Neanderthals in my DNA: Possible impact on Covid-19 outcomes

Part two: The past meets the present to reshape the future

Atique U Ahmed

ALTHOUGH most of the Covid-19 cases are mild, about 15 percent of patients are developing acute distress syndrome associated with systemic inflammation, responsible for more than 2.8 million deaths worldwide. This is partly due to our immune system acting as a double-edged sword to fight against the SARS-CoV-2 virus. On one side, the patient's body tries to destroy the virus right after infection with a controlled immune response. But in the case of patients who are getting more severely sick, the body loses control over the same immune system that is fighting the infection and initiates aggressive systemic inflammation, which may even cause death in some cases. One of the crucial questions related to the Covid-19 pandemic is whether we can identify the population with the highest possibility of becoming severely sick if infected. As of today, over 200 published and peer-reviewed studies are trying to answer this critical question and so far, have identified 21 genes that contribute to the severity of Covid-19; this number is also growing by the day.

A pair of recent research studies showed that two specific pieces of DNA in our genome (both inherited from Neanderthals) are associated with the severe and mild outcomes of Covid-19, depending on which is present in the patient's DNA. The first research at the Max Planck Institute identified a piece of Neanderthals' DNA in our (Homo sapiens') chromosome 3, that is associated with a higher risk of severe Covid-19 illness. Individuals with one copy of this archaic DNA have double the chances of getting severely sick from Covid-19 and therefore are more likely to need intensive care. The biology behind how the Neanderthal DNA can influence the clinical outcome with Covid-19 is an active area of investigation, and scientists are getting closer to the answer. It is theorised that one of the genes in this genomic area is a chemokine receptor 9 (CCR9), which is reported to regulate the inflammatory conditions in Homo sapiens. Thus, it is conceivable that this receptor may play a role in promoting an aggressive immune response during a coronavirus infection.

Analysis of the 23andMe data, which is a DNA testing service that I used to decode my DNA, revealed that I had inherited at least one of these Covid-19 risk variants from Neanderthals, located on my chromosome 3. According to a recent report, this is not surprising because around 63 percent of Bangladeshis carry at least one copy of this archaic DNA in their chromosome 3, compared to only 15 percent of Europeans—thus possessing a higher risk of disease severity during a coronavirus infection. It is far too early to conclude how such genetic risk factors may influence the disease outcome of Covid-19 at the level of a larger population, as additional risk factors (including age, sex, and pre-existing health conditions) may also play an equally critical role. However, a study from the United Kingdom (preprint) showed that people with South Asian backgrounds (this includes people from India, Pakistan, and Bangladesh) had a mortality rate that was approximately 20 percent higher than that of Caucasians after hospitalisation, which may indicate the possibility of this archaic DNA influencing the relatively more severe Covid-19 outcome. By carefully investigating these genetic risks at the population level, scientists believe that they can shed light on why some countries or some sub-populations within a country are more severely affected by Covid-19 than others.

Another intriguing fact associated with the high-risk Neanderthal variant in chromosome 3 is the drastic difference in its frequency being found in the South Asian (approximately 30 percent) vs East Asian population (almost nonexistent). Scientists speculate that such a difference could be due to positive selection (it is how new and advantageous genetic variants get enriched in a population) of this variant within the South Asian population by another disease or pathogenic infection in the past. Indeed, the chemokine receptor gene located within the Neanderthal variant in chromosome 3 within our genome has been reported to play a role in the fight against cholera. This disease has been a serious long-term problem for Bangladesh and India. It is conceivable that the high-risk Neanderthal variant may also be helping the population within these regions to battle diseases like cholera and thus enriched over time, as individuals without this genetic variant may have struggled to survive during a cholera pandemic in the past. However, during the current pandemic, such a variant may be functioning as a double-edged sword in the fight against Covid-19 and could be responsible for the disease's severity.

Research at the Max Planck Institute identified a piece of Neanderthals' DNA in our (Homo sapiens') chromosome 3, that is associated with a higher risk of severe Covid-19 illness. PHOTO: COLLECTED

On the other hand, a second report published in the Proceeding of the National Academy of Science identified another Neanderthal variant in our chromosome 12 which has protective features against Covid-19. Having one copy of this variant in our genome reportedly reduces the chance of becoming severely sick with Covid-19 by about 22 percent. The 23andMe analysis revealed that my DNA carries at least one such variant. A gene located in this area of our genome can destroy the genetic material of coronavirus family pathogens. Thus, having this variant may be advantageous in the battle against Covid-19. The frequency of such protective variants could also be a reason why, despite a large percentage of the population carrying the Covid-19 risk variant from Neanderthal in chromosome 3, the death rate in Bangladesh (63 deaths per million) is significantly lower than in other countries where the population is not carrying the Neanderthal risk variant in their chromosome 3. More research is needed to completely understand how the archaic DNA is whittling the severity of Covid-19 outcomes.

