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Nigeria Centre for Disease Control, awareness creation and risk communication of Covid-19 pandemic amongst non-literate population in South-West Nigeria: Lessons for future health campaign

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Abstract. Risk communication of Covid-19 pandemic in Nigeria appeared to be urban-centered with the dominant use of social media, print communication and other controlled media. In such times of public health emergencies, non-literate population could be vulnerable as a result of their limited understanding of the nature of such health risk. Therefore, the study seeks to investigate the extent to which Nigeria Centre for Disease Control (NCDC) communicated the risk of Covid-19 disease to non-literate population in its public health campaign during the pandemic in South-West Nigeria. The study adopts risk communication theory which advances the approach communication should take during public health emergencies. Using descriptive cross-sectional mixed methods research design, a sample of 420 respondents were purposively selected from 6 towns in the rural areas of Lagos, Oyo and Osun states to examine the level of awareness on Covid-19 pandemic among non-literates. In addition, NCDC risk communication on Covid-19 for non-literate population were analyzed from 3 Jingles in Yoruba language as well as 9 flyers designed for Covid-19 disease from NCDC websites. Results showed that NCDC awareness creation on Covid-19 disease for non-literates in Southwest achieved significant success as a result of the medium used in creating awareness. Specifically, radio was highly rated among majority of the respondents (60.4%) followed by health workers (19.8%) as channels that created understandable message on Covid-19 safety protocols.

Further findings on Jingles content revealed that all Covid-19 safety protocols were communicated in Yoruba language for Southwest populace. However, NCDC fall short in communicating Covid-19 risk effectively for non-literates in Southwest as jingles only buttressed the Covid-19 safety protocols and symptoms as well as the need to comply, without educating the masses on the dreadful nature of the disease and its dynamics. Though flyers designed by the NCDC communicated risk to an extent, nevertheless, graphics and symbols on Covid-19 disease were complimented by words in English language only, which could be difficult for non-literates to decipher. Based on the findings, the study recommends that public health agencies need to educate non-literate population about the nature of a disease more than creating awareness about the outbreak of a disease, and such education should be strategic, context-specific, and evidence-based.

Introduction

Pandemics are not new in human history and their impacts have always altered the human social structure of the world because they pose a serious threat to public health and the overall stability of systems in society. Evidence shows that each outbreak of an infectious disease in the trajectory of human existence is somewhat different from its predecessors (1). The eruption of Covid-19 in China was considered a global threat as a result of its unprecedented spread across countries of the world. By January 2020, the disease became a public health crisis with its nature and dynamics being severely grave. As the disease spread, researchers were worried that misinformation about it was also spreading fast and wide, making it the most debatable and highly controversial health crisis that has threatened the existence of humanity in recent history (2).

Risk communication is an essential component in managing hazards associated with epidemic outbreak, especially in the light of high uncertainties, fear, anxiety and confusion that characterize public health emergencies. For a new disease, public health institutions strive to study the nature and

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dynamics while also launching intervention programs to calm tensions, develop and communicate new strategies to respond to health threats, and provide direction for the people (2). One major purpose of disseminating health information is to increase awareness of the health issue, aside from influencing personal health choices, guiding against misconceptions about health, and demonstrating the benefits of behavior changes to public health outcomes (1). Although pandemic periods are characterized by high information demand, communication must transcend beyond creating awareness about the existence of the disease to a science-based approach for communicating effectively in a high-concern-situation that prioritizes all segments of the population (non-literates inclusive). Hence, the vitally important role of government in risk communication. Governments' intervention in managing pandemics is highly imperative as there is need to actively circulate relevant information to all citizens irrespective of the geographical distributions of the people (3).

