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Original Article:

Buying Practices and Prevalence of Adulteration in Selected Food items in a Rural Area of Wardha District: A Cross - Sectional Study

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Abstract: Introduction: Food adulteration in India includes both willful adulteration and substandard food which do not confirm to prescribe food standard. There is striking paucity of reliable data with regard to extent of adulteration and documentation of food borne illnesses reflecting lack of attention and focus on this problem. **Objectives:** To find the prevalence of food adulteration, buying practices of selected food items and their awareness towards food adulteration act. Also assess relationship between per-capita incomes, education of respondents, and food borne illnesses with magnitude of adulteration in each house-hold. **Methods:** With the best estimate of 50%, sample size comes to 89. By stratifying the village according to social strata and randomly selecting the households with PPS. Questionnaire was administered to fulfill our objectives and food items were tested. Data analyzed by numeral with percentage, Pearson moment correlation, F test and chi square test. **Results:** In 68.5% Households, wife (home-maker) buys the grocery. Majority of them never read the food labels. All the selected food items were adulterated ranging from 76 % to 11%. Mean percentage of purity was highest in literates (47.5 ± 22.48) than illiterates and just literates. Food borne illness was prevalent in households with low purity of food. Association was found between per capita income and percentage of purity (0.765).

Key Words: Adulteration; Awareness; Per capita income; Food borne illness

Introduction:

Food adulteration in India includes both willful adulteration and substandard food which do not confirm to prescribe food standard. Rarely any food item is spared from malicious practice of food adulteration. According to a news article published in year 2002, The Times of India Hyderabad: "There might be iron filings in the sugar you use, including what is distributed through fair price shops all over the state. [1] In a shocking revelation, the Food and Drug administration (FDA) Mumbai in 2007, has said that "nearly 25% of the milk produced in the state is adulterated."[2] National health account 2004-05 shows that minimal of 0.3% of International classification of health accounts (ICHA) functions is spent on prevention of food adulteration[3], though it leads to spectrum of disease from minor health problem like diarrhea to serious problem like cancer, from curable to incurable disease that can ruin ones lifestyle and life.

The three main cause of food adulteration are

1. Dishonesty of traders to make quick and easy money
2. Loopholes in food adulteration act – as evident by fact that eighty percent of food adulteration accused walk free in Gujarat due to laxity and delay in prosecuting them.[4]
3. Ignorance of consumer regarding their right and responsibilities towards food adulteration resulting in faulty buying practices. Food labeling is a tool for consumer to make healthy and informed choices which is their right and responsibility is to read it. But according to one survey only 59% of consumers are able to understand it.[5]

There is striking paucity of reliable data with regard to extent of adulteration and documentation of food borne illnesses reflecting lack of attention and focus on this problem. Hence present study was carried out to find the prevalence of food adulteration, buying practices of selected food items and their awareness towards food adulteration act. Further we had assessed relationship between per-capita incomes, education of respondents, food borne illnesses with magnitude of adulteration in each house-hold. After 56 years law, it is clear that mere implementation is not enough, therefore along with our study we had equipped the house-makers with simple household techniques for identification of food adulteration for selected food items.

Methods

As food adulteration is widely prevalent in society ,we have consider best estimate to be 50% , with 95% of confidence interval and alpha error 0.05 % and 10% non response rate, sample size was 89. Mahakal village situated in Wardha district with population of two thousand was selected. Sampling was done by stratifying the village into five social strata and randomizing household from each stratum equal to proportional to

population size. Questionnaire was administered to member of each house-hold who is mainly responsible for buying the groceries. Questionnaires included information on per- capita income, buying practices, awareness on quality food symbols, history of food borne illness in the house hold in last four weeks. Depending on availability and simplicity of procedure for detection of adulterants, ten food items were selected. After informed consent, selected food items were tested.

If we see the list of adulterated items, it is very large. Common people already know about the adulteration in rice, dal, wheat and they are already aware of it. The spices and other selected items are mostly used in this region and available in almost every house. All of this items are sold loosely here. Along with the testing we had also demonstrated them, the easy simple methods to detect adulteration as seen below and made aware of food adulteration practices in other items too. This doesn't require any laboratory as evident from table below. Considering our convenience for testing the adulteration and availability of items we selected these items.

