GEST ALUMNI SNAPSHOT

SOCIAL IMPACT OF COVID-19 RESTRICTIONS

SOCIO-ECONOMIC IMPACTS OF COVID-19 PANDEMIC ON RURAL CLEAN ENERGY

WOMEN ENTREPRENEURS IN NIGERIA: A MIXED METHOD STUDY

Chinenye Anekwe

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TABLE OF CONTENTS

ABSTRACT

This study employed a mixed-method design. A quantitative method was used in analysing secondary datasets on responses collected from consenting clean energy women entrepreneurs, examining the concern and effects of COVID-19 on the clean energy business. Moreover, a qualitative method was used to collect and analyse semi-structured interviews with eight rural women clean energy entrepreneurs, in addition to two business mentors for validating findings.

Results showed that most of the women had very restricted access to financial sources during the heat of the pandemic. In addition, the sales of clean energy products were severely affected due to movement restrictions and the prohibition of large gatherings which were platforms for sales for the women. This affected the income of the women and subsequently their livelihood and mental health. Some reported that the stress of the pandemic on their businesses put some level of strain in their family relationships which consequently impacted their self-esteem negatively. Most of the women also had no access to relief support during the pandemic hence becoming more vulnerable due to the pandemic.

This study reveals the experiences of rural clean energy women entrepreneurs (women living in rural communities, who run clean energy enterprises) during the pandemic COVID-19. To protect the gains made so far in the clean energy sector, interventions like provision of funds for start-up and working capital, training on online-based business models, as well as bridging the gender technology gaps for the Micro Small and Medium Enterprises (MSMEs) women in the energy sector need to be considered.

KEYWORDS: Clean energy, rural women, entrepreneurs, COVID-19.

1. INTRODUCTION

The effects of the COVID-19 pandemic cut across all facets of human endeavours, including but not restricted to the spheres of healthcare, economic livelihood, and access to other developmental needs. Even more worrisome is the adverse impact on MSMEs especially in the low and middle-income countries. The clean energy space where 32% of the workforce are women, is not an exception to this and this has implications for clean energy transitions and gender equality in low- and middle-income countries (LMICs). To achieve SDG7, which aims to provide clean, and affordable energy for all, it is essential to ensure availability and access to all, especially in the last mile communities. Last-mile communities in the context of this study refers to communities that share some of these interconnected factors: lack of access to grid power, low-income or seasonal economies, and remote or isolated geography. This study investigates the socio-economic impact of COVID- 19 on rural clean energy women entrepreneurs in Nigeria.

1.1. COVID-19 and Women Energy Entrepreneuers

The outbreak of COVID-19 as a global pandemic in 2020 and the turn of events as well as future uncertainties adversely transformed people's way of life and also negatively affected all the aspects of the economy globally. For instance, most countries declared closure of educational institutions, agriculture, closure of international borders leading to cancellation of flights, businesses, sporting activities and tourism (Nicola et al., 2020), essentially confining people to their homes. The decline in the supply of commodities necessitated a general increase in prices, leading to inflation and increasing the macroeconomic burden (Ataguba, 2020). The World Bank estimated an increase in the global extreme poverty rate from 8.23% in 2019 to 8.82% in 2020, the first increase in global extreme poverty in the past 12 years (World Bank, 2020). Consequently, an estimated 100 million people were predicted to become extremely poor by the end of 2021 because of the pandemic while the existing millions of poor people would experience deeper impoverishment. Consequently, (World Bank, 2021) while the health and the non-health effects of the pandemic are general, the effects on women are higher. The UN reported that violence against women and girls has significantly increased, with greater complexity of violence across the world due to the lockdown measures (UN Women, 2020). Similarly, a 2020 systematic review reported higher likelihood of women to develop mental health disorders during the pandemic partially because they constitute a larger proportion of small-scale entrepreneurs and retail service providers which are largely affected by the pandemic (Xiong et al., 2020). In addition, the economic impact of the pandemic disproportionately affects rural women; significantly affecting the sectors with more female employees leading to loss of jobs for more women (Alon et al., 2020). Likewise, as more women than men are engaged in informal job, restrictions on ability to work during the pandemic leaves more women without source of income (Langer et al., 2015) and closure of schools translate to increased expenses for women who engage more in childcare, further increasing their financial burden (Alon et al., 2020).

