

## Psychometric Properties and Confirmatory Factor Analysis of the Social Support Scale

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### ABSTRACT

The aim of the present study was to investigate the reliability and validity of a standardized assessment of social support towards HIV positive patients is considered to be associated with improved physical health outcomes. Many scales have been developed to measure social support in psychological professional and researchers. The social support scale has been widely used. This study was designed to examine the psychometric properties and the theoretical structure of the Social support scale. A total of 200 HIV positive participants responded to the social support scale. A hypothetical model was evaluated by structural equation modeling to determine the adequacy of goodness-of-fit to sample data. The model showed excellent goodness-of-fit. The results supported multidimensionality. The 18 item social support provides a valid and reliable scale to measure social support among participants.

**Keywords:** *Social Support, Confirmatory Factor Analysis, Exploratory Factor Analysis, Structure Validation.*

Factor analysis is the most powerful statistical procedure for scrutinizing relations between observed and latent variables. Manly two types of factor analysis were used: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). When the researcher is not aware of the connections between the observed (items) and latent (factors) variables, the EFA approach describes how and to what extent the observed variables are related to their latent constructs.

### METHODS

#### *Participants*

The study conducted among April 2013 to June 2014, and 220 participants, 50 % male and 50 % female Participants on ART, mean age = 33, range 19 - 54 years, enrolled in ART centers of Chhattisgarh. The inclusion criteria of the participants in the study include HIV positive persons

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and had Hindi and fill a questionnaire. Below 100 and above 1000 CD4 counts cell/ mm<sup>3</sup>, illiterate and those who were infected in any other chronic disease i.e. Tuberculosis, Cancer were excluded.

### *Measure of the study*

The Social Support Scale is a self administered 18 item scale designed to measure perceived and received social support in the context of PLWHA. The scale takes maximum 10 minutes to complete. It consisted 18 items with three dimensions namely emotional support, tangible support and informational support. Scale having five point rating scales i.e. strongly agree, agree, neutral, disagree and strongly disagree with 5, 4, 3, 2, 1 numerical assignment.

### *Procedure*

Following ethical approval granted by Chhattisgarh state aids control society and the institutional ethical committee for human research, Pt. Ravishankar Shukla University Raipur, Chhattisgarh, India, permitted for the research work. Participants, who met inclusion criteria, were contacted individually in their respective ART centers. It was essential to make rapport with the participants, to win their trust. They were ensured that their information will be kept strictly confidential. The information given by them would be used for research purpose only. After getting consent in writing from the participants, they were interviewed.

### *Statistical analysis*

Responses from participants to the scale were coded and entered into SPSS 16. Missing data were excluded from relevant analysis. As do not have an idea of the underlying components of the social support scale in Chhattisgarh, performed maximum likelihood method to explore the links between the observed and latent variables, and to identify the factor structure. The nature of principal component analysis is exploratory rather than confirmatory (Tabachnick, 2007). Retained only factors with eigenvalues greater than 1.25 (Henson & Roberts, 2006). Factor coefficients of 0.40 or greater were required for the interpretation of the factor structure (Hogarty, Hines, Kromery, Ferron & Mumford, 2005). A Cronbach's alpha of > 0.70 is considered to be an acceptable reliability coefficient for determining the internal consistency of the scale (Nunnally & Bernstein, 2010). Corrected item total correlation was considered > 0.40 or above (Costello & Osborne, 2005). Structural equation model (SEM) was performed to evaluate relationships between structural paths and factors using AMOS 22. SEM is a confirmatory technique in contrast to PCA (Tabachnick, 2007).