As part of the Nigerian government's effort to manage the spread of infectious diseases, Nigeria Centre for Disease Control (NCDC) was established in 2011 by the federal government in response to the challenges of public health emergencies, especially to enhance Nigeria's 'preparedness and response to epidemics through prevention, detection and control of communicable and non-communicable diseases' (4). Following the successful control of the Ebola virus in 2014, investments in epidemic preparedness is believed to have proven useful in addressing the Covid-19 pandemic. However, observers of NCDC risk communication during Covid-19 in Nigeria believed that it appeared to be urban-centered with the dominant use of social media, print communication, and other controlled media of mass communication (5). While the use of some digital technologies may be appropriate by public health officials during pandemics (6), overreliance on internet-based technologies to disseminate information in crisis situation leads to the digital divide (7). In the same vein, high dependence on print media (newspapers and magazines particularly) to communicate risk during pandemics could alienate the non-literate population because they do not have the cognitive capacity to consume such content. Thus, leading to widened disparity amongst the population in terms of access to health information. It had been argued that campaigns to mitigate widespread outbreak of Covid-19 in Nigeria were unevenly deployed as they seem to have cut off peri-urban and rural areas (5). This is because the population in these areas are largely persons with low literacy level or no literacy.

Non-literates may face numerous obstacles such as inability to obtain or process information, which may be or may not be related to how information is packaged (8). Everyone affected by a serious crisis receives information differently, processes information differently, and acts differently. The consequence of this is even appalling for people with low literacy who may not be aware of the severity of an infectious disease. Studies have revealed that people with no literacy or low literacy level are easily prone to disease and other health conditions as a result of lack of knowledge (3,9,10). It has also been found that people with low literacy tend to think in more concrete terms, have a smaller vocabulary, and are less able to interpret nuanced expressions (8,10,11). This finding emphasizes the importance of using communication strategies that will

appeal to non-literates, such as images and graphics to illustrate recommended concepts and actions, and the use of word of mouth, and vernaculars or languages that are suitable for them. In light of the foregoing, the extent to which NCDC can maneuver through the complexities inherent in designing and developing a strategic risk communication program for the non-literate population in South-West Nigeria during the Covid-19 pandemic is worth finding out.

Theoretical framework. There is no specific theory that has been developed to explain and predict public communication campaigns. However, a group of theories under risk communication provides insights into how the usual rules of communication are altered during crises (12). These models have been advanced with an established framework upon which communication is being incorporated into emergency preparedness for public health campaigns. As a mental model approach, risk communication rests upon four theoretical assumptions that explain the way 'information is processed, how risk perceptions are formed and how risk decisions are made' (12,13). They include the risk perception model, the mental noise model, the negative dominance model and the trust determination model.

The Risk Perception Model presumes that an individual assessment of a threat determines the level of concern, anxiety, fear, anger and outrage, a person will express toward the threat (12). Hence, several factors increase the level of individual perception of risk; a hazardous situation that is involuntary, the outbreak of a highly infectious disease that is out of a person's control, and is highly controversial amongst experts (14). The outcomes of risk perception are believed to be beneficial because they serve as a prerequisite to protective behaviors. A genuine perception of personal risk is necessary to take protective action, thereby catalyzing behavior change (12,15). In times of crisis, processing information becomes difficult as a result of fear, anxiety, and uncertainty, and these factors cannot be ignored by risk communicators when communicating risk to people; the result is mental noise.

The Mental Noise Model is the second tenet on which risk communication rests. This theory holds that, when people are stressed in crises situation, they attend to a lot of 'mental noise' consequently, they are less able to pay attention to externally generated information (14). Also, people's ability to process information effectively is seriously impaired and a person's ability to process information can be reduced by more than 80% (12). This is especially apparent during the Covid-19 pandemic as a result of high uncertainties, fear and dread, leading to emotional response. Accompanied with Covid-19 pandemic was also the presence of an infodemic which was a case of an overabundance of misinformation as well as disinformation widely circulated among the populace that further heightened uncertainty and anxiety among the populace. This misinformation was indeed capable of diluting legitimate risk communication amongst the populace (16,17)-a typical characteristic of the mental noise theory. The negative dominance theory is the third tenet of risk communication and it explains how negative and positive information is processed in high-concern situations (12). In other words, in Negative Dominance Theory, people who are under stress place far more emphasis on negative information than on positive

information. The implication of this on risk communication is that there should be more positive information regularly disseminated to counter such negative information.

