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Research article

## Obesity and Health Care: Identifying Measures, Indicators and Tools

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### Abstract

The purpose of this study was to identify, with a literature review, a set of indicators, measures, and tools (IM&T) with applicability for obesity management in adults in Primary Health Care (PHC). The data collection was performed at Medline, Lilacs, SUM Search, and Google, with a search using “obesity” and “health indicators” terms. Principal results: Most frequent IM&T within 81 documents included were: body mass index (81.5%), waist circumference (27.2%), arterial pressure (24.7%), lipid profile (21.0%), weight history (17.3%), weight loss (17.3%); glycemia (17.3%). Overall, 181 distinct IM&T were identified in categories: psychological and emotional factors (43.1%); lifestyle and health conditions (19.7%); biochemistry and blood circulation (11.7%); dietary profile (8.5%); socioeconomic, family and cultural issues (8,5); and anthropometry and physical examination (8.5%). Conclusion: The focus of research remains on anthropometry, biochemistry, psychological and emotional dimensions, with a lack of feasibility at PHC. Since the context defines the potential IM&T to monitor health status, obesity care-lines must be developed, including measurable goals and a patient-centered approach, especially in resource-limited settings.

**Keywords:** Obesity; Delivery of health care; Patient care management; Patient care planning; Comprehensive health care; Health status indicator.

### Introduction

Obesity is a multifactorial disease, with an increasing prevalence worldwide in both high-income and low-income countries, characterized as a risk factor for other diseases, also affecting the quality of life of individuals [1,2].

Despite the recognition of obesity as a priority problem by policymakers, advances in intervention policies and actions are still modest, as initiatives focus on behavioral changes and sectoral strategies that underestimate the broader aspects of social inequities, symbolism, culture, and local diversity [3]. It is also noteworthy the complex changes in eating patterns.

Therefore, several factors may explain the ineffectiveness of obesity-related public policies, such as an excessive focus on individual approaches, the lack of socio-environmental policies and programs, the modest effects of interventions to reduce and prevent obesity at the community-level [4], the lack professional training [5,6], and inadequate focus on losing weight instead of health, which can lead to problems of body

dissatisfaction, stigma, eating disorders, and even death [7].

The health care sector assumes a central task on obesity control including the production of scientific knowledge and information, advocacy actions to insert the topic in the public policy managers agenda and development of actions aiming at prevention and comprehensive care [8]. Other responsibilities include delivering care to patients, handing out treatments and technologies considering physical, emotional, and social dimensions. And also, the food environment [9].

The health care network context and the mentioned factors should be observed to propose a useful care line to deal with this complexity. Different countries launched some ordinances to support managers and professionals in the organization of overweight and obesity treatment [8,10,11,13-16]. However, the design, implementation and monitoring of obesity control plans within the care line at the local level include several challenges [17-21].

There are several Indicators, Measures and Tools (IM&T) to evaluate and monitor people with overweight or obesity. The clinical and outpatient diagnosis is based on the Body Mass Index (BMI) where BMI values above 30kg/m<sup>2</sup> already constitute a diagnosis of obesity, being a quite simple and inexpensive method for evaluation at the population level [22,23]. However, other aspects may also be useful, either to identify diseases associated with obesity or to allow comprehensive care according to the specificities of each individual and location [15,24].

A literature review was conducted to identify potential IM&T for management of overweight and obesity in adults on Primary Health Care (PHC).

### Materials and Methods

We carried out a literature review of scientific papers and guidelines of the treatment of obesity and overweight published between 1995 (due to diagnostic criteria) and April 8th, 2016. The following databases were searched: Medline, Lilacs, and SUMSearch using a combination of MeSH terms and text words related to obesity and overweight (body mass index; obesity; body weight; overweight) AND to the care monitoring (delivery of health care, continuity of patient care, needs assessment, patient care management, patient care planning, comprehensive health care, treatment outcome, and health status indicator).

