RESEARCH ARTICLE

Financial literacy as a mediator of personal financial health during COVID-19: A structural equation modelling approach [version 1; peer review: 2 approved with reservations]

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Abstract

The coronavirus disease 2019 (COVID-19) pandemic has become a global humanitarian challenge. This scourge has impacted people from all walks of life as well as every economic sector and activity, from travel to automotives, hotels to banking, and supply chain to retail. The pandemic has affected not only physical and mental health but also financial health. Studies have examined the pandemic's economic impact, but very few have examined its impact on personal finances. Efforts to contain the pandemic's spread, such as lockdowns, have resulted in suspended business operations throughout the world that have intensified joblessness. To prepare and protect people from such unforeseen situations, financial education and planning are necessary. We attempt to expand the evidence on this issue by applying a structural equation modelling approach to identify the mediating role of financial literacy programs in preparing and protecting household wealth against sudden worldwide setbacks. The research design is descriptive and exploratory using snowball sampling technique. The data was collected through an internet survey. In total, 400 survey responses were obtained. After testing the measurement model for key validity dimensions, the hypothesised causal relationships are examined in several path models. The results indicated that coronavirus awareness exerts a direct or indirect influence on the financial health of individuals through financial literacy. We conclude that financial literacy has a full mediating effect on the personal finance of individuals during the COVID-19 pandemic. The findings not only contributed to the need and understanding of financial literacy but also have managerial implications. Financial literacy programs provide investment advice and suggestions which are actionable and also work to help individuals to come out stronger in terms of knowledge and skill set when the COVID-19 crisis passes.

Keywords

COVID-19, financial health, financial literacy, structural equation modelling.

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Any reports and responses or comments on the article can be found at the end of the article.

This article is included in the [Coronavirus \(COVID-19\)](#) collection.

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Introduction

A pandemic refers to any sudden outbreak of contagious disease over a wide geographical area, accompanied by high morbidity and mortality rates (Madhav *et al.*, 2017). It can cause major socio-economic and political disruptions as it directly or indirectly interrupts and hinders all events, activities, and processes pertaining to global development. Pandemics can occur for many reasons, including over-exploitation of natural resources, blurring of geographic boundaries through travel, excessive integration of trade, and globalisation. Though pandemics have occurred since time immemorial, their frequency has increased manifold (Jones *et al.*, 2008) (Morse, 1995). New deadly viruses have emerged through animals, which act as disease vectors. Influenza has the highest probability of causing a pandemic. Analytical tools, such as exceedance probability curve estimates, have shown that influenza has a one percent probability of causing 6 million pneumonia-related deaths in any given year (Patel *et al.*, 2015).

Coronavirus disease 2019 (COVID-19) originated in Wuhan, China in 2019 (see World Health Organization site). As with any pandemic, COVID-19 carries both, a spark risk and a spread risk (Morse, 1995). Spark risk is the risk created at the location where the disease originated. In the case of COVID-19, the spark risk started in Wuhan, China, and the spread risk permeated to other parts of the world. Although the pandemic has led to social, political, economic, and financial disruptions, this study is limited to the economic disruptions and people's financial losses. COVID-19, like any pandemic, has the capacity to cause long-term economic damage via short-term fiscal shocks.

In the field of personal finance, financial health defines a person's monetary state in four dimensions: savings, spending, borrowing, and planning. One can also explain financial health in terms of overall financial capability¹, financial wellness², and financial well-being³. The four dimensions of savings, spending, borrowing, and planning, along with financial capability, wellness, and well-being, provide a holistic picture of financial health. (Xiao *et al.*, 2016).

Both intrinsic and extrinsic factors affect financial health. Intrinsic factors include an individual's attitude, awareness, numeracy skills, knowledge, risk-taking abilities, far-sightedness, and inherent behaviour. Intrinsic factors are subjective and vary from person to person. Extrinsic factors may include socio-economic, political, geographical, and natural disasters such as droughts, floods, earthquakes, and disease outbreaks that lead to pandemics. They may also include circumstances such as World Wars, nuclear attacks, bioterrorism, recessions, and stock market crashes.

Extrinsic factors are uncontrollable, and they cause financial shocks. Thus, sound financial health should not only cater to current needs for saving and meeting immediate financial goals, but also prepare and protect against financial shocks brought about by extrinsic factors. Such preparation and protection are facilitated by financial literacy and awareness. Financial literacy and awareness refer to a person's orientation towards the needs and advantages of savings, investment, and financial planning, as well as their knowledge of various financial products, basic numeracy skills, and other money management tasks, in order to make sound financial decisions and have good financial health (Widyastuti *et al.*, 2016). This study examines the effect of the coronavirus pandemic on the financial health of the urban banking public in general, and the mediating effect that financial literacy may have.

