



Influence of Open Defecation-Free (ODF) Communication Efforts on Knowledge, Attitude and Practice of Residents of Selected States in South- South, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJTDH/2021/v42i1730526

Editor(s):

(1) Dr. Giuseppe Murdaca, University of Genoa, Italy.

Reviewers:

(1) Herlinawati, Institute of Health Sciences of Cirebon, Indonesia.

(2) Sanjay L. Nalbalwar, Dr. Babasaheb Ambedkar Technological University, India.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/75285>

Original Research Article

**Received 19 August 2021
Accepted 29 October 2021
Published 09 November 2021**

ABSTRACT

Aim: To examine the influence of ODF communication intervention on knowledge, attitude and practice as precursor for sustainable ODF adoption.

Study Design: Data was gathered using a mixed method. A total of 384 participants were selected from the South-South region using multistage sampling technique.

Place and Duration: A total of eight communities were selected from four states (Cross River, Rivers, Delta and Bayelsa) in South-South Nigeria. The study was conducted between June and July 2019.

Methodology: A total of eight focus group discussions were held, one in each community while 384 copies of questioners were administered, 48 for each community.

Results: indicates high awareness (89%) of ODF but poor understanding. Significant difference in knowledge between those exposed and those not exposed to ODF communication intervention was revealed. Attitude to ODF was poor and insignificant between those exposed and those not exposed. Practice towards ODF initiative was manifest in the proper handling of child faeces, ownership and use of toilet while a binary logistic regression of demographic factors associated

with the likelihood of practice towards ODF initiative revealed gender, education and age as the three strongest. Other factors impacting negatively on sustained ODF adoption are inappropriate and inadequate communication, denial of structural constraints and intervention systemic glitches.

Conclusion: The relevance ODF communication intervention is established yet inappropriate and adequate application as well as other factors combines to obscure the full realization of its potential in improving defecation practices. A region specific ODF intervention and evidence based participatory communication approaches are recommended.

Keywords: Communication intervention; open defecation-free; sanitation; practice; South-South.

1. INTRODUCTION

Globally, an estimated 673 million people defecate openly and 46 million of these people live in Nigeria [1-2]. Despite more than a decade of conjunctive interventions known as open defecation-free (ODF) to eradicate the practice, anchored on community-led total sanitation (CLTS) which Chambers and Myers [3] describe as ; a model that raises awareness of the risks associated with open defecation and generates a collective sense of intolerance towards the practice while promoting local sanitation options that are affordable, as well as sanitation marketing and behavior change communication, progress remains abysmally low. This is not withstanding the documented negative effects of the practice on public health, social life and the Nigerian economy [4-8].

ODF is expected to materialize in attitude and behavioral change as attitude forms part of the psychological predictors of latrine ownership and consistent usage [9-10]. A key vehicle for driving and sustaining that change is communication intervention. This is because health communication messages increase audience's knowledge and awareness of health issues, influence attitude that may change social norms, prompting action [11-12]. Furthermore, behavior change communication efforts attempt to influence adoption of recommended behaviors by influencing what people know and believe about their behavior, or influence actual or perceived social norms, or by changing actual skills and confidence in skills assumed to influence behavior [13]. To generate such knowledge, ODF communication interventions precede CLTS programmes, used during intervention and as reinforcement at post-intervention phases.

Between 2008 and 2018 such communication efforts took place across communities selected for ODF intervention in the study area at various times. Strategies such as theatre for development, IEC materials, interpersonal

communication and local media were employed [14]. However, considering the channels of communication used, such efforts were limited in reach to only project communities and occurred at less frequent intervals. A near state-wide communication intervention in the South-South region was that implemented by Water Supply and Sanitation Collaborative Council (WSSCC) and partners between December 2018 and April 2019 which saw the simultaneous integration of mass and traditional media channels, interpersonal and IEC materials with due consideration for choice of language, message simplicity and effective visuals [15]. The campaign leveraged the annual carnival Calabar 2018 event to further raise awareness of ODF using printed T-shirts, billboards and flyers purposely to reinforce CLTS and make Cross River the first ODF state in Nigeria (ibid). Messages included "Wash Your Hands O", "No Shit for Open" etc. [16]. During the same period, UNICEF child survival program on the state Radio dedicated episodes to addressing issues of disposal of child feces which ran alongside jingles and short documentaries on the state Television [17]. While in Delta state, "Na So We See Am", a UNICEF communication for development Pidgin English program on Delta Broadcasting Service (DBS) addresses ODF issues. This is not to mention media collaborations under such nomenclatures as WASH media networks spread across states in the region.