The last tenet of risk communication is the Trust Determination Model which assumes that trust is the most powerful factor influencing how people make risk-related decisions. The more trusted the source of information, the more acceptable will be the messages, messengers, and channels for acquiring information. For NCDC, much is needed to earn the trust of the masses in such health emergencies especially when it comes to credibility. It is critical to know who communicates to the public to ensure message acceptance, retention, and action. Several scholars in Nigeria have investigated how trust in the government affects citizens' acceptance and compliance with government preventive measures for Covid-19 (9,18). Results have consistently shown that Nigerians generally do not trust the government as experiences have proven that the government has not been accountable to the citizens in many areas. Thus, the NCDC must strive to earn the trust of the masses and build credibility for themselves to succeed in any public health initiative as this is considered critical in ensuring message acceptance, retention and action. According to Risk Communication Theory therefore, people are interested first in how much a source care about them before caring about the information to be received from the source when they are extremely stressed, or outrageously upset (Trust Determination Theory). Second, people place priority on what they hear first, especially in a situation of the complex and voluminous spread of information that could be difficult to understand (Mental Noise Theory). Third, people frequently focus on the negative rather than the positive when they are stressed or upset (Negative Dominance Theory). Lastly, the gaps between risk perceptions and reality frequently widen during such difficult times (Risk Perception Theory). These core communication frameworks serve as a common denominator in planning and designing activities at various stages of a pandemic or outbreak.

In health emergencies, understanding the cognitive beliefs of a lay audience about risk has also been a concern in risk communication. It has been established that while developing strategic messages on health issues with persons with low literacy, the most pressing cultural barriers should be addressed to draw public attention (3). The logic goes that if risk communicators understand popular interpretations of reality, they will be better able to translate technical and scientific concepts into understandable messages (14).

Materials and methods

Study location and population. The study was carried out in Southwest Nigeria because Covid-19 first broke out in the region (Lagos state) and rapidly spread to other states within the region (19). Also, the Southwest region recorded the highest cases of Covid-19 pandemics compared to other geopolitical regions in the country (20). Six states make up the region and these include Ekiti, Lagos, Ogun, Osun and Oyo states. The population of the study consisted of all non-literates between the ages of 25 years and above, and who reside in rural areas of Southwest Nigeria. The inclusion/exclusion criteria include education (primary or no formal education), age, and/or

residency (rural areas). Specifically, the focus was drawn to residents who were petty traders, laborers, artisans, farmers, and housewives because much of the non-literate population is into such occupations (21).

Research method. Descriptive cross-sectional mixed methods research design was adopted to investigate NCDC awareness creation and risk communication of Covid-19 amongst non-literates in Southwest Nigeria. The research design was adopted to collect data from different geographies (or rural areas) at almost the same time, and from both quantitative and qualitative paradigms thereby aiding appropriate inferences. An interviewer-administered questionnaire was used as a quantitative research method to collect quantitative data, while documents in the forms of NCDC jingles and Covid-19 protocol flyers were used as a qualitative research method for the collection of qualitative data.

Sampling technique and size. The study adopted a multi-stage sampling procedure for the survey. In the first stage, three states (Lagos, Oyo and Osun States) were selected out of the six states in the region using purposive sampling techniques based on the number of Covid-19 cases. To have a wider representation in each state, two Senatorial districts were selected out of the three senatorial districts in each state based on literacy level. In each of the senatorial districts, one local government area (LGA) was selected purposely based on the non-literacy level. In the fourth stage, a rural area was selected in each LGA based on accessibility. Hence, the six rural communities that were represented in this study include Makoko, Ijora-Badia, Fiditi, Iware, Ayedire and Irewle. In each rural community, 70 respondents were selected based on the level of their literacy and availability. Hence, a total of 420 respondents were represented in this study and this has been considered to be a good representative of more than 10,000 study population based on Fisher's formula (22). For the documents, a total of three jingles were selected out of the twelve jingles based on language (that is, three Yoruba jingles were selected out of other jingles designed in Hausa, Igbo and Pidgin languages). In addition, nine NCDC flyers on Covid-19 safety protocols for publicity were retrieved from the agency's website.

