DETECTING BINGE EATING DISORDER AMONG PATIENTS WITH OBESITY AT HIGH RISK FOR DIABETES: AN EXPERIMENTAL MACHINE LEARNING APPROACH

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INTRODUCTION

The likelihood of patients with binge eating disorder (BED) becoming obese increases by 6-7 times compared to the general population[1]. Additionally, BED can lead to difficulties in regulating glucose levels accounting for roughly 30% of all cases of type 2 diabetes[2]. Timely identification and comprehensive treatment of BED can modify the disorder's course and reduce the likelihood of associated health issues.

AIM

This study aimed to test a predictive model for BED, using machine learning (ML) techniques.[3]

Both static and dynamic glucose metabolism indices were used.

RESULTS

Variables related to anthropometric and metabolic features were selected as predictors (Fig.1) .

Figure 2.4 illustrates the relative importance of the 15 variables most frequently selected during the 150 training/validation repetitions.

The final model achieved a sensitivity of 1 and specificity of 0.75 for correctly classifying patients with BED (Fig. 2.5.).

Metabolic features	BMI, Age, Sex, GT, GUTT, IGI, $G_{0,120}$, $Matsuda_{,0}$, $Homa_{IR}$, HeyIns, Hblac
Metabolic features extracted from glucose curve	AUCghTRAPEZ, Max_{Gluc1}, $Skewness_{Gluc}$, $nAcquis_{Gluc}$, $AUC30_{Ins/Gluc}$, $SumvolISI_{0-120}$, HypoComple
Class	BED
# Tot. Patients	144

Fig. 1. Summary of metabolic variables included in the study, the BED class (1 for BED and 0 for Obesity), and the total number of patients included in the study.

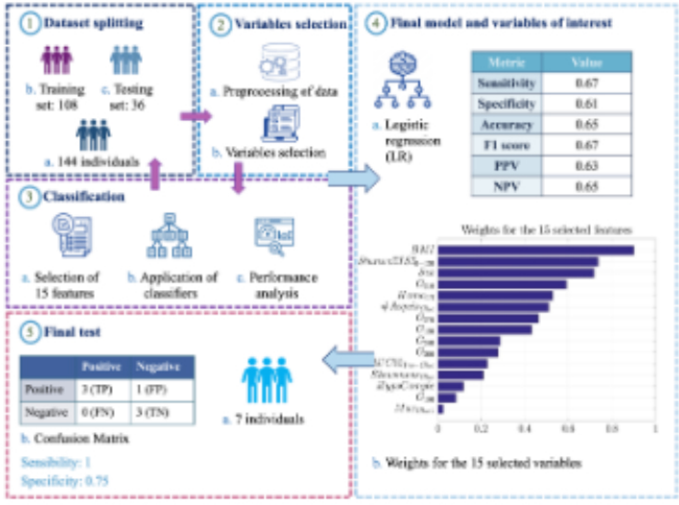

Fig. 2. Workflow of methods and results. (A) Dataset splitting in training e testing set. (B) Selection of the variables of interest from the initial one listed in table 1. (C) Steps of the classification. (D) Final model, metrics of the logistic regression and weights for the 15 selected variables. (E) Final test.

METHOD

For this study, 144 patients with obesity and no diabetes based on a 5-hour long oral glucose test were enrolled and assessed for BED using clinical and psychometric methods. The study incorporated multiple anthropometric and glucose metabolism variables into a ML model (Fig. 1). The ML algorithms employed a k-fold approach (150 repetitions, with 75% for training and 25% for validation) to identify the variables of interest. The final model was trained on the entire dataset of 144 patients (as shown in Fig. 2 A-C), and subsequently, seven more patients with obesity were enrolled for testing purposes.

CONCLUSIONS

This study represents the first instance of ML in the identification of metabolic variables able to detect BED among patients accessing weight reduction programs at high risk of metabolic complications. These findings have implications for the potential use of artificial intelligence models in non-psychiatric contexts to identify and refer patients with BED among those with obesity for multidisciplinary treatment.

REFERENCES

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