Factors with the purchase of meat by consumers in Makassar, Sulawesi[1]

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ABSTRACT: Preliminary research with consumers from 374 households in Makassar, Indonesia is presented into their meat purchasing behaviour and attitudes based on personal interviews conducted from April to May 2009. The items receiving the highest scores on a five - point scale were: good value for money (4.51), consistent quality (4.50), good colour (4.49), nutritional (4.41) and healthy (4.40). Factor analysis identified seven underlying components while cluster analysis identified four main clusters of consumers. The most commonly cooked meats in a month were fish/seafood (92%), chicken (91%), beef (41%), goat (19%) and duck (15%). Traditional markets traders/butchers were the main places for meat purchases. Over half of the consumers surveyed never purchase meat in supermarkets.

Key words: attitudes, factor analysis, market segments, cluster, Indonesia

INTRODUCTION

Indonesian annual meat consumption per capita is relatively low, although it has been increasing (Hatasuhut et al. 2001). These authors suggested Indonesian consumers are likely to increase their demand for meat as incomes increase. This is consistent with statistics presented by Fabiosa (2005) and Suryana et al. (2008) which show an increase in the percentage of food expenditure on meat and a decline in the percentage on fish with increasing income in Indonesian urban. These studies relied on statistical analysis of secondary data derived from household surveys and did not provide an insight into consumer decision-making criteria in purchasing meat. While consumers' behaviour and attitude towards meat consumption have been widely researched in many western developed countries (Verbeke & Viaene 1999), the authors were not able to find any studies that have been conducted on this topic in Indonesia.

This paper outlines results of preliminary research with consumers from Makassar, Indonesia to assess the criteria used when purchasing meat, how often particular types of meat were cooked, where meat was purchased, and the characteristics of market segments.

MATERIALS AND METHODS

Personal interviews were conducted by students of Hasanuddin University, South Sulawesi. The population of interest were the purchasers of meat for household consumption in the city of Makassar, South Sulawesi. Respondents were selected from the 14 subdistricts in Makassar with a similar number in each subdistrict. Households were chosen by student interviewers based on the availability and willingness to participate until the required number of interviews was achieved. A total of 388 questionnaires were submitted, of which 374 were suitable for analysis.

Initial questions for the survey were based on a Western Australian lamb consumer survey (Storer 1993) and a Western Australian in-store Q Lamb consumer survey (Storer 1997), with most of the questions being based on the former. An initial question eliminated vegetarian households and the remainder of the questions dealt with purchase characteristics of meat, purchase frequency and seller, and demographics. Purchase characteristics of meat were assessed with an open-ended question and 35 items developed to identify important characteristics used by consumers when purchasing meat. The research team discussed the relevance of the items from the WA lamb consumer survey, which were translated into Indonesian, and either accepted, adapted or rejected items. In addition, an exercise was conducted with Indonesian staff asking them to compare triads of meat choices from which additional items such as rubbery, causes hypertension and important for birth ceremonies were introduced. Items were rated on a 5 point scale with 1 (not at all important) and 5 (very important). Questions on meat usage and occasions used were also adapted to Indonesian conditions from the WA consumer surveys. A draft survey was pretested on around 15 staff at BPTP and 20 staff from Hasanuddin University and revised.

Interviews were conducted in April and May of 2009 at times chosen by the student surveyors. Questionnaires were checked by staff and students asked to verify or conduct new interviews if they were incomplete. Data was entered into an Excel spreadsheet for initial cleaning and then transferred into SPSS where initial descriptive statistics were run. Errors identified in this process were corrected and the descriptive statistics run again. As a result, the initial 388 questionnaires were reduced to 374 usable questionnaires; although some questionnaires did not have all questions answered and 19 (5%) of the respondents were vegetarians.

Because the 35 items had not been previously tested in Indonesia exploratory factor analysis was undertaken (in SPSS v 17) to identify any underlying patterns or relationships in these variables and to reduce the number of variables to be used in future studies. The approach used was principal components analysis with varimax rotation. Items were excluded if they had cross-loadings greater than 0.4 or had factor loadings below 0.4, the latter based on the sample size (Hair et al. 2010). Selection of number of factors was based on an Eigen value of greater than 1.0 although Scree plots were also examined. Items contributing to each factor were tested by applying the reliability coefficient and where the Cronbach's Alpha Coefficient was below 0.5, the factor was excluded from further analysis.

