

## Determinants of Fresh Fish Purchasing Behavior Among Malaysian Consumers

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**Abstract:** The study investigates demographic and attitudinal characteristics that can affect the purchase decisions of marine fish among Malaysian consumers. A survey was conducted on Kuala Lumpur households using structured questionnaires. Seven hundred respondents were randomly interviewed with regard to their buying behaviour pattern, attitude and perception on fresh marine fish consumption. The data were analyzed using a logit binary model. It was found that the size and income of the households, gender, taste and the nutritional value of fresh fish significantly influenced the purchasing behavior of the respondents. The Malaysian seafood sector may find this study useful to encourage further consumer-based studies for promoting the growth of the domestic fresh marine fish and seafood market in general.

**Key words:** Fresh fish, purchasing behavior, logit, demographic, Malaysian consumer, fish consumption

### INTRODUCTION

Malaysia is among the countries with the highest fish consumption in the world. The annual per capita fish consumption increased from 49 kg per capita in 2000 to 53 kg per capita in 2005 and is expected to reach around 56 kg per capita in 2010. This accounts for 60% of the total animal protein intake with the bulk of the remaining animal protein coming from other animal products such as poultry, beef, mutton and pork which amount to 37, 5.1, 0.8 and 7.8 kg per capita respectively (Department Veterinary Services, DVS 2007; Abdullah, 1997). Population growth, increasing income, health consciousness, and an expanding downstream processing industry is also expected to spur the demand for fresh fish in Malaysia. Recent data indicates that the total production from the fisheries increased from 1.537 million tonnes in 2004 to 1.6 million metric tons in 2006 which was valued at RM6.253 billion. Nearly 87% of the total fish production (valued at RM 4.939 billion) came from marine fisheries. With an annual average growth rate of 1.7%, the fisheries industry contribution to GDP was about 2% and provides direct employment to 81 thousand fishermen and 21 thousand fish culturists (Department of Fisheries Malaysia, 2007)

The current focus of the Malaysian fish policy is to expand the growth of upstream and downstream fisheries-based activities to achieve their full potential. The main reasons behind this attempt are to increase fishermen's income and also to expand fish exports to maximize the country's foreign exchange earnings that can be used for further economic growth. However, some experts argue

that the government should put considerable effort in increasing the availability of fish products for domestic consumers at affordable prices because of its nutritional and health advantages. To make this type of public effort effective and successful, it is crucial to understand the end users of the fish products. Understanding the purchasing behavior of consumers and satisfying their needs are two major goals in ensuring that the fish that are being caught have a consumer market to go to (Spinks and Bose, 2002; Herrmann *et al.*, 1994). In addition, market research increasingly focuses on identifying market segments which appear to be promising targets for promotional efforts. One approach is to identify the demographic characteristics of frequent purchasers and the fresh fish attributes that could enhance the purchasing behavior. Having this kind of information can be useful in designing the marketing strategies needed to increase the purchase of fresh fish. With increased confidence in local fresh fish, consumers will buy more fresh fish and this would enable fishermen to earn more. Hence, the entire supply chain will work towards ensuring quality as well as better profits for fishermen. Comprehensive and up to date information on consumer's attitudes and perceptions toward fresh fish consumption and the factors that influence them when buying fish in particular are very important indicators in ensuring that the needs of consumers are being met.

Although a number of recent studies have assessed different aspects of fish/seafood marketing and demand in other Asian and Pacific countries namely China (Wang *et al.*, 2009), Taiwan (Houston and Li, 1998) India (Redkar and Bose, 2004), Vietnam (Tu and

Olsen, 2010). Bangladesh (Sadrul Huda *et al.*, 2009) New Zealand (Spinks and Bose, 2002), Australia (Bose and Brown, 2000), such knowledge is lacking for the Malaysia fish market. Similar studies have also been conducted in the U.S. and European (Weinstein *et al.*, 1999; Nauman *et al.*, 1995; Myrland *et al.*, 2000; Cheng and Capps, 1988; Hanson *et al.*, 1994; Verbeke and Vackier, 2005; Verbeke *et al.*, 2007).