## **RESULTS AND DISCUSSION**

### *Content Validity*

The responses were analyzed with content validity analysis and results are presented in table - 1

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**Table 1 Content Validity Index of Social Support Scale**

<b>Factors</b>	<b>Items</b>	<b>CVR</b>	<b>Remarks</b>
Emotional Support	12	0.750	Retained in final version
	19	0.500	Eliminated
	16	1.000	Retained in final version
	11	1.000	Retained in final version
	9	1.000	Retained in final version
	21	0.250	Eliminated
	18	0.750	Retained in final version
	4	1.000	Retained in final version
	20	0.500	Eliminated
	7	1.000	Retained in final version
n= 7, CVI = 6.5/7= 0.928			
Tangible Support	6	0.750	Retained in final version
	23	0.250	Eliminated
	10	1.000	Retained in final version
	13	1.000	Retained in final version
	22	0.500	Eliminated
	15	1.000	Retained in final version
	17	1.000	Retained in final version
n= 5, CVI = 4.75/5= 0.950			
Informational Support	1	1.000	Retained in final version
	14	1.000	Retained in final version
	2	0.750	Retained in final version
	25	0.500	Eliminated
	3	1.000	Retained in final version
	5	1.000	Retained in final version
	8	0.750	Retained in final version
	24	0.250	Eliminated
n= 6, CVI = 5.5/6= 0.916			Inclusion – $\leq 0.750$

The scale in the twenty five questions was presented before eight subject experts to assess content validity of social support scale. After experts suggestion seven ( $\leq 0.750$ ) questions were eliminated and eighteen questions ( $\geq 0.750$ ) retained in the final version.

The content validity ratio assessed by Lawshe (1975).  $CVR = (n_e - N/2) / N/2$ . [N = total numbers of subject expert,  $N_e$  = total number of subject indicating essential]. Content validity index (CVI) =  $(\sum CVR) / N$ . [N = total number of retained items].

Table 1 indicates CVI for social support scale value of dimension wise was 0.928 for emotional support, 0.950 tangible support and 0.916 for instrumental support were found.

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### *Item Analysis*

Item analysis and factor analysis were assessed in help of SPSS 16; and corrected item total correlation considered  $> 0.40$  and above.

*Table 2 Corrected item – total correlation of Social Support Scale*

Factors	Items	Corrected Item - Total Correlation
Emotional Support	12	.719
	16	.614
	11	.740
	9	.578
	18	.669
	4	.634
	7	.655
Tangible Support	6	.545
	10	.605
	13	.719
	15	.554
	17	.614
Informational Support	1	.545
	14	.554
	2	.557
	3	.442
	5	.590
	8	.471

The corrected item total correlation was found 0.578 – 0.740 for emotional support, 0.545 – 0.719, for tangible support and 0.442 – 0.590 for informational support.

**Reliability** – Reliability of overall Social support scale Cronbach's  $\alpha$  Coefficient was found 0.92; and its dimension for emotional support (0.87), for tangible support (0.81), and informational support (0.77) were found.

### *Validity* -

#### **Exploratory Factor Analysis**

In the field of social sciences factor loading is considered minimum 0.30 or 0.35 when sample size fewer than 100. But above 200 minimum cut – off above 0.40 was considered (Norman & Streiner, 1994). Also in the field of social science research Communalities ( $h^2$ ) is generally considered between range of 0.40 to 0.70, Costello and Osborne (2005).

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**Table 3 Exploratory Factor Analysis**

Items				(h <sup>2</sup> )
	Emotional Support	Tangible Support	Informational Support	
Emotional Support	.684			.684
	.682			.556
	.668			.664
	.640			.504
	.620			.651
	.461			.489
	.422			.507
Tangible Support		.743		.664
		.684		.596
		.676		.575
		.656		.565
		.593		.599
Informational Support			.469	.506
			.401	.434
			.772	.673
			.700	.546
			.601	.530
			.447	.476
Total explain % of variance	21.19%	20.10%	14.92%	56.22%
Total items = 18				
Factor loading = > .40				
h <sup>2</sup> Inclusion criteria >.4 to <.7				

The help of exploratory factor analysis (EFA) use in this analysis Maximum likelihood method were use. Kaiser – Mayer - Olkin (KMO) in eighteen items were found 0.903, Promax rotation responses  $\chi^2 (165) = 151.523, p = .000$ ; more than 1 Eigen value and above 0.40 factor loading score was found three factors for perceived social support scale. Emotional support explained 21.19%, tangible support 20.10% and informational support was explained 14.92%; overall scale was explained 56.22% of the variance.

