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Introduction

Adherence to medication regimen is crucial for effective treatment of chronic diseases in the elderly with polypharmacy, which is often low. Poor medication adherence or medication default (MD) poses a serious and expensive challenge to patients and healthcare systems in terms of association with unfavourable outcome such as disease progression, risk of hospitalization, cardiovascular complications and death. Medication adherence (MA) is a multifactorial construct that incorporates various factors including socioeconomic, health-system related, condition-related, patient-related, social support, therapy-related and psychosocial.

Despite all the previous studies on measurement tools of MA and their psychometric properties, there is still a scarcity of research on the validity and reliability of MA/MD factors among the elderly. This study aimed to establish a reliable measure for MD named Medication Safety Alert Tool For The Elderly (MeSATE), a patient-reported outcome measure that we developed, by conducting a detailed validation of factors through Exploratory Factor Analysis (EFA) procedure.

Materials and Methods

This cross-sectional study was conducted among the randomly selected elderly residents of nursing care homes and outpatients of a government hospital and a health centre in 2019 - 2021. Data was obtained using MeSATE questionnaire, developed from literature review, validated by experts and pilot-tested prior to study. Trained personnel conducted the interview and filled the questionnaire comprising of 17 items (Q1 - Q17).

A total of 391 respondents were offered to participated in the study. EFA using Principal Component Analysis (PCA) with Varimax Rotation to determine the factors structure and internal reliability test by determining the value of Cronbach's Alpha for each factor was performed using IBM-SPSS version 25.0. The assumptions required to continue with EFA were significant (P-Value < 0.05) Barlett's Test of Sphericity and measure of sampling adequacy by Kaiser-Meyer-Olkin (KMO) of more than 0.6 (1). This study has received ethical approval from MOH and UiTM [NMRR-19-2970-47740 (IIR) and UiTM 600-TNCPI(5/1/6)].

Results and Discussion

The results in Table 1 shows that Barlett's Test of Sphericity is significant (P-value < .05) and measure of sampling adequacy by Kaiser-Meyer-Olkin (KMO) (.684) is acceptable for the data reduction technique.

Table 1. KMO and Barlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.684
Barlett's Test of Sphericity	Approximate Chi-Square	1209.60
	Df	136
	Sig	< .001

Results and Discussion

In PCA, six components surfaced based on the Eigenvalue greater than 1.0 as in the scree plot (Figure 1) and the total variance explained for measuring the MA/MD construct is 58.2% which is acceptable (2).

Table 2. Total Variance Explained of MeSATE

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	% of Variance	Cumulative %	Total
1	3.346	19.681	19.681	13.103	13.103	2.227
2	1.693	9.960	29.640	11.499	24.602	1.955
3	1.435	8.443	38.083	9.385	33.987	1.595
4	1.194	7.025	45.109	8.854	42.841	1.505
5	1.158	6.815	51.923	8.277	51.118	1.407
6	1.062	6.248	58.171	7.053	58.171	1.199
7	.980	5.763	63.934			
8	.889	5.231	69.165			
9	.858	5.049	74.215			
10	.774	4.554	78.769			
11	.742	4.365	83.134			
12	.686	4.038	87.172			
13	.572	3.368	90.539			
14	.545	3.206	93.746			
15	.441	2.596	96.342			
16	.405	2.379	98.721			
17	.217	1.279	100.000			

Table 2: The Four Factors and their items Rotated Component Matrix

Items/Factors	1	2	3	4
Q1				
Q2			0.824	
Q3			0.813	
Q4				0.828
Q5	0.456			
Q6	0.603			
Q7				
Q8				
Q9		0.660		
Q10		0.612		
Q11		0.598		
Q12		0.519		
Q13				0.757
Q14	0.583			
Q15		0.481		
Q16	0.754			
Q17	0.772			
Cronbach's Alpha	0.682	0.615	0.690	0.631

We obtained the distribution of items with factor loadings of more than 0.4 (2) into their respective factors as in Table 2. Q1, Q7 and Q8 with factor loadings of less than 0.4 were deleted (2). Cronbach's Alpha for each factor were found to be more than 0.6 as shown, which is acceptable (4) and therefore have attained the acceptable internal reliability. Hence the 14 items will have to be retained and deemed suitable to assess the MD construct. The four factors of MA/MD identified in this study are disease, socioeconomic, treatment and psychosocial.

