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MEDIA USE FOR *SOYGARI*: A CASE STUDY OF WOMEN'S BEHAVIOUR TO NUTRITION-SPECIFIC INFORMATION IN SOUTH WEST NIGERIA

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ABSTRACT

Gari is the most popular form in which cassava is consumed in most households in Nigeria. However, gari is deficient in most food nutrients and its excessive consumption without supplementation leads to malnutrition. *Soygari* (Gari fortified with soyabean) could help reduce malnutrition if positive behaviour is elicited through appropriate Communication Media (CM). However, empirical evidence on suitable CM mix to elicit positive behaviour towards *Soygari* nutrition is scarce. Therefore, CM mix for behavioural change in *Soygari* nutrition information dissemination among rural households in southwestern Nigeria was investigated. This study evaluated the effect of consistent dosage of *Soygari* information on rural women's behaviour in South Western Nigeria. A quasi-experimental research design was used. Data were collected from 224 women in soybean-producing households in the region through a systematic sampling procedure. This study trained women in *Soygari* information for twelve weeks using podcasts (audio and video messages), and interactive (demonstrations and visual teaching methods). The study targeted change in women's knowledge, attitude, and utilization. Empirical analyses are described in tables and percentages, while parametric tests were used to analyze a priori hypotheses. The podcast method influenced higher change in Knowledge ($\Delta\bar{x}$ = 2.68) and attitude ($\Delta\bar{x}$ =5.94) of women while a higher change in utilization ($\Delta\bar{x}$= 7.32) was found among women exposed to the interactive method. A significant difference existed in the utilization (T = 4.018; $p < 0.05$) of *Soygari* among women exposed to the podcast and interactive methods. Both media types effectively promoted positive behavioural change towards *Soygari* nutrition among rural households in South western Nigeria. Audio and practical demonstration mix were most suitable. An interactive method of communication is best if the target of nutrition information is for immediate household utilization. Multiple dosages of information can be a motivation to change an already existing human behaviour even when distractions exist.

Key words: Change in behaviour, *Soygari*, Nutrition-Specific diet, media use, Women

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INTRODUCTION

Low-income earners consume more low-quality diets than high-income earners [1]. This is connected to the inability to afford an exorbitant quality/protein-rich diet and inadequate knowledge of the nutrition fortification of the diets. Gari is probably the most popular form in which cassava (*Manihot esculenta*) is consumed in Nigeria as it constitutes a daily meal for over 150 million people in the country and beyond. It could be compared to what potato flour is to Westerners [2]. However, despite the popularity of Gari, the product is highly deficient in almost all food nutrients, especially protein, 4], except carbohydrates [3, 4]. Malnutrition problems exist in sub-Saharan Africa where pure cassava gari is a staple food [4].

Over a quarter of all undernourished West Africans are noted to reside in Nigeria while the southwest, north central and northeast regions of Nigeria are reported to represent the majority of those affected by malnutrition [5]. The need to fortify cassava which is an inexpensive source of energy but very low in protein with a more nutritious food prompted the development of *Soygari*, sweet potato gari [3] and some other soybean-based food like Soy-ogi, Soymilk, Soy-vita, Soymusa, Soy biscuit among others. *Soygari* produced from cassava tubers and soybean in correct proportion has been shown to have improved protein content and low hydrogen cyanide level [3, 6]. Bankole *et al.* [7] corroborated this finding by asserting that the incorporation of soybean, groundnut and other seed protein into cassava meal has yielded fortified products of high-protein value. Gari fortified with soybean was developed by the Institute of Agricultural Research and Training (IAR&T) in Collaboration with the International Institute of Tropical Agriculture (IITA) in 1989 and was disseminated through practical demonstrations in some communities in Oyo state, Nigeria. However, a discontinued adoption of the fortified gari (otherwise known as *Soygari*) was observed among the women in Southwest Nigeria, the study area. Little or no fortified food product is known to meet the processing and storage requirements of *Soygari*. It is cheap and a staple food among rural households. Thus, such change in adoption behaviour is mainly informed by key attitudinal change and knowledge as regards nutrition information [8]. Information platforms such as digital and traditional health-related promotions can influence the behaviour of the audience category to change in knowledge, attitude and use [9]. The behaviour change towards *Soygari*, thus requires effective information dissemination for a key attitudinal and knowledge change on the production and processing of the product. The prevalence of malnutrition among children in developing countries amplifies the importance of mass media, be it print, broadcast or social media platforms to educate parents on the need for proper feeding of children and the need for *Soygari*[10].

