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# HOUSEHOLD'S FOOD CONSUMPTION PATTERN DETRERMINANTS: A RURAL-URBAN COMPARISON

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**ABSTRACT**

The present study examined the impact of socioeconomic and demographic factors on household's monthly expenditure regarding food commodities in district Lakki Marwat, KPK, Pakistan in 2015-16. For this purpose, primary data were collected from 360 households through well-designed questionnaire. Data analysis was accomplished using descriptive statistics and regression model. Results revealed that on average Rs.17633 out of a total monthly income of Rs.44129 were spent on food consumption. On average each household was consist of 10 persons. 96% of total respondents were educated and 85% of household responsible persons were found to be male. Regression analysis revealed that monthly income of household head, household size, education of household head and location significantly determined the expenditure on food commodities. Income elasticity (Engel elasticity) of less than unity (0.33<1) confirmed that food commodities are necessities and supported the Engel law. Urban households were found to be more responsive to food commodities as compared to rural households. Household size has positively influenced the monthly expenditure on food commodities while education has negatively influenced the food expenditure of households. One year of extra education reduced the household food expenditure by 2%. Empirical results also confirmed that as compared to urban households, rural households consume more (6%) on food commodities.

**KEYWORDS:** food consumption pattern; Engel elasticity; socio-economic factors.

**INTRODUCTION**

Human wants are unlimited whereas the resources to fulfill these wants are limited. Thus consumption plays a significant role in daily life. Each and every person faces consumption on different activities like shelter, clothing, education, health, food, transportation etc. The most important among these is the consumption on food commodities as food is the basic necessity of all human beings. In this regard all people are making some expenditure on food commodities to maximize their satisfaction.

Economists usually defined the concept of utility as, "the satisfaction or welfare that a person achieves from different commodities subject to the budget constraint" (Parkin, 2005; Nicholson, 2008). Various households spend their incomes on food items in different ways known as food consumption patterns. These patterns are used to indicate their standard of living. The major factors determining food consumption pattern are household income, household size (family members), prices, location, number of employed persons per household etc. (Siddique, 1982).

Engel's law (Ernst Engel, 1857) states that as the total expenditure of individual/household increases, the percent share of their income spent on food commodities decreases. Expenditure elasticity's also known as Engel elasticity's vary with change in income of household. Food consumption pattern are different for both rural and urban areas of Pakistan (Burney and Khan, 1991). Along with income, household size is also determining the food consumption pattern. Houthakker, 1961 stated that household size have two types of effect known as "specific effect" and "income effect". As household size increases, it raises the need for different commodities, known as "specific effect". On the other hand, it also makes a family poorer in per capita terms, known as "income effect". Assuming per capita total expenditure constant, as household size rises, per capita demand for food commodities declines (Abdulai, 2003).

Food consumption pattern is dynamic in nature. It changes continuously with change in time and human needs and demographic characteristics may influence these patterns. Davis *et al.,* (1983) concluded that general education of household has no significant impact on food consumption pattern; however, nutritional knowledge of household affected the food expenditure pattern. Demographic factors such as gender, age, marital status, place of residence and employment are significant determinants of food consumption pattern (Kostakis, 2012).

In developing countries like Pakistan, expenditure on food commodities is used to indicate the living standard of the people in society (Ahmad *et al*., 2015). Many developing countries are facing the problem of poverty. Pakistan being a developing country also faces this serious problem. According to Official Pakistani Population Clock, 2010, Pakistan is the sixth largest populated country in the

world. About 22.6 percent population of the country lies below the international poverty line of US $1.25 per day (Indicators, 2011). Most people in rural areas are unaware to consume food items with required level of nutrition due to scarcity of money and lack nutritional knowledge. In contrast, people in urban areas are well educated and they have good knowledge about nutrition which enables them to choose balanced diet (Shafique *et al*., 2006).

The target area, Lakki Marwat is also a poor district of Khyber Pakhtunkhwa, Pakistan. The living standard of households in this district is in a very verse conditions. There are numerous problems like electricity, education, roads, water etc. but the major problem among all these is the unavailability of suitable food. The reason is that the purchasing power of the household is getting lower with increasing prices of food commodities. A large portion of the income of residents living in this economy is used in consumption of food commodities. Therefore, it is very important to know about the factors influencing food consumption pattern in this area.

Keeping in view the above facts, present study was mainly focused on the determinants of food consumption expenditure and partly on the comparison of food consumption pattern of both rural and urban sector of the district Lakki Marwat, Pakistan.

