



## Socio-Economic Effects of COVID-19 Pandemic on Health Status in Ekiti and Ondo States, Nigeria

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### Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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### ABSTRACT

**Introduction:** The coronavirus pandemic (COVID-19) has become a serious threat to human existence and at the same time causing a lot of traumatic socio-economic losses to people and nations globally. To this effect, studies have examined the impact of the pandemic in Nigeria, but not much has been said on the socio-economic effects of the pandemic on health status. This research work therefore, examines the socio-economic effects of COVID-19 pandemic on health status of people in Ekiti and Ondo States in Nigeria. Data from 663 respondents was obtained from the cross-section of adults age 18-65, using a self-structured open and close-ended questionnaire. Variables such as health status, occupation, income, education among others were used.

**Methods:** Ordered Probit model was specified to investigate the effect of the pandemic on health status and the maximum likelihood estimation (MLE) was used as the estimation technique. Also, descriptive statistics was conducted to examine the demographic features of the respondents.

**Results and Findings:** The results show that COVID-19 pandemic has both negative and positive socio-economic effects on health status among the majority of the participants. A decrease in school closure and job loss/ business closure makes respondents more likely to be in good health with 6.562% and 7.194% probabilities respectively. However, the probability that a respondent will be in a good health as a result of a positive change in income is 0.463%. This indicates that a positive

change in income has a positive effect on health status, while school closure and job loss/business closure during COVID-19 have negative effects on health status. The study recommends that welfare benefits, financial incentives, stimulus package to both individuals and firms, while remote learning strategies are implemented to rebalance and boost people's welfare in both states.

**Keywords:** COVID-19 pandemic; health status; income; job loss; school closure; ordered probit; Nigeria.

**JEL:** D03, I10, I31

## 1. INTRODUCTION

The coronavirus pandemic (COVID-19) is both a serious threat to human existence and at the same time causing a lot of traumatic socio-economic losses to people and nations globally. The COVID-19 outbreak has since spread over 200 countries and every continent across the globe. The first outbreak of the virus was reportedly found in Wuhan, China and has continued to spread through person-to person contact [1]. Hundreds of millions of people in low-income nations lost their jobs in both the formal and informal labor markets as countries declared states of emergency, issued stay-at-home orders, and recommended people to avoid social gatherings. As a result, households have experienced income losses from a variety of sources. The outbreak of Covid-19 pandemic has no doubt left serious and adverse effects on the socio-economic development and growth in Nigeria. Nigeria operates a monolithic nature of economy which relies heavily on crude oil as its major source of its revenue and foreign exchange inflow [2]. The country has recorded slow economic recovery since the 2016 recession to which there is heavy reliance on external borrowing by the government to finance public expenditures, leading to less than palatable socio-economic activities in Nigeria.

The country experienced a shortfall in economic activities during the outbreak of the coronavirus pandemic which led to border closures, trade restrictions revenue loss in the aviation sector. These three sectors together account for more than 30% of GDP in both the formal and informal job markets, contraction in these industries resulted in severe job losses which was a major setback and a source of instability, as youth unemployment and underemployment were at an already high of about 55% [3]. The economic impact of Covid-19 in most countries can be felt through three scenarios: the labour productivity shock, which resulted in an average drop in

labour productivity of 1.4% during the pandemic in 2020 due to people's inability to execute their jobs.

Individuals and businesses were forced to choose between survival and adherence to social distancing measures. The suppression tactic has significance economic and social consequences in a country where the informal sector accounts for 65 percent of GDP and a significant proportion of the population relies on it for day-to-day economic survival [3,4]. In Nigeria, according to The National Bureau of Statistics (NBS), 20 percent of the full-time workforce in Nigeria lost their jobs due to the COVID-19 pandemic in 2020.

Also, there was a sudden reduction in income of the working population during the lockdown as a lot of businesses suffered to keep up with revenue, while some companies shut down and others went out of business and those who work for daily wage experienced a halt during the lockdown causing widespread distress in the economy leaving the populace with inability to afford healthcare, housing and food. Covid-19 pandemic disrupted the economy of China the epic center of the COVID-19 outbreaks, which had a boomerang effect on the global economy [5]. The rise in the death cases from Covid-19 in the United States heightened unemployment and caused scarcity of labour in financial institutions [6]. The macroeconomic implications of Covid-19 caused a shutdown of the economic sector in the United States of America, while also causing undue pain and disruption of socio-economic activities of the citizenry [7].

