



## Evolving Bengali Culinary Culture and its Impact on Hepatic Fat Content

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### Abstract

Fatty liver is to great extent a lifestyle disease, where dietary factors paly important role. The cornerstone of Bengali culinary culture is excessive dependence on carbohydrate, especially rice, as the principal source of energy. Bengali culinary culture has evolved significantly over time. Multiple factors have impacted these changes. These are multi-dimensional as well ranging from influence of foreign rulers, natural calamities, changing socio-economic situation, Westernization of lifestyle, McDonaldization, pandemic and so on. The prevalence of fatty liver is also on the rise among the Bengalis. Although a direct causal relationship is difficult to establish, there is little or no doubt that the Bengali culinary culture over the centuries has favored the accumulation of excessive fat in Bengali livers.

**Keywords:** Fatty Liver; Chronic Hepatitis; Liver Cirrhosis; Bengali, Culinary Culture

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## Introduction

Fatty liver is a major health concern globally which is on the rise worldwide. It is a form of chronic liver disease with potentials of progression to chronic hepatitis, liver cirrhosis (LC) and hepatocellular carcinoma (HCC). It has been estimated that approximately 25% of patients with fatty liver suffer from chronic hepatitis. More importantly these patients are at risk of progressing to LC at a rate of 25% over a period of 7-8 years [1]. Liver decompensates also at a 25% rate over 10 years, while the rate of development of HCC is 1% per annum [2]. In Asia, fatty liver affects 27.4% of the population.

## Who are the Bengali people?

Persons having Bengali or Bangla as their mother tongue are known as 'Bengalis'. They have linguistic, cultural and ancestral origins in Bengal. The geographical area defined as Bengal has, however, changed from time to time. Historically the Gangetic delta was known as Bengal and at one time, even Bihar, Odissa and parts of Assam states of today's India were also considered to be part of Bengal. In modern times, Bangladesh and West Bengal, Tripura and parts of Assam states of present-day India are considered to be the regions which are homes to the Bengali people [3].

## Culinary culture of the Bengalis

Culinary culture is defined as system of processing and cooking foods combined with food consumption activity [3]. There goes a saying that, 'Bengalis don't just eat - they perform food'. Most of the energy of Bengalis food comes from carbohydrate (82.5%) followed by protein (10%), fat (5%), mineral (2%) and fibrous food (1%) [4]. This is in sharp contrast to World Health Organization (WHO) recommended 55%-65% energy from carbohydrate, 10%-20% from protein, 15%-25% from fat and rest 5% mineral sources for balanced composition of energy sources [5].

Bengali culinary culture is known for rice, spices, oil and chilies. Indifferent to their income profile Bengalis principally depend on rice [6]. Paddy cultivation was introduced in Bengal from South-East Asia nearly 5000 years ago [7]. It is practiced in Bengal three times a year. Among them 'amon' cultivation is important when paddy is planted during monsoon and harvested in late autumn. The next most important plantation is 'aush', which is planted around May-June and harvested during August-September. 'Boro' plantation is a relatively new practice and became popular with the introduction

of modern irrigation techniques among the Bengali farmers. 'Boro' cultivation takes place during the winter and the crop is harvested in early summer [8]. It has been estimated that large section of Bengalis receives 3500 kilo-calories out of 3600 kilo-calories from rice itself [9].

As Bengal is traversed by numerous rivers, fishes became integral part of the Bengali culinary culture, including dried fish which is considered to be their signature dish. 'Charyapadas', the first Bengali texts dating back to the 11<sup>th</sup> century has mentions about rice and fishes [10]. Besides, lentil is also an integral part of Bengali culinary culture. In the 15<sup>th</sup> century text 'Mangalkavyas' there is description as well as descriptions of cooking processes of different types of lentils [8]. It has been suggested that the shift from fishes to lentils occurred as a major source of protein in the Bengali culinary culture with the emergence of the 'Vaishnava Bhakti' cult who were vegans [9].

