

Factors Influencing Consumption of Honey in Mwanza City, Tanzania

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Abstract

Despite the proliferating consumption of honey in Mwanza City, scant information is available on the quantity consumed and the factors influencing consumption. This study quantifies honey consumption and the major factors that influence the consumption at household level. A total of 120 households from high-income, medium-income and low-income residential categories were randomly selected and interviewed. Both quantitative and qualitative data related to honey consumption were collected. Descriptive statistics and binary logistic regression model were employed to analyze data. The study revealed that present quantity of honey consumption was about 423,900 Kg while the per capita consumption was about 0.6 Kg. Binary logistic regression model revealed a positive association between consumption and taste of honey (14.2). Other variables such as natural healing characteristic of honey (5.7) and freeness of cholesterol and dangerous sugar contents (1.6) also had a positive correlation. On the other hands, consumption of honey showed a negative association with the education level of head of the household (-3.5). The adjustment in one of these variables can significantly influence the probability of household choice for honey and consumption popularity in the study area. Although honey has important medicinal values but quality is sensitive and important to majority of the consumers.

Keywords: Honey; Household; Consumption; Motivation; Quantity

Introduction

The association of human being and honeybees has existed since time immemorial [1] and honey remains an important product for human wellbeing. It is widely known and

consumed as a food and medicine in various places all over the world [2]. It has also non-consumptive uses. For example, in some societies, honey has been and is still used as sign or charm for love or sweetness of any kind among people of different sex. However, in recent years, human consumption of honey and honey-products has become more popular than ever among the people in different countries [3], particularly in urban areas. This consumption shift provides important benefits to honey producing people's livelihoods as it brings domestic market stability of the product and it has increasingly become one of the key diversifying livelihood activities for some rural households. However, it is worth noting that given the current changing environment and integration through travel and migration among people, the consumption behavior of the consumers for honey inevitably changes [4] and this has an implication for the livelihood of beekeepers, processors and development of beekeeping sub sector. As a result, in order to successfully market honey and other honey products, producers, processors and other entrepreneurs in honey industry in the country must have knowledge on the state of consumption and the behavior of the consumers. Moreover, designing appropriate production and marketing policies in beekeeping sector requires an understanding of the major factors that influences the consumption of bee's products at large. The objective of this study is therefore, to understand the nature of honey consumption in urban areas in Mwanza City, Tanzania.

We chose Mwanza City for the following two major reasons. First, empirical evidence from the field indicates that the consumption of honey per household in Mwanza City has been proliferating. However, little is known on the quantity and factors influencing the consumption at household level. Most of the information is imperative to beekeepers, honey processors and suppliers. In order to produce and market honey products that satisfy consumers' needs and for the sustainable development of beekeeping sector in the country it require a wider knowledge and proper information sharing system regarding consumers' behavior. Regardless of the changing environment, honey production, processing,

consumption and factors influencing its consumption have received little attention in the country to the best of our knowledge. Therefore, it is against this background that necessitates the present study to contribute to this existing knowledge gap. Secondly, following the realized potential of honey for economic development, the government of Tanzania and non-government organizations (NGOs) has devoted significant efforts to mobilize and provides support in development of beekeeping sector in the country in order to increase the production capacity of the country [5]. The initiatives undertaken by the government among others have included; establishment of four zonal demonstration farms, upgrade the beekeeping extension service to acquire modern technologies in the industry and scaled up beekeeping development projects to local communities in the country [6]. These efforts have resulted into increase of honey production where it is estimated to increase from 4,860 tons in year 2001 to 9,380 tons in year 2012. Similarly, it is estimated that about 90% of honey produced is consumed by domestic market and the rest exported for consumption by the external market [6]. Based on these facts honey consumption in Tanzania is dominated by domestic market where it is consumed in either raw state and in few occasions mainly in towns in a processed state. These changes have further attracted many people in various places, particularly in rural areas, to engage in beekeeping activity [5]. Hence, it is important to assess households' consumption of honey in urban centers to understand the potential demand of honey and to device sound policy interventions to increase honey production in the rural areas.

The study specifically aimed to determine and quantify the extent of honey consumption in Mwanza City and examine factors influencing the consumption of honey in the study area.

Methodology

Location and socio economic information of the study area

This study was conducted in Mwanza City located in Mwanza region, Northern Tanzania. Mwanza city is the second

largest city in the country after Dar es Salaam. Administratively it consists of two districts which are Nyamagana and Ilmela. It is located on the Southern shore of Lake Victoria between latitudes 1° 30' and 3° 0' South of Equator, and the altitude 1,134 m above sea level. It covers an area of about 1,324 km² of which 900 (68%) are covered by water while the remaining is land. According to Mmasa and Mlambiti [7] of the 424 Km² land areas, approximately 87 Km² is urbanized while the remaining areas consist of forested land, valleys, cultivated plains and undulating rocky hill areas. However, the city is growing fast, both in area and economic activity due to rural-urban migration and high birth rate.

