

## UNDERSTANDING MATTERS OF THE MIND IN OBESITY

Mr Adrian Toh

### ABSTRACT

**Obesity is a growing global concern and Singapore is not spared from this global epidemic. Apart from the increased risk of numerous serious diseases and health conditions, obese individuals are vulnerable to myriad psychological comorbidities. Obesity management through lifestyle changes can be limited by various barriers, increasing the challenge of implementation and leaving both clinicians and patients feeling frustrated and stressed. The paper examines the barriers identified in the literature, discusses the use of cognitive behavioural concepts and techniques to facilitate the lifestyle change process, and explores the use of motivation and readiness to change to guide the clinician's strategies.**

**Keywords; Weight Management Barriers; Cognitive Behavioural Therapy (CBT); Motivation; Adherence; Lifestyle Changes**

**SFP2024; 51(4): 24-28**

### INTRODUCTION

Obesity is a growing global concern, having nearly tripled since 1975. In 2016, more than 1.9 billion adults (aged 18 and above)—39 percent of the world's population—were overweight (BMI  $\geq 25$  kg/m<sup>2</sup>) and 650 million were obese (BMI  $\geq 30$  kg/m<sup>2</sup>; 13 percent of the world's population).<sup>1</sup> Singapore is not spared from this global epidemic. The National Health Survey in 2010 reported that 29.3 percent of adult residents in Singapore were overweight while 10.8 percent were obese, suggesting that at least two in five adults in Singapore were either overweight or obese. The obesity prevalence in Singapore demonstrated a quadratic increasing trend within the survey years (1992 to 2010).<sup>2</sup> Apart from the increased risk for many serious diseases and health conditions (e.g., type 2 diabetes, high blood pressure, coronary heart disease, etc.), obese individuals are vulnerable to a myriad psychological comorbidities such as mood, anxiety, and eating disorders.<sup>3</sup>

Despite the increasing prevalence rate and the threatening impact of obesity, it is believed that obesity is preventable through lifestyle changes such as dietary and physical activity modifications.<sup>4</sup> However, obesity management through lifestyle changes can be limited by various barriers, which increase the challenges of implementation and leave both clinicians and patients feeling frustrated and stressed.<sup>5</sup> The

purposes of this scientific paper are: to examine the barriers identified in the literature; to discuss the use of cognitive behavioural concepts and techniques to facilitate the lifestyle change process; and to explore the use of motivation and readiness to change to guide the clinician's strategies.

### BARRIERS TO LIFESTYLE CHANGES

For lifestyle changes—such as dietary and physical activity modification—to be successful, it is necessary that the individuals adhere closely to the prescribed behaviours (e.g., having daily intake of 1.2 kcal for the next five days, or brisk-walking 2 km on three days in the next one week). Failing which, treatment effectiveness is hindered and results in poor treatment outcomes. Therefore, it is important to understand the barriers to individuals adhering to the prescribed behaviours.

Burgess, Hassmén, and Pumpa<sup>6</sup> identified barriers to lifestyle intervention in adults with obesity through systemic review, which included:

#### 1. Poor Motivation

Patients and participants in weight loss programmes often anecdotally claimed that they are aware of what they need to do to manage their health and weight, but fail to motivate themselves to carry through with the behaviours. Motivation is key; in fact, patients themselves are aware of the importance of motivation.<sup>7</sup> It was suggested that one of the reasons for poorly sustained motivation might be the misinformation that significant weight loss is required for health improvements to be achieved, and subsequently lead to patients getting disheartened.<sup>6</sup>

#### 2. Lack of Time

Another key barrier identified in the review was the lack of time.<sup>6</sup> In Singapore, the engagement of physical activity was perceived as time consuming, when considered alongside family and work commitments.<sup>8</sup> Consequently, the lack of time and priority management, devoting time to health and physical activity, is challenging for individuals with obesity.