The pandemic also took a drastic turn in the educational sector in Nigeria as academic activities were abruptly ended nationwide. Schools were closed down for a period of 9months from March to November 2020 putting pressure on health status of parents as they had to keep active watch of their wards. Understanding the impact of changes in

individual income, occupational position, and education on health status as a result of the COVID-19 pandemic in Nigeria, will be useful in providing feasible policy options for better recovery at the micro level. This paper specifically examines the effect of changes in income level on health status, investigates the effect of job loss caused by the pandemic on health status and assesses the impact of school closure on households' health status in Ekiti and Ondo state, Nigeria.

## 2. LITERATURE REVIEW

### 2.1 Overview of Health Status, Income, Education and Employment in Nigeria

Many countries across the global community are facing unprecedented challenges as a result of the COVID-19 pandemic, Nigeria and her people are no exception. Despite minor improvements, WHO considers Nigeria's health outcome indicators to be unacceptably high. The maternal death rate equals 814 per 100 000 live births, infants and children under the age of five years have mortality rates of 70 and 104 per 1000 live births, respectively [8]. Also, life expectancy at birth for a female in Nigeria (53 years) is below the average age of 83 years recorded in least developed countries. Preventable infectious diseases such as malaria, pneumonia, diarrhea, and measles accounted for more than 70% of the estimated one million shutdown deaths in Nigeria [9]. Unarguably, communicable diseases remain a major public health concern, tuberculosis case detection rate is 27%; and HIV/AIDS prevalence is 1.3 %, malnutrition is widespread with 31.5 % of children stunted [10]. In the same vein non-communicable diseases (NCDs) burden including diabetes, hypertension and neurological disorders are on the increase. These underlying diseases make COVID-19 pandemic worse as it has led to the death of 2,702 out of 205,484 confirmed cases as of 30 September, 2021 [11]. The containment measures such as lockdown and restriction of movement have had significant impact on education and livelihood of many Nigerians.

Education is among the sectors with devastating impact of COVID-19 pandemic. Before the pandemic, the Nigerian education system has adopted purely, face-to-face approach to teaching and learning process in primary and secondary schools. With the emergence of the

lockdown which resulted in school closure following the COVID-19 pandemic, both teachers and learners were helpless about how to continue learning in the face of the pandemic. Online teaching was ineffective due to limited electricity and internet access especially in the rural areas and a large number of children without remote-learning access were left behind. Employment has also been greatly affected by the pandemic employers in large and small firms are faced with a significant drop in domestic demand as the COVID-19 pandemic continues to wreck the economy globally. The first reaction by most organizations has been to direct their employees to work remotely, to protect their employees and clients from the spread of the pandemic. Also, as the pandemic lingered most employees had to reduce/defer the salaries, bonus and promotions to retain their employments while some in light of current realities and considering the effect of the pandemic on business activities, some employees had to terminate employments [12]. Also, the Nigerian bureau of statistics (NBS) claim that the unemployment rate moved from 27.1% in Q2 2020 to 33.3% in Q4 2020. The economic impact of the pandemic has also worsened the household income, especially the poor and left many people struggling to make ends meet due to the effect of loss of job and harsh economic conditions.

### 2.2 Theoretical Framework

This research applied the health production theory as the theoretical framework that underpins the economic intuition of the relationship between health status, income, education and employment. The health production theory relates health outcomes to health inputs, while health inputs emphasize medical care as well as time inputs (e.g., exercise time spent visiting a doctor, etc.) [13]. Medical care has been a notable factor that influences health status or health outcome; however, the production function contains a lot more than medical care. The prominent factors that influence health include people's life style [14]. People's life style is determined by factors such as education, occupation and income. The efficiency of the health-production process is presumed to be a function of the consumer's stock of knowledge i.e., as the more educated are assumed to be more efficient consumers and producers of health [15]. This is because health inputs are recognized as investment that produces an increment to health [16]. Research

has proposed that the relationship between education and health is attributable to three general classes of mediators: economic; social, psychological, and interpersonal; and behavioral health [17]. Economic variables such as income and occupation mediate the relationship between education and health by controlling and determining access to acute and preventive medical care [18,19]. Also, the effect of education on income is included in a straightforward manner by assuming a Mincer-type wage relation, in which earnings are increasing in the level of education and in the level of experience of workers [20]. Income is assumed to be an increasing function of health and of job-related health stress [21]. On income, higher income families in urban settings tend to consume more health services because they are able to afford the cost [22]. Thus, income is a strong determinant of health status as it relates positively with health status. Health status increases as more and more health care inputs are added to the production process to increase the supply of health so as to meet up with the demand for health.

