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Research article

NUTRITION AWARENESS INVENTORY TREND OF FARMERS IN THE USE OF PERIWINKLE SHELLFISH DIET

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ABSTRACT

This study determined the levels of knowledge, the attitude and pattern in the use of periwinkle shellfish (PSF) diet by Agricultural Development Programme (ADP) extension agent participants with the intention of encouraging farmers of different tribes to improve on the use of PSF diet. The target population was all the tribal farmers' participants in Delta State of Nigeria. Data were collected on the ADP farmer's participants, awareness of the existence and correct use, attitude toward actual use, factors militating against the use of PSF diet and number in 2007 and 2008 of PSF diet use. The data were analyzed using descriptive statistics and markov chain process. The results of the analysis indicated that the ADP farmer participants are adequately aware of the existence and the correct use, and have the right attitudes toward PSF diet but exhibited low and declining use rate. PSF diet use rate could be improved and sustained if they (PSF diet) are easily available and within the economic reach of this category of farmers.

Keywords: Periwinkle shellfish, Diet, Awareness, Adoption, Extension agents, Attitude

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INTRODUCTION

Our cultural diversity, varied cuisines, and generally high nutritional status should be points of pride for Nigerians. Today, we can choose from tremendous varieties of sea food products, the result of continual innovation by food nutritionists. In order to increase the participants of agricultural practices in rural-urban residence, the farmer's current health status should be considered. Farmer's death rate of heart disease, high blood pressure, kidney disease, asthma, strokes, anemia, etc, will drop dramatically if periwinkle shellfish (PSF) diet are introduced in their meal programme. The vast majority of Nigerians have narrowed their nutritional feeding habits based on family arid culture of a particular area

of originality. Therefore, introductory of unaware food to such communities seems a taboo to their traditional per religious beliefs. In recent years, due to high population, urbanization growth rates and awareness of the significant of sea food the demand for periwinkle shellfish diet has increasingly outstripped the available local fresh fish in the rain forest zone. Periwinkle shellfish is locally known as' *Imekpe, anikpara or Isam'* in Nigeria. It is dominant in coastal area of mangrove swamps forest zones of the country. It is highly nutritional delicacy, medicinal and can be used to produce ornaments (the shell) example, decoration of houses, bracelets, etc (Olomu, 1995). He further stated that periwinkle shellfish diet provide good supplies of protein, useful amounts of calcium, iron, riboflavin, niacin and 5 % glycogen.

A number of nutritionist's experts suggested that persistence in the use of periwinkle shellfish diet will reduce patient the risk of suffering from high blood pressure, conjunctivitis, and heart and kidney disease (Nephritis), asthma, strokes, anaemia, etc. As a result of its nutritional and medicinal values, the prejudices to certain communities in Nigeria that do not consume periwinkle shellfish diet are now gradually changing their attitude towards its uses. This study, therefore, intends to determine the levels of knowledge (awareness of existence and awareness of correct use), attitudes of farmers and adoption trend in the use of periwinkle shellfish (PSF) diet.

METHODOLOGY

The study was conducted in Delta State of Nigeria. Delta State lies roughly between longitude 5° 00^1 and 6° 45' East, and Latitude 5° 00^1 and 6° 30^1 North. The total area of the state is 17,440 square kilometer; about 'A, of this is swampy and waterlogged, estimated population of 4,000,000 (NPC, 2006). Delta State is bounded on the north by Edo State, on the East by Anambra State and Rivers State on the South by Bayelsa State. The Atlantic Ocean forms the Western boundary while the North West boundary is Ondo State. The language groups and nationalities in Delta State are Urhobos, Igbos, Ijaws, Okpes, Isokos, Ikas, Itsekiris, Ndokwas and Aniochas (FRN, 2007) The list of ADP extension agent's participants containing locations was obtained at the ADP office in Asaba, and simple random sampling technique was used in selecting one hundred respondents out of a total of one hundred questionnaire were used in seeking information from the respondents. Information sought from respondents included socio-economic characteristics such as their age, literacy level, awareness of existence and awareness of correct use of PSF diet (knowledge), attitudes towards, and number of PSF diet used
(Adoption) in 2012 and 2013, and reasons for non-use of PSF diet. Knowledge, as used here, refers to the farmer's awareness of the existence and of the correct use of PSF diet. A knowledgeable user of PSF diet is that who knows about the existence and the correct use of the PSF diet. Attitude emphasizes the disposition of the fanners to the PSF diet, that is, whether the farmers believe in the nutritional delicacy of the PSF diet. Correct attitude to a PSF diet is formed if the farmers believe its effectiveness and can improve in nutritional and medicinal status. However, adoption refers to the actual use of the PSF diet and occurs only after adequate awareness (knowledge) and correct attitude have been created.

