, et al. The effect of pathophysiological changes in the vaginal milieu on the signs and symptoms of genitourinary syndrome of menopause (GSM). Menopause 2021; 28: 102-8.
11. Mension E, Alonso I, Tortajada M, Matas I, Gómez S, Ribera L, et al. Genitourinary syndrome of menopause assessment tools. J Mid-life Health 2021; 12: 99-102.
12. Di Pace R, Portuesi R. Vaginal health index score and urogenital syndrome of menopause. Gazz Med Ital-Arch Sci Med 2018; 177: 741-4.
13. Mac Bride MB, Rhodes DJ, Shuster LT. Vulvovaginal atrophy. Mayo Clin Proc 2010; 85: 87-94.
14. Faubion SS, Kingsberg SA, Shifren JL, et al. The 2020 genitourinary syndrome of menopause position statement of The North American Menopause Society. Menopause 2020; 27: 976-92.
15. Donders G, Ruban K, Bellen G, Grinceviciene S. Pharmacotherapy for the treatment of vaginal atrophy. Expert Opin Pharmacother 2019; 20: 821-35.
16. Lethaby A, Ayeleke RO, Robert H. Local oestrogen for vaginal atrophy in postmenopausal women. Cochrane Database Syst Rev (8)2016; CD001500.
17. Preti M, Vieira-Baptista P, Digesu GA, et al. The clinical role of LASER for vulvar and vaginal treatments in gynecology and female urology: an ICS/ISSVD best practice consensus statement. Neurourol Urodynam 2019; 38: 1009-23.
18. Shoberi SAA, Kerkhof MH, Minassian VA, Bazi T; IUGA

Research and Development Committee. IUGA committee opinion: laser based vaginal devices for treatment of stress urinary incontinence, genitourinary syndrome of menopause, and vaginal laxity. I Urogynecol J 2019; 30: 371-6.

19. Jha S,Wyld L, Krishnaswamy PH. The impact of vaginal laser treatment for genitourinary syndrome of menopause in breast cancer survivors: a systematic review and meta-analysis. Clin Breast Cancer 2019; 19: e556-62.
20. Hannestad YS, Rortveit G, Sandvik H, Hunskaar S; Norwegian EsEolit-CoN-T. A community-based epidemiological survey of female urinary incontinence: the Norwegian EPINCONT study. Epidemiology of Incontinence in the County of Nord-Trondelag. J Clin Epidemiol 2000; 53: 1150-7.
21. Clark AL. Overactive bladder, stress urinary incontinence, and menopause-what are the associations? Menopause. 2022 Jan 10. (Epub ahead of print)
22. Birder L, de Groat W, Mills I, Morrison J, Thor K, Drake M. Neural control of the lower urinary tract: peripheral and spinal mechanisms. Neurourol Urodyn 2010; 29: 128-39.
23. Aoki Y, Brown HW, Brubaker L, Cornu JN, Daly JO, Cartwright R. Urinary incontinence in women. Nat Rev Dis Primers 2017; 3: 17042.
24. Brown JS, Waetjen LE, Subak LL, Thom DH, Van den Eeden S, Vittinghoff E. Pelvic organ prolapse surgery in the United States, 1997. Am J Obstet Gynecol 2002; 186: 712-6.
25. Phillips CH, Anthony F, Benyon C, Monga AK. Collagen metabolism in the uterosacral ligaments and vaginal skin of women with uterine prolapse. BJOG 2006; 113: 39-46.
26. Olsen AC, Smith VJ, Bergstrom JO, Colling JC, Clark AL. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. Obstet Gynecol 1997; 89: 501-6.
27. Lawrence JM, Lukacz ES, Nager CW, Hsu JW, Luber KM. Prevalence and co-occurrence of pelvic floor disorders in community-dwelling women. Obstet Gynecol 2008; 111(3): 678–85.
28. Swift S, Woodman P, O'Boyle A, Kahn M, Valley M, Bland D, et al. Pelvic Organ Support Study (POSST): the distribution, clinical definition, and epi-demiologic condition of pelvic organ support defects. Am J Obstet Gynecol 2005; 192(3): 795–806.
29. Hendrix SL, Clark A, Nygaard I, Aragaki A, Barnabei V, McTiernan A. Pelvic organ prolapse in the Women's Health Initiative: gravity and gravidity. Am J Obst Gynecol 2002; 186(6): 1160–6.
30. Versi E, Harvey MA, Cardozo L, Brincat M, Studd JW. Urogenital prolapse and atrophy at menopause: a prevalence study. Int Urogynecol J Pelvic Floor Dys-funct 2001; 12(2): 107–10.
31. Ismail SI, Bain C, Hagen S. Oestrogens for treatment or prevention of pelvic organ prolapse in postmenopausal women. Cochrane Database Syst Rev 2010; 2010(9): CD007063.
32. Ecker J: Elective cesarean delivery on maternal request. JAMA 2013, 309: 1930-6.
33. Wilson D, Dornan J, Milsom I, Freeman R: UR-CHOICE: can we provide mothers-to-be with information about the risk of future pelvic floor dysfunction? Int Urogynecol J 2014, 11: 1449-52.
34. Glazener, C M A, Macarthur C, Hagen S, Elders A, Lancashire R, Herbison GP, Wilson PD: Twelve-year follow-up of conservative management of postnatal urinary and faecal incontinence and prolapse outcomes: randomised controlled trial. BJOG 2014, 121:112-20.
35. Hagen S, Stark D. Conservative prevention and management of pelvic organ prolapse in women. Cochrane Database Syst Rev. 2011 Dec 7;(12):CD003882.
36. Giarenis I, Robinson D. Prevention and management of pelvic organ prolapse. F1000Prime Rep. 2014; 6: 77.

Midlife Mental Health Issues and their Management

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Introduction

Mental health can be conceptualized as "*a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community*". Mental health is more than just the absence of mental disorders or disabilities, and is fundamental to our collective and individual ability as humans to think, emote, interact with each other, earn a living and enjoy life. On this basis, the promotion, protection and restoration of mental health can be regarded as a vital concern for individuals.[1]

Midlife is that stage of woman's development which is characterized by important transitions wherein women experience many unsettling physiological changes, such as those associated with menopause, sexuality, and changes in physical attractiveness. It is arbitrarily defined as the age between 40 to 60 years. **Thus, it encompasses that part of a woman's life which leads up to perimenopause and menopause itself.**

Women in midlife are at higher risk for poor mental health. Jaques in 1965 first coined the term *midlife-crisis*[2], which has been adopted widely, and refers to the transition of identity and self confidence that occurs in middle aged individuals. Various studies have demonstrated the association between midlife and perimenopause with stress, anxiety and lowering of quality of life (QoL).

Numerous physical, emotional, and social changes may occur at this time, as well as numerous losses, including loss of youthful appearance, which may cause changes to a woman's sense of self, and may be the cause of much emotional distress and turmoil.

The period of menopausal transition represents the passage from reproductive to non-reproductive life, and is a highly complex phase due to dynamic changes in sex hormones and reproductive function. It is associated with the worst menopausal symptom burden, arising from neurochemical changes within the central nervous system. This period is characterized by a range of menopause specific complaints such as vasomotor symptoms, sleep disturbances, vaginal dryness, breast pain, joint pains, change in cognitive function and performance, significant life stressors, or psychosocial challenges. A variety of menopausal complaints co-occur and overlap with the presentation of mood disturbances during this stage leading to an increased risk of new or recurrent onset of depression. Women with a history of depression, especially during prior reproduction-related phases of hormonal changes, exhibit an elevated risk of depression during the perimenopause.

Mental Health Issues in Midlife

The various mental health issues experienced during menopause transition/midlife are:

- Reduction in Quality of Life (QoL)
- Dementia
- Anxiety and Depression
- Cognitive changes
- Sleep
- Migraine

Reduction in QoL

WHO defines Quality of Life as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.[3] Commonly used scales to evaluate QoL in midlife and menopausal women are Menopause Rating Scale, Greene Climacteric Scale, Women's Health Questionnaire, and Utian QoL Scale.

The reaction to perimenopause is different in each woman; some women have a positive feeling in the form of relief from pain and management of menstruation each month; while others have mental instability and a feeling of diminution of sexuality.

Some studies show that Menopausal Hormone Therapy (MHT) significantly improves overall measures of QoL in symptomatic women at menopause. MHT had mixed effects on QoL among older women in the 'Heart and Estrogen or Progestin Replacement Study trial[4], whereas the 'Women's Health Initiative' (WHI) Trial investigators found that estrogen plus progestin did not have a clinically meaningful effect on health related QoL.[5]

Dementia

Dementia is a syndrome, usually of a chronic or progressive nature, that leads to deterioration in cognitive function (i.e. the ability to process thought) beyond what might be expected from the usual consequences of biological ageing. It affects memory, thinking, orientation, comprehension, calculation, learning capacity, language and judgement. Consciousness is not affected.

Dementia may result from a variety of diseases and injuries that primarily or secondarily affect the brain, such as Alzheimer's disease or stroke. It has physical, psychological, social and economic impacts, not only for people living with dementia but also for their care givers, families and society at large. Dementia is more common in women than in men, even after controlling for the effects of the female population's greater longevity.

Cognitive changes

Perimenopausal women often report a decline in memory and concentration, which might be distressing and is clinically relevant. Cognitive and mood changes are frequently mentioned as complaints before, during and after menopausal transition. There is substantial biological evidence for such associations as there are many mechanisms through which oestrogens can affect the brain: by regulating metabolism, by increasing cerebral blood flow and dendritic outgrowth, by acting on nerve growth factors through the co-localisation of receptors via neurotransmitter synthesis and turnover and many more. While MHT including oestrogens could potentially reverse these psychological issues, the evidence of long-term benefit is inconclusive.[6]

The cognitive test most often used as a screen for cognitive impairment is the *Mini mental state exam (MMSE)*, which takes approximately 7 minutes to complete. MMSE tests a broad range of cognitive functions including orientation, recall, attention, calculation, language manipulation, and constructional praxis.[7]

A systematic review and meta-analysis in 2014 aimed to analyse the relationship between menopausal stage and neuropsychological performance and depression. They concluded that postmenopausal women performed significantly worse than pre- and perimenopausal women on delayed verbal memory tasks, and significantly worse than perimenopausal women on phonetic verbal fluency tasks. Peri- and postmenopausal women were at significantly increased risk of depression.[8]

The 'Study of womens health across the nation' (SWAN study), however, supported the hypothesis that the decline in cognitive performance is not related to menopause, but rather, is a function of chronological aging.[9]

Anxiety and Depression

Depression has become the leading cause of disease-related disability among women in the world today. The prevalence of depression is at least twice as high in women as in men. Onset rates of depression among women appear to be particularly high during the reproductive transition phases such as the late phase of the menstrual cycle, postpartum, and the menopausal transition.

The Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition) (DSM-V)[10] outlines the following criterion to make a diagnosis of *depression* or *major depressive episode*. The individual must experience five or more symptoms during the same 2-week period and at least one of the symptoms should be either (1) depressed mood or (2) loss of interest or pleasure.

1. Depressed mood most of the day, nearly every day.
2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day.
3. Significant weight loss when not dieting or weight gain, or decrease or increase in appetite nearly every day.
4. A slowing down of thought and a reduction of physical movement (observable by others, not merely subjective feelings of restlessness or being slowed down).
5. Fatigue or loss of energy nearly every day.

6. Feelings of worthlessness or excessive or inappropriate guilt nearly every day.
7. Diminished ability to think or concentrate or indecisiveness nearly every day.
8. Recurrent thoughts of death, recurrent suicidal ideation without a specific plan or a suicide attempt or a specific plan for committing suicide.

For a diagnosis of depression, these symptoms must cause the individual clinically significant distress or impairment in social, occupational or other important areas of functioning. The symptoms must also not be a result of substance abuse or any other medical condition.

There is a significant increased risk of new-onset depression in women during the menopausal transition compared with their premenopausal years. In a withinwoman, 8year, longitudinal study to determine the risk factors for depressive disorders, a diagnosis of depression was 2.5 times more likely to occur in the menopausal transition compared with when a woman was premenopausal.[11] Various instruments have been used to screen for depression: Center of Epidemiological Studies Depression Scale (CES-D), Beck Depression Inventory (BDI), Greene Climacteric Scale (GCS), Hospital Anxiety and Depression Scale (HADS), Patient Health Questionnaire (PHQ), and Hamilton Rating Scale for Depression (HAMD).[12]

Symptoms of anxiety may include irritability, apprehension, impatience, restlessness, trouble falling asleep, difficulty concentrating, sweating, increased frequency of urination. Vasomotor complaints seem to have a major impact on the development and maintenance of depressive symptoms.

Sleep

Sleep difficulties, particularly nocturnal awakenings, are major complaints and are reported by 40-60% of menopausal women. The decline of sleep quality in menopausal women might be due to menopause-related symptoms, namely, hot flashes and depressive symptoms. The underlying cause of impaired sleep quality in late perimenopausal and postmenopausal women might be related to a change in arousal levels during both REM and non-REM sleep.

Sleep disruption in menopause might be exacerbated by disordered breathing due to obstructive sleep apnea, independent of body weight and age. Moreover, obstructive sleep apnea affects more women in post-menopause than in pre-menopause.

A detailed assessment of menopausal symptoms should always include questions about sleep pattern and maintaining sleep questionnaires or sleep diaries can be useful for this. Adverse lifestyle factors, social factors, and risk factors should be considered and treated accordingly. If insomnia is identified, medical or psychiatric causes of insomnia should be ruled out and if present, it should be treated accordingly. If specific neurological or breathing disorders are suspected, further investigations and referrals to specialists should be initiated. Sleep hygiene measures and lifestyle modifications should be recommended as the firstline treatment. Psychological treatments, such as cognitive behavioral therapy should also be considered. If insomnia is resistant to lifestyle modifications, then hypnotics, benzodiazepines, or melatonin agonists can be used in the short term but there is no definite or convincing evidence to suggest its efficacy. These should only be prescribed under supervision or after liaison with psychiatrists or sleep experts. No recommendations can be made about the use of herbal remedies for insomnia as there is insufficient evidence. Mind–body therapies such as yoga and tai-chi have some evidence but need further rigorous studies to prove its effectiveness.[11]

Migraine

The prevalence of migraine during menopause ranges from 10% to 29%. It is seen more commonly in women with a history of migraine in the premenopausal years.