Similar to others, the energy sector has been greatly affected by the pandemic, raising concerns on its implications on clean energy transition efforts (Gebreslassie, 2020). Although, huge progress has been made by the off-grid companies to bring power to about 470 million people in the last ten years, there is a threat of reversal of this progress by the COVID-19 pandemic (GOGLA, 2020b) and the low- and middle-income countries (LMICs) may experience the highest consequences, widening the poverty and inequality gaps (Akrofi & Antwi, 2020). The International Renewable Energy Agency (IRENA) reported that an estimated 60 million people in Africa are being served from the off-grid space (IRENA, 2019). However, these gains may be forfeited with continual reduction in demand and supply due to the pandemic restrictions as clean energy organizations may have to forcefully reduce their staff strength, who are mostly women, in order to reduce costs (Akrofi & Antwi, 2020).

The contributions of women entrepreneurs to economic development, endogenous and diversified growth, gender equality and poverty reduction in the LMICs, cannot be overemphasized (Bushell, 2008). For instance, despite several unfavourable factors, 50% of sub-Saharan entrepreneurs are women. Most of the women play vital roles in creating services that improve the quality of life in their communities (Vita

et al., 2014). Previous studies in Nigeria showed that women entrepreneurs expressed innovations, experiences, social networks and other business skills, making them valuable to compliment Government's efforts in economic enterprises and business development (Ekpe, 2011). In rural communities, small scale women entrepreneurs offer substantial prospects for food production and other economic activities via creation of new markets as women convert their domestic and soft skills such as cooking and home management into income-generating activities (Whatmore, 1988; Anthopoulou, 2010). This is the same for the clean energy space as rural women energy entrepreneurs contribute significantly to closing the distribution gap in last mile communities.

Although the Nigerian Government has formulated policies such as the Power Reform Act of 2005, and taken other measures to facilitate the provision of clean energy, especially in the rural areas of the country (Emodi & Boo, 2015), the envisioned results of these measures are only achievable with the full participation of rural women energy entrepreneurs (ENERGIA, 2019). This is because women entrepreneurs are household producers and primary consumers of energy and as well trade in clean energy products and services, thus contributing in no small measure to the distribution of clean energy technologies especially in the last mile communities (Energia, 2020). In addition, evidence of best practices across the world showed that engagement of women entrepreneurs to bridge the energy gap yielded remarkable results, providing energy for the population and driving economic development (Asif & Barua, 2011).

1.2. Problem Statement

Energy access has been one of the daunting challenges in sub-Saharan Africa. The World Bank reported in 2019 that less than half of people in the region have access to clean energy (Blimpo & Cosgrove-Davies, 2019). In Nigeria, over 85 million people live in energy poverty according to the Energy Progress Report, 2020. 70% of this population live in the rural communities, most of this population being women and children. Some of the challenges to the achievement of clean energy transition include high investment cost of the technologies, lack of access to quality products, lack of technical-know-how, legislative and regulatory challenges, political instability, inconsistent energy policies and inadequate research initiatives in the sector. On the demand side, lack of awareness and knowledge of the advantages of renewable energy, poor perception of the credibility of the clean energy components, lack of capacity building were factors negatively influencing the adoption of renewable energy (Izael, 2015; Kebede et al., 2015; Abdullahi et al., 2017). Rural women energy entrepreneurs are very important to closing some of these gaps as they connect users through unconventional means. In the past, they have been instrumental into fast-tracking the last-mile distribution chain due to their unique ability to connect to customers and deliver products and services through untapped social networks.

With the COVID-19 pandemic and its attendant consequences, clean energy distribution and uptake faces multilevel challenges especially for women energy entrepreneurs. A rapid assessment of impact of COVID-19 carried out in Nepal and four African countries among women energy entrepreneurs showed that almost 90% of the women there were very concerned about financial stress, market closure, non-prioritization of clean energy and restricted mobility caused by the pandemic (Energia, 2020). While none of the women entrepreneurs were aware of any financial support for businesses, only 20% got a relief package in the form of face masks or food items from private organizations, churches or local governments during the lockdown period. Although smart phones were reportedly helpful for business purposes during the lockdown, only 33% of the women had a smartphone and the facility to charge it regularly (Energia, 2020). This has serious implications on increasing unemployment rates and consequently the poverty level among women on the continent, especially those in the rural communities. Therefore, women energy entrepreneurs face the imminent risk of not only losing their jobs, but also increasing their dependency on their male counterparts.

