



REVIEW ARTICLE

Physical Activity, Yoga, and Exercise Prescription for Postpartum and Midlife Weight Management: A Practical Review for Clinicians

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Abstract

This narrative review is aimed to practically review and evaluate the existing evidence and illuminate the effectiveness of physical activity, yoga, and exercise for postpartum and midlife weight management. A comprehensive review was conducted using electronic databases such as PubMed and google scholar using search terms physical activity, exercise, yoga, postpartum, midlife, weight loss, weight reduction, and all the probable terms. This helped in generating evidence-based information and formulating practical physical activity prescriptions to be used by obstetricians, general clinicians, nutritionists, and other allied healthcare personnel. Overweight and obesity in postpartum and midlife women present long-term health risks and complications. Indulging in optimum physical activity comprising exercise and yoga will help in weight management, increasing muscular strength, and endurance thus improving overall health and well-being.

Keywords Postpartum · Midlife · Physical activity · Yoga · Exercise · Weight management

Introduction

The prevalence of obesity is rising increasingly in women as compared to men in all parts of the world including India [1]. More young women are getting obese and it has been found that one out of ten women is either obese or overweight at the time of pregnancy in India [2]. Women with higher pre-pregnancy body mass index (BMI) are at additional risk of having excessive gestational weight gain

(GWG) which is the amount of weight gain experienced by a woman right from the time of conception to birth. This often leads to increased postpartum weight retention (PPWR) which is the difference between pre-pregnancy weight and weight after delivery [3]. Women getting obese at a younger age are exposed to the risks of obesity for a relatively longer duration and usually develop complications by their midlife [4]. Such gender-based differences in obesity trends are due to various social factors, hormonal changes, and reduced energy expenditure. Studies suggest that women in India are more physically inactive than their male counterparts and have a higher prevalence of physical inactivity as compared to western women [5].

Physical activity (PA) encompasses all bodily movements that are carried out by the muscles and requires energy. While, exercise is a type of physical activity that requires planned, repetitive, intentional, and structured movement over a period of time [6]. The benefits of exercise are beyond weight management which includes better cardiometabolic health, cardiorespiratory fitness, muscular strength, and endurance [7]. There is a lack of practical evidence-based PA and exercise recommendations for postpartum and midlife women [8]. This review aims to examine evidence to formulate such recommendations which can be used by clinicians, obstetrician-gynecologists, nutritionists, and

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other health personnel involved in weight management of these age groups.

Challenges in Improving Physical Inactivity and Exercises Habits

Despite the well-known benefits of PA, few women can practice the recommended levels. They encounter various intrapersonal, interpersonal, environmental, and organizational barriers (Table 1). These barriers are complex in nature and unique for each stage of life. They affect their perception, motivation, ingrain unscientific dietary and physical activity-related practices and experiences [9, 10].

Women are more indulged in household chores and family responsibilities as compared to their male counterparts, which gives them less time to focus on their health. They don't tend to indulge in leisure time and recreational physical activity. As a result, they often indulge in unhealthy ways to lose weight which may result in initial weight loss but eventually leads to relatively quick weight regain [11]. Apart from this, various myths are also prevalent in all socio-cultural environments which affect physical activity-related behavior. The birth of a child is considered a life-altering event for a woman, new mothers are often encouraged to rest for at least six weeks after delivery. Indulgence in moderate/vigorous-intensity PA is not encouraged [9]. In midlife women, there is cultural acceptance and normalization of having overweight and obese bodies. Contrary to the western society where obesity is more prevalent in low-income groups, in India it is considered as a sign of social and economic prosperity. PA apart from household chores is considered a luxury and women often think that they have passed the stage to toil in PA for their weight management [12].

Types of Physical Activity

Regular physical activity is important for health. It not only improves cardiometabolic and cardiorespiratory health but also boosts psychosocial health by improving mood, fighting boredom, and reducing stress. There are various types of physical activity, each having unique benefits and collectively helps in improving overall well-being:

Endurance

This includes aerobic activities which are best suited to attain metabolic and cardiovascular benefits. Endurance exercises are classified by repeated isotonic movements that lead to the contractions of large skeletal muscle groups. These activities are performed on submaximal intensity till a person reaches their anaerobic threshold (sustained lactate increase and metabolic acidosis) [13]. This helps in building lean body mass and protects connective tissues and joints from damage. Along with this, the basal metabolism rate (BMR) is also boosted which helps in quicker weight loss. In midlife women, such types of activities can improve bone density and decrease the risk of osteoporosis [14]. Classical examples include brisk walking, running/jogging, swimming, bicycle riding, dancing, and climbing stairs at home/work [15].

