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Original Article

Influence of Media on Consumers' Behavioural Intentions Towards Entomophagy in Western Kenya

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Media, Influence, Consumers, Behavioural Intentions, Entomophagy.

ABSTRACT

Insects are rich in protein and fat, and various insect species contain substantial amounts of vitamins and minerals. Consequently, insects can greatly contribute to food and nutrition security. Entomophagy (consumption of insects as food) has been practised in Western Kenya for many years. However, in recent times the consumption of edible insects has declined due to the notion that consuming insects is outdated and distasteful. Numerous studies have shown that media significantly affects consumers' food choices and dietary behaviour. Furthermore, media challenges consumer subjectivities, conceptions of consumer choice, consumer insight, consumer practices, and consumer communities. Hence, the aim of this study was to examine the influence of media on consumers' behavioural intentions towards entomophagy in Western Kenya. The conceptual model for this study was based on the theory of planned behaviour with media as the independent variable, attitude, subjective norms, and perceived behavioural control as mediators and consumers' behavioural intentions as the dependent variable. A questionnaire survey was used to collect data (n = 324), and valid data was analysed by the mediation analysis method. The findings revealed that media directly and indirectly through attitude and perceived behavioural control influenced consumers' behavioural intentions towards entomophagy positively. The indirect effect through subjective norms was insignificant. The total effect, total indirect effect and direct effect were significant, thus confirming the positive influence of media on consumers' behavioural intentions towards entomophagy. Based on the findings of the study, if optimally exploited, media can considerably contribute to the enhanced consumption of insects.

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INTRODUCTION

Insects are the most varied and populous organisms. There are approximately one million insect species on earth (Grimaldi & Engel, 2018). Consistent with Van Huis et al. (2013), insects play vital roles in plant reproduction, biological control, and waste degradation and are important food sources. For many years, insect consumption, often referred to as entomophagy has been practised on continents of the world, particularly Africa, Asia, and South America (Dobermann et al., 2017). Globally, insect species considered edible exceed 2300; in Africa, upwards of 470 insect species are consumed (Jongema, 2017; Kelemu et al., 2015). Dobermann et al. (2017) stated that insects are nutritious and can considerably contribute to food and nutrition security. Insects are replete with protein and fat, and various insect species contain substantial amounts of vitamins and minerals (Kouřimská & Adámková, 2016). Generally, the protein, fat, and mineral content in insects range as follows: 40-75g/100g, 7-77g/100g, and 3-8g/100g, respectively (Verkek et al., 2007). Rumpold and Schlüter (2013) reported that insect protein contains sufficient quantities of vital amino acids required in the human diet. The nutritional quality of insects varies in different species and it is also altered by feed (Roos & van Huis, 2017). Environmental advantages of entomophagy include but are not limited to: comparatively, insects are cheaper to rear, have reduced greenhouse gas emissions and are able to utilise feeds effectively (van Huis & Oonincx, 2017).

In many Western societies, the acceptability of insects and insect-based foods is low (Yen, 2009). Conversely, insects are a key component of food habits in developing countries and are eaten as a staple delicacy or crisis food (Hlongwane et al., 2021). In Kenya, the consumption of insects has existed for decades. Communities that inhabit the Western part of Kenya have been consuming edible insects such as termites and crickets. However, in recent times a notion that consuming insects is outdated and distasteful has emerged in Western Kenya due to changes in cultural and social values (Ayieko et al., 2010; Münke-svendsen et al., 2017). Additionally, Pambo et al. (2018) conveyed that entomophagy has been reduced in many communities and is seen as primitive and fear-inspiring. Among peasant farmers, certain edible insects are seen as crop pests, yet they are more valuable than crops nutritionally (Ayieko, 2013). Thus, consumer acceptance remains a barrier to entomophagy.

