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The sustainability of Technetium-99m to meet the requirements of Kuwait's Ministry of Health

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Tc-99m is a radioactive isotope used in many medical diagnoses, where it is vital for certain diagnostic tests for cancers and heart diseases. However, this isotope is not found naturally and has to be produced from the decay of the radioactive isotope Mo-99. Kuwait has a number of nuclear medical centers that use Tc-99m dominantly for medical diagnosis. Yet, the country does not have any facility that produces such isotope. Currently, the country is relying on importing Mo-99 from external suppliers to meet their needs. In this work, the study was conducted in three main hospitals in Kuwait: Mubarak Al-Kabeer Hospital, Al-Farwania Hospital, and Yiaco Medical Company. The data of the Tc-99m consumption dosage used in each hospital are collected and arranged quarter yearly from 2012 to 2014. Missing data were compensated by using various statistical approaches such as moving average, and linear trendline for backwards data, midpoint, and forward data. Those data were then used to forecast the dosage required of the isotope for the years 2015 to 2018 using logarithmic trendline with seasonal index. The results of collected data obtained from the three nuclear medicine departments in Kuwait, after been analyzed, showed a 52.4%, 4.5%, and 8.63% increase in the total Tc-99m consumption with 10% safety factor for Al-Farwania Hospital, Yiaco Medical Company, and Mubarak Al-Kabeer Hospital respectively up to the year 2018. The average error percentage of the forecasted data showed to be 6.6%, 8.7%, and 8.5% for the previous mentioned hospitals respectively. The results have shown to be highly acceptable and reliable based on the percentages of errors obtained, which is less than 10%.

Biography

Naser Ali has completed his MSc in Thermal Power Fluid Engineering from Manchester University. He has 3 years of teaching experience as an Instructor in the Department of Mechanical Engineering at the Australian College of Kuwait (ACK) and 4 years of research experience in Kuwait Institute of Scientific Research (KISR). He lead several projects in the field of nuclear safety and risk assessment, nano-coatings for enhancing energy efficiency, reverse engineering of wind turbines, biofuel, and improving diesel fuel.

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