A Scale to Measure the Psychological Impact on Farmers during Pandemic Conditions (Covid-19)

ABSTRACT

The recent outbreak of Covid-19 pandemic resulted in global lockdown creating huge economic cost and cascading impact on different sections of society including the farming community. The farmers though directly faced socio economic impact there reported psychological distress due to anxiety, depression etc. Hence the objective of measuring the psychological impact of Covid-19 on farming community was taken up. As there were no proper measuring instruments for measuring the psychological impact especially of the farmers, a need was thus realized for constructing a specific scale. Hence, the Likerts summated rating scale procedure was followed by considering 8 dimensions. Initially 110 statements were sent to judges rating and the statements with relevancy weightage of 0.80 and above were retained. Then it was administered to farmers in non sample area for item analysis and after 't' test 32 statements were retained. The Cronbach's alpha test to measure the internal consistency of components was 0.895 and the split half method, followed for measuring the items reliability showed 'r' is 0.734. The scale validity was measured using face and content validity. Thus the scale has both validity and reliability. The finally developed scale consists of 32 statements under 8 different dimensions.

Key words:Covid-19, psychological impact, farmers, scale, cronbach's alpha, validity.

1. INTRODUCTION

The recent outbreak of the novel SARS-CoV-2 virus, also called corona virus 2019 (Covid-19), has evolved into one of the worst pandemic situations in the past hundred years [1]. The Covid-19 slowly developed into a pandemic, starting with a small chain of spread from Wuhan city of China, which then culminates in a larger chain in many countries resulting in its spread around the world[2]. All nations throughout the world implemented lockdown measures to confront this life-or-death scenario, which accordingly restricted the human mobility and other activities. In order to curb the Covid-19 infection spread, India also ordered a 21-day countrywide lockdown beginning on March 24, 2020, for its 1.3 billion residents. Since then, the lockdown hadprolonged many times.However, the lockdown came with an economic cost and cascading impact on all the sections of society including the farming community [3].

Previous studies shown that natural disasters such as earthquakes, tsunamis; man-made catastrophes such as explosions, wars, or terrorism; or epidemics such as MERS, SARS, Ebola lead to detrimental emotions such as phobia, anxiety, depression, hopelessness, and hostility in the short and long terms [4]. Similarlythe extreme surging of rate of infection and relatively increased mortality, individuals had begun daunting about the Covid-19 [5]and there had been an extraordinary worry about the ailment's latent capacity spread and effect [6].With the encumbrance of strict lockdown measures and halt of the movement, farmers faced severe difficulties in every aspect of farming, from the purchase of inputs, sowing and labor use to harvesting, marketing and processing of the produce[7, 8]. Lack of transportation and severe disruptions in supply chain lead to shrinking markets and falling out prices depriving farmers economic status [7, 9]. Also the pandemic prompted massive reverse migration to rural areas from the urban bringing in changes in the labor availability and wage rates [3]. All these deprived primarily the socio economic conditions of farmer and inturn affected their psychological conditions and many people have disregarded its long-lasting psychosocial repercussions [10]. With disruptions in supply chain, marketing linkages and no enough financial resources for purchasing critical inputs, difficulties in availing labor timely, closure of many mandis, farmers left with burden of increased debts and highly stressed [11]. Several other factors like restricting the movements and no social gatherings, lack of proper medical facilities in the villages, no proper sanitary measures, isolation from friends and closed ones, hoaxes about virus spread in social media, following precautionary measures every time they move out, uncertainty and insecurities about future and reduced income sources of their family members made the farmers unsettle. All these factors made the farmers feel anxious, depressed, dissatisfied, irritated and stressed in the course of pandemic period [12].

Therefore it had become a paramount importance to measure the Covid-19 impact on farmers to analyze their mental health condition and provide suitable assistance in case of future pandemics. Due to the paucity of studies on the psychological effects of pandemics particularly on farmers, no measuring instruments were found appropriate for the study purpose. This necessitated developing a scale which exclusively measures the psychological impact on farmers during any pandemic situations in general and Covid-19 in particularly for the above study.

