

# Barophenotypic Characterization – The key to Person Centric Management of Obesity

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## Abstract

Obesity is now recognized as a chronic disease by many international medical societies. However, its comprehensive assessment is still a challenge in most clinical settings. This paper describes a novel practical approach to assess the barophenotype of a given individual. The word barophenotype is a portmanteau of “baro,” which means weight, and phenotype, which reflects an external expression of a trait. This can be easily assessed using an ABCDE framework, encompassing the Adipose topography, Barophenotypic Behavior, Comorbidity assessment, Dysfunctionality, and Expectations. Furthermore, the utility of this framework in determining an appropriate person-centric therapeutic plan has also been described.

**Keywords:** Adipose topography, barophenotype, obesity medicine, person centered obesity management

## INTRODUCTION

Obesity, well-characterized as a disease entity, is diagnosed using body mass index (BMI). The same index is used as a stratification tool and as a target of intervention.<sup>[1,2]</sup> BMI, however, does not convey the entire complexity of obesity.<sup>[3,4]</sup> The presence or absence of comorbid conditions, which is added as a qualifying scheme, does not do full justice to the syndrome. Models such as Edmonton Obesity Scoring System (EOSS) and Severity of obesity, Expected prognosis, Comorbid conditions, Urgency of control, Risk of complications, Environmental factors, Dysfunction and disability (SECURED) promote a holistic approach to obesity care, whereas the BaroSixer model crafts pragmatic targets, balancing efficacy with safety.<sup>[5,6]</sup> These models, too, may not suffice as a descriptive and decision-making tool for all individuals seeking care for obesity.

This situation is similar to that noted in diabetes, which is an equally heterogeneous condition.<sup>[7]</sup> The concept of glucophenotype and glycemic personality have been found

useful in conveying the diabetes status, as well as informing management strategies in diabetes.<sup>[8]</sup>

## THE BAROPHENOTYPE

We propose a similar concept, the barophenotype, or barophenotypic personality, to diagnose and describe obesity, in a person-centered manner. The word “barophenotype” is a portmanteau of “baro,” which means weight, and phenotype, an accepted term in scientific literature.

Barophenotype can be defined as the sum of all attributes, both biophysical and social, which contribute to the overall impact

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of obesity on health. Barophenotype includes the measurement of obesity (by using ethnicity-specific obesity indicators) and adds to its value by describing other obesity-related attributes.<sup>[1,9]</sup>

## BAROPHENOTYPIC PERSONALITY

The term barophenotypic personality can also be used in place of barophenotype. Both terms have their advantages the latter is crisp and catchy, whereas the former carries a softer, more humane feeling with it.

### The ABCDE of barophenotype

Irrespective of how we term it, barophenotype can be conveyed by an ABCDE rubric. The alliterative construct is learner-friendly and encourages the student's interest [Table 1].

A, or adipose topography, includes the severity and style of adiposity. BMI, waist circumference, and fat composition measure the severity of obesity, whereas the relative distribution of fat over various sites of the body provides an overview of its metabolic impact.<sup>[10]</sup> The swiftness with which obesity develops, reverses, or recurs, offers insights regarding the etiology of the disease, behavior of the patient, and appropriate therapeutic options. Adipose topography gives diagnostic clues to the etiology of various disorders like in Cushing's syndrome there is one particular pattern of fat distribution predominantly over the trunk, upper torso, and face. Similarly, certain endocrine conditions related to insulin resistance, like lipodystrophy syndrome, are fundamentally categorized on the basis of topographic

barophenotype of the person.<sup>[11]</sup> Thus, this term "adipose topography"

Helps in the selection of the molecule for the treatment of the particular disorder (e. g., pioglitazone).

B, viz., barometabolic behavior, is a psychosocial assessment of the individual, encompassing her or his dietary patterns, meal composition, the quantity of food intake and nutrient adequacy; frequency, duration, intensity, and type of physical activity or exercise; and stress levels, sleep hygiene, and substance use/abuse.<sup>[5]</sup>

C, in the ABCDE rubric, implies the status of comorbid conditions and complications. This includes metabolic and endocrine disease such as diabetes, polycystic ovarian syndrome (PCOS), dyslipidemia, and gout, nonalcoholic fatty liver diseases, medical illnesses such as heart failure, obstructive sleep apnea, and cholelithiasis, as well as mechanical or musculoskeletal challenges like osteoarthritis and specific endocrinal alterations other than diabetes attributed to the obesity like late-onset hypogonadism (LOH) and changes in thyroid dysfunction.<sup>[6]</sup>

D, or dysfunctionality, represents the main challenges posed by obesity to quality of life. The emotional, social, or biophysical (such as limitation of exercise capacity, or in locomotion) challenges faced by the patient allow the obesity care provider to craft a meaningful plan of management for him or her.<sup>[12]</sup>

The last letter of our acronym on barophenotype, E, is the strongest reason to term it as barophenotypic personality. The enthusiasm and expectations of the patient play an important role in determining ideation and initiation of therapy, adherence to suggested management protocols, and final outcomes. His or her expectations from a weight loss program, willingness to change behavior, and availability of social/financial support, all contribute to the overall barophenotype.<sup>[5]</sup>

### Application of the ABCDE framework in clinical practice

The barophenotype is a framework that helps assess and define the impact of obesity on a particular individual. A barophenotypic approach allows the choice of appropriate treatment and monitoring strategies for person-centered obesity care [Table 2]. It also facilitates conversation regarding realistic goal-setting based upon the understanding of the rights and responsibilities of both patient and provider.

