

## UNIT NO. 4

## PHYSICAL ACTIVITY INTERVENTIONS IN CHILDHOOD OBESITY

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**ABSTRACT**

**Physical activity is an essential component of obesity intervention in both children and adults. Obese children and adolescents should be encouraged to increase their activity level through lifestyle activities and structured exercise. Exercise program should be appropriate for the child's age and physical capabilities, encourage the development of general fitness and motor skills other than increasing energy expenditure.**

**Keywords: Physical activity, exercise, obese, children, adolescent**

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**INTRODUCTION**

Diet, physical activity and behaviour modifications are the three essential components of obesity intervention. Although weight loss is easier to achieve with caloric restriction than with increase in energy expenditure, physical activity can help to preserve and increase fat-free mass, which is an important determinant of resting metabolic rate, the greatest part of total energy expenditure. In addition, regular physical activity also helps in the long term maintenance of weight loss, prevents chronic diseases, improves cardiovascular fitness, skeletal health and psychological well-being. The active, unrestricted and rewarding nature of exercise also makes it a more positive behaviour to promote as compared to dieting, which is passive, restrictive and negative.

**FACTORS INFLUENCING ACTIVITY LEVEL IN OBESE YOUTHS**

Obese children and adolescents are often found to be less active than their normal-weight peers. As compared to the normal-weight children, obese youths are often disadvantaged by their physical limitations such as excess weight and lower aerobic fitness, in particularly when performing weight-bearing activities. Teasing and discrimination by other children can further reduce their desire to participate in physical activity. This may lead to a vicious cycle of inactivity, positive energy balance, weight gain, reduce fitness and further inactivity. Other significant factors that can affect an obese child's tolerance and compliance of physical activity are as shown in Table 1. Physical

activity interventions for obese children should therefore aim to overcome these barriers and enhance the positive experience of physical activity.

**Table 1. Factors affecting tolerance and compliance of physical activity in obese children/adolescents**

Physical	Psychological
Low cardiopulmonary fitness	Embarrassment
Poor motor skills	Low self-efficacy
Excess weight	Low self-esteem
Greater perceived strain or discomfort of physical activity	Teasing, discrimination
	Previous negative experience

**PHYSICAL ACTIVITY GUIDELINES****Lifestyle activities**

Lifestyle activities are non-structured physical activities that can be implemented into daily routines and are done in small bouts. Such activities include walking or cycling to and from school, taking the stairs instead of elevator or lift, and performing household chores. These activities are usually of lower intensity than activities performed in a structured setting. Increasing lifestyle activities is a good starting point for obese youths who are inactive.

A common lifestyle activity recommendation for adults is to accumulate 10,000 steps per day. Step count can be easily monitored by using a pedometer which is a small and inexpensive instrument for measuring accumulative ambulatory activity. It is also an effective motivational tool that allows direct feedback to the individuals. Daily step count targets for children have not yet been established but based on a recent analysis of pedometer-determined step count obtained from age 6 to 12 years old children from US, Australia and Sweden, a minimum daily step count of 12,000 for girls and 15,000 for boys were recommended. It was found that children with step counts beyond these thresholds had a lower chance of being overweight. The difference in cut-off level for boys and girls is in line with sex-related differences commonly observed in objectively monitored physical activity of children in this age group. The step range (12,000 to 15,000) translates to approximately 120 to 150 minutes of activity per day, consistent with most physical activity guidelines for children and adolescents. As for the older adolescents, the recommended threshold is 12,000 steps per day.

**Structured exercise programs**

Structured exercise program allows a progressive increase in physical activity volume and intensity to maximise the weight

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loss or maintenance. Exercise program for obese youths should not only focus on increasing energy expenditure and reducing body weight. A well-planned program can enhance the child's general fitness, movement skills, self-confidence as well as promote positive attitude towards physical activity. When working with obese youths, it is always better to underestimate their physical abilities and gradually increase the volume and intensity of training than overestimate their abilities and risk an injury. Activities that are beyond the capabilities of the participants may result in overloading and injuries, which in turn may discourage the child from future participation. Obese individuals often feel uncomfortable when participating in physical activity in the presence of non-obese participants. Include a few obese children in group activities may help to reduce inhibition. A single workout session may comprise of a combination of exercises (aerobic, resistance, agility, etc) carried out in a circuit manner.

**Aerobic exercise** - Sustained aerobic activities that use large muscle groups are effective for increasing energy expenditure, cardiopulmonary fitness and body fat reduction. In the initial phase of the intervention, low impact aerobic exercises are preferred to reduce risk of overloading the lower limb's joints and musculatures. Low impact activities include walking, cycling (arm or leg), dancing, rollerblading and aquatic activities. High impact, weight bearing activities such as running, rope skipping, plyometric exercises (i.e. repetitive jumping or bouncing activities) are more exhaustive and may discourage participation and also carry higher risk of overloading the joints. A progressive introduction of more strenuous aerobic activities is recommended once fitness level has improved or body weight has decreased. Exercise intensity should be kept manageable for the kids based on her/his fitness level. A low to moderate intensity for beginners is generally well tolerated. Exercise intensity can be monitored by using the "talk test" - the child should be able to talk comfortably while exercising at a moderate intensity. Alternatively, the participants can use a numerical or picture scale (e.g. Borg or Omni scale, figure 1) to indicate their rate of perceived exertion. Low to moderate intensity corresponds to a rating of 9-13 on the Borg scale. Start with short bouts of activities e.g. 5-10 minutes and alternate with rest intervals (1-2 minutes). The aim is to progressively increase the exercise duration and reduce the rest intervals. The workout frequency may be progressively increased from 3 to 5 times per week.

