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## RESEARCH ARTICLE

# Determinants of Consumers' Willingness to Pay for Organically Produced Fluted Pumpkin (*Telfairia occidentalis*) among University Workers in Eastern Nigeria

Joseph Oluwaseun Komolafe<sup>✉</sup> • Josephine Ngozi Obiekwe • Jennifer Chidera Okechukwu 

Nnamdi Azikiwe University, Faculty of Agriculture, Department of Agricultural Economics and Extension, Awka, Anambra/Nigeria

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## ABSTRACT

As against conventional fluted pumpkin (*Telfairia occidentalis*), certified organic fluted pumpkin is safer, but the production and consumption are low. Awareness of health benefit would likely spur the demand and stimulate production. Thus, this study examined the willingness to pay (WTP) for organically produced fluted pumpkin among the staff of Nnamdi Azikiwe University in Anambra State, Nigeria. Two-stage sampling procedure was used to collect data for this study. Four faculties with the largest staff population were purposively selected out of 14 faculties in the university, then, workers were selected proportionate to the population size of each faculty, resulting in a total sample size of 100. A structured questionnaire was used to collect data on consumers characteristics, awareness, willingness to pay and factors determining consumers WTP. Descriptive statistics and logit regression analysis were used to analyze the data. This study revealed that more than 70% of the respondents were aware of organic vegetables and about 67% of the respondents agreed that organically fluted pumpkin is healthier than conventionally one. On the average, up to 43.22 % of the respondents are willing to pay a premium for organically produced fluted pumpkin above (N200) the average cost of 200grammes of conventional fluted pumpkin. At 5% significance level of education ( $\beta=0.81$ ), and chemical consciousness ( $\beta=0.035$ ) had positive influence on the willingness to pay while premium amount to be paid ( $\beta=-1.1 \times 1005$ ) and sex ( $\beta=-1.38$ ), had negative influence. The study concluded that there was a potential market for organically produced fluted pumpkin among the university staff and recommended its prompt production.

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**1. Introduction**

Organic vegetables, including fluted pumpkin, is gaining recognition among producers and consumers due to their benefits (Rahman et al., 2021). Producers of organic vegetables

can tap into a rapidly growing market segment driven by health-conscious consumers seeking pesticide-free and environmentally friendly produce, allowing them to command premium prices and increase profitability (Reganold &

✉ Correspondence

E-mail address: [joe.komolafe@yahoo.com](mailto:joe.komolafe@yahoo.com)

Wachter, 2016). There are questions that has not been fully answered by researchers in Nigeria. These questions bother on health benefits, awareness associated with organically produced fluted pumpkin, its acceptability among consumers coupled with the pricing challenges (their willingness to pay a premium- WTPAP) faced by producers. There were three major factors identified in literatures that determine the willingness to pay (WTP) a premium for organic produce, these were demographic, economic, and risk attitudes toward human health and the environment (Amolegbe et al., 2022; Haghiri et al., 2009; Onyia et al., 2023). Researchers worldwide, uses mainly contingent valuation method to measure the WTP for a premium price for organic products (Haghiri et al., 2009; Onyia et al., 2023). The WTP a premium price and its determinants varies with products and locations therefore studies like this required.

Fluted pumpkin is a popular vegetable in Nigeria with great nutritional value (rich in vitamins A, C, and E, minerals such as calcium and iron, antioxidant) and medicinal qualities (boosting the immune system and reducing the risk of diseases like diabetes and hypertension) (Ojmelukwe & Philippa, 2022). Organic vegetables are free from synthetic pesticides and chemical residues, making them healthier options for consumers (Rahman et al., 2021). However, the extent to which consumers are aware of these health benefits and their impact on their purchasing decisions remains unclear. Understanding the level of awareness will provide insights into the potential demand for organically produced fluted pumpkin, the need for targeted educational campaigns and the requirements in enhancing the scope of production.

Awareness for organic vegetables measures the degree of consumers knowledge about the existence, benefits, and availability of organic vegetables. Empirical studies showed a growing awareness and demand for organically produced vegetables among consumers worldwide (Fernández-Rodríguez et al., 2019; Sánchez-Rodríguez et al., 2020). This trend is attributed to the increasing concerns about the negative health and environmental impacts of conventional vegetables (Gómez-Luciano et al., 2020).