Data collection procedure. The service of six research assistants was employed for the survey study. Each of the research assistants was familiar with at least one local government area of the study location, and each eventually served as gate-keeper in their respective rural community. This allowed for gradual community entry and easier identification of study participants. For the documents, the website of NCDC was sought, and out of the many documents provided on Covid-19 disease, risk and safety protocols for publications on a different platform, the study selected only flyers on Covid-19 risks, symptoms and safety protocols for publicity. Jingles on the website were also identified, and the three jingles in Yoruba language were used (23). The data generated from both survey and NCDC documents (jingles and flyers) on Covid-19 protocols were analyzed independently and results that emanated were brought together for an overall interpretation.

Results

Socio-demographic characteristics of respondents. The results in Table I present the socio-demographic characteristics of the respondents. Findings showed that the mean and standard deviation of the respondents' ages were 42 ± 25 years, while the median (interquartile range) was 38 years (12 years). Majority (46.2) fell between the age brackets of 36 and 45 years. Females constituted 60% of the respondents, and 95% of the respondents were married. Also, 60.2% of the respondents were Christians while the remaining (39.8%) were Muslims. Findings further showed respondents' occupations to be varied: traders (47.6%), daily laborers (26.4%), farmers (11.4%) and artisans (10.0%). The mean and standard deviation of the respondents' average monthly income were $11202.38 \pm 4,208.13$, while the median (interquartile range) was 10,000 (6,000). Majority (38.1) of them earned between 10,000 and 14,999. It was also found that while almost two-thirds (65.5%) of the respondents lived in tenement bungalow buildings ('face me I face you'), approximately one-quarter (24.8%) of them lived in two to four-bedroom bungalow buildings and 9.8% lived in one-bedroom bungalow building. More details about the socio-demographic characteristics of the respondents are presented in Table I.

Awareness of Covid-19 and various safety protocols. Findings showed that all (100.0%) of the respondents were aware of the existence of the Covid-19 pandemic. Investigation on the awareness of Covid-19 safety protocols showed that all (100.0%) of the respondents were aware of the 'use of facemasks when in public'. The second-rated safety protocol that was well-known among the respondents was 'frequent washing of hands as 95% of the respondents affirmed that they were aware of such safety protocol. The third well-known safety protocol among the respondents was 'maintenance of physical distance' and this was verified by 79.3% of the respondents. Other safety protocols that were known by the respondents were 'mouth or nose covering when sneezing' (78.6%), 'avoidance of large gatherings' (61.4%), 'self-isolation' (45.9%), and 'avoidance of close contact with someone with Covid-19 symptoms' (39.3%). Findings showed that the eighth and least safety protocol known by the respondents was 'cleaning of surfaces with sanitizers/disinfectant' as this was confirmed by only 8.1% of the respondents. Details on the awareness of Covid-19 and its safety protocols are provided in Table II.

Information on Covid-19 and its safety protocol. Table III presents the results on information regarding Covid-19 and its safety protocol. Findings on showed that the majority (60.4%) of the respondents first got information on Covid-19 via radio. Further investigation demonstrated that health workers (19.8%) and family and friends (15.5%) were other sources through which respondents first got information on Covid-19. Results showed that almost two-third (59.0%) got exposed to Covid-19 information very frequently while the remaining proportion (41.0%) were exposed frequently. Radio was highly rated among the majority of the respondents (45%), further results show that Health workers (34.0%), family and friends (15.7%) and Town criers (5.0%) were also channels respondents found easy to understand. Majority (95.0%) of

Table I. Descriptive statistics of respondents.

Variables	n	%
Age ($\bar{x}=42$, $M=38$, $\sigma=25$, $IQR=12$)		
25-35 years	79	18.8
36-45 years	194	46.2
46-55 years	69	16.4
56-65 years	57	13.6
66 years and above	21	5.0
Sex		
Male	168	40.0
Female	252	60.0
Marital status		
Single	21	5.0
Married	399	95.0
Religion		
Christianity	253	60.2
Islam	167	39.8
Occupation		
Farmer	48	11.4
Daily labourer	111	26.4
Artisan	42	10.0
Trader	200	47.6
House wife	19	4.5
Average Monthly Income ($\bar{x}=11202.38$, $M=10000$, $\sigma=4208.13$, $IQR=6000$)		
Below N5,000	19	4.5
N5,000-N9,999	108	25.7
N10,000-N14,999	160	38.1
N15,000-N19,999	133	31.7
Residence		
Bungalow	104	24.8
Storey building	41	9.8
Face me I face you	275	65.5
Total	420	100.0

the respondents affirmed that Yoruba language was used in communicating Covid-19 messages. This is perhaps the reason why the majority of the respondents agreed (in an open-ended question) that Covid-19 information communicated in their native language (Yoruba) through the various channels was understandable.