According to the National Bureau of Statistics and the census of 2012, Mwanza City had a population of 706,453 in which 342,530 were male and 363,923 were female. The natural growth rate in the city is about 3% while the urban migration rate is about 8% per annum. The population density is about 134 people per square kilometer on average. The high population density and high urbanization rate was among the criteria used for selecting Mwanza city as these factors are often a precondition for high consumption of goods (e.g., honey) and services. Other criteria included were its proximity to honey producing areas with reliable infrastructures and market for various products.

Research design and sampling procedure

We used a household level cross-sectional survey data. Both purposive stratified and random sampling techniques were adapted to select the households. At first purposive sampling technique was used to select streets that households are situated, and residential livelihood status was the criteria used to stratify the streets. This is due to the fact that the consumption pattern of products including honey varies with the cost of residence [8]. Three residential categories were identified: high, medium and low. Five streets were selected from each category, making a total of 15 streets. At second stage eight households were randomly selected from each street resulting in a total of sample of 120 households (See **Table 1** for the sample residential areas).

Table 1 Distribution of households and their corresponding categories.

Residential category	Ward	Street	Number of households
Low-Income	Igogo	Bugando "A"	8
		Igogo	8
	Pamba	Igoma	8
		Bugarika	8
		Mabatini	8
Medium-Income	Kitangiri	Selemani	8
		Kitangiri	8

		Kona ya bwiru	8
	Kirumba	Kirumba	8
	Buhongwa	Buhongwa	8
High-Income	Nyakato	Buzuruga	8
		Mwananchi	8
		Mecco	8
	Mbugani	Uhuru	8
	Nyamagana	Capripoint	8
Total	9	15	120

Data collection and analysis

The data was collected using structured open-ended questionnaire through face-to-face interview. Among others, the main questions asked were: Does the household consume honey? What quantity of honey is purchased for consumption in a month? Why does household consume honey? The questions in the questionnaire were pre-tested to about 30 households in Morogoro Municipality in order to improve the questions accordingly before using them in the study area. Visual assessments were also used where household heads (respondents) were required to show to the interviewers the bottles or containers with honey which they use to enable (i) easy quantification and (ii) as a means of verification and validation of the information provided. Moreover, key informants interviews were conducted where two Beekeeping officers and five honey dealers in the study area were interviewed to provide technical information regarding honey marketing and consumption behavior of the consumers in their localities.

Data collected were checked for missing information, verified and for qualitative data the coding process was done in order to enable systematic analysis using SPSS (Statistical Package for Social Sciences) program. Mason and Jayne [9] technique was adapted in determining annual present quantity of honey by summing monthly values or quantity of honey consumed at household level. Descriptive statistics (mean, frequency table and percentage) were generated in order to summarize the results. We also modeled household level factors influencing the consumption of honey using Binary Logistic Regression Model (BLRM). For the purpose of this study, honey consumption was considered under the general framework of utility maximization where household choice for honey is based on the satisfaction attained upon consumption of the product. In such a situation households are faced with two choices which are "consume honey" or "do not consume honey". In that case, household decide to purchase honey for consumption among bundles in the market and the choice is driven by maximum household utility obtained by consuming honey subject to households' socio-

economic factors such as income and honey characteristics including quality.

Thus, the decisions to consume honey among consumption bundles signify the path that maximizes households' utility. Therefore, basing on this assumption the BLRM was then used to relate the decisions to consume honey, and the factors that influence the choice. The general BLRM which was specified as:

$$P(\text{HHC}_i) = \beta_0 + \beta_k X_{ik} + \varepsilon_i$$

Where:

$\text{HHC}_i = 1$ if a household consume honey

$\text{HHC}_i = 0$ if a household do not consume honey

The probability of the i th household to consume honey in this case, the binary variables was used to depict the probability of the households' engagement in honey consumption.

β_0 = The model intercept which shows the probability of the household to consume honey given no influencing factor.

β_k = The associated vector of coefficients that shows the marginal effect of a unit change of the independent variables on the probability of consuming honey.

X_{ik} = The vector of independent variable included in the models (**Table 2**).