Cluster analysis was conducted to see if it was possible to identify major groups of consumers based on the meat purchasing criteria, after removing variables excluded by the factor analysis. Initially, hierarchical cluster analysis procedures (Ward's cluster method based on the squared Euclidean distance measure) were used to identify a potential number of solutions (Hair et al. 2010). The number of potential clusters was then determined based on percentage increase in the agglomeration coefficient. When a cluster contained a small number of cases, these cases were removed and the hierarchical analysis was rerun. This number of clusters and the same variables were then specified in a K-means cluster function using the iterate and classify method. An ANOVA was run as part of the procedure to identify if any variables were redundant or did not adequately differentiate between the clusters. Non-significant variables were deleted and the process repeated to assess the stability of the resultant clusters. The final cluster solution was saved and used to identify any significant differences in response between the various clusters. Cluster membership was cross-tabulated with meat purchase decisions and demographic variables to see if the clusters could be differentiated further. Pearson chi-square tests were conducted and a result was regarded as significant if the probability was less than five percent. Categories were combined or deleted as appropriate and the tests re-run when 20 percent or more of the cells for the Chi-square test had an expected value of less than five or a cell had an expected frequency of less than one; and the result was significant or close to significant at the five percent level.

RESULTS AND DISCUSSION

The most important issues related with purchasing meat were: price of meat (56%), meat quality (35%), colour of meat (33%) and freshness of meat (30%). Respondents were also asked to rank the importance when purchasing meat of 35 items on a 5 point scale with 1 being not at all important and 5 being very important. The 7 items with the highest rating means were: good value for money (4.51), consistent quality (4.50), has good colour (4.49), nutritional (4.41), healthy (4.40), important for birth ceremony (4.40) and looks good or fresh (4.38). A list of the top 15 items is given in Table 1.

Table 1. Highest 15 items in ranking of meat purchase criteria

Item	Mean[1]	SD	n
Good value for money	4.51	0.69	344
Consistent quality	4.50	0.65	326
Has good colour	4.49	0.64	352
Nutritional	4.41	0.73	337
Healthy	4.40	0.75	340
Important for birth ceremony	4.40	0.98	336
Looks good/fresh	4.38	0.74	345
Flavoursome	4.34	0.76	329
Tender	4.33	0.75	335
Rubbery	4.22	0.80	323
Free of artificial additives	4.21	1.05	272
Appetizing	4.13	0.77	327
Low in cholesterol	4.05	0.98	321
Important for religious ceremonies	4.02	0.97	330
Plenty of meat	3.94	0.94	335

[1]Rating , 5 = very important, 1 = not important at all

The most commonly cooked meat types in terms of the percentage of respondents in a month and the mean number of times cooking the respective type of meat are presented in Table 2.

Table 2. Number of respondents cooking various animal protein sources in a month and the mean number of times cooking the respective meat per month[1]

Meat type	No.of respondent cooking	% of repondent cooking	No. of repondent not cooking	Monthly fequency cooking Mean	Range
Fish/seafood	326	92	29	12.6	0--30
Chicken	323	91	32	4.4	0--30
Beef	174	49	181	2.4	0--15
Goat	68	19	287	2.0	0--15
Duck	54	15	301	2.6	0--5
Caribou	13	4	342	2.1	0--5
Pork	12	3	343	1.7	0--4
Horse	10	3	345	1.6	0--4
Other birds	5	1	350	2.4	0--5
Other meat	3	1	352	2.3	0--5

n = 355.

Most people purchase their meat from a butcher in a traditional market (91%) and trader/butcher (66%), with less than half purchasing any meat from a supermarket (Table 3).