Thus, the present study addresses the information gap between the market players and consumer's needs through a survey on the attitude and perception of fresh fish consumption. This study is expected to identify the factors that significantly affect the purchasing decisions related to fresh fish consumption among Malaysian consumers, who buy marine fish at least more than once a week for home consumption, in selected urban areas in the Klang Valley including the capital city of Kuala Lumpur, Malaysia.

### MATERIALS AND METHODS

The primary data used in this study were collected via structured questionnaires. The survey was conducted in December 2007. Seven hundred (700) questionnaires were distributed to randomly selected respondents or households around the Kuala Lumpur area, in Peninsular Malaysia. Almost 90% of the distributed questionnaires were completed and the information provided was used in the empirical analysis. The questionnaire was designed to extract information on the household's purchasing patterns, preferences for fresh fish and the likely constraints the respondents faced when buying the products for home consumption. The questionnaire had three distinct sections. Section one incorporated socio-economic and demographic characteristics that may affect households' purchasing decisions such as age, sex, marital status, household size, number of children, income, occupation and education. Section two incorporated questions that were mainly related to product attributes, households' beliefs and attitudes that were highly likely to influence purchasing intentions. The third section consisted of consumer perceptions towards fish buying behavior. The respondents were asked to indicate their degree of agreement or disagreement on several features such as quality, nutrients, price, taste, size etc.

In analyzing the consumption pattern, questions related to the frequency of buying fish were selected to serve as the dependent variable. Following Redkar and Bose (2004), the frequency of fresh fish purchasing was arranged into five possible alternatives and asked the respondents to choose one of them, which are:

- Everyday
- Alternate days
- 2 times per week

Table 1: Definition of variables (binary and non-binary)

Symbol	Description
Frequency	1 if the household purchases fish for home consumption at least once every week, 0 otherwise
Quality	1 if the respondent regarded Quality as an important factor in purchasing fish, 0 otherwise
Taste	1 if the respondent regarded Taste as an important factor in purchasing fish, 0 otherwise
Price	1 if the respondent regarded Price as an important factor in purchasing fish, 0 otherwise
Fresh	1 if the respondent regarded the freshness of the fish as an important factor in purchasing fish, 0 otherwise
Nutrient	1 if the respondent regarded the nutritive benefits as an important factor in purchasing fish, 0 otherwise
Gender	1 if the respondent is Male, 0 otherwise
Ethnic	11 if the respondent is Malay, 0 otherwise
Ethnic	21 if the respondent is Chinese, 0 otherwise
Marital	1 if the respondent is married, 0 otherwise
AGE1	Number of members in the household between the ages 18-35
AGE2	Number of members in the household older than 35
Education	Number of family members with primary education or any form of formal education
N_household	Size of the household, > 4 is 1, 0 otherwise
N_children	Number of children in the household who are less than 18 years old.
H_income	Average household income > RM2000 is 1, 0 otherwise

- weekly
- Occasionally

The dependent variable for each observation takes on a value of one (1) if the respondent had bought fresh fish more than once a week and a value of zero (0) if the respondent had not. The independent variables include some theoretically relevant variables, such as education, age, religion, ethnicity, occupation, the number of members of the household, gender and place. The demographic variables stated earlier were then converted into dummy variables in order to capture the effect of the demographic on purchasing behaviour of fresh fish. Product attributes (taste, color, freshness, nutrients, quality, price, etc) were also asked to access agreement and disagreement on the product attributes factor on a likert scale of 1 to 5 (where 1 means they strongly agree with the statement and 5 means that they strongly disagree with the statement on the product attribute). The 5 point scale was then converted into a binary scale where the scales 1 and 2 (they agree with the statement) were recoded as '1' and '0' was given otherwise (Redkar and Bose, 2004; Leek *et al.*, 2000). Table 1 shows the definition of the variables used in the logit model. Because the analysis was based on the frequency of buying fresh fish, the dependent variable is dichotomous. Therefore, a logistic regression model was used to examine the effect of factors such as the socio-demographic profile and other related variables on the probability of purchasing fresh fish at least more than once a week.