The different types of activities can be performed for varied intensities such as light intensity, moderate intensity, and vigorous intensity. Metabolic equivalents (METs) are a useful and standardized method for measuring the total intensity of activities. In adults, light-intensity PA can be defined as 1.6–2.9 METs, moderate as 3.0–5.9 METs, and vigorous as 6.0 METs [6]. Thus, the prescription of physical activity for any age group should be made with a combination of all types of exercise as each has its health benefits. The total time spent on PA should also be divided into intensities (Table 2) considering the METs value of each activity.

Table 1 Barriers faced by postpartum and midlife women for physical activity

Intrapersonal Barriers

Fatigue
Sleep deprivation
Lack of time
Lack of resources
Stress and anxiety
Injury or ailment
Vasomotor symptoms*
Health conditions like osteoporosis, sarcopenia*
Lack of motivation
Lack of preparedness
Inability to prioritize
**Specific for midlife women*

Interpersonal Barriers

Socio-familial support
Household chores
Accountability
Child care

Environmental Barriers

Lack of gyms and parks
Weather/ Season
Lack of sidewalks/ trails

Organizational and Policy Barriers

Sedentary jobs
Work commitments
Lack of PA-specific counseling by healthcare personnel

Table 2 Description of Kegels**KEGELS**

The pelvic floor muscles get weakened by pregnancy, childbirth, surgery, and aging. Kegel exercises can help in strengthening of pelvic floor muscles, that support the uterus, bladder, small intestine, and rectum

How to perform?

Identifying the target muscles: The pelvic floor muscles can be best identified by ceasing urination in its midstream. After identification of muscles, Kegels can be performed in any position but they are easiest to do in a reclined position

Focus on correct technique: The correct technique can be identified by imagining sitting on a marble and tightening the pelvic muscles around it as if lifting the marble by pelvic floor muscles. Do not flex the abdominal, quadriceps, or gluteal muscles in process and focus on appropriate breathing

Frequency: The exercise should be performed for a minimum of three sets with 10 to 15 repetitions per day

Strength

Strength building or resistance training encompasses exercises that cause the contraction of muscles against external resistance. These kinds of activities help in building strength, power, hypertrophy, and endurance [16]. External resistance in these exercises can be created by using a pair of dumbbells, bodyweight, bottles of water, bricks, resistance bands, weight machines, or any other object that can cause the contraction of muscles. Strength training is of various types such as isometric, isokinetic, isotonic, plyometric and each type has its mechanism of action and benefits. The effectiveness of each kind of activity depends upon the type of exercise undertaken, sets, repetitions, frequency, intensity, and rest [17]. The comprehensive benefits for both groups are improved muscle strength and tone, increased flexibility and balance, pain management, decreased risk of osteoporosis by improving bone density, and improved cognitive function [18]. In postpartum women, Kegels can be started immediately after delivery to strengthen the pelvic floor muscles (Table 3).

Flexibility

These exercises are based on the ability of a joint to move through its complete range of motion. It facilitates joint movement and prevents tissue damage while conducting any PA [6]. Flexibility is specific to each joint and it helps in stretching the muscles. Hence, apart from helping in daily activities, flexibility allows several other exercises as well. Classical examples of flexibility activities are various kinds of stretches, yoga, and pilates [15]. In midlife women, flexibility exercises improve their mobility, agility, balance and relieves joint pain as well. It is recommended to use flexibility exercises in combination with strength and endurance to attain maximum benefits [19].