In simple terms, media is the communication channel or devices used to store and deliver information. Media can be broadly categorised into two categories: traditional and new media. Traditional media consists of newspapers,

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magazines, books, brochures, flyers, radio, television, and film, whereas new media is composed of computers, cell phones, and websites along with others (Nwammuo & Nwafor, 2006; Rajendran & Thesinghraja, 2014; Shivarudrappa, 2014). According to Verbeke (2008), information and communication sources, predominantly mass media significantly affects consumers' food choices and dietary behaviour by providing information that can assist consumers in obtaining increased satisfaction from food, improve their diets, and prevent them from allergies. The transformative capability of media challenges consumer subjectivities, conceptions of consumer choice, consumer insight, consumer practices, consumer communities, along with marketing practices and market ideologies (Cochoy et al., 2017). Mass media also works as a channel for consumer culture due to the immense presence of consumerist values in the media that can bring about the acquisition of such values in people who depend on media to identify changes in society's value systems and to modify their decisions correspondingly (Paek & Pan, 2004). Furthermore, various studies attest to the influence of media on consumers' attitudes, intentions, and behaviour. It is against this background that this study investigated the influence of media on consumers' behavioural intentions towards entomophagy in Western Kenya.

MATERIALS AND METHODS

Study Area

The survey was executed in the Homa Bay, Kisumu, and Siaya counties of Western Kenya. Kisumu, with a population of 1,155,574, is the most populated among the three, followed by Homa Bay County with a population of 1,131,950 people and lastly Siaya County with a population of 993,183 people (KNBS, 2019). Kisumu County hosts Kisumu city, which is the third biggest city in Kenya after Mombasa and Nairobi. Kisumu city is the main city in Western Kenya and is one of the leading communication and trading confluence in the Lake Victoria basin (JOOUST, 2015). Fishing, agriculture, and trade are the primary economic occupations in Homa Bay, Kisumu, and Siaya Counties (Boi & Bonyo, 2018; County Government of Homa Bay, 2019; County Government of Siaya, 2018).

Study Design and Sampling Procedure

A descriptive research design with a quantitative approach was adopted in this study. 324 consumers were conveniently selected (that is a form of non-probability sampling where constituents of the targeted population who attain a specific functional criterion, for instance, geographical proximity, easy accessibility, or the willingness to participate in the study) (Etikan et al., 2016). A semi-structured questionnaire with sections on demographics, media, and theory of planned behaviour constructs was applied to data collection from the selected consumers.

Data Analysis

Statistical Package for Social Sciences (SPSS) version 25 and PROCESS macro (Hayes, 2013) for SPSS version 3.5 were employed in the data analysis. Descriptive statistics for instance percentages were applied to analyse the demographic characteristics of consumers. The relationship between demographic characteristics and media as a source of entomophagy information was determined using regression analysis. Parallel mediation analysis was performed employing PROCESS macro to test the mediation effect of mediators (attitude, subjective norms, and perceived behavioural control; theory of planned behaviour constructs) in the relationship concerning media and consumers' behavioural intentions towards entomophagy.

RESULTS AND DISCUSSION

Demographic Characteristics of Consumers

Of the 324 consumers, 52.5% were male and 47.5% were female, out of which 11.3% were teenagers aged above 18 years of age, 42.8% young adults (20 to 39 years old), 37.5% middle-aged adults (40 to 59 years old), and 8.4% old adults (60 years and above). 13.3% had primary education, 22.8% had secondary education, while 62.9% had tertiary level of education. 0.9% of the consumers had no formal education. Out of the consumers, 37.3% were self-employed, 27.5% were employed, 19.1% were students, 12.3% unemployed, and 3.7% retired. 54.6% of the consumers were married, 34.9%

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single, 1.2% divorced, and 9.3% widowed (Table 1).

