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OBJECTIVES

- To evaluate the measurement properties of the EQ-5D-Y-5L and explore the associated factors of EQ-5D-Y-5L score differences among children and adolescents with and without mental health issues.

METHODS

- A sample of children and adolescents aged 10-18 years was recruited from eleven schools across various geographical regions in China.
- Data on sociodemographics, family information, health habits, and self-reported EQ-5D-Y-5L, Patient Health Questionnaire-9 (PHQ-9), and Spence Children's Anxiety Scale-Short Version (SCAS-S), were collected.
- Respondents were categorized into **one group with mental health issues (PHQ-9 \geq 5 or SCAS-S \geq 35)** and **another group without mental health issues (PHQ-9 $<$ 5 and SCAS-S $<$ 35)**.
- Assessment of measurement properties :
 - ✓ **Ceiling and floor effects** were firstly evaluated;
 - ✓ **Reliability** was assessed by internal consistency (Cronbach's α) and retest reliability (Gwet's AC1);
 - ✓ **Convergent validity** was assessed using Spearman's rank coefficient, examining the correlation between HAQ-DI and EQ-5D-5L;
 - ✓ **Known-group validity** was evaluated by determining HAQ-DI score differences between subgroups of each indicator;
 - ✓ Effect sizes were then used to assess **sensitivity** of subgroup differences.
- Propensity score matching** was conducted based on age, gender, grade, residence, and geographical region. **Multiple linear regression** was used to examine associations between EQ-5D-Y-5L scores and demographic variables.

RESULTS

Descriptive statistics

- A total of 4,881 respondents were included in the study (Table 1).

Table 1. Characteristics of respondents (N=4,881)

Characteristics	Anxiety/depression (N=1,825) N (%)	General population (N=3,056) N (%)	P value*
Age (mean [SD])	15.66 [1.43]	15.15 [1.37]	0.000
Gender			0.000
Male	757 (41.48%)	1,685 (55.14%)	
Female	1,068 (58.52%)	1,371 (44.86%)	
Residence			0.000
Urban area	903 (49.48%)	1,829 (59.85%)	
Rural area	922 (50.52)	1,227 (40.15%)	
Geographical division			0.000
Northeast	413 (22.63%)	924 (30.24%)	
North	311 (17.04%)	766 (25.07%)	
East	968 (53.04%)	1,154 (37.76%)	
Central	0 (0%)	1 (0.03%)	
Southwest	132 (7.23%)	211 (6.90%)	
Northwest	1 (0.05%)	0 (0%)	
Only child			0.000
Yes	475 (26.03%)	1,061 (34.72%)	
No	1,350 (73.97%)	1,995 (65.28%)	
Family relationship			0.000
Very good	621 (34.03%)	2,205 (72.15%)	
Not bad	1,092 (59.84%)	828 (27.09%)	
Not good	112 (6.14%)	23 (0.75%)	

Table 1. Characteristics of respondents (N=1,000) (following)

Characteristics	Anxiety/depression (N=1,825) N (%)	General population (N=3,056) N (%)	P value*
The number of close friends			0.000
0	105 (5.75%)	71 (2.32%)	
1	235 (12.88%)	215 (7.04%)	
2	458 (25.10%)	619 (20.26%)	
≥ 3	1,027 (56.27%)	2,151 (70.39%)	
Education pressure			0.000
No, I don't care about this	125 (6.85%)	702 (22.97%)	
I'm a little stressed	1,399 (76.66%)	2,285 (74.77%)	
There is a lot of pressure	301 (16.49%)	69 (2.26%)	
Homework burden			0.000
Not heavy	417 (22.85%)	1,829 (59.85%)	
A little heavy	1,165 (63.84%)	1,142 (37.37%)	
very heavy	243 (13.32%)	85 (2.78%)	
Alcohol			0.000
Never	1,214 (66.52%)	2,724 (89.14%)	
Once or twice	309 (16.93%)	212 (6.94%)	
At least once per year	213 (11.67%)	98 (3.21%)	
At least once per month	73 (4.00%)	14 (0.46%)	
At least once per week	16 (0.88%)	8 (0.26%)	
EQ-5D-Y-5L LSS (SD)	6.97 (2.01)	5.34 (0.82)	<0.001

Measurement properties of the EQ-5D-Y-5L

- The ceiling effect (25.64%)** was found for the EQ-5D-Y-5L.
- Cronbach's α was 0.60 and Gwet's AC1 of 0.226** (fair) for the EQ-5D-Y-5L.
- Convergent validity:**
 - ✓ The total EQ-5D-Y-5L score had a moderate positive correlation with the PHQ-9 score ($r = 0.4522, p < 0.001$), a weak positive correlation with the SCAS-S ($r = 0.3346, p < 0.001$), an extremely weak negative correlation with the ERQ ($r = -0.0552, p < 0.001$).
- Known-groups validity:**
 - ✓ The EQ-5D-Y-5L scores differed significantly across subgroups ($P < 0.05$) (Table 2).
- Sensitivity:**
 - ✓ Effect sizes of all other subgroups ranged from **0.154-2.651**(Table 2):.