### 2.3 Empirical Review

The coronavirus outbreak originated in the Chinese city of Wuhan, in the province of Hubei. People in Wuhan first had contact with a live animal at a wet seafood market, suggesting that the virus was transmitted from animals to humans. Severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) was the virus's moniker, and the disease it produces was dubbed "coronavirus disease 2019 (COVID-19)." Researchers have examined the impact of COVID-19 on the economy and come up with ways to tackle the pandemic. Singh et al [23] assessed the health, psychosocial and economic impacts of the COVID-19 pandemic on people with chronic conditions in India . The study found that loss in income, poor health status, job loss and rural residence worsened the diabetes and hypertensive symptoms of the respondents and called for the investment in primary healthcare to boost resilience against future pandemics. Surni et al. [24] examined the socio-economic impact of covid-19 pandemic in Indonesia with a case study on the supply of chicken meat. According to the study, the spread of Covid-19 had a significant economic and social impact on the sustainability of businesses in the livestock sector, particularly those providing food for the community. Similarly, Josephson, Kilic and Michler [25] examined the socioeconomic impact

of covid-19 pandemic in low-income countries (LICs). The findings estimated that about 77% of the population in LICs belong to households who have lost income during the pandemic which escalated food insecurity and the inability to access healthcare services.

Also, due to school closure, teacher-student contact declined rather rapidly to 17% among households with school-age children. Mulugeta and Tadesse [26] examined the challenges faced by the working group as a result of the pandemic. Majority of the respondents are men who work with the government to which the pandemic greatly affected their social and economic life. Ajibo [27] assessed the effect of Covid-19 on Nigeria socio-economic well-being using a focus group and in-depth interview guide and found that covid-19 has a devastating effect on the Nigerian populace due to the ill-equipped health system to handle the pandemic. Also, the Covid-19 negatively impacted the socio-economic and religious progress of Nigerians as all forms of education programs including schools were shut down, and formal academic learning was also disrupted. Durowade, Sanni, Adeniyi, Babalola, Popoola, Adebara, Ajayi [28] analysed the psychological and socio-economic effect of covid-19 pandemic in Southwest Nigeria. The result of their findings shows that there was adverse effect on family income (78.2%) with severe psychological effect (83.9%) in the region coupled with other self-reported vulnerable factors such as diabetes and other cardiovascular diseases. The respondents' mean age is 33years, to which the majority of respondents were males who were married and had a tertiary education.

### 3. METHODOLOGY

The data for this study were obtained through cross-sectional survey of 663 respondents using Cochran sample size formula and through the use of self-structured open and close-ended questionnaire. Specifically, information was collected on health status, income level, occupation/job loss and stress related issues. Also, information on education, majorly the perception of parents towards closure of schools as a result of the pandemic was obtained. The target groups are adults between the ages 18-65years. The simple random sampling technique was used to select participants in the urban areas of Ekiti and Ondo states.

Randomly 150 participants were selected in Ado-Ekiti and Ikere-Ekiti LGAs in Ekiti State while 200 participants were randomly selected in Akure and Akoko North-East LGAs in Ondo state. The questionnaire was administered under the strict COVID-19 guidelines using the online survey method. The electronic copy of the questionnaire was sent to respondents via social media platforms such as; WhatsApp, Facebook and Instagram and retrieved through these same platforms. A total of 663 questionnaires were completely filled/returned the respondents out of the 700 questionnaires sent out. Health status was obtained through the 4-point Likert scale categories of health status (poor, fair, good and excellent) as highlighted in the questionnaire. Income was measured in Naira; the minimum and maximum income was collected from the participants. In the questionnaire the respondent's demographic data was collected and income before and during the pandemic was obtained to capture changes in income. Also, the effect of job loss/ business closure was presented in categories likewise the impact of education/school closure. To estimate the socio-economic effects of COVID-19 pandemic on health status, ordered Probit model was specified and the maximum likelihood estimation (MLE) technique was used to estimate the model. Descriptive statistics such as mean, standard deviation, minimum and maximum as well as simple percentages were used to describe the socio-demographic features of the respondents.