Literature review

Several studies have examined the effect of pandemics on the world's economic condition. Studies have identified the reasons behind pandemic outbreaks as the over-exploitation of natural resources, rapid urbanisation and land use, and recent increases in global travel and integration (Jones *et al.*, 2008; Morse, 1995). A study examined the economic impact of pandemic influenza to identify intervention priorities in the United States via death rates, hospitalisation data, and hospital visits. After excluding disruptions to commerce and society, it estimated the economic impact to be around \$166.5 billion. The study revolved around the potential economic returns of vaccination (Meltzer *et al.*, 1999). Another study estimated the aggregate macroeconomic impact of the HIV/AIDS pandemic in South Africa using a computable general equilibrium approach. The researchers investigated the interaction between unemployment and AIDS and concluded that the pandemic depressed labour demand, with several notable features. First, the rate of overall economic growth declined. Second, there was a decline in certain sectors, such as construction, equipment supplies, investments, and commodities. Third, AIDS-induced morbidity depressed output in sectors that employed unskilled and semi-skilled labour, causing additional negative implications for employment (Arndt & Lewis, 2001). Another study revealed the need to devise and identify specific policies to limit the spread of pandemics. To sustain investment and foster preparedness and health capacity requires strict policies (Smolinski *et al.*, 2003). Many countries devised strategies and policies to mitigate the impact of pandemics in 2003 when there was an outbreak of severe acute respiratory syndrome. A review paper by Rashid *et al.*, 2015 on responses to influenza pandemics concluded that school and workplace closures appeared to be effective in preventing influenza transmission, but it ignored intra-household disease transmission and the very high secondary costs involved. Lockdowns, whether proactive or reactive, were economically disruptive.

Research has revealed that, despite continuous improvements in policymaking, significant gaps exist in global pandemic preparedness. Health encompasses physical as well as mental health, but mental health preparedness has been completely ignored. Its preparation has been insufficient and completely uneven, catering primarily to physical health instead (Fischer & Katz, 2013). Financial health also affects mental health, as

¹Financial capability refers to people's capacity in terms of their knowledge, skills, and money management behaviour in the enabling environment. It is dynamic in nature, as it differs from one person to another.

²Financial wellness is the ongoing and active process of combining financial awareness, literacy, and numeracy skills, with a check on financial behaviour, to achieve financial satisfaction.

³Financial well-being is the end result of desirable financial capability and financial wellness.

people who lose their jobs in the pandemic, and families that lose their income earners, are worried and stressed. A historical review of the literature indicates that it is a dire and pressing requirement to identify and study these gaps.

Research gaps

- There is little focus on the effect of pandemics on joblessness, business losses, and, eventually, on personal finance, in terms of eroded savings and increased expenses.
- The probable solutions provided for the protection of household wealth during pandemics are reactive rather than proactive.

Rationale

The rationale of our study is to prepare people financially for pandemics through financial education. Our research examines the effect of the COVID-19 pandemic, and of the subsequent lockdowns to arrest its spread, on the financial health of individuals. Financial health incorporates four areas of personal finance: savings, spending, borrowing, and planning.

Objectives

1. To identify the impact of coronavirus awareness on the financial health of individuals.
2. To understand how financial literacy mediates the relationship between coronavirus awareness and financial health.

Hypotheses

Null hypothesis H₀₁: There is no relationship between coronavirus awareness (the independent variable, or IV) and financial health (the dependent variable, or DV).

Alternative hypothesis H₁₁: There is a relationship between coronavirus awareness (IV) and financial health (DV).

Mediating null hypothesis MedH₀₂: Financial literacy (Mediator) does not mediate the relationship between coronavirus awareness (IV) and financial health (DV).

Mediating alternative hypothesis MedH₁₂: Financial literacy (Mediator) mediates the relationship between coronavirus awareness (IV) and financial health (DV).

Methods

Data

This study collected its own data, because the required data were not available. We used a web-based survey questionnaire to collect data through snowball sampling, with a sample size of 400. In our study, a structured questionnaire was sent across through e-forms via email or push messages (see extended data (Mishra, 2020)). The size of the population of this research was not identified, therefore to determine the sample size, Slovin's formula with error standard of 5% was used. We have supposed that a group of 2000-3000 urban working individuals needs to be surveyed to gauge the effect of coronavirus awareness and the mediating effect of financial literacy on the financial health of

individuals in COVID-19. Thus, N is taken as 2500 on an average. A margin of sampling error of 0.05 was considered for the survey. Using Slovin's formula, we arrived at the required web sample survey size which is as follows:

$$n = N / (1 + Ne^2);$$

where, n = sample size,

N = Total population

e = Error tolerance.

$$\begin{aligned} n &= 2500 / (1 + 2500 * 0.05^2) \\ &= 344.8 \end{aligned}$$

Thus, post rounding off the figure, we decided the sample size to be nearing 350 but we successfully received 400 responses. Urban banking individuals were the units of analysis. Out of the final sample of 400 respondents, 160 were female and 240 were male, and the highest response rate, 93%, was in the millennial age bracket of people between 20 and 40 years old. It is shown in Figure 1. The scale consisted of items on a five-point Likert scale, ranging from 1=strongly disagree to 5=strongly agree. We utilised AMOS 23 for inferential analysis using structural equation modelling (SEM).

Ethics and consent

This study was approved by the Ethical and Biosafety Committee of Babasaheb Bhimrao Ambedkar University (BBAU/EBC/2020/212-M). The study questionnaire began with a disclaimer stating the purpose of the research and informing participants all data would be anonymised. Proceeding with and completion of the questionnaire was considered to imply consent for participation.

Preliminary pilot testing

Satisfactory preliminary pilot testing has been performed on 40 participants. We identified participants from our social groups and acquaintances who were financially independent. We further invited them formally in a message or email with due consent in the form of an explicit disclaimer to participate in the survey questionnaire. No changes were implemented in the questionnaire resulting from the preliminary testing.

