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A sociological study about the causes and consequences of milk adulteration: A case study of district Faisalabad

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Abstract---Extraordinary nourishing significance of milk as well as comparative lower price related to other diets containing protein made it a particular portion of dietetics amongst the inhabitants around the globe. Conversely, the amplified demand of milk globally made it disposed to gigantic intensities of deceitful actions. It is a highly risky product for falsified deeds for getting economic gains where culprits can intensify nutrition protection threats and reduce nutritious worth by deliberated contamination along with the deficiency of maintenance, negligence in deprived cleanliness circumstances, no refrigeration conveniences. Current study was directed to expose the causes, harmful consequences and solutions for the prevention of this menace. For this purpose, 60 respondents from supply chain

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conveniently and 150 respondents from consumer chain systematically. Due to adulteration in milk, it became considerably low nutritious levels which also be lethal for community well-being exposed through current milk adulteration outrages which caused risky issues related to socio-economic conditions in addition to psychological and serious health concerns related to stomach, eye sight, cardiac, renal, and lever failure due to hazardous additives used as adulterants in milk. A huge majority of 84.7% from consumer chain while 96.7% respondents from supply chain gave response in favor of statement that water was used as an adulterant in milk. A bulk stream of the respondents from consumer chain (88%) and from supply chain (91.7) gave their opinions that health problems related to stomach diseases were faced by users by using adulterated milk.

Keyword---sociological study, causes and consequences, milk adulteration.

Introduction

Milk is a delicate food item bearing a lifespan of four hours at ordinary temperature. Pakistan is 5th largest milk producing country in the world with supplementary production of 54 billion litters and 11.3% contribution in GDP. The estimated population of Pakistan is 224.78 million in 2021 according to the National Institute of Population Studies (NIPS) (Pakistan Economic Survey, 2021-2022). The latest Economic Survey of Pakistan indicates that 172 liters of milk available for each person per year (Pakistan Economic Survey, 2021-2022). Milk is a vital component of the human diet and includes several necessary elements such protein, lactose, fats, minerals, and vitamins in a proper or balanced proportion. It also gives a quick and simple way to add these nutrients to the diet within very few. According to the food pyramid, an adult should eat two to three pieces of dairy-based foods each day for improved health and life maintenance (Mabood et al., 2017). From 530 million tonnes in 1988 to 843 million tonnes in 2018, the global milk output has increased by more than 59%. (FAO, milk report, 2022).

Mostly milk is produced for entire consumption but cost of production varies due to labor wages, animals, use of technology, water and fodder costs. Economic adulteration has been a long-standing issue for the food sector. Food adulteration has been a problem since the dawn of civilization since it not only lowers the nutritional value of food products. (Choudhary. A, et, al 2019). Recent high-profile cases, such as the Chinese milk scandal in 2008 and the EU horsemeat scandal in 2013, have highlighted the vulnerability of the food supply system to adulteration and authenticity fraud. The rising demand for food and the globalization of the supply chain have led to an increase in food fraud. (Valand, R. et al, 2019).

Following the worldwide trend, production of milk in Asia also increased from eighty million tons to two hundred and seventy million tons in 1983-2013. India produces 22% of the world's milk, with the United States, China, Pakistan, and

Brazil following with the remaining 24%. India (FAO, milk report, 2022). India is on the top in production of milk. 85% of total milk production was from cows in 2013. Buffalo milk was on account for 11%, from goats it was 2%, 0.4% from sheep and camel. Horse, donkey, yaks etc contributed the remaining share (FAO, Milk facts, 2022). Milk can be adulterated by different ways which can affect the quality of milk and its further products, this adulteration may be willful or unintentional. It has to be done for profit gain at the stake of human health. Generally, it is practiced with low income are less aware community. The most common adulterants usually detected in milk and its products are water, fat extraction, addition of skimmed milk for thickness, flour, urea, starch, chlorine, salt are also used. Globally, there have been several reports of milk adulteration where ingredients such superfluous water, foreign proteins, whey proteins, melamine, urea, vegetable or animal fats, as well as other minor milk fat components, were introduced as potential adulterants in milk and milk products. (Francis, A. et al, 2020).