ε_i = The error term

The hypothesis tested in this study tests were:

$$H_0: \beta_k = 0$$

There is no effect of the independent variables on the dependent variable. The regression coefficients of the independent variables are equal to zero.

$$H_1: \beta_1 \neq \beta_2 \neq \dots \neq \beta_{10} \neq 0$$

There is a positive or negative effect of the independent variables on dependent variable implying that the regression coefficients of the independent variables are not equal to zero.

Table 2 Description of variables used in the Binary Logistic Regression Model.

Variables	Description	Type	Values
Dependent variable			
HHC	Household honey consumption	Dummy	0=Not consume and 1=Consume
Independent variables			
SEX	Sex of household head	Dummy	0=Female, 1=Male
ELHH	Education of household head	Categorical	Number of years in school
AHH	Age of household head	Continuous	Number of years
FAVH	Frequent availability of honey	Dummy	0=No, 1=Yes
RPHO	Price of honey offered at market	Continuous	Numbers in TZS
TPH	Taste and preference on honey	Dummy	0=No, 1=Yes
RCH	Religious and cultural issues for honey	Dummy	0=No, 1=Yes
AGI	Awareness due to current government initiatives on beekeeping	Dummy	0=No, 1=Yes
NHC	Natural healing (medication) of honey	Dummy	0=No, 1=Yes
FCDS	Freeness of cholesterol and dangerous sugar contents	Dummy	0=No, 1=Yes

Results and Discussion

The consumption of honey

Frequency of purchase: Results shows that in the study area the purchasing frequencies of honey at households were once and twice in a month. The overall proportions of households purchasing honey once and twice per month were 94% and 6% respectively. Therefore, majority of households purchase honey at least once per months indicating a high consumption of such a product in the area. However, this purchasing habit is relevant to urban communities in many places where people purchase different consumable goods in bulks for household consumption. On the other hands, the proportion of households purchasing honey once per month for the low-income, medium-income and high-income groups were 98%, 95% and 90% respectively while those purchasing twice per month were 3%, 5% and 10%. The high-income people tend to purchase hence consume more honey than the low-income people (**Figure 1**). This trend implies that the consumption of honey among households tend to increase with increasing income which is also common in other normal goods. These findings are similar to Pocol [8] who revealed low and high honey consumption in low and high households' income classes respectively in Romania. Income therefore is an important factor for purchasing honey and hence consumption.

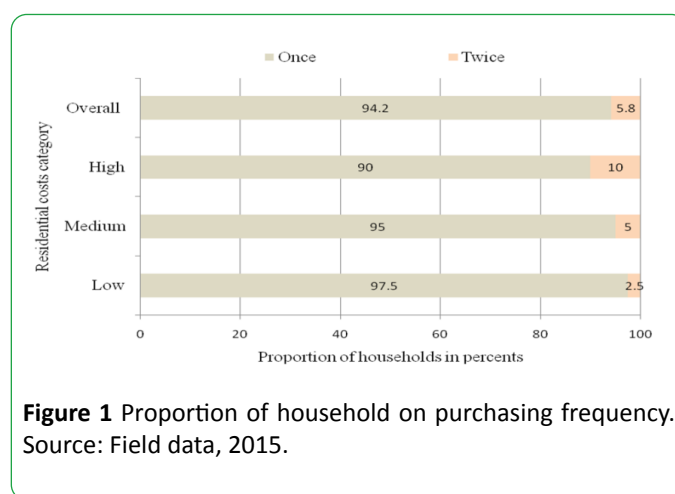


Figure 1 Proportion of household on purchasing frequency. Source: Field data, 2015.

Quantity of honey purchased at households: The minimum quantity of honey purchased per households per month ranged between 0.25 kg and 0.44 kg while the maximum ranged between 1 kg to 5 kg across household income categories (**Table 3**). In addition, the mean quantities of honey purchased were 0.51 kg, 0.70 kg, and 0.80 kg for low, medium and high-income residential categories respectively. The findings indicate that on average the households from low residential cost category purchase little quantity of honey compared to households from other categories indicating increased honey consumption with increasing income. According to Ismaiel et al., [10] in their study in Saudi Arabia, households with low income consume small quantity of honey compared to their high-income counterpart households. With low income, households will have low purchasing power hence

will tend to be selective in what they purchase and the quantity due to their budget constraints.

Table 3 Distribution of average quantity of honey (Kg) purchased per month. Source: Calculated based on the data collected from the field, 2015.

Residential cost category	Minimum	Maximum	Mean	Standard deviation
Low	0.25	1	0.51	0.16
Medium	0.25	2	0.7	0.31
High	0.44	5	0.8	0.72

Pocol [8] found that, poor people are to greater extent non-consumers and to lesser extent frequent consumers, while those who place themselves in the category of “medium to rich” are high frequency consumers. In such situation household from low-income residential categories may consider honey as a luxury food commodity or non-basic food and of which they may spend little or none on it. Consequently, this may be contributed by income situation, where poor people have low income that cannot accommodate purchasing more of honey for consumptions compared to people with medium and high income.