According to Nindi *et al.* [11] effective dissemination of information in the field of nutrition can be achieved by using various media of communication that combine

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both individual and mass methods. These communication media play the unique role of creating demand and building consciousness about the importance of nutrition at all levels and among all key stakeholders in nutrition development. The case of "Massagana 99" project, reported by Yahaya (12) explained how radio broadcast and teaching methods were strategically used in the Philippines, to increase rice production among farmers through positive behavioural change. Likewise, observation learning using Bandura's Social learning theory was used on health education for children and results showed that children tested were endowed with positive behaviour change outcomes in areas of nourishment [13]. These outcomes are necessary for behaviour change in *Soygari* information. These two interventions do not give an effective medium, both in mass media use or in interactions for replicating in a study as *Soygari* dissemination. Thus, this study aimed to ask: 1. Which of these communication types is effective for nutritional information among rural women? 2. How much will a consistent dosage of nutritional information influence behaviour change? and, what media mix would be appropriate and effective in the dissemination of *Soygari* technology?

A priori, the study hypothesized a difference in behavioural attributes after the dissemination of *Soygari* information in different media and a difference in the mean contributions of the four mediums used for behaviour change. This study, thus, provides the background information for the assessment of the divergent behaviour of the respondents in response to communication strategies used for *Soygari* nutrition information in Southwest Nigeria.

Objectives of the study

This study aimed to determine the influence of a consistent dosage of *Soygari* information disseminated in media tools that could produce a change in behaviour towards *Soygari* utilization in Southwest Nigeria. Specifically, this study assessed respondents' baseline nutritional behaviour (attitude, knowledge, and utilization) toward *Soygari* in southwest Nigeria, determined the post-dissemination behaviour to *Soygari* and the communication approach most appropriate for nutrition information dissemination among rural audiences.

MATERIALS AND METHODS

The study area is southwest Nigeria. The study purposely selected soybean-producing communities to aid motivation for utilization and effective communication of intervention. The study focused on women, arguing that empowering women is the surest way to improve nutrition for mothers, their children and other household members [14, 15].

The multi-stage sampling procedure was used to select rural women for the study. The first stage was a purposive selection of Ondo and Oyo States in southwestern Nigeria.

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A study by the Agricultural Media Resources and Extension Centre (AMREC) (16) of the Federal University of Agriculture, Abeokuta, Nigeria, identified the two states in Nigeria as major soyabean producing areas of the Southwestern part of the country. The study randomly selected rural local government areas from southwest Nigeria (Figure 1). These local areas include Tede, Ilua, Ara Oyo, Onirebara, Sabe Idi-apa Murano in Oyo State and Akunu Akoko, Isua Akoko, Owode, Eloyoowo, Epinin Akoko and Ise Akoko in Ondo state.

Research design and sampling procedures

A quasi-experimental research design which involved assessing the knowledge, attitude and utilization of *Soygari* by the women before and after exposure to the *Soygari* information package in a podcast and interactive messages for a period of 12 weeks was used. Two hundred and twenty-four (224) women across 12 communities of the study areas were selected using a systematic sampling procedure on households. Volunteers (women) who were approached for consent in participation during the preliminary phase (reconnaissance survey), were trained and designated as respondents and information was obtained before and after the intervention. The survey instruments (questionnaire) which sourced respondents' primary data (behavioural change observed in women's knowledge of *Soygari*, attitude towards utilization of *Soygari* in diets and level of utilization of *Soygari* in diets) were subject to test pretest validation. Using the split-half method, a reliability coefficient of 0.74 was obtained for the whole instrument testifying that the instrument was reliable for the study. The research was in three phases as follows:

Baseline survey: Pre-intervention assessment of the respondents' knowledge, and attitude towards the utilisation of soybean and their level of utilisation of soybean in diets were carried out using quantitative research tools. Basic personal details of respondents were assessed at this level. Intervention: Dissemination of *Soygari* nutrition information using interactive (practical demonstrations of processing and teaching) and podcast (video and audio) method types. The intervention was for 12 weeks. For the podcast message, nutrition and processing information were packaged into a 10-minute video and audio mp3 clips format and transferred through mobile phones to interested women in six communities of the study. The interactive communication method engaged the researcher along with other agricultural extension workers for women in six communities. All methods were used in a mutually exclusive way.

