

2nd Annual Congress on
Health & Medical Science
May 12, 2023 | Webinar

Scientific Tracks & Abstracts



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Guolong Zhaoa | Henan Institute of Medical Sciences | China

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Application of monte carlo simulations in medical physics: examples in breast cancer, pancreatic cancer, and ocular melanoma

Dragana Krstić, Milena Živković, Tatjana B Miladinović

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Monte Carlo simulations have emerged as a powerful tool in medical physics, allowing for accurate calculations of radiation dose distributions in complex geometries such as the human body. MCNP (Monte Carlo N-Particle) is a widely used code for these types of simulations, capable of modelling various radiation sources and transport mechanisms. In the field of radiation therapy, MCNP can be used to optimize treatment planning by accurately predicting the dose delivered to target volumes and nearby healthy tissue. Specific examples include breast cancer treatment, where the shape and location of the breast tissue can be accurately modelled to deliver precise doses to the tumor while minimizing damage to surrounding healthy tissue. Other examples include pancreatic cancer, where the location and shape of the pancreas and nearby organs at risk can be taken into account for more effective treatment planning, as well as melanoma of the eye, where the shape of the eye and surrounding tissues can be accurately modeled to optimize radiation dose distribution. The use of MCNP in these applications has shown promising results in improving treatment outcomes and reducing side effects.

By using MCNP, we can simulate and optimize radiation therapy treatments, including VMAT (Volumetric Modulated Arc Therapy), for different tumor sites. By integrating MCNP with treatment planning software, we can create treatment plans that are personalized to each patient's unique anatomy and tumor characteristics, leading to more effective and precise radiation therapy treatments.

Recent publications

1. Krstic, D., Nikezic, D., Jeremic, M. Z., Dolicanin, E., Miladinovic, T. B., & Zivkovic, M. (2023) Comparison between MCNP and planning system in brachytherapy of cervical cancer. *Appl Radiat Isot*, 192, 110614.
2. Yu, Kwan Ngok; Watabe, Hiroshi; Zivkovic, Milena; Krstic, Dragana et al. (2023) DynamicMC: An Open-source GUI Program Coupled with MCNP for Modeling Relative Dynamic Movement of Radioactive Source and ORNL Phantom in a 3- dimensional Radiation Field. *Health Physics* 124(4): 301-309.
3. Dragana Krstić, Dragoslav Nikezić, Milovan Matović, Suzana Pantović, Marija Ž. Jeremić. (2017) BIOKINETIC AND DOSIMETRY OF 90Y-DOTATOC THERAPY FOR NEUROENDOCRINE TUMOURS. *Kragujevac J. Sci.* 39: 47-52.

Biography

Krstic studied Physics at the University of Kragujevac, Serbia. She received her PhD degree in 2007 at the same institution. The main subject of research was radiation and medical physics. For dose-determining particles by particle transport codes involved, such as MCNP; owner of the license for the latest MCNP6.2 software. It is also ongoing research in the field of nuclear medicine; recently there was an emphasis on proton boron fusion therapy (PBFT) investigations; Participation in the Voxel Phantom Intercomparison, organized by Eurados 2017. Dragana Krstic has published about 90 papers in journals and most of them were related to the calculation with MCNP. She and D. Nikezic developed input files for MCNP with ORNL and a voxel model of a standard man in a standing position. ORNL phantoms are in the MCNP Medical Physics Geometry Database (D. Krstic and D. Nikezic, U. of Kragujevac, Serbia). Hirsch's index is 12 (according to Scopus) and she obtained about 500 citations.

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The effect of educational intervention educational programs using WhatsApp on adherence to anti-diabetic drugs in primary health care units

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Background: Low adherence to pharmacological therapy by patients with diabetes mellitus is frequent and represents a worldwide challenge.