The quantities of honey consumed across households were 84 Kg, 126 Kg and 158 Kg in low, medium and high residential cost categories respectively (Table 4). The mean household

consumptions of honey in low, medium and high residential cost categories were 2.1 Kg, 3.2 Kg and 4.0 Kg respectively. Similarly, per capita honey consumptions were 0.5 kg, 0.6 kg and 0.8 kg in low-income, medium-income and high-income residential categories respectively. Households living in the high-income residential category tend to consume more honey than households residing in other areas. Residents in this residential category have high income hence consume more honey than those with low incomes in the other residential categories in Mwanza city. This finding is in line with studies that have reported honey consumption associated with income, where low-income people consume small quantity of honey and high-income people consume more honey [8].

Table 4 Quantity of honey consumed per annum. Source: Calculated based on the collected data from the field.

Residential cost category	Quantity of honey consumed		
	Quantity consumed per residential cost category (Kg)	Quantity consumed per household (Kg)	Quantity consumed per person (Kg)
Low	84.2	2.1	0.5
Medium	126	3.2	0.6
High	158	4	0.8
Overall total	368.2	3.1	0.6
Total consumption in Mwanza	423 871.8		

Findings from this study also show that the estimated aggregate annual quantity of honey consumed in Mwanza was about 423872 Kg with per capita consumption amounting of 0.6 Kg. The consumption behavior of people in the study area is low compared to Saudi Arabia where annual per capita honey consumption range between 0.45 Kg to 11.3 Kg with an average of 4.5 Kg [10]. However, this may be associated with the prevalence of low per capita income in the study area and Tanzania as a country compared to Saudi Arabia. The low consumption habit may be due to low level of awareness and consumers exposure on the benefits and multiple uses of honey among people in Mwanza. In addition, it may be due to the fact that honey is not the staple food with which people depend on for survival rather its consumption habit remains the matter of preferences and perceived value. Awareness and exposure on the uses and benefits of a honey may create a desire and increase the preference of people on honey which

may in return alter the consumption habit of many people in Mwanza. During fieldwork, it was revealed that most households consume honey for medicinal purposes particularly for burn body surfaces, chest and cough reliefs. Furthermore, honey sold in most parts of Mwanza has low quality because it is diluted with other products like sugar or water hence reducing its nutritional and functional values in general. In most cases honey consumers judges its quality value based on the relative aroma and test and physical attributes among others [10] which was also observed in the study area. The low quality of honey sold in local markets in Mwanza City forced some households to find honey from honey producing areas such as Sikonge, Manyoni and many others in the country. But still majority of the people purchased honey from local market in the study area despite having low quality and this may partly explain the low consumption among households in the study areas.

Factors influencing households consumption of honey

Honey consumption in Mwanza city is influenced by different factors. In our logistic regression model, we considered ten independent variables and seven of them were significantly associated with household probability of honey consumption in the city. The frequent availability of honey, affordable prices, taste and preferences based on quality of the honey, religious and cultural matters, awareness due to current government initiatives on beekeeping, medicinal values and characteristics embedded into honey as well as the absence of cholesterol and other dangerous sugar contents were among the factors influencing honey consumption in Mwanza city. Based on the Binary Logistic Regression Model (BLRM), the taste and preference of the household on honey (TPH), natural healing characteristic of honey (NHC) and freeness of cholesterol and dangerous sugar contents were found to have a significant effect on the probability of consuming honey at 5% level. The coefficients and significance levels in brackets for the significant variables indicates that the estimated likelihood of households' choice or decision to consume honey given wide range of other product in the

market was influenced by these factors. The specified binary model fits well the data with the Pseudo-R2 (Cox and Snell=0.52 and Nagelkerke=0.861). This high value of Pseudo-R2 (52%) and the high values for Cox and Snell and Nagelkerke (86%) suggest a good predictive power of the model implying that the explanatory variables included in the model explain well the variation in the probability of honey consumption. According to Louviere et al. [11] Pseudo-R2 sometimes though rarely, reaches values as high as those of R2 in linear regression. Therefore, the presented Pseudo-R2 in this model is still considered having a good fit. Furthermore, the Chi-square statistic shows the model is highly significant at 5% ($P < 0.05$) level of significance, indicating that coefficients for all variables included in the model are jointly different from zero. We therefore, affirms that there is a relationship between the dependent variable and explanatory variables included in the model. The existence of a relationship between the dependent and independent variables is based on the statistical significance of the final model chi-square which is also called model fitting information (**Table 5**). In this analysis, the model reveals that the probability of the model chi-square (81.07) was 0.001, less than the test level of significance of 0.05 ($P < 0.05$).