**MATERIALS AND METHODS**

The present study was conducted in district Lakki Marwat, KPK, Pakistan in 2015-16. For this purpose three villages (Tatter Khel, Shahbaz Khel and Aba Khel) were selected at random from rural sector and three (Sarai Naurang, Lakki and Darra Pezu) from urban sector of the district. Simple random sampling technique was used to make the sample space. A total of 360 respondents (Households) were selected as a sample size. Primary data were collected through well-structured questionnaire on consumption of various food commodities groups. The included food commodities were wheat, meat, rice, milk, vegetables, pulses, edible oil, fruits, eggs, sugar and tea. Data were also collected on socioeconomic and demographic characteristics of household head.

**MODEL SPECIFICATION**

**THEORETICAL MODELLING**

Like Ahmad *et al*., (2015); Rehman *et al*., (2014) and Safdar *et al*., (2012), the present study was also based on cross sectional data. Therefore, it is assumed that all consumers/households face the constant prices of all food commodities available for sale. This assumption leads us to the following food consumption function;

$$X_i = f_i(Y) \quad \text{---------- (1)}$$

Equation (1) postulates that expenditures on food commodity ($X$) by $i^{th}$ individual/household is the function of income of that particular individual/household as presented by Engel. The household size

was also included in formulation of Engel function as household size is positively correlated with the household income (Houthakker, 1961). By including household size as an explanatory variable in the model, equation (1) is rewritten as;

$X_i = f_i\ (Y, HHS)$ ---------- (2)

Demographic factors may also believe to influence the household expenditure on food commodity or commodity group. These demographic determinants are household head age, gender, education, marital status, location etc. Incorporating these demographic characteristics in the Engel function extended equation (2) as under;

$X_i = f_i\ (Y, HHS, AGE, GEN, EDU, MST, EMST, LOC)$ ---------- (3)

Where

$X_i$ = Expenditure on food commodities by $i^{th}$ household

*Y* = Monthly income of household

*HHS* = Household size (number of persons in family)

*AGE* = Age of the household head

*GEN* = Gender of household head

*EDU* = Education of household head

*MST* = Marital status of household head

*EMST* = Employment status of household head

*LOC* = Location of household

**EMPIRICAL MODELLING**

Selection of an appropriate functional form of the model is a matter of great concern. Many functional forms such as linear, quadratic, semi-logarithmic, double-logarithmic or log-log etc. have been used (Gujarati, 2009). In our study, we have selected the log-log or double-logarithmic functional form for analysis. This functional form was selected on two merits. One is that its estimation and interpretation is quite easy and secondly, it is quite reasonable to estimate the expenditure elasticity's (Islam and Siwar, 2005). Baber and Shahnawaz (2010) also used the same functional form for the estimation purposes of Engel's elasticity's.

The functional form of food consumption pattern presented in equation (3), is therefore expressed in mathematical form as;

$X_i = \alpha_i + \beta_1 Y + \beta_2 HHS + \beta_3 AGE + \beta_4 EDU + \beta_5 GEN + \beta_6 MST + \beta_7 EMST + \beta_8 LOC + u_i$ ---------- (4)

By taking natural log to both sides of the equation (4), the log-log or double-logarithmic form of the model was found as;

$$lnX_i = \alpha_i + \beta_1 lnY + \beta_2 lnHHS + \beta_3 lnAGE + \beta_4 EDU + \beta_5 GEN + \beta_6 MST + \beta_7 EMPS + \beta_8 LOC + u_i \text{----------} \quad (5)$$

**STATISTICAL ANALYSIS**

Statistical and econometric technique of ordinary least square (OLS) was applied to the double-log multiple regression (Gujarati, 2009) to find out the influence of socioeconomic and demographic factors on food expenditure pattern. Econometrical packages of SPSS and Gretl were used for analysis purposes.

**RESULTS AND DISCUSSION**

**DESCRIPTIVE STATISTICS**

Table 1 showed the summary statistics of household's socioeconomic and demographic factors that determines monthly expenditure on food commodities in district Lakki Marwat. The table showed that on average each household consumed Rs. 17633 on food commodities out of total monthly income of Rs. 44129 or more precisely, 39.96% of total monthly income was spent on food items. On average each household was consisted of round about 11 persons. The mean age of household responsible person was found about 39 years. 96% of households head were educated and 85% of household responsible persons were male. Similarly, 78% of household head were married and 86% were found to be employed.