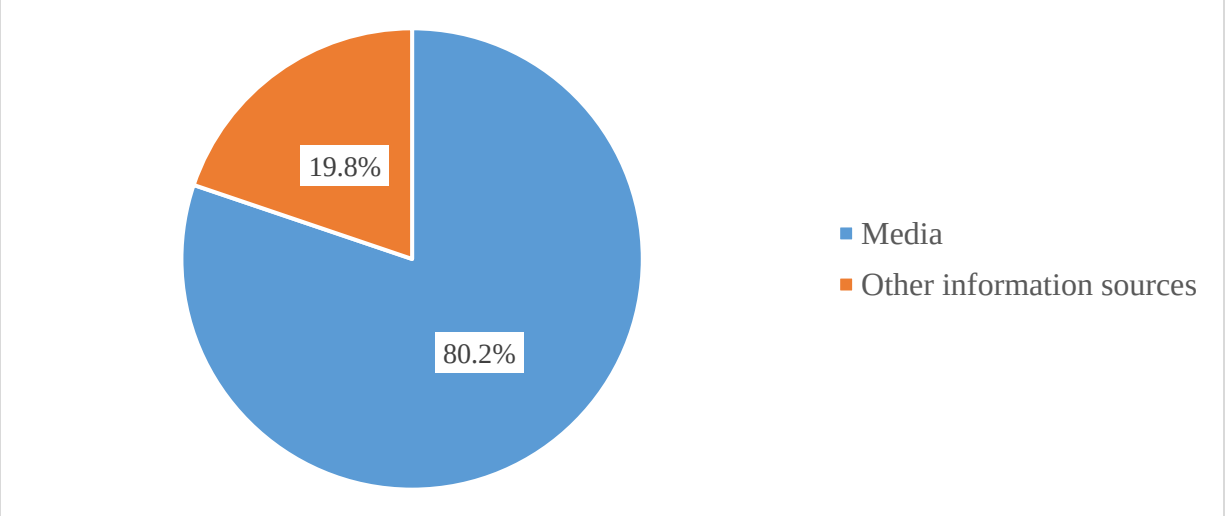
Table 1: Demographic characteristics of consumers

Characteristics		Frequency	Percentage
Gender	Female	154	47.5
	Male	170	52.5
Marital Status	Single	113	34.9
	Married	177	54.6
	Divorced	4	1.2
	Widowed	30	9.3
Age	13-19	37	11.3
	20-39	139	42.8
	40-59	121	37.5
	60 and above	27	8.4
Education Level	Primary	43	13.3
	Secondary	74	22.8
	Tertiary	204	62.9
	No formal education	3	0.9
Employment Status	Student	62	19.1
	Employed	89	27.5
	Self-employed	121	37.3
	Retired	12	3.7
	Unemployed	40	12.3

Consumers' Access to Entomophagy Information

Results show that a large proportion (80.2%) of the consumers obtained information about consuming edible insects from media (Figure 1). This implies that media is a key source of entomophagy information for consumers and correlates with the assertion of research conducted by Alemu & Olsen (2018), which identified media as a vital information source with regard to entomophagy in western Kenya.

Figure 1: Proportion of consumers who obtained entomophagy information from media



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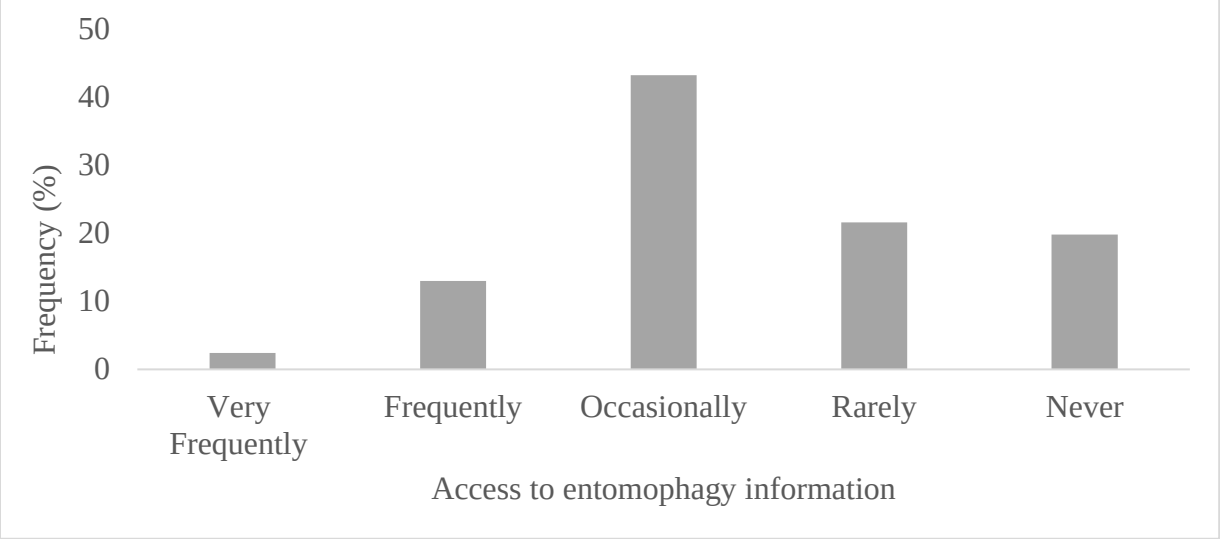
Moreover, the majority of the consumers (43.2%) came across entomophagy information on media occasionally, while a relatively small proportion (21.6%) indicated that they rarely came across the information. Few consumers came across the information frequently (13.0%) and even fewer came across the information very frequently (2.4%) (*Figure 2*).

