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Psychosocial consequences of weight screening of school-age children – a systematic review

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ABSTRACT

INTRODUCTION. Weight-screening children in schools is an ingrained part of preventive health programmes worldwide. Even though there is no evidence that weight monitoring in the context of preventive health work prevents weight gain, evidence indicates that a focus on weight among children may negatively impact mental health. We aimed to review the existing literature on potential psychosocial consequences of routine weighing and weight feedback in school-aged children.

METHODS. A comprehensive search was performed in four databases (PubMed, PsycINFO, Sociological Abstracts and CINAHL) and included all original studies investigating psychological or social consequences of routine weighing or weight feedback in school-aged children. Data extracted from all included studies were coded thematically and summarised considering the nature of the effect on psychosocial outcomes.

RESULTS. Six studies were included in this review. They were heterogeneous regarding aim and study design. Negative consequences included decreased weight satisfaction, increased weight focus and frequency of peer weight talk, over sensitisation about weight and emotional distress and discomfort.

CONCLUSIONS. The literature in the field was sparse and heterogeneous. Even so, the literature indicated that routine weighing and weight feedback resulted in harmful psychosocial consequences for some children. Unfavourable effects primarily seemed to affect children with a high BMI, whereas children categorised as normal weight seemed to have mainly positive or neutral experiences.

KEY POINTS

- Few studies have measured the psychosocial consequences of weight-screening children.
- The literature indicates that routine weighing may decrease weight satisfaction, increase weight focus and over-sensitise weight matters.
- Unfavourable consequences primarily seemed to occur in children with a high BMI.

Routine weighing of children is an ingrained part of preventive child health programmes in many countries. When most weight-screening programmes were originally introduced, they targeted malnutrition and underweight. Today, physical diseases are rare among children in most developed modern societies.

A high BMI in children and adolescents is a risk factor for a high BMI later in life and for disease. In children and adolescents, a high BMI is associated with low self-esteem [1], body image dissatisfaction [2] and bullying [3], social marginalisation and stigmatisation [4] in school and at home [1]. Weight-based teasing in adolescence affects emotional well-being [5] and has been associated with disordered eating behaviours and an increased risk of weight gain later in life [6, 7].

It is convenient to assume that the solution is managing weight in childhood. However, the evidence in the field indicates that weighing children does not lead to a reduced BMI [8, 9]. Many normal-weight adolescents misperceive themselves as overweight [10]. Project EAT, a population-based study with nearly 5,000 teenagers, found that more than half of the girls and one third of the boys displayed unhealthy weight control behaviours [11]. The relationship between perceived body weight and a wide range of negative mental health outcomes has been demonstrated in numerous studies [1, 2, 10, 12-14]. Several studies advocate that recommendations for weight monitoring should be made cautiously and avoid messages that may potentially encourage weight control behaviour such as frequent self-weighing [15, 16].

In screening programmes, health benefits should outweigh potential harm [17]. The potential harm of routine weighing of children has not been explored systematically, and the psychosocial consequences of weighing children remain uncertain. Thus, the overall health effects of a weight-screening programme in a developed modern society are unknown.

This paper aimed to review the existing literature on psychosocial consequences of routine weighing of school-aged children and providing subsequent weight feedback.

METHODS

This systematic review follows the PRISMA guideline [18]. To enhance transparency when synthesising and reporting the qualitative research, we adopted the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) standards [19].

Search strategy and sources

A search strategy was developed with assistance from a specialist librarian. A comprehensive systematic literature search strategy was followed, using a modified PICO format and applying an expansive list of possibly relevant keywords and synonyms related to the terms 'routine weighing' and 'psychosocial consequences'. The PICO parameters were population (children and adolescents, aged 6-18, in high-income countries), intervention (routine weighing or BMI screening and reporting to parents, done by a professional, e.g., teacher or school nurse, without specific medical indication) and outcome (psychological and social outcomes after weighing or reporting weight). The searches were run on 5 May 2022 in the following databases: PubMed, PsycINFO, Sociological Abstracts and CINAHL. See this supplementary file for the full search strategy (https://content.ugeskriftet.dk/sites/default/files/2023-08/A09220534-supplementary.pdf). Furthermore, the reference lists of all included studies were searched manually.

Study selection

Two authors (JJ and GO) screened titles and abstracts independently [20]. Duplicates and retracted studies were removed electronically. The Covidence Systematic Review Software [21] was used to screen and select studies for full-text reading and inclusion. Selected articles were reviewed individually, and all authors agreed on which articles to include in the review.

