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## DETERMINANTS OF KNOWLEDGE, PRACTICE, BELIEF AND ADHERENCE TO TABOOS ON EGG CONSUMPTION IN KWAZULU-NATAL PROVINCE OF SOUTH AFRICA

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## ABSTRACT

Eggs are considered to be one of the cheapest sources of protein, hence, support for their consumption ought to be particularly sought after in a nation like South Africa where many may be food insecure. With much of the population being unemployed and the unsteady economy that has contributed to the higher cost of living, malnutrition remains a challenge. The recognition and dissection of the socio-economic variables that lead to the avoidance of egg consumption will allow the implantation of programs that will encourage the incremental utilization of eggs, to improve on the moderately lower *per capita* consumption when compared to some African countries. This study examines the determinants of knowledge, practice, belief, and adherence to taboos on egg consumption in the KwaZulu-Natal Province of South Africa where there is the lowest level of egg consumption compared to other provinces in the country. A descriptive and quantitative research design using a multi-stage sampling technique and the Rao Soft sample size calculator were used to select 125 households. Data were obtained with the use of a structured questionnaire and analysed with t-test statistics, Principal Component analysis and *Probit* regression analysis. The results show a significant relationship between egg consumption and taboos. The results revealed a decreasing order on the levels of knowledge, practice, belief and adherence to taboos among respondents. The study concluded that cultural reasons exercise a greater influence on egg consumption than socioeconomic, economic and availability factors. It is, therefore, recommended that interventions such as educational programs that encourage healthier eating behaviours should be designed and implemented. These programs should be designed in a way that will incorporate culturally relevant approaches that people in Kwazulu-Natal can resonate with to enhance their potential effectiveness in improving the frequency of egg consumption. Furthermore, it is recommended that future research should delve deeper into the history of the specific cultural norms, beliefs and practices surrounding egg consumption within the region.

**Key words:** egg consumption, South Africa, food security, KwaZulu-Natal, food taboos

## INTRODUCTION

Zero hunger is a major Sustainable Development Goal (SDG 2), to end hunger, achieve food security, improved nutrition and promote sustainable agriculture [1]. This is predicated on the fact that hunger is a leading cause of death despite the tremendous planetary resources, unequal access and inefficient handling of resources leave millions of people malnourished. Malnutrition is associated with reduced mental and physical development and, consequently, reduced economic productivity [2]. Eggs are known as one of the cheapest sources of protein in many parts of the world. They contain many of the essential nutrients that are critical for growth and development. Eggs are a rich nutrient food with high-quality protein, fat-soluble and water-soluble vitamins, in addition to important minerals such as copper, iron and zinc [3].

In South Africa, under-nutrition and malnutrition have been associated with socioeconomic characteristics such as living in rural areas, low educational status, and low income, large numbers of food insecure households, across age categories and locations [3], even though South Africa is regarded as a food-secure nation [4]. An increase in the consumption of eggs might help to reduce the burden of malnutrition since they are generally a cheaper source of protein compared to meat. However, certain misconceptions are associated with the consumption of eggs, for example, that because eggs are high in cholesterol they cause health-related problems. Furthermore, there are also taboos and cultural beliefs associated with the consumption of eggs. Food taboos exist in one form or another and vary with all societies, and there can be traditions and food taboos that have restricted consumption of certain foods such that this becomes embellished and accepted as a norm. The food taboos vary from one ethnic group to another and also from one region to another. Some foods are considered taboo because of the belief that they are unclean and that they carry a curse [4]. Other foods are taboo because they are believed to have a special effect on the health of the person who consumes them. The most common food taboos are those that are associated with the religious beliefs of the people and also those that are associated with their cultural practices. Further, food taboos can also affect food preparation and cooking [3].

The consumption demand for eggs in South Africa is about 8 billion eggs/year with a *per capita* consumption of 145 eggs, less than the average global egg consumption per capita of 180 [5]. The consumption of eggs is not widespread in many provinces in South Africa and has in some cases even decreased in rural areas [5]. In South Africa, avian influenza, feed and fuel price increases and rolling power outages have put the egg industry under pressure. Nevertheless, the need

for South Africans to consume more eggs can be described as “eggs being the ‘gold standard’ in terms of protein inclusion in a diet” [6].

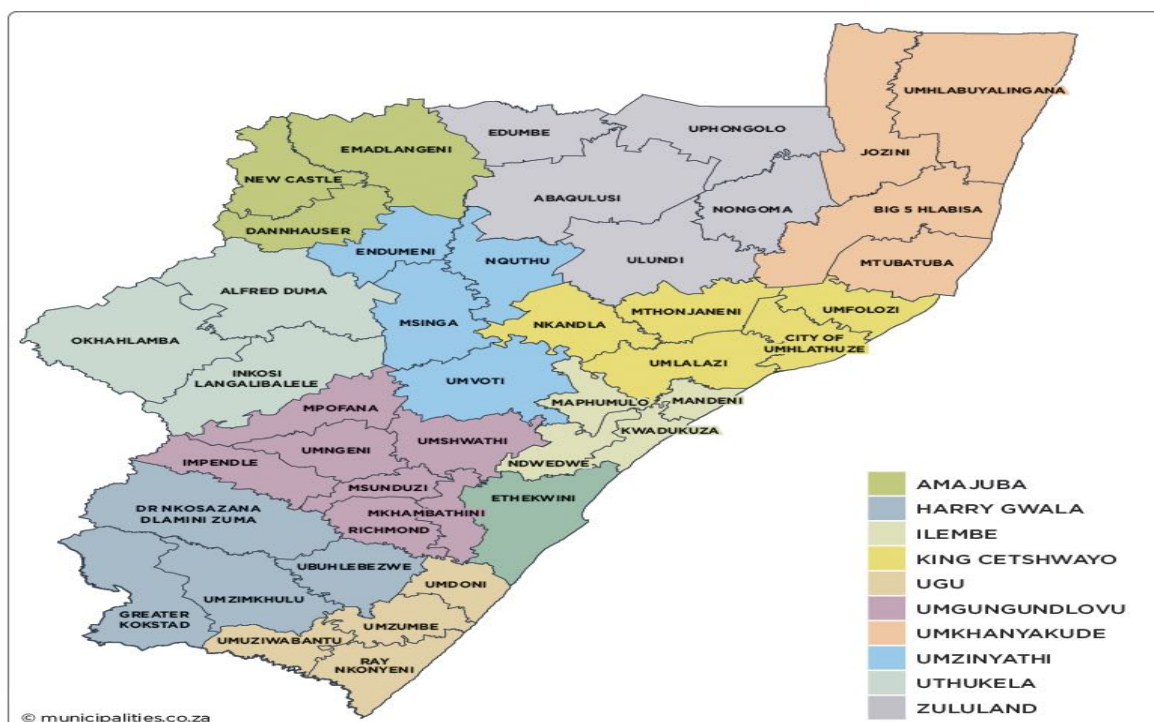
Socio-cultural factors have been reported as the major determinants of egg consumption in South Africa [15]. Food taboos as "sociocultural determinants" affect food security and health and are usually prevalent in areas experiencing a decline in food supply and the available foods are often considered taboo thus preventing people from consuming foods that are of nutritional importance [16]. The International Federation of Red Cross and Red Crescent Societies (IFRC) in relation to malnutrition, stated that culturally prescribed taboos affect access to nutritious food leading to nutrient deficiencies, sense of taste, feelings, abstentions and gender inequalities [17]. The effective prevention and management of lifestyle diseases is influenced by food factors related to social, cultural, political, physical and structural influences [18]. In this study, in relation to taboos associated with eggs consumption, the knowledge is operationalized to yield a theoretical and practical understanding, while practice was measured as the actual application of a taboo, as opposed to theories relating to it. Belief indicated the acceptance of the existence of taboos, and adherence was examined among respondents as sticking to and being faithful in the observance of the taboos. The Necessity-Concerns Framework postulates that adherence is influenced by necessity beliefs and concerns about the potential adverse consequences [19]. The objective of this study was to analyze the determinants of knowledge, practice, belief, and adherence to taboos on egg consumption in the KwaZulu-Natal (KZN) Province of South Africa.