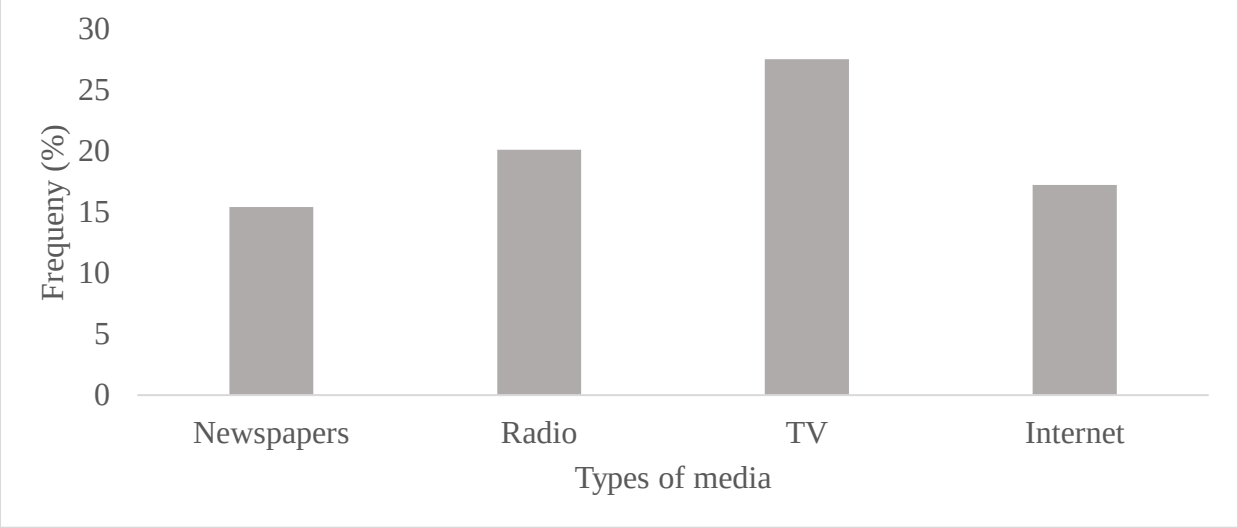
Figure 2: Frequency of access to entomophagy information through media



Types of Media Used to Obtain Entomophagy Information

Figure 3 indicates that most of the consumers obtained entomophagy information from television (TV) (27.5%). Radio was second (20.1%), followed by the internet (17.2%), and lastly, newspapers (15.4%).

Figure 3: Percentage of types of media used to obtain entomophagy information.



TV, radio, and newspapers (traditional media) accounted for 63.0% of the types of media used to obtain entomophagy information, while the internet (new media) accounted for 17.2%. This suggests that the majority of the consumers obtained entomophagy information from traditional media. A

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possible explanation for this is that access to traditional media, specifically radio and television is higher than access to new media in western Kenya (CAK & KNBS, 2010). Furthermore, nearly all of Kenya's adult population have access to the radio (98%). Access to TV is also high (81%) and over half of the adult population has access to the internet (51%) (BBC, 2018).

The percentage of consumers who obtained entomophagy information from the internet was higher than those who obtained the information from newspapers, probably because of the increasing adoption of smartphones which are available in most households. In addition, newspapers are less utilised in rural areas of Kenya due to limited circulation (Tonui, 2020).

