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Public Health

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Original Research

The cost-effectiveness of weight management programmes in a postnatal population

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ARTICLE INFO

Article history:

Received 12 August 2013

Received in revised form

11 July 2014

Accepted 15 July 2014

Available online 3 September 2014

Keywords:

Weight management following pregnancy

Health economics

Mathematical modelling

Childbirth

Public health

Cost effectiveness

ABSTRACT

Objectives: The aim of the study was to estimate the cost-effectiveness of a weight management programme including elements of physical exercise and dietary restriction which are designed to help women lose excess weight gained during pregnancy in the vulnerable postnatal period and inhibit the development of behaviours which could lead to future excess weight gain and obesity.

Study design: A mathematical model based on a regression equation predicting change in weight over a fifteen year postnatal period was developed.

Methods: The model included programme effectiveness and resource data based on a randomized controlled trial of a weight management programme implemented in a postnatal population in the United States. Utility and mortality data based on body mass index categories were also included. The model adopted a National Health Service (NHS) and personal social services (PSS) perspective, a lifetime time horizon and estimated the cost effectiveness of a weight management programme against a no change comparator in terms of an incremental cost-effectiveness ratio (ICER).

Results: The baseline results show that the difference in weight between women who received the weight management programme and women who received the control intervention was 3.02 kg at six months and 3.53 kg at fifteen years following childbirth. This results in an ICER of £7355 per quality adjusted life year (QALY) for women who were married at childbirth.

Conclusion: The estimated ICER would suggest that such a weight management programme is cost-effective at a NICE threshold of £20,000 per QALY. However significant structural and evidence based uncertainty is present in the analysis.

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<http://dx.doi.org/10.1016/j.puhe.2014.07.005>

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Introduction

The proportion of the population in England and Wales who are overweight or obese is increasing.^{1,2} This has led to an increase in the prevalence of weight related diseases which in turn are associated with an increase in morbidity, mortality and the costs incurred by health services in treating and managing them. During pregnancy an increase in weight is recommended so that women can remain healthy and satisfy the increased energy demands of gestation. The American Institute of Medicine has issued guidelines for the recommended gestational weight gain based on prepregnancy body mass index (BMI) and are detailed in [Table 1](#).³

However the period following childbirth is one of the most vulnerable for the development of lifestyles that may lead to excessive weight gain.⁴ The most effective time for women to lose excess weight gained during pregnancy is the six month postnatal period.⁵

A mathematical model was constructed on behalf of the National Institute for Health and Care Excellence (NICE) to estimate the cost-effectiveness associated with the implementation of a hypothetical public health programme designed to encourage women to lose the excess weight gained during pregnancy in the six month postnatal period.⁶ The results of the modelling process were used to inform the development of UK public health guidance issued by NICE.⁷

Methods

A systematic literature search of electronic databases for papers published between 1990 and 2009 relating to weight management interventions which encourage women to return to their prepregnancy weight in the six month postnatal period through physical exercise, dietary management or both was conducted in August 2009 and returned 4414 references. The titles, abstracts and finally the full papers of these identified references were assessed against inclusion and exclusion criteria until five full randomized controlled trials (RCTs) remained.^{8–13}

The evidence regarding the effectiveness of such interventions was then synthesized using a standard literature review methodology.¹⁴ Outcomes of interest were the change in weight during the postnatal period and the associated change in BMI.

The participants and results of each RCT are summarized in [Table 2](#). All the RCT's took place in the United States.

Table 1 – Recommended gestational weight gain by BMI category.

Prepregnancy BMI category	BMI (kg/m ²)	Recommended gestational weight gain (kg)
Underweight	<18.5	28–40
Normal weight	18.5–24.9	25–35
Overweight	25.0–29.9	15–25
Obese	≥30	11–20

Table 2 – Details of participants in the RCT's.

Study	RCT ^{8,9}		RCT ¹¹		RCT ¹²		RCT ¹³		RCT ¹⁰		
	Diet & exercise	Usual care	Behavioural ^a	Usual care	Structured diet & exercise	Self-directed diet & exercise	Aerobic exercise	Usual care	Diet	Diet & exercise	Usual care
Mean age of participants (years)	32	32	31	31	31.5	31.5	30.5	30.5	31.5	31.5	31.5
Start of intervention (weeks postnatal)	4	4	12–52	12–52	6–26	6–26	6–8	6–8	8–16	8–16	8–16
Duration of intervention (weeks)	10	10	26	26	52	52	12	12	1.6 (11 days)	1.6 (11 days)	1.6 (11 days)
Number in group at start (follow-up)	27 (19)	21 (16)	47 (36)	43 (26)	21 (13)	19 (10)	18 (14)	15 (14)	22 (20)	22 (22)	23 (23)
Height of participants (m)	1.67	1.65	Not reported	Not reported	1.64	1.67	1.63	1.68	1.65	1.65	1.67
Prepregnancy weight (kg)	68.6	70.5	67	67	79.8	83.9	61.3	61.6	67.3	64.9	66.4
Weight gained during pregnancy (kg)	15.5	14.8	17.5	19.8	>15	>15	15.2	17.5	15.2	16.1	16.4
Weight at end of study (kg)	72.2	73.7	Not reported	Not reported	71.3	84.1	65.7	65.4	66.4	67.8	68.3
Six month postnatal weight (kg)	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported
	reported	reported					reported	reported	reported	reported	

^a The correspondence intervention was a behavioural weight management programme including two group sessions, correspondence materials and telephone support. Participants were instructed to follow a calorie controlled diet and embark on an aerobic exercise programme, although this was not supervised.

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