## MATERIALS AND METHODS

This research was carried out in KwaZulu-Natal (KZN), one of the 9 provinces of South Africa in the south-eastern part of the country, and composed of 12 districts, namely Amajuba, Zululand, Umkhanyakude, King Cetshwayo, Umzinyathi, Uthukela, Umgungundlovu, Ilembe, Ugu and Harry Gwala (Figure 1).

The KwaZulu-Natal (KZN) province midlands, along with the Eastern Cape and Limpopo provinces, are often regarded to be South Africa's three poorest provinces; with high levels of poverty rates, unemployment rates small urbanized settlements and agriculture accounting for 40–45% of the economy [20].





**Figure 1: Map of the districts that make up KZN province**

Source: [20]

Descriptive and quantitative research designs were adopted in the study to explore the taboos associated with egg consumption in KZN. The population of the study included rural households in all districts. A multi-stage sampling technique was used to select the representative households to interview. The households were stratified based on the districts and further divided in terms of the sub-districts. The RaoSoft sample size calculator was used to select 125 households. A structured questionnaire with 5 sections, namely: socio-economic characteristics, specific food taboos and underlining factors, effects, prevalence and adherence, awareness and knowledge and extent of belief in the food taboos for eggs. Socio-economic characteristics consist of the variables age, gender, marital status, household size, highest educational attainment, income, sources of information and religious beliefs. The section on specific food taboos and underlying factors consists of 35 different taboos associated with egg consumption found in the literature and reasons for such taboos to which respondents affirmed or not. The variables on prevalence and adherence, awareness and knowledge, and extent of belief in food taboos were measured using a 5-point Likert scale with varying descriptors to suit each measurement with at least 25 statements for each of these variables. The validity and reliability of the instrument were established through face-validity and split-half technique for reliability among food and nutrition, and rural development experts and a reliability coefficient of 0.85 was obtained [21].

The instrument was divided into equal halves and correlated to obtain the reliability value. Ethical approval was obtained from the Humanities and Social Sciences Research Ethics Committee (HSSREC), University of KwaZulu-Natal with the number HSSREC/00005889/2023.

Data were analyzed using t-test statistics, Principal Component Analysis, and *Probit* regression analysis. The t-test was used to establish differences among male and female household heads, Principal Component Analysis extracted the factors underlying knowledge, practice, belief and adherence to the taboos on egg consumption, while *Probit* regression analysis was applied to identify the determinants of knowledge, practice, belief and adherence to taboos on egg consumption. For the *Probit* models, it was assumed that respondents have two alternatives of yes or no for each of knowledge, practice, belief and adherence as expressed Nagler [22]. Binary outcome variables were considered dependent variables with two possibilities, such as yes/no. The model is appropriate since it can overcome heteroscedasticity and satisfies the assumption of a cumulative normal probability distribution [23].

The model specifications for the t-test is:

$$t = \frac{(\bar{X}_1 - \bar{X}_2)}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \dots\dots\dots (1)$$

Where  $X_1$  = Socio-economic characteristics of male-headed household,  $X_2$  = Socio-economic characteristics of female-headed household,  $S_1^2$  = variance of the  $X_1$  variable,  $S_2^2$  = variance of the  $X_2$  variable,  $N_1$  = number of households in the male-headed household,  $N_2$  = number of the female-headed household.

In the *Probit* model, it is assumed that Y can be specified as follows:

$$Y = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots\dots\dots + \beta_{ki} X_{ki} + U_1 \dots\dots\dots (2)$$

And that:

$$Y_i = 1 \text{ if } Y > 0 \dots\dots\dots (3)$$

$Y_i = 0$

And, where  $X_1, X_2, \dots\dots\dots X_n$  represents a vector of random variables,  $\beta$  represents a vector of unknown parameters and U represents the random disturbance terms [24].

The Principal Components Analysis, as specified by Koutsoyiannis [25], is presented as follows: ( $X_s$ ...original variables of the composite taboos on egg consumption)

$X_1 \dots X_p$  measured in 'n' households

$P_1 \dots P_p$ : the principal components which are uncorrelated linear combinations of the original variable,  $X_1 \dots X_p$ , given as:

$$\begin{aligned}
 P_1 &= \alpha_{11}X_1 + \alpha_{12}X_2 + \dots + \alpha_{1p}X_p \\
 P_2 &= \alpha_{21}X_1 + \alpha_{22}X_2 + \dots + \\
 P_p &= \alpha_{p1}X_1 + \alpha_{p2}X_2 + \dots + \alpha_{1pp}X_{pz} \dots \dots \dots (4)
 \end{aligned}$$

The component loadings were chosen on the condition that the principal components were not related and that the first component would account for the maximum possible proportion of the total variation in the original variables.

