

MILK IN EGYPT	7
HEPATITIS C IN THE INJECTION DRUG USER POPULATION	10
THE ARGUMENT FOR GLOBAL TOBACCO CONTROL	14
FEMALE GENITAL CUTTING IN EGYPT	20

## Milk in Egypt

### Spotlight on a Dilemma

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Affectionately dubbed at times as “the fluid of life,” milk has played a vital role in the development of mankind and in the shaping of contemporary culture. From the cheeses of the Swiss or the French to the yak milk of the Asian steppes, milk has irrevocably incorporated itself in most cultures through myth, superstition (spilt milk was thought to signify good luck in some parts of Europe and bad luck in others), habits and traditions. Rich in protein, fat, lactose, and beneficial bacteria and enzymes, milk provides nutrition to children and adults alike, both in liquid form and in preserved forms such as cheese and yogurt. Our ancestors’ inability to preserve milk was the driving force behind the creation of cheese and yogurt, but, due to the dawn of the industrial age and recent advancements in biotechnology—notably the discovery of pasteurization and preservatives—milk can be stored for longer durations in liquid form while remaining safe for consumption. Furthermore, as these modern processes prolong the shelf life of milk, it has been more distributed to geographically distant markets. Modern processes have also effectively removed potentially dangerous pathogens (including, but not limited to, bovine tuberculosis and *Chlostridia*). Milk producers quickly embraced these processes, and consuming raw, unprocessed milk became an increasingly uncommon occurrence in many developed countries. Today, however, the number of consumers of raw milk in developed countries is rising as more people embrace the “organic” way of life and refuse to consume processed or preserved foods. More and more people visit dairy farms to buy fresh, unprocessed milk. At the same time, governments are making efforts to ensure the safety of dubious products, such as raw milk, for consumption. Meanwhile, the issue of raw milk consumption is becoming increasingly heated, especially in Egypt, where its consumption and risks are common.

Egypt is a subtropical country with a population over 80 million.<sup>1</sup> The country enjoys a delicate demographic balance; several million individuals live in industrialized urban areas (over 20 million in the capitol Cairo alone), while slightly more (57%) live in impoverished, rural areas with limited access to health facilities and education. However, urbanization

is continuously increasing, and the rural population dropped by 1% between 2003-2007 and 2008-2012.<sup>2</sup> As individuals move from rural to urban areas, they usually live in impoverished slums with a lack of health and educational resources. In families who move into these slums, all members help make a living – children have part-time jobs, and parents often struggle with two jobs each to make ends meet – and this struggle means less time is available to maintain healthy nutrition practices and knowledge. For the expecting mother, taking a day off work to visit a primary healthcare center or obstetrician deprives the family of much-needed income, so women seek pregnancy and nutritional advice from coworkers, family and neighbors instead of healthcare professionals. This dependence on informal and often unreliable sources of health and nutrition knowledge can take a toll on prenatal care and the behavior of the mother in that critical period and, thus, on society as a whole. Informal sources often contradict the information provided by doctors and medical practitioners and the contradiction can be confusing, especially for pregnant women trying to supplement their diet with milk and women seeking information on the nutritional benefits of cow milk for developing infants. For them, having accurate information on raw milk is key to making healthy decisions to protect themselves and their loved ones.

“I am often approached by future mothers in conflict between the consumption of raw and commercial milk,” said Dr. Maha Mosaad, Professor of Obstetrics and Gynecology at the Faculty of Medicine, Cairo University. “Mothers, often lacking the basics in health education, usually tend to follow local culture and folklore, which frowns on the consumption of commercial milk, viewing it as processed and therefore harmful.”<sup>3</sup> To understand the risks doctors see in raw, loose (unpackaged) milk, it is necessary to understand the process it undergoes to reach customers.

To maximize revenue and cut costs, most small-scale dairy farmers milk their own cows and then set out in small vehicles to deliver the milk fresh to homes. Most of these small-scale farmers are severely impoverished and cannot afford portable refrigeration to preserve the milk. To maintain

the relative sterility of milk being transported for hours through hot, dusty and crowded streets, they commonly add adulterating substances, including formaldehyde and hydrogen peroxide, which can cause vomiting, diarrhea and other, more severe illnesses. The amount of formaldehyde, a carcinogen, is usually uncalibrated because it is added by the dairy farmer himself, unsupervised by any authorities.<sup>4</sup> This method of delivery mostly services under-privileged slums. In an interview for *Al-Ahram Weekly* in 2009, the chairman of the Egyptian Chamber of Food Industries, Tarek Tawfik, stated that this informal milk sector contributes up to 80% of the total milk industry (up to four billion liters per year), which shows how deeply entrenched raw milk consumption is in society.<sup>5</sup> Additionally, cost is often the most important factor in the selection of milk in a country in which nearly half of the population earns less than one American dollar a day. The price of raw milk is often less than that of the most affordable brands of commercial, processed milk. Most families simply cannot afford the small price difference; others do not trust the more obscure, but cheaper, commercial brands. This distrust is warranted—the cheaper brands sell the same milk that local farmers would otherwise sell door-to-door, but processed and packaged it in unsupervised factories with questionable sanitation. Hassan Mansour of the Egyptian Food Safety Authority stated in an interview in *Al-Ahram Weekly*, “These marginal producers exist all over the country and work in a way that is difficult to supervise.”<sup>5</sup> Raw milk is thus difficult to monitor and often dangerous to consume.

