

## ORIGINAL ARTICLE

## Development, evaluation and validation of a financial stress scale for traders working in financial market

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### Citation

Saoji A, Saoji P, Mitra A, Hajare S. Development, evaluation and validation of a financial stress scale for traders working in financial market. Indian J Comm Health. 2019; 31, 1: 84-89.

**Source of Funding:** Nil **Conflict of Interest:** None declared

### Article Cycle

**Received:** 15/01/2019; **Revision:** 13/02/2019; **Accepted:**16/03/2019; **Published:**31/03/2019

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### Abstract

**Background:** Stress due to financial aspects in life is increasingly common in today's world. It can lead to psychological consequences such as anxiety, depression and can also lead to other non-communicable disorders. Previous scales to measure stress; which are generalized and does not necessarily include the financial aspects of stress. **Aims & Objectives** The purpose of this research is to develop a valid and reliable instrument that can be used to assess stress among day-traders of stock market. **Material & Methods:** In a cross-sectional survey a questionnaire was prepared based on in-depth interviews with day-traders of stock market. Construct validity, test-retest reliability and inter-rater reliability were carried out. Cronbach's alpha ( $\alpha$ ) was 0.85 for the 11 short-listed items, with item-total correlations of 0.2--0.8. Multidimensional scaling determined 2 dimensions -- work related and non-work related. **Result:** Results from this first study among day-traders in India indicate that traders are not immune to financial stress, with (78.9%) reporting high work related stress, (7.7%) reporting moderate work related and (13.4%) reporting low work related stress. **Conclusion:** this study identified a set of psychosocial stressors among day-traders and a stress scale (The Financial Stress Scale) was developed in the South Asian context.

### Keywords

Financial Stress; Evaluation; Validation; Non-Communicable Diseases

### Introduction

Securities and Exchange Board of India (SEBI) estimates that over 18 million Indians now invest in stock market. Though it seems like a small fraction of the Indian population, this number is set to increase tremendously in the future from the current 1.3% to

over 20% as with other countries in South-East Asia (21% in Hong Kong, 10.5% in China, 39.5% in Taiwan).(1)

A day trader is an individual investor who makes a complete round-trip trade during a single trading day, that is, an investor who buys and sells the same amount of the same stock on one day. Usually a male

in his late 30's, a day trader is expected to endure extremes of unpredictable market fluctuations, huge economic losses and uncertainties of financial future. (2) They are also more likely to experience "burn-out" as they need a high degree of focus and concentration to watch multiple screens to spot trading opportunities, and then act quickly to explore them on a daily basis.(3)

It has been suggested that day-trading is similar to gambling in its addictive nature. Studies done among gamblers suggest higher risk of mental disorders, tobacco & alcohol dependence and high levels of stress which can also be generalised to day-trading population. (4,5,6)

India is a growing economy and in light of changing investor sentiment and demographics (younger generation), the number of involved in day trading in India is expected to rise exponentially in the near future. This coupled with day-traders being exposed to multiple factors responsible for NCDs, suggest day traders as a high risk population for NCDs. This could certainly present a huge challenge to public health experts. The sheer financial impact it is going to have on a citizen of a low income country like India is catastrophic (7)

### Aims & Objectives

To develop a valid and reliable instrument that can be used to assess stress among day-traders of stock market.

### Material & Methods

This study was conducted in Nagpur, India which is the third largest city in the state of Maharashtra after Mumbai & Pune with a population of over 2.4 million with considerable socio-economic and ethnic diversity. It is divided into 10 municipal zones, of which 5 zones house majority of the stock trading centers with day-trading facility. One zone has been randomly selected for this study. All the day traders in the selected financial zone who are involved in day trading in stock market full time for more than 5 years (n=104) were included in the study. The statistical analysis was done using the statistical software R version 3.3.3 (2017).(8)

#### Phase I: Development of the scale

##### Item Generation

This section describes development of the instrument, including conceptual models of financial stress, design of a preliminary version of the instrument, construction of the final version.

It is generally perceived financial stress is a multidimensional construct rather than a unidimensional one. In order to better understand financial stress some researchers employed methods like systems theory while others reviewed literature on personal finance, stress, financial distress, bankruptcy, and workplace financial education. Porter and Garman in 1993 considered a wide variety of personal finance concepts, including questions on the topics of financial satisfaction, financial stressors, feelings of financial well-being, financial behaviors, and impacts on family and work.