Etuah et al. (2021) assess the level of awareness, perception and WTP for certified organic vegetables. The study discovered that 71% of the respondents had knowledge about organic vegetables and vegetable consumers were willing to pay between 31% and 51% premium for certified organic vegetables. Adams et al. (2018) in Ghana investigated the level of awareness and consumption of organic fluted pumpkin and found more than half (64.4%) of the respondents valued organic fluted pumpkin and were willing to pay up to 50% premium for it. The study showed price playing a key role in consumers' purchase intentions to organic fluted pumpkin. Iwu et al. (2020) estimated the awareness of organic fluted pumpkin among urban dwellers in Nigeria to be 83% of the respondents used for

his research, but the consumption was relatively low, only 44% of the respondents consumed the vegetable in the past six months. Assessing the acceptability of organically produced fluted pumpkin among potential consumers influenced by factors such as income, taste, texture, appearance, and perceived qualities (Akinwehinmi et al., 2021; Bazhan et al., 2024) is important to ascertain the willingness of potential buyers embracing organically produced fluted pumpkin as against the conventional one. The knowledge of consumers' preferences and behaviour toward organic vegetables would shed light on the potential market size and consequently, solve the pricing challenges producers of organic vegetables are faced with in Nigeria. Organic production methods often incur higher production costs due to the implementation of sustainable farming practices and the abstinence from synthetic inputs (Reganold & Wachter, 2016). Consequently, organic vegetables are expected to command higher price to bridge price differential gap between organic and conventional. It is important to explore the impact of pricing by ascertain the WTP for organically produced fluted pumpkin and identify strategies that can enhance the affordability and accessibility of organic vegetables.

Consumer awareness of organic vegetables has witnessed a significant increase in recent years, studies have shown that consumer interest in organic agricultural practices and the associated benefits, such as reduced pesticide exposure and increased environmental sustainability, has grown in numerous nations (Nandi et al., 2016; Onyia et al., 2023). A survey conducted (Onyia et al., 2023) revealed that people are becoming more informed about the health benefits of organic vegetables and actively seek out organically produce vegetables. Similarly, Rahman et al. (2021) found that consumers were becoming more aware of the potential health benefits of consuming organic vegetables and were willing to pay a premium for them. This indicates a growing demand for sustainable and healthier food choices among consumers (Fernández-Rodríguez et al., 2019, Sánchez-Rodríguez et al., 2020). University staff was selected as a target population due to their level of education and presupposed level of awareness of the health benefits and the hazardous effect of conventional vegetables that are likely to be high in pesticides and chemicals from inorganic fertilizer

Research conducted by Cerda et al. (2012) suggests that customers are willing to pay a premium for organic vegetables. This study provides insights into customer preferences and their WTP for organic produce. It has been consistently shown that consumers perceive organic vegetables as being of higher quality, safer, and more ecologically friendly, leading them to place a higher value on such products. Factors such as age, income level, education, household size and awareness of organic agricultural processes influence consumers' WTP a premium price for organic products.

Since the organic vegetable market in Nigeria is still in its early stages, even though there are indications of growth and increasing interest among consumers. The empirical studies on consumers' WTP a premium for organic vegetables and its determinants in Nigeria are scanty, particularly among specific target groups like university staff (Smith & Johnson, 2021). Understanding the demand and market potential among the university staff will contribute to the development of tailored strategies for promoting organic vegetable consumption, especially among salary earners, and support the sustainable growth of organic vegetable production in Nigeria's agricultural sector. For as consumer awareness and demand for organic vegetables continue to rise, the organic farming sector in Nigeria is expected to expand in the future. The findings can inform producers, policymakers, and stakeholders about the market potential and opportunities for investment.