1.3. Research Objectives

Although the achievement of the Sustainable Development Goals (SDGs) and especially goal seven on affordable and clean energy has been threatened by the pandemic, gender-inclusive responses and interventions will go a long way in bringing the energy sector back on the right track. This will strengthen the active participation of All (men and women) in increasing clean energy access. Additionally, recognizing that Micro Small and Medium Enterprises (MSMEs) (which are dominated by rural women) play important roles in a healthy recovery, a gendered evidenced documentation on the degree of impact is needed, so that appropriate interventions can be initiated. It is essential to inform decisions with evidence from all stakeholders, including rural women clean energy entrepreneurs. Hence, the need to carry out this study.

Considering the multi-dimensional achievements of engaging women in the clean energy sector, understanding the implications of the COVID-19 pandemic on rural women is key to formulating policies and designing interventions that can improve the quality of life of both the women and their families, as women empowerment interventions affect the quality of life for families (John Hopkins University Babson College and ICRW, 2019).

In addition, there is paucity of data on the challenges resulting from the pandemic on rural clean energy women entrepreneurs. The few study findings available were from quantitative study designs, only highlighting the effects of the pandemic on the psycho-social status of women. Therefore, this study explored the socio-economic impact of the COVID-19 pandemic on rural clean energy women entrepreneurs.

The specific objectives of this study are:

1. To investigate the effects of COVID-19 on the welfare of rural clean energy women entrepreneurs.
2. To explore the effects of COVID-19 on their access to finances.
3. To explore the extent of COVID-19's effect on their access to the economic market.
4. To explore the effects of COVID-19 on their confidence levels, self-esteem, and sense of dignity.
5. To explore their coping strategies to market changes due to COVID-19.

2. METHODOLOGY

This study utilized a mixed method research design: analysing quantitative secondary data from Nigeria and validating findings through qualitative data collection and analysis. The analysis was carried out using SPSS and Nvivo software for quantitative and qualitative data respectively.

2.1. Quantitative Methods

The quantitative component analysed secondary data collected from the mini research study of Solar Sister, a social enterprise working actively to upscale access to clean energy via women enterprise in Nigeria. This data was primarily collected by the organization as an assessment/situation analysis to understand the effect of COVID-19 on women who trade in clean energy business in rural areas. Permission to analyse this dataset for this study was granted by the head of the organization after removing all forms of identifiers that can link the respondents to the dataset. Hence, an anonymous dataset was analysed for the study. The data was collected using google form, an online data collection platform. This platform was utilized because of the movement restriction at the time of data collection and the link to the google form was sent to 100 purposively sampled women. However, only 21 rural women were able to navigate and completely fill the form, giving a low response rate of 21% consenting rural women clean energy entrepreneurs across the country.

2.2. Qualitative Methods

The qualitative component of the study was conducted by the researcher among eight primary respondents who were rural women clean energy entrepreneurs from different geopolitical zones in Nigeria. Information was also elicited from two business coaches/mentors working in organizations operating in the clean energy sector and supporting the rural women. The women were purposively identified through the organizations working in the clean energy sector; however, a maximum variation approach was adopted in the selection to ensure that the sampled women consist of women with varying attributes and experiences in order to elicit a wide range of perspective and experience (Palinkas et al., 2015). The quantitative findings were used to answer the research questions on effects of COVID-19 on access to finance, access to market, level of the women's confidence, self-esteem, and dignity as well as their coping strategies.

The age of the interviewed rural women clean energy entrepreneurs ranged from 43 to 57. The women were in the clean energy business for an average of 2.6 years, selling portable solar lanterns, solar home systems and clean cookstoves of different sizes and the monthly income from the clean energy business varied from N5,000 to N40,000.

Semi-structured interview guides were developed and utilized for qualitative data collection among the rural women clean energy entrepreneurs and the business mentors/coaches. The instrument was developed after a comprehensive literature review on the socio-economic impact of COVID-19 on rural women. The experience of the researcher working in the clean energy sector was also deployed in developing the instrument. The instrument was translated into the local language and translated back to English to prevent loss of contextual meaning due to interpretation.