## RESULTS AND DISCUSSION

Table 1 shows gender differences in knowledge, practice, belief and adherence to taboos on egg consumption. There was a significant difference only in the age of males and females ( $t = 1.93$ ,  $p < 0.05$ ), while other variables such as number of children, knowledge of taboos, taboo belief, taboo practice, taboo adherence and constraints had no significant differences due to gender (Table 1). The findings in this study corroborate those of Weil *et al.* [26] that beliefs about egg products did not differ for men and women; Koch *et al.* [27] the beliefs around femininity or masculinity contributed to gendered food selection; Sugano and Matsuoka [28] women are subjected to prohibitions based on fertility, pregnancy, or quality of breast milk, and Ekwochi *et al.* [29] that the differences in dietary intake were identified across occupational groups and varied by gender. Overall, several communities have various taboos or restrictions against the consumption of different types of foods due to perceptions of mental health, delivery risks and other health conditions [30]. Local knowledge, perceptions and practices associated with eggs through an available and culturally acceptable food source determined the introduction of eggs into the diet [31]. Dietary patterns influence food intake, such that younger age, males with higher educational status, and socioeconomic conditions are associated with meat and egg-based patterns [28].

To compare the influence of sociocultural factors of rate of egg consumption using terms "every day," "once a week," and "once in two weeks," the model for prediction of egg consumption on sociocultural factors was significant,  $\chi^2 = 78.6$ ;  $p < 0.001$  when testing the relationship between egg consumption and sociocultural factors (Table 2). Table 2 distinguishes between respondents who consumed eggs every day, once a week and once in two weeks despite the sociocultural factors affecting egg consumption. Pearson's  $\chi^2 = 259$ ,  $p = 0.04$  and Deviance,  $\chi^2 = 168$ ,  $p = 0.99$  statistics were not significant, implying the predicted responses were not



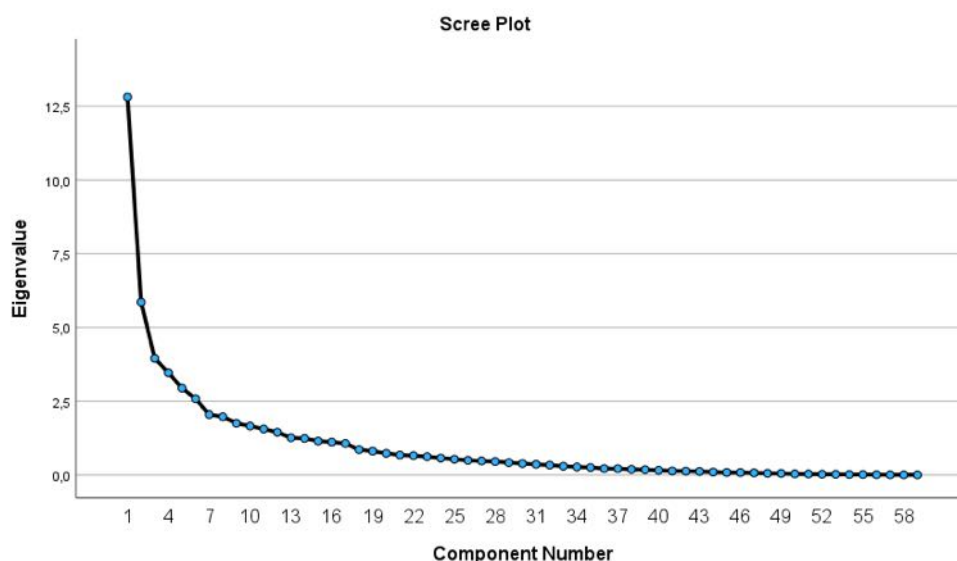
significantly different from that obtained from the households. Therefore, the model is a good fit and can be used to predict the effect of egg consumption and sociocultural factors but with certainty and Cox and Snell (0.467), Nagelkerke (0.542), and McFadden (0.318) values, respectively. Age, number of children per household, income level, occupation, affordability of eggs, time of consuming egg, and knowledge of taboos were significantly different ( $p < 0.05$ ) (Table 3), thus confirming that the predictors were important factors in influencing taboos influencing egg consumption. In this study, once a week was the reference point for comparisons.

The multinomial logistic regression model was fitted, to identify factors influencing the frequency of egg consumption and the results are shown in Table 3. Three logit models were fitted, the first model compared egg consumption every day with the reference group (once in a week). From Table 3, for everyday consumption, the factors, at 5% were age, number of children, income level, egg affordability, person who purchases egg, time of egg consumption, knowledge of nutritive values of eggs, knowledge of taboos, and source of purchase. The unequal distribution of health outcomes is influenced by economic, cultural and social resources, taste, convenience, price, habits, practical skills, and cultural or environmental factors prompting an individual's food choice. Nutrition knowledge is another important factor influencing food choice, though the increase in nutrition knowledge alone cannot lead to a high probability of change in dietary behaviours [29]. The determinants of once-a-week consumption at 10% are income level, source of purchase, knowledge of taboo, and the person who purchases, and cooks the egg. There exists a significant difference in attitude among dietary groups, that is, omnivores, pescatarians and vegetarians [30]. Lombardo *et al.* [31] reported a significant difference in food taboo practices and types of foods on which taboos were relevant between rural and urban areas. Gender differences exist in taste and food habits related to eggs [32]. Similarly, more women than men experienced greater moral emotions and held fewer justifying beliefs for the consumption of animal products [30].

The determinants of once-in-two weeks: income level, occupation, affordability and time of egg consumption were all significant at  $p < 0.05$ . The findings of this study agree with other findings that state cultural practices and beliefs are important factors that influence women's dietary choices during pregnancy [33]. The cultural values and food taboos exempted mothers from eating meat in Cameroun [34], and that generally, misconceptions and food taboos exist due to communities' beliefs [35]. Specific nutrition knowledge improved the implementation of healthy dietary practices among women [36]. In low-middle-income countries, the barriers to egg consumption are unaffordability and unavailability, cultural beliefs, and social taboos [37]. Food taboos

limit egg consumption because of culturally derived norms [38]. Improved maternal nutrition practices and dietary diversities among women are attributed to improved knowledge, and perceptions of social norms [39]. Martinez-Lacoba *et al.* [40] found gender as the social determinant of differences in food group consumption.

