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REVIEW

Accuracy of using self-reported data to screen children and adolescents for overweight and obesity status: A diagnostic meta-analysis

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Summary

Objective: To estimate the accuracy of using the self-reported body mass index (BMIsr) for screening children and adolescents for overweight and obesity status by quantitatively synthesizing individual studies in the research literature.

Method: Three databases, namely PubMed, Web of Science, and EBSCOhost were searched up to September 2016. Studies were included that collected both the self-reported data (BMIsr) and direct measurement data (i.e., BMI based on measured height and weight, BMIm) to screen children and adolescents for overweight and obesity status, and provided sufficient data on sensitivity and specificity. Sensitivity, specificity, likelihood ratios, and diagnostic odds ratios from each of the included studies were pooled by using a random-effects meta-analytic model, and summary receiver operating characteristic curve (ROC) was also constructed.

Results: Twenty-three studies were identified. For screening children and adolescents with overweight and obesity, the use of BMIsr presented a pooled sensitivity of 0.76 (95% CI, 0.76—0.77), a pooled specificity of 0.96 (95% CI, 0.96—0.97) and a pooled DOR of 92.4 (95% CI: 74.3—114.8). Moderator analyses showed that the sample regions (America vs. Europe vs. Asia), weight status screening references (IOTF vs. CDC vs. Nation-specific standard) and weight status screened (overweight vs. obesity) had contributed to the inconsistent findings concerning the screening accuracy across the studies.

Conclusions: Based on the results of current meta-analysis, the use of BMIsr has good overall performance with moderate sensitivity and high specificity, and it is a viable alternative when direct measurement of BMI is not available.

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Contents

Introduction

As overweight and obesity are intimately linked with a series of physical and psychological problems [1,2] and children and adolescents with overweight and obesity status have been found to have lower health-related quality of life than their peers with normal weight [3,4]. Globally, overweight and obesity have been a major health issue for children and adolescents.

To evaluate weight status for children and adolescents, the body mass index (BMI) has been recommended as an appropriate indicator for assessing overweight and obesity [5]. Direct measurement of height and weight is the ''gold standard'' to obtain BMI. However, due to the properties of low cost and convenience of self-reporting, BMI is frequently derived from self-reported height and weight (BMIsr), especially for large scale surveys (e.g., the Youth Risk and Behavior Surveillance Study [6] and the National Health Interview Surveys [7]).

Yet, it should be noted that the appropriateness of BMIsr has been debated both in the literature and in epidemiological practice, with some previous studies supporting the validity of BMIsr [8—12] and some other studies advocating that BMIsr should not be used for this purpose, because of its considerable misspecification [13—16]. To date, there have been dozens of studies examining the accuracy of using BMIsr for screening overweight and obese status for children and adolescents. However, inconsistent findings exist in the literature, with the reported sensitivity showing a range of 27.8% for screening obesity status among preadolescent children aged 8—11 years in Belgium [17] to 100% for screening overweight and obesity status among female adolescents from fifth and eighth grades in Japan [18]. For the specificity, compared with sensitivity, the results were more consistent with a range of 82.5% [19] to 100% [20].

In terms of the existing literature, gender, age, and weight status screened were most frequently reported as factors that could have influenced the accuracy of screening for overweight and obesity by using BMIsr. Several studies reported that sensitivity was lower for girls than that for boys, while specificity was higher for girls [21,22]. However, there were also some other studies reporting no significant gender difference [8,12,23—25]. With respect to age, one study reported that sensitivity declined with increasing age, but specificity improved with increasing age [21]. For weight status screened, two studies reported that sensitivity for screening overweight was higher than that for screening obesity, yet specificity for overweight was lower than that for screening obesity [17,26].

To the best of our knowledge, there has been one literature review available on this specific topic to date. Nearly a decade ago, Sherry et al. [27] conducted a literature review, in which the accuracy of using BMIsr to screen for overweight and obese status for children and adolescents was