**Confirmatory Factor Analysis**

**Model fitting** – Some research findings are indicated that all the indexes be supposed to above 0.90 to be a good fit (Tanaka & Huba, 1985; Bentler, 1990; Bentler & Bonnet, 1980; Bollen, 1989). The inconsistency chi-square is the level of acceptance once > 0.05 (Wheaton et al., 1977). RMSEA should be accept in the range of 0.05 to 1.00, in particular, the lower value is said to be a good level (Browne & Cudeck, 1993).

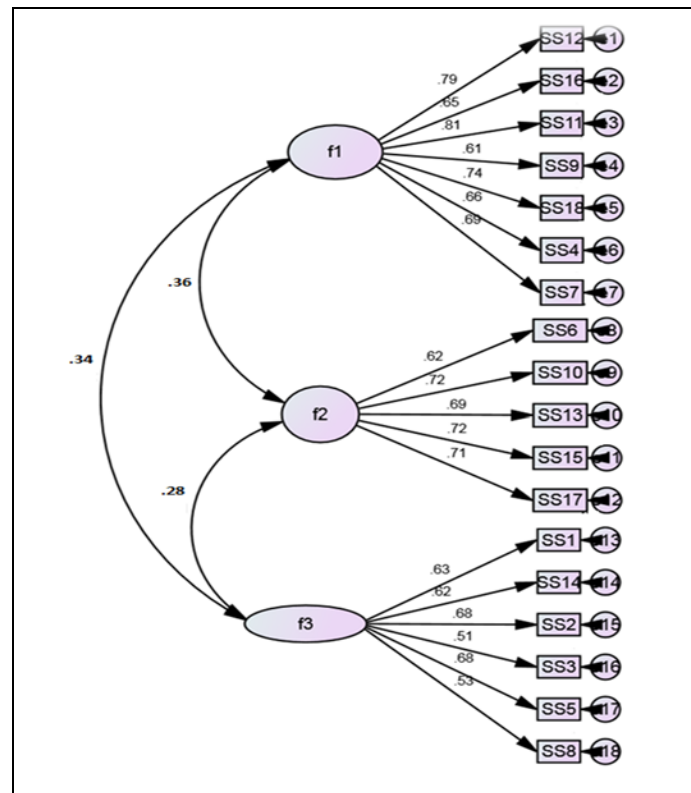
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According to Afthanorhan et al, (2014) the value of average variance extracted (AVE) should be greater than 0.50 for convergent validity, and the association between each pair of constructs should be less than 0.85 for discriminant validity.

**Table 4 Confirmatory factor analysis (Decision on model goodness of fit)**

	<i>CMIN/DF,</i>	<i>CFI</i>	<i>GFI</i>	<i>NFI</i>	<i>TLI</i>	<i>RMSEA</i>
Good fitting values	< 3.00 Good, <i>p</i> -value>.05	Higher than .95	Higher than .95	Higher than .90	Higher than .90	Less than .05
Resulted values	2.37, <i>p</i> =.08	.98	.96	.92	.98	.043
Decision	Good fitting	Good fitting	Good fitting	Good fitting	Good fitting	Good fitting

**Construct Validity** - Standardized estimate ( $\beta$ ) of Social support scale was found 0.51 to 0.81 in all 18 items; Composite reliability (CR) value was found > 0.75, average variance extracted (AVE) was found > 0.50, maximum shared variance (MSV) was found < 40, and average shared squared variance (ASV) was also found < 40 scores for all the factors of social support. Model found positive correlation between the three factors i.e. emotional support – informational support was 0.34, emotional support – tangible support was 0.36 and tangible support – informational support was 0.28 respectively. These scores are suggests satisfactory convergent and discriminant validity of scale (Hair, Black, Babin & Anderson, 2010).



**Figure 1 Factorial validity for social support scale**

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**Concurrent Validity** – Similarly the Hardiness scale and Social support scale applying to the same population at the same time and found significant positive correlation between each other, it's an evidence for sufficient validity.