The results of the Principal Component Analysis (PCA) of knowledge, practice, belief and adherence to taboos on egg consumption are shown in Table 4, which shows that 7 factors were extracted using the Kaiser criterion (1960), Eigenvalues and factor loadings  $\geq \pm 0.30$  were used to select the underlying types and the number of components explaining the data, and the measure of explained variance. Similarly, a factor loading significantly contributes to the derived component of the study if it was  $> 0.30$ ; thus, all the items explaining each derived component on the scale are shown appropriately on the PCA figure. The variables with factor loadings of  $\pm 0.346$  and above at 10% overlapping variance were used in identifying the factors and significance at the 1% level of probability, thus, excluding variables with lower factor loadings [25]. The commonalities show the relationship between each variable and all other variables and the association between variables and reflect the squared multiple correlations between each item and all other items. "Egg consumption during pregnancy leads to a mute child" (0.283) is the least explained by the analysis. According to Figure 1, the extracted components for knowledge, practice, belief, and adherence to taboos on egg consumption are described as Factor 1 (taboo knowledge), Factor 2 (taboo consequences), Factor 3 (taboo practice), Factor 4 (taboo adherence), Factor 5 (taboo belief), Factor 6 (taboo negligence), and Factor 7 (taboo implications), and accounted for 21.7, 9.9, 6.7, 5.9, 5.0, 4.4, and 3.5% of the variance, respectively, with a cumulative 57.0% variance (Figure 2). The Principal Component Analysis uses advanced statistical procedures to identify a number of separate constructs within the data that best explain the observed correlations.



**Figure 2: Scree plot of extracted components**

These results affirm Bartlett's Test of Sphericity with a value of  $X^2 = 3573$   $p = 0.00$ , and Kaiser-Meyer-Olkin Measure of Sampling Adequacy of 0.358. The influence of the variables in the extracted components was measured by the weights of their factor loadings. Also, the items exhibiting the highest loadings provide guidance in identifying the underlying construct associated with a particular component. The prominent items within the knowledge factor are taboo-known, taboo-belief, taboo-adherence, taboo-practice, eggs cause: rashes, boils, eczema, prolonged period flow, wounds, ear problems, shortened period flow, hair falling, disabled child, nail loss, behave like chicken during delivery, appetite for sex, and search for sex everywhere. The findings from this study, correlate with the results of other researchers as indicated that age- and gender-differentiated taboos influencing dynamic and complex processes of knowledge sharing and food practices as depictions of local knowledge [33]; Lombardo *et al.* [31] stated that the reasons associated with pregnancy outcomes, led to avoidance of foods and Kase *et al.* [11] found that most women adhered to cultural food taboos and practices.

For the consequences factor, the items that were identified include reduced breastfeeding duration, loss of finger nails (practice), a pregnant woman should not eat eggs (knowledge), increased allergies (belief), increased blood volume (practice), bluish discoloration in the baby (practice), and leads to bald babies (practice). These are undesirable outcomes used in reinforcing the consequences of not following the taboo practices in relation to the consumption of eggs. These findings agree with previous results such as taboos restrict the diversity of foods consumed [35], taboos and cultural beliefs increase nutrition vulnerability because of decreased intake of nutrient-rich foods [34] and food taboos are used to maintain

identity, and punishments for violation of food taboos vary across food items and communities [28].

The practice factor composed of items such as egg consumption leads to the fear of early puberty for the child (adhere), susceptibility to ear problems (practice), susceptibility to rashes (belief), eggs improve brain development and functioning, fear of early maturity (adhere), constraints to egg consumption, children should not eat eggs (practice), and eggs make girl child promiscuous (know).

The adherence factor included prolonged monthly period flows (adhere), reduced breastfeeding duration (know), eggs are traditionally a taboo for newly wedded wife (adhere), fear of early puberty for the child (practice), prolonged monthly period flows (practice), baby having problems with the umbilical cord (adhere) and increase sexual desire in girls (practice). The adherence to food taboos is influenced by cultural dictates, individual characteristics, and societal context [33]. The results from this study concur with findings from a previous study which indicates that the prevalence of food taboos is high during pregnancy and thus influences the amount, frequency, and quality of nutrients that mothers and children consume [34]. Societal pressure and social dimensions' influence adherence to taboos that seem to be losing relevance as older women impose on younger women and adherence to some taboos is linked to anxiety of reprimand and rejection [35].

The items in the belief component consist of eggs causing pregnant woman to have much appetite for sex (practice, belief, and adherence) and pregnant woman should not consume eggs (belief). While the component of negligence consists of egg remain a food product of high nutritional quality for adults, and consumption during pregnancy leading to the child being mute and the implication factor is made up of eggs help long term memory. The findings in this section agree with other authors that food practices are shaped by local cultural taboos and beliefs [30] and ethnic cultural beliefs and taboos prohibit the consumption of certain foods [31].

Table 5 shows the results of the *Probit* regression analysis of the determinants of knowledge, practice, belief, and adherence to taboos on egg consumption. All the models are well fitted with Chi-square values of  $9.86 \times 10^5$  (knowledge), 464 (adhere), 560 (practice),  $784 \times 10^5$  (belief),  $6.62 \times 10^5$  (constraints to eggs consumption) at  $p < 0.001$ . In Table 5, for knowledge of taboos the determinants are gender, employment, occupation, source of information, chronic sickness, price information, affordability, who purchases eggs, how often eggs are bought, use for sacrifices, age, education, constraints to eggs consumption, taboo-belief, taboo-practice, and taboo-adherence. Significant variables associated with adherence to taboos for egg consumption are gender, employment, source of information,

chicken ownership, egg production, source of purchase, price information, affordability, who purchases eggs, how often eggs are bought, favorite part, when are eggs eaten, use for sacrifices, age, income level, taboo belief, taboo practice and taboo knowledge.

The factors influencing the practice of taboos associated with egg consumption are marital status, employment, occupation, egg production, consumption frequency, source of purchase, price information, who purchases eggs, how often eggs are bought, favourite part, when are eggs eaten, use for sacrifices, education, income level, taboo-belief, taboo-adhere, taboo-know. The determinants of upholding beliefs for taboos for egg consumption are gender, marital status, employment, occupation, source of information, chronic sickness, egg production, consumption frequency, source of purchase, price information, affordability, who purchases eggs, how often eggs are bought, when eggs are eaten, age, taboo-practice, taboo-adhere and taboo-know. The determinants of constraints to egg consumption are gender, marital status, employment, occupation, source of information, chronic sickness, chicken ownership, egg production, consumption frequency, source of purchase, price information, availability, who purchases eggs, how often eggs are bought, favourite part of egg, when eggs are eaten, use for sacrifices, education, income level, taboo-belief, taboo-practice, taboo-adhere and taboo-know.