However, despite such long-term investments in behavior change communication, only 8 local government areas (LGAs) out of the 127 in the South-South region are ODF and even among these ODF LGAs, massive slippage has been reported [18-6]. This behaviour change constraint constitutes barrier even to the widely celebrated Swachh Bharat mission in India aimed at eliminating open defecation [19]. While alluding to the sanitation behavior in rural India, [20] inadvertently captured summarily the reasons widely given for the Nigerian situation when he

observed that it is as a result of a complex web of socioeconomic, environmental, cultural and political determinants. Specifically, the sanitation situation in most parts of the South-South region of Nigeria is further compounded by the geographical dynamics, poor access to sanitation markets and human behavior [21-18-22]. For instance, seventy three (73%) of households in this region use the hanging (pier) toilet that empties faeces directly into open water bodies while using same water sources for washing, drinking and cooking, [23-24]. Available evidence also reveals the public health risks associated with this water-feces interface in the region [25]. Furthermore, the high level of open defecation among residents in some parts of the region has been attributed to low level awareness of healthy living and sanitation [26]. In the same region, [27] observes that even people who are aware of the health risks associated with open defecation, continue with the unhealthy practice. These outcomes are linked to ODF slippage [3].

One is therefore compelled to explore the drivers of this outcome against the backdrop of communication efforts made so far leaning on Ajzen and Fishbein's reasoned action approach (RAA) because the RAA offer sets of personal, social, and control-related factors that impact social behavior as well as reflects the extent to which individuals are motivated to perform a given behavior [28]. In the South-South region of Nigeria, it is observed that the long term experiences of living and socializing under such conditions (water and waste) prevent residents from acknowledging the associated risks [29]. For instance, open defecation sites in Yakurr LGA (South-South, Nigeria) were used as social forum for exchange of snuff (powdered tobacco) and cigarette as well as for economic purposes [30]. Based on the foregoing, it is suggested that were remedies (toilets) provided without adequate sensitization and precise communication of the benefits of latrine ownership, usage will not be guaranteed [31-32].

However, such "wise" advice (behavior change communication messages) as [33] argues is in competition with other strong determinants of human behaviors. Thereby constituting lenses through which ODF messages might be processed and acted upon. More than that, the answer could also lie in communication approaches. For sustained adoption, newer paradigms in development advocates identifying the determinants of behavior and their solutions

with the active involvement of the target populations without which [19] argues that such programs will remain elusive. While such approach forms the basis for the CLTS ODF intervention model, it cannot be ascertained if same applies to the communication programmes that accompany such interventions. This throws up another theoretical construct, Paulo Freire's participatory communication model, premised on the fact that the common people are intelligent and can be active agents in their change management [34]. Although this theory has been criticized for not providing specific guidelines for interventions and focused on interpersonal relations while underplaying the potential of the mass media in promoting development [35], models such as ACADA, SANIFOAM etc. developed for Water, Sanitation and Hygiene (WASH) programmes which take their roots in participation, makes provision for bridging these gaps. Leaning on these two theories, impetus is provided for an in-depth understanding of how ODF communication interventions have fared in the region and what their mitigating factors might be.

The imperative of this inquiry lies in the dearth of data as to the precise contributions of past and existing ODF communication efforts in sustainably entrenching ODF in the South-South region of Nigeria such that there are marked differences between those exposed and those not as well as what constitute interference. As states in the region begin to domesticate the Clean Nigeria, Use the toilet campaign, the relevance of such knowledge in guiding communication strategies cannot be overemphasized.

1.1 Objectives

The study sought to determine the influence of ODF communication interventions on Knowledge, attitude and practice as well as an understanding of other contributory factors using the following research questions; (i) what is the awareness of ODF resulting from exposure to ODF communication interventions in the communities?; (ii) what is the difference in knowledge of ODF between those exposed to ODF communication interventions and others who are not exposed to such?; (iii) what is the attitude towards ODF between those exposed to ODF communication interventions and others who are not exposed to such?; (iv) what is the likelihood of practices towards ODF initiative across demographic characteristics of Household

heads?; (v) what are the other factors influencing attitudes and practice towards ODF initiative in the communities?.

2. MATERIALS AND METHODS

2.1 Study Design

A mixed method was adopted for this study. This design incorporated both quantitative (i.e., the cross-sectional survey) and qualitative approaches. While the quantitative method was designed to address objectives raised (i.e., awareness of ODF, the perceived influence of the interventions on knowledge, attitude and practice of ODF) in the study, the qualitative aspect which employed the use of a Focus Group Discussion (FDG) focused on an in-depth description of the influence of the ODF communication interventions on attitude and practice as well as other factors influencing respondents' behaviour concerning ODF.