Research methodology

We have created a novel questionnaire to collect the data. Data collection was done with a web based survey. Urban banking individuals either self employed or government/private/corporate professionals or research students availing fellowships were identified through snowball convenience sampling and invited to participate in a web based survey through mails and push messages. It is a type of chain-referral sampling technique where existing study subjects recruit future subjects from among their acquaintances. We started with a small pool of initial respondents from our social groups and acquaintances who were financially independent. They were invited to participate with a formal message or mail with due consent in the form of an explicit disclaimer to participate in the survey questionnaire. They further nominated others who meet the eligibility criteria and who could

Figure 1. Gender and age of survey respondents. In the final sample of 400 respondents, 240 were males and 160 were females constituting the 60:40 ratio, whereas the highest response rate of 93% was from the millennial age bracket of 20–40 years.

potentially contribute to our study through their social networks. The inclusion criteria for participants was that they should be financially independent banking individuals earning a living in form of wages, salary or stipend. The exclusion criteria remained the financially dependent, non-earning individuals like minors and housewives. The first data was received on the 30.03.2020 and the end data was collected on 03.04.2020 comprising a total 400 records on a web-based data collection platform. The responses to the questionnaires are provided as underlying data (Mishra, 2020).

The questionnaire has been validated under the validity testing, preliminary pilot testing, and reliability testing. The convergent validity is tested using AVE (Average Variance Extracted). All the AVE values are near to 0.5 which proves the convergent validity of the questionnaire. For establishing the discriminant validity, the discriminant value must be more than the latent variables correlations. The Discriminant value is 0.651 for coronavirus awareness construct, 0.537 for financial literacy construct and 0.620 for financial health construct which is more than the correlations values of 0.408, 0.133 and 0.182 respectively, thus proving the discriminant validity. Composite reliability indicates the shared variance among the observed variables of a latent construct. Composite reliability is also called as internal consistency reliability. The composite reliability of coronavirus awareness construct is 0.777, which is more than 0.7; hence, the measurement model of coronavirus awareness construct is having required internal consistency reliability between indicators CVA9, CVA8, CVA6, CVA2, and CVA1. The composite reliability of financial health construct is 0.752, which is also more than 0.7; hence, the measurement model of financial health is having required internal consistency reliability between indicators FH5, FH4, FH3, FH2, and FH1. The composite reliability of financial literacy construct is 0.534 (near to 0.6 or higher is acceptable for an exploratory), hence the measurement model of financial

literacy is having required internal consistency reliability between indicators FL6, FL5, FL3, FL2, and FL1.

This study employed an exploratory and descriptive research design. The exploratory design helps formulate hypotheses, whereas the descriptive design helps test the hypotheses. We set the level of significance at 5%. For scale development and tool standardisation, we performed factor and reliability analysis for every factor. Under factor analysis, we conducted principal component analysis and calculated the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and percentage of variance. Moreover, we conducted a reliability analysis considering Cronbach's alpha and corrected item-total correlation (CITC). As per accepted thresholds, we used a minimum alpha of 0.70 and a CITC value of more than 0.300 to select the final online questionnaire survey items for the three constructs. In this study, the alpha was over 0.70 for each of the constructs/latent variables, thus establishing the high reliability of the questionnaire.

The IBM SPSS 23.0 version and its add on feature AMOS 23.0 version software is used for the statistical analysis. The statistical tools utilised under these softwares are confirmatory factor analysis and SEM. The results of four conditions of Baron and Kenny's mediation analysis are verified with the help of the Sobel, Aroian, and Goodman test values using online calculators on <http://quantpsy.org/sobel/sobel>.

The IBM SPSS 23.0 version and its add on feature AMOS 23.0 version software is a proprietary software. It is not an open-access software. The open-access alternative that can perform an equivalent function are as follows :

Tetrad

Tetrad is a freeware which performs many statistical functions. It is user friendly in nature. Users need not be updated about the

programming language to work on the same. The scope of Tetrad is limited to linear models and models of categorical or ordinal data with a normal probability distribution. The program runs under the GNU GPL v.2 license and is available for free download.

LISREL

It is also a freely available software used for structural equation modelling. It allows researchers to empirically assess their data and theories in the fields like social sciences and management sciences.

R library: Lavaan

It is free and fully open sourced software with commercial quality for latent variable modelling. R package is very user friendly in nature.

Reliability testing

1. Internal consistency and reliability

The Cronbach's alpha values for coronavirus awareness, financial health, and financial literacy construct are 0.783, 0.763, 0.653 respectively. Calculations were performed using SPSS 23.0. The composite reliability coronavirus awareness, financial health, and financial literacy construct are 0.777, 0.620, 0.534 respectively, hence, all the constructs are having required internal consistency reliability.

All items of coronavirus awareness, financial health, and financial literacy construct are having the CITC (Correlated Item- total correlation) values greater than 0.300, which proves their internal reliability.

2. Test-retest

The questionnaire was tested in two different time interval and found that there was no significant difference in the correlation results, hence test-retest reliability was high for the finalized questionnaire.

3. Inter-rater

The questionnaire was also tested by the different researchers and found that there was no significant difference in the correlation results, hence inter-rater reliability was also proved.

Coronavirus awareness (CVA)

In our study, coronavirus awareness (CVA) acts as an independent variable which enquires about the awareness and knowledge about COVID-19 in terms of its origin, symptoms, virus spread and precautionary measures like social distancing amongst the respondents. We studied novel coronavirus awareness as the IV and examined its effect on the personal financial health of individuals.