Etiology

Several hypotheses have been suggested for why women would be more likely to experience depression during perimenopause. These include hormonal flux, midlife stressors, other symptoms of perimenopause such as insomnia or hot flashes ('domino effect'), body image issues, diminished self-esteem and genetic factors. The rise in mental health issues may be due to fluctuations in hormonal levels like falling levels of estrogen and progesterone and rise in the levels of follicle stimulating hormone and leutinizing hormone but there is no consistent relationship.

Estradiol (E2) "beneficially" modulates systems implicated in the pathophysiology of depression (neurotransmitter deficiency, stress, neuroplasticity, cellular energetics, inflammation, and network dysregulation). E2 regulates the synthesis, metabolism,

and receptor concentration/trafficking of the classical neurotransmitters implicated in depression (serotonin, dopamine, and norepinephrine); it regulates both basal and stimulated HPA axis activity; and it acts like antidepressants in stimulating brain derived neurotrophic factor (BDNF), a critical growth factor observed to be deficient in depression. Lower morning dihydroepiandosterone (DHEA) has also been implicated in perimenopausal depression.

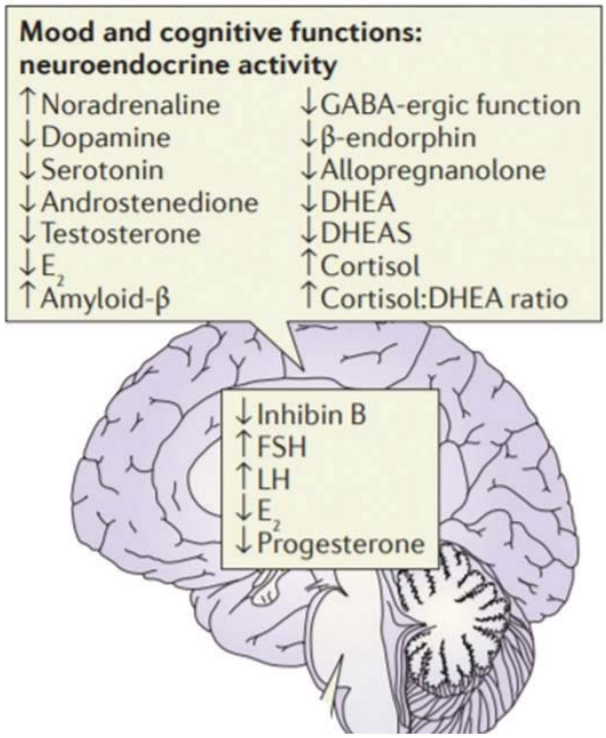

Figure 1: Mood, cognitive functions and neuroendocrine activity, which are closely related to the impairment of GABAergic, opioid and neurosteroid neurotransmitter milieu in the central nervous system (CNS), occur with ageing. Failure of the main target of neurosteroids, the GABA-A receptor, to adapt to changes in levels of allopregnanolone over the course of the menopausal transition might lead to depressive symptoms, mood and cognitive dysfunctions.[13]

Factors associated with increased mental health issues in women:

1. Personal factors

- Past history of mood/psychiatric disorders
- Personality type and ability to cope
- Negative attitude towards menopause and aging
- Surgical menopause
- Poor overall health status
- History of premenstrual dysphoric syndrome
- Higher BMI
- Smoking

2. Social factors

- Unemployment
- Lack of social support
- Low education, low income

3. Interpersonal relationships

- Relationship with partner
- Relationship with family
- Relationship with friends

A recent study showed that levels of estradiol, but not progesterone, FSH and LH, were predictive of depressive symptoms in the perimenopause. Moreover, the presence of burdensome complaints and chronic stress as well as poor self-evaluation seem to promote depressive symptoms in perimenopausal women. It also showed that women with higher progesterone levels experience significantly higher life satisfaction, lower perceived stress, and lower depressive symptoms than women with lower progesterone levels.[14-16] Other studies have also studied the impact of hormones as a causative factor in depression.[17-19]

Management

The various modalities for management of midlife mental health issues are:

(A) Non-pharmacological interventions

1. Exercise:

- Being physically active helps with mood and stress. It also reduces focus on depressive thoughts. Other than mental health, exercise simultaneously helps with other aspects of physical well-being like obesity, diabetes, coronary heart disease.
- Analytical activities can help rejuvenate memory such as doing crossword puzzles, reading books.

2. Diet:

- A healthy nutritious diet, rich in protein, fibre and low in fat, with plenty of fruits, vegetables and

dairy products should be consumed.

- Adequate Calcium and Vitamin D intake
- Consumption of food rich in phytoestrogens. Phytoestrogens are weak estrogenic substances found in some cereals, vegetables, soy and herbs.

3. Acupuncture
4. Cognitive behavioral therapy (CBT): Cognitive behavioral therapy is a psycho-social intervention that aims to reduce symptoms of various mental health conditions, primarily depression and anxiety disorders.
5. Other lifestyle interventions like smoking cessation, reducing alcohol intake, intake of saffron extract, black cohosh, herbal medicine, St John's wort.

(B) Pharmacological interventions

1. Menopausal hormone therapy (MHT)

Hormone therapy may contribute to alleviating menopause-related depressive symptoms. Its administration should be followed across time and should be specifically individualized. Various studies have studied the positive effects of estrogen and progesterone on mental status in midlife and the perimenopause20. The role of estrogen has been more clearly studied.

- Oral route:
  - Conjugated equine estrogen (0.3-0.625 mg), estradiol (0.5-1 mg)
  - Medroxyprogesterone acetate (MPA)(2.5-5 mg), dydrogesterone (5-10 mg), micronized progesterone (100-200 mg), LNG-IUS
  - DHEA capsule (25-100 mg)
- Transdermal route:
  - Estradiol transdermal patch, estradiol transdermal gel, estradiol subdermal implant
  - Testosterone implant
- Tibolone (Livial): it is a synthetic steroid (19-nortestosterone derivative) with weak estrogenic, progesteronic and androgenic actions. Available as a 2.5 mg tablet.

2. Antidepressants

Anxiety, depression and low mood during midlife, perimenopause and menopause are treated in the same way as any other time. Antidepressants are efficacious for women with depressive syndromes during and after menopausal transition but are associated with a higher risk of discontinuation due to adverse events. Side-effects include nausea, diarrhoea, insomnia, headache and fatigue. The various drugs used are:

- SSRI's: fluoxetine, paroxetine, citalopram, escitalopram
- SNRI's: venlafaxine (side effect – hypertension), des-venlafaxine
- TCA's: amitryptaline

Once initiated, it may take 6 to 8 weeks for a patient to respond; however, often, patients notice a difference within the first month of treatment. Dosage can be titrated to achieve improved effectiveness, with increases approximately every month as tolerated. In cases of more severe depression, a combination of the above therapies may be tried.

NICE recommendations for psychological symptoms in menopausal women 2015 (updated 2019)21 :

- Consider hormone replacement therapy to alleviate low mood that arises as a result of menopause.
- Consider CBT to alleviate low mood or anxiety that arise as a result of menopause.

International Menopause Society recommendations 201622 key messages:

(A) Cognitive aging

- MHT should not be used to enhance cognitive function.
- Healthy women considering MHT for approved indications need not be overly concerned that MHT will adversely affect cognitive function.
- Estrogen therapy may be of short-term cognitive benefit to surgically menopausal women when initiated at the time of oophorectomy.
- Phytoestrogen (soy isoflavone) supplements used by healthy postmenopausal women in a daily dose comparable to that consumed in traditional Asian diets have no overall effect on cognition.

(B) Alzheimer's disease and dementia

- For women with Alzheimer's disease, MHT initiated after the onset of dementia symptoms does not benefit cognitive function or slow disease progression.
- MHT initiated and used after midlife increases risk of dementia.
- MHT initiated during midlife is associated with reduced risk of Alzheimer's disease and dementia.
- Extrapolated from risks in older postmenopausal women, estimates in women younger than 60 years imply that dementia risk attributable to MHT would be rare in this age range.

(C) Depressive symptoms and depression

- Findings are inconsistent as to whether MHT improves or has no effect on depressive symptoms in younger postmenopausal women without depression.
- For depression or depressive disorders that occur during the menopausal transition, short-term estrogen therapy may improve affective symptoms or increase the likelihood of remission.

Conclusion

The symptoms of menopause can be very distressing and can considerable affect the personal, social and work lives of women. A woman's experience of menopause is worsened by personal history, current health status, obesity and socioeconomic status. Educating women to adopt lifestyle modification to take care of modifiable risk factors (eg, obesity) will be helpful in reducing the risk of future illnesses and improve the QoL.

References

1. World Health Organization. Mental health: strengthening our response. March 2018. Available from: https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response. Last accessed on: 21 Jan 2022.
2. Jaques E. Death and the mid-life crisis. Int J Psychoanal. 1965 Oct;46(4):502-14.
3. World Health Organization. WHOQOL: Measuring Quality of Life. March 2012. Available from: https://www.who.int/tools/whoqol. Last accessed on: 21 Jan 2022.
4. Grady D, Applegate W, Bush T, Furberg C, Riggs B, Hulley SB. Heart and Estrogen/progestin Replacement Study (HERS): design, methods, and baseline characteristics. Control Clin Trials. 1998 Aug;19(4):314-35.
5. Manson JE, Chlebowski RT, Stefanick ML, Aragaki AK, Rossouw JE, Prentice RL, et al. Menopausal hormone therapy and health outcomes during the intervention and extended poststopping phases of the Women's Health Initiative randomized trials. JAMA. 2013 Oct 2;310(13):1353-68.
6. Hogervorst E, Craig J, O'Donnell E. Cognition and mental health in menopause: A review. Best Pract Res Clin Obstet Gynaecol. 2021 Nov 30:S1521-6934(21)00164-4. doi: 10.1016/j.bpobgyn.2021.10.009. Epub ahead of print. PMID: 34969617.
7. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. J Psych Res. 1975; 12:189–198.
8. Weber MT, Maki PM, McDermott MP. Cognition and mood in perimenopause: a systematic review and meta-analysis. J Steroid Biochem Mol Biol. 2014 Jul;142:90-8.
9. El Khoudary SR, Greendale G, Crawford SL, Avis NE, Brooks MM, Thurston RC, Karvonen-Gutierrez C, Waetjen LE, Matthews K. The menopause transition and women's health at midlife: a progress report from the Study of Women's Health Across the Nation (SWAN). Menopause. 2019 Oct;26(10):1213-1227.
10. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (DSM-5), Fifth edition. 2013.
11. Meeta M, Digumarti L, Agarwal N, Vaze N, Shah R, Malik S. Clinical practice guidelines on menopause: *An executive summary and recommendations: Indian menopause society 2019–2020. J Mid-life Health 2020;11:55-95.
12. Willi J, Ehlert U. Assessment of perimenopausal depression: A review. J Affect Disord. 2019 Apr 15;249:216-222.
13. Monteleone P, Mascagni G, Giannini A, Genazzani AR, Simoncini T. Symptoms of menopause - global prevalence, physiology and implications. Nat Rev Endocrinol. 2018 Apr;14(4):199-215.
14. Süss H, Willi J, Grub J, Ehlert U. Estradiol and progesterone as resilience markers? - Findings from the Swiss Perimenopause Study. Psychoneuroendocrinology. 2021 May;127:105177.
15. Willi J, Süss H, Grub J, Ehlert U. Biopsychosocial predictors of depressive symptoms in the perimenopause-findings from the Swiss Perimenopause Study. Menopause. 2021 Jan 4;28(3):247-254.
16. Willi J, Süss H, Grub J, Ehlert U. Prior depression affects the experience of the perimenopause - findings from the Swiss Perimenopause Study. J Affect Disord. 2020 Dec 1;277:603-611.
17. Joffe H, de Wit A, Coborn J, Crawford S, Freeman M, Wiley A, Athappilly G, Kim S, Sullivan KA, Cohen LS, Hall JE. Impact of Estradiol Variability and Progesterone on Mood in Perimenopausal Women With Depressive Symptoms. J

Clin Endocrinol Metab. 2020 Mar 1;105(3):e642–50.
18. Freeman EW, Sammel MD, Lin H, Nelson DB. Associations of hormones and menopausal status with depressed mood in women with no history of depression. Arch Gen Psychiatry. 2006 Apr;63(4):375-82.
19. Sander B, Muftah A, Sykes Tottenham L, Grummisch JA, Gordon JL. Testosterone and depressive symptoms during the late menopause transition. Biol Sex Differ. 2021 Jul 30;12(1):44.
20. Gordon JL, Rubinow DR, Eisenlohr-Moul TA, Xia K, Schmidt PJ, Girdler SS. Efficacy of Transdermal Estradiol and Micronized Progesterone in the Prevention of Depressive Symptoms in the Menopause Transition: A Randomized Clinical Trial. JAMA Psychiatry. 2018 Feb 1;75(2):149-157.
21. National Institute for Health and Care Excellence (NICE). Menopause: diagnosis and management. 2015, updated 2019. Available from: https://www.nice.org.uk/guidance/ng23. Last accessed on: 21 Jan 2022.
22. Baber RJ, Panay N, Fenton A; IMS Writing Group. 2016 IMS Recommendations on women's midlife health and menopause hormone therapy. Climacteric. 2016 Apr;19(2):109-50.