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
a. Rotation converged in 5 iterations

Results and Discussion

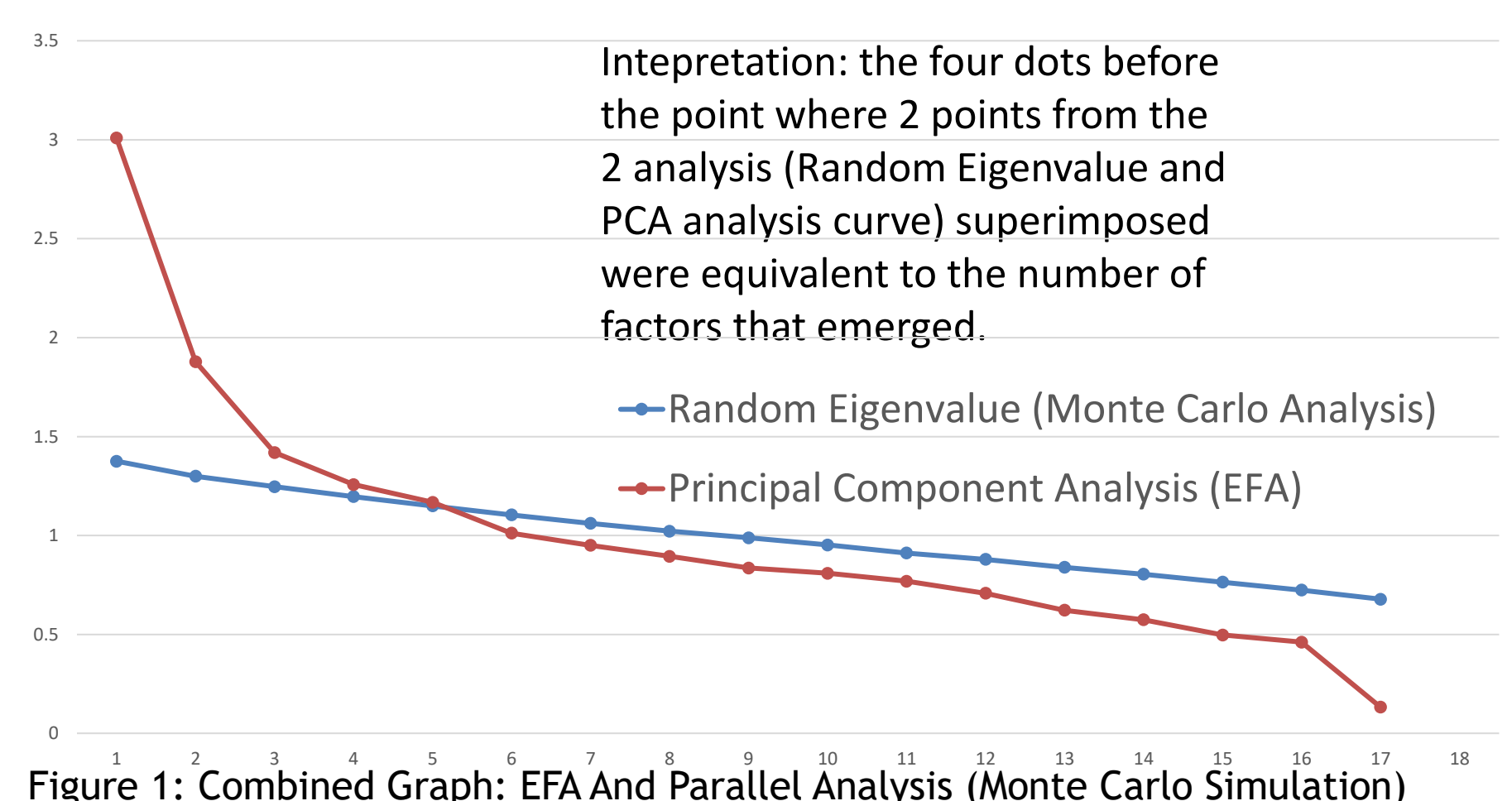


Figure 1: Combined Graph: EFA And Parallel Analysis (Monte Carlo Simulation)

To prevent tendency to overestimate the number of factors to be retained, Monte Carlo simulation technique by applying parallel analysis was done with computer program called ViSta-PARAN (3). Based on the interpretation of Figure 1, where four factors emerged (4 dots before the point where 2 points from the 2 analysis superimposed), we went on to proceed with the Varimax rotation of the four identified components fixing the factors as four in the SPSS analysis.

Conclusions

This study established the validity and reliability of MeSATE for measuring MD construct in the Malaysian healthcare institutions. This will contribute to improved measurement in correlating between the MA risk levels with the appropriate action and follow-up that needs to be taken for the betterment of care for the elderly.

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