Table 1 displays the results of the reliability and factor analysis, and we selected 5 of the 9 items for SEM as under:

CVA1 (I understand the seriousness of the new Coronavirus),

CVA2 (The new coronavirus spread from person to person),

CVA6 (The virus originally came from Wuhan, China),

CVA8 (Social distancing, hand wash, hygiene, sanitising quarantine, lockdown will help in controlling the outbreak) and

CVA9 (Symptoms include sore throat, fever, breathlessness, joint pain, and dysentery.)

Financial literacy (FL)

Financial literacy (FL) is another IV which encompasses a person's basic awareness of financial products, numeracy skills, and money management tactics. We investigated the mediating effect of financial literacy on a person's preparedness for unforeseen pandemic situations such as COVID-19. Table 2 presents the results of the reliability and factor analysis, and we retained 5 of the 6 items for SEM as under:

FL1 (Banks are giving their best services),

FL2 (This is an opportunity to buy stocks at discounted prices as market dips),

FL3 (Digital payments/ ADCs/ UPIs are offering comfort with discounts and help in combating virus spread through currency notes),

FL5 (One should have a diversified portfolio of investment to curtail market risk) and

FL6 (I am aware of telecom's life segment bundled product which is offering term insurance plans on phone recharges).

With the advent of financial inclusion and digital enablement, different industries have joined hands to enter the financial sector. Telecom, E-commerce, Social media platforms etc have entered into finance sector and are termed as fintech companies. Insurance adoption and penetration is low in both rural and urban areas. With the product integration of a telecom giant and a leading private commercial bank, an attempt has been made to remove the barrier in order to provide basic insurance to all. The purpose of putting this question in the survey questionnaire is to check the financial awareness of innovative financial products like the Telecom's life segment bundled product.

Table 1. Reliability and factor analysis for coronavirus awareness. KMO - Kaiser-Meyer-Olkin.

Cronbach's Alpha	KMO Test	N of Items	% of Variance
0.783, 0.777	0.718	5	53.809

Table 2. Reliability and factor analysis for financial literacy.

KMO Kaiser-Meyer-Olkin.

Cronbach's Alpha	KMO Test	N of Items	% of Variance
0.653, 0.534	0.703	5	43.055

Financial health

The personal financial health of individuals was the DV that coronavirus awareness and financial literacy affected. Financial health encompasses people's savings, liquidity, borrowings, as well as their present and future capability, in terms of their financial assets and liability. Table 3 displays the results of the reliability and factor analysis, and we retained 5 out of 6 items for SEM: FH1, FH2, FH3, FH4, and FH5 as under:

FH1(My earnings are arrested and savings getting eroded due to pandemic outbreak and further lockdown),

FH2 (Impulsive use of credit card is happening),

FH3 (Forced to do panic buying and hoarding),

FH4 (Forced to do panic buying and hoarding) and

FH5 (Tend to withdraw cash more often).

Table 4 provides the correlations among the three latent variables of coronavirus awareness, financial literacy, and financial health. All three latent variables were positively correlated with each other.

In addition, the correlation between coronavirus awareness and financial literacy > the correlation between financial health and financial literacy > the correlation between coronavirus awareness and financial health.

Table 5 displays the standardised regression weights. Since all the standardized regression weights (estimates) are more than 0.300, hence it can be concluded that the items under each construct explained above, truly represent the characteristics of

Table 5. Corrected item-total correlation (CITC), standardised regression weights (SRW).

			CITC	SRW
CVA9	<---	CVA	0.609	0.762
CVA8	<---	CVA	0.709	0.856
CVA6	<---	CVA	0.470	0.547
CVA2	<---	CVA	0.543	0.572
CVA1	<---	CVA	0.478	0.429
FH5	<---	FH	0.561	0.687
FH4	<---	FH	0.531	0.644
FH3	<---	FH	0.564	0.740
FH2	<---	FH	0.483	0.467
FH1	<---	FH	0.534	0.520
FL6	<---	FL	0.361	0.464
FL5	<---	FL	0.453	0.525
FL3	<---	FL	0.451	0.635
FL2	<---	FL	0.438	0.508
FL1	<---	FL	0.385	0.543

CVA - coronavirus awareness

FH - financial health

FL - financial literacy

Table 3. Reliability and factor analysis for financial health.

KMO Kaiser-Meyer-Olkin.

Cronbach's Alpha	KMO Test	N of Items	% of Variance
0.763, 0.620	0.775	5	51.740

Table 4. Correlation matrix and discriminant value.

	Coronavirus awareness	Financial literacy	Financial health
Coronavirus awareness	1 (Discriminant value = 0.651)		
Financial literacy	0.408*	1 (Discriminant Value =0.537)	
Financial health	0.133*	0.182*	1 (Discriminant Value =0.620)

*Correlation is significant at the 0.01 level (two-tailed)

their respective constructs. The higher factor loading is better for further statistical analysis.

Structural equation model

We formed an integrated model with a series of dependence relationships among the constructs represented by the measured variables. We based the model on the principle of regression and factor analysis.

This study examines many questions: what variables determine coronavirus awareness? How does coronavirus awareness affect the personal financial health of individuals? What effect does coronavirus awareness have on financial literacy? In what way does it help protect financial health? We cannot answer such an inter-related set of questions with a unified form of analysis that uses a single statistical tool. We must use a unified and integrated measurement model called SEM (Malhotra & Dash, 2019). Coronavirus awareness, financial health, and financial literacy, coded as CVA, FH, and FL, are latent constructs that we cannot observe or measure directly. SEM examines the contribution of each observed variable to determine the latent construct. It generated a series of structural equations by examining the structure of those interrelationships. SEM has two parts:

1. **Measurement model:** This part of the model draws arrows from the constructs to the observed variables.