The interviews with the business mentor/coaches as well as with two of the rural women were conducted on phone while the rest were conducted physically. The phone interviews option was utilized because of the far distance of the respondents but audio recordings were taken for all the interviews with permission and informed consent from the respondents. These were transcribed verbatim.

2.3. Study Limitations

The sampled women were selected across different regions of the country. Although the women shared a common characteristic as rural clean energy entrepreneurs, heterogeneity in their settings may not be totally ruled out. The phone interviews used in this study present limitations such as inability to observe and document the non-verbal cues of the respondents and possibility of external distraction on the respondents' end. In addition, the small sample size of respondents in the quantitative analysis tend to reduce the validity strength of the quantitative findings. However, the strength of this study is that it provided information on experiences of rural women entrepreneurs in the clean energy sector, and possible areas of intervention to ensure gender parity in the sector. The findings may be relevant to other LMICs.

3**. DATA ANALYSIS**

3.1. Quantitative Data

Descriptive statistics were employed to analyze the primary variables of interest in the dataset, including concerns about the effect of COVID-19, support during the pandemic and business coping strategies. The secondary dataset was transferred into SPSS 20 (IBM Corp) software, and this was used to compute the frequency distribution for responses from the study participants on the variables considered in this study.

3.2. Qualitative Data

The qualitative data from audio recordings of the semi-structured interviews were transcribed verbatim by the research assistants who conducted the interviews. The transcriptions were thereafter translated into English language and centrally analysed by the researcher. An electronic matrix for coding and analysis was developed using Excel Spreadsheet and the topic guides for theme classification. The texts from the transcribed audio notes were transferred to the Nvivo software and this was used to sort the text under each theme classification. The analysis interpretation was done deductively and inductively, and relevant verbatim words were quoted where appropriate.

4. RESULTS

4.1. Concerns of the Effects of COVID-19 on Welfare

The quantitative result showed that approximately half of the survey's respondents were very worried that COVID-19 would affect their families and a quarter of the respondents were very worried that the virus might affect their health or that of a family member. The respondents were also worried the pandemic could affect their family's access to food and that the pandemic could affect their ability to access medicine or healthcare facilities. However, less than half were very worried the pandemic could affect their ability to run their business and their ability to earn money and pay their bills. While the majority of the respondents indicated that the pandemic has impacted their business a lot and were very concerned that it would cause loss of market and customers for them, they were less concerned that the COVID-19 would affect their supply of products. Two-thirds of the respondents were very concerned that the customers were prioritizing food and not requesting or paying for clean energy products during the pandemic but only few of them were really very concerned that the pandemic will affect their payment of loans.

When asked what the women entrepreneurs were doing in response to the challenges of the pandemic, a few of them prayed that the pandemic would go away, a few made use of referrals and door-to-door advertisement to attract customers while social media platforms were used by many of them to promote their businesses. Only a few women received relief support from the government, church donations and the community because the available support was not sufficient to go around the community. While about a quarter of the women will prefer support for provision of food, a larger proportion preferred support in the form of loans for their business and some preferred supporting them with the provision of personal protective equipment such as hand sanitizers, face masks. Although most of the women could recharge their phone all the time, only half had a smartphone while few of the women had a smartphone but could not recharge all the time. The women employed business strategies to make sales during the pandemic which include advertisement of products on social media platforms, collection of instalment payment from customers, door to door advertisement of products and with these most of the women were able to meet up with their customers' demand while a few could not meet up with their customers' demands due to stock out and lack of cash to buy more products.

