



## Research Article

# Health or Taste: Understanding Consumers' Preferences Towards Cooking Mediums in Pakistan

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**Abstract** | Consumption patterns are rapidly changing worldwide, subject to awareness, literacy, health concerns, taste, and many other socio-economic factors. In Pakistan, cooking oil is used in two forms; vegetable oil and hydrogenated oil which is commonly known as vanaspati ghee. Over time, due to changing eating preferences, health concerns, and quality issues, vegetable oil is rapidly replacing vanaspati ghee in the country. This study has investigated the impact of taste and health preferences and other factors on the choice of cooking medium. In this study, we have utilized a well-structured and pre-tested questionnaire for data collection from 250 respondents of District Multan. We have employed the logit model to examine the effect of various factors on choice variables. The results indicate that health concerns, urban locality, age, education, family size, and income significantly influence the preference for oil over vanaspati ghee. At the same time, the taste has a negative and significant influence on the choice of vegetable oil. The estimates indicate that the highest income group in the data prefers edible oil more than the lowest income group. As vegetable oil is costly as compared to ghee, consuming healthier food, price is an essential criterion for low-income consumers. Based on the findings, the availability of good quality vegetable oil to the masses requires time which can be ensured by enhancing local vegetable oil production and market competitive prices.

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**Keywords** | Vegetable oil, Vanaspati ghee, Consumers preferences, Socio-economic factors, Logit model



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## Introduction

Consumers expect healthy food to affect their health status and body shape, which develops a strong relationship between health and nutrition (Rozin, 2007; Mai and Hoffmann, 2015). Consumers

shift towards foods that signal healthiness (Otterbring *et al.*, 2020). Furthermore, food consumption is also determined by the interaction of sociocultural traditions and cooking methods that develop unique tastes and aromas (Sato *et al.*, 2020). In this regard, sociocultural traditions such as cultural ceremonies,

religious festivals, appearance, and healthiness are essential elements of food consumption. Similarly, taste is a crucial indicator of food choices. In addition to wellness, consumers also value taste and food choices. However, people may differ in their opinion, which they incorporate health and taste motives in their food consumption [Roininen et al. \(1999\)](#). Likewise, awareness regarding the healthiness of food may change the perception of taste [Jami \(2016\)](#).

Healthy eating is pertinent to a healthy life, reducing risks of common chronic diseases, including cardiovascular diseases, diabetes, cancer, obesity, and many other conditions. Food consumption patterns and lifestyles have gradually changed over the last few decades. However, the prevalence of chronic diseases such as diabetes, high blood pressure, cardiovascular diseases, and obesity are increased ([G et al., 2015](#)). Previously done studies on obesity, high blood pressure and diabetes illustrate that globally around 2.2 billion people are overweight or obese, representing about 30% of the world's population ([Ferris, 2017](#)). Disproportionate use of edible oil results in obesity, heart disease, diabetes and other non-communicable diseases ([Kadandale et al., 2019](#); [Breyer, 2021](#)).

In Pakistan, there are multiple cooking methods for preparing vegetables, pulses, or meat-based gravy, but almost all require edible oil as a critical ingredient for cooking. Its consumption involves around 100-200 ml/gm for the preparation of one time/day meal. Similarly, the per capita availability of edible oil has been about 14.5 kg/annum for a person during 2017-18 ([MNFS and R, 2019](#)). In the sub-continent, edible oil is used in two different forms as a cooking medium: Vegetable oil and vanaspati ghee. Vanaspati ghee is prepared through the hydrogenation of edible oil. Primarily palm oil is used in the preparation of vanaspati ghee which is a cheaper source of oil. However, it has high saturated fatty acid content compared to other edible oils ([Dubois et al., 2007](#)), making it less healthy. In Pakistan, 70 per cent vanaspati ghee while 30 per cent vegetable oil is used as a cooking medium. However, due to growing concerns regarding the quality of vanaspati ghee and associated health risks, it has continuously been replaced by vegetable oil as a cooking medium ([Tarar et al., 2020](#)).

