A scale for measuring evidence-searching capability: a development and validation study

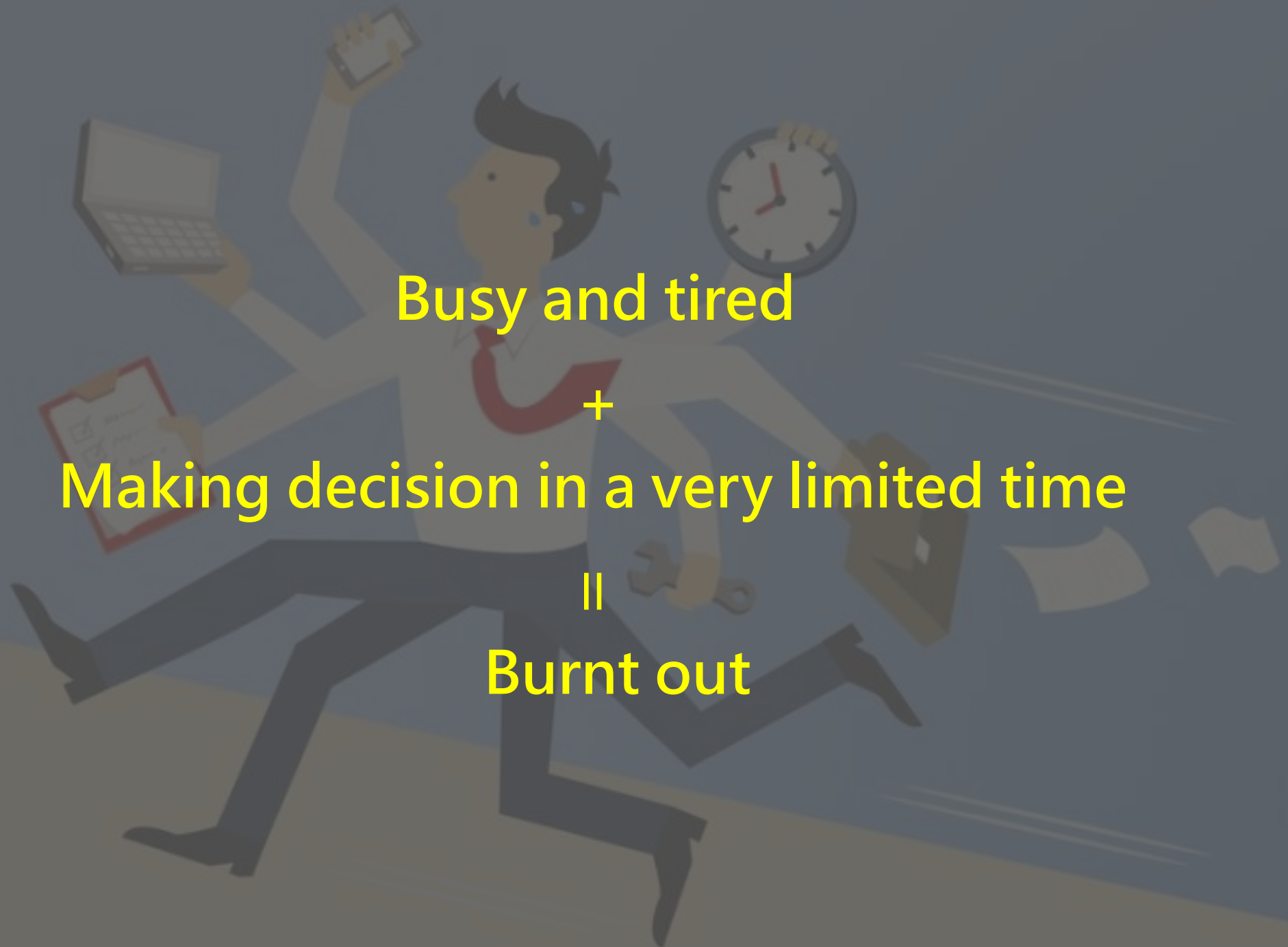**Ching-Chi Chi,**[1,2] Yu-Shiun Tsai,[3] Tien-Pei Fang[4,5]

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Busy and tired

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Making decision in a very limited time

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Burnt out

Background & Aim

- The **ability to acquire the best evidence efficiently** is important for busy healthcare professionals who have to make decision within a limited time.

- However, the current available assessment tools in EBM, e.g. Berlin questionnaire and Fresno test, were not specifically designed for measuring evidence-searching capability.