The culinary culture of pre-colonial Bengal had many distinguishing features. Conventionally, Bengali dishes are divided into four types, such as 'charbya' *i.e.* foods which were to be chewed, like rice, fish, etc., 'choṣhya' *i.e.* foods which were to be sucked, like ambal, tak etc., 'lehya' *i.e.* foods which were to be licked, like chatni and 'peya' *i.e.* drinks, like milk [11,12]. Bengalis usually take mixed diet consisting of food of plant and animal sources [3].

Another important aspect of the Bengali culinary culture is 'duty to eat'. Culinary culture of a nation is the reflection of its culture, history and its struggle to survive. The excessive carbohydrate intake by the Bengalis in the form of rice is possibly not just related to their taste. Once prosperous, the Bengalis became impoverished and destitute following exploitation of Bengal's agricultural production by the British colonial rulers who forced Bengali farmers to cultivate indigo and other cash crops. This reduced food grain production and resulted in repeated famines in Bengal that left 'deep marks' on the Bengali social behavior. Bengal experienced several famines like the 'Great Bengal Famine' of 1770 and famine of 1943, which were the most devastating ones. Famine and food shortages became a kind of ethnic memory that embedded itself into the Bengali psyche. This probably led to a kind of 'food-hoarding instinct' with the tendency to eat as much as possible when food is available [13]. This instinct is possibly further facilitated by the vulnerability of the Bengali people to natural calamities like annual floods and cyclones, which have greatly contributed to the socio-

economic instability of the Bengali people for centuries. As a result, the 'food-hoarding instinct' has become part of the Bengali culinary adaptation with health awareness being largely replaced by duty of 'not to throw away' and the habit of 'eating as much as possible'. This adaptive memory has spread across generations and is even reflected in today's Bengali culinary culture [13].

### Evolving culinary culture of the Bengalis

The Bengali culinary culture underwent major transformation with the introduction of Islam in this region between 12<sup>th</sup> to 18<sup>th</sup> centuries and new food items, such as onion and garlic becoming integral part of the Bengali cuisine [7]. The next major change in Bengali culinary culture was experienced in the 19<sup>th</sup> century following the expansion of British colonial rule in Bengal. Although the Portuguese brought new vegetables and food items such as potato, chili pepper, tomato, cauliflower and cabbage and bakery items like bread, cheese, jelly and biscuits to Bengal, these were popularized in this region after the British colonial administration in Bengal promoted these [14-16].

In 1841 'Auckland Hotel', the first hotel cum bakery in Bengal was established in Old Court Street of Kolkata by Mr. David Wilson, which later became 'Wilson's Hotel'. In 1881 another famous bakery was started, named 'Federico Peliti'. In 1887, Mr. Grish Chandra Mondal set up a bakery in Central Kolkata which started producing 'deshi' biscuits for the first time. During World War I, this bakery changed its name to 'Britannia Biscuits Company', which till today is one of the most dominant biscuit brands in India [16,17].

In another interesting development, the educated, enlightened Bengali middle-class adopted this new culinary culture as a sign of social reform and freedom from caste barriers and traditional taboos [18]. By the end of the 19<sup>th</sup> century, these foods became inseparable part of the culinary culture in colonial Bengal.

The most recent major shift in the dietary pattern of the Bengalis was seen during the recent Corona Virus Disease-2019 (COVID-19) pandemic. This pandemic altered people's daily routines triggering unparallel effect on lifestyle and dietary patterns globally [19,20]. A recent study reported that the change in dietary pattern during the COVID-19 pandemic effected over 50% females, much more than their male counterparts, a pattern that has also been reported from the United Arab Emirates (UAE) and Kuwait. This is possibly due to the gender difference in psychological stress caused by the

pandemic [21,22]. Also, people under 25 years of age increased their food intake to a greater extent than those over 36 years of age, prompted by anxiety and fear from their exposure to social media and other mis-information sources [23-26]. Besides, in case of older people, reduced food intake may have been caused by higher risk of complications and severity of Corona virus COVID-19 among them [27,28]. It was also observed that educated people ate more than those non-educated during the pandemic, a finding which is complemented by the findings of another study that increased dietary intake is strongly associated with educational status [29]. Educated people have secured sources of income and greater buying power. They also have more knowledge about nutrition and choosing alternative foods to strengthen their immune system [30]. It has been well documented that monetary crisis in the form of unemployment or underemployment and food price hike, can contribute to reduced buying capacity during pandemic [31-33]. Moreover, food purchasing behavior depends on information sources, like healthcare, food market conditions, food supply, perceived mental health and confidence [32,34,35].