Perceived healthiness of foods and changing eating habits affect the supply chain of food items, requiring qualitative analysis of consumers values, buying

behaviour and motivation ([Pinto et al., 2020a](#)). Several studies have been conducted on the determinants of oil consumption, such as income, price, family size, [Ali et al. \(2013\)](#), discounts, quality, health concerns, and trademark ([Revathy and Anitha, 2017](#); [Ibrahim et al., 2020](#)), health cost ([Deshmukh, 2019](#)), type of oil seed, artificial ingredients, packing material ([Ali and Begum, 2019](#)). Similarly, to observe the general theory of choice-making for products with novelty attributes among the consumers is conducted with a focus on the cost-benefit of consumers, highly palatable food, societal pressure, diverse culture, cognitive factors such as depression and anxiety, familial and genetic factors ([Asioli et al., 2017](#); [Leng et al., 2017](#); [Briggs, 2019](#)).

Despite all the studies mentioned earlier, none have studied consumers preferences towards vegetable oil and vanaspati ghee consumption in district Multan, Punjab Pakistan. This study investigates the consumers choice between vegetable oil and vanaspati ghee based on health concerns and taste. Furthermore, it also considers other socio-economic factors necessary in decision-making.

## Materials and Methods

### *Data and sampling*

The study employed primary data from two tehsils of the Multan district, namely, Multan Saddar and Shujabad. [Figure 1](#) represents the geographic location of the study area in the Province of Punjab, Pakistan. The study utilized a well-structured and pre-tested questionnaire for data collection from the respondents of the study area. The sample size was calculated using the following formula ([Daniel and Cross, 2013](#)).

$$n = \frac{Z^2 pq}{d^2}$$

Where;  $n$  represents the desired sample,  $z$  is the standard normal deviation,  $d$  is the level of statistical significance, and  $q$  is  $1-p$ .

However, considering the limited resources, only 10 percent population proportion is evaluated, resulting in a total of 250 sample size. Furthermore, 125 respondents from each tehsil were selected. Thus, the questionnaire was developed carefully and pre-tested to ensure consistency, comparability and reliability. Information on required variables from the respondents was gathered from the two tehsils.

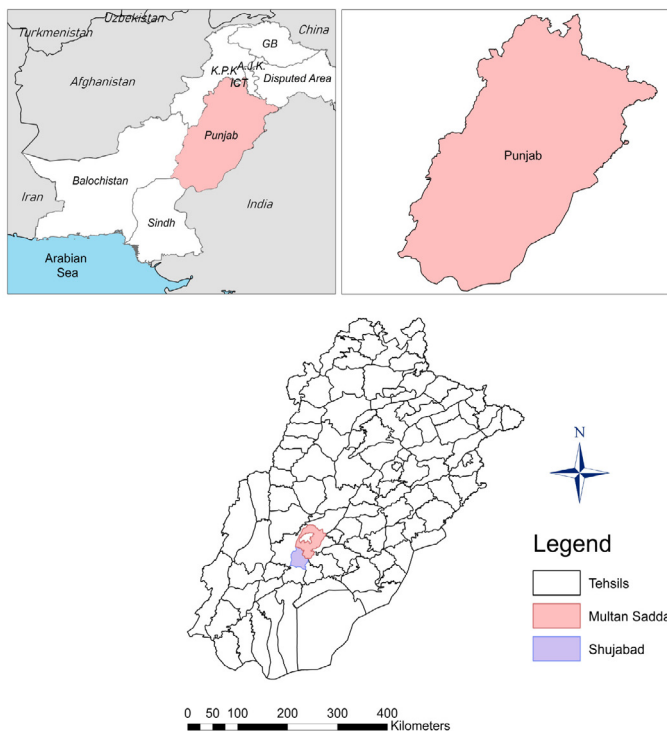


Figure 1: District Multan, Punjab.

*Empirical model*

The questionnaire was coded according to the variables of the study. The description of the studied variables both dependent and independent variables is described in Table 1. Data is analyzed using the R-Studio (A statistical tool for data analysis). The logit model is used for estimating the factors affecting consumer preferences towards oil or vanaspati ghee, as used by (Ahmed et al., 2017). The rationale for using the logit model is that it provides a powerful and flexible framework for modeling the relationship between a binary outcome variable and one or more predictor variables. The constitution of the Logit model was done according to the following equation:

$$\ln\left(\frac{p}{1-p}\right) = \alpha + \beta X$$

The empirical model designed for this study is:

Table 1: Description of variables.

Variables	Description	Variable types
<b>Dependent variable</b>		
Choice	Preference of respondent, it takes value 1 if respondent prefer oil and vanaspati ghee otherwise	Binary
<b>Independent variables</b>		
Location	Locality of respondent, it takes value 1 if respondent live in urban UC and rural UC otherwise	Binary
Health	Preference of oil due to health concern, it takes value 1 if Yes and No otherwise	Binary
Taste	Preference of oil due to taste / aroma, it takes value 1 if Yes and No otherwise	Binary
Education	Education of respondents in years	Continuous
Family size	Total numbers of family of respondent	Continuous
Income	Income of the respondents in rupees	Continuous

Source: Author's own calculation.