Introduction: This study examined the effect of an educational intervention program using WhatsApp_ messaging on medication adherence of patients with type 2 diabetes mellitus

Patients and methods: A randomized clinical trial was performed with 500 patients who had diabetes and who had enrolled in the 3 primary health care units (diabetes clinic) The patients were randomly assigned to either the intervention group (n = 250), which received usual care (multi-professional educational appointments according to each Unit schedule) plus 60 audio, image or text WhatsApp messages about health care promotion, with an emphasis on medication adherence,. The control group (n = 250) only received usual care. Medication adherence, as measured by the Morisky-Green Test, was compared through the chi-square test after 6 months Relative risk (RR) was used as a measure of effect size

Results: After the follow-up period (6 months), 75% of the patients in the intervention group were adherent versus 51.3% in the control group (RR: 1.15, 95% confidence interval = 0.88-1.53, p = 0.05

Discussion: There was a clinically significant impact associated with increase in medication adherence to the control group

Conclusion: Given the complexity of adherence to the use of antidiabetic and antihypertensive medications, educational interventions using WhatsApp could be useful as a reinforcement to increase adherence to medication.

Keywords: Type 2 diabetes,health technology, health promotion, telemedicine

Recent publications

1. Type 2 diabetes mellitus as a risk factor for the development of hepatocellular carcinoma: Case-control; hospital-based study published in Ciencia e Tecnica vitivinicola journal in Portugal, volume 35(no 1,year2020) (ISSN:0254-0223)
2. Herbal use and perceptions among patients with type 2 diabetes mellitus in Kuwait Published in Journal of Diabetes Mellitus .2022,12,50-62
3. Diabetic neuropathy:Patients' experiences and perceptions: A Qualitative study in type2 diabetics published in Journal of Diabetes Metabolism .2022 Volume 13 issue 9:955

Biography

Ibrahim El- Bayoumy holds a bachelor of medicine and surgery (Tanta Faculty of medicine-Egypt,1989), then he earned his master's degree in public health, preventive and social medicine (Tanta Faculty of medicine-Egypt1996), and MD, PhD in public health, preventive and social medicine 2003 from Tanta faculty of medicine-Egypt and McGill faculty of medicine –Montreal -Canada in the division of clinical epidemiology in Royal Victoria hospital through double channel system as a scholarship from Ministry of education-Egypt. He is a Full professor of public health and community medicine at Tanta Faculty of Medicine-Egypt since November 2016. Now he is working in the Ministry of Health in Kuwait as a consultant in public health and preventive medicine.

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The intersection of Radiological physics, Technology, and Psychology in Healthcare and medical science

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Advancements in healthcare technology have transformed the practice of medicine and enabled healthcare professionals to deliver improved patient care. Radiological physics plays a crucial role in medical imaging technologies such as computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET), which allow for non-invasive imaging of the human body. These imaging technologies provide invaluable diagnostic information that can lead to more accurate and timely treatment decisions. However, radiological procedures can also have psychological effects on patients. Radiation therapy, for example, can cause anxiety and fear due to the association of radiation with cancer treatment. This fear can negatively impact patient compliance and treatment outcomes. Healthcare professionals must work to alleviate patient fears by educating them about the safety and efficacy of radiation therapy. Additionally, technological advancements in radiological physics have enabled the development of precision medicine techniques such as proton therapy, which targets cancerous cells with greater accuracy and reduces the risk of damage to surrounding healthy tissues. These advancements have improved treatment outcomes and reduced the need for invasive surgical procedures. The intersection of radiological physics, technology, and psychology in healthcare and medical science is crucial to ensure optimal patient care. It is important for healthcare professionals to consider the psychological effects of radiological procedures on patients and work to mitigate fears and anxieties. By combining advancements in radiological physics and technology with psychological interventions, healthcare professionals can provide more personalized, precise, and effective patient care.

In conclusion, the importance of considering the intersection of radiological physics, technology, and psychology in healthcare and medical science. While radiological physics has enabled significant advancements in diagnostic and treatment options, it's important to consider the potential psychological effects on patients. By understanding and addressing these effects, healthcare professionals can work to provide a more positive patient experience and ultimately improve patient outcomes.