Milk is adulterated chemically due to keep it fresh, fragrant and to increase its shelf life. Gap in demand and supply is also the reason to add water especially in summer when production level becomes low as compared to demand. Lower level of affordability and profit gain also provoke the producer to sell at cheap rate. Due to commercial adulteration, milk quality has been consistently abused throughout the period. To increase the quantity of the milk and boost profit, adulteration is accomplished by mixing in several less expensive adulterants. (Chugh, R. and Kaur, G. 2022). Low law enforcement is also the reason behind this act of adulteration. Milk adulteration has risen during history and has become an issue. Up to date inquiries disclosed the presence of adulterated dairy items in all over the world, especially in developing countries like India, China, Pakistan and Brazil, having high rate of production and as well as a high level of this malpractice. One of the most important and commonly produced agricultural products is dairy. (FAO, 2022).

On the other hand, in developed countries like European Union (EU) and United States of America (USA), there is very low rate of milk adulteration. There is a very high standard of food safety in UE so there is a scarcity of milk adulteration providing the few events together with an illegal import of adulterated milk with melamine from China (European Commission, 2015). In order to increase both overall efficiency and citizen trust, the EU revised and improved its official control regulations for the agri-food chain. (European Commission 2022). At the same, the USA has functionalized high standards of food security and along with this short supply chains and strict scrutiny system for quality has numerously shrink the menace of milk adulteration. Unprofessional conduct taking place in developing countries seems to mainly undeterred by the cause of rigorous control by the food authorities (Padala, 2014). The shelf life of milk and other dairy products, low customer purchasing power, deteriorated socioeconomic structure, disorganized state of the dairy industry, and other food processing units, lack of strict and effective regulatory system, and lack of appropriate, rapid and conclusive tests are just a few factors that contribute to adulteration in milk and other foods. (Kamthania et al., 2018 Pal, 2020).

Objectives

This study had some objectives listed:

- To study the socio-economic characteristics of the respondents
- To identify the causes and implications of adulteration of milk
- To identify the level of awareness of respondents regarding milk adulteration
- To suggest some policy measures to improve the situation

Methodology

The present study is planned with the aim to dig up the adverse impacts of milk adulteration on human health. The study was conducted in district Faisalabad. Multi-stage sampling technique was used for the selection of respondents. From the selected areas 60 respondents were selected conveniently from supply chain while 150 respondents from consumers were selected systematically. Data were collected with the help of interview schedule and was analyzed with the help of Statistical Package for the Social Sciences (SPSS).

Results and Discussion

After analyzing the data, we came to know about the socio-economic conditions of the respondents which are depicted in following tables.

Table 1
Distribution of the respondents according to their age

Age in years	Frequency		Percentage	
	Consumer	Supply	Consumer	Supply
~20	---	7	---	11.7
21-30	49	27	32.7	45
31-40	46	14	30.7	23.3
41-50	41	9	27.3	15
51-60	14	2	9.3	3.3
60+	---	1	---	1.7
Total	150	60	100	100

45% of respondents from the supply chain and 32.7% from the consumer chain were found between ages twenty-one years to thirty years while 58% of respondents from the consumer chain belonged to ages thirty-one to fifty years old.

Table 2
Distribution of the respondents according to their age

Income	Frequency		Percentage	
	Consumer	Supply	Consumer	Supply
Less than 15000	9	5	6	8.3
15000-30000	78	41	52	68.3

30001-45000	49	11	32.7	18
45000+	14	3	9.3	5
Total	150	60	100	100

68.3% respondents from supply chain and 52% of the respondents from consumer chain have their family income in range of 15,000-30,000.

