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Psychosocial Interventions in the Treatment of Severe Adolescent Obesity: The SHINE Program

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A B S T R A C T

Purpose: Psychosocial interventions (PSIs) are characterized by three phases: (1) an initial in-depth assessment, (2) an intensive multifaceted intervention to stem a condition, and (3) an extensive maintenance program. PSIs are often used for treatment of mental health conditions; however, applicability in the treatment of adolescent obesity is unknown. This article sought to evaluate the service-level outcomes of a PSI for young people (aged 10–17) with severe obesity.
Methods: A retrospective evaluation of participants attending the Self Help, Independence, Nutrition and Exercise program between 2011 and 2016 ($n = 435$; age: 13.1 ± 2.1 years, male: 51%, white: 87.4%, body mass index [BMI]: 33.5 ± 7.5 kg/m^2, standardized BMI [BMI SDS]: 3.1 ± .5 units). Anthropometric measurements (BMI and waist circumference) were collected at baseline, 3, 6, 9, and 12 months. Psychosocial measures (anxiety, depression, and self-esteem) were collected at baseline and 3 months. Participant retention was also assessed.
Results: After 3 months, 95% of participants remained with a mean BMI SDS reduction of .19 units (95% confidence interval: .17, .21). Anxiety, depression, and self-esteem improved by 50%, 54%, and 38%, respectively. BMI SDS reductions of .29, .35, and .41 units were found at 6, 9, and 12 months. Fifty-four percent of participants chose to attend the final intervention phase. A higher baseline BMI SDS and a greater reduction in BMI SDS predicted final intervention phase attendance.
Conclusions: The Self Help, Independence, Nutrition and Exercise PSI demonstrated positive mean reductions in all measurements across all time points. In contrast to other community-based weight management services, these results suggest the utility of, and further exploration of, PSIs in the treatment of severe adolescent obesity.

IMPLICATIONS AND CONTRIBUTION

Self Help, Independence, Nutrition and Exercise—a community-based, tier 3 weight management program—presents a novel and potentially effective means of treating obesity in adolescents. Self Help, Independence, Nutrition and Exercise focuses on holistic health improvement (social relationships, stress management, and self-esteem) alongside dietary and physical activity behavior change. Results show significant improvements in both psychosocial and anthropometric measurements.

The prevalence of childhood obesity has increased rapidly throughout the last three decades in the United Kingdom. The Health Survey for England indicates that 35.2% of adolescents alone, aged 11–15 years, are overweight (16.4%) or obese (18.7%) [1], with previous studies suggesting that 22%–90% will be obese in adulthood if intervention is not sought [2]. Factors shown to mediate obesity include low levels of physical activity, a more sedentary lifestyle, and poor dietary behaviors. Psychosocial

Conflicts of Interest: J.N. and D.R. are independent to the SHINE program and do not hold any conflicts of interest. K.S. is the managing director of SHINE Health Academy. P.D., and the Sheffield Children's Hospital, accept referrals from SHINE when more specialist services are required (i.e., tier 4, bariatric surgery, or pharmacotherapy). SHINE also accept referrals from Sheffield Children's Hospital. Leeds Beckett University completed the evaluation of the data and consulted with K.S. and P.D. in the development of the article.

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factors, such as low self-esteem, depression, anxiety, and poor social relationships, are also known to correlate with obesity [3].

The United Kingdom currently implements a four-tiered approach to preventing and treating obesity, the Obesity Care Pathway [4]. The first tier of the pathway focuses on the prevention of overweight and obesity, primarily through marketing campaigns, awareness raising and knowledge building (e.g., Change4Life). Tiers 2–4, however, are dedicated to obesity treatment. The pathway stipulates that more specialist treatment is provided for children with a greater degree of obesity, insofar that tier 2 provides generic weight management advice, tier 3 provides specialist intervention from a multidisciplinary team, and tier 4 offers intensive treatment, pharmacotherapy, and bariatric surgery [4]. This pathway is primarily used in the management of adult obesity, and application in the management of severe obesity in young people (particularly tiers 3 and 4) is limited. Recent data suggest that approximately 56% of local authorities have a tier 2 service, and only 9% have a tier 3 service for children and young people [5].

Traditional community-based weight management program (WMP) for young people (often at the tier 2 level) predominantly focus on healthy eating, increasing exercise, and behavior modification [6,7]. Such programs usually last between 3 and 6 months [7]. Programs adopting this approach usually exhibit modest improvements in body mass index (BMI) during WMP delivery periods, but studies monitoring long term, post WMP effects, weight regain are frequently observed [7]. Furthermore, traditional programs will seldom address the psychosocial complexities presented by many obese adolescents [8].