Table 1: Methods used for detection of adulteration in selected food items

Substance	*Adulterant*	*Test*
Asafoetida (hing)	Rasin or gum, scented and coloured	1. Pure asafetida dissolves in water to form a milk white solution. 2. Pure asafetida burns with a bright flame on being ignited
Cardamon (Elaichi)	The essential oil is removed and the pods are faced with talcum powder	On rubbing the talcum will stick to the fingers, on tasting if there is hardly any aromatic flavor. it indicates removal of essential oil.
Chilles	Sawdust and colour	Sprinkle on the surface of water, wood shavings float and added colour will stain water.
Cinnamon(Dalchini)	Cassia bark which resembles cinnamon in taste and colour	Added colour comes out in water
Cloves(lavang)	Essential oil may have been removed	If the cloves will be shrunken in appearance.
Rawa	Iron fillings to add weight	Pass a magnet through the rawa. Iron fillings will cling to it
Sago	Sand	If sand is mixed, it can be easily detected visually
	Talcum	Greasy feel in mixing with water
Scented Supari	Saccharine	Bitter after taste of saccharine
	Small pieces of coloured wood	When put in water, pieces of wood float and their colour will spread.
Shahajira	Charcoal or brick powder	Rub a little quantity of shahajira between the palms. The palms will be blackened, if charcoal is present
Tea dust	Exhausted tea leaves dried. Powdered and artificially coloured	Sprinkle the dust on a wet white paper. Spots of yellow, pink and red coloured appearing on the paper indicate that the tea is artificially coloured.

Accordingly in each family, percentage of purity was determined by Total no. of food without adulteration / total no. of food tested X 100. The response rate was 100%.

Data was analyzed by numeral with percentage, Pearson moment correlation, F test and chi square test.

Results:

In 68.5% households, wife (home-maker) buys the grocery, 64% of the respondents belong to social class IV and V while 59.5% of them were illiterate.

Table 2: Demographic profile of respondents who buys the grocery for home

Profile		Frequency	Percentage
Distribution of respondent	Wife (home-maker)	61	68.54%
	Husband (head of family)	17	19.1%
	Other	11	12.36%
Socio-economic status	I	7	7.8%
	II	10	11.23%
	III	15	16.85%
	IV	26	29.21%
	V	31	34.83%
Education status	Illiterate	53	59.55 %
	Just literate	6	6.74%
	Literate	30	33.71%

Of the respondents, 86%, 70.7%, and 43.8% never see the nutritional label, manufacturing and expiry date and weight respectively but 77.5% always see the maximum retail price of product. Only 10% always buy the packed sealed edibles.

Table 3: Buying practices of respondents

Buying practices	Always	Occasional	Never
Packed sealed edible	9 (10.11%)	29 (32.58%)	51 (57.3%)
Check MRP	71(77.53%)	12 (13.48%)	6(9%)
Check weight	22(24.72%)	28(31.46%)	39 (43.82%)
Manufacture and expiry date	4(4.49)	22(24.72)	63(70.79)
Nutritional label	0	12(13.48)	77(86.52)

Cloves was found to be maximally adulterated in 73% households followed by supari (68.5%), tea (60.67%), chillies (51.68%) etc.

Table 4: Adulteration found in various food items.

Food items	Adulterated	Percentage
Cloves	65	73.03 %
Supari	61	68.54 %
Tea	54	60.67 %
Chilies	46	51.68 %
Cardamom	43	48.31 %
Jeera	34	38.20 %
Cinnemom	22	24.72 %
Asafetida	21	23.59 %
Sago	11	12.36 %
Rawa (semolina)	9	10.11 %

Mean percentage of purity was highest for literates (47.5 ± 22.48), followed by just literates (47.5 ± 22.52) and lowest for illiterates (30.22 ± 2.99). Difference between means of literate and illiterate was found to be significant (Table 5).

Table 5: Educational status and mean percentage of purity found in household

Education	Frequency	Mean % purity	S.D
Illiterate	53	30.22	2.99
Just literate	6	47.5	22.52
Literate	30	72.2	22.48
F ratio - 16.26 ***			

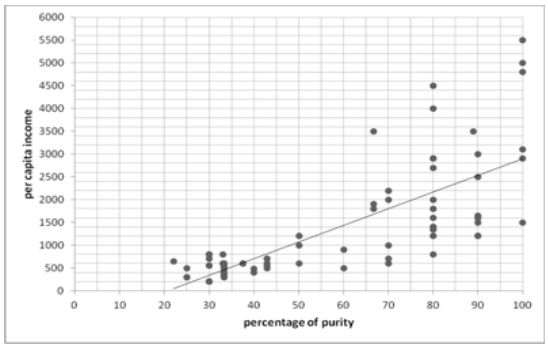

Figure 1: Family per capita income and mean percentage of purity found in household.

r – 0.765, S.E – 0.056, t – 8.884 ***

Significantly moderately positive correlation was found between family per capita income and mean percentage of purity found in households. (r – 0.765) (Fig 1.)