Relationship between Demographic Characteristics and Media as a Source of Entomophagy Information

Gender, educational level, marital status, and age had no statistically significant relationship with traditional media (newspapers, radio, and TV) as a source of entomophagy information for consumers. Employment status had a negative significant relationship ($\beta = -0.22$, $p = 0.024$) with traditional media at 5% level of significance. This infers that as employment status increases, the use of traditional media as a source of entomophagy information decreases. Apart from the educational level, which exhibited a significant positive relationship ($\beta = 0.36$, $p = 0.000$) at a 5% level of significance, other demographic characteristics had no significant statistical relationship with the internet as a source of entomophagy information. The use of the internet as a source of entomophagy information increases with education level.

Parallel Mediation Analysis

PROCESS macro is principally an extension of statistical software such as SPSS, SAS, and R that performs regression analyses entailing different combinations of moderators, covariates and mediators. It is substantially utilised in social, health and business sciences for calculating indirect and direct effects in parallel and serial mediator models, conditional indirect effects in moderated mediation models and multiple interactions in moderation models. PROCESS macro computes a bias-corrected and accelerated bootstrapped confidence interval for the size of each indirect effect with significant mediation specified by a confidence interval which does not contain 0, consequently minimising bias in findings which can result from non-normal sampling distributions (Hayes, 2013). PROCESS macro offers numerous advantages in comparison to traditional casual steps (Baron & Kenny, 1986) and coefficients products (Sobel testing) (Baron & Kenny, 1986; Sobel, 1982) methods of mediation testing. It is reliant on a single statistic to definitely examine the indirect effect of an independent variable on the dependent variable by way of mediators. Single test methods are extra potent compared to the casual steps method, which necessitates at least three tests. *Figure 4* shows the parallel mediation model results for the study.

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Figure 4: The parallel mediation model results for the study

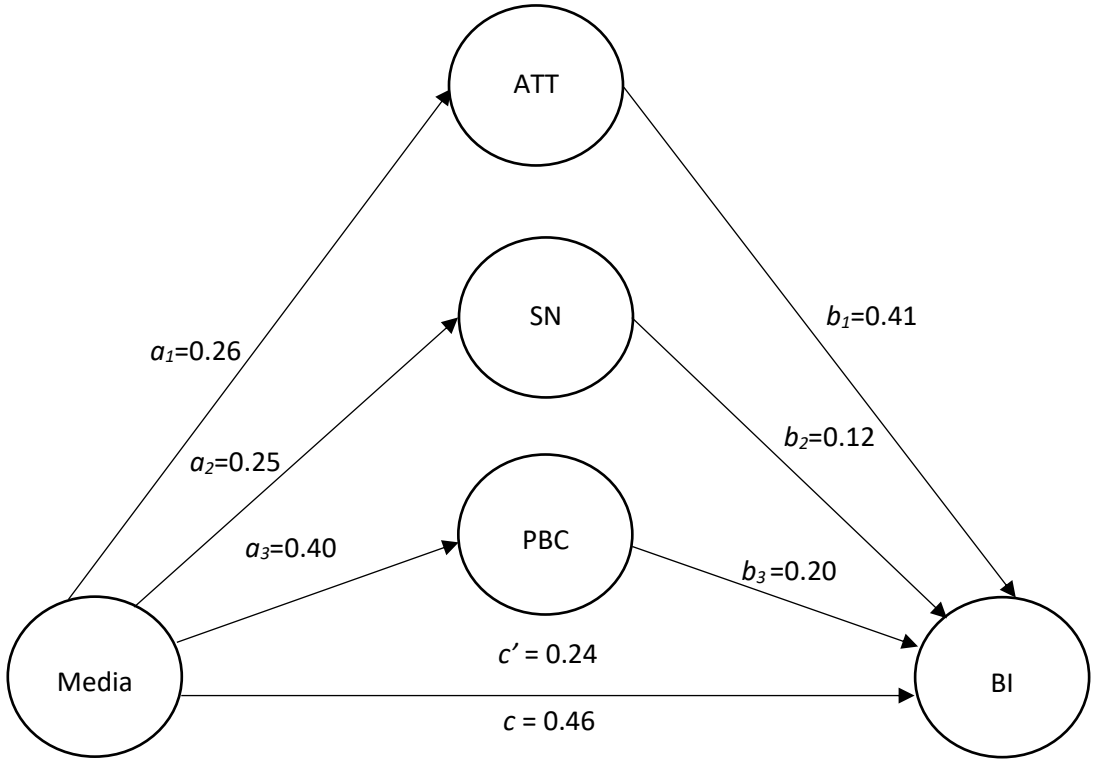

Figure 4. The mediating effect of attitude, subjective norms, and perceived behavioural control in the relationship between media and consumer behavioural intentions towards entomophagy (ATT = attitude; SN = subjective norms; PBC = perceived behavioural control; BI = behavioural intention; *c'* = direct effect; *c* = total effect).