Table 2. Known-groups validity for the EQ-5D-Y-5L among respondents with mental health issues (N = 1,825)

Characteristics	EQ-5D-Y-5L			
	Mean (SD)	P value	Effect size	Scheffe post hoc test
ERQ reappraisal		<0.001	0.317 (0.224, 0.409)	/
High (≥ 28) (N=962)	6.674 (1.795)			
Low (< 28) (N=863)	7.301 (2.173)			
ERQ suppression		<0.001	0.198 (0.106, 0.291)	/
High (≥ 16) (N=960)	7.158 (0.070)			
Low (< 16) (N=865)	6.762 (0.061)			
Gender		<0.01	0.154 (0.061, 0.247)	/
Male (N=757)	6.790 (2.031)			
Female (N=1,068)	7.098 (1.980)			
Family relationship		<0.001	0.871 (0.665, 1.077)	I<II***, I<III***, II<III***
Very good (N=621)	6.565 (1.832)			
Not bad (N=1,092)	7.066 (1.960)			
Not good (N=112)	8.286 (2.632)			
Education pressure		<0.001	0.792 (0.665, 0.919)	I<III***, II<III***
No (N=125)	6.840 (2.018)			
A little (N=1,399)	6.711 (1.622)			
A lot of (N=301)	8.233 (2.937)			
Homework burden		<0.001	0.815 (0.651, 0.979)	I<II***, I<III***, II<III***
Not heavy (N=417)	6.424 (1.533)			
A little heavy (N=1,165)	6.902 (1.755)			
very heavy (N=243)	8.234 (3.060)			

Characteristics	Mean (SD)	EQ-5D-Y-5L		
		P value	Effect size	Scheffe post hoc test
The number of close friends		<0.001	0.705 (0.502, 0.908)	I>II**, I>III***, I>IV***, II<IV**
0 (N=105)	8.124 (2.967)			
1 (N=235)	7.264 (2.158)			
2 (N=458)	7.096 (1.879)			
≥ 3 (N=1,027)	6.729 (1.847)			
Depression (N=1,765)		<0.001	2.651 (2.353, 2.948)	I<II***, I<III***, I<IV***, II<IV***, II<III***, III<IV***
Mild (N=1,284)	6.514 (1.463)			
Moderate (N=330)	7.703 (2.056)			
Moderately severe (N=100)	9.23 (2.726)			
Severe (N=51)	10.725 (3.522)			
Anxiety (N=457)		<0.001	0.586 (0.333, 0.837)	/
High (≥ 42) (N=129)	9.077 (3.488)			
Low (35-36) (N=124)	7.371 (2.158)			

p<0.01; *p<0.001.

Influencing factors of the EQ-5D-Y-5L score changes

- After propensity score matching (N=1,690), the characteristics show **no significant difference** between respondent with and without mental health issues.
- Being female, having poorer family relationships, higher study pressure, heavier homework burden, and drinking history** were independent predictors of EQ-5D-Y-5L score differences ($p < 0.05$) (Table 3).

Table 3. Influencing factors of EQ-5D-Y-5L changes among respondents regarding mental health

Characteristics	Coefficient (SD)	P value
Gender		
Male	ref	
Female	0.21 (0.10)	0.040
Family relationship		
Very good	ref	
Not bad	0.25 (0.10)	0.013
Not good	0.82 (0.21)	0.000
The number of close friends		
0	ref	
1	-0.76 (0.24)	0.002
2	-0.74 (0.23)	0.001
≥ 3	-1.11 (0.21)	0.000
Education pressure		
No, I don't care about this	ref	
I'm a little stressed	0.05 (0.19)	0.805
There is a lot of pressure	0.91 (0.23)	0.000
Homework burden		
Not heavy	ref	
A little heavy	0.34 (0.12)	0.004
Very heavy	0.95 (0.19)	0.000
Alcohol		
Never	ref	
Once or twice	-0.06 (0.13)	0.654
At least once per year	0.60 (0.16)	0.000
At least once per month	0.75 (0.26)	0.003
At least once per week	1.48 (0.59)	0.012

CONCLUSIONS

- The EQ-5D-Y-5L demonstrated good validity and sensitivity in assessing mental health for children and adolescents with mental health issues.
- Gender, family relationships, study pressure, homework burden, and drinking history are key predictors of EQ-5D-Y-5L score differences.

References:

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