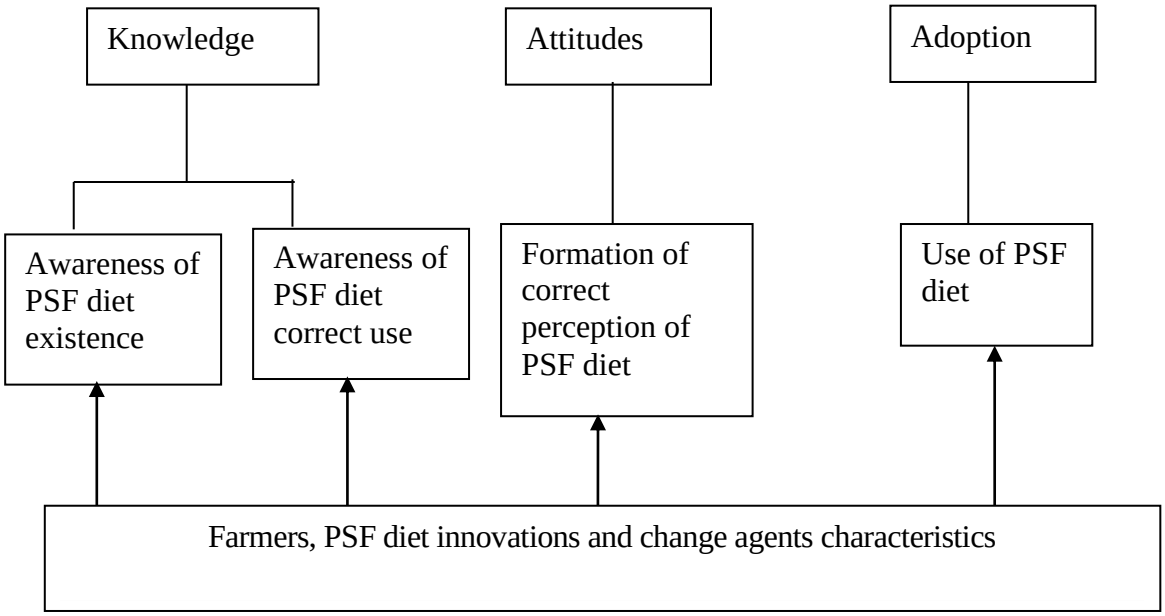

Fig. 1: PSF diet use model Source: Adopted from Alimi (1999)

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The data collected were analyzed using descriptive statistics to determine the proportions of respondents that have knowledge, attitude and use of PSF diet; and markov chain process to predict the pattern or trend in the use of PSF diet. Markov chain process is one of the probabilistic models which have been used in the analysis of economic observations when particular time ordered data are available. Solow (1951) and Champernowne (1953) applied this probabilistic approach to the analysis of income and wage distribution. Hart and Prais (1956) employed the technique in measuring use rate. This model can be used to project adoption of PSF diet in the Nigeria rural setting.