Post-intervention: The effectiveness of the media used was assessed twelve weeks after the intervention. The influence of the media on the respondents' knowledge of *Soygari*, attitude towards *Soygari* utilisation and actual utilisation of *Soygari* in household diets was determined.

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Data collection

Primary data were used for this study. Data were obtained before and after the intervention through the use of an interview schedule consisting of both open and close-ended questions. Data on personal variables such as marital status, religion, educational status, years of formal education training, and household size were obtained. The key variable considered in the study was the behavioural change observed in women's knowledge of *Soygari*, attitude towards utilisation of *Soygari* in diets and level of utilisation of *Soygari* in diets. Knowledge –*Soygari* knowledge statements were presented to the respondents and responses were obtained on whether statements were considered true, not sure, or false by the respondents. Response means were taken at ante and post-interventions. Mean responses were determined before and after the intervention.

Attitude - A comprehensive list of items measuring attitudes towards nutritional innovation adapted from National Obesity Observatory (NOO) [17] was presented to the respondents on a Likert-type scale of strongly agree (SA), agree (A), undecided (U), disagree (D) and strongly disagree (SD). Mean attitudinal scores for each statement were obtained at ante and post-interventions. Utilisation - Statements on the different purposes/ways *Soygari* could be utilised were presented to the respondents. Responses were obtained on a three-point utilisation scale of frequently, occasionally, and never used. Differentials of response mean were taken.

Data analysis - Data obtained were subjected to frequency analysis and visualizers (like bar and pie charts) while the impact of the communication strategy was measured using t-tests and the difference in the mean of each method (video, audio, practical demonstration and teaching) was analyzed with Analysis of variance (ANOVA). The respondents' knowledge, attitude and utilization status before and after the communication intervention were compared using t-independent statistics. The data analysis was done using both International Business Machines Corporation-Statistical package for the Social Sciences (IBM-SPSS version 21) and Excel.

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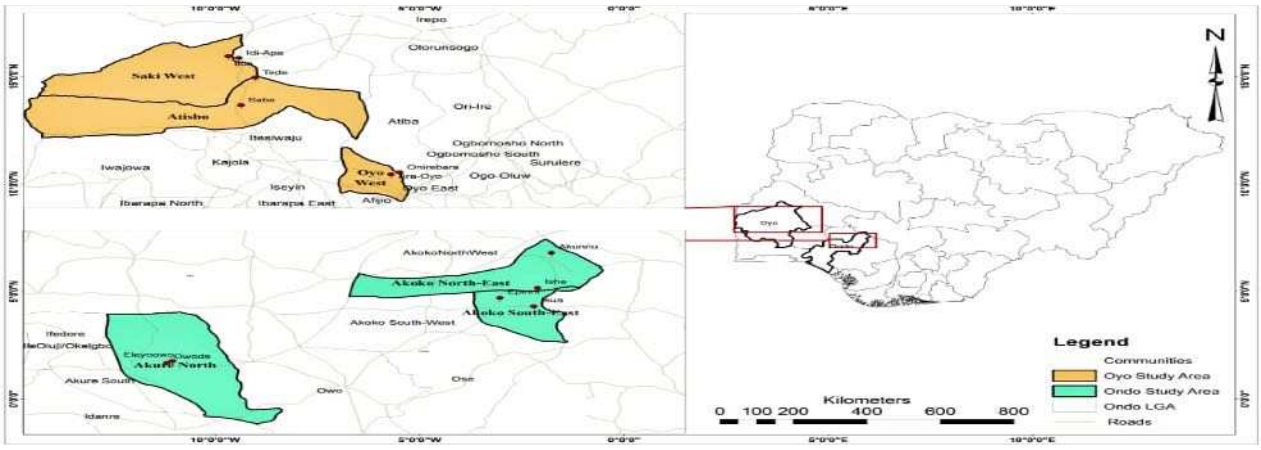