Table 3. Main sources for purchase of meat[1]

Source	All	Most	About half	Some	Never
Traditional market butcher	55 (*15%*)	130 (*37%*)	110 (*31%*)	29 (*8%*)	31 (*9%*)
Trader/butcher	27 (*8%*)	101 (*28%*)	61 (*17%*)	45 (*13%*)	121 (*34%*)
Supermarket	18 (*5%*)	37 (*10%*)	64 (*18%*)	48 (*14%*)	188 (*53%*)

[1]n = 355

Initially there were 35 items for analysis. However, with some items, such as free of artificial additives, a high number of respondents were not familiar, resulting in only 272 usable responses remaining. When this was combined with non responses from other items, the ratio of observations to variables was less than the 8:1 as recommended by Hair et al. (2010). In initial runs, three items with the lowest number of responses were removed. However, it was decided to remove items based on their factor loadings, whether they were cross loading, and the reliability coefficient of their factor. The initial run produced 9 factors. After applying the rules for exclusion the following items were excluded over a number of runs: free of artificial additives, important for cultural occasions, appetising, adds variety, quick to cook, low in calories, available in good size portions, plenty of meat, and healthy. The final solution resulted in 7 factors based on 26 items. These factors explained 68% of the variance.

After discussion of the meanings of the items in Indonesian, the factors were given the following names: Factor 1: Meat quality; Factor 2: Social status; Factor 3: Suits most people; Factor 4: Visual and sensory appearance; Factor 5: Easy to use; Factor 6: Health concerns; Factor 7: Hypertension concerns. The proportions of variance explained by each of these factors were: Meat quality (20%), Social status (11%), Suits most people (9%), Visual and sensory appearance (8%), Easy to use (7%), Health concerns (7%), and Hypertension concerns (6%).

The meat purchase criteria remaining in the final factor analysis were the basis for the cluster analysis. After removal of some outlier cases, the hierarchical cluster analysis led to the selection of four clusters. Analysis by the K-means cluster method confirmed this. An ANOVA of cluster membership on the clustering variables found the clusters were significantly different on all variables except 'important for birth ceremony'. The highest number of members of a cluster was 74 and the lowest number was 23. The average values of clusters for each of the meat purchase criteria were calculated and sorted into the factors identified previously. The average score for each cluster on each factor is shown in Table 4. Possible interpretations of these clusters are: Cluster 1: Not prestige focused - some concern about health but not culture/prestige; Cluster 2: Culture and prestige focused - focussing on culture/prestige items but not health or value; Cluster 3: Quality focussed – focused on value, but not prestige or health; Cluster 4: Health and status – most concerned about health but also status.

Chi-square tests were undertaken of cross tabulations between nominal and ordinal demographic and meat purchase variables and membership of a cluster grouping. The main variables to show significant differences between cluster groups were (Table 5): ethnicity (p=0.003), religion (p=0.007), the proportion bought from a supermarket (p=0.002) and the proportion bought from a meat seller (p=0.000). However, some other tendencies were apparent, which may have been significant with a larger number of respondents and fewer errors in questionnaires. Cluster 2 were mostly Bugis and Makassans, while Torajans were mostly in clusters 1 and 3 and other cultures in cluster 1. Similarly, most people from religions other than Islam were in clusters 1 and 3. Around two thirds of cluster 1 were likely to buy at least some meat from a supermarket, while greater than three quarters of cluster 4 were not.

Likewise, a greater proportion of respondents from cluster 1 were less likely to purchase meat from a traditional market seller, while cluster 4 mostly used traditional market sellers.

Table 4. Mean values of clusters on factors associated with meat purchase decisions

Factor	Mean values					Mean-centred values			
	1	2	3	4	Ave.	1	2	3	4
Meat quality	4.02	4.68	4.54	4.54	4.39	-0.37	0.30	0.15	0.15
Social status	2.77	3.83	2.00	3.67	3.19	-0.42	0.64	-1.19	0.49
Suits most people	3.35	3.93	2.92	4.10	3.64	-0.29	0.29	-0.72	0.46
Visual & sensory appearance	3.67	4.33	3.29	3.30	3.72	-0.05	0.61	-0.43	-0.42
Easy to use	3.77	4.00	2.96	3.40	3.65	0.12	0.35	-0.69	-0.25
Health concerns	4.00	4.01	2.54	4.36	3.92	0.08	0.09	-1.38	0.44
Hypertension concerns	3.51	3.12	3.09	3.91	3.45	0.06	-0.33	-0.36	0.46
Number of cases	74	55	23	48	200				

1 = Not prestige focused; 2 = Culture and prestige focused; 3 = Quality focused; 4 = Health and status