Inclusion and exclusion criteria

The studies had to be original, peer-reviewed and reported in English. They were required to report experiences or consequences connected to the act of weighing with no specific medical indication. Studies were excluded if they did not examine psychosocial outcomes, examined parents' reactions to BMI feedback without including the children's view or examined consequences related to self-weighing.

Quality assessment

We followed the Equator Network's guidelines on enhancing the transparency of health research. The quality of the included studies was assessed by all authors, using checklists. STROBE was used for the observational studies, CONSORT for randomised clinical studies and COREQ for qualitative research [22]. Cases of doubt were discussed and resolved by all authors. No studies were excluded based on the quality assessment.

Data extraction and synthesis of results

The extracted data included study characteristics, data collection, population, outcome measures and results relevant to the research question. The findings were coded and the results were summarised in categories considering the nature of the effect on psychosocial outcomes (Table 1). From this table, we were able to identify themes to make a qualitative analysis of the study results.

TABLE 1 Reported effects of weighing and weight feedback on psychosocial outcomes.

Reference	Nature of positive effects or absence of negative effects on psychosocial outcomes	Nature of negative effects on psychosocial outcomes
Falconer et al., 2014 [23]	Overall, no apparent effects of feedback on weight-related teasing or self-esteem	-
Grimmett et al., 2008 [24]	Body self-esteem increased in "healthy-weight" children: 0.5th-90.0th percentile after BMI feedback No change in eating behaviour or weight-related teasing 96% enjoyed or found it to be OK to be weighed and receive weight feedback Some children saw it as an opportunity to talk about health	Approx. 5% of children reported "not liking" or "hating" the process Some children expressed that they were uncomfortable and saw it as an opportunity for weight teasing
Kaczmarski et al., 2011 [25]	-	47.8% reported that their child was "very uncomfortable" and 19.6% were "somewhat uncomfortable" with discussing BMI feedback with their parents
Kubik et al., 2006 [26]	68% reported that their child was "not at all" and 15% was "only slightly" uncomfortable with discussing weight feedback with their parents	Discomfort in overweight children with weight feedback
Madsen et al., 2021 [8]	Concerns about weight control behaviour declined more among students having their BMI screened at school after 1 year	Weight satisfaction declined more among students who had their BMI screened at school after 2 years The frequency of peer weight talk increased more among students having their BMI screened at school after 1 year
Nnyanzi, 2016 [27]	Curiosity about the weighing process Relief when normal weight was reported	Annoyance, panic and worry among children who were indicated to have weight problems In general, over-sensitisation of children about weight and preoccupation with weight, regardless of their weight category

RESULTS

A total of 1,193 records were identified. After removal of duplicates, 1,122 titles and abstracts were screened. Twenty-two full-text articles were assessed for eligibility and six studies included for review (Figure 1).

FIGURE 1 Flow chart of study selection.

