Measuring the effect of interpersonal communication on awareness and knowledge of COVID-19 among rural communities in Eastern Nigeria

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Abstract
Awareness and knowledge have been identified as essential requirements to successfully combat the global threat which COVID-19 currently poses. Rural communities are particularly at risk because of their low socio-economic status and high illiteracy level. There is currently uncertainty regarding how to effectively raise awareness about the pandemic and educate rural communities about it. In this study, we tested the effectiveness of interpersonal communication in awareness creation and knowledge about COVID-19 among rural communities in a developing country. We tested three hypotheses at 0.05 level of significance. The sample size was made up 470 participants. The questionnaire served as the instrument for data collection. In the analysis of data, both descriptive and inferential statistics were used. The results demonstrate that interpersonal communication is effective in creating awareness about COVID-19 among rural communities. It was also found that interpersonal communication was effective in improving knowledge about the pandemic among rural communications. We explored the implications of these findings on healthcare delivery.

Introduction
Rural communities, especially those from less developed countries, are at higher risk than urban communities of contracting diseases and ailments because of three broad reasons. First, rural communities in most third world countries lack adequate health care facilities. This puts their lives at risk to even curable diseases and ailments. Second, rural communities usually lack access roads, thus making it difficult for such communities to gain access to cities and towns where they are likely to get healthcare services. In addition, the transportation system in rural communities is near absent. There are no taxi services, or commercial bus services. This makes mobility in rural areas difficult with corresponding negative implications on access and utilization of healthcare services. This assumption is supported by evidence in literature [1–4].

The third reason is that people in rural communities are largely illiterate with low socio-economic status. Their illiteracy is a limiting factor for them to understand health messages from traditional media like radio, TV, newspaper and magazine. The World Health Organization (WHO) [5] recognizes that there are rural–urban health inequalities. WHO attributed such inequalities to the characteristics of rural areas as it notes: ‘these health inequalities are the result of weaker health systems in rural areas and adverse social and environmental determinants experienced by the rural poor (p. 2)’. WHO further suggested that addressing health challenges in rural areas is essential to poverty reduction with a corresponding possibility for improving the standard of living of rural dwellers. The recommendation from WHO makes a strong case for researchers to examine ways of delivering messages on health care to
rural communities, especially in times of pandemics like the current COVID-19. Therefore, the objective of this study was to test the effectiveness of interpersonal communication in creating awareness and improving knowledge of COVID-19 among selected rural communities in Nigeria.

Overview of COVID-19

Coronavirus disease, which the World Health Organization has designated as COVID-19, broke out in December, 2019 in Wuhan, a city in China. From Wuhan, the pandemic spread to other cities in China, and gradually, other parts of the world. Wu et al. [6] note that COVID-19 pandemic has a low to moderate (estimated 2–5%) mortality rate. Wu et al., add that transmission from one person to another may take place through contacts with people or droplets. Furthermore, whether there is absence of an effective infection control or unavailability of careful personal protective tools, COVID-19 may be harmful to health workers who provide health care to affected persons and note further that medical experts now face the tough challenge of providing a definite treatment for COVID-19 as none currently exists [7]. Sun et al. [8] corroborate that at the moment, there is no vaccine for COVID-19, instead, what exists as treatment is primarily symptomatic treatments.

The total number of people affected by COVID-19 has continues to increase globally. The World Health Organization [9, 10] states that as at 14 May 2020, there were 4 248 389 confirmed cases of COVID-19 globally with 77 965 new cases. It adds that there were 4971 confirmed cases in Nigeria with 184 new cases and 164 deaths. WHO also notes that Nigeria is currently experiencing community transmission of the virus.

Since the outbreak of COVID-19, clinical studies have been conducted to examine the demographics of those most affected as well as the complications resulting from the pandemic. Huang et al. [11] found that the complications that are most common in patients with COVID-19 infection were serious respiratory discomfort syndrome, anemia, severe heart injuries as well as secondary infections. Joob and Wiwanitkit [12] note that COVID-19 infection might lead to a skin rash and petechiae. Li et al. [13] examined 425 people who were infected with COVID-19. Result showed that the median age of those infected with COVID-19 was 59 years. Also it was found that the incubation time for COVID-19 was an average of 5.2 days. Huang et al. [11] examined 41 patients and reported that males dominated those infected as they made up 73% of the patients while females made up only 27% of the patients. They also reported that 32% of the patients had other health challenges like diabetes, hypertension and cardiovascular disease. They reported further that the median age of those affected was 49 years. The implication from these studies is that age also plays a role regarding the vulnerability of people to COVID-19. The older people are, the more vulnerable they are to COVID-19. Also, those with other ailments were equally found to be more vulnerable. This is, however, not to conclude that younger people are not vulnerable to COVID-19 nor is it enough to conclude that people who do not have other health challenges are not vulnerable to COVID-19.