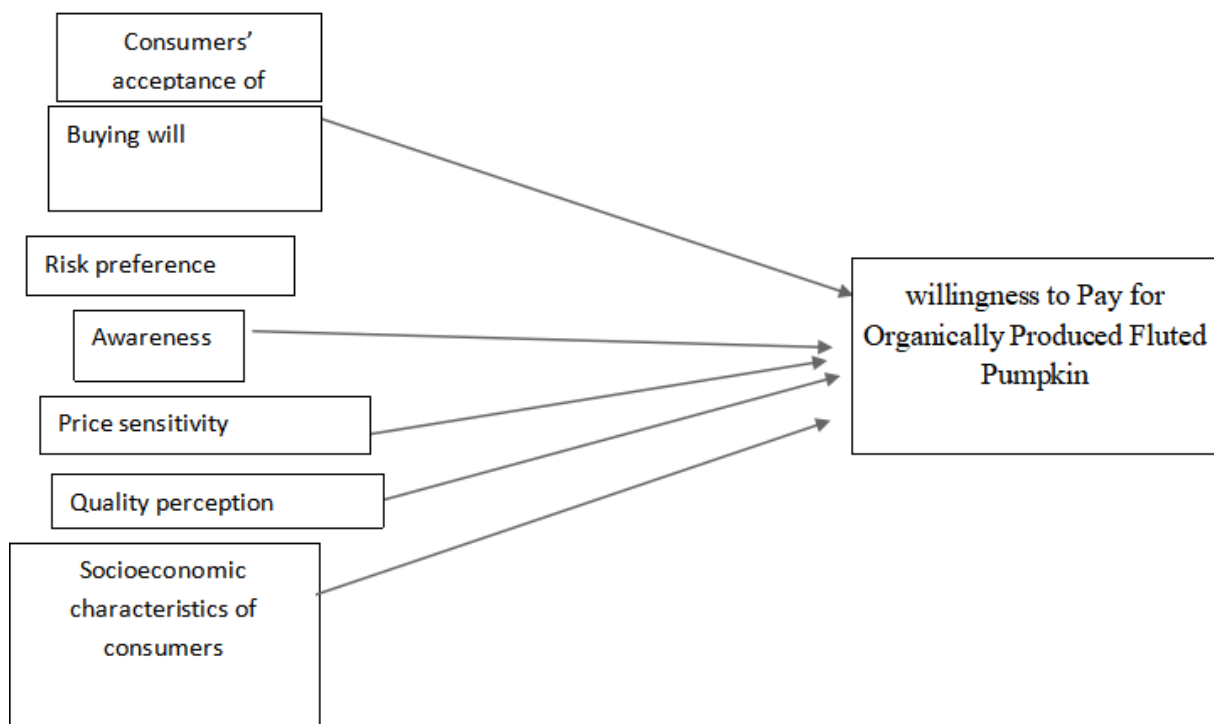
The objectives of the study are:

1. Assess consumer's awareness of organic fluted pumpkin benefits.
2. Assess the WTP for organically produced fluted pumpkin and;
3. Estimate the determinants of consumers' WTP for organically produced fluted pumpkin.

## 2. Materials and Methods

### 2.1. Conceptual Framework

The conceptual framework (Figure 1) shows how the concept of WTP involves several interconnected key variables



**Figure 1.** Conceptual framework, adapted from Osadebamwen et al. (2015) and modified.

that influence consumers' decisions regarding the purchase of the product. At the core of the framework is "Consumers' acceptance of the product," which plays a pivotal role in determining their WTP. If the target audience perceives the organically produced fluted pumpkin positively, their likelihood of buying it increases. Buying will is an important factor that influences WTP. If consumers have a strong desire to purchase the product, they may be more willing to pay a higher price for it.

Risk preference also influences WTP, as consumers who are more risk-averse may be less inclined to pay a premium for the product. Awareness of the benefits and characteristics of organically produced fluted pumpkin can positively impact consumers' WTP, especially if they understand the advantages over conventionally grown alternatives. Price sensitivity is another critical factor, as consumers with higher price sensitivity may be less willing to pay a higher price for organic products. On the other hand, if consumers are risk-tolerant, they may be more willing to pay a higher price for it.

Quality perception is vital as well, as consumers' perception of the quality and value of the organically produced fluted pumpkin will affect their WTP. Finally, socioeconomic characteristics of consumers, such as income level, education, and occupation, can influence their WTP for organic products, as individuals with higher socioeconomic status may be more inclined to prioritize health and environmental concerns. Overall, the interaction between these concepts shapes the WTP for organically produced fluted pumpkin targeted consumers.