2.2 Target Population, Sample Size and Sampling Procedure

The target population for the quantitative part of the study were adults aged at least 18years and above in households within the study area. The study area covers eight rural communities in four States of the South-South region of Nigeria comprising Akwa-Ibom, Bayelsa, Cross-river, Delta, Edo and Rivers. The wide spread unsafe practices of open defecation in this region alongside the high poverty rate in many of the rural communities in the region [36] provide justification for the choice of the study area. As an example, incidence of poverty in Delta and Edo states, which are two of the six south-south states, had a fairly higher percentage than the zonal average while those of the other states were marginally less than the zonal average. While rural share of poverty was 82%, urban share was a meager 18% [ibid]. The sample size used in addressing the issues raised in the quantitative part of the study was determined using Cochran (1963, p. 75) equation. Therefore, a sample size of 384 was determined using the following equation:

$$n = \frac{[Z/2]^2 (p q)}{e^2} \quad n = \frac{[Z/2]^2 (P) (1-P)}{e^2}$$

Where: n= sample size, Z²= confidence level (at 95%), p= rate of occurrence or prevalence (the estimated proportion of an attribute that is

present in a population), q= complement of p and e= margin of error. Therefore;

$$n = \frac{[1.96]^2 0.5 (1 - 0.5)}{0.05^2} \quad n = \frac{3.8416 (0.25)}{0.0025}$$

$$n = 384.16. = 384$$

Further to this, eight separate FGDs were conducted across the four selected States that were chosen for the study. Participants who took part in each of the FGDs were six in number including four women and two men some of whom were water, sanitation and hygiene committee members (WASHCOM). Altogether, 48 participants took part in the study. They were conveniently selected during the fieldwork. Criteria for selection were as follows: (1) they must have stayed in the community(ies) under focus for a minimum of 8 months, (2) they must be knowledgeable about issues surrounding open defecation in the communities under study and (3) must give consent for participation. The discussions were held in public places that were approved by selected participants in each areas of the study. A moderator and a note taker took charge of each session. The moderator while ensuring fairness and orderliness in discussions curtailed meandering and dominating discussants by according time limits for each speaker and insisted on indications such as hand raising and getting approval before speaking.

On the other hand, respondents who participated in the quantitative part of the study were selected using a multi-stage sampling procedure. This involved a number of steps. First, a purposive sampling procedure was used to select a list of communities from four LGAs in four states of the South-South region. The communities were selected because they were ODF project communities. The communities selected were New Heaven in Biase and Ndon in Odukpani LGAs of Cross River State, Gladyside in Akukutoru and Ottoni-Ama in Opobo/Nkoro LGAs of Rivers State, Samagidi in Isoko South and Iwride in Ethiope East LGAs of Delta State and Ekpeingbene in Kolokuma/Opokuma and Sambo-Ama in Brass LGAs of Bayelsa State. In all, eight communities were selected. At the second stage, a systematic sampling procedure with a random start was employed to select households from each of the communities mentioned above. Following this, actual respondents in each of the households were selected based on their availability. Respondents in this category were adults 18 years and above. Furthermore, prior to selection, we anticipated a

five per cent non-response rate and a total of 404 sample size was determined; where n^* (adjusted non-response rate) = $384/0.95 = 404$.

2.3 Measurement

The research objectives informed the design of the questionnaire and the FDG guide used in eliciting data. The overview comprised of two segments: (a) demographic characteristics and other key questions that informed the study. Self-reported exposure to ODF communication intervention, current knowledge, attitude and practice of ODF in the communities under focus were measured. Self-reported exposure to ODF communication intervention was measured by a four item scale. An example of such question was worded "To what extent have you been exposed to ODF communication intervention in the past six months". A highly reliable Cronbach's alpha (α) of .94 was determined for the scale. Response options ranged from "a very large extent" to "a very low extent". This was on a 4 point scale. On the whole, those who answered "a very large extent" and "moderate extent" were defined as personally exposed ($N = 337$). On the other hand, respondents who answered "to a low extent" and "a very low extent" were defined as personally unexposed to the ODF communication ($N = 42$). Notwithstanding, non-exposure does not necessarily mean that respondents were completely unexposed or unaware of ODF objectives; it suggests that they had heard the campaign from any of the media sources to "a low extent" or "very low extent".