Choice (Oil = 1, Ghee = 0)

$$= \beta_0 + \beta_1 location + \beta_2 education + \beta_3 familysize + \beta_4 income + \beta_5 health + \beta_6 taste$$

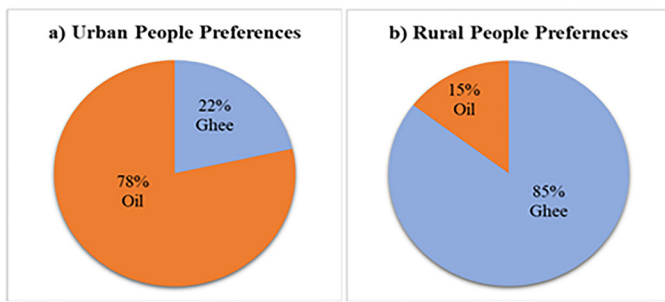
**Results and Discussion**

The study identifies the factors that influence consumers' buying behaviour towards edible oil and vanaspati ghee in the areas of Multan, Pakistan. The results are based on the information gathered by collecting individual responses through filled questionnaires from urban and rural consumers of two tehsils of Multan.

*Descriptive statistics*

The descriptive statistics of area, profession, education, family type, monthly income and the medium used for cooking purposes are described in Table 2. The statistics have highlighted that 140 (56%) of the respondents consume edible oil, while 110 (44%) consume vanaspati ghee. 11% of respondents are male, and the remaining 89% are female. It is evident in the given culture because dietary decisions are considered a primary assignment of females in the household. The respondents have also asked to specify their residential location, either rural or urban. Out of 250 respondents, 162 (65%) belong to urban areas, and 88 (35%) are from rural areas.

The descriptive statistics represent that 32% of the respondents are housewives, 26% are running their businesses, 21% are students while remaining 21% are employees. Furthermore, 80% of respondents belong to nuclear families, and 20% of respondents live in a joint family system. The results illustrated that 19% of the respondents earn more than Rs 80,000, 51% fall between Rs. 40,000 to Rs. 80,000 income group and the remaining 30% fall into Rs. 0 to Rs. 40,000 income group.



**Figure 2:** Urban and rural population preference towards oil and ghee.

Figure 2 shows that 78% of urban respondents preferred edible oil, while only 22% preferred ghee. Moreover, about 85% of respondents from a rural community prefer ghee while only 15% prefer edible oil.

**Table 2:** Descriptive statistics.

Variables	Frequency	Percentage
Edible oil	140	56%
Ghee	110	44%
<b>Gender</b>		
Male=1	27	11%
Female=2	223	89%
<b>Location of the consumer</b>		
Union council city =1	162	65%
Union council rural =0	88	35%
<b>Professional level</b>		
Housewives	80	32%
Government employee	52	21%
Students	52	21%
Own business	66	26%
<b>Family type</b>		
Joint	50	20%
Nuclear	200	80%
<b>Gross income</b>		
Up to Rs. 40,000	75	30%
Rs.40,000 – 80,000	127	51%
above 80,000	48	19%

Source: Author's own calculation.

*Factors affecting consumers' preferences towards edible oil/ vanaspati ghee*

The estimates of the logit model show that the model is fit for the study. The chi-square, pseudo-R-square and log-likelihood show significant values and the model's goodness of fit. As far as the results of individual factors are concerned, shown in Table 3, a respondent's location matters a lot in the preference for edible oil over vanaspati ghee. It exhibits that

people who live in urban communities prefer to consume edible oil than vanaspati ghee compared to rural communities. An urban dweller, on average, desires 13.38% more oil than ghee than rural dwellers. When urbanization is rising, people are becoming more conscious about their health and prefer to consume healthier food (Sammy, 2011, W.K, 2011). Likewise, cultural and social values strongly influence food choices by consumers (Pinto et al., 2021). We have observed that for consumers who are concerned with health issues, their likelihood towards vegetable oil consumption is significantly greater than ghee. The consumption of hydrogenated oil (vanaspati ghee) increases the cholesterol level in the blood more than non-hydrogenated oils (Nelson, 1998; Hosseini and Asgary, 2012). Shankar et al. (2005) reported that if ghee consumption increases more than an optimal level, it escalates the HDL level, consequently resulting in high total cholesterol levels in the blood. It makes consumers more conscious regarding using ghee as the cooking medium. Our model shows that a person with health concerns will prefer oil over ghee 16.81% more on average compared to a person with fewer concerns about health risks. Consumers who are less concerned with food quality have more probability of consuming less healthy food (Saba et al., 2019).

