

Supplementary file 1: Characteristics of studies

Author, year	Country	Aims/Purpose	Total Number of Participants (male-female)	participants	mean age of participant	design	setting	Theoretical framework	Barriers to Physical Activity
Albasheer et al ¹² , 2024	Saudi Arabia	To identify perceptions of overweight and obesity using the health belief model (HBM)	579 (280 male, 299 female)	Undergraduate students from selected colleges of Jazan University	21-23 years	Cross-sectional questionnaire-based study	Jazan University, Saudi Arabia	Health Belief Model (HBM)	1) Practical Concerns Subscale: Time constraints Lack of access to exercise facilities 2) Emotional/Mental Health Subscale 3) Awareness Subscale: Lack of knowledge about healthy behaviors
Aljayyousi et al ¹⁹ , 2019	Qatar	To understand how sociocultural factors influence physical activity among university students.	20 (10 male, 10 female)	Undergraduate Muslim students aged 18-23, Qatari or born and raised in Qatar.	18-23	Qualitative	University Campus	Bronfenbrenner's ecological approach	1) Social Barriers: Family health values. 2) Cultural Barriers: Cultural limitations.
Al-Mohaimeed et al ¹³ , 2017	Saudi Arabia	To explore experiences of barriers and motivators to weight loss among overweight/obese individuals.	37 (19 male, 18 female)	Individuals with a history of weight loss attempts.	37.59 years (21-57 years)	Qualitative	Buraidah, Qassim	Social Cognitive Theory	1) Personal Barriers Increased appetite hindering weight loss efforts. Declining motivation affecting commitment to physical activity. Lack of time for engaging in physical activity. 2) Social Barriers Lack of family support discouraging participation in physical activity. Unhealthy habits during social gatherings impacting motivation to be active 3) Environmental Barriers Insufficient availability of exercise facilities limiting opportunities for physical activity. Cultural practices and norms contributing to a sedentary lifestyle.
Alvarado et al ³³ , 2015	Barbados	To identify modifiable barriers to physical activity and explore factors facilitating physical activity among overweight and obese women.	17 (Female)17	Overweight and obese women aged 25-35 with a BMI ≥ 25 .	30 years (27-34)	Qualitative Case Study	Community	Grounded Theory Principles	1) Social barriers: gender norms and expectations Women tended to be active with their female friends rather than partners or male peers, and reported peer support but also alienation-Being active also competed with family responsibilities and expectations 2) structural barriers: few opportunities for active commuting, limited indoor space for exercise in the home, and low perceived access to convenient and affordable exercise classes Individual barriers: perceptions about chronic disease and viewing physical activity as a possible strategy for desired weight loss but less effective than dieting.

Atlantis et al ¹⁴ , 2008	Australia	To define the prevalence of meeting recommended levels of leisure-time physical activity and diet consumption among different weight statuses and perceptions.	16,314 (7720 male, 8594 female)	Adults aged 20 years or over from private dwellings	Not specified	Cross-sectional survey analysis	National Health Survey (2004-2005)	Social Cognitive Theory	1) Psychological/Perceptual Barriers: Overweight perception as a barrier to physical activity participation. Misperceptions about weight status and health risks.
Bahl et al ³⁴ , 2022	USA	To examine the relationships between components of the home environment and physical activity behaviors among African American adolescents.	99 (37 male, 62 female)		15 years (between the ages of 11 and 18)	Cross-sectional	Community-based sample	Health and Environment Survey	1) Environmental Factors: Internet access. Availability of physical activity (PA) equipment. 2) Social Factors: Family support for physical activity (PA).
Ball et al ⁷ , 2004	Australia	To assess the feasibility of healthy eating and physical activity among young women.	445 (Female 445)	Young women	18-32	Cross-sectional	Community	Health Behavior Theory	1) Psychological/Perceptual Barriers: Embarrassment. Lack of confidence. Physical discomfort. Perception of physical activity as less feasible (particularly among women with children and overweight women).
Doegah and Acquah ¹⁵ , 2022	Ghana	To examine perceived practice, enablers, and barriers to healthy dietary and physical activity behaviours among nursing trainees.	16 (4 male, 12 female)	Nursing trainees in public health nursing program	18-25 years	Cross-sectional qualitative	University of Health and Allied Sciences (UHAS)	Ecological model based on Bronfenbrenner's framework	1) Individual (Intrapersonal) Factors: Busy lifestyle. Inadequate feeding/food satisfaction. 2) Social Environment Factors: Upbringing. Social support. 3) University Characteristics: Studies/academic activities. Student societies.
Duan et al ²⁰ , 2016	China	To evaluate the measurement quality of the FIT model in HEPA	1012 (304 male, 708 female)	University students	19 years (SD= 1.26), ranging from 17–25 years	Cross-sectional	university students from two universities in Hong Kong, China	Four steps from Inactivity to activity Theory (FIT Model)	1) Perceived Barriers: Lack of coping strategies. Low confidence in maintaining consistent activity (particularly in the Fluctuating stage). 2) Motivational Barriers: Reduced intrinsic motivation (e.g., lack of enjoyment or competition) in the Fluctuating stage, leading to disengagement. 3) Behavioral Barriers: Misclassification of activity levels, causing individuals to believe they are sufficiently active. 4) Environmental Influences: External stressors (e.g., academic demands, work overload) disrupting regular physical activity routines. 5) Methodological Limitations: Gender and sample representation (e.g., predominance of female participants introducing gender-specific barriers). Self-reporting limitations (e.g., discrepancies between perceived and actual activity levels). 6) Barriers Related to Social-Cognitive Variables: Lack of coping strategies.

