

# HACKING THE BODY: ANALYZING THE SCIENCE OF NUCLEAR MEDICINE AND RESEARCH IN POST-COLONIAL INDIA

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## **Abstract**

*Nuclear medicine was a major breakthrough in the biomedical research of 20<sup>th</sup> century. It helped to cure metastatic disorders like cancer, thyroid, cardiac and a wide range of other metabolic problems. India, being a newly born nation in 1947, needed nuclear power for development and advancement. Jawaharlal Nehru, the first Prime Minister of India, wanted the peaceful use of nuclear energy for development and research activities. As a result, radioisotopes found increasing application in medical science for upgrading India's health and hygiene. However, it was actually the extension and consolidation of state power through biomedical advancement that allowed science and politics to contest each other. Through radiological diagnosis, the state was able to regulate public health for political and economic benefits. The nexus between science and politics helped in state formation through the manipulation of human bodies. By controlling the body and mind, the state was able to maintain hegemony and helped scientific community to realize its objectives and ambitions. This paper shall analyse the journey of nuclear power in medical science and also investigate the problems in constructing its history of modernizing India.*

**Keywords:** Nuclear Medicine; India; Science; Politics

## **INTRODUCTION:**

The history of nuclear power is not all about bombs and explosions. It also has a medical history that allowed the modern state to engage in both civilian and military activities. Nuclear medicine was a major breakthrough in the history of medical science. The radioisotopes, known as tracers, once injected into the body imaged the organs more precisely and helped in the diagnosis of diseases like cancer, thyroid, liver, heart and skeletal disorders. This potentiality of nuclear medicine helped to identify the diseases at the earliest stage as well as the patient's immediate response to therapeutic interventions (Parthasarathy).

In the era of the cold war, nuclear medicine helped the state to surveil a human body and target it for radiological experiments. It allowed the political class to understand the biochemical reaction to radiation. In countries like America scientists and doctors used the patients as proxies for soldiers to estimate the radiological effects and answer questions about combat effectiveness on a nuclear battlefield (Creager 151). Medical science became a medium through which the political class targeted body and mind to extend power and control. Thus, the anatomization of the human body became an important factor to design plans and policies. This raises some serious questions – Are developments political in nature? Do politics influence science? How medicine becomes a site of contestation for power and politics?

This paper will interrogate these questions by exploring the history of nuclear medicine in India. Nuclear medicine as a separate historical journey will be analyzed in order to understand its impact on the state and power. However, a limited amount of literature is available on this area of study. This has been a major hurdle for this research as I had to rely mostly on government manuals and medical annals. While scholars of countries like America are working on such type of history the field for India remains nascent in stage. This is just a humble beginning of India's nuclear medical history that shall encourage future scholars to analyze medical science in terms of power and politics and estimate its impact on state formation.

## **ANALYZING THE SCIENCE OF NUCLEAR MEDICINE AND RESEARCH IN INDIA:**

Nuclear technology had its birth in the modern West. Due to the integration of the global and local markets, it became virtually impossible to constrain the transborder flow of such technologies. Independent India needed energy and power to become autonomous and self-reliant. However, the effort to be independent made India rely on powerful nations for infrastructural and economic help. When nuclear power came into the scenario, India did not delay to seize the opportunity. As a result, it became dependent on nations like the USA, Canada, France and Soviet Russia. This importation of technology had to face constant barriers that hindered the process of state formation.

The basic tendency of any cultural group is to evaluate new set of knowledge and check its compatibility with the older ones. This process of knowledge diffusion goes through three stages: (i) acceptance, (ii) rejection, or

(iii) co-existence (Mallick et al. 52). Thus, the imposition of statist policies undergoes scrutiny not only at the public but also at the private level. On being accepted the newer form gets dovetailed with the older ones giving birth to hybrid structures. The rejection of any culture is a difficult process. This creates an ideal ground for being branded as traditional, unscientific, and unprogressive. To shape such attitudes and preferences it is necessary to govern the mentalities that help in adaptation and assimilation. Thus, nuclear technology being introduced had to go through deliberations. There were serious debates not only in the Parliament but also across the section of people. Anxiety, dilemmas, and contradictions governed the use of nuclear power. While a lobby of politicians and scientists rejected such an enterprise, there were many who embraced such newer forms of knowledge. David Arnold argues that technology being imported gets its own cultural significance (7). While the physical part remains the same its status value, and cultural significance undergo a change (Arnold 7). According to Frank Dikotter imported technologies undergo a phase of a social constitution known as 'creative appropriation' (qtd. in Arnold 7). On the contrary, David Edgerton came up with 'creole technologies' which implies that technologies get adapted and assimilated according to local needs instead of replicating metropolitan norms (qtd. in Arnold 7). Thus, India's nuclear program was fashioned in an 'Indian' way instead of replicating Western policies and methods.