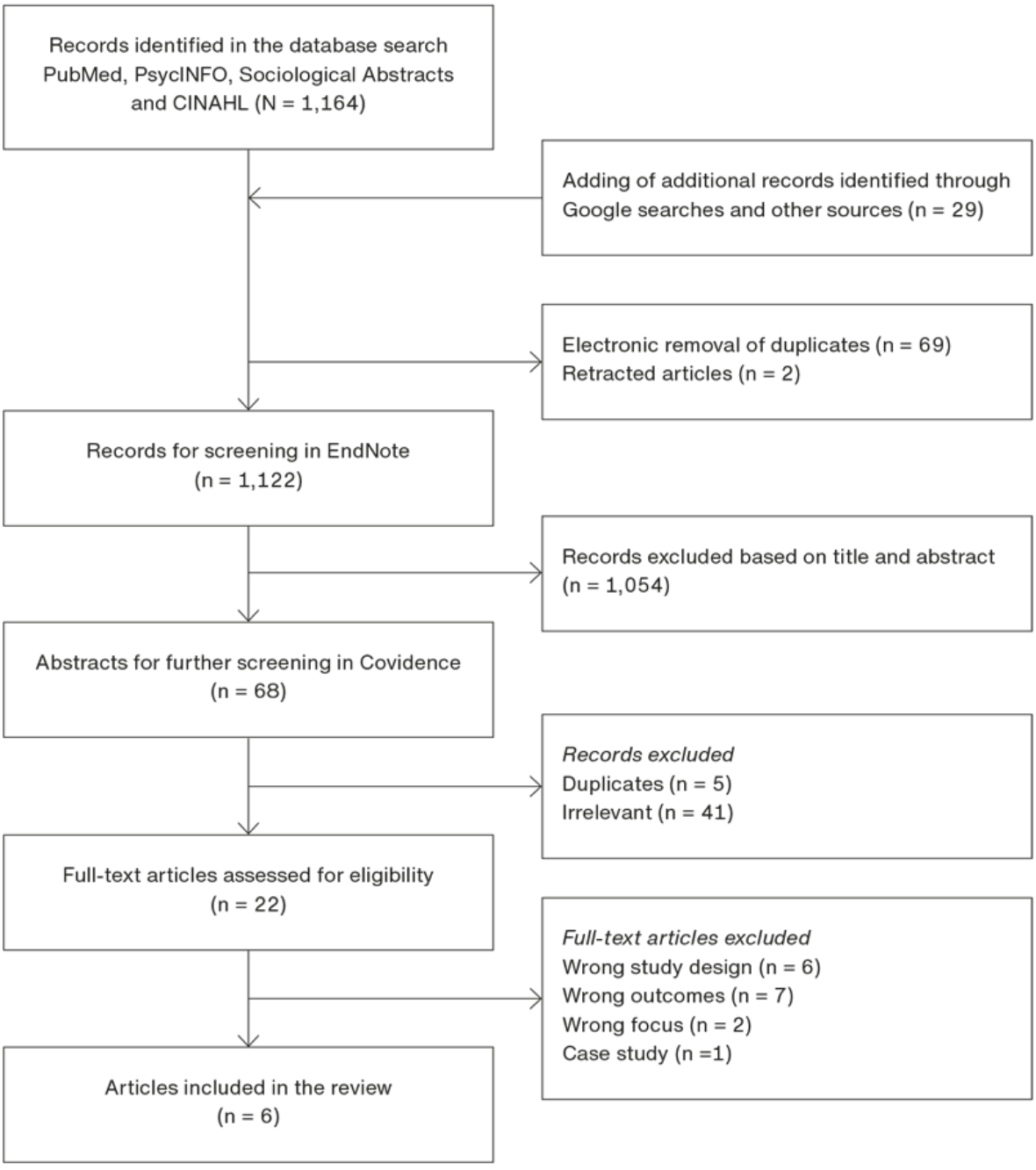

Table 2 presents the characteristics of the studies. Five studies collected data with questionnaires [8, 23-26]. Among these, three studies gathered information about adverse outcomes [8, 23, 24]. They collected data before the weighing and at varying follow-ups after weight feedback. Two of the five studies reported the children's level of comfort with their weight feedback as the only measure relevant to our aim at one month after BMI feedback [25, 26]. Nnyanzi collected data with semi-structured interviews after weight feedback [27]. None of the included studies described psychosocial consequences of routine weight-screening specifically among children with a low BMI.

TABLE 2 Characteristics of included studies.

Reference	Aim of study	Study design	Data collection	Participants (n)	Outcome measures
Falconer et al., 2014, England [23]	To assess the effects of NCMP feedback on parents and children To identify whether these effects vary by the characteristics of the participants or by type of feedback	Prospective cohort study	Questionnaires administered at baseline[a] and 1 month and 6 months after weight feedback	*Parents of children enrolled in the NCMP* (1,844) In reception class: 4-5 years old In year 6: 10-11 years old	Weight-related teasing assessed using a teasing/marginalisation subscale from Sizing Them Up Self-esteem assessed using an emotional functioning subscale from Sizing Them Up
Grimmett et al., 2008, England [24]	To compare parents' and children's reactions to a weighing and measurement programme including weight feedback given to the parents in families with overweight or healthy-weight children	Descriptive study	Questionnaires administered at baseline[b] and at 4 weeks after weight feedback Qualitative data on the children's view of the measurement and feedback process at follow-up	*Children (358)* In year 3: 6-7 years old In year 6: 10-11 years old	Body esteem assessed using a body-esteem scale Eating behaviour assessed using the Dutch Eating Behaviour Questionnaire for Children Weight-related teasing assessed using a perception of teasing scale Subjective reactions to weighing and weight feedback
Kaczmarski et al., 2011, USA [25]	To explore letter delivery methods and psychosocial, environmental and behavioural factors among parents of 6th-grade students who received BMI Health Letters in one Florida county	Descriptive case study Non-experimental post-intervention design	Questionnaires administered 1 month after BMI feedback letter	*Parents of 6th-grade students (76)* 79.3% (60) of parents chose to discuss BMI feedback with their child	Report of the level of comfort of the child when discussing BMI feedback
Kubik et al., 2006, USA [26]	*To describe* The interest of parents of elementary school students in participating in school-based BMI screening and parent notification programmes The opinions and beliefs of parents who participated in a programme Parental report of programme experience by sociodemographic characteristics of parents and children	Descriptive study Post-test-only quasi-experimental research design	Questionnaires administered about 4-6 weeks after BMI feedback letter and about 6 months after BMI measurements	*Parents of children in kindergarten to year 6 (790)* 45% (356) of parents chose to discuss BMI feedback with their child	A closed-ended question about the level of comfort of the child with receiving and discussing BMI feedback
Madsen et al., 2021, USA [8]	To determine the impact of school-based BMI reporting on weight status and adverse outcomes: weight stigmatisation and weight-related perceptions and behaviours among a diverse student population	Randomised clinical trial	Questionnaires administered each autumn from baseline to 1 and 2 years of follow-up Follow-up occurred 6-9 months after BMI assessment and 1-2 months after BMI reports	Children in grades 3-7 at baseline (28,641)	*Questionnaire items adapted from Project EAT and the Family Experiences Related to Food Questionnaire* Peer weight-related teasing Weight satisfaction Concerning weight control behaviours
Nnyanzi, 2016, England [27]	To explore the reactions of children aged 10-11 years towards being weighed and measured and subsequently told their correct weight as part of the NCMP	Qualitative study based on interviews	1-to-1 semi-structured interviews post-NCMP measurement and feedback	Children in year 6: 10-11 years old (21)	Perspective of children on taking part in the NCMP and receiving weight feedback

