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GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

Impact of COVID-19 on poverty and living standards in Ghana: A micro-perspective

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Abstract: The novel Coronavirus disease 2019 (COVID-19), which has become a global epidemic, hit Ghana on 12 March 2020 and, in less than a week, increased by over 300% with two deaths. As of 11 August 2020, Ghana had recorded over 41,000 cases with over 215 deaths. This study seeks to provide a micro-level evidence on how COVID-19 is posing a threat to some of the Sustainable Development Goals, particularly poverty in Ghana. Specifically, the study examined the effect of COVID-19 on poverty and living standards of Ghanaian households. The study further analysed which class of persons within the income distributions has been mostly hit by the pandemic. Data on 3,905 households were obtained via concurrent online survey and telephone interviews. Multiple analytical approaches were employed—Ordinary least squares, probit model and simultaneous quantile regressions. Results showed that COVID-19 had significantly increased the poverty levels of households while deteriorating living standards. The study also discovered that gender and locational heterogeneities exist regarding the impact of COVID-19 with females and rural dwellers mostly disadvantaged. However, simultaneous quantile regression result shows that in terms of overall household consumption, those in the middle and upper classes are profoundly affected compared to those in the lowest class. A

ABOUT THE AUTHOR

Chei Bukari is a Course Demonstrator and researcher in the School of Economics at the University of Cape Coast, Ghana. He has over five years of teaching and extensive research experience. His area of research includes poverty, inequality, finance and corruption. He has several research papers in refereed journals in these fields of interest. He has worked with several reputable organization including Ghana Statistical Service. The major contribution of this study is that COVID-19 is undermining Ghana's efforts to achieve the Sustainable Development Goals (SDGs) particularly poverty and hunger. By implication, while governments must not be complacent in their fight against COVID-19, post-COVID-19 policies will require extra-efforts if agenda 2030 (i.e., SDGs) is to be achieved.

PUBLIC INTEREST STATEMENT

Following the outbreak of COVID-19 globally and its emergence in the Ghanaian economy, a fierce debate on COVID-19—Sustainable Development Goals (SDGs) performance nexus has emerged. While the literature on this subject remains highly contested, micro-level evidence within the Ghanaian contest is sparse. Thus, with the sole objective of contributing to the international dialogue on effective policy interventions and engendering evidence-based policy debates, this study examined the micro impact of COVID-19 on poverty and living standards in Ghana. The study further explored gender and locational heterogeneities dimensions regarding the impact of the pandemic on poverty. We demonstrated that COVID-19 has significantly worsened the poverty levels of Ghanaian households. Additionally, locational and gender heterogeneities exist and were profound in rural and female-headed households. Policy efforts aiming at minimising post COVID-19 poverty is not only fundamental to the attainment of Ghana's agenda 2030 but also crucial on both social and economic grounds.

key policy implication from this study is that Ghana needs to broaden its social protection programmes to assist both the new poor and existing poor.

Subjects: Development Studies; Development Policy; Economics and Development; Economics; Health & Society; Health Conditions; Public Health Policy and Practice; Social Work and Social Policy

Keywords: COVID-19; Ghana; living standards; pandemic; poverty

JEL Codes: I31; I32

1. Introduction

In the history of the world, one of the infectious diseases that has challenged global leaders is the Coronavirus Disease 2019 (COVID-19). Globally, all infectious diseases combined kill approximately 50,000 people daily and claim over 17 million lives yearly, making it among the world's leading causes of death (World Health Organisation [WHO], 2015). However, novel coronavirus (COVID-19) alone, which till date appears incurable, has already killed over 50,000 persons daily and claimed more than 1.3 million lives in less than a year (WHO, 2020; Worldometer, 2020) and is still posing further threats to the world. By implication, COVID-19 is now the world's most brutal killer of persons and the prime cause of the greatest economic distortions in the twenty-first century. Unlike most dangerous infectious diseases that kill humans and often originate in Africa (Fenollar & Mediannikov, 2018), COVID-19 started in Asia, specifically Wuhan, in last quarter of 2019. The disease had caught the world in darkness, and public fear has been growing geometrically. COVID-19 is taking its clang on the global community, causing several deaths and continuous economic despair. Premised that developing countries are faced with severally weak public healthcare systems (see e.g., Fenollar & Mediannikov, 2018), there have been several projections and discussions that the COVID-19 situation might be worse in these economies. For instance, early projections from the World Bank suggest that COVID-19 will push 49 million people into extreme poverty in 2020 out of which 23 million are expected to be in sub-Saharan Africa (Lakner et al., 2020).

Of great concern is that while most of the foregoing projections on the micro impact of COVID-19 on poverty have already been empirically validated and near over-researched in some settings (Austrian et al., 2020; BRAC, 2020; Kesar et al., 2020; Mahler et al., 2020b, 2020a; Malik et al., 2020; Le Nestour et al., 2020; Rahman & Matin, 2020; Sumner et al., 2020), such pieces of evidence within the Ghanaian context remain largely unknown and insufficiently researched. Moreover, available evidence on the micro impact of COVID-19 in Ghana is largely focused on health (Acheampong et al., 2020; Afulani et al., 2020; Dzisi & Dei, 2020; Sarfo et al., 2020) and education (Demuyakor, 2020; Owusu & Frimpong-Manso, 2020; Upoalkpajor & Upoalkpajor, 2020) with very little on poverty (Durizzo et al., 2020). This notwithstanding, Durizzo et al. (2020)'s study was limited in terms of content and geographical coverage. For instance, Durizzo et al.'s study on urban poor mainly centred on only one city (Accra) of Ghana. In terms of content coverage, their study solely analysed how the urban poor in Ghana mitigate the risk of COVID-19 infections, but not the impact of the pandemic on the urban poverty which is equally crucial to policymakers. It is significant to underscore that like existing studies elsewhere, Ghanaian literature has shown that lack of cooperation with government regulations on COVID-19 is more related to poverty rather than an unwillingness to engage in behavioural change (Durizzo et al., 2020). Such findings reinforce further investigations to advance our knowledge and understanding of how COVID-19 is influencing poverty in Ghana, at least, at the micro-level. Therefore, in this manuscript, we extend the literature on the micro impact of COVID-19 by examining its impact on poverty and living standards among Ghanaian households. We further investigated the locational and gender dimensions of COVID-19–poverty nexus via rural–urban and male–female subsamples. Our study covered six regions of Ghana (both rural and urban areas) and captures several dimensions (food, energy, water, health and income) of people's lives.

The first issue of concern from COVID-19 literature is that the virus is taking its highest toll on two factors: (1) the impact of the virus on economic activity and (2) the number of people living close to the global poverty line (Mahler et al., 2020b). Disturbingly, the outbreak of COVID-19 and the non-existence of a cure have several critical implications. First, the pandemic is a threat to the achievement of the

Sustainable Development Goals (SDGs), as it is entrenching poverty thereby deteriorating standards of living in most sub-Saharan African countries, including Ghana. Before COVID-19, more than half of the extreme poor lived in sub-Saharan Africa and alarmingly, the number of poor people in the region increased by 9 million (World Bank, 2018). It was projected even in the absence of COVID-19 that, by 2030, nearly 9 out of 10 extreme poor would be in sub-Saharan Africa. Now with COVID-19, current estimates suggest that the world's progress in achieving zero poverty in this region by 2030 will be slog back by seven extra years owing to COVID-19 (Mahler et al., 2020a). The present study examines how COVID-19 is posing a threat to some of the SDGs, particularly poverty and hunger in Ghana. The most recent estimates from the Ghana Living Standards Survey (GLSS 7) suggest that the battle to end poverty in all its forms everywhere in Ghana is far from over and in some regions, getting harder to achieve as the proportion of Ghana's poor remains unacceptably high (Ghana Statistical Service, 2018a, 2018b). Distressingly, poverty is becoming more entrenched and harder to root out in half of the 16 regions which experienced worsening poverty incidence rates. Half of the nation's 16 regions have their poverty rates high above the national average of 24.5%. According to the report, more Ghanaians are becoming extremely poor as the number of people living in extreme poverty increased from 2.2 million in 2013 to 2.4 million in 2017 based on the 2010 Population and Housing Census (PHC) projections (GSS, 2018, p. 5). Now with COVID-19, these estimates are expected to worsen.