A markov chain process is determined by specifying a given set of states (S_1, S_2, ...S_n). The process can be in one and only one of the states at a given time and it moves successively from one state to another. Each move is called a "step". The probability that the process moves from S i to S_s depends only on the state S that it occupied before the step. The transition probability that the process will move from S_t to Si given for every pair of states. Also, an initial starting state is specified at which the process is assumed to begin. The transition probabilities P,j can be represented in the form of a transition matrix P:

$$P - \begin{array}{c} \\ S_1 \\ S_2 \\ S_n \end{array} \begin{pmatrix} S_1, & S_2, \text{----------} & S_n \\ P_{11} & P_{12}, \text{---------} & P_{1n} \\ P_{21} & P_{22}, \text{----------} & P_{2n} \\ P_{n1} & P_{n2}, \text{----------} & P_{nn} \end{pmatrix} \text{---------- (1)}$$

Pij denotes probability of moving from S_i to S_j in the next step. Since the elements of this matrix are non-negative, and the sum of the elements in any row is one, the matrix (P) is a stochastic matrix. This matrix together with an initial starting state (initial probability vector), completely defines a markov chain process, that is, given this information, the outcome of say, the nth step, can be determined. The main distinguishing feature of the markov process is that it is concerned with the probabilities of being in various states at anytime and for moving from one state to another.

Markov chain process assumes the structure of the population to remain the same, for the period of which a forecast is made, as in the periods which form the basis for deriving the transition probability matrix. The assumption has made it a powerful tool in policy decisions. It enables policy makers to judge whether it is necessary to take any measures in order to influence the relevant economic variables that affect the population structure. Another advantage of this technique is that it gives the equilibrium distribution of the population that is, what the final population distribution will look like if the observed pattern of movement continues.

RESULTS AND DISCUSSION

Iwueke (1991) views age, education, membership in social organization and contact with extension agents to significantly affect adoption of PSF diet by farmers, and unawareness of the nutritional value and unavailability of PSF diet in the market were responsible for non-adoption, Igben (1988) notes that level of education is very crucial in the adoption process, most especially, in areas where extension agents are inadequate. These identified variables can individually or collectively affect knowledge, attitudes and adoption of farmers in the use of PSF diet. Identification of the trend in the use and variable(s) that may be impeding use rate of this category of farmers are necessary to enhance use of PSF diet and thereby increase agricultural productivity.

None of the respondents was below twenty years, while 65 of the respondents are between the age of 20-60 years and 35 respondents were 60 years and above. The mean age was 50 (Table 1) Barring and negative factors such as religious beliefs, unavailability, cost etc, this group of farmers should be able to adopt PSF diet to improve their health and nutritional status.

All the respondents were literate and could read and write in their local and English language. This attribute will enhance their nutritional knowledge as they are able to obtain information on nutritional and medicinal values of PSF diet unaided and possess the attitude of correct perception of the product. Fifty-four percent of the respondents were graduates of tertiary institutions, while the remaining forty-six per cent respondents were secondary school

leavers. They might have had nutrition perspective while in school. Participants were subjected to nutrition awareness inventory programme during which they were taught nutritional and medicinal values of PSF diet. The nutritional and medicinal values of PSF diet introduced to the participants are 16.8 per cent protein, 1.04 per cent fat, l.00 per cent ash, 0.46 percent crude fibre and 70.12 per cent water and its medicinal uses are anti-hypertensive agent, heart and kidney disease, asthma anaemia, strokes etc, as reported by Olomu (1995).

Table 2 indicates that the Itsekiris and Ijaws respondents were aware of the existence and the correct use of PSF diet because of ethnic identity. Both had the right attitude that if PSF diets are adopted their nutritional status would improve. This attributes had caused death rate from heart diseases and strokes which got reduced dramatically since adoption. The Okpes farmers had 65 % of adoption rate because of peer influences as they are neighborhood to Itsekiri farmers while the Isokos farmers had the lowest adoption proportion (10 %) non-adoption of PSF diet was as a result of religious beliefs (80 per cent) and unavailable (40 per cent) (Table 3). The vast majority of non-adoption was attributed to religious beliefs, unavailability and high cost. It could be observed that the most adopter of PSF diet apart from the Itsekiris and Ijaws respondents who had childhood experiences were because of nutritive values, health beliefs, peer influences, availability and taste/texture. Therefore, for sustainability of the use of PSF diet by this category of farmers, the PSF diet must be readily available, inexpensive and within their (farmers) economic reach.