Awareness creation and knowledge about the virus have been identified as essential in a bid to control its spread and limit its impacts on the society. Communication is typically critical during pandemics like COVID-19.

Interpersonal communication and health promotion

Interpersonal communication is the sharing of ideas that take place on a face-to-face basis, usually involving two persons. Improvements in communication technologies have completely changed the definition of interpersonal communication. Hitherto, it was conceptualized as communication on a face-to-face basis, but today, with computer-mediated communication, it is possible for interpersonal communication to take place without face-to-face contact, e.g. using Webex or Zoom. Interpersonal communication is unavoidable because it is difficult for people not to communicate. Face-to-face interpersonal communication has also the advantage of allowing the exchange of
non-verbal cues like eye contacts and body gestures, among others. Scholars [14, 15] argue that the utilization of technology for meaning sharing, has taken away the body gesture in interpersonal communication. Also, interpersonal communication through Internet-mediated platforms like e-mail addresses, social media, instant text messages have also removed non-verbal cues from interpersonal communication. However, in this study we were mainly concerned with interpersonal communication that takes place on a face-to-face basis because the focus of the study was rural communities. Rural communities still depend more on a face-to-face interpersonal communication than they do on computer-mediated communication.

Heidegger [16] notes that interpersonal communication is made up of six components. The first component seeks to answer the question of who the source of the communication thinks he or she is. The second component seeks to answer the question of who the source of the communication thinks the receiver is. The third component seeks to answer the question of who the source thinks others think he or she is. The fourth component seeks to answer the question of who the receivers think they are. The fifth component seeks to answer the question of who the receiver thinks the source is and finally, the last component seeks to answer the question of who the source thinks the receiver believes they are. Heidegger adds that for interpersonal communication to be effective there is the need for both parties involved to share similar understanding in the language used for such communication. Cegala [17] corroborates that appropriate language utilization is a cardinal component of interpersonal communication. Within the context of rural communities, language may not be a challenge in making use of interpersonal communication because such communities share the same language. They also share virtually the same meaning regarding non-verbal cues.

Interpersonal communication presents promising potentials for health promotion. Chichirez and Purcărea [18] claim that when using communication for health promotion, the communicational mix should typically be dependent on interpersonal communication. Storey and Lee [19] is of the view that interpersonal communication for health promotion can take place at home, within health facilities, among small groups, like a family or one-on-one. Storey adds that interpersonal communication has some advantages for health promotion because health messages can be packed and organized in line with the needs of the target receivers.

Studies [20, 21] have reported that interpersonal communication that takes place between patients and health care givers plays a significant role in determining the satisfaction of patients as well as their perceptions concerning the quality of the medical services they receive. Deribew et al. [22] demonstrated that training of households through interpersonal interaction resulted in a decrease in malaria cases in selected areas in Ethiopia. Tanveer et al. [23] conducted a study with the objective to determine the association between interpersonal communication skills of medical doctors and efficiency of healthcare service delivery and reported that medical doctors with better interpersonal communication skills are more likely to effectively address patients’ needs than those with low interpersonal communication skills. Prilutski [24] in a study also reported that interpersonal communication is one of the most effective communication tools in health promotion and concluded that interpersonal communication integrated at a local community level is the most all-around efficient strategy that will substantially influence change in health behaviour of rural people in Ghana. Nkanunye and Obiechina [25] reported a similar result in Nigeria. Based on the results of these studies we hypothesized the following:

- **H1**: Interpersonal communication will be effective in creating awareness on COVID-19 among rural communities.
- **H2**: Interpersonal communication will be effective in improving the knowledge level of COVID-19 among rural communities.

