In Memoriam - Dr. Mrs. A. M. Samuel

Dr. A. M. Samuel
(23-08-1940 - 02-05-2020)

Dr. Mrs. Aban Meyer Samuel (nee Karani), joined the Radiation Medicine Centre (RMC) in 1966, then headed by Dr. K.N. Jeejeebhoy, after her MD (Pediatrics) from Grant Government Medical College, Mumbai. It was the interview with Dr. Jeejeebhoy that convinced her that she must take up an active role in Nuclear Medicine (NM).

Dr. Mrs. Samuel was affectionately and respectfully referred to as “Madam” among most of the national NM fraternity. Dr. Mrs. Samuel was an eminent medical professional, a keen researcher, expert teacher, and a kind manager of programs and personnel, and above all a warm, friendly colleague. She guided several students to acquire PhD (Applied Biology) and DNB (NM). She was goal-oriented and did not allow her personal feelings or inter-personal differences to come in the way of the department’s objectives.

Early beginning with RIA

She is one of the few clinicians who had a keen interest to pursue laboratory research. Inspired by the seminal work of Dr. Solomon Berson and Dr. Rosalyn Yalow on radioimmunoassay (RIA) of insulin, she started an RIA Laboratory, also known as in vitro NM, at RMC in 1967 to measure growth hormone, so important to identify growth disorders in children. Dr. Samuel was sponsored by the WHO, for training at Dr. Berson and Dr. Yalow’s laboratories in Bronx Veterans Administration Hospital, New York. Dr. Samuel continued to receive a lot of support from Dr. Berson and Dr. Yalow. The former visited RMC in December 1969 and provided training to scientists at RMC in RIA. Dr. Yalow visited RMC in December 1977, soon after she was awarded the Nobel Prize for Medicine - a very proud moment for Dr. Samuel. In spite of her busy clinical duties, Dr. Samuel found time to go to the library (before the internet era) and kept track of the latest publications in the field and brought it to her colleagues’ attention.

Rosalyn Yalow Impact

The 1970s and 80s were the days when the import of the much needed lab equipment, test-tubes, centrifuges, (low-energy) gamma counters was extremely difficult and were not indigenously available; but Dr. Samuel didn’t give up and encouraged her junior colleagues to follow-up with lab equipment suppliers to reverse engineer mechanical pipettes and RIA-centrifuges. She pursued with the Electronics Division, BARC, to make an RIA-counter. With this indigenous equipment, RIA at RMC came of age and RIAs for many hormones and metabolically important proteins were standardized and were assayed routinely. Important among them are thyroid-related hormones, thyroglobulin, M. tuberculosis antigens and antibodies, myoglobin (acute myocardial infarction), microalbuminuria; some were done in collaborative studies with hospitals and in IAEA-CRPs. RMC also had the most comprehensive tests for thyroid function in the country, and samples were received from other labs in the country for these tests.

Popularising RIA in India

By 1995, RMC became a center for learning of RIA, and many scientists, from developing countries, were deputed by the IAEA for training at RMC. RMC scientists were invited to participate in many IAEA-CRPs. The support that Dr. Samuel provided to the development of immunoassay at RMC ensured that the RMC could boast of a fully automated RIA-lab with short turn-around assay times. RIA is a much less used technique now, but the present nonisotopic ELISA and chemiluminescence grew on the shoulders of RIA, and the technique was one of the pillars of the peaceful uses of nuclear energy for healthcare.

Pediatric Touch

Dr. Samuel, after a few years of research in in vitro NM, concentrated on the development of pediatric NM at RMC. The Chernobyl accident had led to high incidence of thyroid cancer in children in the affected areas and this prompted her to work on Pediatric Thyroid Cancer resulting in publication of data in JNM. Her publication in Cancer on Pediatric Thyroid Cancer was a landmark paper. In the early 1990s, she was instrumental in bringing out the book on thyroid cancer, which was a summation of a thousand cases treated at the RMC with radioiodine. The book still remains a major source of thyroid cancer information from India.