They use rate from one PSF category to another between the two periods (2007 and 2008) for which data were collected and summarized in Table 4. The farmers were categorized into three, based on the number of PSF diet adopted by each farmer. The first category contains farmers that used between 2 and 4 PSF diet, the second category consists of 5 PSF diets, while the third category consists of 6-8 PSF diet. In table 4, the first cell on the first row contains the number (13) of farmers that used between 2 and 4 PSF diet in the first period (that is, 2007) and still remained in the same category in the second period (That is, 2008). The figures in the second cell (3) of the first row represent the number of farmers that used between 2- 4 PSF diet in the first period but had moved to 5 PSF diet category in the second period. Similarly, the figure in the 7 third cell (4) of the first row represents the number of farmers in between 2 and 4 category in 2007 but had moved to 6-8 PSF diet category in 2008. The corresponding transition probability matrix for the PSF diet categories (Table 4) is presented in Table 5.

The transition probability matrix provides some useful insights into the dynamic aspects of the number of PSF diet adopter for instance, the entries in the cells on the principal diagonal indicate the tendency of the farmers to remain within a given size category of PSF diet. Table 5 shows that there was strong tendency for the farmers of 2 to 4 category of PSF diet to remain within that category. That is, with a proportion of 0.552 in the first cell of the principal diagonal, as many as 55 per cent of the farmers remained in that category in the second period (that is, 2008). This result showed that as many as 55 per cent of the farmers used between 2 and 4 PSF diet by 2008. The proportion in the second cell of the principal diagonal corresponding to farmers of 5 PSF diet is very low (0.11).

This implies that only 11 per cent of the farmers that adopted 5 PSF diet in 2007 remained in this category in 2008. However, equal proportion (0.34 or 34 per cent) move to a 2-4 or 6-8 PSF diet category. The proportion (0.43) in the third cell of the principal diagonal implies that 43 per cent of those who 6-8 PSF diet remained in that category by 2008. The proportions in the cells to the right of the first cell on the principal diagonal contain 0.120 and 0.117 for 5 and 6-8 PSF diet categories respectively. This implies that the chances of moving, by farmers who adopt 2-4 PSF diet in period 1 to 5 and 6-8 PSF diet categories were 0.12 and 0.12 respectively. These low chances of moving to higher PSF diet categories found among the farmers will not bring about the much desired increase in health status

From transition probability matrix and the initial (starting) state probability vector, the structure of use of PSF diet that the ADP extension agents would eventually reach if the factors currently influencing the use of PSF diet remain the same through time was projected for the equilibrium year. Table 6 shows that the farmers will attain equilibrium in the use of PSF diet by the year 2012. At equilibrium, about 52 per cent of the farmers will be in the 2-4 PSF diet category, about 13 per cent will be in the 5 PSF diet categories, while the remaining 3.7 per cent will be in the 6-8 PSF diet categories. When the proportions of farmers in each category of PSF diet in equilibrium are compared with the proportion at the initial/starting state, it is evident that the proportion of farmers (0.465) in the 2-4 PSF diet categories at the initial stage would have increased to 0.516 at equilibrium.

The proportion of those who adopt 5 PSF diet at the initial state (0.125) will remain almost the same (0.128) at equilibrium. The proportion of those who will adopt 6-8 PSF diet will have reduced from 0.410 to 0.366. The mean number of PSF diet through time also shows a declining trend till 2012, and there after stabilizes at an average of about 4.65. The median PSF diet category at equilibrium falls within the 2- 4 PSF diet category. This implies that at least half of the farmers would continue to adopt between 2- 4 in the long-run. This may be attributed to high cost and unavailability that make farmers stop the use of PSF diet. Low level of nutritional status will not augur well for the future of Nigeria farmers for increase of agricultural productivity. The farmers should be encouraged to use PSF diet at affordable prices, forego religious beliefs, adequate supply of PSF diet to rural-urban residence by ADP extension agents so that the goal of self-reliance in food production could be realized before long as they are in health status.