2. METHODOLOGY

For carrying out the present study two districts from two different states i.e., the Raichur district of Karnataka and YSR Kadapa district of Andhra Pradesh were selected and conducted in the year 2022.Psychology is majorlyfocused on people's mental state and processes that the individual possess. Various changes in people's mental health causing anxiety, stress, worry about the situation, depression constitute the psychological impact. Among the various techniques available for scale construction to measure the psychological impact, Likerts summated rating method given by Likert (1932) [13] has been employed because of its comparatively simple nature and requiring less time in comparison to equal appearing interval scales and also one of the best predictors of real behavior found. The below details elicits various steps of the scale construction.

Table 1: Steps for developing and standardizing of a scale

Steps	Psychological impact	
	Total Considered	Total Retained
Collection of dimensions	10	08
Item collection	120	120
Editing of items	120	110
Relevancy analysis	110	50
Item analysis	50	32
Validity and Reliability	32	32
Final scale administration	32	32

3. RESULTS AND DISCUSSION

3.1 Dimensions and Item collection

In order to advance scale development various information related to several dimensions which governs the psychological state of the individuals were gathered after revising pertinent literature, books, bulletins, articles, monographs, previous studies conducted by the researchers and by having fruitful discussions with the scientists, subject matter specialists along with qualified professionals in University and other ICAR institutes. A list of 10 dimensions was prepared tentatively at initial stage. Out of those 8 dimensions which better contributes the purpose were retained bearing in mind the suggestions provided. Under each dimensions 10 to 20 statements were enlisted out marking the final collected statements as 120 bearing in mind their applicability to study area and respondents considered for study.

3.2 Editing of the items

The collecteditems were carefully examined and were scrutinized, edited following the 14 criteria articulated by Edwards [14], Thurstone and Chave [15] and Edward and Kilpatrick [16]. After making suitable corrections and stringent culling, 110 statements in total out of 120 statementswere continued for further step under 8 dimensions. Statements under different dimensions were considered in a way that allowed them to convey either a positive or negative perspective.

3.3 Relevancy analysis

110edited items were distributed to 134 extension specialists working in profuse institutes like State Agriculture Universities, CRIDA, KVK, MANAGE and other National institutes throughout India in Google docs form through mail and also to the judges who were available, they were handed over personally for critical evaluation of statements.The judges were requested to rate therelevancy of

items on a 4 point continuum*i.e,* Most relevant (MR), Relevant (R), Least Relevant (LR) and Not Relevant (LR) by assigning a score of 4, 3, 2 and 1, respectively. In addition the judges were given freedom to make any changes, additions, or deletions to the items that they deemed necessary.

The feedback from 50 of the 134 judges was received on time, with the necessary revisions and suggestions. All the statements were changed and revised accordingly. The judges' responses were then tabulated and examined.

3.3.1Relevancy Percentage (RP)

Relevancy percentage was calculatedby summing up the scores from all the four categories i.e, MR, R, LR, NR and later turned into percentage.

$$\text{Relevancy percentage} = \frac{(MR\times4)+(R\times3)+(LR\times2)+(NR\times1)}{\text{Maximum possible score } (110\times4=440)}\times 100$$

3.3.2Relevancy Weightage (RW)

Relevancy weightage is the ratio of each respondent's actual score for the statements to the maximum attainable score. It is calculated as

$$\text{Relevancy Weightage} = \frac{(MR\times4)+(R\times3)+(LR\times2)+(NR\times1)}{\text{Maximum possible score } (110\times4=440)}$$

3.3.3Mean Relevancy Score (MRS)

The following standard formula had been used for working out the MRS.

$$\text{MRS} = \frac{(MR\times4)+(R\times3)+(LR\times2)+(NR\times1)}{\text{Number of judges response } (n=50)}$$

The items with RP of greater than 80 per cent i.e., aRW of greater than 0.80 and a MRS of more than 3 were evaluated for further analysis and finally 50 statements out of 110 statements were selected.