Recent publications

1. Krstic, D., Nikezic, D., Jeremic, M. Z., Dolicanin, E., Miladinovic, T. B., & Zivkovic, M. (2023) Comparison between MCNP and planning system in brachytherapy of cervical cancer. *Appl Radiat Isot*, 192, 110614.
2. Yu, Kwan Ngok; Watabe, Hiroshi; Zivkovic, Milena et al. (2023) DynamicMC: An Open-source GUI Program Coupled with MCNP for Modeling Relative Dynamic Movement of Radioactive Source and ORNL Phantom in a 3- dimensional Radiation Field. *Health Physics* 124(4):p 301-309.
3. Živković, M., Beni, M. S., Yu, P. K. N., Watabe, H., Krstić, D., & Nikezić, D. (2023) A dosimetric comparison between ICRP and ORNL phantoms from exposure to 137Cs contaminated soil. *Radiat Phys Chem*, 207, 110878.

Biography

Milena P. Zivkovic was born on September 1, 1995, in Kragujevac, Serbia. She graduated with a remarkable academic record, achieving a 9.49 in her undergraduate studies during the 2018/2019 academic year. She was recognized as the top-performing student at the Faculty of Sciences and Mathematics for four consecutive years. Currently, Milena is pursuing her postgraduate studies at the Institute of Physics within the Faculty of Natural Sciences and Mathematics in Kragujevac. She has maintained an outstanding academic record, with a 9.67 average grade in her master's studies, specializing in physics. Milena has actively participated in various research projects, including the Ministry of Education-funded project on "Experimental and Theoretical Research in Radiation Physics and Radioecology."

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Prenatal testing and termination of future pregnancies in Arab mothers of children with severe defects: impact of Moslem cleric or physician on the decision making

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The authors investigated: 1) How many of 250 Israeli Arab mothers (50% in consanguineous marriages) of babies with severe congenital anomalies had undergone prenatal testing during pregnancy, and how many had refused termination of pregnancy (TOP) when recommended; 2) Why TOP had been refused; 3) Attitudes regarding prenatal testing and TOP in future pregnancies; and (4) Whether the women would have changed their decision had they been able to talk to a Moslem cleric or Moslem doctor in addition to the regular personnel. Eighty-seven (35%) refused to even consider TOP, 55 (22%) agreed to undergo TOP, and 87 (35%) agreed provided the procedure would be performed before 120 days gestation. The remainder were undecided. Of 195 women, the addition of a Moslem religious cleric or physician to the Committee would influence 89 (46%) and 55 (28%), respectively, to change their opinion and agree to TOP, and 26 (13%) and 10 (5%), respectively, to change their opinion and agree to TOP prior to 120 days of gestation. The remainder either continued to refuse TOP or were undecided.

Recent publications

1. L Jaber, G Diamond. Why Anemia in infants can't be solved by iron supplementation alone: Notes from the ethnic underground. Arch Community Med Public Health 6 (1), 077-080.
2. L Jaber, N Hamed, ES Grossman, I Berger. Epidemiology and diagnosis of attention deficit hyperactivity disorder in the Arab and Jewish populations in Israel. Arch Community Med Public Health 6 (2), 152-158.
3. G Diamond, L Jaber (2022). Differing Diagnostic Trends in Autism Spectrum Disorders Between Ethnic Groups Reflecting Potential Etiological Risk Factors. Medical Research Archives 10 (8)

Biography

Lutfi A. Jaber is one of the foremost experts in the field of consanguinity and the problems associated with consanguineous marriages. This is still a major problem in many countries in the Middle East and Asia and Professor Jaber has studied it intensively and written many articles about the issue. As a paediatrician, he was a director of a busy pediatric clinic in a large Arab town in Israel and who also worked in the Department of Neurology at a large tertiary children's hospital, he sees first-hand every day the consequences of these marriages as the various illnesses among the children he treats. He is also a Professor in the Sackler Faculty of Medicine, Tel Aviv University, Israel. By teaming up with colleagues in the Department of Genetics at a local tertiary medical center, he also contributes to ongoing research into the genetic conditions that result from consanguineous marriages.