Due to difficulty retrieving protocols and guidelines through traditional search methods and the importance and relevance of them to understand the obesity IM&T adopted worldwide, also, we searched Google, including results available until April 30th, 2017. We evaluated the 50 most relevant results.

Studies and guidelines were included if they addressed treatments, monitoring, covering factors or diseases related to obesity. Studies and guidelines focused or related to children and teenagers, other pathologies, such as depression, weight-related measures secondarily, exclusive surgical interventions for weight loss (such as bariatric surgery) and to nutrigenomics were excluded. In addition to letters, case reports, editorials, and documents not fully available.

The studies were classified according to research design (intervention, observational, protocols or guidelines, review, systematic review, or others). The IM&T were listed and organized into different dimensions: anthropometry, biochemistry and blood circulation, dietary profile, socioeconomic, familial, and cultural aspects, psychological and emotional factors, lifestyle and health conditions, resulting in a provisional set of IM&T.

### Results

A total of 634 documents were found, of which 81 were included: 49 from Medline (60.5 %); 16 from Google (19.8%); 13 from Lilacs (16.0%) and 3 from SUM Search (3.7%). A wide range of study designs was observed: 38 interventional (of which only 11 were randomized controlled trials); 12 observational; 3 reviews; 2 systematic reviews; 6 studies with other designs and, 20 guidelines and protocols of which 85.0% used systematic reviews to gather their evidence. Half of the guidelines and pro-

ocols were published by a government or in cooperation with other institutions, and the other half was published entirely by professional or researchers' associations and societies.

The most frequently IM&T mentioned among the 81 included studies were: body mass index (81.5%); waist circumference (27.2%); blood pressure (24.7%) lipid profile (21.0%); weight loss (17.3%) and glycaemia (17.3%). Table 1 describes the 39 IM&T most cited (found in 3 or more studies) according to study design, except for the category of psychological and emotional factors, in which only IM&T cited by 4 or more studies were included, due to the large quantity of IM&T identified.

Heterogeneity or absence of information regarding measuring techniques of IM&T recommended for the monitoring of obesity treatment was observed among the studies. From the total of 188 IM&T identified, 81 (43.1%) were related to psychological and emotional factors (of which 29.6% were about eating disorders and habits), 37 (19.7%) to lifestyles and health conditions, 22 (11.7%) to biochemistry and blood circulation, 16 (8.5%) to dietary profile; 16 (8.5%) to sociodemographic, familial, cultural and economic factors and 16 (8.5%) to anthropometry and physical examination. See in the supplemental material the IM&T not listed in Table 1.

### Anthropometry and physical exam

Sixteen different IM&T were identified, being the body mass index (BMI) used or recommended by 81.5% of the included studies and waist circumference by 27.2%. BMI and waist circumference appeared in 95.0% and 85.0% of the protocols, respectively. It was also possible to observe that 81.6% of the interventional studies measured the BMI and showed the results in their publications.

Weight loss was a measure constantly used, but presented great measurement variability. Some studies measured weight loss only as the number of kilograms lost [49,50,84,92], while others measured the percentage of weight lost [28,34,38,49-52,88,91] or BMI changes [49,50].

Body composition was cited in some documents [68,73,77], but since they did not mention the type of body compartment evaluated nor the precise methodology of measurement, it was not possible to categorize this suggested measure. One of the protocols also mentioned that the evaluation of body composition is not essential for the treatment of obesity in the clinical routine, although it is useful to measure body fat and fat-free mass before and during treatment [82].

### Biochemistry and blood circulation

A total of 22 IM&T was identified. Blood pressure measurement was the most frequently used or recommended measure, found in 24.7% of the articles or protocols included.

Among the protocols, the most recommended measures were blood pressure (55.0%), blood lipids (60.0%), and glycaemia (50.0%).

We found controversy results regarding the recommendation of blood lipids measurement. While some protocols did not recommend it [67,70,71,73,79,81,102], two studies [51,88] and some protocols [36,65,68,72,78,80] assessed or recommended the measurement of blood lipids, however without further detail about which serum lipid fractions were or should be evaluated.