### Theoretical framework

The theoretical framework for this study was Source Credibility Theory. The idea of source
Credibility is attributed to Aristotle who expressed this in a book called The Rhetoric. In The Rhetoric, Aristotle categorized the approaches to persuasion into three components namely: ethos, pathos and logos. In the views of Aristotle, ethos refers to the moral or ethical qualification that a speaker possesses to convince others. It means possessing both the knowledge and moral credentials to persuade others to take a particular decision. Pathos means appealing to the emotions of the receivers of the message. It requires the speaker to manoeuvre the emotions of the receivers of the messages with the intention to persuade them. Finally, logos mean appeal to logic. It means persuading people through the use of sound arguments based on logic. Scholars [26–28] argue that these three branches of source credibility are essential in behaviour change.

Source credibility as a theory was suggested by Hovland et al. [29]. The theorists argue that individuals or receivers of messages can easily be convinced about a message if the source presents itself as credible. According to this theory, the more a source is rated as credible, the more likely it is to influence the behaviour of receivers. Alternatively, the less likely a source is considered as credible, the less likely is the message to influence the receivers of the message. The effectiveness of messages is directly proportional to the credibility rating of the source by the receiver. To further test the source credibility theory, Hovland and Weiss [30] examined the association between sources of persuasion and effectiveness. The researchers conducted their study by making a comparison of credible and non-credible sources using similar persuasive message to determine whether the sources regarded as credible could modify opinions in the message receivers more than the sources considered non-credible. Results showed that source credibility plays a role in message effectiveness. Also, the study of McCroskey [27] found that communicators who are rated high in terms of credibility have the propensity to influence behaviour change more than those who score low on credibility. See also Ugwu [31] cited in Kari, (2020)

Source credibility has dimensions. Cornan et al. [32] cited in Ale (2020) submitted that the three critical dimensions of credibility are: goodwill, competence and trustworthiness. Cornan et al. adds, however, that these three dimensions do not reflect empirical realities, but reveal perceptions that guide the credibility rating of a source. We found this theory relevant to this study because interpersonal communication brings the source and the receiver face-to-face. Often the source and receiver know each other. And if the source has low credibility with the receiver, there may be a negative impact. Therefore, low source credibility rating of the messages sender may negatively impact on the communication and how it is received. Regarding using interpersonal communication for improving awareness and knowledge level of COVID-19 among rural communities, the source may play a significant role because members of the community may not listen to people who are rated low in terms of credibility. They will likely listen more to people they regard as credible.

Based on this theory, the researchers hypothesized:

\[ H3: \text{Source credibility will significantly moderate the effect of interpersonal communication on health behaviour related to COVID-19 among rural communities.} \]

**Methods**

The researchers made use of a quasi experiment to measure the effect of interpersonal communication on awareness and knowledge of COVID-19. It was decided that a quasi experiment was appropriate for the study to enable the researchers to determine the change in awareness and knowledge of COVID-19 between the treatment and control groups. This was to enable the researchers determine the effectiveness of interpersonal communication. The study was conducted in Enugu State with a population of 4,411,119 [33]. To determine whether the sample was adequate for the study, we carried out a priori power analysis with the G*power programme [34]. The parameters were set with power \((1 - \beta)\) at 0.90, 0.30 effect size \(f\) and \(\alpha = 0.05\). The results showed that a total sample size of 470 participants was required to detect statistical differences at the 0.05.
A total of 235 (118 male and 117 female) control group and 235 (117 male and 118 female) treated group took part in the study. The mean age for the control group was 42 years (range: 32–52 years). The mean age for the treatment group was 34 years (range: 20–48 years). All the respondents were largely illiterate who could neither read nor write. This was ascertained at the point of administering the instrument.

**Treatment procedure**

The study took place in Ede-Oballa, Nsukka Local Government Area of Enugu State. Ede-Oballa is made up of two autonomous communities called Ede-Enu and Ede-Ukwu. There are a total of 52 villages in both communities. Ede-Enu has 22 villages while Ede-Nta has 30. In conducting the study, Ede-Enu was the treatment community while Ede-Ukwu was the control community.

To conduct the treatment, a team of research assistants was engaged and they received briefing from health experts on the basic things that people should know about COVID-19. The team of research assistants was proficient in both the local language and English Language, which enabled interaction with the rural people. The team of research assistants was drawn from the communities to test how source credibility moderated the effect of interpersonal communication. The team had ten members who spent 2 weeks interacting with members of the treatment community, telling them about COVID-19. The community members were told about risk behaviour, preventive behaviour and symptoms. The researchers controlled for interference of the treatment group with the control group by encouraging the treatment group not to discuss the pandemic with members of the control community.