#### 3. Environmental, Societal, and Social Pressures

The obesogenic environment, a term coined to describe “influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations”, functions as a barrier to the lifestyle changes.<sup>9</sup> These include the easy accessibility to less healthy food (especially more convenient with the trend of food delivery), the “pro-sedentary” environment such as the convenient use of cars (and chauffeured rides), escalators and elevators, and passive leisure activities such as television and computer and mobile gaming.<sup>10</sup> Furthermore, when considering social

MR ADRIAN TOH  
Clinical Psychologist  
Singapore Association for the Study of Obesity (SASO)

norms, it is not unusual to not exercise. A local study found that at least one in three Singaporeans does not exercise.<sup>11</sup> Consequently, it will require a good amount of self-efficacy and motivation to live in the obesogenic environment and to be able to change and carry out the prescribed weight management behaviours.

#### 4. Health and Physical Limitations

Individuals with obesity experience various health and physical limitations.<sup>12</sup> These include illness, injury, or complications associated with obesity or other chronic diseases, and these limitations present themselves as barriers to lifestyle changes.<sup>6</sup> The various health and physical limitations may result in the development of a vicious cycle that originates from the individuals' fear of pain and discomfort, leading to the limitation and avoidance of physical exercises, which consequently leads to further weight gain and/or poor health. At the same time, the presence of avoidance behaviours may further exacerbate the anxiety surrounding physical activity.

#### 5. Negative Thoughts/Moods

Challenges in emotion regulation is a common barrier to lifestyle change.<sup>6</sup> Emotion regulation refers to an individual's ability to identify, understand, and accept one's emotions, and respond in adaptive ways. Studies demonstrated that poor mood and negative emotion precede unhealthy eating behaviours, maintaining obesity.<sup>13</sup> In addition, there is an interactive relationship between the individual's emotional distress and carbohydrate cravings.<sup>14</sup> Emotional distress was found to stimulate a craving for carbohydrate snack foods as consumption of these has the positive reinforcing effect of mood enhancement. The temporary positive benefits derived from the consumption will be sought after whenever emotional distress is experienced, creating a cycle of carbohydrate cravings and carbohydrate consumption.<sup>14</sup>

#### 6. Socioeconomic Constraints

Socioeconomic constraints were also highlighted as barriers to lifestyle change. Locally, lower socioeconomic status (SES)—defined by education, income, and housing type—among Chinese women were associated with overweight and obesity.<sup>15</sup> Education is believed to enable individuals to integrate healthy behaviours into their lifestyle, such as dietary choices and exercises. Lowered income limits access to medical care, good housing and working conditions, and opportunities for healthy lifestyles. The lack of these might contribute to the association with overweight and obesity. On the flip side, studies showed that higher SES was positively associated with weight control behaviours such as physical activity, access to healthy foods, and less time spent watching television.<sup>16-18</sup>

#### 7. Gaps in Knowledge/Lack of Awareness

As highlighted earlier, education enables individuals to integrate healthy behaviours into their lifestyle. The gaps in knowledge and/or lack of awareness of what healthy and

detrimental lifestyle behaviours are make lifestyle change challenging. Burgess, Hassmén, and Pumpa highlighted that the lack of understanding regarding dietary and physical exercise recommendations are common among adults with obesity.<sup>6</sup>

#### 8. Lack of Enjoyment of Exercise

The lack of enjoyment of exercise also presents as a barrier to lifestyle changes. Studies showed that enjoyment of exercise was positively correlated with exercise level, thus, when working with individuals with obesity, the enjoyment of exercise is important for the long-term effectiveness of healthcare-based interventions.<sup>19</sup>