- We aimed to develop and validate a scale for measuring evidence-searching capability. This scale would be suitable for use in all healthcare professionals, not just medical students or doctors.

Methods: Stage 1: Development & establishing validity of the scale

The authors drafted a 33-item scale

7 experts who provided comments on a draft 33-item scale and rated each item on a 5-point Likert-type scale
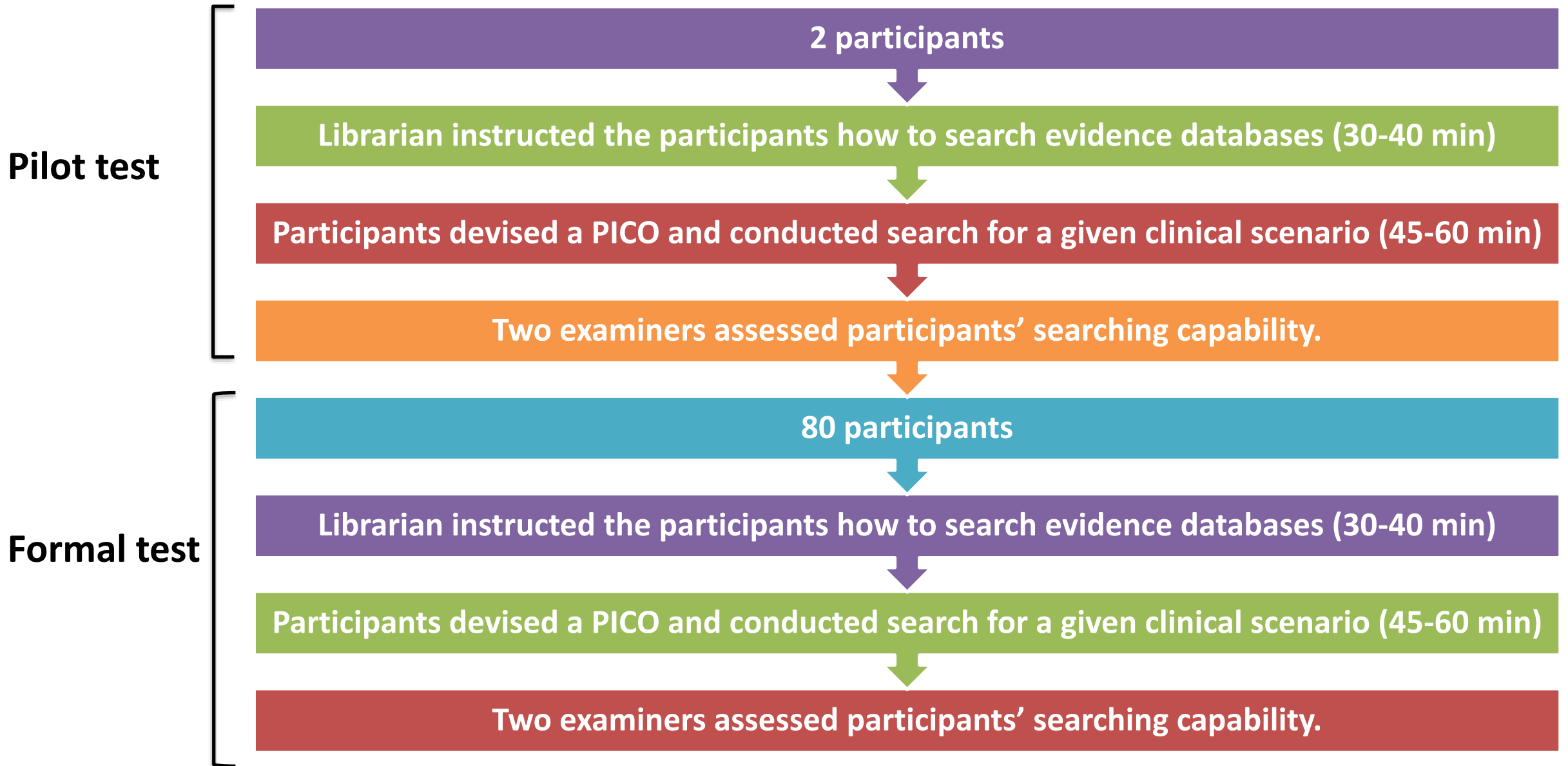
All items rated less than 3 by any expert were removed

