

# The validity, reliability, sensitivity and responsiveness of a modified patient enablement instrument (PEI-2) as a tool for serial measurements of health enablement

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## 1 Introduction

- Patient enablement is a core tenet of patient-centered and holistic primary care
- The Patient Enablement Instrument (PEI) is a transitional measure limited in its ability to measure changes over time.
- A modified version, PEI-2, has been developed to measure enablement at a given time-point without comparison to a recalled baseline.

### Objective:

To assess the psychometric properties of the PEI-2

## 2 Method

- PEI-2 was modified from the Chinese PEI to assess enablement over 4 weeks in a prospective cohort study nested within a community support program (TFES) in Hong Kong.
- **Construct validity** ⇒ factor-analysis.
- **Convergent validity** ⇒ Spearman's correlations with health-related quality of life (SF-12v2) & depressive symptoms (PHQ-9).
- **Internal reliability** ⇒ Cronbach's alpha ( $\alpha$ )
- **Test-retest reliability** ⇒ intraclass correlation (ICC)
- **Responsiveness** ⇒ change in PEI-2 score between 12-24 months.
- **Sensitivity** ⇒ differences in change of PEI-2 score between TFES and control group.

## 3 Results

### 1) PEI-2 demonstrated construct validity with all items loading on one factor

PEI-2 Items (N=360)	Exploratory Factor Analysis	Confirmatory Factor Analysis	
	Factor Loading	Factor Loading	Variance Explained
1. Able to cope with life	0.7544	0.7446	0.5544
2. Able to understand illness	0.7247	0.7219	0.5211
3. Able to cope with illness	0.8898	0.8743	0.7645
4. Able to keep self healthy	0.8281	0.8172	0.6678
5. Confident about health	0.7962	0.7840	0.6146
6. Able to help yourself	0.8347	0.8178	0.6687

### 2) Convergent validity was confirmed by significant correlations with SF-12v2 Mental Component Summary and PHQ-9.

	PEI-2 Total Score (N=358)	
	Correlation Coefficient (r)	p-value
PHQ-9 Score	-0.2030	0.014*
SF-12v2 Physical Component Summary	0.0663	0.212
SF-12v2 Mental Component Summary	0.1720	0.001*

### 3) Internal reliability was high (Cronbach's $\alpha = 0.9095$ ) and test-retest reliability for the total PEI-2 score moderate (ICC = 0.520, $p = 0.506$ ).

Baseline (N = 53)		Follow-Up (N = 53)		P-value	ICC
Mean (SD)	Floor, Ceiling (%)	Mean (SD)	Floor, Ceiling (%)		
22.83 (4.70)	0.0, 5.0	22.53 (4.21)	0.0, 7.5	0.506	0.520

### 4) Significant improvements in PEI-2 scores among the TFES group suggested good responsiveness. The difference in change of PEI-2 scores between TFES and control was also significant, indicating good sensitivity.

	Effect Size of Within Group Change	P-value for paired t-test on within group change	P-value for 2-sample t-test on difference of changes between groups
Total (N=285)	0.348	<0.001*	-
TFES (N=140)	0.522	<0.001*	0.001*
Control (N=145)	0.167	0.050	

## 4 Conclusion

- Results support the validity, reliability, responsiveness and sensitivity of the PEI-2 in Chinese adults from the general population. The PEI-2 can measure changes in enablement, making it a promising tool for cohort and intervention studies.
- Further studies with larger samples, and self-administration of the PEI-2, should be conducted to establish its test-retest reliability and to differentiate intra and inter-rater variability.

## R References

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