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ECG findings and clinical presentations of myocardial ischemia reported among patients with cardiac metastasis from lung malignancies: A narrative review

Swetha Kannan
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Background: Cardiac tumours are substantially infrequent. However, metastasis to the heart from a primary cancer elsewhere in the body is reported often. In addition to its poor prognosis, the diagnosis of cardiac metastasis is considered tough to establish. Primary lung cancers contribute to the maximum of cardiac metastasis cases. Owing to its predominantly clinically silent nature, myocardial metastasis isn't usually detected until autopsy.

Aim: This narrative review aims at highlighting the ECG findings that are seen among patients with myocardial metastasis resulting from lung cancer. It also analyses the clinical presentations associated with cardiac metastasis. Although ECG findings are not standard means of diagnosis, characteristic changes were reported, which might suggest further investigations for the same.

Methods: The studies reported in this review were collected from databases that include PubMed, ScienceDirect, Hindawi, ResearchGate and AHA journals in the period of 1980-2022. The keywords used for searching in the databases included ECG, cardiac metastasis, lung cancer. Articles focusing on lung cancer specifically was included, and studies reporting findings associated with other forms of cancer were excluded. A majority of case reports was used for this review.

Results: Literature review showed that ECG findings in a patient with cardiac metastasis imitated that of myocardial infarction.

Conclusion: This review article encourages health researchers to decipher and justify the findings reported and develop a quicker strategic outline for diagnosis. It also aims to educate the healthcare professionals on the early detection of myocardial metastasis with the study of the preliminary ECG picture, thereby ensuring a better prognosis.

Recent publications

1. Relationship between sleep and hypertension: A Narrative Review
2. Utilization of Complementary and Alternative Medicine for the Management of Cardiovascular Diseases Among Adults in Ajman, United Arab Emirates.

Biography

Swetha is a third-year medical student in UAE. She has authored a book at the age of 18. She has published three medical papers and presented her papers at several international medical conferences.

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Advancements in radiation therapy techniques for the treatment of breast cancer

Milena Živković, Dragana Krstić, Tatjana B Miladinović, Dubravka Živković

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Breast cancer is the most common cancer among women worldwide, and radiation therapy plays a crucial role in its treatment. In recent years, there have been significant advancements in radiation therapy techniques for the treatment of breast cancer, which have led to better outcomes for patients. This presentation will discuss the latest developments in radiation therapy techniques for breast cancer treatment, including intensity-modulated radiation therapy (IMRT), volumetric modulated arc therapy (VMAT), and proton therapy.

IMRT is a highly precise form of radiation therapy that allows for the delivery of high doses of radiation to the tumor while sparing healthy tissue. VMAT is a newer technique that delivers radiation in a single rotation of the treatment machine, resulting in faster treatment times and improved patient comfort. Proton therapy, a type of particle therapy, delivers radiation in a highly targeted manner, reducing radiation exposure to healthy tissues and minimizing side effects.

In addition to discussing these new techniques, the presentation will also cover the clinical outcomes and patient benefits associated with each modality. The role of medical physics in optimizing treatment planning and delivery will also be highlighted. The advancements in radiation therapy techniques for the treatment of breast cancer are helping to improve patient outcomes and quality of life, and medical physicists are at the forefront of these developments.