Development and validation of the measurement model: For the development and validation of the measurement model, each construct is validated under the confirmatory factor analysis. The confirmatory factor analysis is conducted to reconfirm the results obtained from the exploratory factor analysis. The confirmatory factor analysis is done to finalize the construct for further development of the measurement model. All the required model fit indices like GFI (Goodness-of-Fit), AGFI (Adjusted Goodness-of-Fit), TLI (Tucker Lewis Index), CFI (Comparative Fit Index), NFI (Normed Fit Index), and RMSEA(Root Mean Square Error of Approximation) are used for good model fit. The minimum CMIN/DF (Chi-square Mean/Degree of Freedom) is achieved for each construct under the confirmatory factor analysis.

The model fit indices for coronavirus awareness are as follows:

The value of CMIN/DF, RMSEA and P(Significance value) are 2.717, 0.066, and 0.043 respectively. The value of GFI, AGFI, TLI, CFI, and NFI are 0.992, 0.961, 0.972, 0.992, and 0.987 respectively which proves the validation of the coronavirus awareness model. All the model fit indices show that the confirmatory factor analysis of the coronavirus awareness model is a good fit model. (See Figure 2)

The model fit indices for financial literacy are as follows:

The value of CMIN/DF, RMSEA, and P are 2.727, 0.066, and 0.028 respectively. The value of GFI, AGFI, TLI,

CFI, and NFI are 0.990, 0.961, 0.935, 0.974, and 0.960 respectively which proves the validation of the financial literacy model. All the model fit indices show that the confirmatory factor analysis of financial literacy model is a good fit model. (See Figure 3)

The model fit indices for financial health are as follows:

The value of CMIN/DF, RMSEA, and P are 2.490, 0.061, and 0.041 respectively. The value of GFI, AGFI, TLI, CFI, and NFI are 0.991, 0.965, 0.968, 0.987, and 0.979 respectively which proves the validation of the financial health model. All the model fit indices show that the confirmatory factor analysis of financial health model is a good fit model. (See Figure 4)

The measurement model is specified in a way that the three factors namely CVA(Coronavirus awareness), FH (Financial health) & FL(Financial literacy) correlate with each other. All the three factors are showing association with their respective five items. The three factors are positively correlated with each other with a maximum correlation of 0.41 between coronavirus awareness and financial literacy. (See Figure 5)

The model fit indices for the measurement model are as follows:

The value of CMIN/DF, RMSEA, and P are 3.457, 0.078, and 0.000 respectively. The value of GFI, AGFI, TLI, CFI, and NFI are 0.911, 0.874, 0.832, 0.864, and 0.820 respectively which is near to acceptable range which proves the development and validation of the measurement and structural model. These values are the AMOS output under the model fit heading. (The acceptable range of

Figure 2. Confirmatory factor analysis of coronavirus awareness. The figure depicts the construct coronavirus awareness (CVA) having five items. The rectangular shape represents the observed variables. The oval shape represents the latent variable. The value of CMIN/DF (Chi-square Mean/Degree of Freedom), RMSEA (Root Mean Square Error of Approximation), and P (Significance value) are 2.717, 0.066, and 0.043 respectively. The value of GFI (Goodness-of-Fit), AGFI (Adjusted Goodness-of-Fit), TLI (Tucker Lewis Index), CFI (Comparative Fit Index), and NFI (Normed Fit Index) are 0.992, 0.961, 0.972, 0.992, and 0.987 respectively which proves the validation of the coronavirus awareness model. All the model fit indices show good fit for the confirmatory factor analysis of the coronavirus awareness model.

Figure 3. Confirmatory factor analysis of financial literacy. The figure depicts the construct financial literacy (FL) having five items. The rectangular shape represents the observed variables. The oval shape represents the latent variable. The value of CMIN/DF (Chi-square Mean/Degree of Freedom), RMSEA (Root Mean Square Error of Approximation), and P (Significance value) are 2.727, 0.066, and 0.028 respectively. The value of GFI (Goodness-of-Fit), AGFI (Adjusted Goodness-of-Fit), TLI (Tucker Lewis Index), CFI (Comparative Fit Index), and NFI (Normed Fit Index) are 0.990, 0.961, 0.935, 0.974, and 0.960 respectively which proves the validation of the financial literacy model. All the model fit indices show good fit for the confirmatory factor analysis of the coronavirus awareness model.

Figure 4. Confirmatory factor analysis of financial health. The figure depicts the construct financial Health (FH) having five items. The rectangular shape represents the observed variables. The oval shape represents the latent variable. The value of CMIN/DF (Chi-square Mean/Degree of Freedom), RMSEA (Root Mean Square Error of Approximation), and P (Significance value) are 2.490, 0.061, and 0.041 respectively. The value of GFI (Goodness-of-Fit), AGFI (Adjusted Goodness-of-Fit), TLI (Tucker Lewis Index), CFI (Comparative Fit Index), and NFI (Normed Fit Index) are 0.991, 0.965, 0.968, 0.987, and 0.979 respectively which proves the validation of the financial health model. All the model fit indices show good fit for the confirmatory factor analysis of the coronavirus awareness model.