Apart from the cost barrier, commercial milk, while generally available to the same range of consumers (the most impoverished usually do not have access to any milk at all), is culturally frowned upon. Some refuse to buy it on principle—many traditional communities and families look down on a housewife who prefers to buy ready-to-consume goods—while others prefer the “natural” product. A common complaint is that water has been used to dilute milk. This complaint usually arises from a misunderstanding by housewives. Fresh, full-cream, whole-fluid milk is approximately 87.9% water.<sup>6</sup> Housewives who buy fresh milk from wandering milkmen keep it boiling for a few minutes because they cannot effectively pasteurize it, in an attempt to sterilize it. Sometimes it is kept boiling for longer durations than are necessary because they do not follow formal guidelines for this process. As a result, the water content drops and the milk becomes more concentrated, tasting thicker and creamier than commercially-sold milk, which is sterilized according to stricter guidelines and maintains its full water content. Consumers often assume that even the most highly-regulated brands supply milk that is diluted with water. However, commercial milk producers pasteurize and sterilize their product, and constant monitoring by the authorities ensures that major-brand commercial milk is safe (one of the biggest brands boasts six certificates of quality and safety).<sup>7</sup> Thus, contamination incidents are very uncommon.

Most urban consumers are aware of the aforementioned facts, but their distaste for commercial milk is often the result of a social stigma: an unreasonable mistrust of processing and an unshakeable reliance on the “wisdom” of the older generations. Some argue that older generations lived their whole lives without commercial milk, so it follows that raw milk cannot be dangerous. Indeed, even in developed countries, raw milk has its advocates. Small-time dairy farmers and local groups often market raw milk as being healthier and less industrialized. Advocates of raw milk cite a list of arguments, from the mistreatment of cows

in commercial dairy farms to the more “natural” methods of nutrition and care provided by small-time dairy farmers. Some advocacy websites, such as [thedailygreen.com](http://thedailygreen.com), [naturalnews.com](http://naturalnews.com) and [realmilk.com](http://realmilk.com), insist that pasteurization eliminates probiotic nutrients present in raw milk.<sup>8, 9, 10</sup> Other proponents of raw milk go further by implying that pasteurization was only necessary in past times, when veterinary care and overall hygiene were deficient. Several countries have their own guidelines for the sale of raw milk. Some countries such as Germany, allow the purchase of raw milk only directly from government-certified farms, or with a production date clearly printed.<sup>11</sup> Other countries have banned the sale of raw milk altogether; it has been illegal in Canada since 1991.<sup>12</sup>

In a developing country such as Egypt, the misunderstanding of the health benefits of raw vs. pasteurized milk can have a devastating effect on the growth and nutrition of its undernourished population. Up to 29% of children in urban Egypt under five years old are stunted, and lack of milk in the diets (since pasteurized milk is too expensive and cheap raw milk is unsafe) is partially to blame.<sup>13</sup> Doctors and public health experts try to combat chronic malnutrition and to reduce these figures by staying up-to-date on the latest guidelines in maternal and child nutrition, including supplementation with milk. Despite being somewhat divided on the matter, scientific literature sources often agree that despite any potential benefits raw milk may hold, the benefits are outweighed by the greater dangers stemming from the lack of sterilization. The website for the Center for Disease Control and Prevention states that drinking raw milk can harm consumers as it is often contaminated with *Brucella*, *Listeria*, *Campylobacter*, *Salmonella*, *Shigella*, *Escherichia coli* and *Mycobacterium tuberculosis*. According to the Center for

Disease Control (CDC), 148 outbreaks of food borne illnesses due to the consumption of raw milk were reported to the CDC from 1998 to 2011, causing 2,384 illnesses, 284 hospitalizations and two deaths.<sup>14</sup> The CDC does not comment on the likelihood of cases being under-reported, although one cannot always prove the source of an outbreak was indeed raw milk. Furthermore, the CDC emphasizes that raw milk is unsafe, even if it is organic. This statement applies even if the farmer uses grass-fed cows or goats to produce