Nurturing NM Education and HRD

In the mid-1990s, she was keen that the legendary DRM and DMRIT postgraduate diploma courses of the RMC (under University of Mumbai), are replaced by MD and MSc,
respectively. Due to administrative issues, and when she realized that an MD program with KEM Hospital, is not going to materialize, she was keen to start a full-fledged DNB NM Programme at RMC. She and her team also revised the syllabus to match the changing needs and times. The MSc syllabus was adopted in a large way by many other institutes in the country. Dr. Samuel continuously encouraged her successors at RMC to pursue her dream of MD course option at RMC; finally, the MD (NM) became a reality much later, in 2015 (under the HBNI).

When RMC moved to its newly constructed G+4 premises in the TMH-Annexe building with a large radioiodine-therapy ward, Dr. Samuel was instrumental in selecting and effectively deploying RMOs at RMC; for example, she nurtured the very first RMO (Dr. B.A. Krishna) by working together in setting up procedures like radioangiocardiography for cardiac and pulmonary shunts, pertechnetate brain scan for tuberculosis, hepato-biliary scan for biliary atresia, gastroesophageal reflux study protocol using oral capsule method, gastric emptying time study protocol and a multitude of other studies. No wonder this led (late) Dr. R.D. Ganatra to jokingly call Dr. Krishna the “Isotope of AMS”! Indeed, such “Isotopes of AMS” remain grateful to her for being their role model.

**Broadening the specialty**

Although RMC is co-located with the largest cancer hospital TMC, Dr. Samuel was keen that all the sub-specialties of NM grow uniformly and are given equal importance. She encouraged specialty meetings with clinicians and PG students from Mumbai medical colleges in nuclear cardiology, pediatric nuclear medicine, and psychiatry. Making fixed-dose regimes for thyrotoxicosis (it may be recalled that she herself was a beneficiary of radioiodine treatment for her hyperthyroidism) and dosimetry-based therapy for thyroid cancer, would effectively suffice to summarize her valuable contributions to clinical thyroidology.

**Birth of PET and Molecular Fusion Imaging in India**

Dr. Samuel played a crucial role in bringing the first medical cyclotron (MC) and PET facility in our country. It was not only to remain as a great milestone launched in October 2002 but also to be the forerunner for a series of similar facilities to quickly follow. The project she steered for DAE during 1997 to 2002 was one of the most challenging, given the extremely limited space for the facility at Parel inside a functional large cancer hospital, highly complex team of experts from multiple Units of DAE, continual engagement with the vendors to establish various facilities and systems with needs-based revisions and within the procedural constraints of government procurement procedures, etc. But for her stoic patience, perseverance, tact and unwavering eye on the final goal, DAE’s Medical Cyclotron Facility (MCF) would not have seen the light of the day. A publication brought out in October 2012 by RMC-BARC, to celebrate the first decade of MCF functions, contains ample information on the efforts and challenges handled under her leadership.

**Bio-imaging - Her Visionary Concept**

The TMC started its own NM wing and clinical services, only after the DAE’s MCF came into operation, and Dr. Samuel (postsuperannuation) was chosen by TMC to be the Leader-Consultant to establish their PET/CT services at Parel. The Department of Bio-Imaging was her visionary concept exemplifying her scientific belief that molecular imaging is indeed bio-science. Today, the role of PET/CT is phenomenal in the management of cancer patients and Dr. Samuel had the privilege of ensuring a sound foundation for the NM services at TMC. The range of procedures done and contributions made over the years by the TMC’s NM center, created under her guidance (and nurtured by the Directors of TMC), is the envy of even her own parent organization RMC!

Again, it goes to Dr. Samuel’s credit that a first MC in the private sector came up with her advisory guidance in (Navi) Mumbai. Again, this became a trendsetter, and today we have more than 15 such facilities in different regions of the country.