Results on jingles

Jingle 1. The jingle which lasted for 1 min and 50 sec took a conversational style and was apt in establishing awareness of coronavirus outbreak in Nigeria. It further highlighted eight safety measures to comply with to prevent the spread of the virus. These include; washing hands thoroughly, use of hand sanitizers in the absence of water, using of nose mask always and proper disposal of the nose mask, avoid touching of nose, eyes and mouth with hands not washed, and frequently cleaning of surfaces like chair handles, tables and chairs with sanitizers, avoiding someone showing symptoms of Covid-19

Table II. Awareness of Covid-19 disease and safety protocols.

Variables	n	%	
Awareness of Covid-19			
Yes	420	100.0	
No	0	0.0	
Total	420	100.0	
Awareness of Covid-19 safety protocols			
Use of facemask when in public	420	100.0	Rating
Frequent washing of hands	399	95.0	1st
Maintenance of physical distance	333	79.3	2nd
Mouth or nose covering when sneezing	330	78.6	3rd
Avoidance of close contact with someone with covid-19 symptoms	165	39.3	4th
Self-isolation	193	45.9	7th
Avoidance of large gatherings	258	61.4	6th
Cleaning of surfaces with sanitizers/disinfectant	34	8.1	5th
			8th

and self-isolation after visiting countries with coronavirus outbreak. The jingle also explained four symptoms of coronavirus disease that people should watch out for, which are; high temperature, coughing, sneezing and difficulty in breathing. The emergency line of NCDC was rolled out and it was advised in the jingle for people to stop the spread of false information concerning the virus.

Jingle 2. This jingle lasted for about 56 sec and it stressed the need for the individual to take responsibility for their health by obeying the sit-at-home orders and adhering to the safety protocols. Using the dramatic technique, the characters were able to reiterate the safety protocols and established the fact that washing of hands, and using hand sanitizers were not enough to prevent the spread of the virus by avoiding close contact, maintaining social distancing and obeying the sit-at-home orders were also needed to be observed to curb the spread of the virus.

Jingle 3. The message in the third jingle is not much different from the previous two. The 55 sec jingle also accentuated the need for individuals to take responsibility to protect themselves and family as a result of the virus. In this jingle, some of the safety measures were also reinforced like; avoiding crowded areas, maintaining social distancing, washing of hands with soap and water and the need to avoid touching the nose, eyes and mouth with unwashed hands.

The above graphical illustrations are information on Covid-19 virus designed by the NCDC in English language. Nine separate flyers were identified and are the only available graphics on Covid-19 safety protocol in English language from the NCDC website. The flyers combined pictures, symbols, colors, words to convey the intended meaning. The first poster (a) creates awareness of the existence of the virus and the need for individuals to take responsibility for their safety by adhering to four safety protocols which are frequent washing of hands, Coughing/Sneezing into tissue/elbow, avoiding large gathering as well as maintaining social distance and cleaning all surfaces with disinfectant. The second poster (b) is explicit

and brief in relating the dynamics of Covid-19 disease as a respiratory disease that can spread via contact with an infected person or contaminated sources. While the third (c) focused on nine symptoms of Covid-19 which includes; headache, breathing difficulty, runny nose, abdominal pain, sore throat, shivering/chills, body pain, sudden loss of appetite/smell and fatigue/tiredness. Poster (d) goes further to state the severe complication that can arise from contacting the virus. The fifth graphic (e) places emphasis on the need to stay at home when ill and in addition to cover the nose and mouth and disinfect surfaces/objects. Further, the sixth (f), seventh (g) and eight (h) graphics illustrate the importance of frequent hand washing, social distancing and frequent cleaning of surfaces with soap and water respectively. According to the message in both graphics, infection can spread easily via hands, contact with others and surfaces. In the last graphic (i), materials needed to clean surfaces like soap and water, diluted bleach and anti-bacterial wipe are presented.