**Table 5 Concurrent Validity with Social Support and Hardiness**

Variables	Mean	SD	Hardiness	Social Support
Hardiness	110.41	15.922	1.00	.66**
Social Support	65.70	10.970	.66**	1.00

Note -  $p < .01^{**}$  (2- tailed), N = 200

Concurrent validity analysis were also apply (Table – 4.6) with help of Hardiness Scale, and result found significantly positive correlation (0.66\*\*) between each other.

Finally the three components explained 21.19%, 20.10%, and 14.92% variance, respectively. Overall variance explained by all of these factors was 56.22 %. Item communalities were found to be larger than 0.40. CFA of this measure (CMIN/ DF = 2.37,  $p = .08$ , CFI = .98, GFI = .96, NFI = .92, TLI = .98 and RMSEA = .043) confirmed the dimensionality and is in agreement with the observations from the EFA. Internal consistency (Cronbach  $\alpha$  coefficient) of overall scale was found 0.92; and its dimension for emotional support (0.87), for tangible support (0.81), and informational support (0.77). Thus, the scale is fairly reliable and valid.

### **Acknowledgement**

It is my great pleasure to express immense gratitude to, all participants and staff of ART centers in Chhattisgarh. I would also like to thanks Chhattisgarh State Aids Control Society, and Institutional Ethical Committee, Pt. Ravishankar Shukla University, Raipur for provided permission for research.

### **REFERENCES**

- Afthanorhan, Ahmad, & Ibrahim M. (2014). Pooled Confirmatory Factor Analysis (PCFA) Using Structural Equation Modeling on Volunteerism Program: A Step By Step Approach. *International Journal of Asian Social Science*, 4(5), 642-653.
- Bem, D. J. (1972). Self- Perception Theory. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology*, (6th ed.) New York, NY: Academic.
- Bentler, P. M., & Bonnet, D. C. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588-606.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), 238.

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- Blaney, N. T., Goodkin, K., Morgon R. O., Feaster, D., Millon, C., Szapocznik, J., & Eisdorfer, C. (1991). A stress – moderator model of distress in early HIV-1 infection: concurrent analysis of life events, hardiness and social support. *Journal of psychosomatic research*, 32(2-3), 297-305.
- Bogossian, F. (2007). Social support: Proposing a conceptual model for application to midwifery practice. *Women and birth*, 20, 169- 173.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.
- Browne, M. W., & Cudeck, R., (1993). Alternative ways of assessing model fit. *Sage Focus Editions*, 154, 136- 136.
- Conway, J. M. (2002). Method variance and method bias in industrial and organizational psychology. In S. G. Rogelberg (Ed.). *Handbook of research methods in organizational and industrial psychology* (pp. 344-365). Malden NJ: Blackwell Publishers.
- Costello, A., & Osborne, J. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research and Evaluation*, 10 (7), 281-286.
- Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis* (7th Ed.): Prentice-Hall, Inc. Upper Saddle River, NJ, USA.
- Henson, R., & Roberts, J. (2006). Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. *Educational and Psychological Measurement*, 66, 393-416. doi:10.1177/0013164405282485.
- Norman, G. R., & Streiner, D. L. (1994). *Biostatistics: The bare essentials*. St. Louis, MO: Mosby.
- Pandey, D. (2016). *Social support personality traits and immune response in HIV patients: A PhD thesis, Pt. RSU. Raipur, INDIA.*
- Tanaka, J. S., & Huba, G. J. (1985). A fit index for covariance structure models under arbitrary GLS estimation. *British Journal of Mathematical and Statistical Psychology*, 38(2), 197-201.
- Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. (1977). Assessing reliability and stability in panel models. *Sociological Methodology*, 8(1), 84-136.

**How to cite this article:** D Pandey, P Shrivastava (2016), Psychometric Properties and Confirmatory Factor Analysis of the Social Support Scale, *International Journal of Indian Psychology*, Volume 3, Issue 4, No. 65, ISSN 2348-5396 (e), ISSN: 2349-3429 (p), DIP:18.01.152/20160304, ISBN: 978-1-365-34680-4