**Resistance exercise** - Resistance exercise is defined as a form of physical activity that involved the use of a resistive load to increase one's muscular strength and endurance. Resistance training does not typically involved high energy expenditure, but it is important for enhancing bone mineral density, lean muscle mass and strength and injury prevention. The nature of resistance training - short bouts of workout interspersed with brief rest periods between sets - also seem to be more enjoyable and appealing to the obese youths as compared to prolonged

**Figure 1. Borg scale**

6	No exertion at all
7	Extremely light
8	
9	Very light - (easy walking slowly at a comfortable pace)
10	
11	Light
12	
13	Somewhat hard (It is quite an effort; you feel tired but can continue)
14	
15	Hard (heavy)
16	
17	Very hard (very strenuous, and you are very fatigued)
18	
19	Extremely hard (You can not continue for long at this pace)
20	Maximal exertion

periods of continuous aerobic activities. As obese youths tend to be stronger than their non-obese peers, participation in resistance exercise also gives them a chance to do better and gain confidence in their physical abilities. Resistance training should be conducted by qualified professionals and exercise should be selected based on the child's body size, strength level and prior experience with resistance training. Untrained and younger children should start with lighter resistance using body or free weights (elastic bands, dumbbells, medicine balls, etc) and perform a set of 10-15 repetitions for each exercise. Heavier weights and additional sets (2 to 3) of exercises may be introduced gradually once the child has mastered the exercise technique and shown improvement in strength. A rest period of 1-2 minutes between sets is appropriate for most beginners. Rest periods can be reduced gradually once the participant's exercise tolerance improves. For enhancing muscular strength, a training frequency of 2-3 times per week on non-consecutive days is recommended for children and adolescents.

## DECREASING SEDENTARY ACTIVITIES

In addition to encouraging physical activity, it is also important to emphasise the need to decrease participation in sedentary activities such as television viewing, playing computer games or internet surfing. Reduction in sedentary activities may potentially decrease the consumption of energy-dense foods (many children snack while watching television) and also increase the likelihood that time will be spent in more energy-intensive activities.

## BEHAVIOURAL MODIFICATIONS

Several behavioural modification techniques such as self-monitoring, goal setting, positive reinforcement and social support may be useful in assisting obese youths to change their eating and activity behaviours. Self-monitoring includes recording food intake, weight and physical activity in a diary. Its purpose is to increase self awareness and to identify unhealthy behaviours that can be changed. The child should

be encouraged to set a weekly activity goal and decide on the reward for reaching the goal. Goals can be short or long-term but must be specific, e.g. walking for 20 minutes each day. Positive reinforcement includes receiving verbal praise, attention or appropriate reward for good effort. Support from family members, friends, treatment staff is a very important determinant of positive behavioural change. Parents should organise physical activities for the entire family and be a role model by adopting an active lifestyle.

## RISK OF EXERCISE PARTICIPATION

### Musculoskeletal injuries

Because of the excess body weight, obese youths tend to experience more musculoskeletal discomfort and lower limb injuries during physical activities. Choosing low impact activities and allowing gradual progression in exercise load will help to minimise injury risk. Ensure the wearing of appropriate, supportive foot wear during weight-bearing activities, and exercise on soft surfaces rather than hard surfaces e.g. concrete where possible.

### Skin problems

Obese individuals with deeper skin folds are prone to skin rash, chafing and infection due to persistent moisture and frictions. Good hygiene, appropriate exercise clothing and use of lubricants such as petroleum jelly over susceptible areas before physical activity help to reduce such problems.

### Heat intolerance

Obese individuals are less tolerant to heat as fat tissue acts as insulation and inhibits the natural dissipation of body heat. Heat intolerance and dehydration due to profuse sweating will not only impair physical performance, it may also result

in life threatening heat injuries. It is essential to emphasise to all participants the importance of rehydration before, during and after exercise. Wearing appropriate exercise attire that facilitates sweat evaporation, exercising in cooler part of the day and proper physical conditioning will also reduce the risk of heat injuries.

## CONCLUSION

With appropriate planning and supervision, exercise can be safe and enjoyable for even the most obese child. In addition to positive changes in body composition, regular participation in physical activities also give obese youth a chance to experience success, feel good about their performances and gain confidence in their physical abilities.

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## LEARNING POINTS

- **According to the physical activity guidelines for children and adolescents, the common consensus is that children and adolescent should participate in 60 minutes or more of moderate to vigorous physical activity every day.**
- **A common lifestyle activity recommendation for adults is to accumulate 10,000 steps per day**
- **Structured exercise program allows a progressive increase in physical activity volume and intensity to maximise the weight loss or maintenance.**
- **A single workout session may comprise of a combination of exercises (aerobic, resistance, agility, etc) carried out in a circuit manner.**
- **Reduction in sedentary activities may potentially decrease the consumption of energy-dense foods (many children snack while watching television) and also increase the likelihood that time will be spent in more energy-intensive activities.**