The barophenotype utility extends beyond individual clinical care. Analysis of the concept at a macro level can inform health care policy, in terms of provision of health care facilities, including behavioral, nutritional, medical, and surgical support.

## CLINICAL IMPLICATIONS

This framework of the barophenotype will guide the clinician to intercept the patho- physiology at its root. Employing this stratification, a holistic strategy to treatment of a chronic disease like obesity can be chalked out as it addresses the obese

**Table 1: Barophenotype ABCDE**

Adipose topography
Severity of obesity
Style/pattern of weight distribution
The swiftness of weight change
Syndromic features
Barometabolic behavior
Diet
Exercise/physical activity
Addictions
Stress and sleep
Comorbid status
Metabolic
Medical
Mechanical
Mood
Dysfunctionality
Emotional
Social
Biomedical
Biophysical
Enthusiasm and Expectations
Weight loss expectation
Willingness to change behavior
Financial implications
Social support

**Table 2: Barophenotypic choice of therapy pragmatic pointers**

DOMAIN	DIAGNOSIS	NON PHARMACOLOGICAL	PHARMACOLOGICAL	OTHERS
Adipose topography severity style swiftness syndromic	Consider secondary causes for childhood-onset, sudden onset, atypically distributed obesity. (Lipodystrophy, Lipoedema, etc) Look for stigmata of syndromic obesity	Consider behavior assessment and therapy for cyclic weight change	Use severity of obesity as a tool for risk stratification and initiation of therapy. Specific inherited conditions may respond to drugs like setmelanotide.	Consider bariatric surgery for severe obesity, liposuction, or cosmetic surgery for atypical distribution
Barometabolic behavior diet exercise addictions stress and sleep	Use barophenotype behavior to help diagnose etiology of exogenous obesity; psychogenic obesity	Plan intensive behavioral therapy based on current behavior 0	Use calorie restriction mimetics and exercise mimetics as required	Postpone bariatric surgery until barometabolic behavior is optimized
Comorbid status metabolic medical mechanical mood	Assess target organ damage, comorbid features, and impact of obesity	Ensure that diet/exercise prescriptions are appropriate for the 4M needs and limitations	Ensure metabolic and medical optimization while prescribing weight-lowering therapy. Keep contraindication of drugs in mind	Offer medical orthopedic and psychiatric treatment as needed
Dysfunctionality emotional social quality of life financial	Explore the limiting factor(s) to the achievement of optimal health	Suggest changes in lifestyle and rehabilitative measures can maximize functionality	Keep this in mind while crafting treatment strategies	Offer medical orthopedic and psychiatric treatment as needed
Enthusiasm and Expectations the expectation of weight loss willingness to change financial strength availability of support	Assess sincerity and capability in starting treatment, and adhering to it	Suggest diet and exercise options that are available, affordable, and acceptable	Suggest medical treatment which is easy to adhere to	Ensure adequate counseling; be pragmatic

person as a whole, including the flexibility and compliance to treatment. In addition, the comorbidities associated with obesity, which are the primary cause of morbidity and mortality are given due importance in this model thereby steering us away from a myopic approach towards the myriad complications.

## CONCLUSION

The obesity pandemic is all-pervasive, affecting people regardless of gender, prosperity, or geography.<sup>[13,14]</sup> As we face the pandemic of obesity, a holistic approach may be better than a piecemeal approach in dealing with this complex disease. It is important to describe a problem comprehensively, whereas a general approach focuses on obesity as a simple imbalance between energy intake and energy expenditure. This is a flawed concept, as this focuses on “how” obesity occurred. Obesity has a complex origin, from biology, behavior, society, and environment. Hence, we strongly encourage the use of the barophenotype-based characterization, which would instead focus on “why” obesity occurred and offer a multipronged solution for characterizing the disease as well as the person. The wide use of the barophenotype-based characterization would, we feel, fuel holistic thinking, learning, and management of

obesity, and eventually help us better manage the millions of people affected by obesity and its complications.

As we face the pandemic of obesity, a piecemeal approach in dealing with this complex disease may not yield rich dividends. Hence, we strongly encourage this multipronged approach in characterizing the disease as well as the person, in order to achieve treatment success.

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## Conflicts of interest

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