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Obesity Risk Assessment Concept

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Abstract

The obesity risk assessment concept is developed after considering the increased risk of obesity and the concomitant conditions arising due to obesity. The treatment of obesity is very crucial and proper awareness and diagnosis play the important role in treating obesity. WHO declared BMI as a measure of obesity; however BMI and waist circumference as screening tools to estimate obesity and related potential risk have their shortcomings. These parameters lack sensitivity and specificity when applied to individuals to complete risk assessment related to obesity. Edmonton Obesity Staging System (EOSS) is a clinical staging system that effectively captures the severity of obesity and its factors complicating the management. However, EOSS and other such clinical staging systems are not patient-oriented and are difficult to understand for a layperson. The available staging systems do not classify obesity on the basis of the presence and severity of risk factors, comorbidities, and functional limitations. Hence, we developed an obesity risk assessment scale, which is based on EOSS; but, is patient-oriented and allows patients to understand their level of obesity, the risks associated with it and provides the clinical expertise which will guide them to appropriate obesity management. As it is a novel concept, the concept validation is performed along with a Delphi round where the questionnaire and weightage for each respective question is finalized. The strengths of this obesity risk assessment scale include the simple nature of questions, scoring system, patient-facing tool, and treatment guidance. Future studies are required to carry out the clinical efficacy, reliability, and validity of this method.

Keywords: Edmonton Obesity Staging System; Obesity Risk Assessment

Abbreviations: BMI: Body Mass Index; EOSS: Edmonton Obesity Staging System; WHO: World Health Organization; KOLs: Key Opinion Leaders.

Introduction

The term overweight is defined as a weight that is higher than what is considered as a healthy weight for a specific height. It is calculated as per the body mass index (BMI). Obesity is the accumulation of excess body fat to the extent that it presents a risk to health [1]. It is a complex condition with the multi-factorial origin. The genetic and neuroendocrine factors along with excessive caloric intake, sedentary lifestyle, and other environmental factors contribute to obesity [2]. In 2016, about 39% and 13% of worldwide adult population were overweight (Body Mass Index (BMI) 25.0–29.9 kg/m2) and obese (BMI > 29.9 kg/m2) respectively [3]. The fast-paced rise in the prevalence of overweight and obesity and increasing disease burden has left the world worrying especially in developing countries like India. It has been predicted that the prevalence of obesity will triple yet again by 2040 among Indian adults of 20–69 years of age [4]. Obesity is often correlated with demographic and epidemiological alterations, which in turn affect the mortality and fertility rates. Increasing obesity has led to an increase in lifestyle-related diseases such as type 2 diabetes, hypertension and dyslipidaemia, together known as the metabolic syndrome. Along with obesity, these diseases lead to a significant increase in cardiovascular risk [5]. Abdulla, et al. in their meta-analysis found that the risk of developing diabetes in individuals with obesity increases by 7.19 times in comparison to normal-weight individuals. Along with diabetes, its long-term micro and macro-vascular complications affecting the kidneys, heart, and nerves have also shown a rising trend. Thus, addressing this mounting concern of obesity and taking measures to prevent and treat it in a timely manner is of utmost importance to avoid related complications [4,6].

Proper awareness and diagnosis are the pivotal first step for the treatment of obesity. However, the lack of both and the unavailability of proper tools to measure obesity and associated risks are leading obstacles [7]. World Health Organization (WHO) has recommended BMI as a measure for obesity in 1997. This classification for underweight, healthy weight, overweight, and obese on the basis of BMI is accepted universally [6,8]. However, BMI alone cannot be a measure of functional assessment of an individual, quality of life or clinical risks that could be prognostically diagnosed. BMI categories simply group individuals with obesity with or without comorbidities in the same class. Though BMI and waist circumference are surrogate measures of body and visceral fat respectively and also, screening tools to estimate weight status to map potential risk; they fall short as risk assessment tools for disease risks. There is a dearth of sensitivity and specificity when these parameters are applied to individuals for complete risk assessment related to obesity [6].

In recent years, various clinical staging systems have been developed to prioritize the treatment of patients with severe health issues related to obesity and also to treat them more aggressively. These systems enable patients with obesity to be classified on the basis of the presence and severity of risk factors, comorbidities, and functional limitations. Edmonton Obesity Staging System (EOSS) is one such clinical staging system that captures the severity of obesity and its factors complicating the management. However, none of these available clinical staging systems including EOSS are patient-oriented; they are mainly undertaken by clinicians or obesity practitioners. These tools are difficult to understand for an average layperson. Hence, if a patient has to determine the severity of obesity and risks associated with it, he/she needs to visit a weight loss specialist or a clinic for objective evaluation. This process may hinder or delay the necessary evaluation and treatment of obesity. Currently, there is a lack of a precise, practical, economical, and reliable tool for the evaluation of obesity that can be used directly by patients. There exists a need to develop a patient-facing tool that can be easy to comprehend and without the need for expert advice for assessing the stages of obesity the risks associated with it.