Current knowledge on ODF was further measured by a nine item 5 point Likert scale ranging from 'Strongly disagree' ($SD=1$) to 'Strongly agree' ($SA=5$). This scale was developed to ascertain the accuracy of what respondents know about ODF. Examples of some of the items on the scale read thus: 'ODF can protect the environment'; 'ODF can prevent the occurrence of diseases like diarrhea, intestinal worms, and so on'; etc. The consistency of the scale was measured using Cronbach's alpha. The coefficient recorded was found to be highly reliable ($\alpha=.74$). Respondents' attitude towards ODF was measured using a 10 item 5 point Likert scale ranging from 'Strongly disagree' ($SD=1$) to 'Strongly agree' ($SA=5$). The purpose of the scale developed was to determine respondents' sentiments and thoughts towards ODF. Some examples of the items on the scale include: 'ODF messages are true and factual'; 'toilet designs are not durable' etc. We further

determined a highly reliable Cronbach's alpha ($\alpha=.89$). Finally, practice towards ODF initiative was measured by a seven item 5 point Likert scale which ranged from 'Strongly disagree' ($SD=1$) to 'Strongly agree' ($SA=5$). An example of an item used in this scale includes: 'I now use toilet rather than the nearby bush for defecation.' A highly consistent Cronbach's alpha ($\alpha=.93$) coefficient was determined for this scale. Also a reliability cumulative analysis was performed for all the items on the three scales. It was found that a Cronbach's alpha coefficient was highly reliable ($\alpha=.89$). A correlation analysis was performed (see Table 1) to ascertain the relationship between these variables (exposure, knowledge, attitude and practice). Statistically significant relationships were found between each of the variables.

In the administration of the questionnaire items, we observed that there was low literacy level in the study area. This prompted us to adopt an in-person interview procedure which was considered less burdensome to some respondents who could not write out their responses. Using an FGD guide or protocol, eight (8) FGDs were done, two (2) in each of the four focus States. Prior to the study, the participants were notified and were all able to meet at the agreed place and time. Each of the sessions was moderated by the researchers in each of the States. Sessions were equally audio recorded and paper based notes were taken in order to capture all aspects of the FGDs.

2.4 Data Analysis

A Statistical Package for Social Sciences (SPSS) version 23 was used to analyse data gathered for the study. We employed both descriptive and inferential statistics in the data analysis. While simple percentages were used to describe the demographic characteristic of the respondents, mean and standard deviation was employed to describe data on the key research objectives. Furthermore, the independent samples t-test was performed to test whether there were significant differences in OD knowledge and attitude mean scores between those who self-reported that they were aware of ODF communication interventions and those who did not. In addition, a binary logistic regression reporting odds ratio was employed in the analysis. To identify the possible influences of demographic characteristics of household heads on practice towards ODF, we employed binary logistic regression models. The binary logistic regressions were performed to

Table 1. Descriptive statistics, Cronbach’s alpha values and correlation output among variables of interests

Variable	Means	SD	Cronbach’s alpha	Exposure	Knowledge	Attitude
Exposure	9.5132	1.64930	0.94	1		
Knowledge	2.7831	3.18521	0.74	0.301**	1	
Attitude	4.7144	2.91431	0.89	0.413**	0.361**	1
Practice	9.1138	1.23817	0.93	0.169**	0.731**	0.521**

Note: Two-tailed Pearson correlation is significant at ** $p < 0.01$.

highlight the individual explanatory variables for the multivariable analysis. Independent variables with a p value of <0.2 were put in the multivariable analysis and an odds ratio at 95% CI [Confidence Interval] was used to ascertain the strength of association between outcome variable as well as the predictor variables. The demographic characteristics of household heads (predictors) with a p-value of <0.05 were referred to as being significantly correlated with practice towards ODF. In addition, we assessed the goodness of fit of the models using the Hosmer-Lemeshow test. Finally, we used frequency tables to present the results. In this study, the independent variables (the predictors) were gender of the household head, educational level of household head, employment status of the household head, age of the household head, marital status and religion of household head. Statistical significance was determined at 5% probability levels. Finally, a simple regression analysis was used to test for the effect of knowledge and attitude on practice towards ODF at a 95% confidence interval. Data elicited from the FGD sessions were analysed using thematic analysis. This analysis involved steps that were adapted from the works of [37]. The framework employed the following steps: familiarizing with the data, generating initial codes, defining and naming themes, and coming up with the final report. In essence, the analysis was used to look at issues on the perceived factors influencing attitudes towards ODF in the communities studied.

3. RESULTS AND DISCUSSION

3.1 Quantitative Results

A 94% (379 out of the 404 sample size determined) response rate was recorded in the study. As presented in Table 2, the highest proportion of respondents (39.3%) was between the ages of 18 years and 40 years. Also, there were more female (60.0%) than their male

counterparts. However, their presence benefited the study in that they as home keepers play pivotal roles in their family’s sanitary choices. The highest proportion of the respondents (60.7%) was married. Furthermore, the highest percentage of the respondents had a senior secondary certificate. The implication for this group is that they are most unlikely to articulate the benefits of ODF as well as the effects of OD when compared to those with tertiary education. While a majority of the respondents (95.5%) were Christians, half of the sample (50.4%) was self-employed.