Items modified or merged

Consensus achieved when all items were rated ≥ 3 by all experts with an interquartile range (IQR) of ≤ 1

Assessment of content validity

Methods: Stage 2: Assessment of reliability of the scale

Pilot test

| 2 participants |

| Librarian instructed the participants how to search evidence databases (30-40 min) |

| Participants devised a PICO and conducted search for a given clinical scenario (45-60 min) |

| Two examiners assessed participants' searching capability. |

Formal test

| 80 participants |

| Librarian instructed the participants how to search evidence databases (30-40 min) |

| Participants devised a PICO and conducted search for a given clinical scenario (45-60 min) |

| Two examiners assessed participants' searching capability. |

Results

- After two rounds of the modified Delphi process, the final consensus scale consisted of a global rating score and 15 items, all rated 4 or 5 with a mean of 4.79 and an IQR of less than or equal to 1.

- As shown in Table, the I-CVI for all items exceeded the a priori minimum of 0.78 with a S-CVI/Ave of 0.98.

Results

The final scale for measuring evidence-searching capability

NO.	Item	0 Not done	1 Partially done	2 Completely done	Item-Content Validity Index
	First dimension: Building up of search terms				
1	Propose the search terms and synonyms for P (patient/population)				1
2	Propose the search terms and synonyms for I (intervention)				1
3	Propose the search terms and synonyms for C (comparison)				1
4	Propose the search terms and synonyms for O (outcome)				1

Scale for measuring evidence-searching capability

NO.	Item	0 Not done	1 Partially done	2 Completely done	Item-Content Validity Index
	Second dimension: Search strategy and skills				
5	Identify and prioritise the use of appropriate secondary databases (e.g. The Cochrane Library and PubMed Clinical Queries)				1
6	Use of both MeSH term and free text in searching databases				1
7	Search the databases using the search terms for P (patient/population) and I (intervention)				0.857
8	Appropriate use of Boolean operators (AND, OR, and NOT) in combining keywords/synonyms to create search strategy				1
9	Use of truncation in searching databases				1
10	Ability to use the MeSH function in the Cochrane Library to find synonyms				1
11	Ability to use the dropdown menu in the Advanced Search webpage of the Cochrane Library				0.857
12	Write down the number of 'Reviews' in 'Cochrane Reviews' in the search results of the Cochrane Library				1
13	Ability to use the MeSH function in PubMed				1
14	Ability to use PubMed Clinical Queries and obtain systematic reviews				1
15	Ability to identify local publications				1

Scale for measuring evidence-searching capability

Global rating (0 to 5 points)

Inter-rater reliability

	Intra-class correlation coefficient	95% confidence interval	Weighted kappa coefficient
Q1	0.61	0.39–0.75	0.44
Q2	0.79	0.66–0.86	0.64
Q3	0.86	0.78–0.91	0.57
Q4	0.77	0.63–0.85	0.52
Q5	0.80	0.69–0.87	0.65
Q6	0.65	0.46–0.78	0.27
Q7	0.73	0.58–0.83	0.54
Q8	0.75	0.61–0.84	0.60
Q9	0.89	0.83–0.93	0.78
Q10	1	1	1.00
Q11	0.98	0.97–0.99	0.97
Q12	0.99	0.98–0.99	0.98
Q13	0.97	0.95–0.98	0.93
Q14	0.89	0.83–0.93	0.80
Q15	0.66	0.47–0.78	0.48
Global rating score	0.62	0.40–0.75	0.39

Cronbach's alpha = 0.97

Limitations

- First, we did not directly measure the expertise of the panel in the Delphi technique; however, the experts had to have at least 5 years' experience in EBM teaching or literature searching.

- Second, the participants were limited to one country; on the other hand, one expert in the panel is a British physician who provided us feedback during the development stage of the scale.

- Third, we only established the content validity and reliability of the scale; some additional validations for example construct validity may be needed.

Conclusions

- This preliminary study is the first to develop and validate a scale for measuring evidence-searching capability.

- The scale fills in the gap in objective assessment of knowledge-acquiring ability, and is composed of 15 items with high content validity and reliability.

- This scale includes items on search skills related to search anxiety for example search strategy, selection, and usage of database. If we use this scale to identify students who are deficient in these items and provide proper training of evidence-searching skills, these students may be better prepared and search anxiety may be reduced; however, more studies are warranted to confirm this.

- Also, this scale may be used in assessing the effectiveness of EBM curriculum and identify that search skills need to be reinforced.