Concept Design, Results and Discussion

After going through a lot of clinical and research expertise, e-mail communications, and meetings we prepared this questionnaire i.e. obesity risk assessment scale which incorporates important parameters like age, BMI, physical limitations, presence of comorbidities, quality of life, mental health, mechanical, and genetic factors. This scorecard questionnaire is primarily a patient-facing tool. The questionnaire is developed and simplified after considering all the related patient factors which are easy to acquire. Several other studies based on EOSS could not succeed due to failure to produce all the information pertaining to all parameters. Each question was prepared after a thorough literature search. Firstly, the basic parameter such as the gender of the patient plays a significant role. The female gender has a higher tendency to develop obesity than male patients [9]. Secondly, BMI as mentioned above is an important factor in measuring obesity. Thirdly, the patients start perceiving obesity as a disease usually after they have functional and physical symptoms. Thus, question related to functionality was introduced [10]. Obesity also has a psychological impact on individuals in form of clinical depression (maybe due to medications), sleeping disorders, and low self-esteem. A cross-sectional study demonstrated the presence of anxiety and depression in obese patients using Patient Help Questionnaire-9 (PHQ-9) and General Anxiety Disorder-7 (GAD-7) depression screening tools [11]. Existing co-morbidities and family history are also crucial

factors, which will be helping to categorize the obesity stage with reference to EOSS (Table 1).

Sr. No	Category	Questions
1	Gender	Male / Female / Prefer to describe as Gender-fluid
2	Age (in years)	• < 18 years
		• 19 – 25 years
		• 25 – 35 years
		• 36 – 50 years
		• 50 – 65 years
		• > 65 years
3	What is your current height	____ (in cm / feet/ inches)
4	What is your current weight in kg?	____ Kg
	BMI Calculation	(Current Weight in Kg) / (Current height in cm)2
	BMI and weight category (according to WHO Asian guidelines)	
CTA : Answer more questions to know if you are at risk of Obesity		
5	Exercise tolerance	Do you feel tired or short of breath walking even short distances or climbing a staircase? (Not at all/Rarely/Occasionally/Frequently /Almost Every day)
6	Quality of life	Is your sleep interrupted during the night because of Excess weight issues? (Not at all/Rarely/Occasionally/Frequently /Almost Every day)
7		Has anyone complained that you snore loudly and frequently? (Not at all/Rarely/Occasionally/Frequently /Almost Every day)
8	Depression	Do you feel uncomfortable or depressed around friends & family due to your excess weight? (Not at all/Rarely/Occasionally/Frequently /Almost Every day)
9	Comorbidities	Have you been clinically diagnosed with any excess weight related health issues recently?
		Type 2 Diabetes (Yes / No)
		Hypertension (Yes / No)
		Joints pains / Osteoarthritis (Yes / No)
		Infertility (Yes / No)
10	Family History	Do you have a family history of Obesity or Diabetes? (Yes / No)

Table 1: Obesity risk assessment scale questionnaire.

The obesity risk assessment scale is based on EOSS clinical staging system where all the questions are crafted in such a way that all parameters in EOSS are covered. EOSS measures the obesity depending on 4Ms i.e. metabolic (type 2 diabetes, increased glycaemia, hyperinsulinemia, insulin resistance, hypertension, dyslipidaemia, steatohepatitis, gout, and metabolic syndrome), mechanical (osteoarthritis, oesophageal reflux, obstructive sleep apnoea, urinary incontinence, and thrombosis), mental health (anxiety–depression syndrome, panic attack, emotional eating, binge

eating disorder, psychosis, and work-related stress) and monetary (education, employment, low income, life/health insurance, disability, bariatric supply, dietary products, and surgery) and assess patient's risk of mortality (table 2). It replicates obesity-related morbidity and is a better predictor of long-term mortality than BMI alone [12-14]. Padwal, et al. and De Cos, et al. in their studies stated that the EOSS effectively recapitulates the presence and severity of comorbidities, aiding the decision-making, and prioritizing the patients [15]. EOSS classifies adults with obesity into five stages i.e. stage 0 to stage 4. The prognostic nature of the EOSS was validated and found that EOSS could predict the mortality risk of patients. For example, for individuals under EOSS stages 0 and 1, the risk for all-cause mortality was not increased compared with normal-weight individuals, while patients in stages 2 and 3 had a bigger relative risk for all-cause mortality. These findings are indicative that mortality is not only dependent upon weight status but also obesity-related comorbidities [16].