One of the puzzling aspects of Covid-19 is how some people are becoming severely sick and losing the battle to it, while others are recovering quickly/with more ease. Recent research has established that the information carried in a patient's DNA may be critical for determining their Covid-19 outcome. As technological advancement reduces the cost of DNA analysis at an unprecedented speed, we can confidently speculate that, in the not-so-far future, physicians will be able to proactively identify high-risk populations just by looking at a patient's DNA. Although our genetics is a starting point over which we have no control, the code of life passed down to us from our ancestors is carrying the weight of their struggles, triumphs, and survivorship, inaudibly swaying our life with authority. The age of genetic revolution is upon us and is offering us an unprecedented opportunity to decode the untold story of our DNA. These stories are a gift from our ancestors, pleading us to learn from them, endowing us with the power to make necessary adjustments to our lifestyle, allowing us to amend both individual and social habits, encouraging us to write and pass policies, and implement new medical practices to rewrite our future. The codes we inherit in individual DNA may be the dawn of our life, but our responsibility is not to let them be the dusk.

Part one of this article was published yesterday.

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Covid-19 response by women leaders: Will this change the quality of leadership?

Laila Khondkar

FRONTLINE healthcare workers, community mobilisers, caregivers, mothers working from home while supporting children with online classes—women of Bangladesh and all other parts of the world have been facing the Covid-19 pandemic with immense strength, courage, patience, and resilience. I have been thinking of ordinary women performing extraordinary responsibilities in the context of the discussion on women leadership in managing the global pandemic.

One study found that outcomes related to Covid-19, including the numbers of cases and deaths, were systematically better in countries led by women. Countries with women as heads of state such as Denmark, Finland, Iceland, New Zealand, Germany, and Slovakia have been internationally recognised for the effectiveness of their response to the pandemic. These women leaders were proactive and pragmatic in responding to the threat of the virus. They implemented social distancing restrictions early and sought expert advice to inform health strategies. They were also able to unify the country around a comprehensive response with transparent and compassionate communication. They did not take unnecessary risks and did not underestimate the threats posed by the virus. This was done by several male leaders, which had negative consequences and led to more deaths and suffering.

The performance of female leaders received widespread attention by the media. Academics studying leadership are also engaged in analysing this. Numerous articles have examined individual strengths. For example, German Chancellor Angela Merkel's data-driven approach has been appreciated. New Zealand Prime Minister Jacinda Ardern's Covid-19 response has been termed as a "masterclass in crisis leadership" for her empathetic rationality and effective communication.

Various factors beyond leadership are involved in managing a crisis. Each nation confronted Covid-19 with its own advantages and disadvantages (e.g. educational level, income, income inequality, density, demographic profile, etc.). It is too early to have rigorous evidence to claim that women are managing the pandemic better. However, this has clearly generated a discussion on women leadership in general.

According to a 2020 article called "Will the Pandemic Reshape Notions of Female Leadership?" by Tomas Chamorro-Premuzic and Avivah Wittenberg-Cox (published in the Harvard Business Review), "This group of talented leaders may become the first visible wave of role models for the generations to come, redefining the way we pick leaders in politics and business. In short, tales of strong female leaders succeeding through this crisis could lead to a change in the overarching narrative of what a strong leader looks like. Society at large may become less surprised and more accepting of leaders(s) elected on their expertise, intelligence, curiosity, humility, empathy, and integrity."

Women govern only 18 countries (or, 545 million people) globally. That is, only seven percent of the world's population. A recent study by CARE found that only 24 percent of the positions on national level committees established to respond to Covid-19 are held by women. Society has different expectations from male and female leaders, and women in most regions of the world still face the glass ceiling while reaching top positions in various sectors. How to address the structural and attitudinal barriers is a topic for another article. However, the recognition of women leaders in the context of the Covid-19 pandemic is particularly encouraging, especially when people usually like men more when they become successful, while the likeability of women decreases as they gain success. There is decades' worth of social science research by psychologists like Susan Fiske at Princeton, Amy Cuddy at Harvard, and others, which has repeatedly found that women face specific social penalties for doing things that lead to success.