**Quiet Administrator**

Among the several committees in which she actively served and/or led, her roles in the advisory Committee of BRNS - Radiation Technology Applications Committee (RTAC, 1998–2002) and the DAE’s Radiopharmaceuticals Committee (RPC, 2003–2009) should be specially mentioned. The range of technologies and applications covered under the RTAC was large, and also beyond the classical medical science field. She exhibited keen interest, objectivity, understanding, and concern for nurturing R&D and creating HRD, in her review and final judgment of every project proposal of aspiring academia and other associated members. In the case of RPC, need for support to making available required radiopharmaceuticals for NM practices was kept in mind while yet keeping in focus high standards of quality, safety, and adherence/commitment to well-evolved SOP. Some of the important products reviewed and approved for clinical use under her leadership of RPC in that period are: Lu177-EDTMP for palliation of metastatic bone pain (to supplement Sm153-EDTMP); Lu177 chloride as API for peptide labeling in hospital radiopharmacy; Tc99m-HYNIC-TOC kit for tumor imaging. Her visionary support in terms of approval for clinical evaluation of Lu177-DOTATATE for treatment of NET mets is responsible for India becoming an early pioneer in its use and for the great heights subsequently achieved by the Indian NM physicians.
**Bridging AERB and NM Fraternity**

The AERB had a safety review cum advisory committee called “SACNUM - Safety advisory committee for nuclear medicine” and Dr. Samuel was its Chair for a long time during which it evolved and updated procedures for review of personnel qualification, certification and licensing or authorization, etc. There were a lot of tricky aspects to be addressed. The NM field was growing in India and beyond the government sector. The need for HR was quite high, and there were many institutions and NM centers running educational and training programs. It goes to Dr. Samuel’s credit for a number of practices or updates established to satisfy AERB’s mandates with respect to ensuring radiation safety aspects and yet allowing for multiple options for aspirants to meet the requirements for qualifying to register as radiation professional in NM.

**Guiding NM Associations**

Dr. Samuel was always precise in her presentations and succinct in her writings, and one can seldom find a single word of redundancy or superfluous nature; for example, her brilliant text in 2014 for the Focus column of the thematic bulletin of IANCAS on “PET: Products and Applications.”

Dr. Samuel took an active part in the events of the scientific associations - Society of Nuclear Medicine India and the Association of Nuclear Medicine Physicians of India (ANMPI). She was the President of SNM, India, in 1986–1987. She was awarded the Homi Bhabha Oration in 1988. She was a founding Fellow of the Indian College of Nuclear Medicine. She was awarded the Dr. SK Sharma Oration in 2007 by the ANMPI. She was awarded the “Life time achievement award” in the 2019 SNM, India Annual Conference held in Mumbai. Earlier in 2016, under the aegis of Association of Medical Consultants, she was felicitated in Mumbai for her contribution to the specialty of NM.

**Tributes to Madam**

Dr. Samuel was the first lady Group Director at BARC and Member of the Trombay Council and had worked under the leadership of Dr. A. Kakodkar from 1996 and until her retirement at the end of August 2002. Dr. Kakodkar while conveying his condolence and sentiments on the demise of Dr. Samuel said: “I had worked with her quite closely. She was a very capable and concerned scientist with a holistic and practical approach to research, their applications and had a deep concern for everyone around her. We all will miss her.” That is an apt testimony for the immense values Dr. Samuel brought to BARC and NM.

This tribute will be incomplete without citing the anguish and sadness of her colleagues, students, collaborators, and friends, who could not pay their final respects in person to her due to the lock-down related restrictions prevailing in Mumbai. She has been among the numerous unfortunate natural death cases during the lock-down for whom tears and petals could be only remotely showered.

An “Outstanding Scientist,” researcher, teacher, guide, philosopher, mentor, Dr. Mrs. Samuel has touched all of us in more than one way and on several occasions. The void created by her loss is difficult to be filled. She leaves behind her husband, Dr. M R Samuel and two sons, Samson and Reuven.

Dr. Samuel was well-known for her literary quotes in her presentations and special articles, and it is only appropriate that the tribute to her ends similarly. Tweaking a couple of lines from the “Candle in the wind” of Elton John and Bernie Taupin, we can say to “Madam:”

“Your candle burned out too soon,
Your legend in NM forever a boon.”

Compiled by Dr. Venkatesh Rangarajan Dr. N. Ramamoorthy, Dr. MGR Rajan, Dr. BA Krishna.

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