Balance

Posture and balance are very important to conduct any type of daily activity or movement. Balancing activities help in controlling the body's position, whether stationary or moving. It is often neglected in a physical activity regimen, even though it's rehabilitative [20]. In midlife women, balance training helps in reducing the risk of falls, improves motor

Table 3 Common physical activities with various intensities

Light Intensity	Moderate Intensity	Vigorous Intensity
Breathing remains normal with no change MET level: 1.6–2.9 METs Heart rate reserve: < 64%, < 109 beats/minute Rating of perceived exertion: 1–3 Examples: Slow walking at home or workplace Light housework (e.g., making bed, dusting, light sweeping, ironing, dishwashing, cooking) Light gardening Bike riding at slow pace Flexibility exercise Gentle yoga	Breathing quickens, a person can hold conversation but can't sing MET level: 3.0–5.9 METs Heart rate reserve: 64–76%, 109–129 beats/minute Rating of perceived exertion: 3–5 Examples: Walking at a brisk pace Bike riding at a faster pace or uphill Heavy cleaning such as washing floor, windows and washing clothes by hand General gardening activities Dancing, water aerobics, ball sports Standard yoga	Breathing becomes deep and rapid, can't say more than few words MET level: ≥ 6 METs Heart rate reserve: 77–93%, 142–172 beats/minute Rating of perceived exertion: 5–7 Examples: Fast paced walking, running or jogging Biking at a pace faster than 16 km/hour Running sports Hiking Swimming Carrying heavy loads Heavy farming, shovelling, digging

skills, and provides stability in joints thus preventing injuries and sprains [21]. Many women encounter balance issues in their pregnancy which sometimes continue till they are postpartum and pose a potential danger to both mother and baby. Healthcare personnel should promote activities to strengthen balance among all [22]. Some examples of balance activities are yoga, pilates, tai chi, weight shifts.

Yoga: Evidence-Based Regimen

Yoga is an ancient, holistic Indian practice that promotes the physical, mental, and spiritual well-being of its practitioners. 'Yoga' involves the process of joining forces or discipline to align the body with the mind and together connect with the self or soul [23]. Yoga therapy is an advancing and effective tool for many physical and psychological disorders. The biophysical, mental, and spiritual benefits of yoga are gaining popularity among all age groups, and it is deemed as an effective way for weight management [24]. It is being increasingly used in all cultures due to its holistic benefits. The mind–body therapy of yoga is useful for each life stage and has varied benefits. Women can initiate yoga from their preconceptions for improved fertility and mental well-being. Yoga can be safely practiced in pregnancy and continued in postpartum period for improved healing and weight loss [25]. In midlife women, yoga helps in the prevention of various diseases and managing hormonal changes [26].

Yoga practices have many dimensions, studies have shared many components from eastern and western viewpoints such as breathing exercises, loosening practices, asanas, pranayama, meditation and relaxation, which appear to be a classic and balanced model of wellness and healing [27]. The various components of yoga are described below:

- i. **Breathing Exercises (*Swasan Kriya*):** Breathing exercises comprise chest expansion, physical motions, and breath management. These practices are carried out with complete attentiveness and a leisurely pace. They can be performed in all stages of pregnancy with required modifications. Breathing exercises are effective tools in reducing stress with no noticeable side effects [28]. These techniques aid in the management of physical, psychological, emotional, and social challenges that women face in the postpartum period, and have a good effect on postpartum women with low back pain, anxiety/depression, sleep problems, and breastfeeding support [29].
- ii. **Loosening Exercises (*Sithilikarana Vyayama*):** These are a sequence of techniques for loosening and warming up before practicing any asana. It includes forward, backward, and side bending exercises along with joint relaxing exercises as well. These exercises are found to be beneficial in reducing postpartum pain, maternal movement, mobility, sleep, and mental health management [30]. These forms of practices help in weight loss with holistic lifestyle modification and positive psychological changes of midlife women and are also beneficial in combating cardiovascular risk factors and abdominal obesity. They also aid in relieving chronic joint pain, inflammation, back pain, neck pain, headache/migraine, and fibromyalgia of women [31].
- iii. **Yogic Postures (*Asana*):** Yoga poses are a static group of practices that includes standing, sitting, supine and prone types of postures to achieve a stretch in muscles. These postures help in improving the feedback mechanism of both the muscle and the tendon; hence it protects the muscle/tendon from overstretching and ruptures. It aids in improving muscle strength, coordination and reduces muscle rigidity [32]. These practices are performed to improve abdominal strength, muscular endurance, coordination of postpartum women and also improve flexibility, balance and, enhance the overall wellbeing of midlife women [25].
- iv. **Yogic Breathing (*Pranayama*):** Pranayama is practiced by deep inhalation followed by retention of the breath and then finally exhalation (according to the yogic texts, these are conventionally called Puraka, Kumbhaka, and Rechaka). This form of breathing can be learned and improved over time to achieve certain physiological effects. These practices may help in facilitating cardiorespiratory functions and prevent different cardiorespiratory complications with parasympathetic predominance [33]. Long-term pranayama practices have positive effects on pulmonary functions, cardiopulmonary endurance, and quality of life, also various pranayama practices prevent respiratory illness, psychological illness like postpartum anxiety/depression and improve lung function of midlife women [34].
- v. **Meditation (*Dhyana*):** Although meditation has been included in a variety of therapeutic procedures, it is best described as a mindful concentration exercise that comes in a variety of forms and is traditionally known as Dhyana. Numerous studies have documented the health advantages of meditation, however meditation in its traditional sense refers to a type of mental practice that is designed to improve concentration, awareness. It can have long-standing effects on the brain, and reduces the cardiovascular risk factors [35]. This technique helps in reducing depression/anxiety and improves holistic health and quality of life of many postpartum and midlife women [36, 37].