Discussion:

Adulteration and its ill effect on health is known to everyone but no one in picture is trying to solve it. Strong regulations are there in code of conduct but not implemented to full extent. Consumers are unaware of their rights and responsibilities. With this background we are trying to explore the extent of adulteration in community, understand the consumer's knowledge, their buying practices, rights and responsibilities towards food adulteration and equip them with simple detection techniques of selected foods.

In present study out of 89 families, in 68.5% families' wife (homemaker) buys the grocery. Mean age of respondents was 35± 6.2 yrs, 60% of them belong to class IV and V while 59.5% were just literate and only 33% were literate. Homemaker is mainly responsible for buying grocery in families, so she should be main focus of consumer's movement. 77% of consumers always check for MRP while only 24.7% checked weight, 4.5% manufacturing and expiry date while none of them read the nutritional label. Only price is the important factor while buying the grocery and nutritional value is of no value to them. In other study done in south India 68% read label for date before expiry while only half of respondents check the ingredient of food label.[6] Literacy is more in South India but still they are unaware of nutritional values. According to one survey only 21% of Indian food had used local language so most of consumers are not able to understand the food labels. [7]

38% buys the packed sealed edible at one time or other. Study conducted by NIN 2006 revealed 60% of households buy packed food but only 21% read the labels.[8] Later study was conducted in megacity where packed edibles are available. In present study main reason for not buying packed sealed edibles was non availability and high prices. 40% 0f respondents know about Agmark, FPO, and ISI as quality marked product but only 23.9% are able to recognize symbol on food label which is similar to other study carried in slum area of Hyderabad. [9] Studies among south Indian women indicated although women see the label on packed food for manufacture and expiry date but many of them are not aware of quality symbols.[6] Only 24.7% respondent knows whom to complain in case of adulteration but all of them accepted that they had never tried to lodge a complaint due to tedious procedure.

On testing ten selected items in 89 households, mean percentage of purity was 54.67% ± 2.689, S.D 25.36, that means in each household out of this ten food items at least half of them were adulterated. Highest adulteration was found in cloves followed by supari, tea, chillies and least in rawa. Adulteration is common in food stuff where they can be easily concealed. Mainly it was done intentionally by local shops with easily available adulterants to add the weight, improve the appearance and abstract the useful substance. Adulteration is high in small cities and villages as revealed by Roday(2002) due to low purchasing power and consumers ignorance about their rights for safe food.[10] Moderately positive correlation significant at 0.01% was found between family income and percentage of purity in each household. Also F ratio was computed for mean percentage of purity and respondent's education status was found to be highly significant. To find if there exist any differences of mean percentage of purity in illiterate and just literate, t test was computed. The result revealed there is no significant relationship in two groups. So it is only the formal education and high per capita family income that influences the amount of adulteration found in households. Other studies carried out by Dhyani states that education and family income strongly associated with consumer's awareness.[11]

Twenty one families had history of food borne illness in past four weeks. When two groups with cut off of 50% of purity was compared for past history of food borne illness, the difference was found to be highly significant.($\chi 2$ – 7.612). A striking observation during study showed that prevalence of diarrhea was high among pre-school in spite of access to safe drinking water, toilet facilities and strong health infrastructure. This was mainly attributed to food hygiene and safety. Thus adulteration is slow poison weakens the health of family, increasing the health care cost pushing them to poverty and vicious cycle continues.

Conclusion:

Adulterant is rampant in poor strata of society due to consumer's illiteracy and ignorance of their rights responsibilities towards food adulteration. High incidence of food borne illness is found in families who consume adulterated food.

Recommendations:

The government on its part can make the consumer aware of their rights and responsibilities by campaign make the complaint procedure consumer friendly, availability of quality fair price shop for poorest quintiles. Only when the people are aware of their rights to demand pure and nutritive food instead of becoming brunt and suffering quietly and take to task the unscrupulous traders and manufacturer by way of filing public interest litigation in court, then only such serious social evil of food adulteration can be aborted to certain extent. Honest implementation of law is a key approach.

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