Within the policy framework of SDGs, meeting the objective of leaving no one behind implies understanding and addressing the "last mile" of exclusion through a deeper knowledge of the forces that cause people to fall into and remain in poverty. Thus, this study's primary objectives are to examine the impact of COVID-19 on poverty and living standards of Ghanaians and to draw relevant lessons for policy actions that will help achieve Ghana's agenda 2030. A profound question this study seeks to address is: How is COVID-19 affecting various categories of persons within the income distribution? That is, is COVID-19 hurting the very bottom of the distribution or the middle class and upper class are also affected?

The rest of the paper is structured as follows: section two focused on the literature review, where empirical studies have been critiqued and synthesised. Next is section three, which mainly dealt with the methodological issues surrounding the study, while section four is devoted to results and discussion of the study? Section five gives the conclusion and policy implications of the study.

2. Literature

2.1. Epidemiology of COVID-19 in Ghana

The novel coronavirus, COVID-19 belongs to the *coronaviridae* family in the largest order *Nidovirales* (Banerjee et al., 2019; Zhang & Liu, 2020). It belongs to the family of communicable diseases which spreads through personal contacts. Thus, geographical distance matters a lot for its spread. Ghana shares borders with Togo, La Cote d'Ivoire and Burkina Faso. Before the disease was identified in Ghana, all the neighboring countries had recorded cases. Ghana recorded the first two cases of COVID-19 in the same day on 12 March 2020. By the second day, the number of confirmed cases increased by 200% and alarmingly by 21 March 2020, the number of confirmed cases had gone up to 21 with one death (Ghana Health Service, 2020). This was over a 300% increase within a week. Given that within 7 days, 21 cases had been detected, some health workers and experts were of the opinion that in the weeks ahead, the infection rate might be geometric. In terms of the origin of the infected persons, Ghana's Ministry of Health revealed that the first two cases were two individuals who had returned from Norway and Turkey. As of 20 March 2020, the infected persons were reported as persons living in three cities of Accra, Tema and Kumasi. In Ghana and like other parts of the world, the pandemic has been identified as very contagious because it travels from person-to-person through contacts. Unfortunately, in Ghana, the pandemic turned to be spreading at the community level by 20 March 2020, when the latest cases were identified. The Ministry of Health and the Ghana Health Service put tracer teams together to trace the contacts of the infected persons and as of 20 March 2020, 300 contacts had been identified. Health workers observed that the pandemic seems

airborne and rolled out further preventive measures to curtail the spread of the virus. The current update shows that Ghana has recorded over 41,000 cases with over 215 deaths as of 11 August 2020.

2.2. Previous research

While the search for understanding pandemics–poverty nexus has spawned considerable interest since the great depression, the quest for ending poverty in all its form everywhere in recent times amidst COVID-19 has rekindled the debate about the distributional effect of pandemics on poverty. Thus, recent studies have been ardent to understand the channels through which covid-19 affects poverty to engender policy-based debates. Key studies with this agenda include Martin, Martin et al. (2020) in the US, Kesar et al. (2020) in India, Malik et al. (2020) in Pakistan, Austrian et al. (2020) in Kenya, HSRC (2020) in South Africa, Le Nestour et al. (2020) in Senegal and Durizzo et al. (2020) in South Africa and Ghana. From this plethora of literature, three key gaps emerged: First, it is premature to conclude that the health impact of COVID-19 is greater than the economic impact since most studies on the pandemic is heavily skewed toward health and macro impacts. Therefore, urgent research on the micro impact of COVID-19 needs to advance our understanding of how the pandemic is adversely changing the lives of individuals, especially the poor and vulnerable. While at the macro level, there is consensus (ILO, 2020; Lakner et al., 2019, 2020; World Bank, 2020) that developing economies' progress to ending poverty by 2030 will be slackened by seven more years, there is the paucity of literature on how the pandemic is affecting particularly the lives of persons living in poverty. Although, not in Ghana, micro-level evidence (Austrian et al., 2020; HSRC, 2020; Kesar et al., 2020; Malik et al., 2020) so far suggests that COVID-19 has significantly increased poverty in diverse ways: decrease in incomes, loss of jobs, lack of access to basic health services and decrease in per capita household consumption of food and non-food goods.

The second issue of concern from the literature is that COVID-19's impact on poor households is more likely to be heterogeneous across gender with male-headed household better positioned than their female counterparts in dealing with the shock. If this theory holds, then different gender-specific policies are required to tackle post-COVID-19 poverty. It is important to emphasise that poverty-gender heterogeneities have a long-standing history with women continuously being disfavoured (S. A. Grossbard-Shechtman & Neuman, 1988; Betti et al., 2020; Depew & Price, 2018; S. Grossbard-Shechtman & Neuman, 1998). Consequently, the outbreak of the COVID-19 pandemic has received growing concerns (Wenham et al., 2020) that the existing gender poverty gaps are likely to exacerbate given that labour markets and family obligations often constrain females in competition against men on the economic front (Alon et al., 2020). Others (Wenham et al., 2020) underscored that the differential effect of COVID-19 on women results from differences in employment status where most women are engaged in informal care within the household with the consequences of limiting their work and economic opportunities. Most importantly, previous studies suggest that significant differences exist in a household's COVID-19 mitigation or management behaviours and that the typical household does not manage COVID-19 efficiently. In other words, households tend to be shortsighted when making decisions regarding shocks and thus, may be ill-prepared for shocks like COVID-19. At the same time, individual households have been increasingly expected to take responsibility for their COVID-19 security. In this study, we test whether or not the COVID-19-gender heterogeneity proposition holds for Ghana.

Another relatively significant strand of literature on COVID-19 are those who assert that the effect of COVID-19 is not the same across locations. The weak public health care systems and negative consequences of health disparities for persons living in rural areas will further place them at the mercy of the pandemic relative to their urban counterparts. Van Dorn, Cooney and Sabin (2020) found that in the United States, the impact of COVID-19 on people who lived in rural areas was much higher than those in the cities. The authors further observed that the high cost of medical care and a high proportion of rural uninsured and the underinsured persons have further compounded the problem. These findings support the claim by Martin et al. (2020) that the magnitude of the economic effect of the pandemic is spatially heterogeneous, and may take

several years for some areas to rebound, if those localities are more impacted than the average. To further support COVID-19-locational heterogeneity school of thought, Kashnitsky and Aburto (2020) and Emanuel et al. (2020) emphasised that to overcome or contain the impact of COVID-19, there is the need for a fair allocation of scarce resources, taking into cognisance deprived areas such as rural communities. Motivated by the foregoing discussions, this study tests whether the differential effect of COVID-19 exists across rural–urban locations in Ghana.

3. Methods

This study was entirely quantitative and, therefore, adopted the positivism research paradigm. The *ex post facto* design was used to examine the effect of the COVID-19 pandemic on poverty and living standards of Ghanaian households. It helped in a comparative analysis of the before-and-after situation of Ghanaian households in terms of their poverty levels and living standards. Descriptive design was also employed to understand and describe the effect of the novel COVID-19 pandemic on poverty and living standards of Ghanaians. This was, especially useful since little is known about the micro impact of the pandemic on poverty in Ghana. The study covered ten administrative and political regions in Ghana.

The data were obtained using an online survey and telephone interview. The study was conducted from 12 May 2020 to 2 June 2020. Before the rollout of the online survey and telephone interviews, the instrument (questionnaire) was first pilot-tested among 20 participants with a similar socioeconomic background in the Western North Region (which was not part of the sample) to ensure its feasibility having met the institutional review board (IRB) of University of Cape Coast standard safeguards on research ethics. The pilot group was first asked to complete the online questionnaire and comment on the comprehensibility of the questions. This led to minor modifications of the questionnaire to improve understanding. The questionnaire was structured into four sections: socio-demographics, COVID-19's impact on poverty and living standards. Questions on poverty were adopted from Afro barometer survey. The survey uses six main questions to measure lived poverty. The precise questions asked under poverty are presented in Box 1 in the Appendices. The socio-demographic variables include age, sex, education, employment status, region, income, expenditure and presence of dependents in the household. The sampling frame for the study was household heads. Persons who were 18 years or older at the time of the survey and had continuously lived in the household for at least 5 months were eligible to participate in the study. The rationale behind the five-month reference period is that in Ghana, COVID-19 started 2 months preceding the survey (12 March–12 May 2020). Thus, respondents who had continuously lived in the household for at least three months before the outbreak of the pandemic and had continuously lived in the household during COVID-19 period for at least two months preceding the survey would be able to compare living conditions of the household for both periods.