SHINE (Self Help, Independence, Nutrition and Exercise)—a tier 3, not-for-profit, community-based WMP in Sheffield—was founded in 2003 to help severely obese adolescents (aged 10–17 years, standardized BMI [BMI SDS] $\geq$99.6th percentile). SHINE recognizes the complicated etiology of obesity, and rather than solely improving dietary and physical activity habits, the program targets psychosocial areas often associated with obesity: low self-confidence, stress, depression, and poor social relationships [3,8]. The program offers a psychosocial intervention (PSI); defined as treating or preventing a condition using educational, behavioral, and/or cognitive approaches [9]. PSIs are conventionally administered in the treatment of mental health conditions, cancers, and HIV/AIDS [10,11]; conditions which each share commonalities with obesity: chronic nature, negative psychosocial consequences, and episodic relapses [12,13]. SHINE considers the wider implications associated with obesity and, therefore, delivers a long-term program to prevent weight deterioration and promote salubrious habit (re)formation.

PSIs are characterized by three distinct phases. Phase 1 is an acute stage where participants are assessed and signposted to the most appropriate method of treatment using a stepped-care approach [14]. Phase 2 comprises the active stage of the intervention; participants undertake an intensive, educational program with the aim of stemming the condition (e.g., weight gain). The final phase, known as the maintenance stage, aims to educate participants how to sustain the behavioral changes made in phase 2. SHINE supports and educates the young person and their family in long term, sustainable management of body weight.

To the extent of our knowledge, SHINE is the first WMP to adopt the PSI approach when providing a tier 3 service. This article examines the anthropometric, psychosocial, and retention outcomes of the SHINE PSI. As a secondary aim, this article also investigates the variables predictive of initiating the program and those predictive of continuing attendance into phase 3 of the program.

Methods

Study design and setting

A retrospective service evaluation of the SHINE program was undertaken. No control or comparator group data were available. Eligible participants were either severely obese (BMI SDS $\geq$2.67 units [99.6th percentile]) or obese (BMI SDS $\geq$2.00 units [98th percentile]) with associated comorbidities (e.g., hypertension, depression, and type 2 diabetes) [15,16]. Phase 1 to phase 3 lasts 15 months, but families may use the service ad hoc until the child's 18th birthday. Families pay a weekly attendance fee (£5/$8). The SHINE program consists of three phases—aligned to the PSI approach. A standardized [17], comprehensive overview of the SHINE program is available in the Supplement.

Data

SHINE provided participant data from September 2011 to March 2016 (n = 513). Participants with a BMI SDS <98th percentile were excluded from the analyses (n = 34), as were those who attended a pilot program (n = 42) or with erroneous data (n = 2), resulting in a final sample of 435 participants.

Parental consent was previously obtained by SHINE. Ethical approval for secondary data analysis was provided by Leeds Beckett University Research Ethics Committee (ref: 13,048).

Participant entry characteristics

Participant information included gender, age (years and classification [<13.5 years and >13.5 years]), ethnicity (white or nonwhite), presence of a diagnosed learning disability (attention deficit hyperactivity disorder, Asperger's syndrome, or Down's syndrome), and referral pathway (self-referral or non–self-referral [schools, physicians, multiagency support teams, child and adolescent mental health services, and social services]).

Anthropometric measurements

BMI (kg/m^2) and waist circumference (WC [cm]) were standardized for age and gender using the UK growth reference data [15,17]. Clinical cutoffs were applied to BMI SDS to provide weight classifications (obese [2.00–2.66 units, 98th–99.5th percentile], severely obese [2.67–3.49 units, 99.6th—99.97th percentile]) [15]. An additional classification—very severely obese—was categorized as a standardized value exceeding 3.50 units, equivalent to the 99.98th percentile [18]. All measurements were completed by the same senior obesity specialist and in accordance with standardized protocols [15,17]. Data were collected at baseline, 3, 6, 9, and 12 months, conditional on participant attendance.

Psychological measurements

Self-esteem, anxiety, and depression were assessed through the Rosenberg self-esteem scale [19] (higher scores represent greater self-esteem, range 0–30) and the hospital anxiety and depression scale [20] (higher scores represent higher anxiety/depression, range 0–21), respectively. These measurements