### BARRIERS TO LIFESTYLE CHANGES

Cognitive behavioural therapy (CBT) is one of the most extensively researched forms of psychotherapy. CBT has demonstrated effectiveness in addressing unhealthy eating habits, the lack of physical activity, and obesity.<sup>20-23</sup> CBT is particularly useful in managing unhelpful thoughts and behaviours, which prevent individuals with obesity from adhering to prescribed weight loss behaviours. Unsurprisingly, when compared with traditional dietary treatment, weight loss programmes that incorporate CBT strategies to promote lifestyle change were able to achieve better weight losses (of between 5 and 20 percent of weight vs 3 percent) and lower dropout rates (average dropout rates of 20 percent vs rates as high as 58 percent).<sup>24</sup> The following concepts and techniques can be useful in promoting lifestyle changes that will facilitate weight loss:

#### 1. Self-Monitoring

Individuals with obesity can use self-monitoring to keep careful record of their own experiences, such as what, when, how much, and where they eat. Through it, they can learn about the factors (e.g., in social situations, in stressful periods) that put them at risk. With the increased awareness of triggers, they can be empowered to apply various strategies to reduce the risk of reacting to the triggers.<sup>25</sup> The use of self-monitoring on online platforms has also been found to be effective.<sup>26</sup>

#### 2. Attentional Retraining

People who are battling obesity will often show an attentional bias in favour of food cues. For example, an individual with obesity might orient towards food cues, such as appealing high-calorie foods or a store window with rich foods. Attentional retraining demonstrates effectiveness in altering attentional biases for rewarding food cues.<sup>27,28</sup> It involves disrupting or at least reducing the automatic attentional bias by use of distractions, such as focusing on other aspects of the environment or engaging in physical activity.

#### 3. Stimulus Control

The immediate food environment has powerful effects on eating. Thus, individuals with obesity can be trained to

modify the stimuli in the environment that triggers their eating behaviours. Modifications include purchasing low-calorie foods and limiting high-calorie foods kept in the house. Confining eating to a specific place and time of the day can also be helpful, for example, to eat dinner at 7pm at the kitchen table, with a special placemat and to eat only when those stimuli are present. Additionally, in order to battle stress or emotional eating, creating and increasing non-food-related enjoyable activities in one's life can help in managing obesity.

#### 4. Controlling Eating

Some strategies to increase the control over the process of eating include counting each mouthful of food and putting down eating cutlery after every few mouthfuls until the food in the mouth is chewed and swallowed. The lengthened duration between mouthfuls encourages slow eating, which promotes reduced food intake.<sup>29</sup> The process of mindful eating can also help reduce impulsive food choices that might impede weight gain.<sup>30</sup>

#### 5. Self-Reinforcement

Positive reinforcement can further strengthen the carrying out of planned behaviours. For example, self-reinforcement following keeping to a specific diet or physical activity can include going to a movie or playing a video game. Through this process of self-reinforcement, a sense of self-control over eating can be developed. The sense of self-control can help people overcome temptations. Furthermore, being successful in weight loss is tied to greater vitality and psychological well-being, which function as further sources of self-reinforcement.<sup>31</sup>

#### 6. Cognitive Restructuring

A key part of CBT in weight management is the application of cognitive restructuring. Unhealthy behaviours (e.g., poor eating habits and the lack of exercise) can be maintained by unhelpful thoughts or monologues such as "I will never lose weight" or "This weight loss attempt is going to end up like the last 28 attempts: failure." Thus, it is necessary to identify the unhelpful thinking and to consider an alternative or more balanced perspectives. An example of such would be "I have not lost as much weight as I had wished for in my previous attempts; however, I have learnt from the experience to know what behaviours led to the loss of 2 kg. Also, my past attempts do not determine the outcome of my current attempt." The process of cognitive restructuring improves the individual's self-efficacy, the belief that one will be able to lose weight.<sup>32</sup> Individuals with higher self-efficacy were found to have better outcomes with weight, and those with lower self-efficacy were more likely to drop out of treatments.<sup>33,34</sup>