Additionally, other recommended their use detailing measurement of total cholesterol [62,64,74-76,82,94,95], triglycerides [25,64,65,74-76,82,94,95], HDL-cholesterol [60,68,74-76,82,94,95] and LDL-cholesterol [74-76,82,94,95].

**Dietary profile**

Sixteen IM&T were identified in this dimension, but even the most frequently mentioned IM&T, the history of the previous diet [38,48,64,89], was identified in only 4 documents.

The measurement method for most IM&T in this dimension was poorly detailed by the studies, as well as their results. Among protocols, the recommendation for evaluating food environment does not appear accompanied by the assessment methodology [64,68,74]. Although 21 intervention studies have performed and cited some kind of dietary approach within treatment [26,28,34,35,37-41,43,48-50,52-54,93-95,97,99], IM& T related to the dietary profile were performed or discussed by only 28.6% [28,34,38,41,48,94].

**Psychological and emotional factors**

A total of 81 IM&T related to psychological or emotional symptoms were identified, and only 11.1% were present in more than 4 studies. In addition, the measurement method for some IM&T in this dimension was poorly detailed by some studies, especially regarding the evaluation of depressive symptomatol-

**Table 1.** Indicators, Measures & Tools (IM&T) most cited in the articles or protocols identified, according to dimension and study design.

IM&T identified		Intervention (n= 38)	Observational (n= 12)	Protocol (n= 20)	Systematic review (n=2)	Review (n=3)	Others (n= 6)	Total (n=81)
Anthropometry and physical exam	Body Mass Index	31 (25-55)	8 (56-63)	19 (64-82)	1 <sup>(83)</sup>	3 (84-86)	4 (87-90)	66
	Waist circumference	1 (25)	2 (60,63)	17 (64-79, 81)	0	1 <sup>(84)</sup>	1 (88)	22
	Weight loss	8 (28,91,34,38,49-52)	0	2 (65,79)	2 (83,92)	1 <sup>(84)</sup>	1 <sup>(88)</sup>	14
	Weight history	3 (38,48,51)	2 (57,59)	8 (67,68,72,74,79-82)	1 (83)	0	0	14
	Body fat mass	2 (25,32)	0	4 (71,75,77,81)	0	1 <sup>(85)</sup>	0	7
	Waist hip ratio	2 (39,40)	2 <sup>(58,63)</sup>	5 (36,73,75,77,79)	0	1 (85)	0	8
	Weight expectations	3 (51,93,94)	0	1 (81)	1 <sup>(83)</sup>	0	0	5
Acanthosis Nigricans	0	0	3 (74,80,82)	0	0	0	3	
Biochemistry and blood circulation	Blood pressure	5 (25,32,41,94,95)	2 (60,62)	11 <sup>(64,65,68,69,72,74-76,78,80,82)</sup>	0	1 (86)	1 (88)	20
	Lipid profile	2 (95,94)	2 (60,62)	12 (36,64,65,68,69,72,74-76,78,80,82)	0	0	1 (88)	17
	Glycemia	2 <sup>(25,95)</sup>	1 <sup>(60)</sup>	10 (65,68,69,72,74-76,78,80,82)	0	0	1 (8)	14
	Heart Rate	3 (95,32,94)	0	4 (64,68,76,80)	0	0	1 (87)	8
	Liver function	0	0	7 (72,74,75,78,79,80,82)	0	0	0	7
	Glycemic Hemoglobin	0	0	4 (69,72,78,80)	0	0	1 (88)	5
	Insulin	3 (25,95,42)	0	1 (78)	0	0	0	4
	Cortisol	0	0	3 (74,75,82)	0	0	0	3
	Thyroid function	0	0	3 (74,75,82)	0	0	0	3
Dietary profile	Previous weight loss attempts	2 (38,48)		1 (64)			1 (89)	4
	Estimates of resting metabolism or energy needs	2 (28,41)	0	1 (64)	0	0	0	3
	Food records	2 (51,94)	0	0	0	1 (85)		3
	Food environment	0	0	3 (64,68,74)	0	0	0	3