NCMP = National Child Measurement Programme.
a) Before feedback.
b) Before weighing and feedback.

Psychosocial outcomes

Table 1 displays the recorded effects of weighing and weight feedback on psychosocial outcomes. The reported consequences varied across the studies, e.g., from 96% of the children being comfortable with the process [24] and 68% being *"not at all uncomfortable"* [26], to 70% being uncomfortable with receiving and discussing BMI feedback [25]. Falconer et al. [23] found no 'apparent' positive or negative effects of weighing and providing feedback on weight-related teasing or self-esteem. Three studies reported positive effects on psychosocial outcomes [8, 24, 27] and four studies found negative effects on psychosocial outcomes [8, 24, 26, 27].

Positive effects

Nnyanzi [27] found that some children were curious and positive about taking part in the weighing. However, the study stated that this kind of enthusiasm was typical for children who perceived themselves to be of ideal weight. The weighing process would also be experienced as a welcomed opportunity to talk about health, and as a relief after the weighing when they discovered that other children were not told of their weight:

"It was OK because other children didn't know what your weight was so they couldn't talk about it" [24].

Body self-esteem, relief and joy were found to increase after being weighed in children categorised as of normal weight [24, 27]. Madsen et al. [8] found that, after one year, adverse weight control behaviours had declined more among students who were BMI screened at school than among controls who were not BMI screened. Grimmett et al. [24] observed no change in eating behaviour or weight-related teasing after weight feedback.

Negative effects

Weight satisfaction declined and peer weight talk increased independently of weight status in children taking part in the two-year randomised BMI screening programme described by Madsen et al. [8]. Nnyanzi observed a growing preoccupation with body weight in all weight categories. However, this was more pronounced among children who perceived themselves to have weight problems [27]. Children who were told that they were overweight were often surprised about this and reacted with denial or shock. In Kaczmarski et al.'s study [25], nearly 70% of the children felt discomfort during the weight feedback, and Kubik et al. [26] reported that overweight children felt discomfort when receiving weight feedback. However, these studies did not further explore this discomfort. Grimmett et al. [24] found that only few children disliked the process of weighing, stating that they did not want anyone to know their weight and that they perceived weighing a *"perfect opportunity"* for weight-teasing. Some children expressed that emotional distress was associated with the

process of weighing and being given feedback:

"... I just felt oh, when am I gonna get this letter to see what height and weight I am and I was just quite nerve rackened" [27].

The reactions on weight feedback were often emotional, and some children expressed that they did not know what to do about the information given and had to rely on the adults around them to tackle their weight issues, which caused additional worry.