Potential respondents were excluded from the survey because they had not continuously lived in the household for the past 5 months preceding the survey (to reduce recall bias). Ten out of the 16 regions were randomly sampled for the study. The regions included in the survey were Greater Accra, Western, Central, Oti, Ashanti, Bono, Eastern, Northern, North East and Upper West regions. Both the online survey and telephone interviews ran concurrently for four weeks (12th May to 9 June 2020) in all the 10 regions. The telephone interviews mainly targeted household heads with no formal education or at most primary education. In each region, 90 household heads were interviewed (3 household heads per day). Ten days to the start of the interviews, several household heads were contacted to purposely explain the upcoming survey and its importance to them and the nation as a whole, as well as to obtain their telephone contacts due to the social distancing protocols. The respondents were also assured of their anonymity and confidentiality of the information they would give. After the 10 days of exercise, a large number of telephone contacts of household heads were obtained. Though each household head was first contacted to consent to the study before taking the telephone contact, the research team still ensured that respondents were not forced to participate in the study. Thus, participation in the study was purely on a voluntary basis. During the telephone interview, a household head's contact is randomly picked from the pool of contacts obtained. The interviewer re-briefs the household head about the exercise and then seeks for his or her consent. If a household head

consents to participate in the survey, the interviewer finally proceeds with the interview. In a case where the household head declines to the interview, that particular household is dropped, and a new contract was drawn from the national pool. The advantageous part of the telephone survey is that, we already knew the socio-demographic characteristics of the population (GSS, 2018) and could thus clearly select poor settlements where adherence to COVID-19 protocols is lowest and the possibility of spreading COVID-19 is greatest. Indeed, by the 12 May 2020, some of the most affected areas in their respective regions were the research areas we selected (Salaudeen, 2020). Furthermore, within these regions, the sample was randomly selected from our national pool. In total, 900 household heads were interviewed, while the online survey recorded 4,115 household heads. However, the online survey had a lot of missing observations. As a result, the observations from the online survey reduced to 3,005 after cleaning the data. This, therefore, gave a total sample size of 3,905 household heads for the analysis. The location and gender dimensions of the sample were as follows: rural versus urban were 1,841 and 2,064, representing 47.14% and 52.86%, respectively. The females were 1,878, while males were 2,027, giving 48.09% and 51.91%, respectively.

Dependent Variables: The dependent variables were poverty and living standards.

Poverty: As stated earlier, the study adopted the six Afro barometer questions as indicators for lived poverty. These six core questions were used to construct an index called the Lived Poverty Index (LPI) which is an experiential measure that is based on a series of questions about how frequently individuals actually go without basic necessities during the course of a year. The rationale behind LPI is that the value of one's standard of living or poverty lies in living itself and thus, people are the best judges of their own interests and quality of life (Afro barometer, 2016; Sen, 1999). Box 1 shows precise questions.

All the six items under the Lived Poverty section were used to compute a composite Lived Poverty Index (LPI) using Principal Components Analysis (PCA). A Cronbach's alpha (scale reliability coefficient) of 0.89 was obtained prior to the generation of the composite score. As shown in Table 1, only one factor (component) had an eigenvalue more significant than 1, indicating that all the items loaded on one construct. Based on Kaiser's criterion, we retained this factor which also explained almost 69% of the variance in the response variable. The indicators were coded 0-never to 4-always and thus, higher scores on the response variable corresponding to the lower poverty level. The likelihood ratio test indicated a good model fit.

Another main interest of the study was to explain how the COVID-19 pandemic affected household living standards.

Living standards: The final dependent variable was living standard. Using six items (See Box 2 Appendices), the study computed a living standard index using PCA. As shown in Table 1, a Cronbach's alpha (scale reliability coefficient) of 0.742 was obtained before the generation of the composite score. Only two factors (components) had eigenvalues more significant than 1, indicating that all the items loaded onto two constructs. Based on Kaiser's criterion, we retained these factors which also explained almost 63% of the variance in the response variable (living standards)

Independent Variables: The independent variables for the study comprised individual and household characteristics. They included employment status, sex, and education, the region of the household head, household income, expenditure and presence of dependents in the household. For the definition and measurement of these independent variables, please refer to Table A1 under the Appendices.

3.1. Empirical Model specification and estimation method

The empirical model to be estimated is specified in equation (1) as

$$Y_i = \beta_0 + \beta_2 X + \varepsilon_i(1)$$

Table 1. Principal component analysis

Lived Poverty Index (LPI)				
Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.46865	2.61999	0.6937	0.6937
Comp2	.848663	.474067	0.1697	0.8635
Comp3	.374596	.17871	0.0749	0.9384
Comp4	.195887	.0836813	0.0392	0.9776
Comp5	.112206	.	0.0224	1.0000
N	3,905			
KMO overall	0.8197			
Living Standards Index (LSI)				
Comp1	2.84383	1.28473	0.4063	0.4063
Comp2	1.5591	.694758	0.2227	0.6290
Comp3	.864337	.144995	0.1235	0.7525
Comp4	.719342	.145707	0.1028	0.8552
Comp5	.573635	.237509	0.0819	0.9372
Comp6	.336126	.232487	0.0480	0.9852
Comp7	.103639	.	0.0148	1.0000
N	3,905			
KMO overall	0.7623			

Where Y_i represents the poverty level of household i . β_s is a vector of unknown parameters and ε_i is the error term that is normally distributed with mean zero and σ^2 as the variance. X is a vector of individual and household characteristics that affect the poverty level of a household. Table A1 shows the definitions and summary statistics of these variables. Household characteristics which were likely to affect poverty are included in the estimation. These variables include age, employment status and education of the household head, as well as the size and presence of dependents in the household. The study included households' regional and rural/urban locations to controls for labour market disparities. Hence, an Ordinary Least Square (OLS) was used to estimate equation (1).

To ensure the robustness of the results, we implemented the distributional (quantile) regression technique and Probit estimations. While the quantile regression enabled us to determine which class of persons within income distribution is most affected, the probit estimation determined the likelihood of persons being poor by multidimensionality.

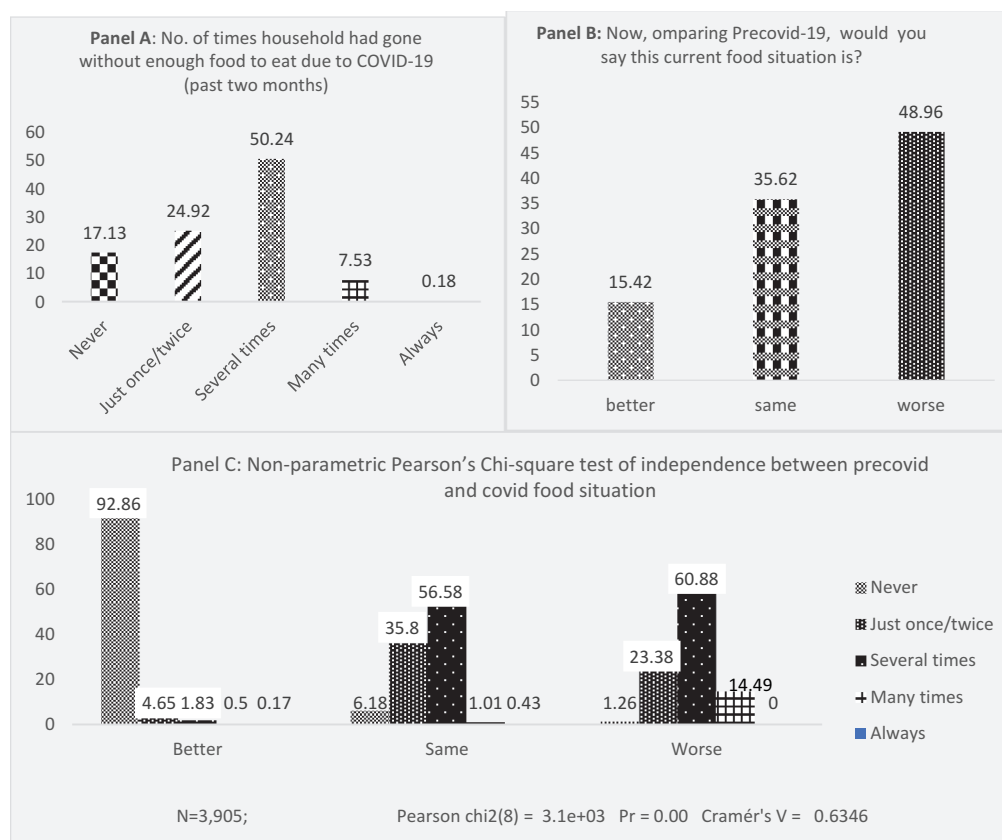
STATA version 14 was the statistical software that was used for the data analysis.