Table 5. Cross tabulation and chi-square test between cluster membership based on meat purchases and demographic and meat purchase variables

Variable	p	Comments on features of cluster membership*
Age	0.333	2 = older; 3 = middle aged
Employment	0.278	2, 3 = > government; 1 > own business; 4 > private sector
Education level	0.293	1 > secondary < tertiary; 2, 3 > tertiary
Ethnicity	0.003	2 mainly Bugis & Makassans; Torajans in 1 & 3; Other in 1
Religion	0.007	Most other religions in 1 & 3
Number of people in house	0.420	
Marital status	0.247	1 & 4 > not married; most in 2 married; 3 > widowed
Income per month	0.370	3 > middle income
Buy goat	0.220	4 > buy goat
Proportion bought from supermarket	0.002	1 > 2/3; 4 < 3/4
Proportion from market seller	0.000	1> never
Proportion bought from trader	0.131	4 > plus meat seller

* 1 = Not prestige focused; 2 = Culture and prestige focused; 3 = Quality focused; 4 = Health and status

Table 6. ANOVA of selected scalar variables by cluster membership for meat purchases

Variable	Mean values					Mean-centred values				p
	1*	2	3	4	Total	1	2	3	4	
Income, million Rp/month	2.21	2.65	2.68	1.80	2.29	-0.07	0.36	0.39	-0.49	0.019
Times cook chicken/month	3.97	4.31	4.78	3.56	4.06	-0.09	0.25	0.72	-0.50	0.700
Times cook fish or seafood/month	10.18	12.89	12.17	10.38	11.20	-1.02	1.69	0.97	-0.82	0.557
Times cook beef/month	1.22	1.84	0.61	0.73	1.20	0.02	0.64	-0.59	-0.47	0.009
Times cook goat/month	0.28	0.51	0.35	0.44	0.39	-0.11	0.12	-0.04	0.05	0.580
Number of respondents	74	55	23	48	200					

* 1 = Not prestige focused; 2 = Culture and prestige focused; 3 = Quality focused; 4 = Health and status

The relationships between income per month and the number of times the key meat sources were cooked by cluster membership were analysed using ANOVA. Both income ($p=0.019$) and times cook beef per month ($p=0.009$) returned significant differences between the clusters (Table 6). Clusters 2 and 3 had higher than average incomes and cooked chicken and seafood more often. Cluster 4 had lower income and were less likely to cook chicken, fish or seafood and beef. Cluster 2 were the highest beef consumers.

The findings of the study are discussed in terms of what sources of animal protein are purchased by consumers, where they are purchased, the criteria they use and possible consumer segments based on the clusters identified.

Consumption of Different Types of Animal Protein

In Indonesia, fish and seafood appear to be the most widely eaten source of animal protein (Fabiosa 2005; Suryana et al. 2008). Findings of this study are consistent with this as 92% of Makassar consumers said they cooked fish and seafood in a month and those who cooked it did so on average 12.6 times in a month. The latter figure is similar, although measuring slightly different things, with the Nielsen survey finding that Indonesians eat fish slightly more than 2.5 times per week (Banks 2008). This study also found a negative correlation between income and number of times fish is consumed per month, which is also consistent with the direction found by Fabiosa (2005) and Suryana et al. (2008).

Chicken is the other main source of animal protein (91%), while beef was the third most common source (49%). Apart from goat (19%) and duck (15%), other sources of animal protein form only a minor portion of the diet. While most people consume chicken, they only cook it about 1/3 as often as fish (4.4 times per month). Of note is that the number of times beef is cooked is highly correlated with the number of times goat is consumed (0.619; $p=0.000$). This may reflect similar attitudes to red meat consumption.

Where Meat Was Purchased

While supermarkets are becoming more common in Indonesia (Suryana et al. 2008), this study suggests they have not replaced traditional markets and suppliers as the main sources for meat with more than half of consumers never purchasing meat from them. Meat sellers in traditional wet markets remain the main source of supply, with over 80% of consumers obtaining about 50% or more of their meat from them. The other traditional source of traders/butchers was used, as a major source, by slightly more than 50%. Chamhuri and Batt (2009) also found that in Kuala Lumpur, Malaysia traditional markets were the preferred source to buy meat.