## 2.2. Theoretical Framework of Contingent Valuation Approach

This study adopted contingent valuation approach (CVA) for the survey which is a popular methodological approach among researchers studying WTP for goods or services (Chuen-Khee & Othman, 2010; Nandi et al., 2016; Sriwaranun et al., 2015). Contingent valuation method is a preference method used in valuing positive externality (Carson et al., 2003; Onyia et al., 2023) Contingent valuation enables direct estimation of WTP for a product. Respondents were asked questions on how much they would be willing to pay for perceived benefits of a product or service in a typical market situation (Nandi et al., 2016). Thus, to apply contingent valuation approach, hypothetical market was created for the product or service under study. It is a reliable methodology used to collect information (Arrow et al., 1993). The approaches normally use were: Open-ended question, iterative bidding, dichotomous choice and payment card approach (Bhattarai et al., 2017). Common methods in dichotomous choice *Contingent Valuation* approach could be single-bounded and double-bounded methods. This study used single-bounded *Contingent Valuation* approach, where respondents were asked whether they are willing to pay a high amount for a product and for a yes response, follow-up question was asked for the ceiling amount they are willing to pay, conversely, for a 'no' response, follow-up question was that what amount of money they are willing to pay for the product under evaluated (Bhattarai et al., 2017). Contingent valuation information is then modeled as below (Alberini, 1995):

$$WTP \text{ is } Wi^* = Xi \alpha + \epsilon_i \quad (1)$$

$$\text{Where, } Wi^* \text{ is WTP (Yes/ No),} \quad (2)$$

$\epsilon$  is the error term with zero-mean, and vector  $Xi$  is the respondent characteristics.

The model for the observables expresses the likelihood of respondent agreeing to a given proposed amount and the individual characteristics. That probability is  $Pr(Wi^* \geq Oi|Xi) = 1 - G(Oi|Xi)$ , where  $Oi$  is the price offer  $G$  is distribution function of  $Wi^*$ ,  $Wi^*$  is assumed to be normal or logistic. The probability of "yes" to a payment of Naira  $C$  is  $Pr(W^*=1) = E(W^*) = Pr(Wi^* \geq Oi) = 1 - F((Oi - Xi\beta)/\sigma)$ , where  $Wi^*$  equal to one if respondent accepts the offer  $Oi$  (and zero otherwise),  $F$  is the distribution function of  $\epsilon/\sigma$ , and  $\sigma$  is scale parameter of distribution of  $W^*$ . The probability of declining to pay proposed amount is  $Pr(W^* \leq Ci) = F((Ci - Xi\alpha)/\sigma)$ .

## 2.3. Logit Model

To estimate the determinants of consumers' WTPAP price for organic fluted pumpkin the relationship between independent variables and WTP was analyzed using the Logit Model. Logit regression models relationships between a dichotomous response variable and a set of regressor variables.

Assuming the probability that consumers' WTPAP price for organic fluted pumpkin is equal to proportion of consumers' WTPAP price, then the individual empirical models to be estimated may be specified as:

$$WTP = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \dots + \alpha_n X_n + \epsilon_i \dots \quad (3)$$

$$NWTP = \delta_0 + \delta_1 X_1 + \delta_2 X_2 + \dots + \delta_n X_n + \epsilon_i \quad (4)$$

Where;

WTP=consumers' WTPAP price for organic fluted pumpkin

NWTP=consumers' no WTPAP price for organic fluted pumpkin

$\alpha$  and  $\delta$  were parameters to be estimated.

$X_i$  were explanatory variables.

$\epsilon_i$  = error terms

The Explanatory Variables include:

$X_1$  = Years of formal education (years);  $X_2$  = Age (years);  $X_3$  = Gender (Male = 1 female = 0);  $X_4$  = Household size;  $X_5$  = Marital status (Married = 1 otherwise = 0);  $X_6$  = Perceived Health Benefits of Organic Produce;  $X_7$  = Income Level (N);  $X_8$  = Awareness of Organic Farming Practices;  $X_9$  = Environmental Concerns.

## 2.4. Area of the Study

The study was carried out in Southeast, Nigeria. Southeast, Nigeria consists of five states: Ebonyi Abia, Anambra, Enugu and Imo. The zone is surrounded in the West by Delta and Edo States, in the East by Awka Ibom and cross River States, in the North by Kogi and Benue States, and in the South by Bayelsa and Rivers States. The area is inhabited by the Ibo people and their native language is Igbo, though pidgin English is widely spoken and English is the official language. The zone lies between latitude 40 longitude 60 401E and 80 301E. and 501N to 70 10°N. The area of land covered by the zone is 26,982.67 km<sup>2</sup> which is 8.5% of the total land area in Nigeria. they have a total population of 16,395,555 million according to National Population Commission, 2006. The zone has five federal universities namely University of Nigeria, Nsukka, Nnamdi Azikiwe University, Awka, Federal University of Technology, Owerri, Michael Okpara University of Agriculture, Umudike, Federal University, Ndufu-Alike Ikwo.