**Sampling**

The researchers made use of simple random sampling procedure to select the participants for the study. It was decided that simple random sampling technique was most appropriate for the study so that the outcome could be generalized across the population. Therefore, the simple random sampling technique was implemented by visiting both the treatment and control communities and selecting the study participants.

The data for this study was collected with the use of a structured questionnaire. Although the questionnaire was drafted in English, it was interpreted and read out to the respondents in the local language. The questionnaire had a total of 25 items that were arranged in a Likert scale format that range from strongly agree (4), agree (3), disagree (2) and strongly disagree (1). The questionnaire also had four subheadings that focused on awareness, knowledge, behaviour and the source credibility. Examples of items on the questionnaire include, ‘do you know symptoms of COVID-19?’ ‘Are you aware of how to prevent COVID-19?’ ‘Do you wash your hands regularly?’ And ‘Do you make use of facemask?’ We determined the validity of the instrument by giving it to three experts from University of Nigeria, Nsukka. It was based on the recommendations of the experts that the initial draft of 30 items was reduced to 25 to avoid repetition. We ascertained the reliability of the instrument with the use of a test–retest approach. The outcome showed a coefficient correlation of 0.87 for awareness, 0.77 for knowledge, 0.74 for behaviour and 0.76 for source credibility. This suggested that the instrument was highly reliable.

**Measuring effect**

We measured the effect of interpersonal communication on awareness, knowledge and behaviour by comparing the results of both the treatment and control groups at baseline and after the treatment had been done. This was to enable the researchers to dictate the effect of interpersonal communication. It should be noted that it was decided that interpersonal communication was better because of the low level of education of the rural areas. It is essential to add here that behaviour was measured by asking members of both communities to determine if they were practicing preventive behaviour like handwashing, physical distancing and avoiding of handshake.
Data analysis
We combined both descriptive and inferential statistics to analyse data for this study. Among the descriptive statistics, we made use of simple percentages, mean and standard deviation. Among the inferential statistics, we made use of independent \( t \)-test and hierarchical multiple regression to test the hypotheses at 0.05 level of significance. All the analyses were done with the use of Statistical Package for Social Sciences (SPSS) version 22. The results are presented in the tables.

Results
There was 100% return rate for this study. This may be because the instrument was administered to the respondents by reading it out and asking them to indicate their preferred response option. The results are presented in the tables below:

In Table 1, we combined the results for both Time 1 and Time 2 on the effect of interpersonal communication on awareness of COVID-19 among rural communities. First, at baseline, our result showed no significant statistical difference in the mean scores of rural areas on awareness of COVID-19. Both groups scored low on awareness of COVID-19. This means that both groups did not significantly differ at pre-treatment stage.

We then took the next stage to ascertain the effect of interpersonal communication on awareness of COVID-19 among the study participants (Time 2). The result showed that there was a significant statistical difference in the awareness of COVID-19 among the study participants. Therefore, the result of the study showed that when rural communities are exposed to information on COVID-19 through interpersonal communication, it is likely to result to an improvement in their awareness level of the pandemic. Therefore, the first assumption was supported and it was concluded with 95% confidence that there is a significant relationship between interpersonal communication and awareness level of COVID-19 among rural communities in Nigeria.

In the second part of the study, we sought to ascertain the baseline (Time 1) and post-treatment (Time 2) of knowledge level of COVID-19 among rural communities. The result revealed no significant statistical difference in the mean scores of rural areas on knowledge of COVID-19 at baseline. Both groups scored low on knowledge of COVID-19. This means that both groups did not significantly differ at pre-treatment stage.

Furthermore, we sought to ascertain the effect of interpersonal communication on knowledge of COVID-19 among the study participants (Time 2). The result showed that there was a significant statistical difference in the knowledge of COVID-19 among the study participants. Therefore, the result of the study showed that when rural communities are exposed to information on COVID-19 through interpersonal communication, it is likely to result to an improvement in their knowledge level of the pandemic. Therefore, the second assumption was supported and it was concluded with 95% confidence.

| Groups          | Pre-treatment (baseline-Time 1) (awareness of COVID-19) | Post-treatment (Time 2) |
|-----------------|--------------------------------------------------------|------------------------|
|                 | Mean        | SD       | df | Sig | Mean        | SD       | df | Sig |
| Control group   | 1.2         | 1.4      |    |    | 1.7         | 0.71     |    |    |
| Treatment group | 1.3         | 1.3      | 51 | 0.72| 3.1         | 0.87     | 39 | 0.02|
| Groups          | Pre-treatment (baseline-Time 1) (knowledge of COVID-19) | Post-treatment (Time 2) |
|                 | Mean        | SD       | df | Sig | Mean        | SD       | df | Sig |
| Control group   | 1.1         | 1.2      |    |    | 1.9         | 0.72     |    |    |
| Treatment group | 1.0         | 1.3      | 43 | 0.67| 3.3         | 0.80     | 33 | 0.02|

\( n = 235 \) for both groups.
that there is a significant relationship between interpersonal communication and knowledge of COVID-19 among rural communities in Nigeria (Table II).