'Nutrition transition' among the Bengalis, like elsewhere in the Indian sub-continent as a result of physical inactivity and unhealthy food habits following socio-economic shift, has also made huge impact [36,37]. As an inevitable consequence of the changing lifestyle and socio-economic upliftment, ultra-processed foods (UPFs) are gradually intruding in the Bengali culinary culture. UPFs are industrial food formulations that contain ingredients not commonly included in home-cooking *e.g.* emulsifiers, colorants, flavor enhancers, preservatives etc. These foods now constitute 50%-80% calory intake in high income countries, because of their extended shelf-life and hyper-palatability [38]. Confectionary and sugar-sweetened beverages are the top UPFs that dominate modern diets [39]. UPFs have led to increased dietary energy density and calory consumption. However, this comes at the cost of compromised nutritional quality as compared to fresh and minimally processed foods, UPFs have high content of added sugar and unhealthy fat, while there is less fiber, vitamins and minerals [40]. The journey that began from the 'Auckland Hotel' in Old Court Street of Kolkata in 1841, is now days becoming almost part and parcel of the Bengali culinary culture. It is now well established that global rise in fatty liver parallels increased consumption of UPFs. A review of 9 studies that included 60000 participants, revealed that UPFs intake significantly increases the risk of developing fatty liver [41]. Therefore, Bengalis can be no exception.

Like UPFs, trans fat (TFA) remains another major concern. TFA is a harmful type of unsaturated fat present in foods processed via partially hydrogenated oils (PHOs) and in some animal products. TFA increases low density lipoproteins (LDL) or 'bad' cholesterol, while lowering high density lipoproteins (HDL) or 'good' cholesterol. TFA has been directly linked to metabolic dysfunctions including cardiac comorbidities. While, WHO recommends restricting TFA to less than 2 grams per 100 grams of total fat, the United States Food and Drug Administration (USFDA) has banned PHOs in the United States of America (USA). One important issue is that TFA formation is directly related to high temperatures and duration of heating food. Repeated heating of oil above 180° C-200° C or reusing oil more than 2-3 times or continuous heating for more than 2 hours lead to TFA formation [42]. Polyunsaturated fats like sunflower oil remain particularly vulnerable. While oil dominates curries that are integral part of the Bengali cuisine, with current high pace of life it is nearly impossible for most urban Bengali families to avoid reusing or repeated heating of oil for all practical reasons, thus adding to the increasing burden of fatty liver.

The traditional 'joint family' structure of the Bengalis is rapidly transiting into 'nuclear families' with large, multi-generational households transforming into smaller, independent units. There are several factors responsible for this shift. These include limited housing, inflation, migration to urban hubs or abroad for employment, rising female literary, increased women workforce, female financial independence, personal privacy, autonomy and individual career growth over collective family conformity. This transformation is however not so evident in the rural Bengali communities as of now [43]. However, this has impacted major change in the recreational practices of the urban Bengalis in the recent times. Restaurants have become primary outlets for their recreation, socializing and relaxation. The Bengali cultural tradition of 'adda' - long, casual conversation with friends and family has shifted from living rooms to restaurants and cafes [44]. In 2018, the restaurant industry in Bangladesh was estimated at over 4500 crores taka contributing 2.1% of the GDP of country by 2021 [45,46].

Lack of greens spaces in the urban centers has further facilitated this. According to urban planning studies, an ideal city should have at least 25% of it's total area dedicated to open spaces and greenery [47]. WHO recommends 9 square-meters of green space per capita.

