Genomics has become one of the most controversial areas of science in recent decades. However, genomics has many social and ethical implications that make it a topic worthy of discussion. The quest to understand how the human body works has increased rapidly in recent decades, with genomics playing a central role in this progress.

The identification and sequencing of individual human genomes have already led to numerous medical breakthroughs. However, there is still a long way to go before this has a significant impact on the healthcare sector. Researchers are working to create an individual genome map for patients. They would be able to predict a person's predisposition to certain diseases, which would help with lifestyle decisions and preventive medicine.

So what problems might be at the root of this important and useful area of research?

Genomic research has always been conducted for the benefit of society as a whole. Advances in treatment and/or diagnosis are made once genetic susceptibilities are identified. With recent advances in genomic research, it is now possible to identify a genetic susceptibility even if a person has only a few symptoms. Previously, genetic susceptibility research was limited to those who already had enough symptoms to warrant such research. Affected individuals and their families could be subjected to unnecessary psychosocial stress because not all individuals with genetic susceptibility are expected to develop the disease in the future.

The questions that researchers can answer using genomic information are limited by the size, diversity, and representativeness of the sample population. Serious problems in these areas could limit the utility of research findings. A small sample would likely not be robust enough to generalize to the population from which it was drawn and could lead to false positives (i.e., false associations between genetic variants and disease). These particular problems are not limited to genetic epidemiology. However, the unique characteristics of genetic studies may also have unintended consequences, including loss of privacy and perceived risks from participation in such studies.

In recent years, the affordability of genome sequencing and the increasing search for disease susceptibility genes have made people more aware of their own genetic susceptibility to various diseases. The discovery of several common gene variants associated with cardiovascular disease through genome-wide association studies (GWAS) in various populations, including the U.S., Chinese, and Korean populations, is a concrete example of this trend. However, there is ample evidence that not all genetic susceptibility leads to disease and that many people with genetic susceptibility do not develop disease in the future. This raises the question of whether all individuals should be informed and involved in the interpretation of their susceptibility results.