The limitations of EOSS are discordance in mental health and social milieu or monetary risk factors. These factors are subjective and flexible, thus, clinical judgment can also be varied. As time progresses, the metabolic thresholds may also change with different classification systems. Also, EOSS contemplates several mental, physical, and functional health impacts, it is uncertain to understand patients' reaction at different EOSS stages to treatment. Although it may be a useful prognostic indicator, it is necessary to evaluate reliability and validity in clinical practice [12].

The obesity risk assessment scale allows patients to understand their level of obesity, identify the risks associated with it, and also, suggests the stratified action which incorporates basic clinical expertise which will guide them to appropriate obesity management pathway. For example, a 32-year-old male with a BMI 36 kg/m^2 suffering from hypertension and obstructive sleep apnea would need to manage the obesity with treatment while a 24-year-old with 32 kg/m^2 with no comorbidity would need to prevent weight gain. A 45-year-old female with BMI 54 kg/m^2 suffering from arthritis and hypopnea would need to undergo aggressive obesity treatment [6].

Stage	Description	Clinical characteristics
0	No obesity related risk factors (Physical, psychopathological, and functional)	No clinical features
1	Mild physical, psychopathological, and metabolic symptoms)	Diabetes: fasting blood sugar>100 mg/dl Hypertension: SBP >130 mmHg; DBP> 85mmHg Dyslipidaemia: LDL-cholesterol>130 mg/dl; total cholesterol>200 mg/dl; HDL-cholesterol <60 mg/dl; TAG> 150 mg/dl Kidney disease: GFR< 90 ml/min; some physical activity limitations
2	Metabolic symptoms needing medical treatment and/or moderate psychological symptoms and/or moderate functional limitations;	Diabetes: fasting blood sugar>126 mg/dl; currently taking anti-glycaemic medication, including insulin Hypertension: currently taking antihypertensive medication; SBP>140 mmHg; DBP>90mmHg Dyslipidaemia: LDL-cholesterol>160 mg/dl; Total cholesterol > 240 mg/dl; HDL-cholesterol<40 mg/dl; TAG >200 mg/dl Kidney disease: GFR< 60 ml/min Non-alcoholic fatty liver Some daily activity limitations
3	Functional symptoms and organ damage affecting the living standard	Diagnosis of myocardial infarction, heart failure, angina pectoris or cerebrovascular stroke Chronic kidney disease: GFR< 30 ml/min
4	Severe disabilities from obesity, severe disabling psychopathology, and severe functional limitations.	No data on these factors available to evaluate this stage

Table 2: Edmonton Obesity Staging System classification.

As obesity risk assessment scale is a new concept, performing concept validation is crucial. The concept

validation of the obesity risk assessment scale was carried out after referring this questionnaire to 5 different key opinion leaders (KOLs). It has been performed with qualitative group discussions and individual interviews. They were keen on adopting this questionnaire as it was user friendly and efficient tool for patients. They found this as a reasonable amalgamation between the questionnaire and the EOSS clinical staging system. To finalize the questions and discuss the weightage given to every question, a Delphi round was conducted. Five out of 8 KOLs were part of this virtual panel discussion. Each KOL identified the most important parameters to assess obesity and were asked to give weightage percentage to the questions out of 100 which they had identified as most important parameters to assess risk of obesity. After considering the weightage/ score to each question, the median of scores was taken for every question. The median achieved 100% consensus from all the experts and hence, the output for weightage for each respective category was decided. After their consensus on questions and scores to be appointed to every question, the obesity risk assessment scale was finalized. The simple question formations, scoring system, their correlation with EOSS, understanding their risk of obesity then and there, and providing guidance to seek steps for appropriate management had intrigued the respected KOLs and they had validated this obesity risk assessment scale conceptually. Future studies are required to carry out the clinical efficacy, reliability, and validity of this method.

Conclusion

Awakening to the increasing prevalence of obesity, it is necessary to spread awareness and develop a patient-friendly tool to carry out the risk assessment accompanied by obesity. BMI cannot be the sole predictor in classifying obesity and choosing the appropriate treatment. The obesity risk assessment scale is a proposed patient-friendly tool that makes patients understand about the severity of their obesity and also provides risk assessment related to obesity. Though concept validation of this scorecard is successful; the clinical efficacy, reliability, and validity should be measured in future clinical studies.

Conflicts of Interest

The authors claim there are no conflicts of interests

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