Optimizing Cardiovascular Status and Lipid Profile after Menopause

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Introduction

Menopause is a crucial phase of a woman's life which involves physical and social changes. Post-menopausal women are defined as those with spontaneous amenorrhea for 12 months or less, in spontaneous amenorrhea with serum FSH (Follicle stimulating hormone) levels more than 40 mIU/mL for 6 months or women after Bilateral salpingo-oophorectomy with/without hysterectomy for 6 weeks.[1] Menopause has been associated with weight gain, metabolic syndrome, changes in lipid profile.[2-5] Oestrogen causes vascular changes and has impact on Blood pressure, endothelial functions, and cardiac remodeling. Changes in oestrogen levels also affect the immune system.[6-7] Hormonal therapy helps in reducing the vasomotor, genitourinary symptoms and cardiovascular risks. Ischemic Heart Disease(IHD) is the leading cause of death in women all over the globe. Type I classical Myocardial Infarction (MI) is more common in men(three times) than women, although the number of cases in women less than 65 years of age is increasing gradually.[8-9] Type II MI with no obstructive coronary artery occurs more in women. It has been estimated that more than 30% of MI in women are caused by spontaneous coronary artery dissections.[10-12]

CVD and Menopause

TABLE 1. TRADITIONAL CARDIO-VASCULAR(CV) RISK FACTORS AND THEIR DISPROPORTIONATE EFFECTS ON CARDIO VASCULAR DISEASES(CVD) IN WOMEN COMPARED WITH MEN[13]

TRADITIONAL CARDIO VASCULAR RISK FACTORS	DISPROPORTIONATE CARDIO-VASCULAR RISK IN WOMEN COMPARED WITH MEN
Diabetes Mellitus	Increased cardiovascular mortality Increased risk of heart failure, out of proportion to that seen between diabetic and non–diabetic men Higher rates of coronary microvascular dysfunction, hypercoagulability, and concurrent metabolic syndromes.
HTN	Increased cardiovascular mortality Less likely to be treated to goal
Obesity	Higher prevalence Increased independent risk of CVD

Over past 20 years, various studies of females transitioning into menopause suggest that these women foster coronary heart disease (CHD) several years later as compared to men, with a remarkable expansion in CHD hazard during midlife, a period incidental with the menopause transition (MT). Throughout the course of recent years, longitudinal investigations of women transitioning through menopause have contributed significantly to the understanding of the relationship between the MT and CVD hazard. These studies have documented examples of changes in endogenous sex hormones and unfavorable changes in muscle versus fat distribution, lipids, and lipoproteins, as well as underlying and practical proportions of vascular wellbeing over the MT.[14-15] Table-1 highlights traditional cardio-vascular risk factors and their disproportionate effects on cardiovascular diseases in women compared with men.

Women have a decreased plaque burden lower vascular calcifications, a more diffuse pattern of atherosclerosis, as compared to men.[39-43] Coronary artery spasm or coronary microvascular dysfunction constitutes major cause of IHD in middle aged women.[16-19]

There is a decrease in endothelial function which starts in early menopause before the presentation of subclinical atherosclerosis causing chest pain and dyspnoea which is often mistaken as stress or menopausal symptoms. These women are at increased risk of developing IHD in coming 5-7 years. There is an increase in fat mass and decrease in lean mass in central and visceral regions. Increase in fat mass visceral adipose tissue releases inflammatory cytokines, for example TNF α, IL-6 and retinol binding protein-4. These inflammatory cytokines cause release of reactive oxygen species from liver causing further damage and increases insulin resistance.[20-23]

Following menopause transition phase immune reactivity also increases causing autoimmune and endocrine disorders like SLE, Rheumatoid Arthritis, APS, SJ syndrome and thyroid disorders.[24-27] Table-2 lists the females specific risk factors and strategies for prevention.[28]

Risk Factors

TABLE 2. FEMALE SPECIFIC RISK FACTORS AND STRATEGIES FOR PREVENTION28

	MENOPAUSE
EXCESS CV RISK	-Central adiposity ↑ -Insulin resistance ↑ -Pro-atherogenic lipid profile -Autonomic dysfunction→heart rate variability ↑↑
STRATEGIES TO ADDRESS EXCESS CV RISK	-Assess glucose, lipid levels and BP during menopause transition -Menopause may interfere with working ability→increased employer awareness -Healthy lifestyle and diet with regular exercise -Menopausal Hormone Therapy is indicated to alleviate menopausal symptoms -In young women around the menopause MHT may offer cardio protection -MHT is not recommended in women at high CV risk and after a previous CVD event.

CHARACTERSITICS RELATED TO CVD RISK FOLLOWING MENOPAUSE

1. AGE AT NATURAL MENOPAUSE

In 2016 a meta-analysis of 32 observational studies was conducted on 310329 women and concluded that in females in whom there is an early onset of menopause(less than 45 years of age) are relatively at a higher risk of fatal CHD then those in whom menopause occurs at age >45 years. Females encountering menopause at 50-54 years old have significantly lower risk of CHD.[29]

A meta-analysis from 3 studies, which were prospective in nature and included 3568 heart failure events, concluded that those with early onset of menopause were at higher risk for heart failure than those with late onset menopause.[30]

2. TYPE OF MENOPAUSE

A study was conducted in 2007 to observe the relationship between bilateral oophorectomy (BSO) surgery and CVD risk. They concluded that female in whom menopause is caused by bilateral oophorectomy (BSO) without oestrogen therapy use are at a higher risk of CHD than those in whom BSO occurred around the time of natural menopause. The risk increases significantly if BSO occurred at younger age(<40 years). [31,32]

3. MENOPAUSE STAGES

Stages of menopause can be divided into pre-menopause, early and late menopause transitions and post menopause. A longitudinal SWAN analysis concluded that total cholesterol, HDL (High density lipoproteins), LDL (low density lipoproteins), triglyceride, Lipoproteins-a with structural carotid artery remodeling is most evident during late menopause and early post menopause. [33-34]

4. ENDOGENOUS ESTROGENS

Oestrogen determines variety of systemic factors like alteration in serum lipid concentrations, immune system, coagulation profile, fibrinolytic system, antioxidant systems, and the productions of vasoactive molecules like nitric oxide and prostaglandins.35 Reduced level of endogenous oestradiol levels during menopause transitions has been directly associated with cardiovascular disease. Less carotid remodeling and better endothelial functions was associated with higher estradiol levels. Therefore, lower levels of estrogen at menopause appear to be directly related to cardio vascular diseases. Authors of SWAN have concluded that higher oestradiol level causes decreased progression of carotid inter-adventitial diameter.[36-37]

5. VASOMOTOR SYMPTOMS

Vasomotor symptoms can last upto 10 years, however longer duration can occur in women experiencing menopause transition at early age. Four patterns of vasomotor symptoms have been identified in these women: Early onset- 11years before final menstrual period, Onset near final menstrual period, persistently high frequency and persistently low frequency.[38-39]

When these symptoms are reported in midlife, they have been found to be associated with adverse lipid profile, insulin resistance and greater risk of hypertension.36 Autonomic dysfunction occurs which enhances the heart rate variability, increases sympathetic activities, causing hot flushes and greater aortic calcification, which are independent risk factors for CVD.40 During a longitudinal SWAN study, authors concluded that females who experience vasomotor symptoms during early menopause transition have higher incident of HD than those who experience low

frequency of vasomotor symptoms.[41]

6. SLEEP DISTURBANCES

Poor sleep quality is associated with greater risk for metabolic syndrome, aortic calcification and arterial stiffness in perimenopausal women. AHA Life's Simple 7 Score has identified that those females with shorter duration of sleep, poor quality of sleep and higher level of insomnia were associated with worse outcome in post-menopausal women.[42-43]

7. DEPRESSION

Depression is strongly linked to higher CVD risk. It has been found to be associated with elevated coronary artery calcification. Depression and anxiety symptoms tend to decline after menopause. SWAN Heart Study was conducted, with a follow up upto 5 years, reported that females having more than 3 episodes of depression had higher risk of cardiovascular diseases in post-menopausal women.[44-46]

8. OTHER RISK FACTORS INCREASING RISK OF CVD IN FEMALES [28]

- Recurrent pregnancy loss
- Preterm delivery
- Hypertensive Pregnancy disorders
- Gestational Diabetes Mellitus
- Pregnancy in women at increased risk for IHD
- Polycystic ovarian syndrome and cardiovascular disease risk
- Autoimmune disorders.

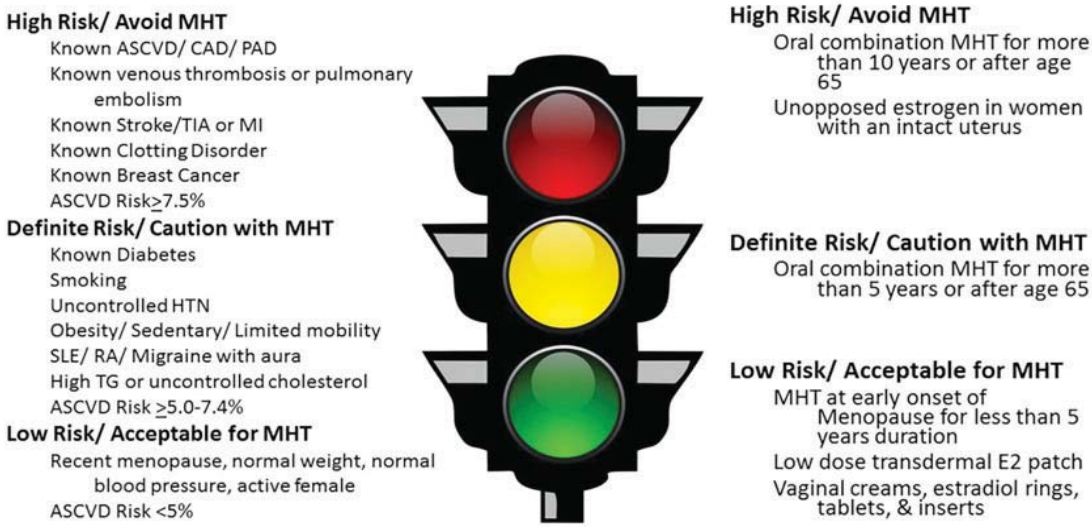
MENOPAUSAL HORMONE THERAPY

Advantage of MHT on CVD outcomes and mortality may occur when MHT is initiated in less than 60 years of age or time elapsed after onset of menopause is less than 10 years. Various studies have implied that the risk of mortality in females who use MHT were significantly lower than those who never used MHT.[47,48]

The Kronos Early Oestrogen Prevention Study (KEEPS) evaluated efficacy of combined oestrogen and progestin therapy in decreasing the progression of carotid intima media thickness (CMIT) or coronary artery calcium (CAC) on females approaching their final menstrual period (within 36 months). Their follow up showed no improvement in CVD or CMIT but did improve vasomotor symptoms in recent onset menopause.[49]

ELITE (Early versus Late Intervention Trial with Oestradiol) also conducted a study with similar conclusions. Post-menopausal women were divided into early post menopause (<6 years) and late post-menopausal (>= 10 years) and were categorized into 2 groups: one receiving oral estradiol 1mg/day and other being placebo group. They concluded after a follow up of 5 years that there was a decline in progression of CMIT in females in early post menopause group whereas no effect was seen in females who were in late post menopause. [50]

HIGH RISK WOMEN AND SUITABILITY FOR MHT [13]



ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index; BP, blood pressure; CAD, coronary artery disease; CV, cardiovascular; E2, estradiol; HTN, hypertension; MHT, menopause hormone therapy; MI, myocardial infarction; PAD, peripheral artery disease; RA, rheumatoid arthritis; SLE, systemic lupus erythematosus; TIA, transient ischemic attack; TG, triglyceride

Twenty four RCT's have been published regarding MHT administration and they found that there was 75% decrease in hot flashes and 87% decrease in severity of hot flashes. [51-53]

ROUTE OF ADMINISTRATION AND MHT FORMULATIONS:

Numerous recent studies have stated differential effects according to route of administration, type of oestrogen or type of progestin agent in combined regimens. Drugs for MHT includes conjugated equine or synthetic oestrogens, micronized 17β 3oestradiol, or ethinyl oestradiol. Progestogens were used for endometrial protection which includes MPA, norethindrone acetate and progesterone.[53] An observational study conducted by WHI on 93676 post-menopausal females where they concluded nonsignificant but lower incidence of CHD, stroke, and CVD mortality with transdermal estradiol in comparison to oral CEE. Oral preparations of MHT have been associated with increased venous thromboembolism, within which CEE+MPA carries the greatest risk whereas estradiol + dydrogesterone has lowest risk.[54-55]

TABLE 3. OPTIMIZING CVD RISK IN WOMEN PRIOR TO INITIATING MHT [13]

ASSESSING ATHEROSCLEROTIC CARDIOVASCULAR DISEASE RISK AFTER MENOPAUSE				
Past Medical History: HTN DM Lipids Autoimmune Rheumatic HIV	**Past Pregnancy History:** Preterm Labour HTN disorder of pregnancy Gestational DM Eclampsia Pre-eclampsia PPCM	**Family history:** atherosclerotic cardiovascular disease, social history, lifestyle	**Biomarkers and Labs:** BP BMI Weight Waist Lipids Glucose	**Pooled Cohort Atherosclerotic cardiovascular disease risk score.**

Guidelines exist to prevent CVD in females and thereby identifying and modifying the risk factors wherever possible. Life style modifications include moderate exercise 150 min/week, quit smoking, to consume a diet filled with vegetables and fruits including whole grain food and fish at least twice a week. Also to maintain BMI < 25Kg/m^2 or waist size < 35 inches. Interventions for medical conditions such as blood pressure, diabetes mellitus and dyslipidemia have also been identified. [56]

MHT is not given for primary or secondary prevention of CVD. Pre-existing CVD risk factors should be gauged in all women approaching menopause prior to initiation of these therapies. In 2013 ACC/AHA Pooled Cohort Risk Equation for ASCVD was suggested. This provides 10-year primary risk in females, without pre-existing CVD, between the age of 40 – 79 years of age. Those with high risk should avoid MHT therapy while those with low risk are appropriate candidates for MHT.[57-58]

TABLE 4. CLASSIFICATION OF CVD RISK IN WOMEN[32]

RISK STATUS	CRITERIA
High risk (>=1 high risk states)	Clinically manifest CHD
	Clinically manifest cardiovascular disease
	Clinically manifest peripheral arterial disease
	Abdominal aortic aneurysm
	End – stage or chronic kidney disease
	Diabetes
	10 year predicted CVD risk >10%
At risk (>1 major risk factor)	Cigarette smoking
	SBP >= 120 mmHg, DBP >=80 mmHg, or treated hypertension
	Total cholesterol > 200 mg/dL, HDL – C < 50 mg/dL, or treated for dyslipidemia
	Obesity particularly central adiposity
	Poor diet
	Physical inactivity
	Family history of premature CVD occurring in first degree relatives in men < 55 years of age or in women < 65 years of age
	Metabolic syndrome
	Evidence of advanced subclinical atherosclerosis
	Poor exercise capacity on treadmill test or abnormal heart rate recovery after stopping exercise.
	Systemic autoimmune collagen vascular disease
	History of pre-eclampsia, gestational diabetes or pregnancy induced hypertension.
Ideal cardiovascular health (all of these)	Total cholesterol < 200 mg/dL (untreated)
	BP < 120/80 mmHg (untreated)
	Fasting blood glucose level < 100 mg/dL (untreated)
	BMI < 25 kg/m2
	Abstinence from smoking
	Physical activity at goal for adults > 20 years of age: 150 min/ week moderate intensity, > 75 min/ week vigorous intensity or combination
	Healthy (DASH like) diet.