4. Results and discussion

4.1. Effect of COVID-19 on poverty levels of households

One of the main focuses of the study was to analyse how COVID-19 pandemic is affecting the poverty levels of households. As stated under the previous section, six-core questions from Afrobarometer on lived poverty were adopted. Figures 1–6 show the distribution of responses on how COVID-19 is affecting household by each poverty indicator. Each figure consists of three panels (A–C). In each figure, Panel A shows the current impact of the pandemic on the indicator, Panel B illustrates a comparison between pre-COVID-19 and COVID-19 era on the same indicator, while Panel C gives a non-parametric Pearson's Chi-square of the test of associations between those categorical distributions. As illustrated in Figure 1, the majority (57.76%) of the households indicated that in COVID-19 era, there were several times that they had to go without enough food

Figure 1. Number of times that households had gone without enough food to eat due to COVID-19 (past 2 months).



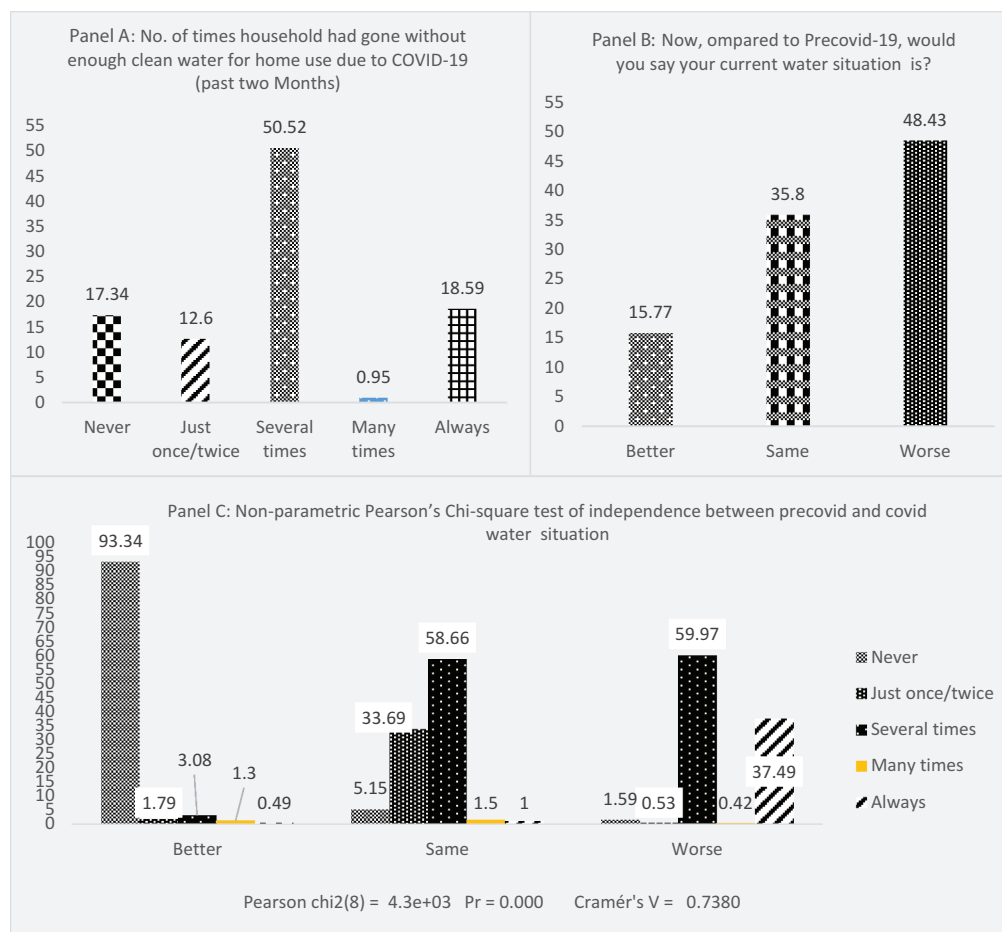
to eat due to the pandemic. Panel B indicates that the household food insufficiency situation was worse in the COVID-19 compared to the pre-COVID period. As shown by the non-parametric Pearson's Chi-square test of independence for the three categorical distributions (Better, Same, and Worse), the hypothesis that household food insufficiency is independent of COVID-19 was rejected. Besides, the Cramer's V statistic shows that there is a statistically significant association between COVID-19 period and food insufficiency.

As shown in Figure 2, the majority (50.52%) of the households had several times with clean water for home use in the COVID-19 period. From Panel B, it is clear that the household water problems had worsened in the COVID-19 period compared to the pre-COVID period. From the non-parametric person's Chi-square test of independence for the three categorical distributions (Better, Same, Worse), we failed to accept the hypothesis that household water problems are independent of COVID-19. The Cramer's V statistic also showed a statistically significant association between COVID-19 period and water problems.

Most (52.22%) of the household (see Figure 3) had at least reported several times of not being able to access medicines or medical treatments due to COVID-19. Those who reported of never experiencing such situations were just 18.05%. Compared to the pre-COVID-19 period (see Panel B), the majority (52.27%) of the households indicated that the situation in the COVID-19 period was worse, implying that COVID-19 is genuinely having a deleterious effect on the medical conditions. The households, several times, had clean water for home use in the COVID-19 period. At 1% level of significance, we fail to accept the null hypothesis that the household's inability to get medicines or medical treatments was independent of COVID-19. Cramer's V statistic also showed that the association is statistically significant.

Evidently (see Figure 3), about 34.21% of the households indicated that, on several occasions, they could not get enough fuel to cook food for their households. About 14.9% and 6.38% also

Figure 2. Number of times that households had gone without enough clean water for home use due to COVID-19 (past 2 months).



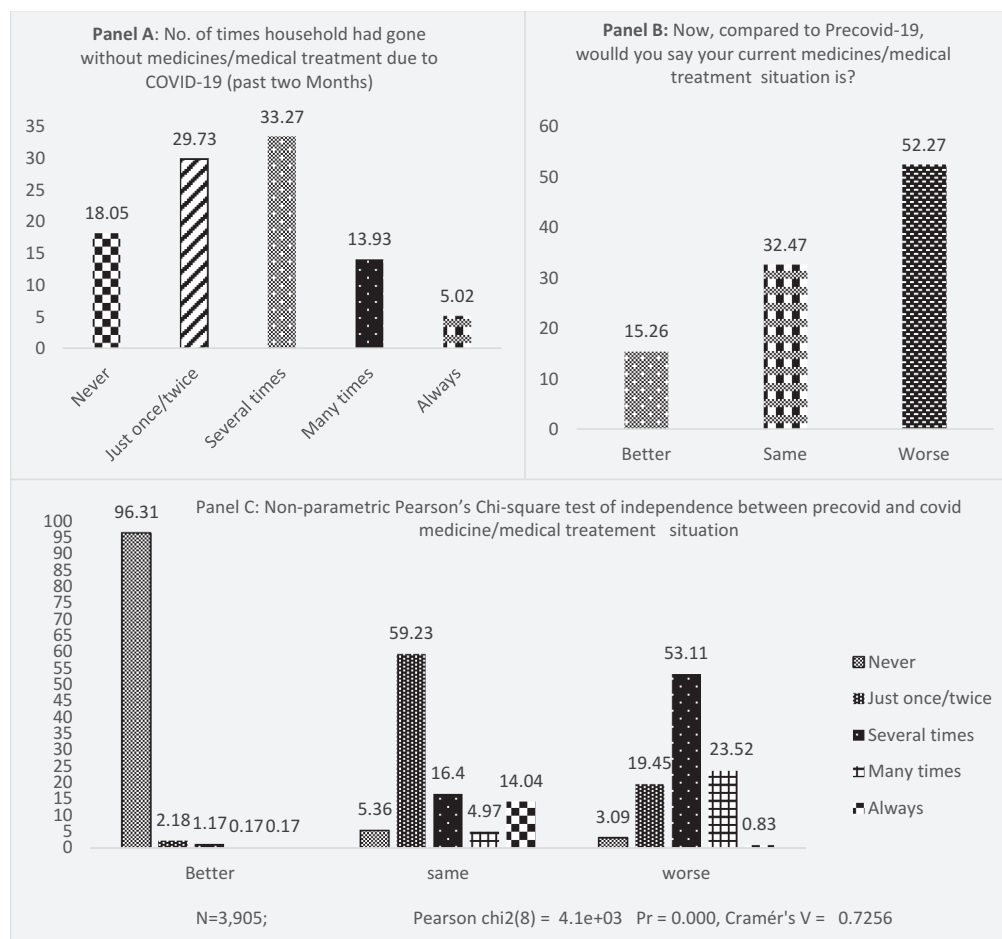
reported that incidence many times and always, respectively. A comparison of the pre-COVID-19 period to the COVID-19 period (see panel B) also shows that the inadequacy of cooking fuel is worse in the pandemic era. Clearly, there was a significant association between inadequate cooking fuel and the COVID-19 period, as evidenced by Pearson's Chi-square test of independence. Cramer's V statistic also showed that the association is statistically significant.