In 1948 the Atomic Energy Commission of India (AEC) was built under the helm of Homi J. Bhabha. Bhabha's realization of the potentiality of nuclear power in building a new India can be gauged from his letter, Notes on the Organization of Atomic Energy in India, written to Jawaharlal Nehru, the first Prime Minister of Independent India:

"Mr. Prime Minister, on my return from Europe and America ... made it reasonable to believe that within the next couple of decades atomic energy would play an important part in the economy and industry of countries and that if, India did not wish to fail even further behind the industrially advanced countries of the world, it would be necessary to take more energetic measures to develop this branch of science and appropriate larger sums for this purpose."

It was in 1960 when Bhabha realized the potentiality of nuclear medicine in curing and diagnosing body disorders. Thus, the isotopes entered the pharmaceutical market which happened to revolutionize India's medical industry.

Health is an important asset of a nation. An unhealthy population is considered a burden with zero work productivity. Longer life expectancy ensures demographic quality and strong economic output. There is a direct correlation between health and the economy which is a vital apparatus for ensuring a sustainable nation. Medicine is thus, seen as a solution to eradicate bodily agonies. It helps to cure diseases generating productive labor and a wealthy population. Dipesh Chakrabarty argues that the modern state seeks to extend power by controlling the body and mind (qtd. in Hardiman and Mukharji 12). It is also argued that medicine helps to create a body of docile citizens who expands the aims of the state (Hardiman and Mukharji 12). The colonial mentality to maintain surveillance through health programs continues even in the post-colonial era. Though driven by an ideology yet is being pushed in an unworthy manner through forced programs and violation of human rights (Hardiman and Mukharji 2). Ellen Leopold shows how Irma Natanson, in USA, had received radiation injuries from treatment with cobalt therapy (qtd. in Creager 152). Leopold argues that agencies like the military, hospitals and industry colluded to expand the nuclear medical agenda for fulfilling the interest of the state (qtd. in Creager 152). Gerald Kutcher shows how radiologist Eugene Saenger conducted experiments on cancer patients to examine the effects of radiation under the contract with the Department of Defense (qtd. in Creager 152). These patients were used as proxies to produce knowledge in order to design statist policies and actions. When reports of such violations surfaced there were huge protests across the west. Scientists who opposed such political agendas were castigated as 'rebels' and 'dissidents' (Creager 152). According to Dipesh Chakrabarty, any opposition to state policies is branded as 'unscientific', 'anti-national', and 'unprogressive' (qtd. in Hardiman and Mukharji 12).

Nehru's promotion of biomedicine as state medicine received backlash from a wider section of the population. The traditional Indian forms of healing were marginalized as they lacked scientific methods. While biomedicines like nuclear medicine got promoted, the other versions were condemned as backward and unprogressive. Nuclear medicine received massive sponsorships on a priority basis. Homi J. Bhabha was able to appropriate a large sum of US\$ 120,000 from the government of America for setting up nuclear medicine facilities ("Radioisotopes and Radiation in Health Sector"). This was largely possible due to the connection between science and the state. In Science and Religion: Beyond Disenchantment Renny Thomas argues that modern India's obsession with science and technology was evident from the amount of money spent on various projects when India was facing extreme poverty and other social issues (25). This shielding of the scientific estate created a symbiotic relationship, allowing science and politics to contest each other.

In 1954 a lecture on 'Health Protection, and Biological and Medical Applications of Atomic Energy' was delivered by Subodh Mitra, former director of the Chittaranjan Cancer Hospital, Kolkata (Parthasarathy). Dr. Subodh Mitra was a cancer specialist and founder secretary of the Indian Radiological Association (Parthasarathy). He built the Chittaranjan Cancer Hospital in 1950 which was inaugurated by Marie Curie (Parthasarathy). It was in 1958 that nuclear medicine as a specialized branch started emerging across the world (Parthasarathy). By 1962 a small room was opened in the Richardson and Cruddas building at Byculla, Mumbai for experimenting with such