Several studies established that femininity and masculinity beliefs contribute to gendered food selection, even though women are subjected to varied prohibitions about fertility, pregnancy, or quality of breast milk [35]; occupational groups are varied by differences in dietary intake by gender [27] and the perceptions of mental health, delivery risks, and other health conditions attributed to various taboos or restrictions against the consumption of different types of foods [30]. Educational status, socioeconomic conditions, and gender influence dietary patterns and food intake [29], the higher the nutrition knowledge the better the dietary behavior [40] and Lombardo *et al.* [31] found that gender variation existed along taste, food habits, and moral emotions [39]. Dietary choices are influenced by cultural practices and beliefs [33], cultural values and food taboos [34], misconceptions and food taboos [35], nutrition education [36] unaffordability and unavailability [37], culturally derived norms [38], gender [40], age and gender-differentiated taboos [29], pregnancy outcome, labor, and undesirable body form [27], cultural dictates, individual characteristics, and societal context [35-39], therefore, the results of the current study are in line with findings from aforementioned studies.



## CONCLUSION, AND RECOMMENDATIONS FOR DEVELOPMENT

The analysis of determinants of knowledge, practice, belief and adherence to taboos on egg consumption in KZN, a province in South Africa having the lowest egg consumption, was done through a descriptive and quantitative research design covering 125 households. Results showed that many taboos associated with egg consumption exist particularly about girls and women and that gender, employment, sources of information, egg production, price information, who purchases eggs and frequency of egg purchase, when the egg is eaten, use of egg for sacrifices, taboo-belief, taboo-practice, taboo-adhere and taboo-know were all significant determinants of knowledge, adherence, practice, belief, and constraints. The main components of sociocultural reasons extracted by PCA were knowledge of taboos, consequences of taboos, practice of taboos, adherence to taboos, belief of taboos, negligence of taboos, and implications of taboos. The study concludes that cultural reasons have a greater influence on egg consumption than socioeconomic, economic and availability factors. From the findings of this study, it is recommended that interventions such as educational programs that encourage egg consumption should be designed and implemented. These programs should incorporate culturally relevant approaches that people in Kwazulu-Natal can resonate with to enhance behavioural changes towards egg consumption. The concept of nutrition-sensitive agriculture can be introduced to help households to rear chicken for egg production to leverage on increased egg consumption. Furthermore, it is recommended that future research should delve deeper into the history of the specific cultural norms, beliefs and practices surrounding egg consumption within the region.

## ACKNOWLEDGEMENTS

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**Table 1: Gender differences in knowledge, practice, belief and adherence to taboos on egg consumption**

Sociocultural variables	Gender	N	Mean	Std. Deviation	Std. Error Mean	t	Df	p
Age	Male	55	41	11	2	1.93	120	0.05
	Female	70	37	12	2			
Number of Children	Male	55	2.00	2.41	0.32	1.0	98	0.31
	Female	70	1.00	1.84	0.22			
Knowledge of taboos	Male	55	45.81	4.98	0.67	-0.77	121	0.44
	Female	70	46.55	5.68	0.67			
Taboo known	Male	55	77.41	12.33	1.66	1.04	117	0.30
	Female	70	75.07	12.70	1.51			
Taboo belief	Male	55	69.47	10.56	1.42	0.66	116	0.50
	Female	70	68.20	10.66	1.27			
Taboo practice	Male	55	61.25	8.99	1.21	1.12	114	0.26
	Female	70	59.45	8.79	1.05			
Taboo adherence	Male	55	59.36	8.84	1.192	0.76	115	0.44
	Female	70	58.14	8.78	1.04			
Constraints to eggs consumption	Male	55	11.74	0.90	0.12	0.61	122	0.26
	Female	70	11.62	1.20	0.14			

**Table 2: Likelihood ratio test of the independent predictors of egg consumption**

Likelihood Ratio Tests			Model Fitting Criteria			Likelihood Ratio Tests		
Effect	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.		
Intercept	234	308	182	13.7	2	0.001		
Age	230.45	303.99	178.45	10.07	2	0.006		
Number of Children	228.04	301.58	176.04	7.65	2	0.022		
Income level	237.91	311.44	185.91	17.53	2	0.001		
Occupation	227.48	301.02	175.48	7.10	2	0.029		
Price information on egg	223.92	297.46	171.92	3.55	2	0.17		
Egg affordability	230.36	303.90	178.36	9.98	2	0.007		
Who cooks eggs	223.20	296.74	171.20	2.82	2	0.24		
Who buys eggs	224.74	298.28	172.75	4.36	2	0.11		
Consumption-during-outbreak	224.62	298.16	172.62	4.24	2	0.12		
When do you eat eggs	225.77	299.31	173.77	5.39	2	0.06		
Knowledge	223.95	297.49	171.96	3.57	2	0.17		
Known- taboo	226.57	300.11	174.57	6.19	2	0.05		
Source of purchase	224.32	297.86	172.33	3.95	2	0.14		
Intercept only	250.97	256.63	246.97					
Final	224.38	303.57	168.38					
Pearson Chi-Square/ p	259.27/0.04							
Deviance Chi-Square/ p	168.38/0.99							
Df	222							
-2 Log Likelihood Intercept Only	247							
-2 Log Likelihood final	168							
Chi-Square				78.6				
Df				26				
Sig.				0.001				
Observation no	125							
Cox and Snell	0.47							
Nagelkerke	0.54							
McFadden	0.32							