## 2.5. Sample Technique and Sample Size

This study used primary data that were collected using well-structured open-ended questionnaire. Data collected were university workers' demographic, economic, and risk attitudes toward human health and the environment. The study adopted a three-stage procedure for its sampling. In the first stage two Federal Universities in Southeastern Nigeria were selected purposefully. These were Nnamdi Azikiwe University, Awka,

and Federal University of Technology, Owerri. Second stage involved stratified each university by their faculties and purposive selection of faculties with the largest population of workers was done and in the third stage workers were selected proportionate to the population size. The total number of respondents selected were two hundred workers.

### 3. Results and Discussion

The respondents were asked question on whether they had aware of organically fluted pumpkin vegetable. Table 1 showed that all the respondents were aware/ heard about organic vegetables. This corroborates the work of De Zoysa and

Waisundara (2022). Concerning its availability in the market, 20.00 percent of the respondents asserted that it is available, 60.00 percent asserted that it is not easy to come by, while the remaining 20.00 percent responded were indifferent. All the respondents (100%) were well informed about the benefits of organically fluted pumpkin. About sixty seven percent of the respondents agreed that organically fluted pumpkin is healthier than conventionally one, while (30.00%) were indifferent and only (3.00%) disagreed. About seventy-six percent of the respondents were highly concern about chemicals in food crops. (16.00%) of the respondents were mildly concerned, (11.00%) were indifferent and (3.00%) felt unconcern.

**Table 1.** Awareness of organic fluted pumpkin benefits (OPFP).

Variables	Frequency	Percentage
<b>Information about availability of OPFP in the market</b>		
1. Yes	40	20.00
2. No	120	60.00
3. Indifferent	40	20.00
<b>Awareness of OPFP health benefits over convention</b>		
1. Yes	200	100.00
2. No	0.00	0.00
<b>Level of agreement that OPFP is healthier than conventionally on</b>		
1. Strongly agree	60	30.00
2. Agree	74	37.00
3. Neutral	60	30.00
4. Disagree	6	3.00
<b>Concerned about chemicals in foods</b>		
1. Very concerned	140	70.00
2. Somewhat concerned	32	16.00
3. Neutral	22	11.00
4. Not very concerned	6	3.00

Table 2 showed that only (43.00 %) of the respondents are willing to pay a premium for organically produced fluted pumpkin. Thirty seven percent of the respondents were willing to pay additional 20% on the market price of the conventional one, (28.00%) of the respondents were willing to pay additional 10% on the market price of the conventional, (20.00%) were willing to pay extra 30% while, the remaining (15.00%) were willing to pay extra premium above 30%. Factors motivating respondents' WTPAP for OPFP were identified to be better health benefits (70.00%), environmental concerns (10.00%), support for local farmers (7.00%) higher quality and taste (12.00 %) and other reasons (2.00%). Frequency consumption of fluted pumpkin was presented in table 3.4 as once a week

(50.00%) 2-3 times a week (40.00%) 4-5 times a week (22.00%), and > 5 times a week (13.00%). The Present purchase channels of fluted pumpkin were presented as follows: local market (69.00%), supermarket (14.00%), online retailer/home delivery (2.00%) and. farm gate (15.00%).

Table 3 presented the result of logit model used to investigate the determinants of university staff WTP for organically produced fluted pumpkin. Nine variables were included in the model, only four of the variables were significant at 5%. The likelihood ratio chi-square of 63.317121 with a p-value of 0.000 and Pseudo R<sup>2</sup> = 0.1823 reveals that the whole was statistically significant at 1% level of significance.