Discussion

Findings from the quantitative study established that public awareness of Covid-19 disease among non-literates was very high. This was not surprising because the pandemic was global in nature and it affected all countries of the world. This finding support existing studies that investigated the level of awareness of Covid-19 pandemic (24,25). Non-literate awareness on the safety protocol is also worthy of note. The relevance of radio as a suitable medium in creating awareness amongst the non-literate population has further been reinforced because as for the majority of the population, radio was their first source of information on Covid-19 pandemic. This finding reinforces the fact that radio has established itself as a fundamental tool for news dissemination and sensitization amongst the non-literate populace compared to other mediums of mass communication. Based on this, it has been argued that radio played an important role in curbing Covid-19 pandemic in Nigeria through public sensitization in English and local languages (26,27).

Table III. Information on Covid-19 and its safety protocol.

Variables	n	%
First source of information on Covid-19 and its protocols		
Radio	254	60.4
Health workers	83	19.8
Family and friends	65	15.5
Town criers	18	4.3
Frequency of exposure to Covid-19 information		
Very frequently	248	59.0
Frequently	172	41.0
Occasionally	0	0.0
Regularly	0	0.0
Never	0	0.0
Easy channel to understand		
Radio	190	45.2
Health workers	143	34.0
Town Criers	21	5.0
Family and friends	66	15.7
Language used in communication		
English language	21	5.0
Yoruba language	399	95.0
Reasons for easy understanding of the information		
Communicated in the native language	298	71.0
Relatable	101	24.0
More explicit	21	5.0
Total	420	100.0

A higher percentage of the respondents affirm that they were aware of the preventive measures as well. The use of nose masks and frequent washing of hands seems to be popular among the non-literate compared with other safety protocols. The knowledge of other protocols as 'avoidance of close contact with someone with Covid-19 symptoms' and 'self-isolation was not well known' compared with others. This finding is in consonant with earlier findings which revealed incomplete knowledge of Covid-19 preventive measures (9,18). All safety protocols are considered imperative to curb the spread of the infection. The implication of this is that observing some and disregarding others still put a person at a greater chance of being infected with the virus. Although this study did not probe further, several other factors could be responsible for this inadequate knowledge of all Covid-19 safety protocols among the populace.

Respondents understanding of information sources is notable as it has also proven the effectiveness of the radio medium in reaching out to the non-literate population. In this study, radio is rated first as the easiest channel to understand. This is because, to date, radio remains an irreplaceable tool in

promoting health and well-being and delivering life essential information to the uneducated and marginalized population in places without functional infrastructure like electricity, road, health care, *et cetera* (26-28). This assertion is in tandem with study that probed the extent to which people in the South-western part of Nigeria were exposed to NCDC radio information on Covid-19 (24). Again, this reinforces the tenets of risk communication in times of public health emergencies that messages ought to be channeled strategically to the targeted audience (29).

Health workers are instrumental in the spread of Covid-19 awareness amongst the non-literate population. A significant number of respondents regarded health workers as providing easy information on Covid-19 safety protocols. Community health workers also play a significant role in public sensitization among non-literate population through interpersonal communication. These paraprofessionals or lay health workers with an in-depth understanding of the culture and language of the people have been globally recognized because they are uniquely positioned in combating the pandemic by providing health care services and supporting public health efforts through education and outreach amongst the masses (30,31). Community health workers have served as a bridge between the government and the grassroots community and because they are people within their immediate community, they understand the best way to relate with the masses in a culturally appropriate context. For this, people tend to trust them when it comes to the health information on disease.

In addition, almost all the respondents affirmed that the Yoruba language was used to communicate Covid-19 information. As a result, this aided understanding of the messages related to them making the message explicit. Nigeria is a multi-lingual country and is also polarized along ethnic fault lines, as a result, the English language is adopted for communication officially. However, in the event of a disease outbreak or other life-threatening ailments, reaching the grass root population will require communication in their indigenous language not even when it involves people with low literacy. Researchers have studied why many health initiatives have failed to achieve the desired objectives for the intended audiences, findings have shown that amongst other factors, messages were not communicated intelligibly in the language of the people (32). In risk communication tenets, the strategic channeling of messages to reach the intended audiences is what makes risk communication effective. The adoption of an indigenous language which is a reflection of a people's identity becomes necessary to reach non-literate because it inspires entire communities to take action and encourages them to live a healthy lifestyle by taking preventative measures (32).