Table 2: Statement wise relevancy percentage (RP), relevancy weightage (RW) and mean relevancy score (MRS)

Sl.No	Statements	Relevancy		
		RW	RP	MRS
A. Anxiety				
1.	I am nervous and anxious about getting viral infection during the pandemic (Covid-19).	0.885	88.5	3.54
2.	The hardships faced for availing inputs and labour increased my crop insecurity feelings.	0.855	85.5	3.42
3.	Reduced marketing options for the final produce are aggravating my worries.	0.845	84.5	3.38
4.	I am worried about difficulties in completing the agricultural operations on time.	0.825	82.5	3.42
5.	Continued agricultural activities on time even during pandemic (Covid-19) brought a great relief for me.	0.800	80.0	3.20
6.	I am jeopardized whether I can support my family financially and socially during pandemic (Covid-19).	0.845	84.5	3.38
B. Depression				
1.	Media coverage of the pandemic (Covid-19) and people helpless situations depressed me.	0.895	89.5	3.58
2.	I feltmiserable when my family members suffered with virus infection.	0.905	90.5	3.62

3.	Spending more time with family at home made me feel relaxed	0.810	81.0	3.24
4.	The thoughts of the effects of pandemic (Covid-19) on my farm and income created sad feelings in me.	0.850	85.0	3.40
5.	Post harvest losses and improper storage facilities aggravated my grief.	0.860	86.0	3.44
6.	The thoughts of loosing their lives as expressed by friends and family members filled me with great sorrow.	0.845	84.5	3.38
7.	I am a good spirited and encouraged my friends and family members to stay mentally positive.	0.845	84.5	3.38
8.	The restrictions for movements and isolation due to lockdown are making me feel stressed.	0.890	89.0	3.56
9.	My anguish towards low market prices for quality produce is exacerbated during pandemic (Covid-19).	0.835	83.5	3.34
C. Dissatisfaction				
1.	I am always adjustable for the changes made personally and professionally.	0.835	83.5	3.34
2.	Promotion of locally available/made food items always make me feel happy and time has come again.	0.850	85.0	3.40
3.	The pandemic (Covid-19) has forced us to change in lifestyle and consumption patterns leading to greater dissatisfaction.	0.810	81.0	3.24
4.	Changes in farm inputs, cropping patterns due to pandemic (Covid-19) restrictions discomforted me.	0.800	80.0	3.20
5.	Poor crop management leading to reduced yields and income left me with no hope for following seasons.	0.805	80.5	3.22
6.	Reduced income sources of family members disappointed me.	0.855	85.5	3.42
D. Irritability				
1.	Fake news regarding pandemic (Covid-19) infections that is exaggeratedly repeated in the mass media irritated me.	0.925	92.5	3.70
2.	Lack of basic medical and sanitary facilities within the village grounds made me feel annoyed.	0.835	83.5	3.34
3.	I feel fortunate to spend quality time and share responsibilities with all the members at home.	0.810	81.0	3.24
4.	Delayed credit sanctions from financial institutions frustrated me.	0.830	83.0	3.32
5.	There is growing annoyance in me due to insufficient demand for perishable goods and delayed transportation.	0.825	82.5	3.30
6.	Pressure from non-institutional sources to repay the debts increased my short temper.	0.855	85.5	3.42
7.	Avoiding watching the repetitive and fake news in social media made my mind clam.	0.835	83.5	3.34
E. Indecisiveness				