#### 7. Contingency Contracting

Contingency contracting has been found in many studies to be effective in increasing individuals' compliance with weight loss behaviours and significant weight loss was

observed.<sup>35</sup> Contingency contracting involves a cost (e.g., forfeit of deposit money) for failure to attain a goal (e.g., abstaining from sweetened beverages) and/or provision of reward (e.g., praises or money) for attainment of a goal. The use of contingency contracting was found to reduce dropout rate as well.<sup>36</sup>

### MOTIVATION AND READINESS TO CHANGE

The Transtheoretical Model (TTM) offers a promising framework for weight management intervention.<sup>37,38</sup> TTM uses stages of change to integrate processes and principles of change across major theories of intervention. The stages describe behaviour changes in an individual from less healthy behaviours to healthier ones. The five stages of change are pre-contemplation, contemplation, preparation, action, and maintenance. They are briefly described below:

#### 1. Pre-contemplation

The individual has no intention of change and many at this stage are not aware of the problem (e.g., being within an unhealthy weight range). There are also some individuals at this stage who seek treatments because they have been pressurised by others, and consequently, they often revert to their old behaviours.

#### 2. Contemplation

The individual in this stage gains increased awareness of the problem and the benefits of changing. However, the individual is also considering the costs involved in this change, weighing the pros and cons of changes.

#### 3. Preparation

The individual intends to take steps to change, but may not yet begin to do so. Some reasons for not starting might include being unsuccessful in the past, or delaying until they can get over a stressful period of time. It is suggested that individuals in this stage should be recruited for action-oriented programmes.

#### 4. Action

In this stage, the individual overtly modifies lifestyle behaviours to overcome the problem. Being in the action stage requires the commitment of time and energy to make the behavioural changes.

#### 5. Maintenance

In the maintenance stage, the individual works to stabilise behaviour changes and to remain free of the old behaviours, or they might relapse.

To illustrate these with the situation of someone who is overweight: At the start, the person might not consider that he has a problem or that he is overweight. In this pre-contemplation stage, it is unlikely that he will change his behaviours. Later, he might acknowledge that he is overweight, and he considers the benefits and costs of

changing his eating and exercise behaviours, or joining a weight loss programme. He is in the stage known as contemplation. After some time, he might arrive in the preparation stage, where he decides to lose weight and starts planning for the changes to be made. In the action stage, he takes actions and makes changes to address the weight issue. Over time, when he made changes and the new behaviours have become habits, he transits into the stage known as maintenance.

While these might sound sequential, and the eventual stage is maintenance, changes sometimes do not last due to the fact that humans make mistakes. The person who had worked hard to make healthier changes might slide back into old behaviours, where he is less active, eats less healthily, and regains weight. This stage is known as relapse. He has a number of options at this point: he can remain in relapse, move into contemplation, or preparation, or straight back into action. Often, people move around between stages, going forwards, then backwards, and entering and leaving the cycle many times before they settle on a stable set of behaviours.

It can be useful to utilise tools to assess the individual's motivation and readiness to change for weight management and control. The S-weight is a tool that is easy to administer and was considered (among the assessment tools) to be more efficient in assessing the individual's readiness to change.<sup>39</sup> Through the assessment, it promptly identifies the stage of change the individual is in and the psychological obstacles towards weight management.<sup>39</sup> For example, educating, increasing importance of the cognitive dissonance, and using gamification and extrinsic rewards are useful intervention strategies for individuals in the precontemplation, contemplation, and preparation stages. Intervention strategies such as increasing the individuals' awareness of their current behavioural patterns are likely more useful for individuals in all the other stages of change, than individuals within the precontemplation stage. Thus, knowing the stage that the individual is in helps the clinician to understand the individual's challenges and to provide relevant intervention strategies accordingly.

Understanding the matters of the mind in obesity is the first step to effective lifestyle changes as an intervention for obesity. These include understanding the various barriers to lifestyle changes, the use of cognitive behavioural concepts and techniques to facilitate the process of change, and harnessing the knowledge of one's motivation and readiness to change to guide the intervention strategies.