Figure 1: Map of Nigeria showing the study areas (South West Nigeria)

RESULTS AND DISCUSSION

Personal Characteristics description

Majority of the respondents (88.8%) were married, while a few of them (8.5%) were single mothers and 0.9% were divorced. Most of the women (62.1%) had basic education or more (Figure 2) which also reflects in the number of years they spent in school (1 – 12 years, 63%) in Table 1. The women were mainly into farming (57.1%) and practiced Christianity (67.9%). Exposure to formal education settings combined with informal familiarisation with communication methods in the study was expected to positively influence women's ability to understand and internalise nutritional messages and, hence, boost chances of achieving behavioural change outcomes. Although the ability to understand and internalise messages is expected to be enhanced by a higher level of education [18], the minimum education attained is thus, sufficient for the understanding of messages that women were exposed to in this study. The low educational status of the respondents falls in line with the results of Bechoff *et al.* [19] who established that most gari processors were illiterate and that few of them attended primary school. Married women are generally considered to be more relevant in matters relating to household nutrition when compared to their male or unmarried counterparts [20, 21]. This coherence can be hinged on the environmental and economic conditions of the study areas, which compel women to fend for the home in support of their spouses. Religion influences an individual's diet, food preferences, processes or feeding practices [22]. However, the two main religions (Christianity and Islam) in the study area do not have any known negative assertion on the processing and consumption of either soyabean, cassava or gari. This implies that the continuous use of *Soygari* is not likely to be hindered by any religious belief of the rural women; rather it should be regarded as additional knowledge to the existing belief [23].

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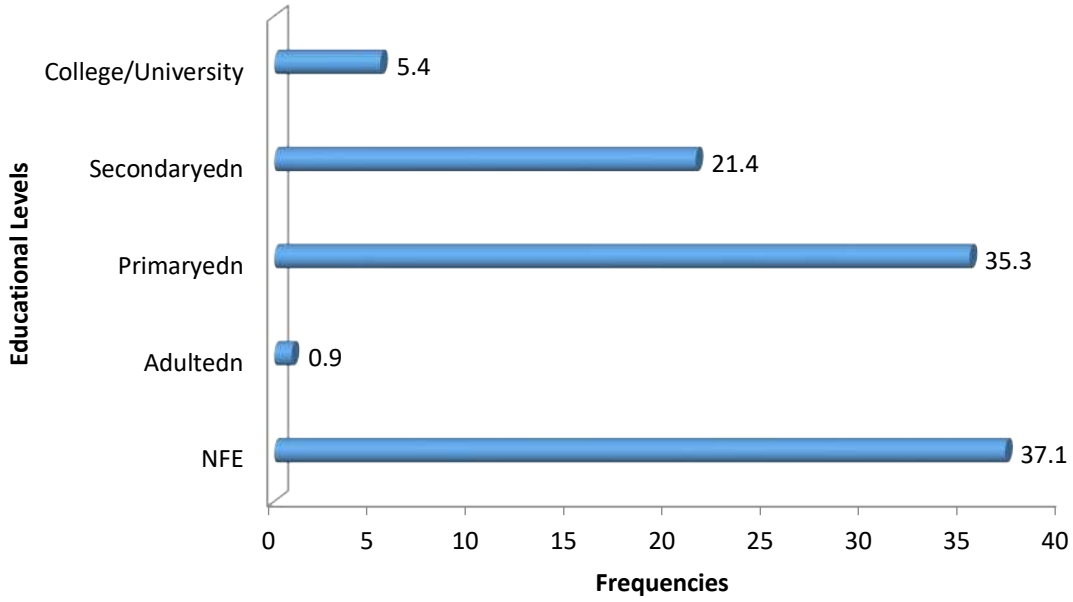

(NFE – No Formal Education)

Figure 2: Distribution of Respondents according to their educational groups

Knowledge, Attitude and Utilisation of *Soygari* Nutrition Information Ante and Post Communication Intervention