The safety protocols were further reinforced in all the jingles analyzed (in Yoruba language). Jingles are popular for their use in public sensitization and advertisement of goods and services. They are known for their effectiveness in leaving lasting impressions especially when they are creatively accompanied by fascinating music. During the pandemic, several jingles were designed in the major indigenous languages of Nigeria to reach the grass root population. With a duration of less than 2 min, each of the analyzed jingles were apt in creating awareness about the pandemic and each rolled out the safety precaution to comply with in addition

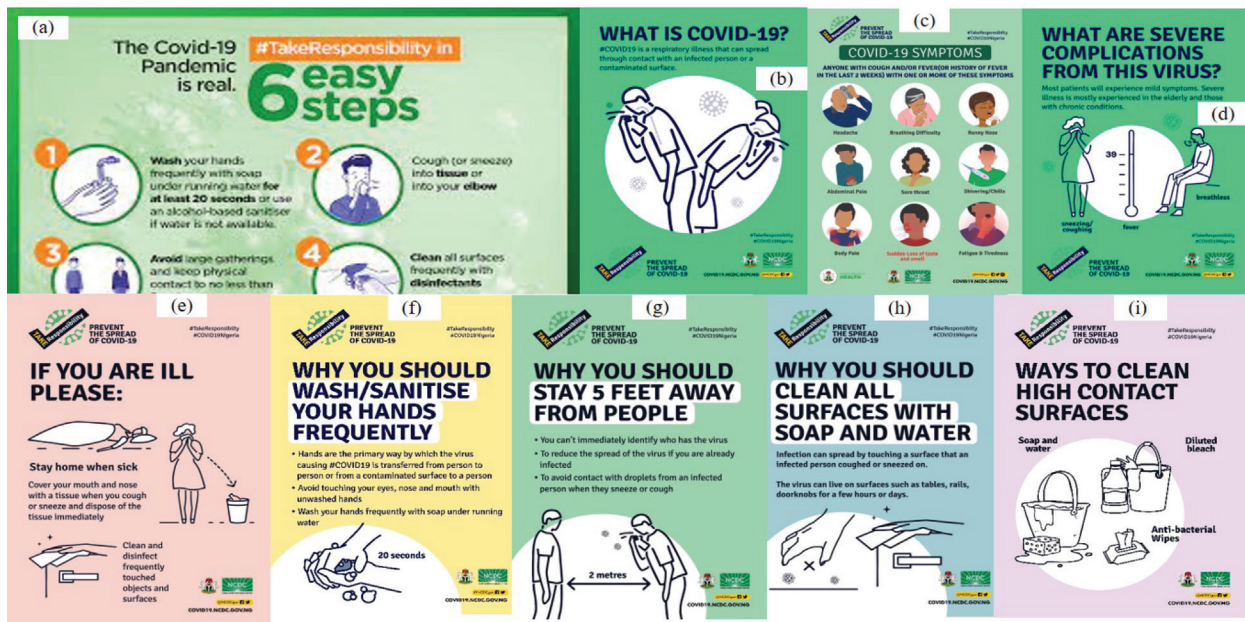


Figure 1. Flyer showing Covid-19 safety protocols and symptoms (Source: NCDC, 2020 <https://www.ncdc.gov.ng/diseases/guidelines>).

to the need for people to take responsibility for their health. However, messages on radio jingles were limited in content and scope as they only created awareness of Coronavirus disease outbreak and emphasized safety measures without providing insight into the nature and dynamics of Covid-19 disease itself. This is at variance with the principles of risk communication which strives to explain scientific information in simpler terms for lay audiences. If non-literates must avoid the risk of contracting infectious diseases then they must be exposed to timely, accurate, actionable, culturally sensitive and easy-to-use health information to make relevant health choices (3).