Figure 5. Measurement model. The measurement model is specified in a way that the three factors namely CVA (coronavirus awareness), FH (financial health) and FL (financial literacy) correlate with each other. All the three factors are showing association with their respective five items. The three factors are positively correlated with each other with a maximum correlation of 0.41 between coronavirus awareness and financial literacy.

GFI, AGFI, TLI, CFI, and NFI should be near to 0.9, CMIN/DF should be in between 2 to 3, and RMSEA values should be near or below 0.05)

2. **Structural model:** This part of the model displays the interrelationships between constructs with multiple dependence relationships. Ovals represent the constructs, while squares represent the items of the construct. The standard regression weight between CVA (coronavirus Awareness) & FH (financial health) diminishes from 0.13 to 0.07 after the addition of the mediator FL (financial literacy). Thus, showing full mediation by the mediating variable. The IV (coronavirus awareness) exerted its total influence on the DV (financial health) through the mediating variable (financial literacy). If we take the mediator away, the relationship between the DV and the IV disappears. It shows the importance of financial literacy programs for good financial health. All three constructs are represented by their own sets of observed variables with error variables e1-e17. Out of which e4-e5 and e11-e12 are correlated with each other. The assignment of measured variables to each latent construct is graphically equivalent to drawing arrows from each construct to the measured variables that represent that construct. The degree to which each measured variable is related to its construct is represented by that variable's loading as values on the arrows.

Analysis and results

Mediation effects

We considered a variable to be a mediator based on the extent to which it carried the influence of a given IV on a given DV. Generally, we can say mediation occurs when (1) the IV significantly affects the mediator, (2) the IV significantly affects the DV in the absence of the mediator, (3) the mediator has a significant, unique effect on the DV, and (4) the effect of the IV on the DV diminishes after the addition of the mediator to the model.

Baron and Kenny's mediating analysis

Condition 1: The IV should significantly affect the mediator.

Under this condition, we studied the effect of coronavirus awareness on financial literacy to examine the effect of the IV on the mediator.

Table 6 reveals a value of p (***) < 0.05 , indicating that there exists an effect of IV (coronavirus awareness) on the mediator

(financial literacy). Here, p^{***} means the value of p is 0.00. This satisfied the first condition of Baron and Kenny's mediating analysis.

The standardised regression weight is 0.446, which indicates that for every one standard deviation (SD) increase in coronavirus awareness, there is 0.446 SD increase in financial literacy. The standard error (SE) is very low (0.068), hence the sample size is sufficiently large and it truly belongs to the selected population. Since the critical ratio (CR=5.821) is > 1.96 for the regression weight 0.446, hence the path between coronavirus awareness and financial literacy is significant at the 0.05 level or better. (Z Score 1.645, 1.96 and 2.576 represent 90%, 95% and 99% confidence Interval respectively). Figure 6 explains the structural model on the condition 1 of the Baron and Kenny's Mediating Analysis.

Condition 2: The IV significantly affected the DV in the absence of the mediator.

Table 7 reveals a value of p (.044) < 0.05 , indicating that there exists an effect of IV (coronavirus awareness) on the DV (financial health) in the absence of the mediator. The standardised regression weight is 0.127, which indicates that for every one SD increase in coronavirus awareness, there is 0.127 SD increase in financial health. The standard error (SE) is very low (0.090), hence the sample size is sufficiently large, and it truly belongs to the selected population. Since the critical ratio (CR=2.014) is > 1.96 for the regression weight 0.127, hence the path between coronavirus awareness and financial health is significant at the 0.05 level or better. This satisfied the second condition of Baron and Kenny's mediating analysis. Figure 7 explains the structural model on the condition 2 of the Baron and Kenny's Mediating Analysis.

Condition 3: The mediator has a significant, unique effect on the DV.

Table 8 reveals a value of p (0.007) < 0.05 , indicating that there exists a significant, unique effect of the mediator (financial literacy) on the DV (financial health). The standardised regression weight is 0.202, which indicates that for every one SD increase in financial literacy, there is 0.202 SD increase in financial health. The standard error (SE) is very low (0.141), hence the sample size is sufficiently large, and it truly belongs to the selected population. Since the critical ratio (CR=2.702) is > 1.96 for the regression weight 0.202, hence the path between financial literacy and financial health is significant at the 0.05 level or better. This

Table 6. Standardised Regression Estimate: Independent Variable -----> Mediator (coronavirus awareness----->Financial literacy).

Direct Path	Standardised Regression Estimate	S.E.	C.R.	P
Financial literacy ← coronavirus awareness	0.446	0.068	5.821	0.000

Figure 6. The effect of coronavirus awareness on financial literacy. The figure displays both coronavirus awareness (CVA) and financial literacy construct (FL) represented by their respective observed variables. The e1 to e16 error variables are used for the unexplained content, in which a latent variable is not able to describe perfectly about the observed variables. Out of which e4-e5 and e7-e9 are correlated with each other. The standard regression weight between CVA and FL is 0.45. The values on the arrow are path coefficients. The values on the corner of the rectangle are known as the coefficient of determination R^2 . The constructs, observed variables, and the error variables are represented by oval, rectangular, and circular shapes respectively.

Table 7. Standardised Regression Estimate: Independent Variable ----> Dependent Variable (coronavirus awareness ----->financial health).