In the table above, we conducted a hierarchical multiple regression model to assess the ability of interpersonal communication to influence the health behaviour of inhabitants of rural communities. First, the effect of interpersonal communication was entered and this accounted for 7% of the variance in health behaviour related to COVID-19. After adding source credibility at step 2, the total variance explained by the model as a whole was 51% \( F(2,399) = 12,170, \ P = <0.001 \). Therefore, we conclude that source credibility significantly moderates the effect of interpersonal communication on health behaviour of rural dwellers related to COVID-19. Therefore, the third assumption was also supported and the researchers concluded with 95% confidence that source credibility significantly moderates the effect of interpersonal communication on health behaviour of rural communities related to COVID-19.

| Behaviour | R square | R square change | F | F change | P value |
|-----------|----------|-----------------|---|----------|---------|
| Model 1   | 0.074    | 0.074           | 2951 | 2399 | 0.001   |
| Model 2   | 0.571    | 0.507           | 8862 | 12,170 | 0.001   |

Another interesting aspect of the study was the moderating effect of source credibility on the influence of interpersonal communication on health behaviour of rural communities. This result confirmed the theory of source credibility as suggested by Hovland and Weiss [30]. The result is also similar to those of McCroskey [27] and Ugwu [31] who reported that the credibility of the source plays a role in determining the effectiveness of the message. The results of this study have implications on healthcare delivery to rural communities by making a strong case for the use of interpersonal communication. In addition, the results make a strong case for the use of sources that are regarded as credible among members of the target group. Also, the results have implications on theory by confirming the theoretical postulations of source credibility as put forward by Hovland and Weiss [30]. Also, the results of this study have implications on scholarship by reawakening the consciousness of researchers on the need not to completely ignore the effectiveness of interpersonal communication even in the face of growing

**Discussion of findings**

In this study, the researchers tested the effectiveness of interpersonal communication in creating awareness about COVID-19 as well as improving the knowledge of the pandemic among rural communities in a developing country. Also, the researchers tested the moderating effect of source credibility on the capacity of interpersonal communication to influence the health behaviour of rural communities. The results of the study showed that the three assumptions in the study were supported. In particular, it was found that while both the control and treatment groups reported low awareness of COVID-19 at baseline, the treatment group reported higher awareness at post-treatment. This led the researchers to conclude that interpersonal communication is effective in creating awareness about COVID-19. A similar situation played out with knowledge of COVID-19 among the sample studied. The result of this study is similar to those of previous scholars [22–25] who reported that interpersonal communication is effective in health care promotion. What this means is that when interpersonal communication is applied, it could successfully create awareness about the Coronavirus pandemic as well as improve knowledge of rural dwellers about the disease.

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acceptance of computer-mediated communication and Internet-based media.

**Conclusion and recommendations**

The researchers conclude that interpersonal communication is effective in raising awareness about Coronavirus pandemics among rural communities who are largely illiterate with low socio-economic status. It is equally the conclusion of this study that the source of interpersonal communication plays a moderating role in determining a change in the health behaviour of rural communities. The world is currently held to a standstill by an invisible enemy called COVID-19. Awareness and health education remain essential.

Drawing from the results of this study, the researchers make three broad recommendations. First, it is recommended that healthcare promotion workers should make use of interpersonal communication in raising awareness and improving knowledge of Coronavirus pandemic among rural communities. In the second place, it is recommended that communication about Coronavirus pandemic should be done in collaboration with sources that are regarded as credible among the members of the target public. Finally, further studies should examine media framing of COVID-19 to determine the contribution of the media in raising awareness about the pandemic. This study, just like any other one has limitations. The first one is that the researchers were not able to pay attention to the demographics of the respondents. Also, this study examined only rural areas. Despite these limitations, the study has provided useful evidence for understanding the effectiveness of interpersonal communication in health promotion.

**Conflict of interest statement**

None declared.

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