									Low confidence. Reduced intrinsic motivation. Misclassification of activity levels.
Garcia et al ²⁹ , 2017	USA	To examine Hispanic males' perspectives on health behaviors related to weight management.	14 (Male 14)	Overweight/obese Hispanic males aged 18-64, recruited via flyers and community postings.	37.6 ± 13.1 years (18 to 64)	Qualitative	Community-based organizations in Tucson, AZ	Grounded Theory	1) Environmental Barriers: Access to safe spaces: <i>Presence of gangs and unsafe neighborhoods.</i> <i>Lack of safety for walking or exercising, especially at night.</i> <i>Visible signs of insecurity (e.g., bars on windows and doors).</i> 2) Personal Barriers: Strenuous labor, long hours, and fatigue: <i>Physically demanding jobs leading to exhaustion.</i> <i>Long working hours reducing time and energy for physical activity.</i> <i>Cultural prioritization of work over exercise.</i>
Hamer et al ³⁰ , 2023	UK	To explore how fears about physical activity are experienced by adults with obesity aged 18 to 45 years.	10 (6 male, 4 female)	Adults with obesity aged 18-45 years	18 to 45	Qualitative interpretative description study	University of Central Lancashire, Preston, UK	Fear Avoidance Model (FAM)	1) Psychological Barriers: Fear as a barrier to physical activity: <i>Fear(s) of leisure facilities.</i> <i>Fear(s) of weight stigmatization.</i> <i>Fear(s) of negative evaluation.</i> <i>Fear(s) of injury.</i> <i>Fear(s) of darkness.</i> <i>Fear(s) of pain.</i> Threats, concerns, and worries about weight underpinning fear(s) of activity: <i>Perceptions of negative body image.</i> <i>Societal judgment.</i> <i>Experiences and catastrophizations of pain.</i> 2) Social Barriers: Societal judgment and weight stigmatization. 3) Consequences of Fear(s): Activity avoidance. Heightened perceptions of disability. Depressive cognitions.
Johnson and Annesi ⁸ , 2018	USA	To examine reasons for weight gain and barriers to weight loss among emerging adults with obesity.	81 (Female 81)	Female undergraduate students, ages 18-25, with obesity.	20.9 (18 to 25)	Qualitative Study	Public University	Social Cognitive Theory and Self-Efficacy Theory	1) Personal Barriers: Lack of time. Busy schedule due to school or school and work. 2) Psychological Barriers: Lack of motivation. Barriers related to inadequate self-regulation. Barriers related to inadequate self-efficacy.
LaRose et al ²¹ , 2016	USA	To inform future efforts to effectively recruit and engage emerging adults in BWL programs	144 (37 male, 107 female)	Emerging adults aged 18-25	21.8 ± 2.2	Mixed methods	Online and focus groups	Health Belief Model	1) Personal Barriers: Lack of time. Lack of motivation. 2) Environmental Barriers: Lack of money. 3) Sedentary Behavior: Engaging in sedentary activities (e.g., watching TV, sitting at a computer, playing video games) for an average of 4.1 hours per day on weekdays and 4.9 hours per day on weekends.