##### Content Adequacy Assessment

The concepts of the initial construct (pool of items) were chosen based on a review of the published literature, textbooks and measuring instruments. Next, inputs from 15 experts including psychologists, psychiatrists, financial education experts and researchers were solicited suggestions about concepts to be included and the preliminary pool of items were revised from 35 to 26. The construct was then modified after a series of focus group discussions with day-traders and a questionnaire was prepared. All the modifications were done before the onset of the rounds of data collection. The final pool had 23 items.

##### Questionnaire Administration

Data was collected by means of questionnaire. After explaining the objective of the study and obtaining the consent from the day-traders, preliminary socio-demographic data like age, gender, years of experience and sources of income were recorded. The Financial Stress Scale was administered by face-to-face interview method. An additional financial distress scale (Incharge Financial Wellbeing/Distress Scale) was administered using the same method for validation.(9)

##### Dimension Reduction by Exploratory Factor Analysis (EFA)

The data was checked for factorability using Barlett's test of sphericity which was found to be highly significant at 5% level with a p-value <0.001. Exploratory factor analysis (EFA) was used for dimension reduction. We have used both comparison data method and scree plot method for determining the number of factors.(10) Both of the methods resulted in similar results. Finally, an orthogonal varimax rotation was used to produce the final rotated factor solution. Items were classified as loading on a factor if they produced loadings equal to or greater than 0.3 on a factor and

if there was at least a .2 difference for items that loaded onto multiple factors. Of the 23 item pool, (11) items were retained on the final version of the scale.

#### **Internal Consistency Assessment (Reliability)**

Cronbach's alpha ( $\alpha$ ), inter-item and item-total were used to estimate internal consistency and reliability.

#### **Phase II: Validation and reliability of the scale**

This section detail the subsequent testing of the instrument for validity and reliability. The stress scale was validated using The Incharge Financial Distress/Financial Well-Being Scale (IFDFW Scale).(9) The interpretation of scores on the IFDFW Scale overall were as follows: mean scores of 1.0 - 4.0 = high financial distress/low financial well-being, mean scores of 4.1 - 6.9 = average financial distress/average financial well-being, and mean scores of 7.0 - 10.0 = low financial distress/high financial wellbeing.

Inter-rater agreement was measured using Cohen's Kappa Statistic ( $\kappa$ ) and percent agreement.

### **Results**

The subject characteristics of the study population is given below in [Table 1]

The mean age of the day-traders was  $36.3 \pm 8.2$  years and the mean years of experience was  $8.6 \pm 2.9$  years. It was found that 57% of the day-traders depended solely on the income generated through day-trading, the rest had other sources of income.

The items consisted of family-related concerns, personal finance-related concerns and work-related concerns. The maximum possible score for the Financial Stress Scale was 55 and the minimum possible score was 11. The mean score for the sample of day-traders was 39.3 (standard deviation 5.6; range 28-45).

Two domains were identified using dimension reduction by factor analysis [Figure 1]. These domains can be classified as: "work related" and "non-work related". The work-related domain consists of eight items and the non-work related domain consists of three items. Both domains displayed good internal consistency, though the reliability of "work related" domain (Cronbach's  $\alpha = 0.91$ ) was slightly higher than that of the "non-work related" domain (Cronbach's  $\alpha = 0.78$ ).

The item--total correlations for each item ranged between  $r = 0.22$  and  $r = 0.62$  [Table. 3]. Cronbach alpha ( $\alpha$ ) for the Financial Stress Scale was 0.85.

Table 3 shows the correlation matrix of the final 11 items of the Financial Stress Scale. The average item-total correlation of 4.4 indicates very good discrimination.

The validation of the Financial Stress Scale with the Incharge Financial Wellbeing/Distress scale (IFDFW Scale) showed moderate agreement with Cohen's weighted Kappa ( $\kappa$ ) of 0.55 (95% CI: 0.36-0.74) and a percent agreement of 78.8%. Day-traders scoring  $<2.5$  on the Financial Stress Scale were classified as low stress, those scoring between 2.5 and 3.5 as moderate and those scoring  $>3.5$  were classified as high stress. The classification matrix is given in [Table 4]

### **Discussion**

Preliminary data indicates that the (11) item Financial Stress Scale could be used to financial stress among day-traders of stock market. As far as we know, this is the first comprehensive scale developed to measure stress among day-traders in the Global context and definitely in Indian scenario. Existing stress scales have relied on items measuring psychological and somatic symptoms that are common in everyday work and their utility in identifying stress among a vulnerable group like day-traders is limited. Moreover, the existing scales also lack specificity because they have been developed in different sociocultural settings. This study identified two dimensions among the (11) financial stressors i.e. work related and non-work related.