Figure 4 shows the case for household cash income. It indicates that about 60.72% of the households had at least, on several times, gone without enough cash income for the household. Remarkably, approximately 45% had indicated that the situation is worse (see panel B) in the COVID-19 period compared to the pre-COVID-19 era. Pearson's Chi-square test of independence (see Panel C) showed that there is a strong link between income shortages and the COVID-19 period.

4.2. Econometric estimation of the effect of COVID-19 on poverty and living standards

Table 2 presents the results of the effect of COVID-19 on poverty and living standards of Ghanaian households. In this analysis, both poverty and living standards are composite indices. Both the poverty model and the living standard models are log-level (semi-elasticity). In this analysis, unemployed due to COVID-19 refers to workers who lose their jobs due to the pandemic. As shown in Table 2, compared to households whose heads were employed, the poverty levels of households whose heads were unemployed due to COVID-19 increases significantly by 55.7%, while their living standards decreased by 65.7% generally. The study also found supportive evidence of the gender-COVID-19 heterogeneities. The poverty levels and living standards in the male-headed household who lost their jobs due to the pandemic increased and decreased by 54.3% and 61.4% for poverty and living standards, respectively. However,

Figure 3. Number of times that households had gone without enough fuel to cook food due to COVID-19 (past 2 months).

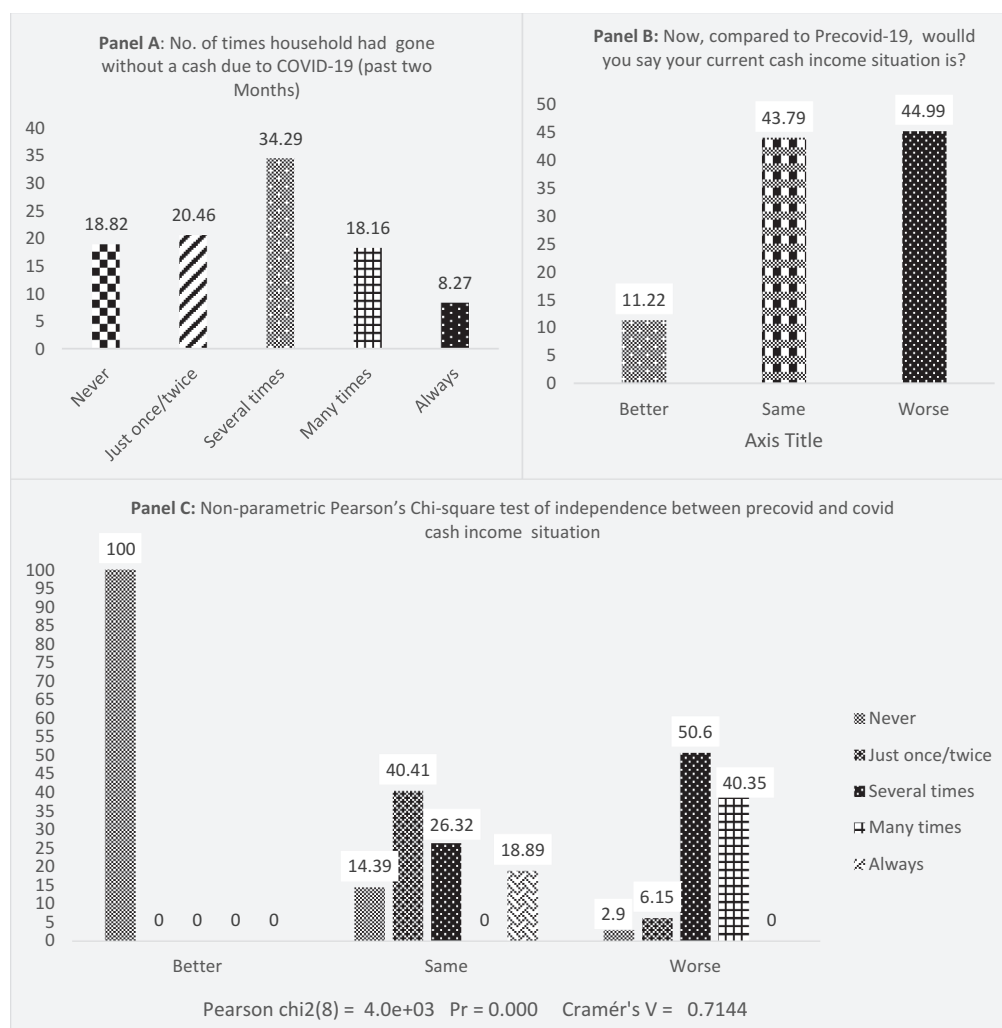


poverty increased by 58% for a female-headed household whose heads loss jobs due to COVID-19 while their living standards decreased by 71%. The differential magnitude of 3.7 percentage points in favour of male-headed household is indicative of the gender gap. Similar trends hold for other individual and household characteristics. This finding supports the findings of Wenham et al. (2020) and Alon et al. (2020) who observed that COVID-19 pandemic is widening the gender inequality gap with females continuously disfavoured.

Again, for households whose heads were unemployed due to factors other than the pandemic, their poverty levels dropped by 14.2% with a 40.6% decrease in living standards. The differential effects of 1 percentage points and 15.1 percentage points for poverty and living standards, respectively in the female-headed household again validates the gender-COVID-19 heterogeneity hypothesis. By, implication, the pandemic generally had a significant deleterious effect on households in terms of poverty and living standards and that the pandemic's impact is more pronounced in households headed by females. Similar findings had been reported by Suryahadi et al. (2020) in Indonesia.

Still on COVID-19-gender dimensions, compared to households headed by males, the poverty levels of female-headed households increased by 6.3% and their standard of living also decreased by 5.4%. These are statistically significant, indicating the relevance of such variations. This finding supports the findings of Alon et al. (2020), who found that COVID-19 had exacerbated the gender equality gap. The authors found that closure of schools and daycare centres have massively increased the poverty levels of females and the effect is likely to persist for a long while owing to a high return to experience in the labour market. Similarly, Wenham et al. (2020) observed that a huge gender heterogeneity

Figure 4. Number of times households has gone without a cash income due to covid-19 (past two Months).



exists regarding the impact of COVID-19 with women mostly disadvantaged. The authors underscored that the differential effect of COVID-19 on women results from differences in employment status where most women are engaged in informal care within the household with the consequences of limiting their work and economic opportunities. In terms of COVID-19-location nexus, Table 2 evidently shows that households located in rural settings were heavily affected compared to their urban folks. As shown in Table 2, relative to urban households, poverty levels of rural households had increased by 10.5% owing to COVID-19 compared to their urban counterparts. Besides, the living standards of households in rural areas had fallen by 7.7% compared to those in urban areas. Focusing on rural-urban subsamples, although the poverty levels increased and living standards dropped for households in both rural and urban areas whose head loss their jobs compared to their employed counterparts, the differential effect of 22 percentage points and 14.3 percentage points for poverty and living standards in rural households is statistically significant at 1%. This further confirms that the impact of COVID-19 is more pronounced in deprived areas. This finding supports the findings of van Dorn, Cooney and Sabin (2020) who found that in the United States, the impact of COVID-19 on people living in rural areas was much higher than those in the cities. Other studies, such as Kashnitsky and Aburto (2020) and Emanuel et al. (2020) have also reported similar findings.