IMPACT OF MHT ON CARDIO-METABOLIC AND VASCULAR HEALTH:

1. BODY FAT DISTRIBUTION:

PEPI (post-menopausal estrogen/ progestin intervention) study was conducted in women receiving CEE based regimens with follow up of 3 years. Women on PEPI had decreased weight gain and 1.2 cm less increase in waist circumference than those given placebo.[59]

2. METABOLIC SYNDROME COMPONENTS:

In PEPI, it was observed that there was decrease in fasting glucose and fasting insulin whereas no effect was seen on blood pressure. In another study, KEEPS, transdermal estradiol caused decrease in blood glucose levels and insulin as compared to placebo.[60-61]

3. VASCULAR HEALTH:

ELITE study showed decreased progression of CIMT with the use of oral estradiol versus placebo in women <6 years post-menopausal. WHI study, that was conducted on women between the age of 50 – 59 years, reported that CEE alone was related to decreased mean coronary artery calcium score 1 year after trial completion.[62]

4. LIPID LOWERING MEDICATIONS IN WOMEN

For prevention of primary and secondary atherosclerotic CVD and improved quality of life, lipid lowering drugs remain an exclusive part of drug therapy in females. Non-pharmalogical therapy include lifestyle modifications, dietary supplements as first line therapy with addition of herbal products and nutritional supplements as a holistic approach to promote health and for prevention of cardiovascular disease. Supplementation with ω-3 and ω-6 polyunsaturated fatty acid has also been studied. While ω-3 is related to reduction in CHD and MI but not CVD mortality, ω-6 is associated with decreased total cholesterol. Various studies have showed HMG-CoA reductase inhibitors like statins are useful for lipid lowering.[63-65]

CONCLUSION

Cardiovascular risk increases in females as a result of ageing and menopause transition. Proper risk identification is required to calculate the high risk group, starting of treatment and initiating menopause hormonal therapy if required. Detailed history of any adverse outcome of pregnancy or any complications in peri-menopausal period is required. Family history of CVD in combination with personal history of autoimmune disorder or HIV is essential.

All risk factors should be examined such as lipid profile, blood pressure, blood glucose levels and women should receive knowledge regarding body weight and exercise and adverse outcome of obesity. MHT does not reverse the adverse outcomes of CVD and it may be safely given in women with low risk for CVD who may benefit from its genitourinary, vasomotor and bone health advantage upto the age of 65 years.

BIBLIOGRAPHY

1. US Department of Health and Human Services. Guidance for industry: estrogen and estrogen/progestin drug products to treat vasomotor symptoms and vulvar and vaginal atrophy symptoms: recommendations for clinical evaluation. January 2003. https://www.fda.gov/media/71359/ download. Accessed January 9, 2020.
2. Crandall CJ and Barrett-Connor E. Endogenous sex steroid levels and cardiovascular disease in relation to the menopause: a systematic review. Endocrinol Metab Clin North Am 2013; 42: 227–253.
3. El Khoudary SR and Thurston RC. Cardiovascular implications of the menopause transition: endogenous sex hormones and vasomotor symptoms. Obstet Gynecol Clin North Am 2018; 45: 641–661.
4. Sowers M, Tomey K, Jannausch M, et al. Physical functioning and menopause states. Obstet Gynecol 2007; 110: 1290–1296.
5. Sowers M, Zheng H, Tomey K, et al. Changes in body composition in women over six years at midlife: ovarian and chronological aging. J Clin Endocrinol Metab 2007; 92: 895–901.
6. Kovats S. Estrogen receptors regulate innate immune cells and signaling pathways. Cell Immunol 2015;294:63–69.
7. Klein SL, Flanagan KL. Sex differences in immune responses. Nat Rev Immunol 2016;16:626–638
8. Gabet A, Danchin N, Juilliere Y, Olie V. Acute coronary syndrome in women: rising hospitalizations in middle-aged French women, 2004-14. Eur Heart J 2017;38: 1060–1065.
9. Chieffo A, Buchanan GL, Mehilli J, Capodanno D, Kunadian V, Petronio AS, Mikhail GW, Capranzano P, Gonzal N, Karam N, Manzo-Silberman S, Schupke S, Byrne RA, Capretti G, Appelman Y, Morice MC, Presbitero P, Radu M, Mauri J. Percutaneous coronary and structural interventions in women: a position statement from the EAPCI Women Committee. EuroIntervention 2018;14:e1227–e35.
10. Thygesen K, Alpert JS, Jaffe AS, Chaitman BR, Bax JJ, Morrow DA, White HD, Thygesen K, Alpert JS, Jaffe

AS, Chaitman BR, Bax JJ, Morrow DA, White HD; ESC Scientific Document Group. Fourth universal definition of myocardial infarction (2018). Eur Heart J 2019;40:237–269

11. Adlam D, Alfonso F, Maas A, Vrints C, Al-Hussaini A, Bueno H, Capranzano P, Gevaert S, Hoole SP, Johnson T, Lettieri C, Maeder MT, Motreff P, Ong P, Persu A, Rickli H, Schiele F, Sheppard MN, Swahn E; Writing Committee. European Society of Cardiology, acute cardiovascular care association, SCAD study group: a position paper on spontaneous coronary artery dissection. Eur Heart J 2018;39:3353–3368.
12. Collet JP, Thiele H, Barbato E, Barthelemy O, Bauersachs J, Bhatt DL, Dendale P, Dorobantu M, Edvardsen T, Folliguet T, Gale CP, Gilard M, Jobs A, Juni P, Lambrinou E, Lewis BS, Mehilli J, Meliga E, Merkely B, Mueller C, Roffi M, Rutten FH, Sibbing D, Siontis GCM; ESC Scientific Document Group. 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. Eur Heart J 2020;doi: 10.1093/eurheartj/ehaa575.
13. Prabakaran S, Schwartz A, Lundberg G. Cardiovascular risk in menopausal women and our evolving understanding of menopausal hormone therapy: risks, benefits, and current guidelines for use. Ther Adv Endocrinol Metab. 2021 Apr 30; 12:20420188211013917. doi:10.1177/20420188211013917. PMID:34104397;PMCID:PMC8111523.
14. Kannel WB, Hjortland MC, McNamara PM, Gordon T. Menopause and risk of cardiovascular disease: the Framingham study. Ann Intern Med. 1976;85:447–452. doi: 10.7326/0003-4819-85-4-447
15. El Khoudary SR. Gaps, limitations and new insights on endogenous estrogen and follicle stimulating hormone as related to risk of cardiovascular disease in women traversing the menopause: a narrative review. Maturitas. 2017;104:44–53. doi: 10.1016/j.maturitas.2017.08.003
16. Kunadian V, Chieffo A, Camici PG, Berry C, Escaned J, Maas A, Prescott E, Karam N, Appelman Y, Fraccaro C, Louise Buchanan G, Manzo-Silberman S, Al-Lamee R, Regar E, Lansky A, Abbott JD, Badimon L, Duncker DJ, Mehran R, Capodanno D, Baumbach A. An EAPCI expert consensus document on ischaemia with non-obstructive coronary arteries in collaboration with European Society of Cardiology Working Group on Coronary Pathophysiology & Microcirculation Endorsed by Coronary Vasomotor Disorders International Study Group. Eur Heart J 2020;41:3504–3520.
17. Ford TJ, Ong P, Sechtem U, Beltrame J, Camici PG, Crea F, Kaski JC, Bairey Merz CN, Pepine CJ, Shimokawa H, Berry C. Assessment of vascular dysfunction in patients without obstructive coronary artery disease: why, how, and when. JACC Cardiovasc Interv 2020;13:1847–1864.
18. Padro T, Manfrini O, Bugiardini R, Canty J, Cenko E, De Luca G, Duncker DJ, Eringa EC, Koller A, Tousoulis D, Trifunovic D, Vavlukis M, de Wit C, Badimon L. ESC Working Group on Coronary Pathophysiology and Microcirculation position paper on 'coronary microvascular dysfunction in cardiovascular disease'. Cardiovasc Res 2020;116:741–755.
19. Sharaf B, Wood T, Shaw L, Johnson BD, Kelsey S, Anderson RD, Pepine CJ, Bairey Merz CN. Adverse outcomes among women presenting with signs and symptoms of ischemia and no obstructive coronary artery disease: findings from the National Heart, Lung, and Blood Institute-sponsored Women's Ischemia Syndrome Evaluation (WISE) angiographic core laboratory. Am Heart J 2013;166:134–141.
20. Stefanska A, Bergmann K, Sypniewska G. Metabolic syndrome and menopause: pathophysiology, clinical and diagnostic significance. Adv Clin Chem 2015;72:1–75.
21. Mauvais-Jarvis F, Manson JE, Stevenson JC, Fonseca VA. Menopausal hormone therapy and type 2 diabetes prevention: evidence, mechanisms, and clinical implications. Endocr Rev 2017;38:173–188.
22. Fairweather D. Sex differences in inflammation during atherosclerosis. Clin Med Insights Cardiol 2014;8:49–59.
23. Mauvais-Jarvis F, Bairey Merz N, Barnes PJ, Brinton RD, Carrero JJ, DeMeo DL, De Vries GJ, Epperson CN, Govindan R, Klein SL, Lonardo A, Maki PM, McCullough LD, Regitz-Zagrosek V, Regensteiner JG, Rubin JB, Sandberg K, Suzuki A. Sex and gender: modifiers of health, disease, and medicine. Lancet 2020;396:565–582.
24. Lasrado N, Jia T, Massilamany C, Franco R, Illes Z, Reddy J. Mechanisms of sex hormones in autoimmunity: focus on EAE. Biol Sex Differ 2020;11:50.
25. Amaya-Amaya J, Montoya-Sa´nchez L, Rojas-Villarraga A. Cardiovascular involvement in autoimmune diseases. Biomed Res Int 2014;2014:1–31.
26. Mason JC, Libby P. Cardiovascular disease in patients with chronic inflammation: mechanisms underlying premature cardiovascular events in rheumatologic conditions. Eur Heart J 2015;36:482–489.
27. Del Buono M, Abbate A, Toldo S. Interplay of inflammation, oxidative stress and cardiovascular disease in rheumatoid arthritis. Heart 2018;104:1991–1992.
28. Maas AHEM, Rosano G, Cifkova R, Chieffo A, Van Dijken D, Hamoda H, Kunadian V, Laan E, Lambrinoudaki I, Maclaran K, Panay N, Stevenson JC, Van Trotsenburg M, Collins P. Cardiovascular health after menopause transition, pregnancy disorders, and other gynaecologic conditions: a consensus document from European cardiologists, gynaecologists, and endocrinologists. Eur Heart J. 2021 Mar 7;42(10):967-984.doi: 10.1093/eurheartj/ehaa1044. PMID:33495787;PMCID:PMC7947184.
29. Muka T, Oliver-Williams C, Kunutsor S, Laven JS, Fauser BC, Chowdhury R, Kavousi M, Franco OH. Association of age at onset of menopause and time since onset of menopause with cardiovascular outcomes, intermediate

vascular traits, and all-cause mortality: a systematic review and meta-analysis. JAMA Cardiol. 2016;1:767–776. doi: 10.1001/jamacardio.2016.2415