studies (“Radioisotopes and Radiation in Health Sector”). Later this came to be known as Radiation Medicine Centre (RMC) and got housed in Tata Memorial Hospital (TMH) in September 1963 (“Radioisotopes and Radiation in Health Sector”). The journey began with thyroid disorders with patients arriving from J.J. Hospitals, Byculla to TMH (“Radioisotopes and Radiation in Health Sector”). In 1963 the equipment needed for such exercises began to land from the USA and had to be installed without any assistance from specialized agencies (“Radioisotopes and Radiation in Health Sector”). The responsibility to run RMC was entrusted to Dr. K.N. Jeejeebhoy, Dr. RD Ganatra, Dr. SM Sharma, Dr. Mrs H. Dacosta and other luminaries (Sharma 6). Bhabha personally supervised the activities in RMC and succeeded in creating global networks to engineer nuclear medical facilities in India (Sharma 6). The power given to the scientific community since the days of Bhabha was nearly total (Nandi 5). All data on nuclear power was protected by law from the public gaze (Nandi 5). As a result, it became virtually impossible to extract information on India’s nuclear program. Thus, science was put to the use of the state; the state was not put to the use of science (Nandi 5).

In 1958, a radiation cell under the Ministry of Defense was established at Safdarjung Hospital, Delhi with Lt. Col. Dr. S.K. Mazumdar as the officer-in-charge (Sharma 6). In 1961 under the helm of S.K. Mazumdar, Krishna Menon (then defense minister), and Prof. Kothari a research institute known as the Institute of Nuclear Medicine and Allied Sciences (INMAS) was set up (Sharma 6). At the initial stage, it was widely regarded that the knowledge of atomic power was so vital to national security that no country would share it anyway (Abraham 9). However, since 1950 there was a shift of this mood as there began a regular exchange of information about nuclear power under the helm of UN-sponsored programs (Abraham 9). An early example of this sort was the training provided by Soviet Russia to China and the expertise provided by the USA worldwide (Abraham 9). India was no less in this regard. In order to be sustainable in the field of nuclear science, India had to depend on Britain, Canada, France and the United States of America. Thus, the possibility of producing radioisotopes became feasible with the construction of nuclear reactors like APSARA, CIRUS and DHARVA. APSARA was built with British assistance whereas CIRUS was built with American and Canadian assistance. This reliance on Western help raises subtle questions about India’s mission to self-reliance and autonomy which were the watchwords of the anti-colonial movement.

In 1989 the Department of Atomic Energy set up ‘The Board of Radiation and Isotope Technology’ at Navi Mumbai for supplying products and services to users of radioisotopes and radiopharmaceuticals (Sharma 6). In 1990 another facility at Kolkata was installed for producing radioisotopes like Gallium and Indium that helped in medical diagnosis. The manual of the Bhabha Atomic Research Centre (BARC) states that since the 1960s animals were used for experimentation of nuclear medicine. As a result, a large number of rats, rabbits, and mice were used for understanding a variety of human diseases and the production of antibodies (Chadha and Thomas 6). The manual states that a large number of patients suffering from cancer and other disorders were treated successfully by nuclear doctors. In 1976, a survey was carried out in Bombay, which found that goiter (thyroid disease) was prevalent among economically weaker people. A range of experiments was conducted on both humans and animals to analyze the biochemical reaction to radiation.

What about the pain and suffering that the men and animals went through? Do we have any insights into the problem faced by nuclear doctors while treating patients? What about those patients who voiced concern on exposure to radiation? We don’t have much knowledge about the patients nor do we have much data on the politics inside the nuclear labs. The government records deny incidents of any overexposure and thus it is necessary to look beyond the official records and hear the subaltern voices. Gita Chadha and Renny Thomas in *Mapping Scientific Method: Disciplinary Narration* argues that it is necessary to have a critical measure of science and scientific method (15). Science involves a large number of experiments that need to be curated in order to estimate the effects on the life of a human being. Shiv Visvanathan talks of ‘vivisection’ which is the infliction of pain for experiments where pain and suffering are justified to obtain scientific knowledge (qtd. in Thomas and Chadha 15). The growth of such medical technologies helped India to improve its geopolitical position in the era of the cold war (Kachnowski 35). As argued that medical technology not only improves the healthcare of a nation but also serves as a leverage point of goodwill or influence (Kachnowski 35). Kachnowski opines that the improvement of healthcare allows the local, state or federal government to maintain political power (35).