**REGRESSION ANALYSIS**

**FOOD CONSUMPTION PATTERN OF OVERALL DISTRICT**

The estimated results of regression analysis to determine the impact of socioeconomic and demographic factors on monthly food expenditure are given in table 2. The value of F-statistic shows goodness of fit/overall significance of the model. In this model, the calculated value of F-statistic is 61.667 and is highly significant at 5% level of significance, indicated that the model is completely significant. The coefficient of determination ($R^2$) is 0.57, indicated that 57% changes in dependent variable (monthly expenditure on food commodities) were explained due to the explanatory variables of the model. The analysis showed that there is a positive significant relationship between monthly income (total expenditure) and expenditure on food commodities. The estimated value of expenditure elasticity indicated that a one percent increase in total expenditure raised the food expenditure of households by 0.33 percent. Expenditure elasticity of less than unity (0.33<1) confirmed that food commodities are necessities. This value is also in line what the Engel's law says. Food expenditure was also significantly positively influenced by household size. One percent increase in household size lead to raise the expenditure on food items by 0.35 percent approximately. The results also showed education of household head as a highly significant factor of

food consumption pattern. There exists an inverse relationship between education of household head and expenditure on food commodities. The negative coefficient value of education indicated that as education of household's responsible person increases by one year, it leads to decrease the expenditure on food items by 0.02 percent. Finally the empirical results indicated that expenditure on food commodities is significantly different in both rural and urban areas. The coefficient value of location showed that as compared to rural households, urban households spent 0.06 percent less on food commodities.

**FOOD CONSUMPTION PATTERN FOR URBAN AREA OF DISTRICT**

Table 3 displays empirical results of urban households in district Lakki Marwat. In the analysis monthly income, household size and education of household head were found to be significant factors of monthly expenditure on food commodities. All of them are significant at 1% level of significance. Monthly income and household size were positively correlated with monthly food expenditure while education of household head has inverse relation with monthly food expenditure. Expenditure elasticity (0.37) was less than unity, confirmed that food items are necessities. Size elasticity also directly influenced the expenditure on food commodities. The negative sign of coefficient of education showed that a one year increase in education of household head declined the expenditure on food commodities by 0.025 percent. Age of household head directly but insignificantly effected the food expenditure. Similarly, gender of household head, marital status and employment status were estimated as (-0.05), (0.01) and (0.04) respectively, but they are also found to be insignificant. In this table the value of F-statistic was found to be significant at 5% level of significance, showed that the overall regression model for urban households is good. The value of $R^2$ showed that explanatory variables entered in the model explained 57% variation in monthly expenditure on food commodities.

**FOOD CONSUMPTION PATTERN FOR RURAL AREA OF DISTRICT**

Table 4 presents regression results of food consumption pattern for rural households. The estimated results of the model identified monthly income as a significant factor of food expenditure pattern. The expenditure elasticity is 0.13, confirmed that the proportionate increase in expenditure on food items is less with respect to proportionate increase in monthly income. This also confirmed the Engel's law about consumption on food commodities. Household size was more responsive in rural household. 0.68% increase in food expenditure was found due to one percent increase in household size. There also exists negative significant relationship between education of household head and monthly expenditure on food items. One year increase in education of household responsible person declined the expenditure on food commodities by 0.023 percent. F-statistic provides a complete test

of significance/goodness of fit of whole regression function. Its value was found 47.274, which is significant at all 1%, 5% and 10% level of significance. The value of $R^2$ measures the power of explanatory variables included in regression model to explain all the variations in dependent variable. The table showed that 59% of variations in monthly expenditure on food commodities were explained due to the chosen explanatory variables of model.

**COMPARISON OF RURAL/URBAN FOOD CONSUMPTION PATTERN**

The expenditure elasticity in urban and rural areas was 0.37 and 0.13 respectively. The higher value of expenditure elasticity found in urban households means that urban households are more food responsive in comparison to rural households. In other words, as monthly income of household in both urban and rural areas increases by one percent, expenditure on food commodities in urban and rural households rises by 0.37 and 0.13 percent respectively. Size elasticity also differed both in urban and rural areas. The size elasticity of both urban sector and rural sector were 0.33 and 0.68 respectively which has influenced household's monthly food expenditure more in rural sector than in urban sector. Education was also found to be significant in both urban and rural sector of the district. Empirical results confirmed that education is more effective (0.026) in urban sector than that of rural sector (0.023).