The various components of yoga have varied effects in different life stages of women which are explained below, and a specific yoga regimen is given in (Table 4) and a detailed module for each life stage is given in (supplementary table 1).

Pregnancy

During pregnancy, there is an increase in cardiac output, heart rate, and plasma volume which can be counteracted through yoga by parasympathetic activation. Yoga practices also improve autonomic response to stress in healthy pregnant women. Yoga and massage therapy has shown a significant change in improving prenatal depression and prematurity among pregnant women, as compared to standard care [38]. The major problem of low back pain especially in the lumbosacral area is also greatly benefited by stretching and strengthening yoga practices such as one hour of Hatha yoga for two and half months. Similarly, issues like sleep disturbances which are mostly overlooked can also be significantly improved by yoga [39].

Postpartum

The postpartum period helps in the healing of the new mother; hence, it should not be neglected. The various postpartum yoga techniques improve calmness, reduce irritability and anger, increase energy, lower blood pressure, reduce muscle tension, and aids in relaxation [40]. Along with this, yoga helps in the reduction of postpartum weight, body fat percentage, fat mass, and improves the basal metabolic rate. The low-intensity yoga asanas help in quick recovery, relieve postpartum depression and anxiety. It helps in strengthening the abdominal wall, pelvic muscles, improves blood flow, and balance [41].

Midlife

Midlife women experience various physiologic changes due to gradual estrogen withdrawal. This leads to narrowing of core body temperature which is majorly regulated by the sympathetic nervous system (SNS). Due to these changes women

experience various vasomotor symptoms. Yoga helps in decreasing autonomic arousal which reduces SNS activation and thus helps in the reduction of vasomotor symptoms. It also helps in improving sleep disturbances, mood disorders, anxiety and improves health-related quality of life [26]. The combination of various yoga techniques like pranayama & breathing exercises, yoga asana practiced for varied duration along with chanting of Om is recommended for midlife women [42].

Prescription for Physical Activity

Physical activity prescription is useful to create dose–response benefits from it. It should be individually tailored, simple, and easy to follow. The suggested PA prescription for different life stages is given in (Table 5) and its explanation is described below:

Preconception

Women should indulge in regular PA as per the recommendations to prevent overweight and obesity. It is beneficial for the management of polycystic ovarian syndrome (PCOS), infertility, and impacts the overall quality of life [43]. Regular PA in preconception is a strong predictor of pregnancy PA which helps in the prevention of excessive GWG and resultant PPWR [44].

Early Pregnancy

In early pregnancy, women should continue their usual pre-pregnancy activity. Since there is an increase in ligament laxity in the first trimester which is believed to promote implantation, activities like jumping, skipping should be avoided to prevent falls and injury. Stretching should also be performed in a slow and controlled manner. While performing PA, women should maintain optimum hydration, avoid heat stress by high humidity and temperature and wear loose-fitting clothing for comfort [6, 45, 46].