30. Appiah D, Schreiner PJ, Demerath EW, Loehr LR, Chang PP, Folsom AR. Association of age at menopause with incident heart failure: a prospective cohort study and meta-analysis. J Am Heart Assoc. 2016;5:e003769. doi: 10.1161/JAHA.116.003769.
31. Lobo RA. Surgical menopause and cardiovascular risks. Menopause. 2007;14(pt 2):562–566. doi: 10.1097/gme.0b013e318038d333
32. El Khoudary SR, Aggarwal B, Beckie TM, Hodis HN, Johnson AE, Langer RD, Limacher MC, Manson JE, Stefanick ML, Allison MA; American Heart Association Prevention Science Committee of the Council on Epidemiology and Prevention; and Council on Cardiovascular and Stroke Nursing. Menopause Transition and Cardiovascular Disease Risk: Implications for Timing of Early Prevention: A Scientific Statement From the American Heart Association. Circulation. 2020 Dec 22;142(25):e506-e532. doi: 10.1161/CIR.0000000000000912. Epub 2020 Nov 30. PMID: 33251828.
33. Son MK, Lim NK, Lim JY, Cho J, Chang Y, Ryu S, Cho MC, Park HY. Difference in blood pressure between early and late menopausal transition was significant in healthy Korean women. BMC Womens Health. 2015;15:64. doi: 10.1186/s12905-015-0219-9
34. Derby CA, Crawford SL, Pasternak RC, Sowers M, Sternfeld B, Matthews KA. Lipid changes during the menopause transition in relation to age and weight: the Study of Women's Health Across the Nation. Am J Epidemiol. 2009;169:1352–1361. doi: 10.1093/aje/kwp043
35. Mendelsohn ME and Karas RH. The protective effects of estrogen on the cardiovascular system. N Engl J Med 1999; 340: 1801–1811.
36. El Khoudary SR, Thurston RC. Cardiovascular implications of the menopause transition: endogenous sex hormones and vasomotor symptoms. Obstet Gynecol Clin North Am. 2018;45
37. El Khoudary SR, Wildman RP, Matthews K, Thurston RC, Bromberger JT, Sutton-Tyrrell K. Endogenous sex hormones impact the progression of subclinical atherosclerosis in women during the menopausal transition. Atherosclerosis. 2012;225:180–18.
38. Avis NE, Crawford SL, Green R. Vasomotor symptoms across the menopause transition: differences among women. Obstet Gynecol Clin North Am. 2018;45:629–640. doi: 10.1016/j.ogc.2018.07.005
39. El Khoudary SR, Greendale G, Crawford SL, Avis NE, Brooks MM, Thurston RC, Karvonen-Gutierrez C, Waetjen LE, Matthews K. The menopause transition and women's health at midlife: a progress report from the Study of Women's Health Across the Nation (SWAN). Menopause. 2019;26:1213–1227. doi: 10.1097/GME.00000000000014
40. Vongpatanasin W. Autonomic regulation of blood pressure in menopause. Semin Reprod Med 2009;27:338–345.
41. Thurston RC, Sutton-Tyrrell K, Everson-Rose SA, Hess R, Matthews KA. Hot flashes and subclinical cardiovascular disease: findings from the Study of Women's Health Across the Nation Heart Study. Circulation. 2008;118:1234–1240. doi: 10.1161/CIRCULATIONAHA.108.776823.
42. Zhou Y, Yang R, Li C, Tao M. Sleep disorder, an independent risk associated with arterial stiffness in menopause. Sci Rep. 2017;7:1904. doi: 10.1038/s41598-017-01489-7
43. Makarem N, St-Onge MP, Liao M, Lloyd-Jones DM, Aggarwal B. Association of sleep characteristics with cardiovascular health among women and differences by race/ethnicity and menopausal status: findings from the American Heart Association Go Red for Women Strategically Focused Research Network. Sleep Health. 2019;5:501–508. doi: 10.1016/j.sleh.2019.05.005
44. Janssen I, Powell LH, Matthews KA, Cursio JF, Hollenberg SM, SuttonTyrrell K, Bromberger JT, Everson-Rose SA; SWAN Study. Depressive symptoms are related to progression of coronary calcium in midlife women: the Study of Women's Health Across the Nation (SWAN) Heart Study. Am Heart J. 2011;161:1186–1191.e1. doi: 10.1016/j.ahj.2011.03.017
45. Janssen I, Powell LH, Matthews KA, Jasielec MS, Hollenberg SM, Bromberger JT, Sutton-Tyrrell K, Everson-Rose SA. Relation of persistent depressive symptoms to coronary artery calcification in women aged 46 to 59 years. Am J Cardiol. 2016;117:1884–1889. doi: 10.1016/j.amjcard.2016.03.035
46. Wassertheil-Smoller S, Shumaker S, Ockene J, Talavera GA, Greenland P, Cochrane B, Robbins J, Aragaki A, Dunbar-Jacob J. Depression and cardiovascular sequelae in postmenopausal women: the Women's Health Initiative (WHI). Arch Intern Med. 2004;164:289–298. doi: 10.1001/archinte.164.3.289
47. Morabia A, Costanza MC. International variability in ages at menarche, first livebirth, and menopause. World Health Organization Collaborative Study of Neoplasia and Steroid Contraceptives. Am J Epidemiol 1998;148:1195–1205.
48. Barrett-Connor E, Bush TL. Estrogen and coronary heart disease in women. JAMA. 1991;265:1861
49. Harman SM, Brinton EA, Cedars M, et al. KEEPS: The Kronos Early Estrogen Prevention Study. Climacteric 2005; 8: 3–12.
50. Hodis HN, Mack WJ, Henderson VW, et al. Vascular effects of early versus late postmenopausal treatment with estradiol. N Engl J Med 2016; 374: 1221–1231.
51. Maclennan AH, Broadbent JL, Lester S, et al. Oral oestrogen and combined oestrogen/ progestogen therapy versus placebo for hot flushes. Cochrane Database Syst Rev 2004; 2004: CD002978.

52. Zhu D, Chung HF, Dobson AJ, et al. Vasomotor menopausal symptoms and risk of cardiovascular disease: a pooled analysis of six prospective studies. Am J Obstet Gynecol 2020; 223: 898. e1–898.e16
53. The NAMS 2017 Hormone Therapy Position Statement Advisory Panel. The 2017 hormone therapy position statement of The North American Menopause Society. Menopause 2017; 24: 728–753.
54. Shufelt CL, Merz CN, Prentice RL, Pettinger MB, Rossouw JE, Aroda VR, Kaunitz AM, Lakshminarayan K, Martin LW, Phillips LS, et al. Hormone therapy dose, formulation, route of delivery, and risk of cardiovascular events in women: findings from the Women's Health Initiative Observational Study. Menopause. 2014;21:260–266. doi: 10.1097/GME.0b013e31829a64f9
55. Vinogradova Y, Coupland C, Hippisley-Cox J. Use of hormone replacement therapy and risk of venous thromboembolism: nested case-control studies using the QResearch and CPRD databases. BMJ. 2019;364:k4810. doi: 10.1136/bmj.k4810
56. Mosca L, Benjamin EJ, Berra K, et al. Effectiveness-based guidelines for the prevention of cardiovascular disease in women–2011 update: a guideline from the American Heart Association. J Am Coll Cardiol 2011; 57: 1404–1423.
57. Lundberg G, Wu P and Wenger N. Menopausal hormone therapy: a comprehensive review. Curr Atheroscler Rep 2020; 22: 33
58. Goff DC Jr, Lloyd-Jones DM, Bennett G, et al. 2013 ACC/AHA guideline on the assessment of cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines. Circulation 2014; 129(Suppl. 2): S49–S73
59. Espeland MA, Stefanick ML, Kritz-Silverstein D, Fineberg SE, Waclawiw MA, James MK, Greendale GA. Effect of postmenopausal hormone therapy on body weight and waist and hip girths: Postmenopausal Estrogen-Progestin Interventions Study Investigators. J Clin E
60. Harman SM, Black DM, Naftolin F, Brinton EA, Budoff MJ, Cedars MI, Hopkins PN, Lobo RA, Manson JE, Merriam GR, et al. Arterial imaging outcomes and cardiovascular risk factors in recently menopausal women: a randomized trial. Ann Intern Med. 2014;161:249–260. doi: 10.7326/M14-0353
61. Canonico M, Carcaillon L, Plu-Bureau G, Oger E, Singh-Manoux A, Tubert-Bitter P, Elbaz A, Scarabin PY. Postmenopausal hormone therapy and risk of stroke: impact of the route of estrogen administration and type of progestogen. Stroke. 2016;47:1734–1741. doi: 10.1161/STROKEAHA.116.013052
62. Manson JE, Allison MA, Rossouw JE, Carr JJ, Langer RD, Hsia J, Kuller LH, Cochrane BB, Hunt JR, Ludlam SE, et al; WHI and WHI-CACS Investigators. Estrogen therapy and coronary-artery calcification. N Engl J Med. 2007;356:2591–2602. doi: 10.1056/NEJMoa071513
63. Grundy SM, Stone NJ, Bailey AL, Beam C, Birtcher KK, Blumenthal RS, Braun LT, de Ferranti S, Faiella-Tommasino J, Forman DE, et al. 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA guideline on the management of blood cholesterol: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines [published correction appears in Circulation. 2019;139:e1182–1186]. Circulation. 2019;139:e1082–e1143. doi: 10.1161/CIR.0000000000000625
64. Khan SU, Khan MU, Riaz H, Valavoor S, Zhao D, Vaughan L, Okunrintemi V, Riaz IB, Khan MS, Kaluski E, et al. Effects of nutritional supplements and dietary interventions on cardiovascular outcomes: an umbrella review and evidence map. Ann Intern Med. 2019;171:190– 198. doi: 10.7326/M19-0341
65. Mora S, Glynn RJ, Hsia J, MacFadyen JG, Genest J, Ridker PM. Statins for the primary prevention of cardiovascular events in women with elevated high-sensitivity C-reactive protein or dyslipidemia: results from the Justification for the Use of Statins in Prevention: An Intervention Trial Evaluating Rosuvastatin (JUPITER) and meta-analysis of women from primary prevention trials. Circulation. 2010;121:1069–1077. doi: 10.1161/CIRCULATIONAHA.109.906479

Malnutrition and Maltreatment of the Elderly

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Malnutrition

Introduction

The process of ageing is characterized by numerous changes in the body, which has an overall negative effect on the health and lifestyle of the elderly. Nutrition deserves special attention as an individual reaches old age as their nutritional status is an important determinant of quality of life, including physical, mental and social health. The older population is at risk of inadequate diet, dehydration and malnutrition which may be related to disease, drugs, disability and dependence.[1,2] It is important to learn about these actors that contribute to poor nutritional status in older people and their consequences so that improvements can be made to bring about tangible benefits and enhance healthy ageing of the population.[3]

Factors affecting Malnutrition[1]

- As age advances, the body no longer effectively absorbs certain minerals and vitamins due to mal-absorption and gradually lean body mass and metabolic rate decrease.
- Physical impairments such as reduced mobility, limited access to shops in order to purchase, prepare and consume foods.
- Low food intake because of isolation, dental problems, depression, or chronic illnesses.
- Medication side effects and interaction may alter absorption capacity of certain nutrients.
- Forgetfulness and growing cognitive impairments.
- Gastrointestinal(GI) issues, whether from a GI tract infection or surgical procedure.
- Smoking, tobacco and over-consumption of alcohol.
- Hormonal and neurotransmitter changes that affect how hunger and fullness are experienced.
- Other social and medical reasons that affect food choices in older adults.
- A reduced or fixed income, limits the purchasing capability of food.

Table 1-Risk factors contributing to the development of nutritional deficiency in older adults.[3]

Cause of nutritional deficiency	Consequence
Physical and physiological	
Changes in body composition	Reduced metabolic rate and loss of muscle mass
Altered nutrient requirements	Insufficient energy and nutrients intake
Decreased physical activity	Progressive loss of body weight and reduced appetite
Sensory impairment	
Decreased sense of taste and smell	Reduced appetite
Loss of vision and hearing	Decreased ability to purchase and prepare food
Dental problems	Difficulty in chewing and poor-quality diet
Age-related issues	
Dementia	Decreased ability for self-care and increased morbidity
Sarcopenia	Decreased functional ability and assistance needed with activities of daily living.
Social determinants	
Financial restraints and poverty	Poor diet and limited access to food
Social isolation, reduced mobility, and lack of transport	Inappropriate food choices
Widowhood and bereavement	Food aversion
Decrease independence	Decreased food intake and inability to self-feed

Common Nutritional Deficiencies

As elderly adults can have smaller appetites and a lower caloric requirement, they may need more nutrients than before. Older adults are more likely than younger people to experience the following deficiencies:

- **Calcium**: contributes to bone density and strength. Calcium deficiency causes osteoporosis, may

influence mobility and exacerbate fall-related injuries.

- **Vitamin D**: Works in conjunction with calcium to improve bone density.
- **Magnesium**: Influences certain body processes, including blood pressure regulation.
- **Vitamin C**: Contains antioxidants, affects wound healing and protein absorption.
- **Vitamin B6**: Helps with protein absorption and can influence cognitive functioning.
- **Vitamin E**: Also known for its antioxidant property and is the key for the immune system.
- **Vitamin B12**: Essential for creating new blood cells and nervous system functionality.
- **Folate or Vit B9**: Assists in the production of red and white blood cells and its deficiency may contribute to anemia in older adults.
- **Potassium**: Contributes to stronger and healthier bones, helps to reduce blood pressure and lessens the risk of kidney stones.
- **Fiber**: Affects how well food moves through the digestive system and helps in reducing constipation and the risk of heart disease.
- **Omega 3 fatty acids**: known to reduce the progression of rheumatoid arthritis, Alzheimer's disease, macular degeneration and may improve cognitive health.

Common nutrition-deficiency related conditions and recommendations

Vitamin and nutritional deficiencies can take months or years to develop. Inadequate food intake contributes to many health conditions including anemia, malnutrition, sarcopenia, osteoporosis, and cognitive decline. Prevention and mitigation strategies are possible and nutritional strategies are needed to enhance consumption of the foods that may prevent or delay the onset of these conditions and promote healthy ageing.

Malnutrition

Due to many factors, nutritional intake is often compromised in older persons and the risk of malnutrition is increased. Anorexia of ageing is crucial in this context.

- Guiding value for energy intake in older persons is 30 kcal per kg body weight and day;
- Protein intake in older persons should be at least 1 g protein per kg body weight and day. The amount should be individually adjusted with regard to nutritional status, physical activity level, disease status and tolerance.[2]
- Older persons with malnutrition or at risk of malnutrition and/or their caregivers should be offered individualized nutritional counseling in order to support adequate dietary intake and improve or maintain nutritional status and should be offered fortified food in order to support adequate dietary intake. Those with chronic conditions should also be offered oral nutritional supplements (ONS) when dietary counseling and food fortification are not sufficient.
- Those with signs of oro-pharyngeal dysphagia and/or chewing problems should be offered texture-modified, enriched foods as a compensatory strategy to support adequate dietary intake.[2]
- In older patients with malnutrition, enteral nutrition should start early, however it should be very gradually increased during the first three days in order to avoid the refeeding syndrome. Re-feeding syndrome (RFS) is a condition of potential risk in malnourished patients leading to electrolyte disturbances and clinical deterioration. Criteria to identify RFS varies from reduced phosphate or any electrolyte serum concentration and clinical symptoms of fluid overload (e.g., peripheral edema, acute circulatory fluid overload, disturbance to organ function).[2]

Anemia

Hospitalized elderly are often diagnosed with this deficiency, which can occur together with inflammation, chronic diseases and protein-absorption issues.

- Nutritional deficiencies in the form of iron and Vit B12 deficiencies are common and need to be identified and treated appropriately.
- Inflammatory diseases and renal failure are also frequent etiological factors and tend to be chronic. Myelodysplastic syndromes increase in frequency with age and may be difficult to diagnose and only a minority of cases respond to appropriate treatment.[4]
- Anemia of chronic disease should be managed by treating the underlying disorder. Iron therapy is of no benefit. Erythropoietin may be helpful in some patients with anemia of chronic disease. The

dosage is 50 to 100 U per kg three times a week.

Cognitive Impairment

- Vitamin B12 deficiency manifests as cognitive impairment, often in concurrence with gastrointestinal issues related to absorption and infection, anemia and folic acid deficiency.
- Older adults may display signs of memory loss, confusion, delayed processing and depression.
- The nutrients, most notably B vitamin, should start at an earlier stage to ensure adequate intake and maintain healthy cognitive function.
- Dietary antioxidants such as β-carotene and vitamins C and E play a protective role against cognitive decline by reducing the negative effects of free radicals.