## REFERENCES

- World Health Organization. Obesity and overweight [Internet]. 2020 [cited 2021Apr1]. Available from: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
- Ministry of Health, Singapore. National Health Survey 2010 [Internet]. 2011 [cited 2021Apr1]. Available from: <https://www.moh.gov.sg/resources-statistics/reports/national-health-survey-2010>
- Carpiniello B, Pinna F, Pillai G, et al. Psychiatric comorbidity and quality of life in obese patients. Results from a case-control study. *Int J Psychiatry Med.* 2009;39(1):63-78. doi: 10.2190/PM.39.1.e. PMID: 19650530.
- Harris JK, French SA, Jeffery RW, McGovern PG, Wing RR. Dietary and physical activity correlates of long-term weight loss. *Obes Res.* 1994 Jul;2(4):307-13. doi: 10.1002/j.1550-8528.1994.tb00069.x. PMID: 16358394.
- Alberga AS, Nutter S, MacInnis C, Ellard JH, Russell-Mayhew S. Examining weight bias among practicing Canadian family physicians. *Obes Facts.* 2019;12(6):632-638. doi: 10.1159/000503751. Epub 2019 Nov 8. PMID: 31707395; PMCID: PMC6940460.
- Burgess E, Hassmén P, Pumpa KL. Determinants of adherence to lifestyle intervention in adults with obesity: a systematic review. *Clin Obes.* 2017 Jun;7(3):123-135. doi: 10.1111/cob.12183. Epub 2017 Mar 15. PMID: 28296261.
- Piana N, Battistini D, Urbani L, et al. Multidisciplinary lifestyle intervention in the obese: Its impact on patients' perception of the disease, food and physical exercise. *Nutr Metab Cardiovasc Dis.* 2013 Apr;23(4):337-43. doi: 10.1016/j.numecd.2011.12.008. Epub 2012 Apr 11. PMID: 22497979.
- Bu EQL, Chung HJ. Barriers towards exercise and physical activity of different ethnic groups in middle-aged female Singaporeans. *J Exerc Rehabil.* 2018 Oct 31;14(5):739-745. doi: 10.12965/jer.1836388.194. PMID: 30443518; PMCID: PMC6222159.
- Swinburn B, Egger G, Raza F. Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Prev Med.* 1999 Dec;29(6 Pt 1):563-70. doi: 10.1006/pmed.1999.0585. PMID: 10600438.
- Whitton C, Ma Y, Bastian AC, Chan MF, Chew L. Fast-food consumers in Singapore: demographic profile, diet quality and weight status. *Public Health Nutr.* 2014 Aug;17(8):1805-13. doi: 10.1017/S13688980013001997. Epub 2013 Aug 2. PMID: 23905623; PMCID: PMC10282443.
- Lai L. One in three Singaporeans not active enough [Internet]. *The Straits Times.* 2018 [cited 2021Apr2]. Available from: <https://www.straitstimes.com/singapore/one-in-three-singaporeans-not-active-enough>
- Raman RP. Obesity and health risks. *J Am Coll Nutr.* 2002 Apr;21(2):134S-139S. doi: 10.1080/07315724.2002.10719210. PMID: 11999541.
- Spirou D, Smith E, Wood K, Raman J. The clinical obesity maintenance model: a structural equation model. *Eat Weight Disord.* 2021 Aug;26(6):1927-1937. doi: 10.1007/s40519-020-01034-y. Epub 2020 Oct 17. PMID: 33068275.
- Christensen L. The effect of food intake on mood. *Clinical Nutrition.* 2001 Jun 1;20:161-6.
- abanayagam C, Shankar A, Wong TY, Saw SM, Foster PJ. Socioeconomic status and overweight/obesity in an adult Chinese population in Singapore. *J Epidemiol.* 2007 Sep;17(5):161-8. doi: 10.2188/jea.17.161. Erratum in: *J Epidemiol.* 2008 Jan;18(1):43-4. PMID: 17827863; PMCID: PMC7058476.
- Jeffery RW, French SA. Socioeconomic status and weight control practices among 20- to 45-year-old women. *Am J Public Health.* 1996 Jul;86(7):1005-10. doi: 10.2105/ajph.86.7.1005. PMID: 8669502; PMCID: PMC1380443.
- Jeffery RW, French SA, Forster JL, Spry VM. Socioeconomic status differences in health behaviors related to obesity: the Healthy Worker Project. *Int J Obes.* 1991 Oct;15(10):689-96. PMID: 1752730.
- Jeffery RW, French SA. Epidemic obesity in the United States: are fast foods and television viewing contributing? *Am J Public Health.* 1998 Feb;88(2):277-80. doi: 10.2105/ajph.88.2.277. PMID: 9491022; PMCID: PMC1508201.
- Hagberg LA, Lindahl B, Nyberg L, Hellénus ML. Importance of enjoyment when promoting physical exercise. *Scand J Med Sci Sports.* 2009 Oct;19(5):740-7. doi: 10.1111/j.1600-0838.2008.00844.x. Epub 2008 Aug 5. PMID: 18694433.
- Linardon J, Wade TD, De la Piedad Garcia X, Brennan L. The efficacy of cognitive-behavioral therapy for eating disorders: A systematic review and meta-analysis. *J Consult Clin Psychol.* 2017 Nov;85(11):1080-1094. doi: 10.1037/ccp0000245. PMID: 29083223.