The communication intervention impacted the attributes of respondents (Table 2) on *Soygari* use. Comparing the group mean responses on the knowledge of *Soygari*, the women group in the interactive method had a moderately higher knowledge ($\bar{x}$= 42.49±6.64) than the women in the podcast group ($\bar{x}$=42.02±6.02). However, at post-communication intervention (PCI) the two different categories in which knowledge of *Soygari* was assessed show a positive knowledge change for respondents exposed to the podcast ($\Delta\bar{x}$ = 7.95) and interactive methods ($\Delta\bar{x}$ = 7.20). The mean figures imply that the sum of the respondents affirming their knowledge of the benefits of the *Soygari* PCI was more than those that affirmed their knowledge at ante-communication intervention (ACI). There was an overall significant knowledge change (t = 8.94 and t = 10.09; p> 0.05) with the use of podcasts and interactive methods, respectively. Furthermore, the study found a positive change in women's attitude toward *Soygari* information through podcasts and interactive methods of dissemination. Furthermore, table 2 shows that at ACI the mean responses ($\bar{x}$ =76.63±8.36 and $\bar{x}$ = 77.48±10.41) to attitudinal issues were lower than what was obtained at PCI ($\bar{x}$ = 85.54±5.94 and $\bar{x}$ = 84.32±6.68) for women in the podcast and interactive groups, respectively. As with the knowledge change, there was a clear media effect on attitude to *Soygari* information with the use of interactive (t = 5.68; p > 0.05) and podcast (t = 8.73; p>0.05). This is because more of the respondents agreed with the positive attitude

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statements at PCI than ACI. Women's responses to utilization options of *Soygari* in households show the consistent influence of communication methods used. Table 2 reveals a very low utilization at ACI ($\bar{x}$ = 0.42±2.28 and 0.71±3.02) for the utilization options inquired from the respondents. The result at PCI with more positive mean responses to the same options shows the influence of both interactive ($\bar{x}$ = 10.24±5.41) and podcast ($\bar{x}$ =6.74 ± 4.68) methods of communication on the two groups of women. However, comparing a change in the utilization, table 2 shows a higher mean response ($\Delta\bar{x}$ = 9.53) with the use of interactive methods (practical demonstrations and teachings) than with the use of podcasts ($\Delta\bar{x}$ = 6.63). This implies that the interactive methods of communication build confidence in the subject of the discussion thus driving immediate trials. However, results for knowledge and attitude show that the knowledge and attitude of respondents were more influenced positively by messages from the podcast communication (audio and video) media, and utilisation of the *Soygari* message was more influenced positively by the interactive method. Two (2) major strategies for attitude and behavioural changes are persuasion and the use of incentives [24]. Further analysis of mean contribution indicates a significant weight of influence of each method to the change in the attributes. The easy archiving of the audio message and repeated practical demonstrations served as motivations to learn for change. The utilisation of soybeans among women could be helped by continuous exposure to knowledge of processing [25]. Furthermore, to achieve a positive influence, effective communication should be mainstreamed, beginning with the innovation itself and the social and organizational context of the receiver to address negative external influences. [13, 26].

Differences in respondents' change in behavioural attributes associated with Podcast and interactive communication methods

The test of difference of change in knowledge, attitude and utilisation of *Soygari* associated with either podcast and interactive methods in Table 3 shows a significant difference only in the utilisation of *Soygari* ($t=4.0180$; $p<0.05$) for the two media used while no significant difference was established for knowledge ($t=0.643$; $p<0.05$) and attitude ($t=1.230$; $p<0.05$). The mean difference for utilization ($\bar{x}$ = 6.363 ± 5.24 for podcast messages and $\bar{x}$ = 9.534 ± 6.15 for interactive messages) indicates a higher influence of practical demonstrations and teaching over the video and audio messages on utilization. This result, thus, implies that a satisfactory level of knowledge and attitudinal change could be achieved among rural women with the effective use of podcasts and interactive methods. However, the adoption and use of an innovation in the nutrition space such as *Soygari* may require consistent interactive approaches to intervention. Communication is a source of persuasion which is a factor of change in the beliefs, attitudes and behaviour of others. The mean differences as well as their significances at the ACI