4.2. Effects of COVID-19 on Access to Finance

A few rural women clean energy entrepreneurs commonly start up their business with seed capital grants from some projects and partnerships. Most of them started their businesses with money from personal savings. Others receive loans from thrift or local banks to start their businesses. The loans come with a high interest rate, and this has prevented many of them from accessing this option to finance their business especially during the pandemic. One of the respondents stated:

> *My bank had requested I should borrow from them; I did not accept because after making sales my profit will be used to pay interest (a respondent from Enugu State).*

During the pandemic lockdown, most of the clean energy women entrepreneurs did not have access to financial support. The local banks could not operate due to movement restrictions. Although some of them were given credit facilities by some local organizations, this credit facility was not accessed by all the respondents because of the seemingly stringent conditions attached to it. Similarly, the respondents who usually access funds through thrift were unable to do so because the contributors were restricted to their houses. As stated by one of the women:

> *I went to the local bank but there was no money. They said because of the pandemic; the Corona, there was no business, so people didn't bring a lot of money. So, my little money that I was able to save, I said let me just continue with it. It was very difficult. We ate almost all the capital, and even the profit and then deep hand into the capital (a respondent from Plateau State).*

Although some of the organizations operating in the clean energy business offered to assist the rural women with loans and credit facilities (this was corroborated by the business mentors/coaches), it was clear from the respondents that the loans and credit facilities had some steep conditions which discouraged them from accessing the facilities. One of the women said:

> *They planned to help us, but the kind of loan they wanted to give to some of us we don't like. They said within 30 days that if we desire to sell something of #50,000 they will give us product of #100,000 and that we have to pay within one month. And if we don't pay within one month the pressure will be too much on us. So many of us opted out that we will not collect the loan (a respondent from Oyo State).*

In summary, access to capital proved to be difficult for these women, either there is no money available in their networks or the conditions were too steep for the few available funding opportunities. Most available opportunities were not tailored for MSMEs, they were mostly focused on large enterprises. Although there were efforts by the mentors to link the rural women with funding, the business registration status of their enterprises was a disadvantage. This criterion alone excludes 90% of this population of entrepreneurs from accessing funding. One of the business mentors noted that:

> *Most of these options for funding that came, came with certain requirements anyway, like business registration and most of our rural entrepreneurs have not yet formalized their business and so they don't have access to these opportunities (a business mentor from Plateau State).*

4.3. Extent of COVID-19 Effect on Access to the Economic Market

The pandemic severely affected business as the respondents who usually advertise and sell their products, moving from one gathering to the other were restricted. Thus, there was a drastic reduction in their sales. Many of the respondents reported that they usually advertise their products in religious gatherings, schools and when they attend social gatherings like marriage and burial ceremonies. However, due to restrictions on gatherings, these marketing platforms for women were disrupted and women were limited to the few customers who came to their houses to buy products.

In addition, many customers refrained from buying clean energy products, prioritizing food and other essential commodities, thus some of the women were forced to reduce the price of the products:

> *COVID has really affected my business because the places I usually go to sell my product I can no longer go there. I usually go to schools to do my marketing, but schools are locked down. I couldn't go to places I could ordinarily go before because of the restrictions. So, I am tied down to doing it within my locality (a respondent from Bauchi State).*

Interestingly, poor knowledge and perception of the COVID-19 by the customers affected the sales of the clean energy. These products were assumed to be made in China and hence could possibly be

contaminated with the virus. This was a challenge to the respondents as many of their customers refused to buy the products for fear of being infected with the virus because they were made in China:

> *During COVID, people were not buying my products again. They were complaining that my solar lamps are from China which I tried to convince them that this product was with me before the COVID. If it is infected, I would have died even before coming to them, and I have to move around with facemask and sanitizer (a respondent from Adamawa State).*

The supply chain for the clean energy products was also affected by the pandemic. Purchase and transportation of goods from supporting organizations to the entrepreneurs were hampered by transport restriction, causing delays in getting products to sell. Similarly, the pandemic affected the business social support of the women as they were unable to hold training and support meetings physically, which is the most preferred mode of training although most of the organizations supporting the entrepreneurs resorted to calls, online and virtual training for the women. However, these online meetings are determined by other programs and logistics and may not hold at times.

