

HS7.301 Science, Technology and Society

Assignment 1

Read chapter 3: 'Tonsils: Diagnosis and Dealing with Uncertainty' of 'Dr. Golem: How to Think About Medicine' as well as the conclusion.

Based on the reading, what would you say about knowledge-making in science? Analyze using frameworks/theories discussed in class.

Word Limit: 1000-1200 words

Ans:

Tonsillitis is contagious swelling in the tonsils located at the back of the throat because of infection caused by viruses and bacteria. At the beginning of the twentieth century, there was a lack of information, knowledge, awareness and surgical operations on tonsillitis. However, upon noticing the problem of tonsillitis, the scientific community gathered knowledge about the disease, which led the scientific community to catalogue its nature, document literature around it and share it among the community, which led to the development of tonsillectomy, a surgical method for removal of tonsils to prevent infection or breathing problems caused by tonsillitis. The tonsillitis problem is a classic example of how knowledge-making in science.

Any knowledge in science should be certified by a set of characteristic methods, and for any advancement, the knowledge-making process should follow the following four principles:

- i. **Communism:** Science should be a cooperative, collaborative and cumulative exercise where the findings result from social collaboration. And the existing knowledge should be shared with everyone while crediting the scientists behind the findings.
- ii. **Universalism:** All scientists in the scientific community are equal regardless of nationality, race, class, gender, or personal qualities, and science should be deeply impersonal; therefore, any scientist can not be denied if he wants to contribute to the existing knowledge.
- iii. **Disinterestedness:** Every claim should result from verifiable, unbiased methods, analysis and experimentation.
- iv. **Organized Skepticism:** As no scientist can be considered absolutely correct, every claim should be exposed to criticism to find flaws in a claim and check its validity. And the scientific community need a set of norms to function per the CUDOS guidelines.

Now we try to understand the process of knowledge-making in the case of tonsillitis and tonsillectomies. In today's world, tonsillectomies are a standard operating procedure for treating tonsillitis, especially among children; however, there are other claims for tonsillectomy, such as sleep disorders, recurring throat infections, hoarse voice, and many others.

When the tonsillectomy diagnosis was new, the various doctors shared the treatment knowledge and started prescribing to various patients for various reasons, which signifies communism among the doctors. And the method started to become popular with doctors from various individuals in the community, which signifies the universalism in this process. However, as the diagnosis was new and the scientific community didn't know about its risks, long-term consequences, and drawbacks, people were divided into two categories based on their opinions. First are those who believe that the doctors practice disinterestedness and are responsible enough to decide on whether a patient should go for a tonsillectomy or not, and the knowledge around the diagnosis can only be obtained by performing it again and again, and in contrast, others criticized that doctors should not operate on someone unless a tremendous amount of knowledge around tonsillectomy is available.

After the division in the scientific community based on the opinions, the doctors continued to perform tonsillectomy and popularised it. However, the diagnosis led to many inconsistencies in the initial days due to a lack of knowledge. A doctor in the USA performed tonsillectomy differently than one in the UK. And due to the lack of a standardized procedure, a doctor may give different prescriptions to two patients suffering from the same condition and make different diagnoses at different times. Moreover, a patient who was rejected for tonsillectomy by one doctor could have been asked for tonsillectomy by another. Therefore, the lack of a proper and standard operating procedure led to different surgical procedures, reasons, and opinions despite an increase in the number of surgeries.

And in the context of tonsillitis, the quest for a proper surgical method to perform tonsillectomy is equivalent to knowledge-making in science. Open to criticism and discussions with fellow doctors, the doctors had to weigh the precise short-term known pros against the minor unknown cons of the surgery. And the cons were minor, and various surgical methods were dropped once their cons were known, which is a symbol of organized scepticism. As a result, the operating procedure started to become standardized, and after studying various consequences and performing more surgeries, it enabled science to work more on understanding the surgical method. Performing a tonsillectomy became synonymous with experimentation, where every experiment in identical conditions should lead to an identical result.

After several surgeries by various doctors at various places in various conditions, the knowledge around the tonsillectomy method increased after increased research in this domain and the division in people in the scientific community based on their earlier opinions started to reduce as the method never claimed to be perfect at any time frame, but better than earlier surgical methods dealing with the same problem. However, during the knowledge-making around this idea, scientists kept coming up with different theories, alternate ideas and experiment setups in defence or against the preexisting method, which itself again shows communism where every individual in the scientific community can present their claim with disinterestedness, i.e. to find a better method rather than aim to prove tonsillectomy wrong for personal biases. Moreover, the practice of tonsillectomy was shared among the community because of universalism and was open to hearing criticism because of organized scepticism.

In today's world, the scientific community still doesn't have a unanimous opinion on tonsillectomy, whether it should be continued in practice or not. However, continuous research continues to contribute to the existing knowledge. And as the mystery has not been solved yet, the scientific community is open to new hypotheses, research, theories and criticisms against the old theories. But we all can zero in on knowledge-making as a cumulative process, and current knowledge on tonsils is manifold times more than we had in the early twentieth century. And the CUDOS guidelines helped a lot in bettering the surgical method and therefore benefitting millions of humans across the globe.

References:

1. 'Tonsils: Diagnosis and Dealing with Uncertainty'; 'Dr. Golem: How to Think About Medicine'
2. Robert K. Merton, 1942, The Normative Structure of Science