Households with large members were also adversely affected. For instance, every additional member of the household increased the poverty level by 2.3% and decreased living standards by 1.1%. Households with significant dependents also had their poverty levels increased by 18.5%, and living standards decreased by

Table 2. Effect of COVID-19 on poverty and living standards

Poverty (Lived poverty Index-LPI)						Living standards				
Variables	Full	Male	Female	Rural	Urban	Full	Male	Female	Rural	Urban
Unemployed due to COVID-19	0.557*** (0.048)	0.543*** (0.070)	0.580*** (0.067)	0.670*** (0.067)	0.450*** (0.069)	-0.657*** (0.0415)	-0.614*** (0.0584)	-0.710** (0.0594)	-0.734** (0.0530)	-0.591** (0.0647)
Unemployed due to other factors	0.142*** (0.043)	0.159*** (0.060)	0.169** (0.063)	0.154*** (0.056)	0.133** (0.065)	-0.406*** (0.0409)	-0.331*** (0.0567)	-0.482** (0.0593)	-0.443** (0.055)	-0.377** (0.0608)
Age	-0.003*** (0.001)	-0.004** (0.002)	-0.003** (0.001)	-0.004** (0.002)	-0.003** (0.002)	0.015 (0.001)	0.0708 (0.001)	0.003 (0.001)	0.049 (0.001)	0.028* (0.001)
Age squared	-0.006 (0.002)	-0.004* (0.002)	0.003 (0.002)	0.001 (0.002)	-0.002 (0.004)	-0.007*** (1.38e-07)	-0.007*** (1.19e-07)	-0.017* (0.043)	-0.067** (0.002)	-3.59e-07 (0.007)
Female head (ref = male head)	0.063** (0.030)			0.095** (0.041)	0.042 (0.044)	-0.055** (0.0284)			-0.060** (0.0376)	-0.051** (0.0435)
Rural (ref = urban)	0.105*** (0.035)	0.047 (0.049)	0.151*** (0.049)			-0.077** (0.0331)	-0.160** (0.040)	-0.101** (0.0482)		
Household size	0.0233** (0.005)	0.032*** (0.007)	0.016** (0.007)	0.017** (0.007)	0.030*** (0.007)	-0.011** (0.00488)	0.046** (0.00663)	-0.084** (0.00733)	-0.039** (0.007)	0.018** (0.0061)
Dependents (ref = no dependents)	0.185*** (0.035)	0.199*** (0.050)	0.169*** (0.049)	0.093** (0.047)	0.269*** (0.051)	-0.454*** (0.0357)	-0.476*** (0.0495)	-0.438** (0.0521)	-0.505** (0.0479)	-0.394** (0.0537)
Primary education	-0.152*** (0.035)	-0.191** (0.050)	-0.113 (0.049)	-0.206** (0.047)	-0.074 (0.051)	0.0918* (0.0357)	0.123* (0.0495)	0.0863 (0.0521)	0.0547 (0.0479)	0.106* (0.0537)

(Continued)

Table 2. (Continued)

Poverty (Lived poverty Index-LPI)						Living standards				
Variables	Full	Male	Female	Rural	Urban	Full	Male	Female	Rural	Urban
Secondary education	(0.050)	(0.068)	(0.074)	(0.060)	(0.088)	(0.0491)	(0.0733)	(0.0673)	(0.0783)	(0.0637)
	-0.216***	-0.273**	-0.169**	-0.124**	-0.305**	-0.103**	-0.156**	-0.0487	-0.0749	-0.168**
Tertiary	(0.047)	(0.066)	(0.067)	(0.061)	(0.077)	(0.0439)	(0.0611)	(0.0639)	(0.0639)	(0.0645)
	-0.282***	-0.312**	-0.264**	-0.218**	-0.369**	0.0132	0.0351**	0.0614**	0.0123**	0.0353**
Household income (log)	(0.043)	(0.060)	(0.062)	(0.054)	(0.072)	(0.0404)	(0.0564)	(0.0588)	(0.0616)	(0.0549)
	-0.011***	-0.213	-0.028**	0.001	-0.027	0.0567***	0.0737***	0.0413*	0.0480**	0.0569**
Western Region	(0.018)	(0.025)	(0.025)	(0.024)	(0.026)	(0.0163)	(0.0235)	(0.0227)	(0.0215)	(0.0247)
	0.186***	0.257***	0.118	-0.085	0.230***	0.281***	0.197***	0.369***	0.317***	0.316***
Central Region	(0.056)	(0.081)	(0.078)	(0.129)	(0.072)	(0.0531)	(0.0750)	(0.0759)	(0.0709)	(0.112)
	-0.087	-0.152	-0.030	-0.304**	-0.119	0.192***	0.258***	0.127*	0.131*	0.326***
Oti Region	(0.072)	(0.104)	(0.100)	(0.145)	(0.096)	(0.0529)	(0.0756)	(0.0736)	(0.0690)	(0.113)
	0.007	0.064	-0.040	-0.194	-0.116	0.0393	-0.0132	0.0844	-0.114	0.179
Bono Region	(0.070)	(0.098)	(0.099)	(0.135)	(0.112)	(0.0611)	(0.0837)	(0.0899)	(0.0880)	(0.115)
	0.193***	0.175**	0.227***	-0.107	0.242***	0.479***	0.493***	0.461***	0.430***	0.586***
Ashanti Region	(0.060)	(0.089)	(0.083)	(0.132)	(0.080)	(0.0547)	(0.0763)	(0.0792)	(0.0671)	(0.118)
	-0.036	0.039	-0.104	-0.367**	0.019	0.439***	0.453***	0.420***	0.426***	0.540***
Eastern Region	(0.057)	(0.079)	(0.081)	(0.135)	(0.067)	(0.0478)	(0.0664)	(0.0686)	(0.0559)	(0.115)
	-0.162**	-0.154	-0.161*	-0.439**	-0.131	0.567***	0.586***	0.548***	0.587***	0.618***
Northern Region	(0.068)	(0.098)	(0.096)	(0.139)	(0.092)	(0.0600)	(0.0854)	(0.0849)	(0.0742)	(0.125)
	0.225***	0.221**	0.233***	-0.018	0.210**	0.218***	0.204**	0.234***	0.200**	0.300***
	(0.062)	(0.087)	(0.087)	(0.127)	(0.095)	(0.0609)	(0.0848)	(0.0884)	(0.0924)	(0.113)

(Continued)

Table 2. (Continued)

Variables	Poverty (Lived poverty Index-LPI)					Living standards				
	Full	Male	Female	Rural	Urban	Full	Male	Female	Rural	Urban
North East Region	0.266*** (0.069)	0.264*** (0.097)	0.278*** (0.100)	0.009 (0.132)	0.318** (0.126)	0.458*** (0.0773)	0.374*** (0.107)	0.544*** (0.112)	0.580*** (0.167)	0.511*** (0.121)
Upper West Region	0.403*** (0.067)	0.409*** (0.092)	0.408*** (0.097)	0.119 (0.129)	0.562*** (0.134)	-0.0589 (0.0738)	-0.00536 (0.104)	-0.130 (0.104)	0.341** (0.154)	-0.0627 (0.117)
Constant	-0.092 (0.148)	-0.117 (0.212)	-0.123 (0.204)	0.256 (0.227)	-0.019 (0.218)	-0.139 (0.137)	-0.208 (0.192)	-0.0112 (0.197)	0.0382 (0.180)	-0.342 (0.221)
N	3,905	1,878	2,027	1,841	2,064	3,905	2,027	1,878	1,841	2,064
R-squared	0.131	0.133	0.136	0.145	0.107	0.238	0.236	0.248	0.186	0.298

LPI is Lived Poverty Index. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Reference group for the region is Greater Accra. Reference group for employment are the employed. Reference group for education is no formal education. Unemployed due to COVID-19 refers to workers who lose their jobs due to the pandemic.