LaRose et al ²² , 2021	USA	To test the efficacy of mHealth lifestyle interventions for weight loss in emerging adults.	381 (130 male, 251 female)	Emerging adults aged 18-25 with overweight/obesity.	21.5 years (18-25)	Randomized Clinical Trial	Virginia Commonwealth University	Self-Determination Theory and Behavioral Economics	1) Time-Related Barrier: Minimize potential time 2) Psychological/Intrapersonal Barrier: Lack of motivation
McVay et al ³¹ , 2018	USA	To understand barriers and facilitators of weight loss intervention initiation	58 (22 male, 36 female)	Adults with obesity, intervention initiators and non-initiators	54 years (18–70)	Qualitative	Academic Medical Center, Durham, NC	Behavioral change models focusing on initiation vs maintenance	1) Practical and Logistical Barriers: Cost: Financial constraints affecting participation. Scheduling Compatibility: Incompatibility with personal or family schedules. 2) Social and Psychological Barriers: Stigma: Fear of judgment or negative social perceptions. Concerns about Group Format: Anxiety or discomfort with group-based activities. 3) Intervention-Specific Barriers: Anticipated Effectiveness: <i>Content Relevance: Whether the intervention addresses individual needs.</i> <i>Social Influences: Peer or social dynamics affecting participation.</i> <i>Evidence of Effectiveness: Perceived credibility or proven success of the intervention.</i> Anticipated Pleasantness: <i>Social Enjoyment: Social aspects that may enhance or detract from enjoyment.</i> <i>Dietary and Tracking Prescriptions: Concerns about dietary restrictions or self-monitoring requirements.</i> <i>Identity and Self-Reliance: Personal identity conflicts or desire for autonomy.</i> 4) Perspectives on Intervention: Initiators vs. Non-Initiators: Differing views between those who start interventions and those who do not, reflecting varying motivations, expectations, and perceived barriers.
Misra et al ¹¹ , 2018	India	To find out the prevalence of overweight and obesity among medical students and study the effects of physical activity on overweight/obesity and its barriers.	200 (119 male, 81 female)	Medical students aged 19-25 years from middle to upper middle class households.	22.2 ± 1.96 years	Cross-sectional study	Rama Medical College Hospital & Research Centre, Kanpur, Uttar Pradesh, India	Social Cognitive Theory, Health Belief Model, Theory of Planned Behavior.	1) Personal Barriers: Smoking. Obesity. Self-efficacy/confidence. Injury. Menstruation. 2) Psychological Barriers: Self-interest. Motivation. 3) Environmental Barriers: Available facilities. 4) Social Cognitive Behavior-Related Barriers: Learning. Reinforcement. Leisure time.
Poobalan et al ²³ , 2012	UK	To explore physical activity behaviour among 18–25 year olds with influential factors including attitudes, motivators and barriers.	mixed 1313	Young people (18–25 years) in the Grampian area of North-East Scotland.	Not specified	Mixed methods	Community/University	Theory of Planned Behaviour, Social Cognitive Theory	1) Intrapersonal Barriers: Lack of motivation Low self-esteem or negative self-perception Inadequacy regarding body image Personal factors (e.g., disability) 2) Interpersonal/Social Barriers: Peer influence Competition