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milk and performs laboratory tests for bacteria. The CDC also denies claims that pasteurization reduces the nutritional benefits of milk.<sup>15</sup> The CDC, supported by several research papers, states that it is not true that beneficial enzymes (xanthine oxidase and lactoperoxidase, along with other non-enzyme molecules, such as lactoferrin) are inactivated during the process.<sup>16</sup> A quantitative risk study performed in northern Italy in 2012 suggests that the risk of illness associated with raw milk cannot be ignored and that simple measures, such as boiling, can minimize the risk of verocytotoxin-producing *Escherichia coli* and *Campylobacter jejuni*.<sup>17</sup> Other studies stress the danger of even low colony counts of Shiga toxin-producing *Escherichia coli* in raw milk cheese.<sup>18</sup> These results are consistent with older studies, which prescribe milk pasteurization as a means of eliminating possible colonies of *Campylobacter jejuni*.<sup>20</sup>

But some of these pathogens pale against a larger threat—bovine tuberculosis. Bovine tuberculosis is the ingestible form of tuberculosis, a contagious chronic bacterial disease that usually affects the lung but, if ingested, can affect the tonsils and intestines and spread to other organs in individuals with low immunity, such as children. Tuberculosis, including the bovine variety, is very difficult to diagnose clinically early on, but in

the advanced stages it may cause fever, night sweats and weight loss, as well as abdominal pain and diarrhea.<sup>21</sup> Notoriously prevalent in underserved communities, it constitutes a major source of non-pulmonary tuberculosis in Egypt. A 2009 study using combined Single Intradermal Tuberculin Test and ELISA revealed that 30% of dairy cattle and 40% of farm workers are infected with bovine tuberculosis, which suggests that the presence of *M. bovis* in milk represents a major source of infection for humans.<sup>22</sup> Other factors that come into play when examining the risk of infection from raw milk consumption are climate, preservation and the local prevalence of food-borne disease. In Egypt, these factors exacerbate the risk of tuberculosis. This debilitating disease leaves individuals ineffective and markedly affects the growth and future productivity of children, thus burdening the community. It is also worth mentioning that gastrointestinal TB may require treatment with up to four drugs daily for 12 months.<sup>23</sup> One of these drugs, rifampicin, can cost anywhere from 70 USD to 160 USD per 100 pills, depending on the manufacturer. Tarek Tawfik, chairman of the Egyptian Chamber of Food Industries, states in an interview that the Egyptian government “has been dedicating 10% of its annual budget allocated for health to the treatment of diseases caused by ‘loose’ milk.”<sup>24</sup> All in all, Egypt and many similar countries cannot afford the disease burden of bovine tuberculosis, and preventing the consumption of risky loose milk might be the most efficient solution.

Improving the standards of education and ensuring that health providers are well equipped to dispel cultural myths is key to helping Egypt overcome the health-related issues related to raw milk consumption. With better education comes greater income, and only with an understanding of proper personal hygiene and milk sanitation practices can general nutrition be improved. Word of mouth helped create the local cultures and myths about milk, and perhaps these myths can be dispelled through peer education and cooperation with local figures of social authority in the smaller towns and villages. Thus, healthy practices can spread into the collective subconscious of the whole society. In addition, increasing the production of pasteurized milk and agricultural products in general will help lower milk and food prices, benefiting millions, especially infants, children and the elderly. Egyptians live mostly in the Nile basin and its delta, and therefore occupy only 4% of their land.<sup>24</sup> Perhaps the expansion and cultivation of the remaining desert areas can help improve agricultural outcomes. Given enough time and hard work, Egypt is capable of overcoming its issues through managing ignorance, unemployment and poverty, as well as trying to directly eradicate the disease that is the result.

It is necessary for the risks of raw milk

consumption by vulnerable populations in Egypt to be reviewed and reassessed. Modern evidence suggests that the biological risks of contamination outweigh raw milk's potential benefits over pasteurized milk, but are scientific papers enough to find a solution to a conflict that involves health, poverty, education and deeply rooted cultural beliefs? Finding a solution to the dilemma may be difficult in a country stricken by poverty, but it is definitely not impossible. While there may be no simple or direct answer to the problem, combined efforts can save time and accelerate the progress of ongoing projects. In 2009, the Egyptian Ministry of Health launched a three-year milk-drinking campaign to promote the practice and ensure product safety.<sup>5</sup> Perhaps with increased awareness of the issue, more sponsors and advocates can be alerted to the cause, and with their help, as well as that of medical practitioners and medical students, this matter can be brought into the public eye. If the raw milk situation can be contained and improved in Egypt, home to the oldest medical schools and some of the best public health service networks in the Middle East and North Africa, then perhaps the same solution can be implemented to help improve the lives of people in its neighboring countries with similar demographic distributions and/or cultural backgrounds. “This is an issue that has been rarely addressed in formal scientific settings,” said Professor Mosaad, “but for the families affected, a small effort can mean a world of change.”<sup>3</sup>

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