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and PCI connote changes in the knowledge, attitude, and utilization of *Soygari* as influenced by the communication intervention. Change through communication intervention could also be enhanced by the presence of little or no interference/distractions. Although findings have established that distraction while listening to persuasive communication impairs reception [27], possible "distractions" in rural settings are institutionalized, thus posing little or no disruption in the communication process. The little distraction that existed could be taken as a facilitator of impactful intervention because it has been established that distraction, where it exists, would aid pro-persuasive communication [28]. The communication intervention in the research can be classified as a pro-persuasive one (appealing to respondents to accept the *Soygari* technology using interpersonal and mediated information) hence, the existing distraction is said to have enhanced persuasion acceptance. The acceptance of the persuasive messages leading to the impact could also be linked with the nature of the carrier of the persuasion. Respondents have been found to trust and accept persuasive communication from extension personnel (either health personnel or agricultural social agents) who are their peers when compared to other groups [29]. The nature of the message (in the form of attitude, knowledge and utilization statements) can also aid persuasion impacts. Research has suggested that metaphorical language elicits an assimilation effect wherein positive metaphors elicit positive attitudes toward the communication topic and negative metaphors enhance negative attitudes [28]. Lastly, changes in respondents' knowledge, attitude and utilization are interdependently related and can be linked to both convincing arguments (like communication intervention as in the present work) and experiencing behaviour that affects one's attitude [30]. The podcast (audio) influenced better change in knowledge and attitudes and behaviour of women while the interactive demonstration of processing method improved the utilisation of *Soygari*. Uninterrupted consistent access to podcast messages reinforced knowledge and enforced a change in attitude. Frequent treatment with a regular dose of information reinforces people's knowledge of any developmental issue [31]. In addition, familiarization and relative local context use during interactive method fostered confidence in the subject among the women and propelled use in targeted households.

Mean differences in communication mediums' influence on change in behavioural attributes

Further inquiry on which type of interaction and podcast influenced more change in behavioural attributes prompted the use of analysis of variance. Table 4(a) shows a significant difference ($p < 0.05$) in a change in knowledge ($F=4.553$), attitude ($F=2.756$) and utilisation ($F= 7.233$) among rural women, where each of the communication mediums was used for dissemination of *Soygari*. This result implies that each of the communication mediums used contributed to the change observed

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in knowledge, attitude and utilisation at different levels. Duncan multiple range tests (Table 4(b)) at 95% alpha significant level, however, show the difference in the mean contribution of each medium to the attributes, a higher mean contribution of the audio podcasts and the least impact of the teaching method on the change in knowledge of *Soygari*. The change in attitude was more influenced by the audio message and practical demonstrations. The utilization of *Soygari* was more influenced by practical demonstrations. However, there was no significant difference ($p < 0.05$) in mean contributions of teaching, audio and practical demonstration messages to the change in utilization. Table 4(a) further reveals that the teaching method had a low/ insignificant influence on behaviour change. The communication intervention has greatly enhanced respondents' knowledge, attitude, utilization and overall behaviour in *Soygari* information. Thus, household malnutrition can be reduced with consistent interaction with the target recipient of nutrition-specific information. The study, therefore, recommends that this work be expanded to cover other nutrition-specific products to evaluate the effectiveness of the intervention.

CONCLUSION, AND RECOMMENDATIONS FOR DEVELOPMENT

This study concludes that effective media use can bring the desired behavioural change in nutrition information campaigns if tools are accessible and information well-tailored for household nutrition needs. Also, audio tools promote abstract knowledge and easy recalling of nutrition messages among women while practical demonstration methods promote utilization of information faster. Only a minimum level of literacy is required in the internalization of nutrition education through accessible media tools. Based on these findings, it is recommended that Developmental agencies should primarily use locally available media tools to promote rural nutrition interventions to ensure sustainable use. Interactive communication methods should be employed in nutrition campaigns to build confidence in the use of the information.

This study advocates the importance of audio messages for behaviour change in nutrition-specific diets for rural households. Audio messages are less distorted by the presence of distractions in the communication process while the interactive method of communication increases the utilization of household nutrition information. Thus, pre-recorded audio messages and practical demonstration mix should be incorporated as an effective tool in national extension communication strategies among rural dwellers. Agricultural extension interventions for nutrition should be flexible and inclusive to achieve both learning and development goals. A focus to determine the appropriate communication mix for influencing behavioural change for the promotion of a locally sourced nutrition-specific diet in other regions

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of Nigeria would be necessary to establish similarities and differences across these regions in terms of responses to different modes of communication media.

