

## Data analysis

### 1) List of related variables

The outcome variables are physiological variables, including HbA<sub>1c</sub>, FBG, 2PBG, TC, TG, LDL-C, HDL-C, blood pressure, BMI, WHR, visceral fat; psychological variables, depression, and anxiety symptoms; cognitive behavior-changing variables, including cognition changes, health-related behaviors changes, awareness of disease knowledge; quality of life and sleep quality.

The grouping and time variables: intervention group; control group; pre-post-follow up.

The confounding variables for the data analysis are age, sex, education, marital status, smoke, alcohol, and exercise.

The specific variable types are as follows:

**TABLE 1** | List of demographic variables.

Demographic variables	Type of variable	
age	continuous variable	confounding
sex	categorical variable	confounding
education	categorical variable	confounding
marital status	categorical variable	confounding
smoke	categorical variable	confounding
alcohol	categorical variable	confounding
exercise	categorical variable	confounding

**TABLE 2** | List of outcome variables.

Outcome variable	Measure	Type of variable	Analysis method
glycosylated hemoglobin	measured value	continuous variable	Mix linear model
fasting blood glucose	measured value	continuous variable	Mix linear model
2hour postprandial blood glucose	measured value	continuous variable	Mix linear model
total cholesterol	measured value	continuous variable	Mix linear model
triglyceride	measured value	continuous variable	Mix linear model
low density lipoprotein cholesterol	measured value	continuous variable	Mix linear model
high density lipoprotein cholesterol	measured value	continuous variable	Mix linear model
blood pressure	measured value	continuous variable	Mix linear model
body mass index	measured value	continuous variable	Mix linear model

waist-to-hip ratio	measured value	continuous variable	Mix linear model
visceral fat	measured value	continuous variable	Mix linear model
depression symptoms	scale score	continuous variable	Mix linear model
anxiety symptoms	scale score	continuous variable	Mix linear model
health-related behaviors			
changes	scale score	continuous variable	Mix linear model
cognition changes	scale score	continuous variable	Mix linear model
awareness of disease			
knowledge	scale score	continuous variable	Mix linear model
quality of life	scale score	continuous variable	Mix linear model
sleep quality	scale score	continuous variable	Mix linear model

## 2) Data analysis process

Stata 15 software will be used for analysis, in which the P-value is bilateral probability and the test level 0.05. The Shapiro-Wilk test will be used to check data normality.

For continuous variables, descriptive analyses will be presented as mean and standard deviation. Independent two-sample t-tests will be used to assess the between-group differences in constant demographic characteristics and clinical variables at baseline. For the categorical variables, the descriptive analysis will be presented as percentages. A chi-square test will be used to assess the between-group differences in categorical variables at baseline.

The independent variable is the groups (CBT-based intervention vs. usual intervention). In contrast, the dependent variables were physiological variables, including HbA<sub>1c</sub>, FBG, 2PBG, TC, TG, LDL-C, HDL-C, blood pressure, BMI, WHR, visceral fat; psychological variables, depression and anxiety symptoms; cognitive behavior-changing indicators, including cognition changes, health-related behaviors changes, awareness of disease knowledge; quality of life and sleep quality. The intention to treat method will be used to assess the effectiveness of the intervention program, with patients retaining in their original group, regardless of program completion. The multiple-imputation will be used to estimate missing values.