1.	The reports of the possible continuance of pandemic (Covid-19) in future created uncertainty in mind.	0.880	88.0	3.52
2.	Uncertain information about inputs and labour availability dragged me into a perplexing situation.	0.810	81.0	3.24
3.	I am unsure of using my regular marketing tactics because of high fluctuations in market prices.	0.870	87.0	3.48
4.	I feel myself highly capable to take good decisions even under uncertainties.	0.800	80.0	3.20
5.	Paradoxical views expressed by friends and relatives confused me while taking suitable decisions.	0.835	83.5	3.34
6.	It is difficult to make decisions on proportionate money distribution for personal and professional activities.	0.820	82.0	3.28
F. Social withdrawal				
1.	Quality time spent with the family members pleased me greatly outweighing the impacts of being less sociable.	0.845	84.5	3.38
2.	I can't move freely with the group as news about the pandemic (Covid-19) is spreading like wild fire.	0.860	86.0	3.44
3.	The feeling of getting infected with virus and acting as a spreader to others kept me distance from people.	0.860	86.0	3.44
4.	The hurdles to make contact with the officials made my works difficult and slow, aggravating my situation.	0.830	83.0	3.32
5.	The fear rose due to high mortality rate and unavailability of proper medical facilities pushed me to withdraw form group.	0.810	81.0	3.24
6.	Feeling of disconnected completely from others is increasing my stress.	0.810	81.0	3.24
G. Self-efficacy				
1.	I am able to manage all my family activities without any interruptions.	0.845	84.5	3.38
2.	I am able to make correct decisions even under stress conditions with calm and steady mind.	0.845	84.5	3.38
3.	It is easy for me to make adaptations in my farm to avoid the pandemic (Covid-19) effect on farming.	0.810	81.0	3.24
4.	I strongly believe that I can overcome all the problems caused by the pandemic (Covid-19) in my life.	0.840	84.0	3.36
H. Post traumatic stress				
1.	There are repeated, disturbing memories for me about stressful experiences of the pandemic (Covid-19).	0.820	82.0	3.28
2.	Afresh memories of People sufferings are making me feel uneasy	0.840	84.0	3.36
3.	I feel upset when someone reminds me of stressful farming situations.	0.820	82.0	3.28
4.	I managed to come out from that stressful period completely and started a healthy life	0.835	83.5	3.34

5.	Supporting and coordinating family activities became a real challenge.	0.820	82.0	3.28
6.	I am very practical and adapt with situations accordingly.	0.845	84.5	3.38

3.4 Item analysis

The main intent of item analysis is to find items which can distinguish between the selected two criteria effectively. The 50 finalized statements were administered to a randomly selected sample of 40 farmer respondents both from the Raichur and YSR Kadapa districts in non sample area. The respondents were requested to indicate their degree of agreement on a five point continuum namely Strongly disagree, disagree, undecided, agree and strongly agree with scores of 1, 2 ,3 ,4 and 5 for positive statements and 5, 4, 3, 2 and 1 for negative statements respectively. Each respondent's impact score was determined by summing up the scores of total items he had provided, and thus the combined scores of all 40 respondents were determined. Then based on the scores obtained by each respondent 25 per cent of them r with highest total score and other 25 per cent with lowest total score were selected. Further the t test was carried out for every statement by considering the responses of only these two groups.

$$t = \frac{x_1 - x_2}{\sqrt{s_1^2/n_1 + s_2^2/n_2}}$$

Where, x_1= Mean of higher group

$\overline{x_2}$ = Mean of lower group

n_1 = Total respondents in higher group

n_2= Total respondents in lower group

s_1^2= Higher group sample's Standard deviation

s_2^2 = Lower group sample's Standard deviation

Again,
$$s_1^2 = \frac{1}{n_1 - 1}\left[\sum x_1^2 - \frac{(\sum x_1)2}{n_1}\right]$$

$$s_2^2 = \frac{1}{n_2 - 1}\left[\sum x_2^2 - \frac{(\sum x_2)2}{n_2}\right]$$

$\sum x_1^2$ =Sum of squares of individual score of given statement for higher group

$\sum x_2^2$ = Sum of squares of individual score of given statement for lower group

Based to the thumb rule, final items to be retained in the scale include the statements with greater discriminating values while excluding the statements with weak discriminating capacity and uncertain validity. Thus 32 statements were eventually consideredfor final scale according to the following standards.

1. The 't' value should be more than 1.75

2. The statement should convey a novel idea without overlapping with others expressed.

3. The statement should be concise and with simple words.

Table 3: Statements t value analysis of the impact on farmers in non sample area

Sl.No	Statements	't' value
A. Anxiety		
1.	I am nervous and anxious about getting viral infection during the pandemic (Covid-19).	2.150
2.	The hardships faced for availing inputs and labour increased my crop insecurity feelings.	3.354
3.	Reduced marketing options for the final produce are aggravating my worries.	2.241
4.	I am worried about difficulties in completing the agricultural operations on time.	1.941