**Table 3: Factors influencing the frequency of eggs consumption**

Frequency of egg consumption	Every day			Once a week			Once in two weeks		
	B	Wald	Exp(B) RRR	B	Wald	Exp(B) RRR	B	Wald	Exp(B) RRR
Intercept	7.24 (4.67)	2.42		-10.62 (3.24)***	10.77		10.73 (3.21)***	11.19	
Age	0.106 (0.04)**	8.12	1.11	-0.018 (0.023)	0.43	0.98	0.02 (0.03)	0.57	1.02
No of children	-0.674 (0.28)**	5.49	0.51	0.28 (0.18)	2.34	1.32	-0.27 (0.19)	2.18	0.76
Income level	1.123 (0.44)*	6.71	3.09	1.02 (0.58)*	3.08	2.76	-0.96 (0.57)*	2.82	0.38
Occupation	-0.43 (0.27)	2.62	0.65	0.42 (0.18)	5.63	1.51	-0.43 (0.18)**	5.88	0.65
Price info on eggs	0.47 (0.45)	1.11	1,599	0.37 (0.31)	1.46	1.44	-0.35 (0.31)	1.29	0.71
Egg affordability	-1.89 (0.73)**	6.80	0.15	0.46 (0.40)	1.30	1.58	-0.93 (0.46)**	4,03	0.39
Who cooks eggs	-0.34 (0.29)	1.37	0.71	0.34 (0.20)*	2.83	1.41	-0.31 (0.20)	2.32	0.74
Who buys eggs	0.59 (0.31)*	3.58	1.81	-0.03 (0.18)*	0.03	0.97	0.07 (0.19)	0.12	1.07
Consumption during outbreak	-0.94 (0.70)	1.79	0.39	0.29 (0.28)	1.12	1.35	-0.40 (0.28)	2.10	0.67
When eggs are eaten	0.73 (0.36)**	4.20	2.07	-0.34 (0.24)	2.02	0.71	0.40 (0.25)*	2.69	1.50
Knowledge	-0.12 (0.09)	1.92	0.88	0.08 (0.05)*	2.97	1.09	-0.07 (0.05)	2.11	0.93
Taboo- know	-0.08 (0.04)**	4.43	0.92	0.03 (0.02)	2.49	1.03	-0.03 (0.02)	2.53	0.97
Source of purchase	1.82 (0.94)*	3.72	6.16	-0.02 (0.62)*	0.01	0.98	0.13 (0.64)	0.04	1.14
No observation	125								
Cox and Snell	0.47								
Nagelkerke	0.54								
McFadden	0.32								

**Table 4: Principal Component Matrix of sociocultural factors of taboos on egg consumption**

Items	Knowledge	Conseq uences	Practices	Adherence	Belief	Neglig ence	Implic ations	Commona lities
Taboo- know	0.92							0.92
Taboo- belief	0.91							0.86
Taboo- adhere	0.81							0.79
Eggs cause rash (know*)	0.79							0.83
Taboo- practice	0.76							0.69
Eggs cause boils (know)	0.73							0.65
Egg cause eczema (belief)	0.72							0.66
Prolong period flow (know)	0.72							0.63
Egg cause eczema (know)	0.72							0.49
Eggs cause wounds (know)	0.71							0.60
Eggs cause ear problems (know)	0.71							0.57
Shorten period flow (know)	0.71							0.62
Cause hair to fall (know)	0.69							0.73
Pregnant woman having disabled child	0.65							0.63
Lead to losing nails (know)	0.62							0.74
Women behave like chickens during delivery (belief)	0.60							0.60
Cause women to have appetite for sex (know)	0.57							0.61
Make pregnant women search sex everywhere (know)	0.54							0.71
Reduces breastfeeding duration (practice)		0.61						0.60
Lead to losing nails (practice)		0.61						0.46
Pregnant woman should not eat eggs (know)		-0.58						0.39
Create allergies (belief)		0.57						0.61
Increases blood (practice)		0.54						0.48
Create allergies (practice)		0.53						0.75
Cause bluish discoloration in the baby (practice)		0.53						0.46
Knowledge		-0.53						0.51
Leads to bald-headed babies (practice)		0.44						0.31
Increases blood (adhere)		0.43						0.37
Eggs help milk production by lactating mothers		-0.41						0.60
Lead to the fear of early puberty for the child (adhere)			0.58					0.51
Lead to susceptibility to ear problems (practice)			-0.56					0.67



Lead to susceptibility to rashes (belief)	-0.54		0.50
Eggs improve brain development and functioning	-0.54		0.57
Leads to the fear of early maturity for the child (adhere)	0.50		0.64
Constraints to egg consumption	-0.50		0.32
Children should not eat eggs (practice)	0.45		0.41
Eggs make girl child promiscuous (know)	0.40		0.35
Lead to prolonged monthly period flows (adhere)		0.53	0.38
Reduce breastfeeding duration (know)		-0.50	0.46
Traditionally a taboo for just married wife (adhere)		0.49	0.58
Lead to fear of early puberty for the child (practice)		0.48	0.51
Lead to prolonged monthly period flows (practice)		0.42	0.78
Baby having problems with the umbilical cord (adhere)		0.42	0.34
Increase sexual desire in girls (practice)		-0.41	0.59
Pregnant woman to have much appetite for sex (practice)		0.66	0.77
Pregnant woman to have much appetite for sex (belief)		0.65	0.58
Pregnant woman to have much appetite for sex (adhere)		0.64	0.52
Pregnant woman should not consume eggs (belief)		0.54	0.38
A food product of high nutritional quality for adults		0.59	0.58
Consumption during pregnancy leads mute child		-0.59	0.28
Eggs help long term memory			0.46 0.42
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.35		
Chi-Square	3573		
Df	1711		
Sig.	0.001		

\*Know is theoretical and practical understanding, Practice is the actual application  
Belief is the acceptance of the existence of taboos, Adherence - sticking to and observance



**Table 5: *Probit* regression analysis of the determinants of knowledge, practice, belief, and adherence to taboos on egg consumption**