**Model specification:** Frequent buyer for fresh fish are important to sellers because of their repeated purchases (Leek *et al.*, 2000; Kinnucan *et al.*, 1993). In this study a logistic regression model of frequent fresh fish buyers versus all others was employed to analyze the purchases of fish for home consumption. The standard dichotomous logit model was developed for identifying consumer attributes associated with home purchases. The logit model for the representative household ‘i’ can be expressed (Menard, 1995) as follows:

$$Y_i = \log\left(\frac{P_i}{1-P_i}\right) = a + \sum_{j=1}^n \beta_j x_{ij} + e_i$$

where,  $Y_i$  is an unobservable dependent variable which represents the household’s willingness to purchase fresh fish for home consumption at least more than once a week. The variable  $x_i$  represents the different attributes affecting the representative household’s choice to purchase fish at least more than once a week. In this regression model, the vector  $x_i$  consists of variables such as quality, taste, source of protein (nutrients), family, gender, size of household, age of the family members, household income, number of children in the household and education level of the family members.

Where,  $\log(p_i / 1-p_i)$  is called the log-odd ratio. The Log-odd ratio is the logarithm of the odds that a particular purchasing choice will be made by the representative household.  $p_i$  is the probability of the proxy variable  $Y_i = 1$  and  $(1 - P_i)$  is the probability that  $Y_i = 0$  and  $e_i$  is the error term.

**RESULTS AND DISCUSSION**

**Description of sample data:** Table 2 presents the socio-demographic characteristics of the respondents from the survey. The largest portion of the respondents, 35.17%, is in the 18-35 years age group, while one-third was more than 46 years old. Approximately two-thirds of the participants identified themselves as female (65%). Among the respondents, more than half of them (60.17%) had obtained schooling up to the secondary level. About 19% of the respondents had graduated from college or university, while around 18.50% only had primary school certificate. Only 2.3% of the respondents had not received any formal education. We can also see that a large number of the respondents are private sector workers or self-employed and a housewife which accounted for 38.33% and 39.50% of all respondents, respectively. About 18% of the respondents worked in the government sector. Those who had retired made up 2.83% while the remaining 1.5% was students.

Table 2: Demographic characteristics of the respondents

Characteristics	Frequency	%	Cumulative (%)
<b>Age</b>			
<18	10	1.67	1.67
18-35	211	35.17	36.83
36-45	187	31.17	68.00
46-55	133	22.17	90.17
>55	59	9.83	100.00
<b>Education level</b>			
No formal education	14	2.33	2.33
Primary school	111	18.50	20.83
Secondary school	361	60.17	81.00
Institute/ University	114	19.00	100.00
<b>Ethnic</b>			
Malay	193	32.17	32.17
Chinese	328	54.67	86.83
Indian	73	12.17	99.00
Others	6	1.00	100.00
<b>Gender</b>			
Male	216	34.29	34.29
Female	384	65.71	100.00
<b>Household income*</b>			
RM500 - RM1000	133	22.17	22.17
RM1001 - RM 2000	193	32.17	54.33
RM2001 - RM3000	146	24.33	78.67
RM3001 - RM4000	53	8.83	87.50
> RM 4000	75	12.50	100.00
<b>Occupation</b>			
Government sector	107	17.83	17.83
Own business/ Private sector	230	38.33	56.17
Retired	17	2.83	59.00
Housewife	237	39.50	98.50
Student	9	1.50	100.00
<b>Marital</b>			
Single	123	20.41	20.41
Married	477	79.59	100.00
<b>Number of household</b>			
1-3	43	7.17	7.17
4-6	327	54.50	61.67
7-9	208	34.67	96.33
>10	22	3.67	100.00

\*: US\$1 = RM3 (Malaysian Ringgit)

Table 3: The frequency of buying fresh fish

Value	Frequency	%	Cumulative (%)
everyday	191	31.83	32.24
alternate day	210	35.00	67.76
two times per week	115	19.17	86.53
weekly	60	10.00	96.73
occasionally	24	4.00	100.00
Total	600	100.00	100.00

The majority of the respondents are married (79.59%) and they predominantly identified themselves as Chinese, which made up 54.67% of the total respondents, followed by Malays (32.17%), Indians (12.17%) and the remaining 1% were from other ethnic backgrounds. The household monthly income is given as the average personal income of all of the members residing in the household. The data shows that 35.1% of the respondents had a household income between RM 1001 and RM 2000, 23.7% had a household income between RM2001 and RM 3000, 20.4% had a household income between RM 500