47.6% compared to households without dependents. In terms of education, households whose head had higher educational attainments had their poverty levels fallen compared to those with lower or no formal education. The study also found supportive evidence that incomes cushion households' poverty levels and, thus, improve their living standards. Every additional Cedi decreases the poverty levels by 1.1% and increase the standard of living by 5.7%. With regard to regional dimensions, some regions of the country were more affected by others. For example, Greater Accra, which is the region most affected with the COVID-19 cases, was the reference categories. As shown in the table, compared to Greater Accra region, poverty levels of households in the Central, Ashanti and Eastern regions were lower.

In sum, the findings in Table 1 are supportive evidence that the COVID-19 pandemic had led to a significant rise in the poverty levels of households. Consistent with extant literature, while Baker et al. (2020) found that the COVID-19 pandemic had increased the poverty levels of households in terms of decrease in overall household consumption, Van Lancker and Parolin (2020) found that COVID-19 had increased child poverty. At the same time, Sumner et al. (2020) observed that the adverse effect of COVID-19 on poverty is global.

4.3. Robustness checks

The study conducted two additional robustness estimations as checks on the results mainly on two grounds. First, given that the effect of the use of essential or necessary services may change along with the distribution of household welfare, we apply a distributional (quantile) regression technique to examine the effect of the pandemic beyond mean household consumption expenditures. Secondly, there is a tendency that by merely varying the measurement of poverty, the adverse effects of COVID-19 on it might vary substantially. Under that context, the effect of COVID-19 on poverty becomes sensitive and hence will depend on measurement and conceptualisations issues. Thus, to address this concern, we implemented Alkaire Foster methodology to measure poverty by multidimensionality. Poverty, in this study, has five core dimensions (food, water, cooking fuel, medical care, and cash income) and, thus, applying equal weights will yield $1/5 = 0.2$. In the context of multidimensional poverty (see (Alkire & Foster, 2011; Alkire et al., 2015), a household is multi-dimensionally poor, if it is deprived in at least two dimensions. Hence, the Multi-dimensional Poverty Index (MPI) threshold is $MPI \geq 0.4$ and households with $MPI \geq 0.4$ are poor, and those with $MPI < 0.4$ are non-poor. Within the Alkaire Foster framework, the MPI is dichotomised such that a household is given a value of 1 if its $MPI \geq 0.4$ and 0 otherwise. The effect of COVID-19 on the MPI is estimated with a probit model. To further ensure the robustness of the study's results, we carried out a sensitivity analysis by varying our MPI cutoff ($MPI \geq 0.4, 0.6$ and 0.8). Variations in the cutoff were highly insensitive to poverty estimates. Hence, we presented the conventional cutoff of ≥ 0.4 .

Fundamentally, these checks are to account for any unobserved heterogeneity that could be found among the sampled households. The estimates for these additional robustness checks are presented in Table 3. From these robustness estimations, two key issues emerged: First, in terms of the overall household consumption, persons within the middle class and the upper class (highest) were profoundly affected though the poorest were also affected. For instance, while the overall consumption of households whose heads were unemployed due to COVID-19 decreases by 18% for those in the lowest quantile, it decreases more (18.5%) for their counterparts in the highest quantile. A possible explanation for this finding is that COVID-19 in Ghana is so much concentrated in its major cities compared to its rural areas. Second, those who were unemployed due to COVID-19 have a 10.5 percentage points probable risk of being multi-dimensionally poor compared to the employed. Households whose heads were unemployed due to factors other than COVID-19 have a 5.8 percentage points probable risk of being multi-dimensionally poor compared to the employed.

5. Conclusions and recommendations

This paper empirically provides a first view of the micro-effects of the COVID-19 pandemic in Ghana. With primary data, the study demonstrates how COVID-19 affects household poverty and living standards in Ghana. The study showed that COVID-19 has negatively affected the poverty and living standards of households and that the adverse effect was much higher for the unemployed compared to the employed. The study also found supportive evidence that COVID-19 has a heterogeneous effect on demographic characteristics

Table 3. Effect of COVID-19 on poverty and living standards

Total household consumption expenditure						Multidimensional poverty				
Simultaneous Quintile Regression (SQR)						Full	Male	Female	Rural	Urban
Variables	Lowest	Second	Third	Fourth	Highest	ME	ME	ME	ME	ME
Unemployed due to COVID-19	-0.180**	-0.203**	-0.199**	-0.226**	-0.185**	0.105**	0.145**	0.090**	0.149**	0.065***
Unemployed due to other factors	(0.059)	(0.0526)	(0.0416)	(0.0245)	(0.0411)	(0.019)	(0.029)	(0.027)	(0.029)	(0.024)
	-0.0231	-0.0691	-0.0749	-0.082**	-0.215**	0.058**	0.049	0.070**	0.057*	0.055**
Age	(0.0586)	(0.0554)	(0.0501)	(0.0369)	(0.0357)	(0.020)	(0.030)	(0.027)	(0.031)	(0.023)
Age squared	0.000923	0.026**	0.00110	-0.00128	-9.61e-06	-0.001	-0.001	-0.001	-0.001	-0.002
	(0.001)	(0.001)	(0.00106)	(0.001)	(0.00107)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female head (ref = male head)	3.01e-08	3.99e-08	-2.25e-07	-0.007	-1.61e-07	0.009	-0.003**	-0.007	0.002	0.001
	(0.007)	(0.007)	(2.38e-07)	(0.007)	(2.13e-07)	(0.009)	(0.001)	(0.009)	(0.001)	(0.001)
Rural (ref = urban)	-0.0298	-0.0493*	-0.062**	-0.064**	-0.076**	0.015**			0.020**	0.027**
Household size	(0.0343)	(0.0292)	(0.0240)	(0.0235)	(0.0274)	(0.013)			(0.0200)	(0.016)
	-0.133**	-0.186**	-0.089**	-0.100**	-0.207**	0.004*	0.010**	0.007**	0.008**	0.0014
Dependents (ref = no dependents)	(0.0536)	(0.0397)	(0.0296)	(0.0268)	(0.0362)	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)
	-0.00753	-0.013**	-0.016**	-0.014**	-0.023**	0.084**	0.144**	0.096**	0.123**	0.038**
	(0.006)	(0.005)	(0.003)	(0.004)	(0.004)	(0.014)	(0.022)	(0.020)	(0.021)	(0.019)
	-0.0318	-0.115**	-0.0473	-0.114**	-0.215**	0.007	-0.051	-0.019	0.004	0.007
	(0.0399)	(0.0531)	(0.0300)	(0.0336)	(0.0378)	(0.023)	(0.038)	(0.029)	(0.039)	(0.024)

(Continued)

Table 3. (Continued)