Table 2 shows that all paths except subjective norms to behavioural intentions were significant (p<0.05).

Table 2: Significance and standardised path coefficients

Path	Coefficient	Std. Error	P-Value	Result
Media ATT	0.26	0.124	0.004*	Significant
ATT BI	0.41	0.097	0.000*	Significant
Media SN	0.25	0.131	0.000*	Significant
SN BI	0.12	0.078	0.125	Not Significant
Media PBC	0.40	0.130	0.000*	Significant
PBC BI	0.20	0.085	0.014*	Significant
Media BI (Direct Effect)	0.24	0.115	0.001*	Significant
Media BI (Total Effect)	0.46	0.137	0.000*	Significant
Note. * Implies statistical significance at a 5% level				

Parallel mediation analysis revealed that media is indirectly associated with consumers' behavioural intentions as a result of its relationship with attitude and perceived behavioural control. A 95% bias-corrected confidence interval determined from 5,000 bootstrap samples demonstrated that the standardised indirect effect through attitude (a_1b_1 = 0.11) was statistically significant (given 0 does not fall in the confidence interval). The standardised indirect effect through perceived behavioural control (a_3b_3 = 0.08) was statistically significant as 0 does not fall between 0.0023 and 0.1755. Contrastingly, the standardised indirect effect through subjective norms (a_2b_2 = 0.03) was not

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statistically significant as 0 falls between -0.0112 and 0.0891. The total indirect effect (0.22) was statistically significant as 0 does not fall in the confidence interval (*Figure 4* and *Table 3*).

Table 3: Standardised indirect effects of media

	Effect	BootSE	BootLLCI	BootULCI
Total	0.22	0.0544	0.1082	0.3223
ATT	0.11	0.0466	0.0306	0.2107
PBC	0.08	0.0446	0.0023	0.1755
SN	0.03	0.0261	-0.0112	0.0891

Note. BootLLCI = bootststrap lower limit confidence interval, BootULCI = bootstrap upper limit confidence interval, Boot SE = bootstrap standard error.

Correspondingly, 0.11/0.46, 23.9% of the influence of media on behavioural intention is mediated through attitude, 0.08/0.46, 17.4% is mediated through perceived behavioural control, 0.03/0.46, 6.5% is mediated through subjective norms, and 52.1% is a direct effect. Complete mediation occurs when the removal of the mediating variables makes the effect of media on behavioural intentions insignificant (Shrout & Bolger, 2002). This is not the case in this study, thus implying partial mediation. The inference from the results is that directly and indirectly through mediators (attitude and perceived behavioural control), media has a positive effect on consumers' behavioural intentions towards entomophagy.

CONCLUSION

The majority of consumers obtained entomophagy information from traditional media specifically TV, radio, and newspapers. It was established that media has a significant positive influence on consumers' behavioural intentions towards entomophagy. The total effect, total indirect effect, and direct effect of media on consumers' behavioural intentions were significant. Media is indirectly associated with consumers' behavioural intentions via its relationship with attitude and perceived behavioural control (mediators). The indirect effect through subjective norms was not statistically significant. The indirect effect through attitude was greater than the indirect effect through perceived behavioural control. Based on the findings of the study, if optimally exploited, media can considerably contribute to enhanced consumption of insects and, as a result promotion of food and nutrition security.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ETHICAL APPROVAL

This study was ethically reviewed and permitted by the Ethical Review Committee and Board of Postgraduate Studies of JOOUST. Permission to collect data from the study counties was obtained from respective county administrators. Consumers who took part in the study completed consent forms and were assured of anonymity.

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