DISCUSSION

Our systematic synthesis of the literature indicated that routine weighing and weight feedback in school-aged children may have harmful psychosocial consequences for some children. Negative consequences included decreased weight satisfaction, increased weight focus and frequency of peer weight talk, over-sensitisation about weight and emotional distress and discomfort associated with the process. Our results relate to the findings of Ikeda et al. who among other topics addressed body dissatisfaction and lowered self-esteem as potential harms of BMI screening [28]. Our review suggested that harmful psychosocial consequences were frequent in children with a high BMI, whereas normal-weight children seemed to have mainly positive or neutral experiences with weighing and receiving feedback.

The review also points to a scarcity of evidence about the psychosocial consequences of weight-screening children, which is a common practice in many countries.

The most comprehensive and relevant study regarding the research question was conducted by Madsen et al. [8]. This study explored the impact of school-based BMI screening and subsequent BMI reports on anticipated adverse effects. It was a well-powered randomised clinical trial that explored multiple aspects of adverse effects and had three years of follow-up. Multiple aspects of psychosocial outcomes were examined in [8, 23, 24, 27]. Three of these studies [8, 24, 27] had children reporting for themselves, limiting the potential bias of adult interpretation of the children's emotions.

However, the design of two studies did not allow for analyses stratified on BMI categories (as children in the control arm were not weighed), which is a limitation as other included studies primarily found negative psychosocial consequences of routine weighing among children with a high BMI [26, 27]. Two studies [25, 26] did not aim to explore the consequences of weighing and providing weight feedback. However, both studies reported on the comfort of children discussing BMI feedback letters with their parents. Thus, the study design did not allow us to conclude whether the reported impact was related to the BMI assessment, BMI feedback and/or weight discussion. Both studies [25, 26] were at risk of selection bias in terms of which parents chose to take the discussion with their children. Furthermore, parents reported on behalf of their children in the studies by Kaczmarski et al. [25], Kubik et al. [26] and Falconer et al. [23], which carries a risk of proxy response bias.

Falconer et al. [23] conducted a large cohort study exploring two psychosocial outcomes. Unfortunately, the study had a low response rate of only 18.9%, a high attrition rate and underrepresentation of children with a high BMI, all of which limits the generalisability of the study. The resulting selection bias may therefore well explain the null findings reported. In line with this, three studies had strong selection bias with an underrepresentation of overweight children [24] and an overrepresentation of highly educated Caucasian parents [24-26]. In contrast, the study by Nnyanzi [27] had an overrepresentation of children from areas of high deprivation (61.9%). All studies failed to declare conflicts of interest, except for the study by Falconer et al. [23] where one author was a director at Public Health England and thus responsible for the weight-screening programme examined.

This review included all studies we could identify that were relevant to our research question. A comprehensive

literature search was performed in four major databases with assistance from a specialist librarian. It is a strength that our synthesis displays the scope of all the available evidence on the topic. The review was conducted adopting the PRISMA standards [18], and the included studies were systematically assessed for quality.

Among the six included studies, three were conducted in local school districts in England and three in the USA. These conditions make their results applicable to societies that resemble these countries but limit the generalisability to other societies.

The six included studies were heterogeneous regarding aim, design and outcome measures. Some studies were methodically limited by employing a simple assessment method of psychosocial consequences. Considering that our systematic review included all available evidence related to our research question, this clearly displays a gap in the literature; little evidence of good quality exists in the field.

Future research into the psychosocial consequences of weight-screening should explore these consequences among children and adolescents themselves and not by parent proxies. It would be valuable to differentiate between the weighing process itself and provision of weight feedback to parents to establish which intervention is related to which outcome.

In context of the increasingly poor mental health among children and adolescents in many countries, authorities and professionals should pay attention to the side effects of existing practices. Weight-screening of children should apply to Wilson and Junger's principles like all other screening programmes [17]. As there is no documented long-term effect of dieting or weight loss interventions among children, the current screening programme identifying overweight children conflicts with the screening ethics principles. In addition, the present review points to the existence of psychosocial harms related to the screening process.

CONCLUSIONS

This systematic review found that routine weighing of school-age children and subsequent provision of weight feedback may result in harmful psychosocial consequences such as an increased weight focus and frequency of peer weight talk, decreased weight satisfaction and general over-sensitisation about weight. The unfavourable effects primarily seemed to affect children categorised as overweight, whereas children categorised as normal weight seemed to have positive or neutral experiences with weighing and receiving feedback.

A literature gap exists as investigating adverse effects of weight-screening programmes among children and adolescents is scarce, and more studies are warranted. Weight screening does not prevent weight gain but has the potential to harm mental health. Preventive weight-screening programmes in children should follow general ethical principles for screening and should be evaluated regarding their overall impact, including any effects on physical, psychological and social health.

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