Exposure to ODF communication interventions was high among respondents (337 representing 89.0%) in the communities under focus. The remaining respondents (42 representing 11.0%) were not exposed to these interventions. Exposure was confirmed through the receipts of ODF messages via interpersonal communication with IEC materials as aid. Many respondents were able to recall the themes or contents contained in ODF messages.

3.1.1 Knowledge of ODF between those exposed to ODF communication interventions and others who are not exposed to such

An independent-samples t-test was conducted to compare the extent of knowledge of ODF for those exposed to ODF communication interventions and others who are not exposed to such. There was a significant difference in scores for those exposed to ODF communication interventions ($M=23.13$, $SD=8.61$) and others who are not exposed to such interventions [$M=19.26$, $SD=6.66$; $t(377)=2.15$, $p=.000$]. Going by the differences in the mean score, this result is an indication that those who self-reported being exposed to the communication intervention were more accurate concerning ODF objectives and benefits.

Table 2. Demographic characteristics of the participants

Variables		Frequency	Percent (%)
Age	18-40yrs	149	39.3
	41-59yrs	139	36.7
	60yrs and above	91	24.0
	Total	379	100.0
Sex	Male	150	40.0
	Female	229	60.0
	Total	379	100.0
Marital status	Married	230	60.7
	Single	126	33.2
	Divorced	23	6.1
	Total	379	100.0
Highest Academic Qualification	Primary	140	36.9
	SSCE	180	47.5
	OND/HNDE	35	9.2
	BA/B.Sc.	11	2.9
	No formal education	13	3.4
	Total	379	100.0
Religion	Christian	362	95.5
	Muslim	13	3.4
	Others	4	1.1
	Total	379	100.0
Employment	Self-employed	191	50.4
	Civil servant	77	20.3
	Oil company	12	3.2
	Student	20	5.3
	Wife	79	20.8
	Total	379	100.0

3.1.2 Attitude towards ODF between those exposed to ODF communication interventions and others who are not exposed to such interventions

Furthermore, we performed an independent-samples t-test to compare the level of attitude towards ODF practices for those exposed to ODF communication interventions and others who are not exposed to such interventions. There was no significant difference in scores for those exposed to ODF communication interventions ($M=9.37, SD=12.33$) and others who are not exposed to such interventions [$M=9.16, SD=13.12; t(377)=0.32, p=.11$]. A further look at the differences in the mean score shows that both groups have similar attitude towards ODF practices in the communities under the study focus. Compared to the mean scores value in objectives 1 and 2 above, attitude of both groups were lower and this suggests that respondents had negative disposition towards ODF despite the high self-reported exposure to ODF communication interventions.

3.1.3 Likelihood of the practice of ODF across demographic characteristics of household heads

The odd of practicing ODF was highest among the older household heads between ages 41-59 years ($OR\ 1.11, 95\% CI\ 1.135-3.112, p=.000$) and those 60 years and above ($OR\ 1.10, 95\% CI\ 1.113-1.991, p=.031$) relative to respondents in the referent category (18-40 years). Compared to households headed by males (i.e., the referent group), households headed by females ($OR\ 1.76, 95\% CI\ 1.14-6.29, p=.042$) had a higher likelihood of practicing ODF. Furthermore, households whose head were single ($OR\ 0.10, 95\% CI\ 0.10-3.30, p=.073$) and divorced ($OR\ 0.51, 95\% CI\ 0.61-1.13, p=2.12$) were less likely to practice ODF relative to household heads who were married. In addition, households whose heads were educated to the level of having a SSCE ($OR\ 3.12, 95\% CI\ 1.18-2.32, p=.012$), OND/HND ($OR\ 4.12, 95\% CI\ 1.14-4.83, p=.000$) and BA/BSc ($OR\ 5.31, 95\% CI\ 2.31-5.43, p=.000$) had a much higher likelihood of practicing ODF relative to those with households with heads having a primary education (i.e., the

referent group) or no education at all (OR 0.52, 95% CI 0.01-0.20, $p=3.01$). Furthermore, households with no religious affiliation (95% CI 1.33-2.54, $p=.014$) were 1.13 more times more likely to practice ODF compared to households whose heads were Christians (the referent group), Muslims (OR 0.72, 95% CI 0.38-1.36, $p=3.011$) and other religions (OR 0.61, 95% CI 0.28-1.33, $p=.712$). Although there was no significant differences across households by the employment status of their heads, households with civil servants as head (the referent group) were 1 time more likely to practice ODF compared to households with heads who were self-employed (OR 0.43, 95% CI 0.38-1.36, $p=5.13$), oil workers (OR 0.73, 95% CI 0.28-1.33, $p=0.621$), students (OR 0.34, 95% CI 1.10-1.00, $p=.831$) and housewife (OR 0.21, 95% CI 1.03-2.05, $p=.301$).