Total household consumption expenditure						Multidimensional poverty				
Simultaneous Quintile Regression (SQR)						Full	Male	Female	Rural	Urban
Variables	Lowest	Second	Third	Fourth	Highest	ME	ME	ME	ME	ME
Primary education	0.123 (0.0839)	0.0441 (0.0565)	0.0157 (0.0475)	0.0149 (0.0386)	0.0809* (0.0443)	-0.032 (0.021)	-0.029 (0.032)	-0.092** (0.029)	-0.081** (0.033)	0.007 (0.025)
Secondary education	0.228** (0.0905)	0.105 (0.0672)	0.0724 (0.0486)	0.0545 (0.0393)	0.156*** (0.0485)	-0.047** (0.019)	-0.073** (0.029)	-0.089** (0.026)	-0.091** (0.031)	-0.017 (0.022)
Tertiary	0.155** (0.0653)	0.0808* (0.0456)	0.0849** (0.0369)	0.0679** (0.0297)	0.225*** (0.0367)	-0.023** (0.008)	-0.003** (0.009)	-0.027** (0.011)	-0.032** (0.011)	-0.013 (0.009)
Household income(log)	-0.0449 (0.0765)	-0.0517 (0.0733)	-0.235*** (0.0530)	-0.324** (0.0690)	-0.218*** (0.0607)	0.073*** (0.015)	0.111** (0.024)	0.055** (0.021)		
Western	0.000466 (0.0757)	0.0150 (0.0852)	-0.0864 (0.0577)	-0.228** (0.0619)	-0.138*** (0.0448)	0.175*** (0.024)	0.143** (0.037)	0.185** (0.035)	0.178** (0.031)	0.170*** (0.058)
Central Region	-0.0880 (0.0980)	-0.123* (0.0664)	-0.226*** (0.0701)	-0.296** (0.0790)	-0.134* (0.0715)	0.045 (0.031)	0.107** (0.044)	0.034 (0.045)	0.0392 (0.041)	0.042 (0.064)
Oti Region	-0.0638 (0.0896)	-0.148 (0.0986)	-0.189*** (0.0701)	-0.203** (0.0597)	-0.120** (0.0511)	-0.059* (0.034)	-0.102** (0.047)	-0.046 (0.048)	-0.021 (0.054)	-0.072 (0.063)
Bono Region	-0.00778 (0.0866)	-0.0593 (0.0675)	-0.162*** (0.0582)	-0.183** (0.0932)	-0.0642 (0.0671)	0.214*** (0.026)	0.160** (0.043)	0.194** (0.039)	0.231** (0.034)	0.193*** (0.059)
Ashanti Region	-0.0277 (0.0719)	-0.140* (0.0842)	-0.212*** (0.0823)	-0.310** (0.0870)	-0.153* (0.0908)	0.086*** (0.025)	0.024 (0.037)	0.134** (0.034)	0.091** (0.030)	0.064 (0.061)
Eastern Region	-0.113* (0.0649)	-0.193** (0.0933)	-0.281*** (0.0609)	-0.321** (0.0678)	-0.154** (0.0726)	0.152*** (0.030)	0.134** (0.046)	0.149** (0.044)	0.124** (0.041)	0.177*** (0.061)

(Continued)

Table 3. (Continued)

Total household consumption expenditure						Multidimensional poverty				
Simultaneous Quintile Regression (SQR)						Full	Male	Female	Rural	Urban
Variables	Lowest	Second	Third	Fourth	Highest	ME	ME	ME	ME	ME
Northern Region	-0.342**	-0.217*	-0.246***	-0.232**	-0.0641	0.208***	0.208**	0.199**	0.242***	0.179***
	(0.116)	(0.122)	(0.0857)	(0.104)	(0.0669)	(0.027)	(0.044)	(0.040)	(0.039)	(0.058)
North East Region	-0.614**	-0.516**	-0.304***	-0.356**	-0.264***	0.249***	0.241**	0.286**	0.238***	0.227***
	(0.218)	(0.0869)	(0.0868)	(0.0605)	(0.0903)	(0.028)	(0.048)	(0.038)	(0.055)	(0.057)
Upper West Region	5.861***	6.522***	7.071***	7.686***	8.022***	0.316***	0.221**	0.352***	0.382***	0.260**
	(0.131)	(0.0930)	(0.0885)	(0.0892)	(0.0691)	(0.023)	(0.051)	(0.029)	(0.031)	(0.056)
Constant	3,905	3,905	3,905	3,905	3,905	3,905	2,027	1,878	2,064	1,841
ME is the marginal effect. Reference group for the region is Greater Accra. Reference group for employment are the employed. Reference group for education is no formal education. Unemployed due to COVID-19 refers to workers who lose their jobs due to the pandemic Standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.										

ME is the marginal effect. Reference group for the region is Greater Accra. Reference group for employment are the employed. Reference group for education is no formal education. Unemployed due to COVID-19 refers to workers who lose their jobs due to the pandemic Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

such as age, household size, income, educational attainments and employment status. Moreover, we validate that gender, and local heterogeneities exist regarding the impact of COVID-19. While female-headed households were worse off in terms of poverty and living standards compared to their male-headed counterparts, rural households were affected mainly than the urban households. This study has several policy implications. First, COVID-19 has widened the gender equality gap, and thus, more efforts or gender-specific policies are required to close the new gaps and possibly narrow existing ones. Again, rural dwellers were more affected than those in urban settings, although, in both settings, a significant proportion had lost their jobs. Thus, there is an urgent need for the country to broaden its social protection programmes to assist both the new poor and existing poor. However, our study had some limitations. We caution that findings from this study were based on short-term responses meant to illustrate a close to a real-time view of COVID-19 micro-effect on household poverty and living standards as possible. The outbreak of COVID-19 has upended countries worldwide, and we are surely just at the beginning of understanding the full impact of the pandemic at both the household and national levels. In that regard, this study comes in hand as a reference for future studies within Ghana and possibly beyond. We suggest that future studies should analyse how households that lost their jobs due to COVID-19 were able to substitute to new types of work and new employers.

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Box 1: Lived poverty

Q5. **Over the past two Months (12 March to 12 May), how often, if ever, have you or anyone in your family?**

- 5A. Gone without enough food to eat due to COVID-19? Never ☐ Just once/twice ☐ Several times ☐ Many times ☐ Always
- 5B. Gone without enough clean water for home use due to COVID-19? Never ☐ Just once/twice ☐ Several times ☐ Many times ☐ Always
- 5C. Gone without medicines or medical treatment due to COVID-19? Never ☐ Just once/twice ☐ Several times ☐ Many times ☐ Always
- 5D. Gone without enough fuel to cook your food due to COVID-19? Never ☐ Just once/twice ☐ Several times ☐ Many times ☐ Always
- 5E. Gone without a cash income due to COVID-19? Never ☐ Just once/twice ☐ Several times ☐ Many times ☐ Always

For each of these six core questions on poverty, there was a follow up question to ascertain the precovid-19 situation on each indicator. For example, in Q5A. Gone without enough food to eat due to COVID-19?, there was a follow up question as: 5Ai. Now compared to pre-COVID-19, would you say your current food situation is?

Better ☐ the Same ☐ Worse ☐

Box 2: Living Standards

Q7. Please tell me if the following things are worse or better for you or others in your household during the past two Months (12 March, to 12 May 2020) than they were a before COVID-19, or are they about the same?

- A. Your ability to get medical care when you need it. Much worse ☐ Worse ☐ Same ☐ Better ☐ Much Better ☐
- B. Your ability to eat healthy and nutritious food when you need it. Much worse ☐ Worse ☐ Same ☐ Better ☐ Much Better ☐
- C. Income Much worse ☐ Worse ☐ Same ☐ Better ☐ Much Better ☐
- D. Cost of living Much worse ☐ Worse ☐ Same ☐ Better ☐ Much Better ☐
- E. Access to electricity Much worse ☐ Worse ☐ Same ☐ Better ☐ Much Better ☐
- F. Overall standard of living (education, health, food, etc) Much worse ☐ Worse ☐ Same ☐ Better ☐ Much Better ☐
-

Table A1. Sample distribution of the respondents (n = 3,905)

Variable	%	Definition	Mean	SD
Employed	55.62	Employment status of the respondents. (0= employed, 1=unemployed due to COVID-19, 2=unemployed due to other factors/ reasons)	.66	.81
1 Job-loss-COVID-19	22.64			
3 unemployed	21.74			
Male	51.91	Gender of the respondent. (0=male, 1=female)	.48	.50
Female	48.09			
Urban	52.86	Respondent's place of residence. (0=urban, 1=rural)	.47	.50
Rural	47.14			
No edu	19.59	Educational attainments of the respondents (0=no formal education, 1=primary, 2=secondary, 3=tertiary)	2.67	1.49
Primary	15.31			
Secondary	24.02			
Tertiary	41.08			
Dependents Yes	30.93	Whether persons under 16 years are living in the household (0=No, 1=Yes)	.69	.462
No	69.07			
Greater Accra Region	19.62	Region of the respondent (0=Greater Accra, 1=western, 2=central, 3= Oti, 4=Eastern, 5=Ashanti 6=Bono, 7=Northern, 8=North East, 9=Upper West)	3.61	2.82
Western Region	13.11			
Central Region	8.22			
Oti Region	8.40			
Eastern Region	8.83			
Ashanti Region	15.01			
Bono Region	7.27			
Northern Region	8.50			
North East Region	6.35			
Upper West Region	4.69			
Household size		Household size	4.41	2.99
Income		Household total monthly income	1145.56	1095.16
Age		Age of the respondent	36.6	14.06



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