## 4. RESULTS AND DISCUSSIONS

### 4.1 Socio-Demographic Features of the Respondents

Table 1 which analyzes the basic socio-demographic features of the respondents shows that of the total respondents, 46.8% of the respondents surveyed are male while 53.2% of the respondents are female. Among the respondents, 16.7% are single, 52% are married, 11.2% are divorced, 12.7% are widowed while 7.4% are separated from their partners. Also, among the respondents, 63.7% indicate that school closure had an effect on their health while 36.3% indicated otherwise. Furthermore, 62.4% of the respondents are experienced job loss during the pandemic while 37.6% indicated no job loss. Finally, 8.1% of the respondents have poor health, 64.7% with fair health, 19.9% with a good health status and 7.2% with excellent

health.. Conclusively, majority of the respondents are female, married with good health status, employed with post-secondary education.

Also, indicated in Table 1, is the summary statistics which show the scores range between 0 and 1 for the dummy variables. The basic statistical features include the mean, minimum and maximum values, and standard deviation. The standard deviation indicates that the responses significantly varied among the sampled respondents. However, among all the variables, Income level and age of respondents are continuous variables. Specifically, the average income level of the respondents is increasing at ₦3058.824 with a deviation ₦13077 and a corresponding minimum ₦17000 and maximum of ₦180000 Also, the average age of the respondent is approximately 41years, deviation of 12.88, a minimum age of 18 and a maximum age of 64 years.

## 4.2 The Regression Analysis

### 4.2.1 The effect of changes in income level on health status

To examine the effects of changes in income level on health status in Ekiti state and Ondo state, this study employs the use of ordered Probit model and the results are presented in Table 2. The ordered Probit model was computed using the maximum likelihood estimation technique (MLE). From the results, it was shown that 663 observations were used in the analysis without any missing value of the non-selected variables. The table shows the coefficients of the variables, their standard errors, the z-statistic and associated p-values. The variables employed in this analysis include; income level, age and marital status of respondents. Variables used such as change in income level and age of respondents are significant while marital status (married) is insignificant. The coefficients of the ordered Probit regression give the change in the z-score for a unit change in the predictor, while the other variables are held constant. The result shows that a positive change in income increases the z score by 0.035 indicating that positive changes in income has a positive effect on health status. However, an increase in age, reduces the z score by 0.771 meaning that as respondents gets older the more likely they are to be in the lower category health status. Conclusively, changes in income influences health status positively, while age has contrary effect.

**Table 1. Summary and descriptive statistics**

Variable	Mean	Std. Dev.	Min	Max
Changes in income	3058.824	13077.52	17000	180000
Age	40.84766(271)	12.88009	18	64
Male	0.467572(310)	0.499324	0	1
Female	0.532428(353)	0.499324	0	1
Single	0.167421(111)	0.373633	0	1
Married	0.520362(345)	0.499962	0	1
Divorced	0.111614(74)	0.315129	0	1
Widowed	0.126697(84)	0.332884	0	1
Separated	0.073907(49)	0.261816	0	1
None Education	0.06184(35)	0.241047	0	1
Primary Education	0.076923(51)	0.266671	0	1
Secondary Education	0.122172(81)	0.327732	0	1
Post-secondary education	0.739065(496)	0.439476	0	1
Job-loss (Yes)	0.624434(414)	0.484634	0	1
Job-loss (No)	0.375566(249)	0.484634	0	1
School closure (No)	0.363348(241)	0.243773	0	1
School closure (Yes)	0.636652(422)	0.243773	0	1

Source: Field survey, 2021

The marginal effect is measured in unit of probability and the associated effects are reported also in Table 2 shows that the probability that a respondent will be in a poor health category as a result of a positive change in income is 0.253%. Similarly, the probability that a respondent will be in a fair health category as a result of a negative change in income is 0.438%. However, the probability that a respondent will be in a good and excellent health category as a result of a positive change in income is 0.463% and negative change is 0.228% respectively. In addition, an increase in age is associated with a 5.561% and 9.634% probability of being in the category of poor and fair health status respectively. Contrarily, a decrease in age is associated with a 10.181% and 5.014% probability of being in the category of good and excellent health status correspondingly. Overall, changes in income level and age have a larger effect on respondents with good health status.