21. Dalle Grave R, Calugi S, Centis E, El Ghoch M, Marchesini G. Cognitive-behavioral strategies to increase the adherence to exercise in the management of obesity. *J Obes*. 2011;2011:348293. doi: 10.1155/2011/348293. Epub 2010 Oct 28. PMID: 21052533; PMCID: PMC2968119.
22. Cooper Z, Fairburn CG, Hawker DM. *Cognitive-Behavioral Treatment of Obesity: A Clinician's Guide*. New York, NY: Guilford Press; 2003.
23. Hofmann SG, Asnaani A, Vonk IJ, Sawyer AT, Fang A. The efficacy of cognitive behavioral therapy: A review of meta-analyses. *Cognit Ther Res*. 2012 Oct 1;36(5):427-440. doi: 10.1007/s10608-012-9476-1. Epub 2012 Jul 31. PMID: 23459093; PMCID: PMC3584580.
24. Rapoport L, Clark M, Wardle J. Evaluation of a modified cognitive-behavioural programme for weight management. *Int J Obes Relat Metab Disord*. 2000 Dec;24(12):1726-37. doi: 10.1038/sj.ijo.0801465. PMID: 11126231.
25. Laliberte M, McCabe RE, Taylor V. *Cognitive behavioral workbook for weight management: a step-by-step program*. New Harbinger Publications; 2009.
26. Krukowski RA, Harvey-Berino J, Bursac Z, Ashikaga T, West DS. Patterns of success: online self-monitoring in a web-based behavioral weight control program. *Health Psychol*. 2013 Feb;32(2):164-70. doi: 10.1037/a0028135. Epub 2012 Apr 30. PMID: 22545978; PMCID: PMC4993110.
27. Kemps E, Tiggemann M, Orr J, Gear J. Attentional retraining can reduce chocolate consumption. *J Exp Psychol Appl*. 2014 Mar;20(1):94-102. doi: 10.1037/xap0000005. Epub 2013 Sep 30. PMID: 24079387.
28. Kemps E, Tiggemann M, Hollitt S. Biased attentional processing of food cues and modification in obese individuals. *Health Psychol*. 2014 Nov;33(11):1391-401. doi: 10.1037/hea0000069. Epub 2014 Apr 7. PMID: 24707847.
29. Smit HJ, Kemsley EK, Tapp HS, Henry CJ. Does prolonged chewing reduce food intake? Fletcherism revisited. *Appetite*. 2011 Aug 1;57(1):295-8. doi: 10.1016/j.appet.2011.02.003. Epub 2011 Feb 21. PMID: 21316411.
30. Hendrickson KL, Rasmussen EB. Mindful eating reduces impulsive food choice in adolescents and adults. *Health Psychol*. 2017 Mar;36(3):226-235. doi: 10.1037/hea0000440. Epub 2016 Nov 3. PMID: 27808529.
31. Taylor SE, Stanton AL. *Health psychology*. McGraw-Hill Education; 2020.
32. Dallow CB, Anderson J. Using self-efficacy and a transtheoretical model to develop a physical activity intervention for obese women. *Am J Health Promot*. 2003 Jul-Aug;17(6):373-81. doi: 10.4278/0890-1171-17.6.373. PMID: 12858617.
33. Warziski MT, Sereika SM, Styn MA, Music E, Burke LE. Changes in self-efficacy and dietary adherence: the impact on weight loss in the PREFER study. *J Behav Med*. 2008 Feb;31(1):81-92. doi: 10.1007/s10865-007-9135-2. Epub 2007 Oct 26. PMID: 17963038.