Countries with women as heads of state have been internationally recognised for the effectiveness of their response to the pandemic.

The ongoing global pandemic is threatening to roll back progress on achieving most Sustainable Development Goals. For example, "Covid-19: A threat to progress against child marriage"—a report released by UNICEF on International Women's Day 2021—warned that school closures, economic stress, service disruptions, pregnancy, and parental deaths due to the pandemic are putting the most vulnerable girls at increased risk of child marriage. Ten million additional child marriages may occur before the end of the decade. If we continue with a business-as-usual approach, it will not be possible to cope with the loss due to the pandemic.

Even before Covid-19, we were living in a unique time of human history. The world is richer than ever before. But inequality is increasing, which has given rise to protests in different regions. Economic insecurity, fiscal austerity, migration, and violent extremism have contributed to political polarisation and people's declining trust in institutions. Millions of people are becoming refugees and displaced as a result of wars and conflicts. We have also witnessed a backlash against human rights. Children all over the world walked out of classrooms to demand that political leaders take actions to address climate emergency. While information technology has revolutionised work, education, communication and entertainment, it has also created challenges for social, political and legal systems.

Covid-19 exposed the limitations of the existing political, economic and social systems and reminded us of the importance of a fairer, greener and more equitable world. In a post-Covid-19 phase, how can we ensure social justice for all groups, leaving no one behind, while also progressing economically? How are we going to define our relationship with our planet and protect our fellow species, as well as our collective future? How should we respond to the emerging child and human rights concerns due to the unprecedented advancement of technology?

We should be courageous enough to reimagine bold and innovative solutions to address the most compelling challenges of our time. Going back to "normal" is not good enough, as the status quo did not protect the rights and dignity of all human beings and also disrupted the environmental balance to the extent that we are faced with an existential crisis. If we are to create a new world, we need different types of leaders who will work with vision, commitment, honesty, creativity and hopefulness.

Will our experiences of female leadership during the pandemic influence our willingness to elect more women into power and promote their leadership at all levels? Will it improve the quality of leaders in general? The long-term impact of Covid-19 on these aspects of our societies is yet to be seen.

Laila Khondkar is an international development worker.

QUOTABLE *Quote*

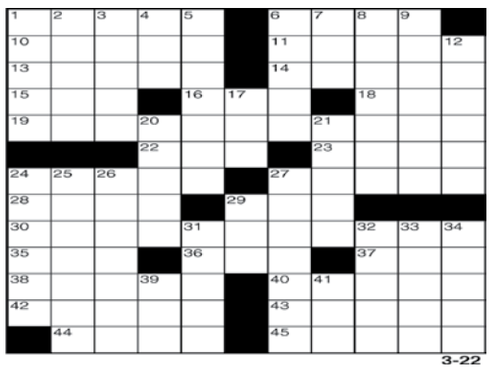
ELIF SHAFAK
Turkish novelist (1971—)

Do not go with the flow. Be the flow.

CROSSWORD BY THOMAS JOSEPH

ACROSS
1 One who accepts a bet
6 Wound reminder
10 Fill with joy
11 Adores
13 Satchel part
14 Biscotti flavor
15 Michele of "Glee"
16 Lab animal
18 Had lunch
19 Movie worker
22 Printer's supply
23 Folk stories
24 Pencil part
27 Ready for bed
28 Writer Rice
29 Coffee dispenser
30 Movie worker
35 Knight's title
36 Writer Harper
37 Log chopper
38 Blow one's top
40 Titled women
42 Western competition
43 Plain to see
44 German denial
45 Bird abodes

DOWN
1 Inventor Nikola
2 Change
3 Gold unit
4 Seventh Greek letter
5 Book copy
6 List of candidates
7 Swindle
8 Pilot
9 Do museum work
12 Be furious
17 Noah's boat
20 Had a feast
21 Static problem
24 Quarterback, at times
25 Golfer's cleek
26 Be a crasher
27 Checked for fit
29 Purpose
31 Rocker John
32 Identifies
33 Bring to bear
34 Work breaks
39 Architect I.M.
41 Broad st.



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YESTERDAY'S **ANSWERS**

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BEETLE BAILEY BY MORT WALKER

BABY BLUES BY KIRKMAN & SCOTT