**4.2.2 The effect of job loss/business closure on Health Status**

To investigate the effect of job loss/ business closure caused by the pandemic on health status in Ekiti state and Ondo state, this study employs the use of ordered Probit model and the results are presented in Table 3. The variables used include job loss/business closure and ages of respondents are significant while marital status (married) is insignificant. The coefficients of the ordered Probit regression give the change in the z-score for a unit change in the predictor, while

the other variables are held constant. The result shows that a job loss decreases z score by 0.573, indicating that job loss has negative effect on health status. Similarly, a unit increase in age reduces the z score by 0.779, implying that age of the respondents' influences health status negatively.

The marginal effect is measured in unit of probability and the associated effects are reported in Table 3. The result shows that the probability that respondents with very poor health status, poor health status, fair health status and good health status. The result shows that increase in job loss makes respondents more likely to be in poor and fair health category by 4.530% and 5.8632% individually. However, a decrease in job loss makes respondents more likely to be in good and excellent health category by 7.194% and 3.26 % respectively. Also, a unit increase in age makes respondent more likely to likely to be in poor and fair health category by 5.485% and 9.8161%, while a unit decrease in age makes respondent less likely to likely to be in good and excellent health category by 10.308 % and 4.993% correspondingly. Overall, increase in job loss and age has a larger effect on respondents with fair health status, while decrease in job loss and age have higher effects on good health status.

**4.2.3 The effect of school closure on Health Status**

To assess the impact of school closure on households in Ekiti state and Ondo state, this

**Table 2. The effects of income level on health status**

Health Status	Coefficient(Z Statistics)	Marginal Effects (Z Statistics) Robust estimate			
		Poor	Fair	Good	Excellent
Changes in income	0.03511(1.74)	*0.002529(1.71)	*-0.004382(-1.71)	*0.00463(1.71)	*-0.00228(-1.74)
Log of age	-0.77193(-3.13)	***0.055608(3.36)	***0.096339(2.75)	***-0.10181(-3.01)	***-0.05014(-2.94)
Marital Status (Married)	0.044028(0.28)	-0.00317(-0.28)	-0.00549(-0.28)	0.005805(0.28)	0.002858(0.28)

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$  Source: Computed from STATA, (2021)

**Table 3. The effects of job loss/business closure on health status**

Health Status	Coefficient(Z Statistics)	Marginal Effects (Z Statistics) Robust estimate			
		Poor	Fair	Good	Excellent
Job loss/Business closure	-0.57278(-3.26)	***0.045902(2.99)	***0.058632(3.41)	***-0.07194(3.3)	***-0.0326(-3.45)
Log of age	-0.77915 (-3.19)	***0.05485(3.4)	***0.098161(2.82)	***-0.10308(-3.08)	***-0.04993(-2.99)
Marital Status (Married)	0.03649 (0.23)	-0.00257(-0.23)	-0.00459(-0.23)	0.004826(0.23)	0.002337(0.23)

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$  Source: Computed from STATA, (2021)

**Table 4. The effect of school closure on health status**

Health Status	Coefficient(Z Statistics)	Marginal Effects (Z Statistics) Robust estimate			
		Poor	Fair	Good	Excellent
School closure	-0.53241(-2.13)	*0.045288(1.83)	***0.049552(2.89)	** -0.06562(-2.33)	** -0.02922(-2.37)
Log of age	-0.83605 (-3.31)	***0.059839(3.59)	***0.104934(2.9)	***-0.11051(-3.18)	***-0.05426(-3.13)
Marital Status (Married)	-0.01179 (-0.07)	0.000844(0.07)	0.001481(0.07)	-0.00156(-0.07)	-0.00077(-0.07)

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$  Source: Computed from STATA, (2021)

study employs the use of ordered Probit model and the results are presented in Table 4. The ordered Probit model was computed using the maximum likelihood estimation technique (MLE). The variables employed in this analysis include; school closure, age and marital status of respondents. Variables used such as school attendance and age of respondents are significant while marital status (married) is insignificant. The coefficients of the ordered Probit regression give the change in the z-score for a unit change in the predictor while the other variables are held constant. The result shows that as school closure increases, z score decreases by 0.532, showing that school closure during COVID-19 has negative effect on health status. Similarly, as age increases, the z score reduces by 0.836 meaning that age of the respondents negatively influences the individual health status.