Direct Path	Standardised Regression Estimate	S.E.	C.R.	P
Financial health ← coronavirus awareness	0.127	0.090	2.014	0.044

Figure 7. The effect of coronavirus awareness on the financial health. The figure depicts the standard regression weight between CVA (coronavirus awareness) and FH (financial health) as 0.13. Both the constructs are represented by their own sets of observed variables with error variables e1-e17. Out of which e3-e4, e4-e5, and e11-e12 are correlated with each other. The assignment of measured variables to each latent construct is graphically equivalent to drawing arrows from each construct to the measured variables that represent that construct. The degree to which each measured variable is related to its construct is represented by that variable's loading as values on the arrow shown in the figure.

Table 8. Standardised Regression Estimate: Independent Variable-----> Dependent Variable (financial literacy ----->financial health).

Direct Path	Standardised Regression Estimate	S.E.	C.R.	P
financial health ← financial literacy	0.202	0.141	2.702	0.007

satisfied the third condition of Baron and Kenny's mediating analysis. Figure 8 explains the structural model on the condition 3 of the Baron and Kenny's mediating analysis.

Condition 4: The effect of the IV on the DV diminishes after the addition of the mediator to the model.

Table 9 reveals that the standardised regression weight is 0.070, which indicates that for every one SD increase in coronavirus awareness, there is 0.070 SD increase in financial health. The standard error (SE) is low (0.100), hence the sample size is sufficiently large and it truly belongs to the selected population. Since the critical ratio (CR=0.978) is < 1.64 for the regression weight 0.070, hence the path between coronavirus awareness and financial health is insignificant at the 0.10 level. Since the standardised regression estimate values shrank from 0.127 to 0.070 and $p > 0.050$ ($p = 0.328$), there existed full mediation by the mediating variable; thus, the IV (coronavirus awareness) exerted its total influence on the DV (financial health) through the mediating variable (financial literacy). A p-value of less than 0.05 would have indicated a partial mediation effect. Hence, the fourth condition of Baron and Kenny's mediating analysis was also

satisfied. A p-value of less than 0.05 would have indicated a partial mediation effect. Figure 9 explains the structural model on condition 4 of the Baron and Kenny's Mediating Analysis.

Sobel, Aroian, and Goodman tests

We used an online excel calculator to check the SEM's results that indicated a full mediation effect of financial literacy on the financial health of individuals during the COVID-19 pandemic.

As Table 10 indicates, the p-value was less than 0.05, indicating that the IV exerted its total influence through the mediating variable.

Thus, in our study, the null hypothesis and mediating null hypothesis are not accepted. Therefore, we can conclude the following:

- There is a relationship between coronavirus awareness (IV) and financial health (DV).
- Financial literacy (Mediator) mediates the relationship between coronavirus awareness (IV) and financial health (DV) with full mediation effect.

Figure 8. The mediator has a significant, unique effect on the DV (dependent variable). The figure depicts the standard regression weight between FL (financial literacy) and FH (financial health) as 0.20. Both the constructs are represented by their own sets of observed variables with error variables e6–e17. Out of which e11–e12 are correlated with each other. The assignment of measured variables to each latent construct is graphically equivalent to drawing arrows from each construct to the measured variables that represent that construct. The degree to which each measured variable is related to its construct is represented by that variable's loading as values on the arrow shown in the figure.

Table 9. Standardised Regression Estimate: Independent Variable--->Mediator-->Dependent Variable for Mediating Hypothesis MedH2.

Mediation (Indirect) Path	Standardised Regression Estimate	S.E.	C.R.	P
Coronavirus awareness> Financial literacy>Financial health	0.070	0.100	0.978	0.328

Figure 9. The effect of the IV (independent variable) on the DV (dependent variable) diminishes after the addition of the mediator to the model. The figure depicts the standard regression weight between CVA (coronavirus awareness) and FH (financial health) diminishes from 0.13 to 0.07 after the addition of the mediator FL (financial literacy). Thus, showing full mediation by the mediating variable. The IV (coronavirus awareness) exerted its total influence on the DV (financial health) through the mediating variable (financial literacy). If we take the mediator away, the relationship between the DV and the IV disappears. It shows the importance of financial literacy programs for good financial health. All three constructs are represented by their own sets of observed variables with error variables e1-e17. Out of which e4-e5 and e11-e12 are correlated with each other. The assignment of measured variables to each latent construct is graphically equivalent to drawing arrows from each construct to the measured variables that represent that construct. The degree to which each measured variable is related to its construct is represented by that variable's loading as values on the arrow shown in the figure.

Table 10. Sobel, Aroian, and Goodman Tests.

Mediation Path	Sobel Test	Aroian Test	Goodman Test
Coronavirus awareness-----> Financial literacy -->Financial health	2.43702564*	2.40700518*	2.46819812*
P value	0.01480863*	0.01608394*	0.01357951*

*Calculated using online Excel calculators

Discussion, conclusion, and managerial implications

The existing literature studies the economic impact of various pandemics but very few focusses on the personal finance arena of the same. Regardless of the current or coming health effects of COVID-19 on our family, the pandemic has affected and will likely continue to affect household finances for years to come. Having a plan, prioritizing spending, and using resources efficiently will be key to personal financial stability.

The GDP of India was already at its lowest level in the last six years in the third quarter of 2019–20. The coronavirus outbreak plunged it to a new low, as low as 1.9%, which was still better than many of the other countries in the G-20 as projected by the IMF. However, the Reserve Bank of India (RBI) declared that it would inject liquidity into the financial market to curb the economic crisis. Banks offered a three-month moratorium for repaying loans, and did not report them as non-performing assets.