NCDC information on Covid-19 and its safety protocols combined the use of graphical illustrative images accompanied with words to reinforce the messages. In addition to communicating Covid-19 safety protocols, the nine graphics were able to convey severe complications that could arise from contracting the virus. The nature and dynamics of Covid-19 as a respiratory disease, as well as the modes of transmission, were also depicted. Beyond just relating safety protocols, the graphics also explained the importance of adopting hygiene practices like frequent washing of hands and cleaning surfaces with soap and water, bleach and other disinfectants. These health measures are necessary to avoid infections (9,18).

Visual images are known to be a universal language that could be understood by all with little or no dependence on words irrespective of cultural background. However, these graphics were not communicated in indigenous Yoruba language, and therefore might not be of immense benefits to non-literates. In other words, NCDC flyers accompanied by visual images with the use of words to relate Covid-19 risks, may not be suitable for the non-literate audience who cannot decode the messages. Consequently, NCDC Covid-19 posters could only be better understood by literate audiences, because the images and symbols were complimented by words in English language. Graphics remain one method of

communicating health information to illiterate patients because they stimulate the imagination and provide an alternative method of recalling instructions without involving the written word (33) Accordingly, graphics should reinforce information communicated via jingles. The outcomes from analyzing NCDC Covid-19 graphical illustration reveal messages on Covid-19 risks in the posters were not all communicated in the jingles. The implication of the mismatch between the contents of the jingles and that of the posters leaves non-literate audiences with incomplete information during a severe period of pandemic. Studies have shown that non-literate audiences are marginalized when it comes to health information especially when using online platforms and graphics (13,32,34). This further widens digital gap among populace of a country whose significant number of its population are found at the grass root level. Translations of graphics on safety measures into indigenous languages are therefore germane in ensuring inclusiveness in health communication and achieving universal health coverage in Nigeria (35).

A critical evaluation of NCDC jingles based on the principles of risk communication reveals that the risk was not adequately introduced in the messages disseminated even though awareness about the virus was sufficiently created. Risk communication uses fear appeals in persuading the audience to adopt protective behaviours (29). Research reveals that risk not adequately communicated tends to be underestimated by the target audiences thereby disregarding the available protective measures (5,13,29). NCDC risk communication via visuals was not context specific for non-literate people; as a result, might not be able to stimulate understanding of such message as intended. For non-literates, a campaign must therefore transcend beyond awareness creation about a public health emergency, to explaining the danger of such an event via visual illustrations. Risk perception is beneficial because it catalyzes taking protective action on a health issue (15). Since the ultimate goal of the NCDC is to see the disease effectively managed, communication

must move from awareness creation to risk communication enough for people to perceive the event as a threat to influence behavioral change.

Conclusions

The crux of risk communication is premised on the assumption that the general public has a right to be informed about dangers and risks. From the foregoing, the NCDC was successful in awareness creation for non-literate population by using the most effective medium to reach the non-literate population and using their indigenous language to communicate to them in ways in which they could understand. It is apparent that messages emphasized the safety protocols that needed to be adhered to and highlighted the symptoms of the disease, but not the nature and dynamics of the disease in causing health hazards. Based on the findings, the study concludes that NCDC risk communication on Covid-19 for non-literate was not able to communicate graphical illustrations in indigenous language, neither did it appropriately convey the dire consequence of contracting the virus. To effectively contain the spread of an infectious disease like Covid-19, knowledge of its dynamics and nature must be communicated so that the population will make an informed decision concerning the disease since people in general have a vital role to play in mitigating the spread of an infectious disease. The study, therefore, recommends that in times of public health emergencies, NCDC communication interventions for vulnerable populations must be strategic and evidence-based. In achieving this, there must be careful audience analysis based on demographic characteristics and need for risk messages to be channeled in a context-specific way for the targeted audience. This study also advances the need for NCDC to have an indigenous feedback platform just like it is obtainable on social media platforms where non-literate population in rural communities can also engage with health information specialist to obtain accurate and substantive information about the nature of a disease and how to prevent it. This mode of enlightenment will further help to clarify misconceptions and misinformation that may spread and make them better equipped against health crises. Effective risk communication holds great promise for improving the health of a non-literate population.

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Availability of data and materials

All data generated or analyzed during this study are included in this published article.

Conflict of interest

The authors declare no potential conflict of interest.

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