The Nehruvian era began with peaceful programs, whereas the Vajpayee era saw an aggressive campaign for nuclear policies. Despite such shifts, the clear agenda behind each scientific innovation was guided by political factors. It cannot be denied that though such innovation ensured qualitative growth yet were guided by factors to maintain political power and hegemony. The massive infusion of funds from America, Britain, Canada, and Soviet Russia led India to assert its geopolitical role in global affairs. The construction of nuclear reactors, the importation of expertise and facilities allowed India’s growth and domination in global politics. This intersection between science and politics helped in modern state formation. Technology acts as a medium of governance through which the state ensures dominance and hegemony. It is used to conquer people, produce knowledge and design the contours of a nation. Modern India became a ‘laboratory state’ allowing scientists, engineers and doctors to perform, experiments for solving the problems of the state and society (Anderson 20). They provided master solutions to the problems plaguing growth and development. By engineering large-scale projects like nuclear medicine this community was able to gain access to the inner sphere that helped the state to extend its power and hegemony.

Medical specialists by gaining access to the human body market medical products. The knowledge gathered from such marketing helps in identifying behavioral patterns that strengthens state policies and actions. Nuclear medicine allowed the state to eradicate the bodily disorders which were a growing burden for a nation's economy. It allowed the gathering of data and marketing of pharmaceutical products generating cash and commercial exchange. Radiological diagnosis produced data for security and development that allowed the state to employ programs like surveillance, inoculations, vaccinations, as well as defense-related schemes.

## CONCLUSION:

Technology acts as an agency of social change and political control. It helps to gather knowledge that in turn designs policies and actions. Knowledge production creates power that is executed through institutions like hospitals, police stations, prisons, schools and so on. Power can be defined as a force having the ability to influence or mobilize people toward a certain outcome. The execution of power in either way depends on the will and ambition of the state. Technology in this respect is employed in every field of life to collect and produce knowledge that in turn allows the state to understand and govern mentalities. It is through technology that the state executes power and control as knowledge is necessary to maintain systems of surveillance and ethical discipline. It helps to know the taste, desires, preferences, and opinions as complete information of a citizen's profile helps in building a state. Nuclear medicine in this context produced knowledge of radiation, bodily reactions to such exposures and combat effects on a nuclear battlefield that helped to sketch the security and strategic policies.

The interlink between science and politics is necessary for the survival of the state. In colonial times science was used as a tool to gather knowledge and information. It helped to define borders, know the weather and natives of the nation. Jahnvi Phalkey in Science, State Formation and Development: The organization of nuclear research in India argues that in post-colonial India, nuclear research was linked to state formation in such a manner that failures to actively engage with the bureaucratic state implied the death of a laboratory project or constraints upon research (2).

As mentioned in the beginning, this paper is a humble beginning of research on nuclear medicine in India. It has been stated that due to lack of sources, it remains an incomplete study to examine the medical journey of India's nuclear power. Government manuals and medical annals do not speak much of the doctors and specialists who had immense efforts in advancing such a field, nor do we have any understanding of the patients involved. Traditionally, there have been stories of scientific giants like Homi J. Bhabha, C.V. Raman, Vikram Sarabhai, Shanti Swarup Bhatnagar, Meghnad Shah, and so on. However, there were many others who contributed to the development of science in India. In this journey of development, there were many who were thrown outside the process of nation-building. Their misalignment with the political class marginalized them from the textbook of history. Nuclear medicine in India should not be studied as a flat narrative, but be analyzed in terms of power and politics. Though lacking in records and documents, such a narrative can be constructed from oral interviews of doctors, patients and lab workers. As Indira Chowdhury, argues that contemporary works on modern science need to be investigated through oral interviews (374). Though there are limitations in this approach, it can shed light on certain events and help us move beyond the topicalities. Indira Chowdhury talks of 'micro-history' which are subaltern voices inside the research labs (55). We need to unearth the subaltern voices of those who encountered such a medical journey. Oral interviews with these men and women can help us to understand the jubilation, dilemmas, anxieties, fear, and political power play governing nuclear medicine and research in India. This paper is therefore just the beginning of research on nuclear medicine in India. By moving beyond the narratives on bombs and explosions, it has tried to trace a parallel history and contextualize it within the academic debates on science and politics. This should not be considered as an end, but as an initiative that shall open the doors for innovative ideas and further research on the history of nuclear medicine in India.

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