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Table 1: Distribution of the Respondents by some Socio-economic Variables

Variable	Options	Percentage
Methods	Podcast	40.6
	Interactive	59.4
Years in formal school	No formal Education	37.1
	1-6yrs	38.4
	7-12yrs	19.2
	>12yrs	5.4
Household Size	1-5 people	41.5
	16-20 people	0.9
	11-15 people	5.4
	6-10 people	52.2
	1 person	4
Marital Status	Married	199
	Singles	21
Religion	Islam	32.1
	Christianity	67.9
Major occupation	Artisan	4.9
	Civil servant	2.2
	Farming	57.1
	Processing	16.1
	Trading	19.6

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Table 2: Knowledge, Attitude and Utilisation change to the podcast and interactive messages on *Soygari* nutrition and processing information

Knowledge	**Podcast**	**t**	**P**	**Interactive**	**t**	**P**
Mean	$\bar{x}$ ± SD			$\bar{x}$ ± SD		
ACI	42.02±6.02	10.09	0.00	42.49±6.64	8.94	0.00
PCI	49.97±4.15			49.69±4.49		
Mean change	$\Delta\bar{x}$ = 7.95			$\Delta\bar{x}$= 7.20		
Attitude	Podcast	t	P	Interactive	t	P
Mean	$\bar{x}$ ± SD			$\bar{x}$ ± SD		
ACI	76.63±8.36	8.72	0.00	77.48±10.41	5.68	0.00
PCI	85.54±5.94			84.32±6.68		
Mean change	$\Delta\bar{x}$ = 8.91			$\Delta\bar{x}$= 6.84		
Utilization	Podcast	T	P	Interactive	t	p
Mean	$\bar{x}$ ± SD			$\bar{x}$ ± SD		
ACI	0.42±2.28	8.47	0.00	0.71±3.02	17.87	0.00
PCI	6.78±4.68			10.24±5.41		
Mean change	$\Delta\bar{x}$ = 6.36			$\Delta\bar{x}$= 9.53		

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Table 3: Analysis of the difference in change in knowledge, attitude, utilisation and overall behaviour of rural women exposed to the podcast and interactive communications

Change in	Communication type	Mean	Df	t-independent statistics
Knowledge	Podcast	7.956±7.52	222	0.643
	Interactive	7.203 ±9.29		
Attitude	Podcast	8.912±9.73	222	1.230
	Interactive	6.842±13.88		
Utilisation	Podcast	6.363±5.24	222	4.018*
	Interactive	9.534±6.15		
Behaviour	Podcast	1.910±1.83	222	-0.0284
	Interactive	2.003±2.75		

*Significant at 5%

Table 4a: Analysis of Variance for differences in knowledge, attitude and utilisation of *Soygari* as influenced by individual medium used (Practical demonstrations, teachings, video and audio methods)

Change	Groups	Df	Mean square	F
In knowledge	Between	3	435.994	4.553**
	Within	220	69.575	
	Total	223		
In Attitude	Between		409.716	2.756*
	Within	220	148.665	
	Total	223		
In Utilisation	Between	3	233.773	7.233**
	Within	220	32.321	
	Total	223		
In Behaviour	Between	3	26.753	6.220**
	Within	220	5.437	
	Total	223		

*Significant at 5% ** significant at 1%

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Table 4b: Alpha subset in Duncan range tests for mean difference in methods used for knowledge, attitude and utilization change in *Soygari* information

Change in knowledge	**Subset 1**	**Subset 2**				
	Teaching	video	Practical	Audio		
	4.0	6.36	7.80	12.29		
Change in Attitude	**Subset 1**	**Subset 2**			**Subset 3**	
	Teaching	Video	video	Practical	Practical	Audio
	1.95	6.67	6.67	7.75	7.75	12.67
Change in Utilisation	**Subset 1**	**Subset 2**				
	Video	Audio	Teaching	Practical		
	6.22	8.26	8.71	9.68		
Change in behaviour	**Subset 1**	**Subset 2**			**Subset 3**	
	Teaching	video	Video	Practical	Practical	Audio
	7.08	7.85	7.85	8.79	8.79	9.38

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