Table 4 Evidence-based yoga regimen for various life stages of women

Practices	Early Pregnancy (0–3 Months)	Mid Pregnancy (03–06 Months)	Late Pregnancy (06–09 Months)	Early Post-partum	Late Post-partum	Midlife
Breathing practices	30 min	30 min	30 min	35 min	40 min	40 min
Loosening practices						
Asana						
Pranayama	15 min	15 min	15 min	10 min	5 min	5 min
Meditation	5 min	5 min	5 min	5 min	5 min	5 min
Relaxation	10 min	10 min	10 min	10 min	10 min	10 min

Table 5 Exercise prescription for pregnancy, postpartum and midlife women [6, 45, 46]

Stage of life and intensity of aerobics	Suggested Exercise**
PRECONCEPTION <i>Frequency:</i> 5 days a week <i>Intensity:</i> Moderate-vigorous intensity <i>Time:</i> 30–60 min/day accumulating 150–300 min of moderate-intensity activity per week OR 75–150 min of vigorous-intensity activity per week	Aerobic activities including large muscle groups (at least 30 min 5 days in a week) Resistance training using weight and bands, Calisthenics (At least one set of all major muscle groups twice a week) Flexibility (2 days a week) Balance training (at least once/week) Kegel exercise
EARLY PREGNANCY (0–3 MONTHS) <i>Frequency:</i> At least three days preferably all days of the week* <i>Intensity:</i> Moderate-intensity <i>Time:</i> 150 min per week started from 10 min and gradually accumulate to the target (30 min per day)	Jogging (if doing it from pre-conception) Light intensity weight-bearing exercise like brisk walking Pilates Yoga
MID PREGNANCY (4–6 MONTHS) <i>Frequency:</i> At least three days preferably all days of the week* <i>Intensity:</i> Moderate-intensity <i>Time:</i> 150 min per week started from 10 min and gradually accumulate to the target (30 min per day)	Sitting and standing exercise, avoid supine positions Water aerobics Weight supporting yoga Stationary cycling Seated resistance exercises using weights and band Hand bike for upper body Kegel; exercise Balance exercise using stability balls
LATE PREGNANCY (7–9 MONTHS) <i>Frequency:</i> At least three days preferably all days of the week* <i>Intensity:</i> Moderate-intensity <i>Time:</i> 150 min per week started from 10 min and gradually accumulate to the target (30 min per day)	Water aerobics Stationary cycling Seated resistance exercises using weights and band Hand bike for upper body Balance exercise using stability balls Kegel exercise Weight supporting yoga
IMMEDIATE POSTPARTUM <i>Frequency:</i> 3–5 days a week <i>Intensity:</i> Light-moderate intensity <i>Time:</i> 150 min per week (30 min per day can be divided into short intervals of 10 min each)	Brisk walking Kegel exercises Drawing exercises (breathing in and out) Flexibility stretches targeting all muscle groups (if feasible) Yoga techniques relaxation techniques, prana (subtle energy) mobilizing techniques
LATE POSTPARTUM <i>Frequency:</i> 5 days a week <i>Intensity:</i> Moderate intensity <i>Time:</i> 150 min per week (30 min per day can be divided into short intervals of 10 min each)	Brisk walking Jogging Resistance training using weight and bands Aerobics including dancing, Zumba Flexibility stretches (pre- and post-workout) Balance training by Yoga, Pilates, Tai chi
MIDLIFE <i>Frequency:</i> > 5 days a week to maximize calorie expenditure <i>Intensity:</i> Moderate-vigorous intensity <i>Time:</i> 30–60 min/day accumulating 150–300 min of moderate-intensity activity per week OR 75–150 min of vigorous-intensity activity per week	Aerobic activities including large muscle groups (at least 30 min 5 days in a week) Resistance training using weight and bands, Calisthenics (At least one set of all major muscle groups twice a week) Flexibility (2 days a week) Balance training (at least once/week)

*Previously overweight or obese and sedentary women should be prescribed to initiate exercise from a reduced frequency (i.e., 3 to 4 days per week, providing a day for recovery in-between sessions)

**All types of exercise should be performed with prior warm-up and cool down after a workout to lower the risk of injury

Mid Trimester

Sedentary overweight or obese pregnant women should gradually increase their physical activity along with a healthy diet. This will help to maintain the energy balance, avoid excessive GWG and metabolic complications. As the pregnancy progresses venous obstruction may occur due to an enlarged uterus. Therefore, activities involving supine positions should be avoided or modified for sitting and standing position. Exercise prescription should be thoroughly modified if medical conditions like gestational diabetes mellitus, uncontrolled hypertension, hypo or hyperthyroidism, severe anemia, cardio-pulmonary disorder, and morbid obesity are present [6, 45, 46].