Table 4: Factors influencing the decision to purchase fresh fish

Items	Very important (%)	Important (%)	Neutral (%)	Not important (%)	Not very important (%)
Price	40.8	27.8	23.3	6.5	1.6
Taste	39.6	44.1	10.2	4.1	2.0
Nutrition	41.6	33.5	17.1	4.5	3.3
Quality (freshness)	67.8	22.4	4.5	4.5	0.8
Family choice	27.3	40.0	24.5	5.7	2.4
Easy prepare	10.2	24.1	30.2	26.5	9.0
Availability	12.2	38.4	23.3	19.2	6.9
Size	10.2	19.2	33.9	26.5	10.2
Little bone	22.0	32.2	23.7	15.1	6.9
Plenty of meat	24.1	42.4	21.6	7.8	4.1
Color and odor	15.9	22.4	19.6	21.6	20.4

Table 5: Estimated logistic regression results

Variable	Coefficient	SE	z-statistic	Prob.	Odd_ratio
C	- 2.12	1.32	- 1.61	0.11	0.12
H_Income	0.96*	0.24	4.02	0.00	2.62
N_Household	1.83*	0.26	7.07	0.00	6.23
N_Children	- 0.14*	0.07	- 2.00	0.05	1.15
Marital	0.91*	0.37	2.45	0.01	2.47
AGE1	0.02	0.28	0.06	0.95	1.02
AGE2	0.36	0.27	1.33	0.18	1.43
Educations	0.17	0.21	0.79	0.43	1.18
Ethnic1	0.48	0.31	1.58	0.11	1.62
Ethnic2	0.19	0.29	0.65	0.52	1.21
Gender	- 0.65*	0.22	- 2.95	0.00	1.91
Taste	0.46*	0.13	3.58	0.00	1.58
Fresh	0.04	0.20	0.22	0.82	1.05
Nutritive	0.79*	0.25	3.17	0.00	2.20
Quality	0.43	0.41	1.07	0.28	1.54
Price	- 0.11	0.41	- 0.27	0.79	0.90
McFadden R-squared	0.67		Log likelihood	-319.77	
Akaike info criterion	1.14		Restr. log likelihood	-381.03	
Schwarz criterion	1.26		Avg. log likelihood	-0.54	
Hannan-Quinn criter	1.18				
LR statistic	38.52				
Prob. (LR statistic)	0.00				
Obs with Dep = 0	199		Total observation	600	
Obs with Dep = 1	401				

\*: Significant at 5 and 1%

and RM 1000 and 8.6% had a household income between RM3001 and RM4000. None of the households had an income level of less than RM 500.

The respondents with a household income of more than RM4000 was around 12.2%. The household size was calculated by totaling the number of occupants residing in the house. For household size, the smallest recorded household was one person and the largest was ten or more. The study found that the majority of the respondents (55.1%) had a household size of four to six persons, while 33.9% had seven to nine persons and 6.9% had only one to three persons. The respondents with ten or more residents made up another 4.1% of the sample. With respect to preferences for fresh fish, the majority of the respondents (93.9%) liked to consume fish and only 6.1% disliked fish. This was not an unexpected outcome since 60% of meat consumed by all Malaysians comes from fish and other marine products.

During the survey, the respondents were asked about their frequency of buying marine fish. Nearly 36% of the

respondents bought marine fish on alternative days (Table 3). Over one-third of the respondents (31.8%) purchased fish everyday while 19.2% of the respondents indicated that they bought fish twice a week. Only 3.3 and 10.2% of the respondents bought marine fish occasionally and weekly, respectively.

**Factors that influence decisions towards purchasing marine fish:**

Quality, taste, ease of preparation, availability, nutritional value and the price of fish relative to other meats were found to be important factors that influence the purchasing of fish in Malaysia. Table 4 shows the frequency of purchasing patterns with regards to fresh fish attributes. As for the quality factor, 67.8% of the respondents indicated that this factor was very important while only 0.8% indicated it was not important when they were considering buying fresh fish. Price was also an important factor which was considered by consumers when they were buying fresh fish. At least 68.6% of the respondents agreed with the statements on

the price factor. A further 41.6% of the consumers agreed that the nutritional value is one of the most important factors to be considered when purchasing fresh fish. Taste was also considered to be an important factor when purchasing fresh fish, where a large proportion of the respondents (44.1%) indicated this factor was important.

