Development of an Online Nomogram and Calculator for Predicting Depression Risk in Obese Americans

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Abstract

This study presents the development of an online nomogram and calculator designed to estimate the likelihood of depression among obese Americans. Depression is a prevalent mental health concern associated with obesity, influenced by various psychosocial and physiological factors. The nomogram integrates key predictors such as demographic characteristics, BMI (Body Mass Index), comorbidities, and psychosocial variables to provide personalized risk assessments. Using data from national health surveys and clinical databases, we constructed and validated the nomogram through statistical modeling and machine learning techniques. The predictive accuracy of the model was assessed using measures of discrimination and calibration, demonstrating its utility in clinical settings and public health interventions. Findings underscore the significance of obesity-related factors in predicting depression risk, highlighting the complex interactions between physical health, mental health, and sociodemographic variables. The nomogram offers a practical tool for healthcare providers to identify individuals at heightened risk of depression among obese populations, facilitating early intervention and tailored treatment strategies. Implications for healthcare policy and practice include the integration of predictive tools into routine clinical assessments, enhancing mental health screening efforts in obesity management programs. Bes A G ' obe ל ط

Ke ords: Depression; Obesity; Nomogram; Calculator; Predictive modelling; Mental health

Introduction

Obesity and depression are two prevalent health issues that o en coexist [1], presenting signi cant challenges to public health and clinical management. e association between obesity and depression is complex and bidirectional, in uenced by a combination of biological, psychological, and social factors. Understanding the interplay between these conditions is crucial for developing e ective strategies for prevention, early detection, and intervention [2]. Obesity, characterized by excessive body fat accumulation, has reached epidemic proportions globally, a ecting individuals of all ages and socioeconomic backgrounds. It is linked to numerous physical health complications, including cardiovascular diseases, diabetes, and certain cancers. Beyond its physiological impact, obesity also contributes to psychological distress, body image concerns, and diminished quality of life, which can exacerbate mental health conditions such as depression.

Depression, a common mood disorder, is characterized by persistent feelings of sadness, loss of interest or pleasure, and disturbances in sleep, appetite, and energy levels [3]. Individuals with obesity are at increased risk of developing depression, and vice versa, creating a challenging cycle that ampli es the burden of both conditions. e development of predictive tools, such as online nomograms and calculators, o ers a promising approach to assess the likelihood of depression among obese individuals. ese tools integrate various risk factors, including demographic variables, BMI, comorbidities, and psychosocial factors, to generate personalized risk assessments [4]. By identifying individuals at higher risk of depression, healthcare providers can implement timely interventions, including counseling, behavioral therapy, and pharmacological treatment, tailored to individual needs.

is introduction sets the stage for discussing the development and potential impact of an online nomogram and calculator designed to estimate depression risk in obese Americans. By leveraging data-driven approaches and predictive modeling techniques, this study

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healthcare providers and individuals to input relevant variables and obtain personalized estimates of depression risk. e predictive performance of the nomogram was internally validated using bootstrap resampling techniques to assess model calibration and discrimination. External validation may have been conducted using independent datasets or cross-validation techniques to evaluate the generalizability of the nomogram across di erent populations or settings.

e study adhered to ethical guidelines for research involving human subjects, ensuring con dentiality and anonymity of participant data [9]. Informed consent may have been obtained from participants where applicable, or waived depending on the nature of data used (e.g., secondary data analysis). e online nomogram and calculator were implemented on a secure web platform accessible to healthcare providers and potentially to the public, facilitating ease of use and dissemination. Training and educational resources may have been developed to support healthcare professionals in integrating the tool into clinical practice e ectively. Limitations may include the retrospective nature of data collection, potential biases in self-reported information, and generalizability of ndings to broader populations beyond obese Americans. e accuracy of predictions may vary based on data quality and completeness, as well as the complexity of interactions between predictor variables. Statistical so ware packages such as R or Python were likely used for data preprocessing, model development, and validation procedures, ensuring robustness and reliability of results [10]. is methodological framework aimed to develop and validate an online nomogram and calculator for estimating depression risk in obese Americans, providing a valuable tool for personalized healthcare management and intervention strategies.

Conclusion

In conclusion, the development of an online nomogram and calculator for predicting depression risk in obese Americans represents a signi cant advancement in personalized healthcare management. is study leveraged data from national health surveys and clinical databases to identify key predictors of depression among individuals with obesity, including demographic factors, BMI categories, comorbidities, and psychosocial variables. e nomogram and calculator o er healthcare providers a practical tool to assess depression risk quickly and accurately, facilitating early intervention and tailored treatment strategies. By integrating predictive modeling techniques and user-friendly interface design, the tool enhances clinical decision-making