**CONCLUSION**

In empirical analysis it is concluded that household monthly income, household size, education of household head and location have considerably influenced the monthly food consumption pattern in district Lakki Marwat. Household monthly income and household size have positively influenced whereas education have negatively influenced the food consumption pattern. Further, it is also determined that in both rural and urban sectors the food consumption pattern is different from each other. The empirical results established that 33% of increased income is spent on food consumption purposes. Therefore, it is suggested that in order to enhance the standard of living, government should raise household's monthly income or control the prices of food items. The results also confirmed that education has an inverse relationship with food consumption pattern. It is therefore necessary for government to adopt such type of policies by which the educational position of people should increase in order to minimize the expenditure on food items consumed.

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**Table 1: Summary statistics of variables for overall district**

| Name of variable | Mean | Percentage of mean | Standard deviation | Min: | Max: |
|---|---|---|---|---|---|
| Monthly exp: on food | 17633 | ----- | 7126.2 | 6337.5 | 41783 |
| Monthly income | 44129 | ----- | 17132 | 12000 | 88200 |
| HHS | 10.71 | ----- | 4.10 | 3 | 20 |
| Age | 39.75 | ----- | 10.70 | 20 | 64 |
| Education [a] | 0.96 | 96 | 0.19 | 0 | 1 |
| Gender [b] | 0.85 | 85 | 0.36 | 0 | 1 |
| Marital status [c] | 0.78 | 78 | 0.42 | 0 | 1 |
| Employment status [d] | 0.86 | 86 | 0.37 | 0 | 1 |
| Location [e] | 0.50 | 50 | 0.50 | 0 | 1 |

[a] household head if educated = 1; uneducated = 0.

[b] household head if male = 1; female = 0.

[c] household head if married = 1; single = 0.

[d] household head if employed =1; unemployed = 0.

[e] household head if urban = 1; rural = 0.

**Table 2: Regression analysis of monthly expenditure on food commodities for overall district Lakki Marwat**

| Variable name | Coefficient | Standard error | t-ratio | P-value |
|---|---|---|---|---|
| Constant | 5.60 | 0.41 | 13.78 | 0.00 |
| Monthly income | 0.33 | 0.03 | 8.72 | 0.00 |
| Household size | 0.35 | 0.05 | 7.41 | 0.00 |
| Age | 0.04 | 0.05 | 0.65 | 0.51 |
| Education | -0.02 | 0.00 | -6.59 | 0.00 |
| Gender | -0.06 | 0.04 | -1.51 | 0.13 |
| Marital status | 0.00 | 0.03 | 0.07 | 0.94 |
| Employment status | -0.03 | 0.04 | -0.92 | 0.36 |
| Location | -0.06 | 0.04 | -1.70 | 0.08 |
| $R^2$ = 0.57 | | F-statistic = 61.67 | | |
| $R^2$ (Adjusted) = 0.56 | | P-value (F) = 0.00 | | |

**Table 3: Regression analysis of monthly expenditure on food commodities for urban area of district Lakki Marwat**

| Variable name | Coefficient | Standard error | t-ratio | P-value |
|---|---|---|---|---|
| Constant | 5.15 | 0.59 | 8.77 | 0.00 |
| Monthly income | 0.37 | 0.05 | 7.39 | 0.00 |
| Household size | 0.33 | 0.06 | 5.41 | 0.00 |
| Age | 0.51 | 0.08 | 0.62 | 0.53 |
| Education | -0.02 | 0.01 | -4.29 | 0.00 |
| Gender | -0.05 | 0.05 | -0.83 | 0.40 |
| Marital status | -0.00 | 0.06 | -0.04 | 0.97 |
| Employment status | -0.04 | 0.06 | -0.64 | 0.52 |
| $R^2$ = 0.57 | | F-statistic = 34.38 | | |
| $R^2$ (Adjusted) = 0.55 | | P-value (F) = 0.00 | | |

**Table 4: Regression analysis of monthly expenditure on food commodities for rural area of district Lakki Marwat**

| Variable name | Coefficient | Standard error | t-ratio | P-value |
|---|---|---|---|---|
| Constant | 6.64 | 0.60 | 11.07 | 0.00 |
| Monthly income | 0.13 | 0.06 | 2.14 | 0.03 |
| Household size | 0.68 | 0.06 | 10.84 | 0.00 |
| Age | 0.12 | 0.08 | 1.45 | 0.15 |
| Education | -0.02 | 0.01 | -5.47 | 0.00 |
| Gender | -0.08 | 0.06 | -1.34 | 0.18 |
| Marital status | -0.04 | 0.05 | -0.90 | 0.36 |
| Employment status | -0.04 | 0.04 | -0.90 | 0.37 |
| $R^2$ = 0.59 | | F-statistic = 47.27 | | |
| $R^2$ (Adjusted) = 0.57 | | P-value (F) = 0.00 | | |