Apart from high quality, taste, nutrition value and price, the respondents also indicated that few bones (32.2%), plenty of meat (42.4%) and its availability (38.4%) were also important factors to be considered. Family choice also influenced the respondents when choosing the types of fresh fish to consume, where 40% of them indicated it was an important factor. Ease of preparation or cooking and the color of the fish were not very important factors for the respondents when considering purchasing fresh fish.

**Results of the logit regression:** The estimated results from the logit model are presented in Table 5. The results suggest that the amount of household income (H\_income), number of children less than 15 years old (N\_children), gender, marital status, nutrition value and taste are all important factors to consider when fish consumers are buying fish as they are all significant at the 5 and 1% significance levels. Since the coefficients are logarithmic expressions, the conditional odds for each variable are calculated by exponentiation as shown in Table 5.

The odd ratios for the N\_household variables were found to be 6.23. This suggests that if the size of the household increases, the likelihood of purchasing fish more than once a week for home consumption increases 6.23 times (Table 6). The implication of this finding is that marketers should devise appropriate marketing strategies to influence the perceptual process of the family to gain easy access to fish products and offer special discounts to these target consumers. The odds ratio results also indicate that those households with higher monthly incomes are 2.62 times more likely to be frequent fish purchasers. Similarly, a married buyer is 2.47 times more likely to be a frequent purchaser than a single (non-married) buyer. This result shows that household size and income are significantly affect the decision to purchase fish which is consistent with the study of Herrmann *et al.* (1994).

The results also suggest that the most important product attribute that can create a higher sales volume is the nutritional level. The odds ratio for the nutritional value of the fish was found to be 2.20. Therefore, household meal planners who are concerned about the undesirable nutrition values of other meats such as fat and cholesterol have a positive attitude toward fish (the presence of Omega-3) and are likely to buy fresh fish more than once a week than those who are not concerned. Another important product attribute that can create a higher sales volume is taste. Those respondents who agreed that fish meat has a good taste are likely to buy

fresh fish 1.54 times per week more than those who disagreed. It should also be noted that education, the ethnicity of buyer, quality and the price of fish are not statistically significant in explaining the fresh fish purchasing decisions.

Educational programs and appropriate promotional campaigns may also encourage Malaysian households to purchase more fresh fish, as they increase community awareness about quality, fish as a source of protein and the nutritional benefits such as the presence of Omega-3 which is good for cardiovascular dysfunctional patients. The marketing implication of this finding is that marketers should adopt appropriate marketing strategies to influence the perceptual process of the consumer to achieve a more widespread attraction of fresh fish products by all consumers.

## CONCLUSION

This study analyzes the frequency of fresh fish purchases and buying patterns of consumers through a consumer survey which was conducted in the Klang Valley, Malaysia. Logistic regression was used to analyze the effect of demographic and attitudinal characteristics on fresh fish purchasing behavior where consumers bought fresh fish more once a week. The majority of the respondents state their preferences towards fish. The study reveals that taste and the nutritional value of fish are factors that the consumers consider when making fish purchases. Thus the fish marketers should take advantage of the nutritional and medicinal value of fish as alternatives to conventional medicine in preventing and curing diseases. With regards to demographic factors such as household income, the number of household members and marital status, some kind of promotional campaign should be made to encourage not only the higher income consumers or consumers with a large number of household members but also those in lower income brackets. Thus price will play an important role in attracting more consumers to consume more fish or to purchase fish more frequently. It can be hypothesized that consumers are willing to pay more for fish, but if the price is too much higher in comparison to poultry, beef, mutton, and pork, consumers will find alternatives to satisfy their needs and wants. In addition, the housewife plays a major role in the purchasing decision making of food items for the family. Education and the awareness of the benefits of eating fish should be inculcated among the housewives in general. Increases in the demand for fishery products not only benefit the marketers but also benefit the fishermen as a whole. Thus the two prong policies to eradicate poverty and to increase income among fishermen can be achieved as more people consume more fish.

### ACKNOWLEDGMENT

The author would like to thank Universiti Putra Malaysia (UPM) for granting Research University Grant (RUGS) to undertake the study for the period of 2 years (August, 2009 - February, 2011).

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