A recent trial examining adults aged >70 y with mild cognitive impairment (MCI) found that a high dose of folic acid (0.8 mg), vitamin B12 (0.5 mg) and B6 (20 mg) supplementation for 24 months was associated with a slower cognitive decline in those receiving the intervention, compared to those receiving the placebo.[5,6]

Vitamin D Deficiency

Elderlies with lower levels of Vitamin D in their blood, often due to decreased sunlight exposure, tend to have lower bone density. This condition can lead to more fractures that are frequent and puts them at risk for osteomalacia or osteoporosis. Women are predominantly affected due to hormonal changes that occur at menopause, resulting in the rapid loss of bone mass. Vitamin D and Calcium are well supported in terms of their contribution to bone health and the prevention or mitigation of this condition.[7,8]

Sarcopenia

- Sarcopenia is the progressive depletion of muscle mass and loss in strength, which is associated with a consequent risk of adverse outcomes, poor functional status and an increased risk of chronic diseases. It is a highly prevalent condition among ageing individuals and also occurs in those who are immobile, even in the absence of comorbidities. In many older adults, the cause of sarcopenia is multi-factorial, but it is primarily influenced by the ageing process.
- Low intakes or deficiencies in energy, protein, and vitamin D, in addition to acute or chronic diseases may also exacerbate the development of sarcopenia. A poor protein intake results in a decrease in lean muscle mass, limiting muscle protein synthesis and increasing oxidative damage of muscle tissue. In addition, deficiencies in vitamins B, D, and some antioxidant nutrients, that is, carotenoids, selenium, vitamins C and E are also implicated in the development of sacropenia.
- Amino acids are also essential nutrients required for the stimulation of muscle protein synthesis. Leucine, in particular, is recognized to have a role in the synthesis of muscle protein and the management of sarcopenia.

More attention should be paid to diets providing adequate energy and nutrients to ensure sufficient intake and coupled with physical activity to prevent or postpone the onset of sarcopenia. [9,10]

Maltreatment

Maltreatment is defined as any willful infliction of injury, unreasonable confinement, intimidation or cruel punishment that results in physical harm, pain, mental anguish or other willful deprivation by a caretaker of goods or services. Maltreatment of the elderly may be as common as child maltreatment.[11,12]

Elderly maltreatment can be divided into six categories:

1. Physical maltreatment
2. Sexual maltreatment
3. Neglect
4. Psychological maltreatment
5. Financial and material exploitation
6. Violation of rights

Elderly maltreatment often is unrecognized and under-reported. Signs of maltreatment can be subtle (e.g., poor hygiene and dehydration) and go undetected. Physical maltreatment occurs in up to 14% of geriatric trauma admissions, resulting in a higher mortality than in younger patients.[11] Trauma is the fifth leading cause of death in patients over the age of 65.[12]

The physical findings suggestive of maltreatment are –

- Contusions affecting the inner arms, inner thighs, palms, soles, scalp, ear (pinna), mastoid area,

buttocks
- Multiple and clustered contusions
- Abrasions to the axillary area (from restraints) or the wrist and ankles (from ligatures)
- Nasal bridge and temple injury (from being struck while wearing eyeglasses)
- Periorbital ecchymoses
- Oral injury
- Unusual alopecia pattern
- Untreated pressure injuries or ulcers in non-lumbosacral areas
- Untreated fractures
- Fractures not involving the hip, humerus, or vertebra
- Injuries in various stages of evolution
- Injuries to the eyes or nose
- Contact burns and scalds
- Scalp hemorrhage or hematoma

The presence of physical findings suggesting maltreatment should prompt a detailed history. If the history conflicts with the physical findings or reveals an intentional delay in treatment, immediate reporting of the findings to appropriate authorities for further investigation should be done. If maltreatment is suspected or confirmed, take appropriate action, including removal of the elderly patient from the abusive situation. According to the National Center on Elder Abuse, more than 1 in 10 older adults may experience some type of maltreatment, but only 1 in 5 or fewer of those cases are reported.

Conclusion

Inadequate macro and micro-nutrient intakes are common among older people. This contributes to weight loss, malnutrition, and associated conditions such as sarcopenia and cognitive decline. This risk can be reduced only by combined assessment of the nutritional needs of the elderly and by providing them with adequate access to food, they require.[7] By considering nutritional gaps and challenges, potential high-quality food products can be tailored specifically to enhance nutritional status and health of older adults. This can be achieved by fortifying foods with selected functional ingredients, vitamins and minerals, which may offer additional potential to enhance the nutritive value of individual portions of food.[2] By also providing products with beneficial attributes such as ready-to-eat, easy-to-open, and easy-to-bite and chew products along with tender loving care will help fulfill this cohort's nutritional and functional needs.

Early suspicion and detection of maltreatment in elderly with a multidisciplinary care approach will help to address the problems faced by these victim.[12]

References

1. Roe DA. Geriatric nutrition. Clinics in geriatric medicine. 1990 May 1;6(2):319-34.
2. Volkert D, Beck AM, Cederholm T, Cruz-Jentoft A, Goisser S, Hooper L, Kiesswetter E, Maggio M, Raynaud-Simon A, Sieber CC, Sobotka L. ESPEN guideline on clinical nutrition and hydration in geriatrics. Clinical nutrition. 2019 Feb 1;38(1):10-47.
3. Kaur D, Rasane P, Singh J, Kaur S, Kumar V, Mahato DK, Dey A, Dhawan K, Kumar S. Nutritional interventions for elderly and considerations for the development of geriatric foods. Current ageing science. 2019 May 1;12(1):15-27.
4. Beyer, N. Compte, A. Busuioc, S. Cappelle, C. Lanoy & E. Cytryn (2010) Anemia and transfusions in geriatric patients: a time for evaluation, Hematology, 15:2, 116-121, DOI: 10.1179/102453310X12583347010052.
5. Baugreet S, Hamill RM, Kerry JP, McCarthy SN. Mitigating nutrition and health deficiencies in older adults: a role for food innovation?. Journal of food science. 2017 Apr;82(4):848-55.
6. Alles B, Samieri C, Feart C, Jutand MA, Laurin D, Barberger-Gateau P. Dietary patterns: a novel approach to examine the link between nutrition and cognitive function in older individuals. Nutrition research reviews. 2012 Dec;25(2):207-22.
7. Artaza-Artabe I, Saez-Lopez P, Sanchez-Hernandez N, Fernandez-Gutierrez N, Malafarina V. The relationship between nutrition and frailty: Effects of protein intake, nutritional supplementation, vitamin D and exercise on muscle metabolism in the elderly. A systematic review. Maturitas. 2016 Nov 1;93:89-99.
8. Gennari C. Calcium and vitamin D nutrition and bone disease of the elderly. Public health nutrition. 2001 Apr;4(2b):547-59.
9. Barberger-Gateau P, Raffaitin C, Letenneur L, Berr C, Tzourio C, Dartigues JF, Alperovitch A. Dietary patterns and risk of dementia: the Three-City cohort study. Neurology. 2007 Nov 13;69(20):1921-30.
10. Gariballa S, Alessa A. Sarcopenia: prevalence and prognostic significance in hospitalized patients. Clinical nutrition. 2013 Oct 1;32(5):772-6.
11. Min L, Burruss S, Morley E, Mody L, Hiatt JR, Cryer H, Ha JK, Tillou A. A simple clinical risk nomogram to predict mortality-associated geriatric complications in severely-injured geriatric patients. The journal of trauma and acute care surgery. 2013 Apr;74(4):1125.
12. Centers for Disease Control and Prevention. Fatalities and injuries from falls among older adults---United States, 1993--2003 and 2001--2005. MMWR: Morbidity and mortality weekly report. 2006;55(45):1221-4.

ERAS (Enhanced Recovery After Surgery) Protocols in Gynecological surgeries

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Introduction

ERAS (Enhanced Recovery After Surgery) protocols are de ed with the aim of achieving early recovery in patients undergoing any surgical procedure by giving optimum pre-operative care and minimizing surgical stress. The concept of ERAS was brought into existence by Danish surgeon Professor Henrik Kehlet in 1990.[1] It has been developed with an intention to modify the physiological and pschyological stress related to surgery, ultimately leading to decrease in complications and resumption of early normal activites.[2] Any surgery triggers a combination of hormonal and inflammatory response leading to a state of insulin resistance. Decrease in insulin sensitivity will initiate a catabolic state characterized by breakdown of protein, decrease in the uptake of peripheral glucose and increase in the production of endogenous hepatic glucose.[3] Implementation of these protocols will modulate perioperative insulin sensitivity, thus improving postoperative outcomes with early return to baseline function. Broadly, the ERAS protocols include pre admission, pre-operative, intraoperative and post operative care. The limitation in preadmission and preoperative care during emergency surgeries can be overcome by a multi-disciplinary approach.[4]

ERAS protocols are divided into 4 phases:

- Pre-admission
- Pre-operative
- Intra-operative
- Post-operative

Pre-admission ERAS protocols: Goal of Pre-admission ERAS protocol is to inform, educate and counsel the patient and their families. It includes:

a. Proper **counselling** of timing, type and details of the procedure to be performed with proper documentation.

b. Pre-operative **medical optimization** is a major prerequisite to achieve positive surgical outcome. In obstetrics, pregnant patients with comorbidites come under this ambit. Tight control of blood glucose in gestational diabetes mellitus, well controlled blood pressure in hypertensive patients, correction of preoperative anemia, cessation of smoking and optimal gestational weight gain in maternal obesity (BMI >= 40 kg/m^2) should be undertaken for a favorable outcome.[5]

c. Patients scheduled for exploratory lapartomies for malignancy may undergo cancer prehabilitation. Cancer prehabilitation is a process of continous care provided between the diagnosis of cancer and beginning of the treatment. It mainly focusses on improving the physical and mental well being of the patient by incorporating dietary interventions, aerobic and targeted functional exercises and pschyological interventions to reduce stress.[6,7] Role of prehabilitation in enhanced recovery is still being investigated.

Pre-operative ERAS protocol: Goal of preoperative care is to avoid post-operative complications and expedite patient recovery via the following interventions. It includes:

a. **Limitation of the fasting Interval:** The American Society of Anesthesiologists recommends surgical fasting for fatty food 8 hours prior, light meal 6 hours prior and clear liquids 2 hours prior to the surgery.[8] This time frame limits the risk of aspiration while avoiding the risk of hypovolemia, metabolic stress and ketosis.

b. **Pre-operative carbohydrate loading:** Data extrapolated from various studies have shown that pre-operative non particulate liquid carbohydrate loading is associated with reduced post-operative insulin resistance, enhanced return of bowel function and shorter hospital stay.[9]

c. **Bowel Preparation:** In cesarean delivery (CD), Oral or mechanical bowel preparation is discouraged. Routine use of bowel preparation is not recommended in minimally invasive gynecological surgeries or even laparotomies for benign or malignant lesions. Studies show

no additional advantage of bowel preparation in terms of improved visualization or ease of handling tissues in minimally invasive surgeries.[10] A Cochrane review of 20 randomized controlled trials with patients undergoing elective colorectal surgery showed no difference in wound infection or anastomotic leakage rates among the participants who received or did not receive mechanical bowel preparation.[11] Despite this, if the surgeon feels the need of mechanical bowel preparation, then its use should be limited to patients undergoing colonic resection and should be done in conjunction with oral antibiotics.[11]

d. **Premedications**: This includes administration of antacids and H2 receptor antagonist to reduce the risk of aspiration pneumonitis. Avoidance of preoperative sedative in case of CD is recommended as it decreases the immediate skin to skin contact between mother and the baby following surgery.

e. **Venous Thrombo-embolism (VTE) Prophylaxis:** Physiological changes in pregnancy increase the chances of venous thromboemblism in the mother. The risk of VTE is 4 times more in CD as compared to vaginal delievery. American College Of Obstetrics & Gynaecology (ACOG) recommends the placement of pneumatic sequential compression devices in all the patients undergoing CD and these should be kept in place until the patient is ambulatory.[12] VTE occurs in 3-4% of cervical cancer, 4-9% of endometrial cancer and 17-38% of ovarian cancer patients.[10] Hence, all patients undergoing major gynecological surgeries for malignancy should receive dual VTE prophylaxis with low-molecular weight heparin (LMWH)/ unfractionated heparin (UFH) and mechanical pneumatic compression. This prophylaxis must be continued throughout the hospital stay. Extended prophylaxis (4 weeks) with LMWH to prevent postoperative VTE after major laparotomy in patients with cancer is indicated in patients with a high VTE risk and low bleeding risk.[13]

f. **Pre-operative hemoglobin stabilization:** The Ministry of Health & Family Welfare, Government of India and UNICEF have launched a program to combat the burden of anemia. As per Government of India, all pregnant women should be provided with 60 mg of elemental iron daily throughout pregnancy as anemia prophylaxis. Pre-operative anemia in gynecological surgeries should be identified and corrected accordingly.

Intra-operative ERAS protocol: The Goal is avoidance of surgical site infections (SSIs) and pain, fluid management and limiting blood loss.

1) **Following interventions are a part of the surgical site reduction bundles:**

   a. Antiobiotic prophylaxis: The anti-microbial coverage, dosing and timing of adminstration is of key importance in preventing SSI. First generation cephalosporins are the first line antimicrobials in abdominal and vaginal hysterectomies.[14] Dose of the antibiotic needs to be adjusted according to the patient's weight. Intravenous antibiotics should be given 60 minutes prior to the incision to obtain the highest drug serum level. Anerobic coverage should be added in cases of cancer and bowel surgery. Amoxycillin- clavulinic acid has better anaerobic coverage and can be used.[15] Redosing of the antibiotics is required if the duration of the surgery is > 3 hours or there is blood loss of > 1.5 litres. Patients with beta lactam allergy can be given either clindamycin and gentamycin or a fluroquinolone.[14] In obstetrics, first generation cephalosporin is indicated in all cases of CD. Azithromycin may be given to the women who were in active labor or had ruptured membranes at the time of surgery.[16]

   b. Skin Preparation: Patients should preferably wash themselves with chlorhexidine- based antimicrobial soap before the surgery. Centre for Disease Control & Prevention (CDC) endorses the use of chlorhexidine alcohol over aqueous povidone iodine solution for abdominal cleaning before surgery. Scrub time for chlorhexidine solution is 2 minutes for moist areas (inguinal fold, vulva) and 30 seconds for dry sites (abdomen). Scrub time for povidone iodine solution should be 5 minutes. The scrub should be dried with a towel followed by painting with topical povidone-iodine solution which should be allowed to dry for 2 minutes before starting draping.[15]

   c. Vaginal Cleansing: United States Food & Drug Association (FDA) has approved the use of povidone iodine for vaginal toileting.[17] It should be done in hysterectomies and all

vaginal surgeries. Vaginal cleansing has shown to decrease the risk of endometritis when CD is done in a patient in active labor or with rupture of membranes.[18]

d. Maintainence of normothermia: Exposure to cold operating room (OR) and anaesthesia can disrupt the thermoregulatory centre in the brain leading to hypothermia.[19] Epidural anaesthesia accounts for 50-80% of intraoperative hypothermia[16] as it results in vasodilatation below the level of nerve block. Hypothermia causes increased release of adrenaline and steroids leading to peripheral vasoconstriction and subsequent rise in blood pressure. In addition to this it is also associated with SSIs, coagulopathy and adverse outcomes in the neonate.[16] Maintaining the OR temperature (>72 F), forced air warming and intravenous fluids warming are some of the recommended methods to avoid hypothermia.

e. Avoidance of use of peritoneal, subcutaneous and nasogastric tube after abdominal surgery.

f. Maintainence of normoglycemia: Screening of all the patients for diabetes. Perioperative capillary blood glucose level should be maintained <200 mg/dl.