Criteria Used When Purchasing Meat

Unprompted, consumers suggested the *price of meat* was the most important criterion, while *good value for money* was ranked highest of the 35 items provided to consumers. Banks (2008) also found both *low price* and *good value for money* were important for meat consumers worldwide, although *good value for money* appeared to have a greater effect than just straight price. It is apparent therefore, that Makassar consumers are price and value conscious, perhaps more so than Western Australian consumers, for instance, where the *value for money* item was ranked much lower (Storer 1993). While *competitive price* was also a factor identified by Chamhuri and Batt (2009) for Malaysian consumers, they did not rank it against other factors.

Apart from price, *perceptions of quality* appears to be the next most important factor considered by consumers in Makassar. This was the most important factor in the factor analysis accounting for 20% of the variance and included items such as *consistent quality*, *has good colour*, *nutritional*, *looks good/fresh*, which also scored high on the list of meat characteristics criteria. Issues relating to meat quality also received the second, third and fourth highest

number of mentions in the unprompted question. Meat quality is a consistent factor considered by consumers in other countries as well (Storer 1993; Verbeke & Viaene 1999; Chamhuri & Batt 2009).

The next most important factors were those associated with *social status* and *appeal to people's social circle*. While the factors *social status* and *suits most people* ranked second and third in terms of proportion of variance explained in the factor analysis, they ranked lower in terms of the average factor score than all other factors except *hypertension concerns*. Storer (1999) had a similar factor for WA consumers, where it also had the lowest factor score. Obviously, consumers use these factors, but their use may be situation specific and therefore not considered in all purchase decisions. It is an area for further research and analysis.

Consumers in Makassar are similar to consumers elsewhere, with at least some of them concerned about the effect of meat consumption on their health. The areas of concern are mostly related to the affect of fat and cholesterol and a particular concern in Indonesia relating to some meats causing hypertension and high blood pressure. These factors are linked to heart attacks and strokes. While this is also a concern of consumers in European countries (Verbeke & Viaene 1999; Verbeke & Vackier 2004) unlike them Makassar consumers do not appear to be concerned about additives such as hormones, antibiotics, dioxin, BSE or animal welfare issues.

Characteristics of Market Segments

Cluster analysis (using the K-Means procedure) identified four main clusters. The largest cluster (37% of respondents) seemed to be concerned about health but not culture/prestige. This cluster had higher proportions of people who were: from other ethnic groups and religions, not married, owned their own business, likely to buy from supermarkets (2/3), but less likely from a market seller. The second largest (27%) was almost the polar opposite, focussing on culture/prestige items but not health or value. This cluster were more likely to cook seafood, beef and goat and were mainly Bugis and Makassans. It also had higher proportions who were: older, married, employed by the government, and had tertiary education. Another large cluster (24%) was health and culture focussed with higher average scores on these factors. They were the most concerned about fat, cholesterol and the link between meat consumption and hypertension/heart attack. People from this cluster had the lowest average incomes and had higher proportions of people who were: employed in the private sector, not married, bought from traditional traders and meat sellers but not from supermarkets, and bought goat. The smallest cluster (11%) was mainly concerned about value and quality. This group had the highest average incomes, a higher proportion who were: from middle income levels, middle aged, widowed, Torajans, from other religions, and had tertiary education.

The segments derived from the responses to meat purchase criteria are mainly delineated demographically by their ethno-religious background, rather than other factors. As expected the lowest income segment were less likely to buy from a supermarket, but the highest income segment were not the most likely to do so, however, they tended to be older. The segment with the highest level of younger, unmarried people were more likely to purchase from a supermarket.

CONCLUSIONS

The findings are consistent with other findings that, in Indonesia, as income increases the quantity of meat purchased increases relative to the quantity of seafood purchased. Similarly, most still purchase their meat from traditional markets, but the younger seem to be moving towards supermarkets. As in countries consumers are price and value conscious, are after quality and some are concerned about health effects. However, unlike people from developed economies, consumers do not appear to be as concerned about the presence of additives or animal welfare issues. Consumers can be divided into segments with different levels of concern about quality, value for money, health concerns and prestige and status. These segments also

are more likely to purchase their meat in different locations and to purchase different amounts of the various meat protein sources. The segments tend also to be different in terms of the ethno religious background.

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