3.1.4 Factors influencing knowledge and attitudes on practice towards ODF initiative in the communities

As shown in the Table 4, the result of regression indicated that the model explained 44.3% of the respondents' scores on practice towards ODF

initiative in the communities ($F(2,379)=15.337, p<.000$). A further look at the table shows that knowledge ($p=.004$) and attitude ($p=.002$) of respondents significantly contributed uniquely to the prediction in the equation. This is an indication that knowledge and attitude had a positively significant effect on practice towards ODF initiative in the communities under study. To put differently, a higher levels of knowledge and attitude could lead to a higher behavioural practice towards ODF.

To further ascertain the extent of those factors that impact practice towards ODF, a qualitative analysis was performed. On the extent to which participants felt that ODF communication interventions had influenced their attitude and practice towards ODF, they reported that community members have started to comply with ODF practices. FGD participants in Ottoni-Ama community confirmed that the number of toilets increased from 20 to 62 (that prior to intervention only 20 toilets were available in their community of 332 households, but that after intervention the number of toilets increased to 62). Other changes seen were those of children's feces

Table 3. Binary logistic regression analysis for possible influences of demographic characteristics of household heads on ODF practice

		OR	95% C.I.	
			Lower	Upper
Age				
Reference:	18-40 years	1		
	41-59 years	1.101*	1.113	1.991
	60 years & above	1.113**	1.135	3.112
Gender				
Reference:	Male	1		
	Female	1.76*	1.142	6.291
Marital status				
Reference:	Married	1		
	Single	0.101	0.102	3.302
	Divorced	0.511	0.614	1.130
Highest academic qualification				
Reference:	Primary	1		
	SSCE	3.112*	1.178	2.317
	OND/HND	4.107**	1.141	4.831
	BA/BSC	5.312**	2.312	5.432
	No formal education	0.516	0.012	0.201
Religion				
Reference:	Christian	1		
	Muslim	0.722	0.383	1.363
	Others	0.612	0.282	1.325
	None	1.132*	1.325	2.542
Employment status				
Reference:	Civil servants	1		
	Self-employed	0.432	0.383	1.363
	Oil workers	0.731	0.282	1.325
	Students	0.342	1.104	1.001
	Housewife	0.211	1.034	2.051

* $P < .01$. ** $P < .001$.

which were hitherto left in the open but now being disposed in the toilet. Participants also noted that people have started to apply ashes as a method of pathogen removal in compost latrines in the communities or as alternative to soap for hand-washing. However, despite the changes observed, there were still concerns with the attitude and practice of some individuals in various communities. As an example, two participants mentioned that: *“women and men were going to the river to shit [defecate], but now we have put laws that nobody should go to the waterside to shit, if you do, you pay a fine of 20,000 [Nigerian Naira – around 50 USD]” (Female, Ekpiengbene Community); “However, some still defecate outside... When women and children use toilets, they leave it dirty and that’s why some men still defecate outside” (Male, Iwride community).*

3.1.5 Individual factors explaining why OD is still fashionable in the communities

Participants observed that maintaining toilet facilities is a huge task as people object to doing so consistently and adequately. As one participant commented: *“In a compound, when one person refuses to clean, others will join” (Female, New Heaven community).* This spirals a negative chain of mismanagement behaviour, putting enormous pressure on the members of WASHCOM (a community-based voluntary group instituted through CLTS as support structure). One WASHCOM member who participated in an FGD session maintained that: *“It is not easy to go checking toilets because of the pungent smell”; It is not easy to do this job and get nothing for it. We trek around no mobility (Female, Iwride community).* They also raised the need to train people on toilet construction, use and maintenance, failure of which the effectiveness of ODF communication intervention continue to water down. This reason was coded as ‘improper latrine or toilet usage’. Some participants who were members of WASHCOM suggested that by sustaining a group like theirs (WASHCOM), the public would continue to draw motivations from its educational and monitoring efforts. Plausible reason for such suggestion might not be unconnected to the short life span (5 to 6months) of ODF interventions in Nigeria. Another issue discussed bordered on lack of public toilets at strategic points such as market squares, bus stops, and busy areas within the community. They expressed the view that it is not enough to build toilets in these strategic places but proper maintenance will encourage usage.