34. Mitchell C, Stuart RB. Effect of self-efficacy on dropout from obesity treatment. *J Consult Clin Psychol*. 1984 Dec;52(6):1100-1. doi: 10.1037//0022-006x.52.6.1100. PMID: 6520280.
35. Janz NK, Becker MH, Hartman PE. Contingency contracting to enhance patient compliance: a review. *Patient Educ Couns*. 1984;5(4):165-78. doi: 10.1016/0738-3991(84)90176-9. PMID: 10317452.
36. Jeffery RV, Thompson PD, Wing RR. Effects on weight reduction of strong monetary contracts for calorie restriction or weight loss. *Behav Res Ther*. 1978;16(5):363-9. doi: 10.1016/0005-7967(78)90005-0. PMID: 743075.
37. Johnson SS, Paiva AL, Cummins CO, et al. Transtheoretical model-based multiple behavior intervention for weight management: effectiveness on a population basis. *Prev Med*. 2008 Mar;46(3):238-46. doi: 10.1016/j.ypmed.2007.09.010. Epub 2007 Oct 23. PMID: 18055007; PMCID: PMC2327253.
38. Mastellos N, Gunn LH, Felix LM, Car J, Majeed A. Transtheoretical model stages of change for dietary and physical exercise modification in weight loss management for overweight and obese adults. *Cochrane Database Syst Rev*. 2014 Feb 5;2014(2):CD008066. doi: 10.1002/14651858.CD008066.pub3. PMID: 24500864; PMCID: PMC10088065.
39. Ceccarini M, Borrello M, Pietrabissa G, Manzoni GM, Castelnuovo G. Assessing motivation and readiness to change for weight management and control: an in-depth evaluation of three sets of instruments. *Front Psychol*. 2015 May 11;6:511. doi: 10.3389/fpsyg.2015.00511. PMID: 26029126; PMCID: PMC4426708.

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## LEARNING POINTS

- **Barriers to lifestyle intervention in adults with obesity include: poor motivation; lack of time; environmental, societal, and social pressures; health and physical limitations; negative thoughts/moods; socioeconomic constraints; gaps in knowledge/lack of awareness; and lack of enjoyment of exercise.**
  - **Cognitive behavioural therapy (CBT) is effective at addressing unhealthy eating habits, the lack of physical activity, and obesity. Some of the concepts and techniques that can be useful in promoting lifestyle changes include self-monitoring, attentional retraining, stimulus control, controlling eating, self-reinforcement, cognitive restructuring, and contingency contracting.**
  - **Understanding the five stages of change and being able to identify the individual's stage of change can guide the intervention strategies. The five stages include pre-contemplation, contemplation, preparation, action, and maintenance.**
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