Psychological and emotional factors	The Structured Clinical Interview for DSM IV Axis I Disorders – SCID I	9 (29-31,35,36,43,44,47,54)	1 (96)	1 (79)	0	0	0	11
	Beck Depression Inventory II	9 (29,36,37,42,47-50,97)	2 (61,98)	0	0	0	0	11
	Eating Disorders Examination (EDE)	7 (29,36,42-44,47,54)	4 (59,61,96,98)	0	0	0	0	11
	Motivation for changes <sup>a</sup>	0	0	10 (68,72,73,74,76,78-82)	0	0	0	10
	Rosenberg Self-Esteem Scale	5 (26,29,36,47,97)	1 (59)	0	0	0	0	6
	Binge Eating Scale - BES	4 (39,46,48,99)	1 (100)	0	0	0	0	5
	The Structured Clinical Interview for DSM IV Axis II Disorders – SCID I	4 (43,45,47,54)	0	0	0	0	0	4
	Symptom Checklist 90-Revised (SCL-90-R)	3 (30,39,99)	1 (100)	0	0	0	0	4
Socioeconomic, family and cultural issues	Family history of obesity	2 (34,51)	0	4 (72,75,78,80)	0	0	0	6
	Educational level	2 (36,47)	1 (57)	0	0	0	0	3
	Gender	2 (36,47)	0	1 (68)	0	0	0	3
	Social support	1 (26)	0	3 (72,78,81)	0	0	0	4
Lifestyle and health conditions	Short Form 36 (SF-36 <sup>b</sup> )	2 (26,99)	2 (56,58)	0	0	0	0	4
	Smoking	2 (51,52)	1 (60)	1 (72)	0	0	0	4
	Alcohol and drug use	1 (37)	1 (60)	1 (68)	0	0	0	3
	Osteoarthritis	0	0	3 (69,70,78)	0	0	0	3
	Obesity-Related Well-being questionnaire – ORWELL 97	3 (39,40,99)	0	0	0	0	0	3

a - Although only two documents cited the method of measurement (73,79), this indicator was maintained in this table because it was found in half of the protocols included.

b - Instrument has a validated version for the Brazilian population (101).

ogy [69,72,73,76,82]; history or general psychological state [72,74- 76,78,82]; eating disorders [70,73,76]; adherence [29,39,59,83,86,94]; binge eating [74,75]; psychological stress [82];loss of weight control [34]; number of episodes of binge eating [42,49]; history of compulsive eating [37]; history of psychiatric treatment [37]; calculated neurotic predisposition [26].

Otherwise, it was observed that 50.0% of the protocols recommended the evaluation of the patient’s motivation for changes, but none indicates the specific instrument for measuring it [68,72- 74,76,78-82]. Overall, 29.6% of the IM&T identified were directly related to eating and eating disorders.

### Socioeconomic, family and cultural issues

Among the 16 IM&T identified in this dimension, the most frequent were: family history of obesity (7.4%), educational level (3.7%), gender (3.7%), and social support (4.9%). The

assessment of the social history was recommended by some protocols [68,74,78,80]. The instrument for the assessment of frequently mentioned IM&T, it was also possible to identify occupation, ethnicity or race, immigration history, and literacy to assess health skills and competencies. The last one without using a specific instrument.

### Lifestyle and health conditions

A total of 37 IM&T was identified in this dimension, and the most frequently cited were quality of life by SF-36 [26,56 ,58,99]; Obesity-Related Well Being Questionnaire [32,39,40], some risk factors such as smoking [51,52,60], and alcohol and drugs use [60,72]. Only within the protocols, it was possible to identify the importance of evaluating specific conditions, such as osteoarthritis [69,70,78]. It was also observed the use of two other specific instruments to evaluate the quality of life for obesity: Weight Efficacy Life-Style Questionnaire - WELSQ [37,97], and Impact of

Weight on Quality of Life questionnaire- IWQOL [103].