3.1.6 Constraints created by intervention problems

A common theme that further emerged during the FGD sessions conducted was on the lack of synergy between WASHCOM, local government officials and interveners in study communities. Related to this is the issue of transparency in intervention processes. For example, community stakeholders do not trust interveners; likewise, community members do not trust WASHCOM. The issue of trust was significantly raised in two communities but subliminal in others during the FGD sessions. Some of the participants were of the view that ODF interventions is an avenue for different persons or group to gain personal access to the ‘benefits’ of foreign aid programmes of the global north. As some of the participants observed:

We all know that they pump a lot of money into this programme and people will never stop at thinking of how they can get some goodies from the whole thing... we have issue of embezzlement of money meant to do our water project and its making us not to trust the people again (Male, Ndon Community). We [WASHCOM] are also accused of diverting funds, so some of our members are withdrawing (Male, New Heaven community).

Summarily, the participants called for the elimination of implementing agencies who serve as ‘middle men’ between funders and beneficiaries. As an example one participant advised: *“International bodies should assist the LGAs directly (Female, Gladyside community).* Another issue which was briefly mentioned was security threats arising from communal clashes and militancy particularly in accessing communities across the sea which participants claimed was affecting ODF verification processes since it puts intervention workers and development partners at risk. As some participants put it: *“Communal clashes is delaying nearby community from becoming ODF (Male, Ndon community); “security issues is preventing UNICEF from verifying ODF claims of communities across the sea (Female, Gladyside).* Additionally, a key factor informing negative attitude is the interconnectivity of communities through common water sources in relations to the phased approach to ODF intervention. The unsuitability of the approach for the region is captured by an FGD participant thus: *Even if we are ODF, we are still not safe*

from the water angle because about seven communities use the stream before it gets to us so we use water purification to help ourselves. Also, even though those communities become ODF, as long as they wash into the stream, we are not safe. (Male - Ndon Community). Also, the need for policy enactment and enforcement was generally raised in terms of regulation of practice, and prices of sanitary hardware through withdrawal or reduction of taxes on such products.

4. DISCUSSION

The aim of this study was to determine the influence of ODF communication intervention on knowledge, attitude and practice as well as an understanding of other contributory factors in the South-South region.

In response to the first research question, although awareness of ODF is high (89%), understanding is limited. This finding may justify the observations of [38] on the lack of reflection of awareness on practice in the region. Although interpersonal communication channel which encourages dialogue, elicits immediate feedback thereby aiding understanding is the most commonly used channel, this outcome suggests ineffective messages, channels used or the effect of low literacy levels.

The difference in knowledge between those exposed ($M=23.13$, $SD=8.61$) and those not exposed ($M=19.26$, $SD=6.66$) is significant which supports the assertion that communication intervention is supportive and vital in the fight to end OD [39-40]. However, knowledge of how to use and maintain toilet which [41] describe as 'action knowledge' was lacking among respondents. The knowledge-practice gap in the study area contributes to slippage [27-3]. As Scutchfield and Keck in [13] insist, the success of communication is determined among other things on whether the target audience has acquired sufficient knowledge and skills to perform the behavior. This outcome indicates the absence of needed information in ODF messages which suggests the lack of participation by beneficiaries in the development of ODF messages. For instance, regarding the 2018 'carnival Calabar', a report of the event reads in part "intervening agencies collaboratively developed messages of sanitation and hygiene"[15].

The general poor and insignificant attitude to ODF among those exposed and those not exposed to ODF communication interventions support the lack of understanding but further points to the existence of other variables capable of acting on both groups alike, implying that influencing attitude requires more than awareness creation and increased knowledge. The South-South region presents a unique scenario where shallow water tables and heavy rainfalls demand suitable toilet designs, lack of space requiring access to clean public toilets while the structure of the region constitute threat to ODF communities sandwiched between non-ODF communities combine to form lenses through which the reasoned process must occur. Such complex behavioral considerations impede attitude change despite availability of information or presence of knowledge [42-43]. This is why the location of cognitive orientation in individual behaviour has been described as problematic because it ignores the role of context and structure in which the individuals exist [13-44].

Practice towards ODF initiative was manifest in improved hand-washing, increase in the number of toilets, use of toilet and proper handling of child faeces. Consistency in practice demonstrates success in intervention as well as serves as a criterion for certifying communities with open defecation-free status in Nigeria. However, demographic factors of household heads were a significant determinant for practice such that gender (female), educational attainment (tertiary) and age (younger) were the strongest factors informing compliance. This implies the need for more investments targeting the less likely to adopt demographics while supporting the most likely to adopt demographics move up the sanitation ladder (which involves upgrading toilet choices to a range of improved options e.g flush toilet) as well as total sanitation.