Parameter	Knowledge	Adhere	Practice	Belief	Constraints
Gender	-1.83 (0.28)***	0.12 (0.04)**	0.012 (0.042 )	-0.575 (0.305)*	-1.744 (0.225)***
Marital status	-0.14 (0.14)	0.032 (0.02)	0.096 (0.027)***	0.314 (0.163 )*	1.369 (0.127)***
Employment	0.55 (0.33) *	0.126 (0.051)**	0.211 (0.051 )***	0.525 (0.263 )**	-1.174 (0.290)***
Occupation	-0.40 (0.08 ) ***	0.009 (0.021)	0.036 (0.021 )*	-0.327 (0.105 )**	-0.904 (0.071)***
Source of info	-0.53(0.11) ***	-0.034 (0.015) **	0.007 (0.016 )	-0.292 (0.112 )**	-0.879 (0.111)***
Chronic sickness	-0.18(0.11) *	-0.014 (0.029)	-,042 (,029 )	-0.373 (0.127 )**	0.960 (0.112 )***
Chicken ownership	-3.42(0.52)	-0.156 (0.049)***	-0.075 (0.049 )	0.522 (0.427 )	-1.290 (0.321 )***
Egg production	-0.32(0.44)	0.356 (0.050) ***	0.314 (0.048 )***	2.883 (0.370)***	0.997 (0.329 )**
Consumption frequency	0.48(0.30 )	-0.028 (0.037 )	-0.071 (0.037 )*	-1.870 (0.288 )***	-1.668 (0.197 )***
Source of purchase	-0.43(0.28)	-0.244 (0.062 )***	-0.410 (0.062 )***	-0.551 (0.325 )*	2.771 (0.192 )***
Price information	-0.30(0.13) **	0.111 (0.024 )***	0.101 (0.024 )***	0.321 (0.148 )**	-1.945 (0.139 )***
Availability of eggs	-0.03(0.22)	-0.036 (0.034 )	-0.035 (0.034 )	-0.171 (0.195 )	0.576 (0.146 )***
Affordability of eggs	2.65(0.26) ***	-0.171 (0.048)***	0.032 (0.049 )	-1.134 (0.275 )***	0.092 (0.165 )
Who purchases eggs	0.69(0.12) ***	0.033 (0.017 )**	0.030 (0.017 )*	-,559 (,111 )***	-1.097 (0.069 )***
How often eggs are bought	0.56(0.21) ***	-0.102 (0.025 )***	-0.114 (0.025)***	-0.716 (0.217 )***	-1.081 (0.166 )***
Favorite part of eggs	0.18(0.20)	-0.122 (0.024 )***	-0.192 (0.025)***	-0.187 (0.159 )	-1.078(0.145 )***
When eggs are eaten	0.06(0.18)	-0.032 (0.019 )*	-0.046 (0.019)**	-0.381 (0.169 )**	1.555(0.095 )***
Use eggs for sacrifices	-0.58(0.33) *	0.203 (0.036 )***	0.192 (0.036)***	0.075 (0.339 )	2.420 (0.193 )***
Age	-0.04(0.011) ***	0.004 (0.002 )*	-0.003 (0.002)	-0.069 (0.011)***	0.012 (0.010 )
Education	-0.49(0.19) **	0.017 (0.030 )	0.079 (0.030)**	-0.155 (0.215 )	0.510 (0.140 )***
Income level	0.08(0.30)	0.091(0.033)*	0.066 (0.033 )**	0.170 (0.270 )	-1.352 (0.167 )***
Constraints to egg consumption	0.86(0.32) ***	0.025 (0.040 )	0.028 (0.041 )	-0.460 (0.338 )	
Taboo-belief	7.73(0.51) ***	-0.291 (0.064)***	0.126 (0.060 )**		0.641 (0.358 )*
Taboo-practice	-0.24(0.04) ***	0.028 (0.003)***		0.200 (0.034 )***	0.176 (0.027 )***
Taboo-adhere	0.19(0.04) ***		0.026 (0.003 )***	-0.110 (0.032 )***	-0.101 (0.028 )***
Taboo-know		0.252 (0.069 )***	-0.180 (0.073 )**	7.361 (0.427 )***	1.422 (0.324 )***
Intercept	-4.11(2.38) *	-1.69 (0.331)***	-1.539 (0.308)***	-4.247 (2.331)	-4.641 (1.471)**
Chi-Square	9.86 x 10 <sup>5</sup>	463.64	559.57	784 x 10 <sup>5</sup>	6.62 x 10 <sup>5</sup>
Df	99	99	99	99	99
Sig.	0.001	0.001	0.001	0.001	0.001

\*\*\* significance level at 1%, \*\* significance level at 5%, \* significance level at 10%

## REFERENCES

1. **United Nations: Transforming Our World by 2030.** A new agenda for global action zero. Draft of the outcome document for the UN Summit to adopt the post-2015 development agenda. New York, NY, USA: United Nations. 2015.
2. **Myers M and CHS Ruxton** Eggs: Healthy or Risky? A Review of Evidence from High Quality Studies on Hen's Eggs. *Nutrients*. 2023; **15(12)**:2657.  
<https://doi.org/10.3390/nu15122657>
3. **Nguyen PH, Kim SS, Sanghvi T, Mahmud Z, Tran LM, Shabnam S and P Menon** Integrating nutrition interventions into an existing maternal, neonatal, and child health program increased maternal dietary diversity, micronutrient intake, and exclusive breastfeeding practices in Bangladesh: results of a cluster-randomized program evaluation. *Journal of Nutrition*. 2017; **147(12)**: 2326-2337.
4. **Landim A S, de Menezes Souza J, Dos Santos LB, de Freitas Lins-Neto EM, da Silva DT and FS Ferreira** Food taboos and animal conservation: a systematic review on how cultural expressions influence interaction with wildlife species. *Journal of Ethnobiology and Ethnomedicine*, 2023; **19(1)**: 31.
5. **Evers EC, Waters WF, Gallegos-Riofrío CA, Lutter CK, Stewart CP and LL Iannotti** A sex-and gender-based analysis of factors associated with linear growth in infants in Ecuadorian Andes. *Scientific Reports*. 2022; **12(1)**: 3292.
6. **Lesnierowski G and J Stangierski** What's new in chicken egg research and technology for human health promotion? - A review. *Trends in Food Science and Technology*. 2018; **71**: 46–51.
7. **SAPA.** South African Poultry Association 2021 Industry Profile. 2021.  
<https://www.sapoultry.co.za/wp-content/uploads/2023/01/2021-Industry-Profile.pdf>
8. **Tiwari C, Balehegn M, Adesogan AT and SL McKune** Benefits, perceived and actual risks and barriers to egg consumption in low-and middle-income countries. 2023.