The marginal effect is measured in unit of probability and the associated effects are reported in also in Table 4. The result shows that the probability that respondents with very poor health status, poor health status, fair health status and good health status. The result further shows that an increase in school closure makes respondents more likely to be in poor and fair health category by 4.5288% and 4.9552% individually. However, a decrease in school closure makes respondents more likely to be in good and excellent health category by 6.562% and 2.922% respectively. Also, a unit increase in age makes respondent more likely to be in poor and fair health category by 5.9839% and 5.9839%, while a unit decrease in age makes respondent less likely to be in good and excellent health category by 11.051% and 5.426% correspondingly. Overall, increase in school closure and age has a larger effect on respondents with fair health status, while decrease in school closure and age have higher effects on good health status.

## 5. DISCUSSION OF FINDINGS

Findings from the study reveal that changes in income level have a positive effect on respondents with poor health, negative effect on fair health, positive effect on good health status and negative effect on respondents with excellent health status. This implies that the effect of changes in income caused by the pandemic was mostly felt by respondents with fair and excellent health status. Also, effect of job/business closure is felt more by respondents

with good and excellent health status. Similarly, the effect of school closure is significant with respondents of good and excellent health status. Furthermore, this study showed that majority of the respondents have 0.462% changes in their income, 7.194% in job loss/business closure and 6.562% effect of school closure which has had a rather devastating effect on respondents. This can be tied to the strict lockdown enforced and restriction of movement put in place by the governments in the region of the country without cushioning effect to reduce the prolonged impact of the pandemic. This caused a significant loss in income among the respondents which was made severe by the further lack of stimulus packages from the government both federal and state. This is similar to the research carried out by Josephson, Kilic and Michler [25] whose findings estimated that about 77% of the population in LICs belong to households who have lost income during the pandemic which escalated food insecurity and the inability to access healthcare services. Also, due to school closure, teacher-student contact declined rather rapidly to 17% among households with school-age children. Similarly, Durowade et al. [28] also revealed that majority have their family income and family feeding negatively affected by COVID-19 pandemic [28]. In addition, Singh et al [23] found that loss in income, poor health status, job loss and among others worsened the diabetes and hypertensive symptoms of the respondents [21] Ajibo [27] also revealed that revealed that Covid-19 negatively impacted the socio-economic and religious progress of Nigerians as all forms of education programs including schools were shut down, and formal academic learning was also disrupted.

## 6. CONCLUSION AND RECOMMENDATIONS

In Conclusion, COVID-19 pandemic has socio-economic effects among majority of the study respondents as increasing changes in income level, job loss, school closure, has a large effect on respondents with good health status by 0.463%, 7.194% and 6.562% which shows that the respondents are relatively healthy. More so, among the key variables, job loss has a greater effect on respondents with good health status. Immediate relief measures must be implemented, with modifications made for those who may fall on hard times. Medium and long-term control is critical to rebalance and boost the states following the crisis. Also, because of the lower household income caused by the lockdown



measures and job loss/business closures, the governments of Ekiti and Ondo should give welfare benefits to the people. Efforts should be made to improve the efficiency and effectiveness of the distributive mechanisms of the conditional cash transfer program in place to reach households that are worse-hit by the pandemic. In addition, policymakers should use legislation to establish a strong social welfare safety net for all residents, particularly unemployed people and destitute families while financial incentives and a stimulus package should be provided to private-sector entrepreneurs. Furthermore, since school closure has a large effect on health status of the respondents, the governments of both states should implement remote learning strategies evenly so as to ensure continuity in learning at a reduced cost to reduce the education gaps caused by the pandemic. Likewise, teachers and students need to be trained on how to use ICTs and e-learning facilities to promote easy and accessible learning. Also, in educational institutions, both teachers and student should be well-trained in blending virtual and physical teaching and learning methods.

Finally, job loss/business closure was also found to have a negative effect on health status. There is a need to develop sufficient digital infrastructure to ease the shift from face-to-face business activities to "digital or online" business activities, which can assist the digital economy thrive. Also, the state should invest in health-care infrastructure to strengthen the health-care system's ability to withstand outbreaks of infectious and deadly diseases.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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