Table 3
Distribution of the respondents according to their education

Age in years	Frequency		Percentage	
	Consumer	Supply	Consumer	Supply
~20	---	7	---	11.7
21-30	49	27	32.7	45
31-40	46	14	30.7	23.3
41-50	41	9	27.3	15
51-60	14	2	9.3	3.3
60+	---	1	---	1.7
Total	150	60	100	100

53.3% of the respondents were under-matriculation from supply chain and 24% were having matriculation from consumer chain in their educational qualification.

Table 4
Distribution of the respondents according to reasons of milk adulteration

Reasons	Disagree		Uncertain		Agree		Total	
	F	%	*f*	%	*f*	%	*f*	%
Consumer Chain								
Keeping it fresh	49	32.7	9	6	92	61.3	150	100
Keeping it fragrant	61	40.7	43	28	46	30.7	150	100
Increasing shelf life	41	27.3	12	8	97	64.7	150	100
Demand-supply gap	22	14.7	18	12	110	73.3	150	100
Supply Chain								
Keeping it fresh	29	48.3	1	1.7	30	50	60	100
Keeping it fragrant	35	58.3	2	3.3	23	38.3	60	100
Increasing shelf life	16	26.7	3	5	41	68.3	60	100
Demand-supply gap	22	36.7	1	1.7	37	61.7	60	100

50%, 58.3%, 68.3%, and 88.3% respondents from consumer chain told that milk was being adulterated to keep it fresh, for keeping it fragrant, for increasing its shelf life, to fill the demand and supply gap respectively. 50%, 38.3%, 68.3%, and 61.7 respondents from supply chain told that milk was being adulterated to keep it fresh, for keeping it fragrant, for increasing its shelf life, to fill the demand and supply gap respectively.

Table 5
Distribution of the respondents according to types of adulterants used in milk adulteration

Adulterants	Disagree		Uncertain		Agree		Total	
	f	%	*f*	%	*F*	%	*f*	%
Consumer Chain								
Chemical	47	31.3	14	9.3	89	59.3	150	100.0
Water	11	7.3	12	8	127	84.7	150	100.0
Cane juice	69	46	36	24	45	30	150	100.0
Detergent	43	28.7	27	18	80	53.3	150	100.0
Supply Chain								
Chemical	26	43.3	0	0	34	56.7	60	100.0
Water	1	1.7	1	1.7	58	96.7	60	100.0
Cane juice	34	56.7	6	10	20	33.3	60	100.0
Detergent	28	46.7	4	6.7	28	46.7	60	100.0

A huge majority of 84.7% from consumer chain gave response in favor of statement that water was used as an adulterant in milk while 96.7% respondents from supply chain were agreed that water was being used as additive in milk. In Faisalabad, 90% of sample were adulterated with water with different ratio of formalin, hydrogen peroxide sugar and urea (Faraz *et al.*,2013)

Table 6
Distribution of the respondents according to health problems caused by milk adulteration

Problems	Disagree		Uncertain		Agree		Total	
	f	%	*f*	%	*f*	%	*f*	%
Consumer Chain								
Stomach	6	4	12	8	132	88	150	100.0
Eye sight	53	35.3	38	25.3	59	39.3	150	100.0
Cardiac	48	32	46	30.7	56	37.3	150	100.0
Liver	40	26.7	35	23.3	75	50	150	100.0
Supply Chain								
Stomach	5	8.3	---	---	55	91.7	60	100
Eye sight	33	55	4	6.7	23	38.3	60	100
Cardiac	30	50	5	8.3	25	41.7	60	100
Liver	23	38.3	8	13.3	29	48.3	60	100

A bulk stream of the respondents from consumer chain (88%) and from supply chain (91.7) gave their opinions that health problems related to stomach diseases were faced by users by using adulterated milk.

Table 7
Distribution of the respondents according to life span of milk

Life span	Not at all		Rarely		Often		Total	
	f	%	*F*	%	*f*	%	*f*	%
Consumer Chain								
At room temperature	41	27.3	88	58.7	21	14	150	100
Supply Chain								
At room temperature	24	40	30	50	6	10	60	100

72.3% respondents from consumers' chain and 60% from supply chain were aware about the lifespan of milk at ordinary room temperature. They often came to know by smelling, after tasting and by seeing dust filth that milk was being adulterated.