**Table 2.** WTP for organically produced fluted pumpkin (OPFP).

Variables	Frequency	Percentage
<b>Willing to pay a premium for OPFP</b>		
1. Yes	86	43.00
2. No	114	57.00
<b>Maximum premium willing to pay for OPFP</b>		
1. 10%	56	28.00
2. 20%	74	37.00
3. 30%	40	20.00
4. 40%	14	7.00
5. ≥ 50%	16	8.00
<b>Factors motivating premium pay for OPFP</b>		
1. Better health benefits	140	70.00
2. Environmental concerns	22	11.00
3. Support for local farmers	10	5.00
4. Higher quality and taste	24	12.00
5. Other	4	2.00
<b>Frequency consumption of fluted pumpkin</b>		
1. Once a week	50	50.00
2. 2-3 times a week	80	40.00
3. 4-5 times a week	44	22.00
4. > 5 times a week	26	13.00
<b>Present purchase channel for fluted pumpkin</b>		
1. Local market	138	69.00
2. Supermarket	28	14.00
3. Online retailer/home delivery	4	2.00
4. Farm gate	30	15.00
<b>Is there a price difference between organic and conventional products is justified?</b>		
1. Yes, definitely	66	33.00
2. Yes, to some extent	54	27.00
3. Not sure	48	24.00
4. No	32	16.00

**Table 3.** Determinants of WTP for organically produced fluted pumpkin (logit regression result).

Variables	Logit Regression Result			Marginal effect	
	Coefficient	P> z		Coefficient	P> z
Age	-0.0594041 *	0.042		-0.0146838 *	0.042
Gender	-1.377026 **	0.008		0.320928 **	0.003
Marital status	0.2419634 *	0.037		0.0598096 *	0.216
Household size	-0.001	0.994		0.0003	0.994
Years of education	0.809**	0.001		0.047**	0.004
Monthly income	-3.79e-07	0.966		-9.36e-08	0.966
Premium percentage	-1.1E-05**	0.003		-5.4E-02**	0.0010
Health consciousness	0.105*	0.064		0.026*	0.073
Chemical in vegetable conciseness	0.035**	0.007		0.003**	0.0041
Constant	0.4712649	0.832			
Log likelihood = -63.317121 Prob > chi2 = 0.0100 LR chi2(9) = 101.3 Pseudo R <sup>2</sup> = 0.1823 Number of obs = 200					

\*\*5% significant level; \*10% significant level.

Years of education positively and significantly contributed to the determinants of university staff WTPAP for organically produced fluted pumpkin. This implies that with one year increase in the years spent in school there is likelihood that respondents will choose improved maize seed. The marginal effect (0.05) shows that with one year increase in year spent in

school respondents has the likelihood of increasing their WTPAP by 5% ceteris paribus. This is in line with the work of Katt and Meixner (2020) and Magnusson and Cranfield (2005) that report a positive relationship between education and the WTPAP for organic food products, but at variance with the work of Haghiri et al. (2009).

Gender negatively affects WTPAP and it is significant at 5%. The marginal effect (0.33) shows that being a female have the likelihood of decreasing the WTPAP by 5% ceteris paribus.

Percentage of premium to be paid has negative and significant effect on WTPAP. The marginal effect (-5.4E-02) showed that the WTPAP decreased by 0.5%. Consciousness of chemical in vegetable has positive effect on WTPAP. This implies that as the consciousness of chemical in vegetable increases there is likelihood that farmers will choose to pay a premium. The marginal effect (0.003) shows that with an increase in the consciousness of chemical in vegetable by respondent there is likelihood that they will be willing to increase the premium paid by 5%. Marital status and health consciousness were positively related to the premium paid by respondent and were significant at 10%, but age was negatively related to the premium paid by respondent and were significant at 10%.

Therefore, this outcome permits the rejection of earlier stated null hypothesis that University staff willingness was not to pay for organically produced fluted pumpkin; hence the alternative hypothesis is accepted.

#### 4. Conclusion

The study provides empirical evidence of the University staff WTPAP for organically produced fluted pumpkin. University staff are willing to pay a higher premium for organically fluted pumpkin above the N200 they pay for N200grammes of conventional one. They are well informed about the benefits of organic fluted pumpkin and noted that it is healthier. Gender negatively affects WTPAP, while education, marital status and health consciousness positively influenced the premium payment

#### 5. Recommendations

Based on the finding of this study the following policy recommendations were made:

- Due to low level of awareness and the level of significance of education, workshops and seminars needed to be conducted by food safety organizations like NAFDAC to sensitized consumers on the need to embrace organic products.
- From the study male were ready to pay higher premium therefore, women should be enlightened about the dangers of chemicals in food and be encouraged to be ready to pay premium on organic products.
- Consciousness of the hazard of chemicals in food was significant in payment of premium, therefore, people should be sensitized about the hazards of consuming conventional vegetable that were treated with chemicals.

#### Conflict of Interest

The authors declare no conflict of interest.

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