**Table 3:** Results of logistic regression with odd ratios and marginal effects.

	Odds ratios	Standard error	z	P> z	Marginal effects
Location	6.377487	4.620628	2.56	0.011	0.13385***
Health concern	9.392090	8.521963	2.47	0.014	0.16181***
Taste/Aroma	0.047972	0.049925	-2.92	0.004	-0.21941***
Age	1.102772	0.041769	2.58	0.010	0.00706***
Education	1.557105	0.214414	3.22	0.001	0.03199***
Family size	1.410317	0.242364	2	0.045	0.02483**
<b>Income</b>					
1	10.31088	9.678883	2.49	0.013	0.18408***
2	7.949293	9.182165	1.79	0.073	0.16621*
Constant	0.0000058	0.000020	-3.51	0.000	-
No. of observations	250				
LR chi <sup>2</sup> (8)	107.98				
Prob > chi <sup>2</sup>	0.000				
Pseudo R <sup>2</sup>	0.6575				
Log likelihood	-28.118				

Source: Author's own calculation.

The estimates show that people prefer ghee more due

to its taste and aroma. The results have revealed that taste concerns enhance vanaspati ghee preference over oil by 21.94%. It may be because vanaspati ghee has a synthetic aroma like butter, which makes the food tasty. Willingness to compromise on the taste for healthy food is quite risky and highly speculative, and taste is a general driver for using extra-virgin olive oil as a cooking medium (Verbeke, 2006; Cavallo *et al.*, 2019). The respondents age also influences the consumer's preference for edible oil. As a person's age increases by one year, the preference for edible oil over vanaspati ghee increases significantly by 0.7%. Older people are more concerned towards healthy food (Verbeke, 2006). The education of a person substantially increases the likelihood of oil. The results of our model suggest that if a person's education increases by one year, the preference for edible oil increases by 3.19%. Educated people consume healthier food than uneducated people and become more conscious about their health (Kearney, 2010). Similarly, knowledge and cognition can lead to good decisions regarding healthy food (Pinto *et al.*, 2021).

The results show that as family size increases by one unit, preference towards vegetable oil increases by 2.48% more on average. It may be because large families may be more earning hands or may show more health concerns due to children or elderly persons in the family. The income of the person exhibits a preference for edible oil over ghee. It shows that the highest income group in the data prefer edible oil 18.4% more than the lowest income group. As vegetable oil is nearly 10% more costly as compared to ghee, consuming healthier food, price is an essential criterion for low-income consumers (Kamar *et al.*, 2016; Pelly *et al.*, 2020).

## Conclusions and Recommendations

The importance of vegetable oil or vanaspati ghee as the cooking medium is indispensable worldwide. The consumption patterns and preferences towards vegetable oil or vanaspati ghee are changing over time due to growing health concerns and changing eating habits. This study has found that health concerns, urban locality, age, education, family size and income have a significant and positive influence on oil preference over ghee. In comparison, the taste has a negative and significant impact on the preference towards oil over ghee. The use of vegetable oil as a cooking medium is growing among urban and educated consumers.

However, in Pakistan, the quality of cooking medium is a major concern as Pakistan imports most of its edible oil, mostly palm oil. Moreover, vanaspati ghee is mainly of poor quality. Based on the findings, the availability of good quality vegetable oil is needed, which can only be ensured through enhancing local production of oil seed crops, and implementation of high-quality standards in the production of vanaspati ghee.

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## Novelty Statement

This study stands out as a pioneering effort in comprehensively examining the intricate interplay between health considerations and taste preferences among consumers in Pakistan regarding cooking mediums.

## Author's Contribution

**Sami Ullah and Choudary Ihtasham Ali:** Idealization, data collection, data entry and cleaning, analysis, write-up

**Umar Ijaz Ahmed:** Idealization conceptualization, proof reading and editing

**Shoaib Nasir and Amjad Masood:** Proof reading and editing.

## Conflict of interest

The authors have declared no conflict of interest.

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