2) **Pain Management:** Epidural and spinal anaesthesia have a better safety profile over general anaesthesia. In CD, regional anaesthesia is preferred as a part of ERAS protocol.[16] Society for Obstetric anaesthesia & Perinatology (SOAP) advocates the use of multimodal analgesia protocol which includes low dose, long acting neuraxial morphine and a non-opioid analgesia(acetaminophen and ketorolac 15-30 mg IV after delivery). Peripheral nerve blocks like transverse abdominis plane (TAP) block, quadratus lumborum block (QLB) and continous wound infiltration should be considered where neuraxial morphine is not available or when pain is severe despite the use of morphine.[20]

3) **Goal directed Intraoperative fluid therapy:** Up to 3 litres of intravenous fluids should be given in routine CD. Treatment of spinal induced hypotension should focus on the use of vasopressors along with the co administration of intravenous fluids.[20]

4) **Adoption of type of surgery:** Robotic and laparoscopic surgeries should be preferred to open surgeries where ever feasible as they are associated with less intraoperative blood loss, shorter operating time and lesser duration of hospital stay.

5) **Surgical Techniques:** Following techniques must be deployed while doing CD:[16]

- Blunt expansion of a transverse uterine hysterotomy at time of CD to decrease intraoperative blood loss.
- Uterine incision should be closed in two layers to lower the rate of uterine rupture.
- Peritoneal closure is not associated with improved outcomes, instead increases the operative time.
- Fat layer should be closed if the subcutaneous tissue is > 2 cm.
- Skin should be closed using subcuticular suture.

Post-operative ERAS protocol: Goal of post-operative care is early mobilization, early oral intake, early removal of catheter and early discharge from the hospital.

a. ERAS sham feeding: Chewing gum is effective if delayed oral intake is planned.

b. Post-operative nausea and vomiting prophylaxis (PONV): Prophylactic vasopressor (e.g. phenylephrine infusion) and administration of fluids can prevent or minimize spinal anaesthesia-induced hypotension. Combination of at least 2 prophylactic IV antiemetics with different mechanism of action should be used. Examples: 5HT3 antagonist (ondansetron 4 mg) ,Glucocorticoid (dexamethasone 4 mg) , D2 receptors antagonist (metoclopramide 10 mg).[20]

c. Post-operative analgesia: Multimodal analgesia including Non-Steroidal Anti Inflammatory Drugs (NSAIDS) and paracetamol should be used for enhanced recovery.

d. Post-operative Nutrition: A regular diet within 2 hours of CD and within 24 hours of gynecological cancer surgeries is recommended.[10,21]

e. Post-operative tight control of blood glucose level

f. Early Mobilization: Mobilization and ambulation should occur soon after return of motor function. An example of a mobilization schedule from SOAP includes dangling feet on the edge of the bed and sitting in the chair within the first 8 hours postoperatively, followed

by walking at least 1–2 times within 24 hours postoperatively, followed by walking 3–4 times daily on the subsequent postoperative day[20].

g. **Removal of urinary catheters** : Catheters should be removed immediately after CD if no strict urine output record is required.[21]

h. **Post-operative thromboprophylaxis:** Caprini or Rogers score may be used for risk stratification in patients at high risk for VTE. Early ambulation, intermittent pneumatic compression and well fitted compression stockings should be given to all post-operative patients for thromboprphylaxis.[15]

i. **Hospital Discharge:** Patient should be discharged only if the following criteria are met:[15]
   - Adequate pain control is achieved
   - Patient is ambulating
   - Patient is tolerating oral diet
   - Passing flatus is not mandatory before discharge
   - Absence of any other complications

j. **Discharge Counselling:** Patient and care givers should be educated and specific instructions must be given in writing regarding advice on recovery and emergency contact information if needed. Post-operative counselling plays a very crucial role in lowering the readmission rates and reducing the number of unplanned visits to the hospital after discharge.

Implementation of the ERAS principles

Implementation of ERAS pathway is a major challenge as it requires considerable changes in the supporting clinical system and interventions.[15] Successful implementation requires the following:

- Clinical leadership at a senior level
- Dedicated team-work with active participation in patient care
- Regular audit of the goals and target to identify compliance and window for improvement.
- Work culture should emphasize on safety and quality .[15]

Conclusion

The benefit of ERAS principles has been proved in all gynecological surgeries including minimally invasive and open surgeries. It requires active and effective participation of all the surgical team members including anaesthesiologists, neonatologists and the nursing staff. Not only has it shown to improve patient care and decrease the hospital stay but also improves patient satisfaction.

References

1. Lassen K, Soop M, Nygren J, et al. Consensus review of optimal perioperative care in colorectal surgery: Enhanced Recovery After Surgery (ERAS) Group recommendations. Arch Surg. 2009; 144:961–9.
2. Melnyk M, Casey RG, Black P, Koupparis AJ. Enhanced recovery after surgery (ERAS) protocols: Time to change practice? Can Urol Assoc J. 2011 Oct;5(5):342-8. doi: 10.5489/cuaj.11002. PMID: 22031616; PMCID: PMC3202008.
3. Carli, F. Physiologic considerations of Enhanced Recovery After Surgery (ERAS) programs: implications of the stress response. Can J Anesth/J Can Anesth 62, 110–119 (2015). https://doi.org/10.1007/s12630-014-0264-0
4. Saurabh, K., Sureshkumar, S., Mohsina, S. et al. Adapted ERAS Pathway Versus Standard Care in Patients Undergoing Emergency Small Bowel Surgery: a Randomized Controlled Trial. J Gastrointest Surg 24, 2077–2087 (2020). https://doi.org/10.1007/s11605-020-04684-6.
5. Wilson RD, Caughey AB, Wood SL, Macones GA, Wrench IJ, Huang J, Norman M, Pettersson K, Fawcett WJ, Shalabi MM, Metcalfe A, Gramlich L, Nelson G. Guidelines for Antenatal and Preoperative care in Cesarean Delivery: Enhanced Recovery After Surgery Society Recommendations (Part 1). Am J Obstet Gynecol. 2018 Dec;219(6):523.e1-523.e15. doi: 10.1016/j.ajog.2018.09.015. Epub 2018 Sep 18. PMID: 30240657.
6. Silver JK, Baima J. Cancer prehabilitation: an opportunity to decrease treatment-related morbidity, increase cancer treatment options, and improve physical and psychological health outcomes. Am J Phys Med Rehabil 2013;92:715–27
7. Carli F, Silver JK, Feldman LS, et al. Surgical prehabilitation in patients with cancer: state-of-the-science and recommendations for future research from a panel of subject matter experts. Phys Med Rehabil Clin N Am 2017;28:49–64.
8. Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures: an updated report by the American Society of Anesthesiologists Task Force on preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration. Anesthesiology. 2017;126(3):376-93. https://doi.org/10.1097/ALN.0000000000001452

9. Smith MD, McCall J, Plank L, et al. Preoperative carbohydrate treatment for enhancing recovery after elective surgery. Cochrane Database Syst Rev 2014;8.
10. Nelson G, Bakkum-Gamez J, Kalogera E, Glaser G, Altman A, Meyer LA, Taylor JS, Iniesta M, Lasala J, Mena G, Scott M, Gillis C, Elias K, Wijk L, Huang J, Nygren J, Ljungqvist O, Ramirez PT, Dowdy SC. Guidelines for perioperative care in gynecologic/oncology: Enhanced Recovery After Surgery (ERAS) Society recommendations-2019 update. Int J Gynecol Cancer. 2019 May;29(4):651-668. doi: 10.1136/ijgc-2019-000356. Epub 2019 Mar 15. PMID: 30877144.
11. Güenaga KF , Matos D , Wille-Jørgensen P . Mechanical bowel preparation for elective colorectal surgery . Cochrane Database of Systematic Reviews 2011, Issue 9. Art. No.: CD001544..
12. ACOG Practice Bulletin No. 196: Thromboembolism in Pregnancy, Obstetrics & Gynecology: July 2018 - Volume 132 - Issue 1 - p e1-e17 doi: 10.1097/AOG.0000000000002706
13. 2019 international clinical practice guidelines for the treatment and prophylaxis of venous thromboembolism in patients with cancer Farge, DominiqueAgeno, Walter et al.The Lancet Oncology, Volume 20, Issue 10, e566 - e581
14. Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health-Syst Pharm. 2013; 70:195–283.
15. Perioperative pathways: enhanced recovery after surgery. ACOG Committee Opinion No. 750. American College of Obstetricians and Gynecologists. Obstet Gynecol 2018;132:e120–30.
16. Caughey AB, Wood SL, Macones GA, Wrench IJ, Huang J, Norman M, Pettersson K, Fawcett WJ, Shalabi MM, Metcalfe A, Gramlich L, Nelson G, Wilson RD. Guidelines for intraoperative care in cesarean delivery: Enhanced Recovery After Surgery Society Recommendations (Part 2). Am J Obstet Gynecol. 2018 Dec;219(6):533-544. doi: 10.1016/j.ajog.2018.08.006. Epub 2018 Aug 15. PMID: 30118692.
17. Berríos-Torres SI, Umscheid CA, Bratzler DW, et al. Centers for Disease Control and Prevention guideline for the prevention of surgical site infection, 2017. JAMA Surg 2017;152:784–91.
18. Haas DM, Morgan S, Contreras K. Vaginal preparation with antiseptic solution before cesarean section for preventing postoperative infections. Cochrane Database Syst Rev 2014;12: CD007892.
19. Sessler DI. Mild perioperative hypothermia. New Engl J Med. 1997;336:1730-7.
20. SOAP. Society of Obstetric Anesthesia and Perinatology (SOAP) Enhanced Recovery After Cesarean (ERAC) Consensus Statement 2019. 2019.https://soap.org/SOAP-Enhanced-Recovery-After-Cesarean-Consensus-Statement.pdf
21. Macones GA, Caughey AB, Wood SL, Wrench IJ, Huang J, Norman M, Pettersson K, Fawcett WJ, Shalabi MM, Metcalfe A, Gramlich L, Nelson G, Wilson RD. Guidelines for postoperative care in cesarean delivery: Enhanced Recovery After Surgery (ERAS) Society recommendations (part 3). Am J Obstet Gynecol. 2019 Sep;221(3):247.e1-247.e9. doi: 10.1016/j.ajog.2019.04.012. Epub 2019 Apr 14. PMID: 30995461.

Women Pathbreakers

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Advancement in medical science led to the discovery of hormones and the functioning of endocrine system, giving a more realistic perspective to menopause. Gradually, the belief that menopause was a 'sign of madness' was replaced by the idea that women's 'lost femininity' could be restored by hormonal treatment. It is the tireless efforts and immense progress of these great women which led to a change in the attitude towards menopause.

Rosalyn Sussman Yalow : 'The mother of endocrinology'

Rosalyn was born into a Jewish family in 1921 in the Bronx, New York, and received a doctorate from Urbana University in Physics. She was a member of the National Academy of Sciences and the second woman in United states to win Nobel prize in Physiology or Medicine for creation of radioimmunoassay that revolutionised every field of medicine by providing specific measurements of peptide hormones and other biologically active substances in the body. The discovery of radioimmunoassay led to major advances in diabetes research, treating hormonal problems related to growth, thyroid function, and fertility.

Valerie Beral :

Valerie Beralstudied medicine at the University of Sydney. After doing clinical work for few years she realized that her interest lay in epidemiology. Shejoined theDepartment of Epidemiology,London School of Hygiene & Tropical Medicine and worked there for almost 20 years. One of her interests was the study of protection of breast cancer with use of combined oral contraceptive pill. Beral is one of the main leaders in 'Million Women Study' done to evaluate how reproductive history can affect health particularly the effect of Hormone replacement therapy. The study showed that risk of breast cancer increases the longer a woman uses HRT, but drops to the normal level within five years after stopping use.She also leads manyinternational collaborative studies of breast, ovarian and endometrial cancer. She is currently researching on the modifiable factors associated with increased morbidity and mortalityof ageing in women.

Quiz - Midlife and Geratic Health

Reena Rani
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Q1. Scales to evaluate QoL in midlife and menopausal women are

1. Menopause Rating Scale
2. Greene Climacteric Scale
3. Utian QOL Scale
4. All of above

Q2. Hormone replacement therapy in menopause is currently recommended for all except

1. Prevention of osteoporosis
2. Reducing cardiovascular risk in early menopause
3. Reducing the risk of dementia developing in postmenopausal women
4. None of the above

Q3. Menopause is not associated with

1. Central adiposity
2. Reduced Insulin resistance
3. Pro-atherogenic lipid profile
4. Autonomic dysfunction

Q4. Which one is not true with menopause

1. Increased Serum FSH
2. Low antral follicle count
3. Low Serum FSH
4. High iSerum Inhibin B

Q5. KEEPS and ELITE STUDY are related to:

1. Efficacy of vaginal rings in prolapse in postmenopausal women
2. Efficacy of hormone replacement in dementia
3. Efficacy of hormone replacement in osteoporosis treatment
4. Efficacy of combined oestrogen and progestin therapy in decreasing the progression of carotid intima media thickness (CMIT) or coronary artery calcium (CAC)

Q6. Postmenopause severe sarcopenia is characterised by

1. low muscle mass
2. low muscle strength
3. low physical performance
4. All of them

Q7. Risk of venous thromboembolism (VTE) be greatest in which year of post menopausal HRT use?