India had a good buffer stock of food grains, and agriculture. Internet banking and ATMs worked at 91% of capacity and the RBI reduced the reverse repo rate from 4% to 3.75%. However, all these measures were reactive in nature. India requires a proactive approach to prepare and protect households from sudden financial setbacks. Not everyone could work at home; only highly skilled government/corporate/service class employees had that opportunity. Businesses that offered non-essential products and services, as well as low-skilled workers such as drivers and deliverers, were major sufferers during the pandemic. Not only were they unable to make money, but they were spending their savings to meet basic requirements. Financial education for employees is a pressing requirement in times of crisis. We have discovered that financial literacy had a profound mediating effect on the personal finance of individuals during the COVID-19 pandemic. Since a full mediation by the mediating variable existed, the IV exerted its total influence through the

mediating variable. If we take the mediator away, the relationship between the DV and the IV disappears, making financial literacy imperative for good financial health. Awareness of the coronavirus's origin, symptoms, prevention, and control will not take care of people's financial well-being; they also need to be financially educated.

Companies should take the initiative to educate their employees financially. In turn, this will develop their loyalty for their organisation (Dhore, 2020). People's physical and financial well-being are congruent with each other, and they cannot ignore either one, since financial stress can lead to mental stress that eventually compromises their physical health.

Financial institutions and policymakers should curate programs such as infomercials, self-service modules, artificial intelligence applications, and decision support tools, into the form of mobile apps that are capable of providing personalised financial education that prepares people for a pandemic crisis. Contact lessness is going to be the new normal, thus making the digital education and financial literacy, a new bundled tool for financial well-being. As it is rightly said, an informed and educated person is more capable of performing crisis management.

Data availability

Underlying data

DANS: THE EFFECT OF COVID-19 ON FINANCIAL HEALTH.
<https://doi.org/10.17026/dans-x9e-rqhf> (Mishra, 2020)

This project contains the following underlying data:

- swati form.csv (Questionnaire responses)

Extended data

DANS: THE EFFECT OF COVID-19 ON FINANCIAL HEALTH.
<https://doi.org/10.17026/dans-x9e-rqhf> (Mishra, 2020)

This project contains the following extended data:

- questionnaire copy.pdf (Study questionnaire)

Data are available under the terms of the [Creative Commons Zero "No rights reserved" data waiver](#) (CC0 1.0 Public domain dedication).

Acknowledgment

We would like to thank Editage (www.editage.com) for English language editing.

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Open Peer Review

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Yogesh Upadhyay

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1. At many place multiple in-text citations are given in different brackets. They need to be brought in same bracket (sixth line of introduction). In many in-text citations, year of citation is not in bracket.
2. Review of literature needs to include more studies regarding the variables selected for the study;
3. There are grammatical errors in the paper that need to be addressed;
4. "The inclusion criteria for participants was that they should be financially independent banking individuals earning a living in form of wages, salary or stipend". What we banking stands for in 'financially independent banking individuals' , phrase used for inclusion criteria;
5. There is no term like 'discriminant value'. Discriminant validity should be addressed in correlational terms;
6. Composite reliability and reliability should be shared in the same para;
7. The illustration of alternative to perform SEM are not required. The authors should only concentrate on the tool used by them unless the illustration has something to do with the findings of the study.
8. Individual running of CFA is unwarranted. CFA that includes all the variables of the study is suffice (Figure - 5);
9. Figures 6, 7 and 8 are unwarranted. Figure 9 is sufficient to illustrate the results
10. Conclusion needs to made in view of results obtained.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Partly

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Partly

Does the piece present solutions to actual real world challenges?

Partly

Is real-world evidence provided to support any conclusions made?

Partly

Could any solutions being offered be effectively implemented in practice?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Human Resource Management, Marketing and Finance

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 05 October 2020

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Neeti Agarwal

School of Management Studies, IGNOU, New Delhi, India

The study should include more literature review on the financial literacy and financial health as the topic concentrates on it. The study should focus more on these aspects than the precautional measures of corona virus. The models derived are appropriate. The literature review can add more papers on financial literacy and health. Articles like these 'The Importance of Financial Literacy During the COVID-19 Pandemic'¹.

The Paper speaks about the use of financial literacy as a mediator for personal financial health during the COVID times. The paper has used SEM to analyse the effect of financial literacy on personal financial health. The study has used a lot of statistical tests to reach the inference. However, the literature review could have talked about the financial literacy models during crisis situations and related personal financial health than concentrating more on the details related to COVID-19. The hypotheses framed regarding awareness about COVID and testing its effect does not seem to be relevant in the context of the study. These parts can be highlighted in brief rather than taking up the whole discussion rather concentrate more on the role of financial literacy on personal financial health. The study focuses on the urban middle class and only one sector has been covered. It would have been better if at least two sectors could have been covered.

The paper can be revised highlighting more on the financial literacy parts than concentrating on COVID 19. COVID is a crisis situation and not a standalone problem so the study can be generalised for any kind of crisis situation.

The authors have made sincere efforts to draw the inference and if modified the paper can attain certain standards.

References

1. Dhore AR: The Importance of Financial Literacy During the COVID-19 Pandemic. *SHRM*. [Reference Source](#)

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

I cannot comment. A qualified statistician is required.

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Yes

Does the piece present solutions to actual real world challenges?

Yes

Is real-world evidence provided to support any conclusions made?

Yes

Could any solutions being offered be effectively implemented in practice?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Strategic finance, International business, Innovation, VCF

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.