Late Pregnancy

As the weight gain progresses in pregnancy there is an increased load on the joints, weight supporting activities are more comfortable as compared to weight-bearing activities. The center of gravity also gets altered due to weight distribution changes and that affects the balance. Activities involving abrupt change in direction should be modified or avoided or straight activities should be done.

Regular physical activity with combination strength and endurance training is recommended in all trimesters. It is associated with relatively shorter and uncomplicated labor, increased chances of vaginal delivery, reduced chances of postpartum depression, and improved maternal and fetal health [6, 45, 46].

Immediate Postpartum

Pregnant women often become inactive after childbirth. Deconditioning happens in the immediate postpartum period. Pelvic floor muscles are weakened due to childbirth therefore pelvic floor exercises should be started in the immediate postpartum period. The incidence of diastasis recti abdominis and inter-rectus distance can also be reduced by starting abdominal strengthening exercises in both vaginal and cesarean birth [6, 46, 47].

Late Postpartum

Normal physical activity can be resumed 4–6 weeks after vaginal and 6–8 weeks after cesarean delivery. Postpartum women should target moderate-intensity activities for

150 min/week. Sedentary timing (sitting, watching TV, using a mobile phone) should be limited and replaced with light-intensity activities. Encouragement should be given to increase NEAT (non-exercise activity thermogenesis) by increasing daily step count and indulgence in household activities [6, 46, 47].

Midlife Women

Midlife women should indulge in a combination of training for rehabilitation and prevention of diseases. Conditions like cardiovascular diseases, osteoporosis are significantly managed by aerobic exercises and strength training. Interval training which includes exercising at a healthy heart rate, then increasing it for short sprints and repeating it helps in reducing the severity of vasomotor symptoms [19, 48].

Tips to Improve Compliance

At all life stages each women should indulge in appropriate level of physical activity unless it is deemed unsafe by the healthcare practitioner [46]. The benefits of optimum physical activity far outweigh the potential harms. The physical activity prescription should always be based on the following points to ensure better compliance:

5A's (Assess, Advise, Agree, Assist, Arrange)

The life stage of women should be duly considered along with any possible complication or contradiction. The PA advice should be synchronized with their schedule and resources. Healthcare practitioners should teach and assist them in performing activities with correct techniques irrespective of age or health status. This ensures optimum gain and minimizes the risk of injuries. Apart from this, timely follow-ups should also be scheduled to mitigate barriers and reaffirm the PA plan [45].

Cognitive Behavioural Strategies

The various components of cognitive behavior theory should be used to formulate the PA intervention or prescription. These components help in improving efficacy and compliance. The various techniques like health risk appraisal will help in increasing intrinsic motivation. Apart from it, components like goal-setting, self-monitoring, reinforcement and

incentives, problem-solving, relapse prevention, stimulus control, cognitive restructuring and motivational interviewing will also help in attaining better compliance.

Lifestyle Approach

The various physical activities should be planned with a lifestyle approach as it is associated with greater adherence while maintaining the same health benefits [49]. Lifestyle-related PA includes activities in leisure, occupational, and household physical activities. The various activities can be tailored into these categories based on the specific lifestyle, availability of time, and resources of an individual [9].

Social Support and Environment

These are multidimensional in nature and help in effectively increasing the PA levels. Social support can be given in terms of family, friends, community, apart from this social media groups can be created for the same target population to create accountability, support, and motivation [9]. The various factors in the environment such as well-lighted roads and footpaths, access to gyms, parks, neighborhood safety, levels of pollution and weather also affect compliance to PA. Hence efforts can be made to alter or mitigate the controllable factors and provide a fostering environment for PA.

Conclusion

Physical activity is important for maintaining a healthy lifestyle. It is preventive, curative, rehabilitative against various complications arising from overweight and obesity. Postpartum and midlife women must be encouraged to engage in optimum amount of physical activity comprising strength, endurance, flexibility, and balance to attain maximum benefits. The physiological and psychological benefits of yoga as a form of physical activity should not be overlooked and must be emphasised for each stage of life. Women should be encouraged to indulge in appropriate level of physical activity unless it is deemed unsafe by the healthcare practitioner. The focus should be given to building a PA fostering environment from individual level to policy level by addressing the various myths and barriers.

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