Table 5 Model fitting information. Source: Analysis from our own field data.

Model	-2log Likelihood	Chi-Square	df	Sig
Final	20.38	81.07	9	0.001

We reject the hypothesis that household socio-economic characteristics and product characteristics do not influence choice of honey among households. Findings in **Table 6** indicate that, some predictor variables influence honey consumption choice significantly. The positive coefficients indicates that, for every unit change in taste, natural healing characteristics and freeness of cholesterol and dangerous sugar content in honey, the log odds of honey consumption in the households increases by 14.2, 5.7 and 1.6 units respectively. However, most of honey sold in Mwanza city particular in local markets and in the streets has low quality as the taste and aroma is not comparable to the natural honey from other areas. This may be due to improper handling during harvesting and processing or because of mixing honey with sugar or water by some sellers as means of increasing quantity and weight hence high profit, which reduces the quality of honey. This in turn affects the sweetness taste and medicinal characteristics of the honey preferred by majority of the consumers in Mwanza city. The poor quality of honey may consequently reduce the likelihood of honey consumption by consumers not only in the study area but also in other places in the country.

The statistical significance influence of taste, natural medicinal values and characteristics, freeness of cholesterols and dangerous sugar content on consumption of honey in the study area may be attributed by the natural inherent of honey spectrum revealed by consumers. Honey is used in medication for treating various diseases by providing varieties of permitted nutritional and health effects which also includes antibacterial, antioxidant, anti-inflammatory and prebiotic value just to mention a few. It is worth noting that the growing consciousness on the nutrition and health values of honey and other food commodities to people has made quality to become one of the important aspects in consumption choices [12]. Therefore, maintaining the natural quality of honey is important to maximize the likelihood of household consumption in the study area. These findings are similar to those reported by Ismaiel et al. [10] who found that medication, food, and sweetening were the major factors motivating people buying honey for consumption in Saudi Arabia with the aggregate scores of 4.5, 3.7 and 1.5 respectively.

Table 6 Estimated results of the binary logistic regression on honey consumption. Source: Analysis based on the data collected from the field, 2015. Note: **Significance at 0.005, Number of observation 120, Pseudo R2: Cox and Snell=0.52 and Nagelkerke=0.86.

Variables considered	β	S.E.	Wald	df	Sig.	Exp(β)
SEX	4.01	2.31	3.01	1	0.08	55.38
ELHH	-3.50**	1.71	4.21	2	0.04	0.03
AHH	0	0.04	0	1	0.99	1
FAVH	0.89	5.06	0.03	1	0.86	2.43
RPHO	2.21	38.53	0	1	0.95	9.11
TPH	14.18**	5.41	6.87	1	0.01	1.44E+06
RCH	-2.29	2.03	1.27	1	0.26	0.101
AGI	9.08	5.6	2.63	1	0.11	8.75E+03
NHC	5.73**	2.37	5.85	1	0.02	308.04
FCDS	1.56**	0.77	4.13	1	0.04	0.21
Intercept	-20.66	10.36	3.98	1	0.05	0

On the other hand, results show that education (ELHH) has a negative coefficient and statistically significant effect on the choice of honey consumption which is contrary to the prior expectation. This indicates that any unit change in education level of household head the log odd of honey consumption will decrease by 3.5 units to the prior expectation. In both theoretical and practical situations, it is obvious that education creates awareness and influences decision making regarding any aspect including consumption options. It equips an individual with proper understanding on the advantage and disadvantage of particular commodity based on its content and quality. Based on this fact as education level of household head increases the more concern on the quality aspect on honey increases and honey with low quality may cause a decrease in the consumption of honey in households. The phenomena may be an indication that many people in the study area are knowledgeable and that honey sold in the area has low quality which in turn minimizes the likelihood of honey consumption in the households.

Conclusions and Recommendations

The consumption of honey in household is potentially popular among people in the study area. The popularity is significantly contributed by natural characteristic and quality of honey providing medicinal values, good taste, healthy body and proper nutritional contents to consumers. We therefore recommend that, to increase the consumption of honey there should be quality control and maintained standard that governs honey trade in Mwanza region as well as Tanzania as a country. Further studies on the quality of honey and value chain analysis may be of high significant for the livelihood improvement and poverty reductions for the local communities in the area. The studies may also be important for assessing how honey production and trade contribute to poverty reduction among households in Mwanza Region and Tanzania as whole.

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