CONCLUSION

The respondents (ADP extension agent's participants) had adequate knowledge and the right attitude towards the introduced PSF diet. The use of PSF diet was affected by their unavailability, high cost and poor financial position of the ADP extension agents. If the present situation continues, decline in the use of PSF diet is eminent which will reduce health status. Thus, for sustainability in the use of PSF diet, apart from creating environment (literacy, training extension agents contractors) for adequate knowledge and attitude, the PSF diet must be easily available and within the economic reach of the farmers.

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Table 1: Distribution of Farmers by Age, Literacy Level and Health Status

Variables	N=100 Respondents	Proportion (%)
Age in years		
Under 20	-	-
Between 20-60	65	65
Above 60	35	35
Mean Age (years)		50
Literacy level		
Secondary school leaver	46	46
Tertiary Institutions Graduate	54	54
Health Status		
High Blood Pressure	68	68
Heart Disease	2	2
Kidney Disease	6	6
Asthma	14	14
Anaemia	3	3
Leukamia	7	7
Strokes	-	-

Table 2: Percentage of Respondents Having Correct Knowledge, Attitude and Adoption of PSF Diet.

Respondents	Awareness of Existence	Awareness of Correct	Attitude	Adoption
Urhobos	70	70	70	50
Itsekiris	100	100	100	100
Ikas	30	30	30	20
Isokos	20	20	20	10
Ijaws	100	100	100	100
Okpes	70	70	70	65
Ndokwas	40	40	40	25
Aniochas	60	60	60	60
Igbos	50	50	50	30

Table 3: Distribution of Farmers by Reasons for Adoption and Non-Adoption of PSF diet.

Farmers	Reason for Adoption	Percentage	Reason for Non-Adoption	Percentage
Urhobos	AVA	70	REL BEF	60
	HLTH BEF	60	₦	50
Itsckiris	AVA	100	-	_
	CHDEP	80		
Ijaws	AVA	100	-	-
	CHDEP	80		
Aniochas	NTV	50	UNAVA	70
	HLTH BEF	80	₦	50
	TAST	30		
Isokos	NTV	60	REL BEF	80
	PEER IPS	50	UNAVA	30
Okpes	AVA	70	₦ REL BEF	60
	TAST	50		50
Ndokwas	NTV	70	REL BEF	60
	TAST	50	UNAVA	40
Ikas	PEER,IFS	60	₦	70
	NTV	50	UNAVA	10
Igbos	HLTH BEF	70	UNAVA	80
	AVA	40	RELBEF	30

AVA =**A**vailability, UNAVA = Unavailability, HLTH = Health beliefs,

PEER IFS =Peers influence, TAST = Taste, NTV = Nutritive Value

₦ =Cost, REL BEF =Religious belief, CHDEP= Childhood experience,

Note: Each respondent can give more one reason that is why the total for each farmers Adoption/Non- Adoption of PSF diet may exceed 100 per cent.

Table 4: The Number of Farmers in Different Use of PSF Diet Categories

	2008			
2007	S_1 (2 - 4)	S_2 (5)	S_3 (6 - 8)	Total 2007
S_1 (2 - 4)	13	3	4	20
S_2 (5)	10	3	10	23
S_3 (6 - 8)	10	3	14	27
Total 2007	33	9	28	70

Table 5: Transition probability matrix for PSF diet categories.

PSF Categories		2008	
2007	(2-4)	(5)	(6-8)
(2-4)	0.552	0.120	0.117
(5)	0.340	0.110	0.340
(6-8)	0.267	0.100	0.433

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Table 6: Actual and Projected Structure of Change in the Use of PSF Diet by Farmers,

PSF diet Categories	Years						
	Actual		Projected				
		*				**	
	2007	2008	2009	2010	2011	2012	2013
2-4	0.285	0.465	0.51	0.511	0.514	0.516	0.516
5	0.333	0.125	0.127	0.128	0.128	0.128	0.128
6-8	0.384	0.410	0.363	0.361	0.358	0.366	0.366
Total	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Mean number of PSF diet	5.175	4.860	4.712	4.670	.651	4.647	4.647

Note: * Starting state (Initial) probability vector ** Equilibrium probability vector