4.4. Effects of COVID-19 on Confidence Level, Self-Esteem, and Dignity

The pandemic and lockdown affected the level of confidence and self-esteem of the respondents especially as some of them could not contribute to their household upkeep. Some could not trust that the decisions they would make will not affect their businesses negatively as a result of uncertainties. The women reported to have given up hope of driving a viable business because of the severe effects of the pandemic on their business. One of the women shared:

> *Before now I thought I could sell many more products and make more profits monthly. During the lockdown I was thinking the business would collapse, it's a setback, instead of getting more I am getting less, all my visions are shattered. Before I was feeling I am now a businesswoman, but now I feel I still have a long way to go because all through it is like there is a problem. I lost my confidence (a respondent from Adamawa State).*

Another woman stated that:

> *Even my confidence level (my morale) dropped because of the covid-19. Covid-19 has really brought a lot of problems to us. In my house, feeding became a problem because there was no money to live as we were living before (a respondent from Bauchi State).*

However, despite the reported negative effects of COVID-19 on the confidence and self-esteem of the women, a few of the rural women energy entrepreneurs were challenged to think more actively and independently.

> *The COVID made me have self-confidence that even without government I can help myself, it also made me to be bolder and to have more product knowledge. It also helped me to be more encouraged because nobody knows what might happen in the next five years (a respondent from Lagos State).*

The women reported that the pandemic affected their relationships with other members of the families and friends. Some reported a positive effect, as it helped them to stay more at home and keep close to their immediate family. Others reported that it kept their friends away because of fear of infection. However, they were not bold enough to report on if the economic hardship bred domestic violence in their homes.

4.5. Coping strategy during the pandemic

Many of the women increased their marketing and advertising efforts to adjust to the pandemic situation. In addition, they were less demanding for payment for fear of return of products. Some of the women also reported resorting to prayers and other forms of religious activities as a form of coping strategy to the situation. Interestingly, the rural women energy entrepreneurs learnt and made use of online and social media platforms to advertise their products from their mentors during the pandemic and lockdown period.

> *This social media has really helped me. I have advertised and used that period to have a business name. I tried to register through social media. Then I used the opportunity to call to show people my products. So, through social media I was able to do a lot (a respondent from Oyo State).*

It was evident that the rural women gained some competence on the use of online media for market advertisement and sales which was as a result of adjusting to the COVID-19 pandemic. A business mentor shared:

> *COVID-19 actually helped. It has some negative and positive effects. One of the positives was their exposure to digital tools. My rural women are ever grateful for such opportunities. They call themselves digital women now like they can compete favorably with their counterparts elsewhere (a business mentor from Plateau State).*

5. DISCUSSION

The rural clean energy women entrepreneurs in this study expressed worry that the virus could affect their health and their family members. This is not unexpected as pandemics generally create a sense of concern and fear for everyone, especially women (Sasaki et al., 2013; Mizrak & Nur, 2020). This study also corroborated an earlier similar assessment conducted in five countries where women energy entrepreneurs were very worried that the pandemic could affect their businesses because customers do not prioritize purchasing clean energy products, movement is restricted and there is reduced purchasing power (Energia, 2020).

The findings in this study showed that rural women clean energy entrepreneurs lack a strong financial base to start up their businesses again as most of them were limited to personal savings, and thrift contributions. It also reflected previous study findings which reported that Nigerian businesswomen have a limited capacity due to lack of start-up or working capital (Adesua-lincoln, 2011). It is worrying to note that although women own/manage almost half of the small-scaled registered business in Nigeria, less than 15% have access to appropriate bank credit facilities and this could be linked with unequal gender power. This makes them vulnerable when there is a crisis such as a global pandemic (Halkias et al., 2011).

This study also revealed that the pandemic had several significant effects on the lives and livelihood of rural women clean energy entrepreneurs. It is interesting to note that inaccurate knowledge of COVID-19 and its mode of transmission had a severe effect on the purchase of clean energy products as the products were tagged ‘china products’ (because the products originate from China) and were perceived as capable of transmitting the virus. Previous studies have reported poor knowledge of infection among Nigerians with corresponding poor attitude towards measures that can prevent and mitigate the disease (Enitan et al., 2020; Nnama-Okechukwu et al., 2020). The movement restriction, prohibition on gatherings and reduced demands drastically affected clean energy market access. A similar reduction in the sales of products and market access by MSMEs was reported by Aderemi et al. (2020), although the severity in reduction differs. The reported drastic sales reduction in this study could be attributed to the fact that

clean energy products such as solar lanterns and stoves were not considered as priority products unlike foods and other essential products in the other study. This is evidenced by an AGRA survey report among women operating small and medium agribusiness in sub-Saharan Africa which showed that over 70% had access to the market despite the COVID-19 pandemic (AGRA, 2020). Experts had expressed concerns that COVID-19 pandemic and the subsequent lock-down would be extremely detrimental to the survival of MSMEs in Nigeria especially female-owned ones and without any policy intervention, most of the thriving enterprises would fold up (Adiyoh et al., 2020). This study further confirmed this.