### Discussion

The study identified several IM&Ts in all dimensions, but only a few accompanied by detailed assessment and evaluation criteria. It is noteworthy that many IM&T identified may present low applicability in the context of the PHC, especially in low and middle-income countries, due to the limited availability of adequate or expensive equipment for obese people (adipometer, sphygmomanometer, non-elastic tape, scale, dual-energy X-ray absorptiometry), specific and expensive blood tests or, absence of validated questionnaires and scales. In addition to financial, time, and human resource limitations at the primary health care level.

Some earlier studies showed that approaches from specific studies or clinical trials lack practical applicability for primary care [32,36,42,47,87,97], being restricted to hospitals and specialized centers with selected samples. It is a current challenge for incorporating information from clinical research into health practices [104,105], which can generate an ineffective system to control public health problems such as obesity [106,107].

Only a few articles discussed treatment models that considered factors such as large-scale applicability of the fraction of the total of IM&T found, however, were identified in large frequency among the included studies. This finding reflects both the focus on anthropometry as the main category for measurement of success in obesity treatment [111] and the challenge to assess parameters related to psychological and emotional issues and risk factors, despite their importance to obesity care.

Moreover, fewer IM&T related to socioeconomic, family and cultural issues and lifestyle and health conditions were identified compared to the total of IM&T identified in other dimensions. They are essential in the daily life of obese individuals and should be more carefully assessed during treatment to improve overall health and quality of life [116].

For example, difficulties in the IM&T assessment and understanding in such complex scenario could harm the actions of health professionals and obese individuals for the divergence in perceptions regarding causes, responsibility and treatment options for obesity among these groups [113].

Although we understand that individual strategies have limited impact, given the influence of the environment on the development of obesity, the inclusion of these aspects in individual care allows a joint reflection between patient and professional, handling resistance and overcoming strategies for possible changes. Therefore, a better assessment of the corresponding IM&T is needed.

The incentive for collaborative work processes integrating key actors in the development of individual care strategies [115], can lead to a cooperation between the health services, research centers and professionals responsible for obesity care [15] generating consistent improvements in health care delivery, with a potential to produce greater adaptations to the context and to the

low technological complexity available.

### Conclusion

We identified a significant number of indicators, measures, and tools in all the necessary dimensions listed. Most of them presented limited potential applicability by PHC, revealing the lack of compatibility between many IM&T proposed and used in the studies and the primary health care functioning structure.

Identifying an adequate and feasible subset of indicators, measures, and tools in each context, considering the local structure of primary health care could favor the organization of obesity healthcare delivery. Furthermore, it is necessary to include obesity specific training, management structures, and equipment provisioning.

Further research should be conducted in order to present IM&T proposals for use at PHC level, which assist professionals in individual and collective diagnosis and monitoring of people living with obesity. They should be aligned with the idea to shift the focus from interventions based on behavioral aspects, with only anthropometric measures and rapid weight loss as indicators of therapeutic success, and start to address issues such as weight stigma, food environment and social determinants of health and obesity. Besides the great difficulty to establish successful interventions for obesity, even in places with high availability of resources, it is essential to discuss long-term weight loss, weight loss maintenance, and other improvements in health and quality of life. Thus, the corresponding indicators, measures, and tools should reflect effective health care delivery.

Effective obesity care planning includes combining scientific evidence available with the current needs of individuals, population characteristics, the reality of health services, professionals, and resources available, according to regional issues and culture. This process can lead to changes in current perceptions and generate potential impact for obesity control, guaranteeing effective human-centered healthcare, instead of focusing only on the disease.

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### Conflict of Interest

The authors declare no conflict of interest.

### Authorship

E.K. dos SANTOS is responsible for the project as a whole, wrote the manuscript and had primary responsibility for the final content; C. CURIONI and J.J. DAMIÃO contributed to the interpretation of results and critical review of the manuscript. All authors read and approved the final manuscript.who show t

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