#### **Work Related**

Results from this first study among day-traders in India indicate that traders are not immune to financial stress, with 82 (78.9%) reporting high work related stress, 8 (7.7%) reporting moderate work related stress and 14 (13.4%) reporting low work related stress. It is striking to note that 8 in 10 day-traders experience work related stress. The day-traders rated "very unpredictable monthly income" (Mean = 4.82, SD = 0.39) as the most important contributor of work stress. This was followed by "concern about under performance" (Mean = 4.46, SD = 0.7) and "not enough money to make ends meet" (Mean = 3.88, SD = 0.77). This clearly points to the high stressful everyday work environment. As rightly pointed out by Schwager, 'the composite profile of a losing trader would be someone who is highly stressed and has little protection from stress'.(11) Though a few studies show some relationship between stress and trading

performance, it is difficult to come to a general consensus due to lack of robust evidence. Some authors proposed that assessing performance in non-work domains (e.g. marriage and personal relations) may help clarify the relationship between work stress and trading performance.(3) Though this study did not assess the trading performance, the influence of non-work domains on stress has been studied.

### **Non-Work Related**

Despite the fact that the number of day-traders are increasing day by day, it is unclear if they actually make any money. Though investigators studied the profitability of day-trading there is no comprehensive evidence till date. A quick review of the literature shows that most day traders, especially heavy day traders, lose money trading.(6,12,13,14) While researchers argue the reasons for this to be overconfidence or a lack of a robust trading strategy; the consequence of this is increased financial stress on to the day-trader. Infact, over 97% of all day-trading activity is done by individual investors rather than institutional investors.(12) This only adds to the burden that the money lost is from the pocket of the individual investor causing much financial distress leading to serious health consequences. The most rated stressor in the non-work domain was "headaches & tiredness after work" (Mean = 3.81, SD = 0.79) followed by "concern about health" (Mean = 3.67, SD = 0.89). This clearly points that the overall day-trading performance has an impact on the individual's health.

In addition to this, many authors suggest the possibility that day-traders are similar to gamblers with respect to addictive behaviours.(4,15,16) These addictive behaviours include an array of factors that can lead to increased risk of non-communicable diseases. Smoking and alcoholism are established as addictive behaviours among gamblers; however, association of these behaviours among day-traders was not studied. Association between volatility in stock market and stroke, mental disorders, acute coronary syndrome and other cardiovascular diseases has been studied by various authors.(17,18,19,20)

Day-traders also are at a risk of non-communicable diseases due to their sedentary lifestyle. There is an immediate need for researchers to explore the possibility of day-traders being a high risk population for non-communicable diseases.

### **Conclusion**

In conclusion, this study identified a set of psychosocial stressors among day-traders in the South Asian context. The Financial Stress Scale has 2 dimensions (work related & non-work related) and shows good evidence of validity and reliability. Most stressors are work related. The Financial Stress Scale is a potentially important tool that can be used to improve the overall health of individuals working in financial markets.

The scale has evolved over the process, with stressors added and removed over the course of the scale development based on statistical testing for reliability and validity. The high internal consistency indicated by a robust overall Cronbach's alpha ( $\alpha$ ) of 0.85 shows that The Financial Stress Scale is a potentially important tool that can be used to improve the overall health of individuals working in financial markets. It also provides a high level of confidence for researchers and practitioners using the scores to indicate perceived levels of financial stress in both individual settings and group settings. It could readily be utilized by clinicians, researchers and social scientists working for the wellbeing of individuals involved in the financial markets in India and South Asia.

### **Recommendation**

Financial stress is a widespread experience. People experiencing financial stress may be more likely to numb their anxiety by drinking, smoking, overeating, or practicing other unhealthy coping behaviors. This, in turn, leads to more stress. Early diagnosis & management is need of the hour.

### **Limitation of the study**

Future research directions regarding stress among traders should include the examination of the role of personality and study the impact of more non-work domains like family and personal relationships. Also, some researchers established the relationship between gender and stress in trading, we could not make any such conclusions because all of the day-traders in this study were males and this area needs to be investigated further.