									Lack of social support Gender-related barriers (e.g., discomfort in mixed-gender settings like gyms or pools, particularly for single mothers) 3) Environmental Barriers: Weather conditions Lack of facilities 4) Structural/Logistical Barriers: Lack of time Younger participants (18-21) reported higher barriers related to time and motivation; older participants (22-25) focused more on personal and environmental barriers.
Sabharwal ³² , 2018	India	To explore perceived barriers to physical activity among college students.	67 (19 male, 48 female)	College students aged 18-24 years. All Indian nationality and enrolled full-time.	19.4 ± 1.25 years	Qualitative Research Design	College Premises, University of Delhi, New Delhi, India.	Socio-ecological framework.	1) Intrapersonal/Personal Barriers: Time constraints Stress 2) Interpersonal/Social Barriers: Social barriers (unspecified, but implied by the context) 3) Environmental Barriers: Safety issues
Saghafi-Asl et al ²⁴ , 2020	Iran	To examine factors affecting behavioral intention of weight management using HBM.	336 (Female 336)	College students	22.02	Cross-sectional	Tabriz University of Medical Sciences dormitories	Health Belief Model	1) Practical/Structural Barriers: Practical concerns (e.g., time, resources, logistics) 2) Psychological/Emotional Barriers: Emotional/mental health (e.g., stress, mood, motivation) 3) Cognitive/Knowledge-Based Barriers: Awareness (e.g., lack of knowledge or understanding)
Serrano-Sanchez et al ¹⁸ , 2012	Spain	To identify individual and environmental factors associated with physical activity levels in adults.	3000(1505 male, 1495 female)	Adults aged 18-75 years old	18-75 years old 961 (18-29)	Cross-sectional	Gran Canaria, Spain	Social Cognitive Theory (SCT)	1) Intrapersonal/Personal Barriers: Lack of time Tiredness Mood disturbance Boredom 2) Structural/Logistical Barriers: Employment (e.g., work-related time constraints or demands)
Sharifi et al ²⁵ , 2013	Iran	To examine perceived barriers to weight-loss programs among overweight or obese women.	204 (Female 204)	Overweight or obese women aged above 18 with BMI > 25 kg/m ²	31.97 ± 10.62 years (18 to 50)	Cross sectional (Descriptive -analytical)	Nutritional counseling centers in Tabriz, Iran	Health Belief Model	1) Intrapersonal/Internal Barriers: Lack of motivation 2) Interpersonal/External Barriers: Lack of time Exercising alone (loneliness)
Sooknarine-Rajpatty et al ²⁶ , 2020	Ireland	To assess barriers to physical activity and obesity counselling in secondary care as reported by healthcare providers.	Not specified	Healthcare Professionals	Not specified	Systematic Review	Secondary Care Facilities	COM-B Model	1) Intrapersonal/Internal Barriers: Lack of motivation Lack of knowledge 2) Structural/Logistical Barriers: Lack of time Lack of structural support
Stankevitz et al ²⁷ , 2017	USA	To characterize barriers to healthy eating (BHE) and physical activity (BPA)	124 (9 male, 115 female)	Obese employees at Duke University and Medical Center, Durham NC, USA	45 years (SD=9.0)	Randomized Controlled Trial	Workplace	Health Belief Model	1) Intrapersonal/Internal Barriers: Lack of interest and motivation Physical discomfort 2) Structural/Logistical Barriers: Time constraints 3) Environmental/External Barriers: Lack of accessibility

Turner and Reed ³⁶ , 2011	USA	To examine exercise habits and perceived barriers to exercise among truck drivers	300 (259 male, 41 female)	Commercial long-distance truck drivers with specific inclusion criteria	47 years (SD = 10.0) (24 to 71)	Cross-sectional, non-experimental	Truck shows	Environmental theories, health risk behavior surveys	1) Structural/Logistical Barriers: Lack of time 2) Environmental/External Barriers: Lack of place to exercise
Wingo et al ⁹ , 2011	USA	To explore fear-avoidance beliefs related to exercise among overweight and obese adults	21 (7 male, 14 female)	Overweight and Obese Adults	20–65 years 48.57 (±11.64)	Qualitative Focus Groups	University of Alabama, Birmingham, AL, USA; University of Alabama, Birmingham, AL, USA; University of North Dakota School of Medicine & Health Sciences, Grand Forks, ND, USA	Fear-avoidance model Focus groups discussing beliefs about exercise and pain.	1) Intrapersonal/Internal Barriers: Pain Fear of injury Discomfort 2) Psychological/Emotional Barriers: Pain-related fears and beliefs about exercise
Yiga et al ²⁸ , 2020	Belgium, Uganda	To synthesize data on determinants of dietary and physical activity behaviours	23 (female 23)	Women of reproductive age (18-49)	Not specified	Systematic Review	Urban Sub-Saharan Africa	Socio-ecological framework	1) Structural/Logistical Barriers: Lack of time/family obligations Financial constraints/financial limitations 2) Intrapersonal/Internal Barriers: Preference for sedentary activities 3) Cultural/Social Barriers: Cultural beliefs Social norms Gender stereotypes Pregnancy-related misconceptions Cultural misconceptions 4) Environmental/External Barriers: Environmental factors
Young et al ³⁵ , 2019	USA	Examine longitudinal correlates of sedentary time among females from age 17 to 23 years.	431 (Female 431)	Females aged 17 to 23 years from a cohort study.	20.5 years (approx.)	Longitudinal study	Kaiser Permanente Southern California, University of Maryland, RAND Corporation, University of Rochester	Socioecologic model of factors associated with sedentary behavior.	1) Behavioral/Lifestyle Barriers: Computer time TV time Weekend daily TV hours Weekday daily computer hours Weekday sleep duration hours Smoking status (yes vs. no) 2) Psychosocial Barriers: Depressive symptoms score Physical activity barriers score 3) Sociodemographic Barriers: Black race (associated with lower sedentary time) Higher paternal education More vehicles available in a household Being a college graduate Higher income Being an unemployed student Working fewer hours