Other factors negatively impacting ODF are; lack of synergy and mistrust necessitated by inefficient communication chain and seeming lack of empowerment participation, policy enactment/enforcement, security and denial of the unique structural context of the South-South region as having significant impact on ODF intervention which Skinner and Schneider in [43] refer to as operant conditioning. Although the demand for immediate results has meant the denial of community dynamics in relation to a desired behavior [45], these factors are linked in a causal chain to the present outcome and may

Table 4. Summary of simple regression analysis for variables predicting respondents' scores of practice towards ODF initiative in the communities

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	7.122	2.616		2.722	.005	1.982	12.262
	Knowledge	3.727	.745	.118	.417	.004	2.701	6.156
	Attitude	2.855	.900	.138	3.172	.002	1.087	8.623
R ² .443		F 15.337**						

a. Dependent Variable: practice towards ODF initiative in the communities, **p < .001

explain the slow progress despite years of interventions. It is probably based on such outcome that it is observed that communication alone cannot bring about the right attitude towards a development programme in any society in terms of the expected social changes [46].

Communication in its simplest form entails a transactional process where upon sending a message, the sender expects feedback from the receiver which is used to modify subsequent messages. The goal is information exchange that aids mutual understanding, necessitate listening and trust as well as generate new knowledge [47-48-34]. The gaps identified from this study despite years of interventions suggest that ODF communication efforts in the region have not employed a participatory process even though they complement a community-led programme, are neither evaluated or that such feedbacks are not used to modify or inform new or subsequent communication strategies. The implication for public health particularly in the South-South region is that ODF beneficiaries remain at risk of continuous exposure to air and water pollution despite adoption. This outcome informs poor attitude to ODF, portray interveners in bad light and obscure the relevance of communication efforts.

Therefore, as the WHO in [13] insist, it is reasonable to think carefully about the process through which intervention messages are disseminated. In the South-South region for instance, interveners could acknowledge that community members are unequally exposed, hence devise plans for community-sustained campaigns to ensure continuity such that the chances of exposure for all especially new comers to the community are increased by strengthening existing structures such as WASHCOM, identify what constitute barriers to knowledge such as illiteracy and 'how to' knowledge which can be considered in creating easy to understand (demonstrative) messages using appropriate language, publicizing user-friendly and suitable toilet designs that are affordable using wider communication channels, while considering regulating variables such as structural dimensions and a more transparent intervention system anchored on participation.

5. CONCLUSION

In search for how best to accelerate progress in eliminating open defecation practice, some key

factors have been unearth informing renewed efforts by the Nigerian government such as the launch of the first national open defecation-free campaign; 'Clean Nigeria, Use the toilet'. The need for such investment is further demonstrated in the capacity ODF Communication intervention to improve knowledge, attitude and practice evident in the seeming display of self-efficacy and evaluation of self-risk as a result of exposure to ODF messages. Yet sustained adoption is tied to a combination of factors identified in this study which if left unattended, could erode the gains of ODF. Therefore, it is crucial for interveners to return to their drawing boards to analyze their performances so far and re-strategize for sustainable demand creation while simultaneously and efficiently addressing other members of the ODF tripod (sanitation marketing and faecal sludge management).

6. LIMITATIONS OF THE STUDY

This study was conducted among residents of selected communities in selected States of the South-South region using a sample size of only 384 which may be too small and not reflective of the entire region. Also, giving the peculiarity of the region, findings obtained might not represent other regions in the country hence generalization should be applied with caution. Therefore a replication of this study in other regions of the country, a comparative analysis of the various regions and a content analysis of the manifest contents of ODF messages as well as the methods used in creating them should be pursued.

7. RECOMMENDATIONS

It is therefore recommended that;

1. A simultaneous rather than phased state-wide or regional communication intervention strategy e.g the state-wide communication intervention implemented by WSSCC between December 2018 and April 2019 in Cross River state. This is required in the region to eliminate the danger posed by non ODF communities to ODF communities because of their interconnectedness through common water sources.
2. A stand-alone participatory communication strategy anchored on evidence based behavior determining frameworks, executed by professionals and evaluated for improvements.

3. Peace building and collaborations with security agencies should mandatorily reflect on ODF communication intervention processes and messages.
4. An overhaul of the intervention process such that transparency, accountability and region specific approaches are more carefully considered.

CONSENT

All data forms and recordings were stored in a confidential and secured place.

ETHICAL APPROVAL

Ethical clearance was obtained from the University of Nigeria Nsukka Teaching hospital Health Research Ethics Committee and the Department of Mass Communication, University of Nigeria, Nsukka. Written informed consent was obtained from the study participants.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/75285>