Modern standards recommend that residents should see at least 3 trees from their home, live in a neighborhood with 30% tree canopy coverage and be within 300 meters of a high-quality park [47]. However, the unfortunate reality is that these are not the case in many major Bengali cities. Dhaka can be the perfect example. According to a recent United Nations (UN) report, Dhaka is now the second most populous city of the world, next only to Jakarta. Approximately 36.6 million people now call Dhaka their home, where total open space, including green cover and water bodies, is less than 15% [48]. In contrast to WHO recommendation of 9 square-meters of green space per capita, Dhaka's residents enjoy only 0.5-1 square-meter of green space per capita [49]. This clearly shows that like many other major urban centers across the globe, residents of the second largest city on the face of the earth in terms of population, hardly have enough space to enjoy healthy living and recreation.

The impact of the 'theory of McDonaldization' is also an important factor behind this shift in the Bengali culinary culture. All 'McDonald's' restaurants have some inherent similarities, like in layout, procedure of ordering, staff uniform, tables, packaging and service, although language and interior decor may be different on the basis of local influence. 'McDonaldization' is making social life more homogeneous and less personal. The Bengali society, with no exception and like other societies, is moving towards 'McDonaldization' [50]. 'McDonaldization' has multi-dimensional effects on a society including on it's culinary culture. A study from West Bengal has recently concluded that preference for street food over home-made food is on the rise among the young Bengalis, which possibly is a consequence of 'McDonaldization' of the Bengalis (Table 1) [50].

Food Age	Home made	Street food
18-25	5%	6%
25-35	9%	4%
35-45	12%	1%
45-60	14%	1%
60 and Above	15%	0%
Total	55%	12%

**Table 1:** Preference between home-made versus street food among the Bengalis of West Bengal.

Besides, in this age of globalization the culinary culture of a particular people is no longer limited to a particular territory. Rather eating objects and eating patterns are crossing national and regional boundaries. A recent study from West Bengal observed that irrespective of age Bengalis now have almost similar affinity for Bengali, Indian and international cuisines, the preference for Bengali cuisine being slightly higher among the elderly (Table 2) [50].

Food Age	Bengali food	Indian food	International food
18-25	5%	4%	11%
25-35	7%	4%	9%
35-45	9%	6%	5%
45-60	9%	6%	5%
60 and Above	12%	6%	2%
Total	42%	26%	32%

**Table 2:** Preference of cuisine of the Bengalis of West Bengal.

### Rising prevalence of fatty liver among the Bengalis

A study from Bangladesh in 2018 reported that the overall prevalence of fatty liver among Bengalis was 33.86%, with the highest prevalence seen among rural females and middle-aged adults between 45-54 years of age [51]. It needs to be mentioned that another earlier study from Bangladesh in 2013 reported the overall prevalence of fatty liver among the same population to be not more than 18% [52]. In 2024, a study from Bangladesh involving the rural community reported 33% overall prevalence of fatty liver. However, the prevalence was as high as 48.7% among those between 41-60 years age [53]. Results of studies from West Bengal and Tripura States of India are indifferent. The prevalence of fatty liver in West Bengal has been estimated between 31.7% to 53.1% [54]. From Tripura, published data shows that prevalence of fatty liver in this state is between 19.72% to as high as 68.3% [55].

### Conclusion

The evolution of Bengali culinary culture is evident. At the same time, fatty liver is also on the rise among Bengalis. The question however is whether this culinary culture is affecting the fat content in the liver among the Bengali population. It is well established that lifestyle is crucial in the development of fatty liver; are dietary habits

are extremely important. The excessive dependence of Bengalis on carbohydrate and specially rice as the main source of energy surely facilitates accumulation of fat in the liver. Most evolutions of the Bengali culinary culture also favour the same. Therefore, although a direct causal relationship between the Bengali culinary culture and the growing amount of fat in the Bengali liver cannot be established, it is possibly safe to infer that Bengali diet has to take lots of blame for the rising burden of fatty liver among the Bengalis.

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