9. **Guyonnet V** World Egg Production and Marketing Trends. *Handbook of Egg Science and Technology*. 2023; 9-26.
10. **Asi LN, Teri DT and VB Meyer-Rochow** Influence of food taboos on nutritional patterns in rural communities in Cameroon. *International Review of Social Research*. 2018; **8(1)**: 2-6.
11. **Kase BE, Frongillo EA, Isanovic S, Gonzalez W, Wodajo HY and EW Djimeu** Determinants of egg consumption by infants and young children in Ethiopia. *Public Health Nutrition*. 2022; **25(11)**: 3121-3130.
12. **Abive-Bortsi M, Baidoo ST and S Amiteye** Assessment of Consumers' Perception of Chicken Eggs Consumption and Associated Health Implications in the Volta Region of Ghana. *Nutrition and Metabolic Insights*. 2022; **15**, 11786388221118872.
13. **Ramulondi M, de Wet H and NR Ntuli** Traditional food taboos and practices during pregnancy, postpartum recovery, and infant care of Zulu women in northern KwaZulu-Natal. *Journal of Ethnobiology and Ethnomedicine*. 2021; **17(1)**: 1-19.
14. **Teweldemedhin LG, Amanuel HG, Berhe SA, Gebreyohans G, Tsige Z and E Habte** Effect of nutrition education by health professionals on pregnancy-specific nutrition knowledge and healthy dietary practice among pregnant women in Asmara, Eritrea: a quasi-experimental study. *BMJ nutrition, prevention & health*. 2021; **4(1)**: 181.
15. **Janssens M and G Bergam** MSF and development: The end of a taboo? *Médecins Sans Frontières In-house Newsletter*. 2011.
16. **Nath J** Gendered fare? A qualitative investigation of alternative food and masculinities. *Journal of Sociology*. 2011; **47(3)**: 261-278.
17. **Fisher D** The International Federation of Red Cross and Red Crescent Societies and the IDRL Guidelines. *Commonwealth Law Bulletin*. 2009; **35(4)**: 743-754.
18. **World Health Organization**. *Diet, nutrition, and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation* World Health Organization. 2003; **Vol. 916**.

19. **Horne R, Chapman SC, Parham R, Freemantle N, Forbes A and V Cooper** Understanding patients' adherence-related beliefs about medicines prescribed for long-term conditions: a meta-analytic review of the Necessity-Concerns Framework. *PLoSOne*. 2013; **8(12)**.  
<https://doi.org/10.1371/journal.pone.0080633>
20. **Mncube LN, Ojo TO and YS Nyam** Addressing food insecurity in Richmond area of KwaZulu-Natal, South Africa: The role of cash transfers. *Scientific African*, 2023; **19**, e01485.
21. **Egele VS and R Stark** Specific health beliefs mediate sex differences in food choice. *Frontiers in Nutrition*. 2023; **10**, 1159809.
22. **Nagler JS** An alternative estimator to logit and probit. *American Journal of Political Science*. 1994; 230-255.
23. **Gujarati D** Basic Econometrics, 4th edn, McGraw-Hill, Maidenhead 2004.
24. **Rondoni A, Asiole D and E Millan** Consumer behavior, perceptions, and preferences towards eggs: A review of the literature and discussion of industry implications. *Trends in Food Science & Technology*. 2020; **106**: 391-401.
25. **Koutsoyiannis A** Theory of Econometrics. 2nd Edition. New York: McGraw-Hill Publishers. 1972.
26. **Weil K, Coulibaly I, Fuelbert H, Herrmann A, Millogo RM and I Danquah** Dietary patterns and their socioeconomic factors of adherence among adults in urban Burkina Faso: a cross-sectional study. *Journal of Health, Population and Nutrition*. 2023; **42(1)**: 107.
27. **Koch F, Hoffmann I and E Claupein** Types of nutrition knowledge, their socio-demographic determinants and their association with food consumption: results of the NEMONIT study. *Frontiers in nutrition*. 2021; **8**: 630014.
28. **Sugano M and R Matsuoka** Nutritional Viewpoints on Eggs and Cholesterol. *Foods*. 2021; **10(3)**: 494.  
<https://doi.org/10.3390/foods10030494>



29. **Ekwochi U, Osuorah CD, Ndu IK, Ifediora C, Asinobi IN and CB Eke** Food taboos and myths in South Eastern Nigeria: The belief and practice of mothers in the region. *Journal of ethnobiology and ethnomedicine*. 2016; **12(1)**: 1-6.
30. **McNamara K and E Wood** Food taboos, health beliefs, and gender: understanding household food choice and nutrition in rural Tajikistan. *Journal of Health, Population and Nutrition*. 2019; **38**: 1-14.
31. **Lombardo M, Aulisa G, Padua E, Annino G, Iellamo F, Pratesi A, Caprio M and A Bellia** Gender differences in taste and foods habits. *Nutrition & Food Science*. 2019; **50(1)**: 229-239.
32. **Iradukunda F** Food taboos during pregnancy. *Health care for women international*. 2020; **41(2)**: 159-168.
33. **Klink U, Mata J, Frank R and B Schüz** Socioeconomic differences in animal food consumption: Education rather than income makes a difference. *Frontiers in Nutrition*, 2022; **9**: 993379.
34. **Tsegaye D, Tamiru D and T Belachew** Food-related taboos, and misconceptions during pregnancy among rural communities of Illu Aba Bor zone, Southwest Ethiopia. A community-based qualitative cross-sectional study. *BMC pregnancy and childbirth*. 2021; **21(1)**: 1-9.
35. **Waters WF, Gallegos CA, Karp C, Lutter C, Stewart C and L Iannotti** Cracking the egg potential: Traditional knowledge, attitudes, and practices in a food-based nutrition intervention in highland Ecuador. *Food and nutrition bulletin*. 2018; **39(2)**: 206-218.
36. **Ioannidou M, Lesk V, Stewart-Knox B and KB Francis** Moral emotions and justifying beliefs about meat, fish, dairy and egg consumption: A comparative study of dietary groups. *Appetite*. 2023; **186**: 106544.
37. **Sholeye OO, Badejo CA and AJ Olubukunola** Dietary habit of pregnant women in Ogun-East senatorial zone, Ogun state, Nigeria: A comparative study. *International Journal of Nutrition and Metabolism*. 2014; **4**: 42-49.
38. **Abdulai A, Abdul-Nasir I, Bashiratu Y and A Faith** Dietary habit, nutritional status and related factors among adolescents in Tamale Metropolis, Ghana. *African Journal of Food Science*. 2023; **17(1)**: 10-23.

39. **Mugyia ASN, Tanya ANK, Njotang PN and PK Ndombo** Knowledge and attitudes of pregnant mothers towards maternal dietary practices during pregnancy at the Etoug-Ebe Baptist Hospital Yaounde. *Health sciences and disease*. 2016; **17(2)**.
40. **Martinez-Lacoba R, Pardo-Garcia I, Amo-Saus E and F Escribano-Sotos** Social determinants of food group consumption based on Mediterranean diet pyramid: A cross-sectional study of university students. *PLoS One*. 2020; **15(1)**: e0227620.