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Objectives

The fatty liver index (FLI), which is calculated by the equation composed with waist circumference, body mass index (BMI), triglyceride, and gamma glutamyl transpeptidase (GGT), is frequently used for hepatic steatosis evaluation. This study evaluated the accuracy and optimal cut-point value of FLI to predict hepatic steatosis in patients with nonalcoholic fatty liver disease (NAFLD).

Methods

From August 2013 to August 2016, a community-based study was performed in the north-eastern region of Taiwan. All subjects participated in a demographic survey, blood testing and abdominal ultrasonography (US). The formula for FLI is given below:

$$FLI = \left[\frac{e^{0.953 \times \log_e(TG) + 0.139 \times BMI + 0.718 \times \log_e(GGT) + 0.053 \times \text{waist circumference} - 15.745}}{1 + e^{0.953 \times \log_e(TG) + 0.139 \times BMI + 0.718 \times \log_e(GGT) + 0.053 \times \text{waist circumference} - 15.745}} \right] \times 100$$

FLI is expressed as a value ranging from 0 to 100; the original cut points are: FLI score <30 rules out fatty liver and FLI score \geq 60 indicate fatty liver.

Results

Total 1711 subjects were enrolled for abdominal US survey. After matching age and gender, 564 subjects were included in NAFLD group and 564 subjects were in control group. The mean ages were 57.1 years (control group) and 57.5 years (NAFLD group). The distribution of mild, moderate or severe fatty liver by abdominal US was 297 (52.6%), 222 (39.4%) and 45 (8.0%), respectively. Subjects in NAFLD group had a higher mean FLI value than those in the control group (30.7 ± 22.9 vs. 14.3 ± 15.8 , $P < 0.001$). More subjects in the NAFLD group had hepatic steatosis (FLI >60) than in the normal controls (77/564, 14.0% vs. 12/564, 2.2%, $P < 0.001$). FLI was well correlated with the severity of fatty liver by abdominal US (Spearman's rank correlation coefficient = 0.516, $P < 0.05$). The higher cut-point of FLI was set, the lower sensitivity for predicting fatty liver was seen. Oppositely, the lower cut-point was set, the higher specificity was seen (cut-point, sensitivity, specificity: 10, 80.22%, 57.27%; 30, 43.01%, 86.56%; 60, 13.97%, 97.79%).

Conclusion

FLI could be applied for predicting FL in a large community survey. However, the cut-off point of FLI might be adjusted to a lower value, such as 10 or 30, to predict hepatic steatosis for Asian populations.

Diagnostic Accuracy of the Fatty Liver Index by 10-value intervals

ff Point	SN (%)	SP (%)	PPV (%)	NPV (%)	LR+	LR-	Youden Index
80.22	57.27	65.58	74.05	1.88	0.35	0.38	
58.80	76.98	72.16	64.81	2.55	0.54	0.36	
43.01	86.56	76.45	59.95	3.20	0.66	0.30	
29.58	93.00	81.09	56.55	4.23	0.76	0.23	
19.78	95.03	80.15	53.86	3.98	0.84	0.15	
13.97	97.79	86.52	52.84	6.32	0.88	0.12	
7.62	98.34	82.35	51.20	4.60	0.94	0.06	
3.45	99.26	82.61	50.33	4.68	0.97	0.03	
0.73	99.63	66.67	49.72	1.97	1.00	0.01	