1. 1st year
2. 2nd year
3. 3rd year
4. 4th year

Q8. What T score is diagnostic of osteoporosis on DEXA scan?

1. +2.5
2. +1.0
3. −1.0
4. −2.5

Q 9. Most suitable type of HRT to start for a 49-year-old woman having troublesome hot flushes for the past 6 months. Her last period was 2 weeks ago and they are regular.

1. Continuous combined HRT
2. Estrogen only HRT - oral tablets
3. Estrogen only HRT - patches
4. Sequential combined HRT
5. Tibolone

Q10. True about Tibolone is

1. Low risk of DVT in high risk women
2. More effective than HRT for reducing hot flushes
3. More effective in treating reduced libido in postmenopausal women
4. None of above

Q11. What is the critical threshold of follicle below which menopause occurs regardless of age

1. 10
2. 100
3. 1000
4. 10000

Q12. World menopause day is celebrated on

1. 18 September
2. 18 October
3. 18 November
4. 18 December

Q13. ERAS (Enhanced Recovery After Surgery) concept was given for the first time by

1. Henrik Kehlet
2. Alois Alzheimer
3. Fuller Albright
4. Herbert Flisch

Q14. VHI (Vaginal health index) includes all except

1. Vaginal elasticity
2. Fluid volume
3. Epithelial integrity
4. Proportion of the superficial, intermediate and parabasal layers in the vaginal epithelium

Q15. What factors can cause premature menopause?

1. Smoking
2. Autoimmune disorders
3. A woman's mother had early menopause
4. All of the above

Quiz Answers

1) 4	2) 3	3)2	4) 4	5) 4	6) 4	7) 1	8) 4
9) 4	10) 3	11) 3	12)2	13) 1	14) 4	15) 4	

NARCHI Activities 2020-2022

A rewarding journey

"EMPOWERED WOMEN ENRICHED SOCIETY "

SUMMARY OF ACTIVITIES

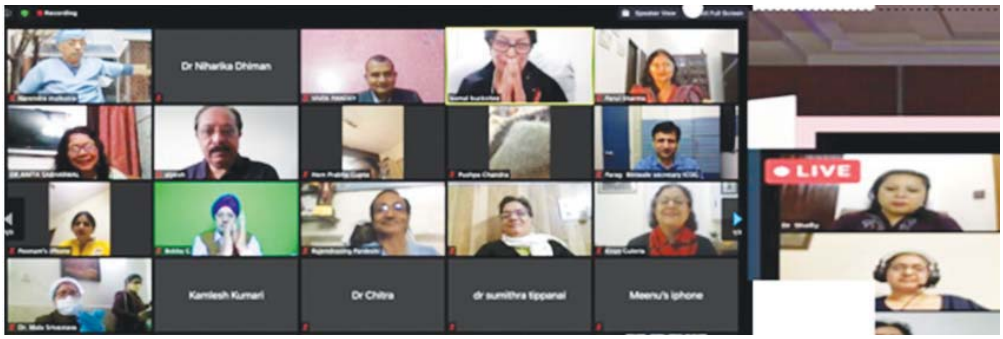
1. CMEs in the form of Webinars on changes in management and recent advances in the field of women's health
2. Awareness and empowerement of the Youth : Activities in Colleges and Schools
3. Awareness programmes incuding health talk , distribution of IEC material in Polycinics / Govt Hospitals
4. Cancer Screening camps in various hospitals.
5. Education series for Postgraduates
6. International participation : FIGO Session - Pregnancy and COVID-19
7. **NARCHIDELCON** annual conference 27-29th August 2021. A grand success, well received and appreciated with following highlights
   - Preconference workshops – 5
   - Sheila mehra Quiz
   - 20 scientific sessions on main conference day
   - 24 prizes won for paper and poster presentations
   - 128 paper presented
   - Oration by Sir Sabaratnam Arulkumaran
   - Release of E- souvenir
   - FIGO complimentary registration to Quiz winners.
8. First to start an initiative of **Caesarean Section Audit** with 27 centers in collaboration with DFW, Govt of NCT Delhi
9. NARCHI Delhi in collaboration with DFW, Govt. Of NCT of Delhi carried out various activities like CMEs, awareness programmes for Youth in colleges and hospitals as **World Population Day fortnight** and **NSV fortnight** celebrations.
10. Organised Training Program for **ASHA** of Central District, Delhi in association with DFW, Govt of NCT Delhi, 11th Feb 2021.
11. **Training of Trainers** including PHNO, Nursing officer, LHV, ANM on Family Planning Counselling Services in collaboration with DFW Training Cell and Narchi Delhi on 30th Nov and 1st Dec 2021.
12. Mass Mails sent to ~ 1000 NARCHI Delhi Members for awarenesss on current health issues /Narchi events.
13. Live Website with regular updation of Messages on key isssues and events.
14. E - Bulletin released quarterly – the 3rd Issue -E Souvenir
15. Addition of 158 new members to NARCHI Delhi .

Recent Events

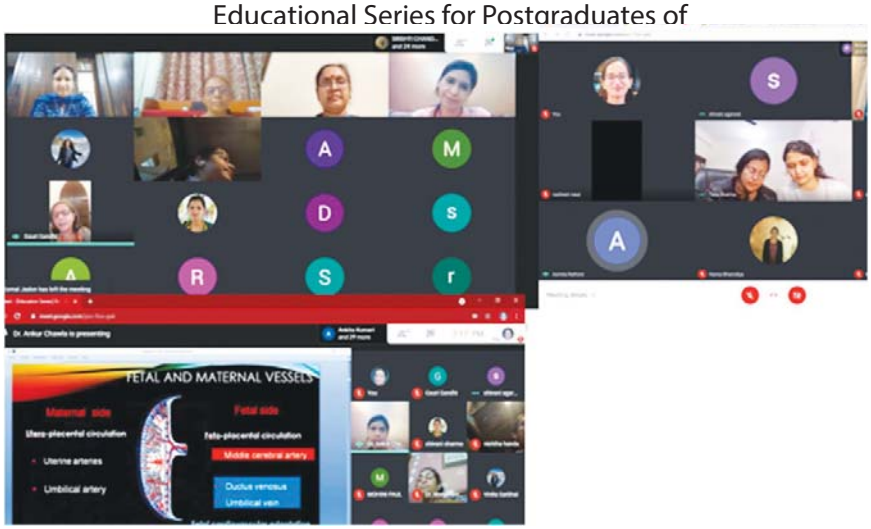
- Steps towards Safe Motherhood - Birth Companion and VBAC organized by Dept of Obgy Dr Baba Saheb Ambedkar Medical College and Hospital on 11th December 2021.
- CME ' Critical Care in Obstetrics: Reducing Maternal Mortality ' organised by Dept of Obgy, MAMC in association with RCOG, NZ.
- Handing Over of NARCHI office to next team along with 6th MFM CME 'Inverting the Pyramid of Antenatal Care ' on 12th March 2022 organized by Dept of ObGy, MAMC

GLIMPSES OF THE JOURNEY

CME in Form of Webinars



Educational Series for Postgraduates of



Youth Awareness and empowerement

Awareness programmes incuding health talks/nukkad natak/IEC

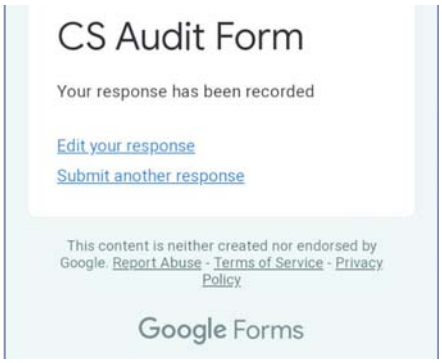
TOTs in association with DFW Govt of NCT of Delhi

Screning camps: Cancer/thalessemia

TOT- Family Planning Counselling Services organised by HFW Training Cell, NARCHI Delhi & Dept of Obstetrics & Gynecology, MAMC & LNH 30th Nov & 1st Dec 2021

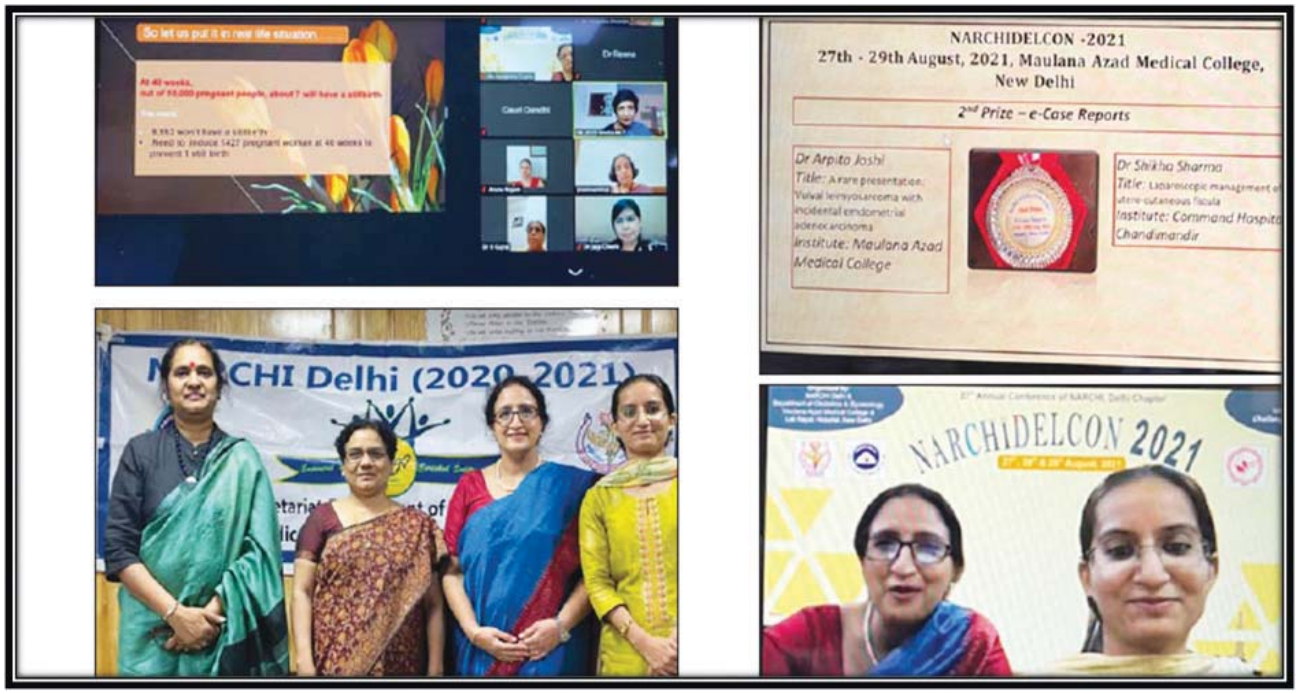
CS Audit

In collaboration with DFW, Govt Of NCTD



International participation

NARCHIDELCON annual conference 27-29th August 2021



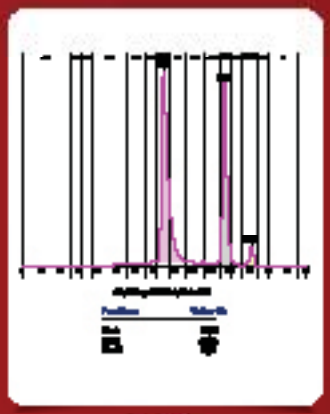
Website : Live and Active

Passing the Baton

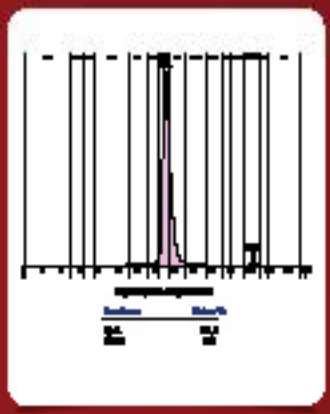
HIGH RESOLUTION AND CLEAR-CUT SEPARATION OF

HEMOGLOBIN FRACTIONS

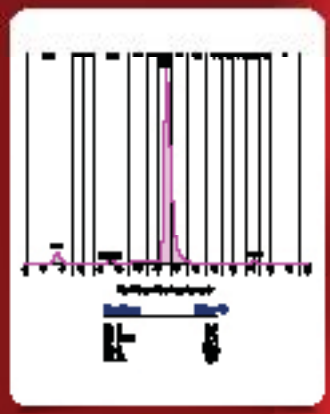
BY CAPILLARY ELECTROPHORESIS



HB S



NORMAL SEPARATION



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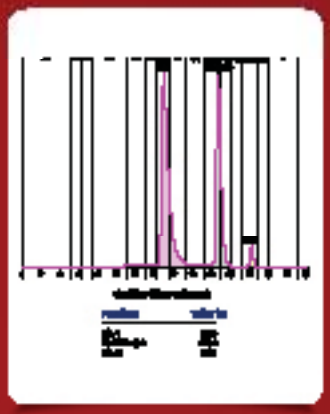

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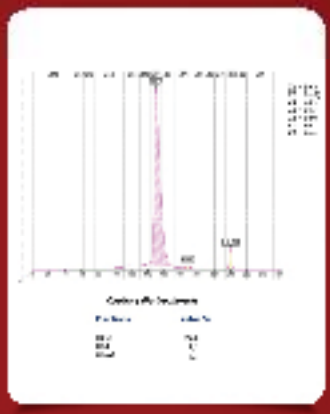
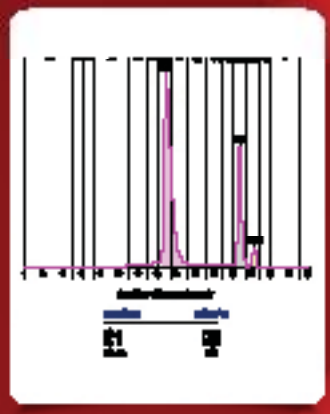


BETA-THALASSEMIA



HB E

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