B. Depression		
1.	Media coverage of the pandemic (Covid-19) and people helpless situations depressed me.	1.781
2.	The thoughts of the effects of pandemic (Covid-19) on my farm and income created sad feelings in me.	2.369
3.	Post harvest losses and improper storage facilities are aggravating my grief.	1.800
4.	The restrictions for movements and isolation due to lockdown are making me feel stressed.	1.781
5.	My anguish towards low market prices for quality produce is exacerbated during pandemic (Covid-19).	6.139
C. Dissatisfaction		
1.	Promotion of locally available/made food items always make me happy &time has come again.	2.828
2.	The pandemic (Covid-19) has forced us to change in lifestyle and consumption patterns leading to greater dissatisfaction.	5.000
3.	Poor crop management leading to reduced yields and income left me with no hope for following seasons.	3.379
4.	Reduced income sources of family members disappointed me.	3.841
D. Irritability		
1.	Fake news regarding pandemic (Covid-19) infections that is exaggeratedly repeated in the mass media irritated me.	3.149
2.	Lack of basic medical and sanitary facilities within the village grounds made me feel annoyed.	2.052
3.	I feel fortunate to spend quality time and share responsibilities with all the members at home.	2.138
4.	There is growing annoyance in me due to insufficient demand for perishable goods and delayed transportation.	1.784
5.	Pressure from non-institutional sources to repay the debts increased my short temper.	3.200
E. Indecisiveness		
1.	The reports of the possible continuance of pandemic (Covid-19) in future created uncertainty in mind.	1.765
2.	Uncertain information about inputs and labour availability dragged me into a perplexing situation.	2.272
3.	I feel myself highly capable to take good decisions even under uncertainties.	1.975
4.	It is difficult to make decisions on proportionate money distribution for personal and professional activities.	3.308
F. Social withdrawal		
1.	Quality time spent with the family members pleased me greatly outweighing the impacts of being less sociable.	2.411

2.	I feeling of getting infected with virus and acting as a spreader to others kept me distance from people.	1.861
3.	The hurdles to make contact with the officials made my works difficult and slow, aggravating my situation.	2.113
4.	The fear rose due to high mortality rate and unavailability of proper medical facilities pushed me to withdraw form group.	2.169
G. Self- efficacy		
1.	I am able to manage all my family activities without any interruptions.	1.941
2.	I am able to make correct decisions even under stress conditions with calm and steady mind.	2.000
3.	It is easy for me to make adaptations in my farm to avoid the pandemic (Covid-19) effect on farming.	1.907
H. Post traumatic stress		
1.	There are repeated, disturbing memories for me about stressful experiences of the pandemic (Covid-19).	2.497
2.	I managed to come out from that stressful period completely and started a healthy life	2.000
3.	Supporting and coordinating family activities became a real challenge for me.	2.768

3.5 Standardization of the scale

The standardization of tools plays a very critical role in research without which the research would be incomplete. It isvital for proper data collection and helps in arriving at proper conclusion.Hence for standardizing the present constructed scale, two tools i.e., validity and reliability which are ascertained as part and parcel of constructing a measuring tool were used and carried further for its final administration.

3.5.1 Reliability

Reliability is referred as the consistency of scores or measurement which is reflected in the reproducibility of the scores. A good instrument should elicit valid responses and yield nearly same results if administered to the same respondents twice [17].

3.5.1.a Cronbach's alpha test

For measuring the reliability ofcomponents or dimensionsconsidered for study Cronbach's alpha (α) test was adopted.It is widely used to represent the reliability, or the internal consistency, of an instrument or an instrument scale in relation to a particular sample or sub sample of a population [18]. It assesses the components reliability by comparing the amount of covariance, among the items in an instrument to the amount of overall variance. It is obtained by using the formula as follows,

$$\alpha = \frac{N\bar{c}}{\bar{\vartheta}+(N-1)\bar{c}}$$

Where, N= Number of items.

$\bar{c}$= Average inter component covariance

$\bar{\vartheta}$= Average variance

All the 8 components considered were tested for obtaining reliability and the αvalue attained for the scale was 0.895. This demonstrates good accuracy of the scale andits high reliability for assessing the mental health condition of the farmers.