Suggestion

For the developing farmers, to prevent this malpractice which is become a fraud now-a-days, education is needed in its improved circumstances. Government should spread awareness through campaign, projects etc. about the fatal consequences of milk adulteration. Detection methods must be improved and there should be an easy access toward its implementation. It will improve the quality and standards of milk and its products. To indorse suppliers' privilege, auditors should bring together and examine collected samples of milk. There should be a strict sanction like life-imprisonment implemented against the accused of this malpractice of milk adulteration and there should be no chance to pay fine. There must be a place/ model milk stalls/ sale points at union council levels, where there should be a frequent laboratory analysis tool kit to measure the quality of milk. It may be a good step if government sale this essential food item in custody of herself and there is no permission to sale at public establishments. In supply chain, producers, milkman, etc. everyone should be an authentic license holder from dairy and livestock department. Branded-milk processing units should be monitored through CCTV cameras.

Conclusion

Extraordinary nourishing significance of milk as well as comparative lower price related to other diets containing protein made it a particular portion of dietetics amongst the inhabitants around the globe. Conversely, the amplified demand of milk globally made it disposed to gigantic intensities of deceitful actions. It is a highly risky product for falsified deeds for getting economic gains where culprits can intensify nutrition protection threats and reduce nutritious worth by deliberated contamination along with the deficiency of maintenance, negligence in deprived cleanliness circumstances, no refrigeration conveniences. These frauds are now becoming general in trend all over the world especially in developing countries such Pakistan and India having essentially loose rehearsals. For human consumption, milk can be contaminated through inexpensive and substandard material, or harmful compounds, together with cane sugar, detergents, glucose, melamine, pond water, re-formed milk-powder and urea. Due to adulteration in

milk, it can become considerably low nutritious levels which also can be lethal for community well-being exposed through current milk adulteration outrages.

References

Chaudhary, A, and C Chen, 2019. A Mathys Nutrients, 11 (4), 856.

Chugh, R., & Kaur, G., 2022. A Study on Milk Adulteration and methods of detection of various Chemical Adulterants qualitatively. In IOP Conference Series: Materials Sci. and Engineering 1225(1), 012046.

European Commission. 2022. Food and feed safety alerts. RASSF.http:// www.ec .europa. eu/food/safety/rasff/index_en.htm

FAO. 2022. milk report. Rome: United Nations Organization.

FAO. 2022. Dairy Market Review: Emerging trends and outlook. Rome.

FAO. 2022. Milk facts. Rome. Food and Agriculture Organization of the United Nations. http://www.fao. org/assests/infographics/FAO-Infographic-milk-facts-en.pdf

Francis, A., Dhiman, T., and Mounya, K. S., 2020. Adulteration of milk: A review. J. Sci. Technol, 5, 37-41.

Faraz A., m. Lateef, M. I. Mustafa, P. Akhtar, M. Yaqoob and S. Rehman. 2013. Detection of adulteration, chemical composition and hygienic status of milk supplied to various canteens of educational institutes and public places in Faisalabad. J. Animal Plant Sci., 23(1): 119-124.

Ladani, P. S., Valand, R., and Sailer, H., 2019. Ear reconstruction using autologus costal cartilage: a steep learning curve. J. of maxillofacial and oral surgery, 18, 371-377.

Mabood, F., Jabeen, F., Ahmed, M., Hussain, J., Al Mashaykhi, S. A., Al Rubaiey, Z. M., and Manzoor, S., 2017. Development of new NIR-spectroscopy method combined with multivariate analysis for detection of adulteration in camel milk with goat milk. Food Chemistry, 221, 746-750.

Pakistan Economic Survey. 2021-2022. Pakistan.

Sharma, P., and Kamthania, D., 2018. Food adulteration: A global public health concern. Food Drink Indust, 38-40.