### **Relevance of the study**

The Financial Stress Scale is a potentially important tool that can be used to improve the overall health of individuals working in financial markets

**Authors Contribution**

All the authors contributed substantially to the design, acquisition of data, analysis, interpretation, drafting of the article and final approval.

**Acknowledgement**

The authors wish to thank all the participants and experts for their invaluable insights and comments. All the trading organisations support is gratefully acknowledged.

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**Tables**

**TABLE 1 DEMOGRAPHIC CHARACTERISTICS OF THE STUDY PARTICIPANTS**

Parameter	Mean	Std. Dev
Age (in years)	36.3	8.2
Trading Experience (in years)	8.6	2.9
Source of Income	Trading only:	57.00%
	Trading + others:	43.00%

**TABLE 2 FACTOR LOADINGS AND MEDIAN VALUES OF STRESSOR ITEMS FOR FINANCIAL STRESS AMONG DAY-TRADERS (N = 104)**

Item	Factor Loadings	Median	Chronbach’s Alpha
<b>Domain 1: Work Related</b>			
You find yourself under time pressure at work	0.81	4	0.91
You have a very unpredictable monthly income	0.91	5	0.91
Has anyone ever told you that you must change your lifestyle?	0.61	3	0.91
You are concerned about performance being less than your colleagues	0.81	5	0.91
You are concerned about performance being judged by your colleagues	0.83	4	0.91

<b>You are unsure about your financial future</b>	0.82	3	0.91
<b>You feel headaches / tiredness after work.</b>	0.71	4	0.91
<b>You are concerned about your health</b>	0.71	3	0.91
<b>Domain 2: Personal Finances Related</b>			
<b>At the end of each month you end up with not enough money to make ends meet</b>	0.86	4	0.78
<b>You are hugely dependent on the returns from the financial market for your monthly expenditure</b>	0.89	3	0.78
<b>How often do you perform household chores?</b>	0.54	4	0.78

**TABLE 3 CORRELATION MATRIX OF THE FINAL 11 ITEMS**

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Avg. Inter-Item
<b>Q1</b>	1	0.93	0.2	0.29	0.98	0.85	0.73	0.69	0.5	0.13	0.26	0.56
<b>Q2</b>	0.93	1	0.22	0.53	0.93	0.92	0.88	0.74	0.74	0.14	0.16	0.62
<b>Q3</b>	0.2	0.22	1	0.36	0.2	0.59	0.11	0.07	0.07	0.44	0.44	0.27
<b>Q4</b>	0.29	0.53	0.36	1	0.29	0.59	0.69	0.4	0.55	-0.09	-0.2	0.34
<b>Q5</b>	0.98	0.93	0.2	0.29	1	0.85	0.73	0.69	0.5	0.13	0.26	0.56
<b>Q6</b>	0.85	0.92	0.59	0.59	0.85	1	0.78	0.64	0.64	0.3	0.31	0.65
<b>Q7</b>	0.73	0.88	0.11	0.69	0.73	0.78	1	0.5	0.76	0.25	0.18	0.56
<b>Q8</b>	0.69	0.74	0.07	0.4	0.69	0.64	0.5	1	0.38	-0.13	-0.05	0.39
<b>Q9</b>	0.5	0.74	0.07	0.55	0.5	0.64	0.76	0.38	1	0.05	-0.15	0.41
<b>Q10</b>	0.13	0.14	-0.44	0.09	0.13	0.3	0.25	-0.13	0.05	1	0.94	0.22
<b>Q11</b>	0.26	0.16	-0.44	0.2	0.26	0.31	0.18	-0.05	-0.15	0.94	1	0.22
<b>Avg. Inter-Item</b>	0.56	0.62	0.27	0.34	0.56	0.65	0.56	0.39	0.41	0.22	0.22	0.44*

\*Average Item-Total Correlation

**TABLE 4 CONTINGENCY TABLE OF FREQUENCIES FOR FINANCIAL STRESS USING FINANCIAL STRESS SCALE AND INCHARGE FINANCIAL WELLBEING/DISTRESS SCALE (IFDFW SCALE)**

		IFDFW Scale			
		High	Moderate	Low	Total
Financial Stress Scale	High (>3.5)	68	6	8	82
	Moderate (2.5 - 3.5)	2	5	1	8
	Low (<2.5) 2 3 9 14	2	3	9	14
Total		72	14	18	104

**Figures**

**FIGURE 1 MCDONALD’S OMEGA ESTIMATES OF FACTOR SATURATION OF THE FINAL ITEMS**