In addition, the respondents reported that COVID-19 also affected their confidence and self-esteem. This is in line with a systematic review which reported that the COVID-19 pandemic has several mental health effects on the population, and women are at a higher risk. The anxiety and uncertainty associated with the pandemic as well as reduced demand for the products resulting in loss of income for the women are potential stressors for mental health challenges (Xiong et al., 2020). Unfortunately, most of the interviewed women reported not to have received any relief support because these were not sufficient and, in some cases, the rural women clean energy entrepreneurs were perceived to be 'rich enough' to cater for themselves and their families. Eranga (2020) reported that there were expressions of dissatisfaction around distributions of relief items during the pandemic in Nigeria. Although the Government had stated that the relief items would be for the vulnerable, politicizing the process of distribution and lack of predefined parameters for the vulnerable undermined the objective of the distribution.

Despite the severe negative impact of the pandemic and the consequent lockdown on the socio-economic activities of the rural women clean energy entrepreneurs, some of them took advantage of the period to stay with their families, strengthen the bond with their family members. This is similar to the finding by Nnama-Okechukwu et al, (2020) where women were reported to spend more time with their children and partners.

The coping strategies employed by the respondents to sustain their business which include door to door marketing and product advertisement through social media and other online fora were similar to the ones reported by the multi-country energy studies (Energia, 2020). It is worth noting that the pandemic facilitated the use of digital solutions by some rural clean energy women entrepreneurs similar to what was done by the rural agribusiness entrepreneurs (AGRA, 2020). However, not all the women have smart phones nor can always recharge with airtime or are even technology savvy to stand up to this challenge.

6. RECOMMENDATIONS

As COVID-19 is shifting the dynamics of businesses and work, there is a need to bridge the gender technology gap especially among rural women entrepreneurs to enable optimal recovery for their businesses. This could be in terms of providing them with mobile phones, training them on successful digital marketing skills as well as online market expansion.

Secondly, COVID-19 relief grants such as the recent Shine Campaign funds (an international initiative supporting rural women energy entrepreneurs with relief grants) should be made available and easily accessible specifically for rural clean energy women entrepreneurs. There are a few recovery loans available for businesses, but it is either that the interest rates are too high or that the conditions are too steep for this group of entrepreneurs considering that most of their businesses fall between Micro and Small Enterprises.

Thirdly, enabling policies and environment needs to be made available to support rural women clean energy entrepreneurs to fast track access to clean and affordable energy for ALL especially in the last mile. The nexus between gender and energy should be part of the COVID-19 recovery plans and high-level policy dialogues.

Furthermore, consumer financing options should be seriously looked into to complement the efforts of these women to reach the last mile end users.

7. CONCLUSION

The devastating effect of COVID-19 has increased the vulnerability of women, especially rural women, around the globe. Rural women businesses which are major contributors to local economic development are badly hit of which the clean energy sector is not exempted. For access to clean and affordable energy for ALL to be actualized within the next decade, efforts need to be intensified. Quick recovery for the facilitators of the distribution value chain fast trackers, namely rural clean energy women entrepreneurs, needs to be strengthened.

This study, which investigated the effects of COVID-19 pandemic on rural clean energy women entrepreneurs in Nigeria, reveals that a few women were able to make positive use of the situation. There were a number of negative effects of the pandemic on finance, market access, and mental health of the women. The subsequent detrimental results of these effects, as revealed by this study, have grave implications on the achievements made so far in the clean energy sector, economic growth, and gender equality. While it is commendable that many of the respondents have developed some corresponding coping measures such as use of online platforms to increase market access, there is need for more interventions to enhance full optimization of these measures.

Sequel to the results of this study, it is recommended that the government and other relevant stakeholders protect the gains made so far in the clean energy sector through support for the women entrepreneurs. Provision of funds for start-up and working capital, training on online-based business models as well as bridging the gender technology gaps are essential for the MSMEs women in this sector.

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