3.5.1.b Split-half method

In this study, split-half method was used to test the statementsreliabilityframed for the scale. Initially scale was divided into two equal halves. One half consists of odd numbered statements (1, 3, 5, etc.)

and other half has even numbered statements (2, 4, 6, etc.). The scale was then administered to 20 farmers and were asked to rate each statement. Later Karl Pearson's product moment correlation coefficient was calculated between the two sets of scores. Then the reliability of half test was computed by applying the formula given below

$$r_{1/2} = \frac{n(\sum XY) - (\sum X)(\sum Y)}{\sqrt{[n\sum X^2 - (\sum X)^2][n\sum Y^2 - (\sum Y)^2]}}$$

Where, $\sum X$ = Sum of the scores of odd numbered items
$\sum Y$ = Sum of the scores of even numbered items
$\sum X^2$ = Sum of the squares of odd numbered items
$\sum Y^2$ = Sum of the squares of even numbered items
n = Total number of respondents

The half testreliability ($r_{1/2}$) was 0.581, and is significant at 5 percent level of probability. Further,reliability coefficient (r) for whole testwas estimated using the Spearmans-Brown formula, as follows

$$r = \frac{2\times(r_{1/2})}{1+(r_{1/2})}$$

The whole testreliability for the scale (r) was 0.734, which indicates its higher significance at one percent level of significance and its high reliability. The scale can therefore be trusted and is reliable to assess andquantify the psychological impact of farmers during pandemic situations.

3.5.2 Validity

Validity of the test is defined as the degree to which the test measures that which it is intended to measure. It ensures that the obtained test score is valid, if it measures what it claims to measure. For the present study, two types of validity were used i.e., face validity and content validity. As they were determined to be appropriate after taking suggestions from the experts they were administered to estimate scale's validity.

3.5.2.a Face validity

A scale is said to possess face validityespecially if it appears valid to a layman. Making it palatable to the examinee is more scientific and professional justifiable reason for obtaining face validity. When the scale was administered to experts in the various fields who were conversant with the scale development and from agricultural extension in particular they opined that the present scale under study looked valid. Therefore the scale obtained face validity.

3.5.2.b Content validity

When the contents of the items individually and as a whole are relevant to the test, it represents content validity. It shows how well the scale's content samples the subject matter from which conclusions are to be drawn. The tool was examined, criticized, and commented on by specialists from the experts ofvarious fields like agricultural extension, economics etc. The scale then wasmodified accordingly to their comments and criticisms made. Thus, this indicates content validity of the scale.

The scale was finalized after the reliability and validity testing were completed and it consists of 32 statements organized under eight components. The components include Anxiety, Depression, Dissatisfaction, Irritability, Indecisiveness, Social withdrawal, Self efficacy and Post traumatic stress.

3.6 Administering the scale

During final selection all the 32 items under 8 components which obtained the judges reliability andvalidity were retained in the scale. This finalized scale was administered to farmer respondents and were asked to express their agreement or disagreement on a five point continuum *viz.,* Strongly Agree, Agree, Undecided, Disagree, and strongly disagree for all the 32 statements. The order of scores for positive statements was 5, 4, 3, 2 and 1 respectively and vice versa for negative statements. Thus theindividual respondent's possible scorefor the psychological impact of Covid-19 on them was obtained. The responses were recorded and the frequency, percentages were employed to the data.

The minimum and maximum scores that can be obtained by each respondent are 32 and 160. Further, the farmers were grouped into less impact, moderate impact and high impact based on their scores obtained and by considering the mean, standard deviation as a measure of check.

4. CONCLUSION

In case of any pandemic and natural disasters the impact is viewed primarily through a biological lens because of its greater impact on health and the economy, but its psychosocial repercussions have been neglected which is also equally important to their physical health. Hence for measuring the psychological conditions of farmers in unprecedented situations and analyze their mental health the scale has been developed. This will help the researchers, extension agents and others who want to estimate the psychological impact of farmers and can design the training, motivational sessions accordingly for betterment of the mental health of farmers under depressed situations. With the appropriate modifications, this scale can also be used to analyze additional uncertainties faced by farmers in the future, in addition to the psychological effects of Covid-19.

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