Recent publications

1. Krstic, D., Nikezic, D., Jeremic, M. Z., Dolicanin, E., Miladinovic, T. B., & Zivkovic, M. (2023) Comparison between MCNP and planning system in brachytherapy of cervical cancer. *Appl Radiat Isot*, 192, 110614.
2. Yu, Kwan Ngok; Watabe, Hiroshi; Zivkovic, Milena et al. (2023) DynamicMC: An Open-source GUI Program Coupled with MCNP for Modeling Relative Dynamic Movement of Radioactive Source and ORNL Phantom in a 3- dimensional Radiation Field. *Health Physics* 124(4):p 301-309.
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Milena P. Zivkovic was born on September 1, 1995, in Kragujevac, Serbia. She graduated with a remarkable academic record, achieving a 9.49 in her undergraduate studies during the 2018/2019 academic year. She was recognized as the top-performing student at the Faculty of Sciences and Mathematics for four consecutive years. Currently, Milena is pursuing her postgraduate studies at the Institute of Physics within the Faculty of Natural Sciences and Mathematics in Kragujevac. She has maintained an outstanding academic record, with a 9.67 average grade in her master's studies, specializing in physics. Milena has actively participated in various research projects, including the Ministry of Education-funded project on "Experimental and Theoretical Research in Radiation Physics and Radioecology." Her doctoral studies will focus on the use of voxelization in radiotherapy, with the aim of developing more precise and personalized treatment plans for patients. So far, she has published 30 papers, 8 of which are from the SCI list

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A data-based adjustment for Fisher exact test

Guolong Zhao, Huiyu Yang, Junxia Yang, Liufeng Zhang, Xiaoang Yang

Henan Institute of Medical Sciences, China

Fisher exact test is one of most popularly used methods in modern data analyses. However, it is conservative because of discreteness. The mid-p method may reduce the conservativeness but it is defined by the factor 1/2, an extra term beyond data. This paper considers an adjustment defined by a data-based factor. The adjusted test is compared with other ten tests. Special attention is given to the comparison between the data-based factor and the factor 1/2. The standardized version of the adjusted test is asymptotically standard normal. The adjustment reduces the conservativeness, as evidenced by increasing test size and power and decreasing p-values. The adjusted test holds such properties as the significance level under control of nominal α , the same modification in the left- and right-sided p-values, and the proportional reduction from Fisher test, which the mid-p method lacks. The mid-p method is more powerful than the adjusted test but the increment of power comes from the factor 1/2 and is not controlled by α . The unconditional tests are also more powerful but the power comes partly from the unobserved samples. The proper choice of an adjustment is based largely upon a consideration of both the power of test and the origin of power so that the adjusted test is an option in data analyses. It is easy to implement for 2×2 and $r \times c$ contingency tables. Two real examples are given for analyzing 2×2 tables and another example for $r \times c$ tables.

MSC 2010 subject classifications: Primary 62H15; secondary 62H17

Key words: adjustment; Barnard exact test; conservativeness; contingency table; Fisher exact test; mid-p method.

Recent publications

1. Fisher RA (1922) On the interpretation of χ^2 from contingency tables, and the calculation of P. Journal of the Royal Statistical Society 85: 87-94.
2. Fisher RA (1970) Statistical Methods for Research Workers (14th Edn) New York: Hafner, USA.
3. Agresti A (1992) A survey of exact inference for contingency tables. Statistical Science 7 131-53.

Biography

Guolong Zhao, MD, AUF., a Chinese physician at Henan Institute of Medical Sciences, Zhengzhou University, 40 University Road, Zhengzhou, Henan 450052, China, was born on January 16, 1942, known for his work on survival analysis, cancer epidemiology, and clinical evaluation of drugs. In 1998 he received the 2nd prize of sciences (98000) conferred by the Henan Commission of Science and Technology and the 1st prize of medical sciences (9602) conferred by the Department of Public Health of Henan. There are 93 papers published such as Zhao G. Tests of non-null hypothesis on proportions for stratified data. Statistics in Medicine, 2008; 27(9): 1429-1446. (<http://dx.doi.org/10.1002/sim.3023>), Zhao G. A test of non-null hypothesis for linear trends in proportions. Communications in Statistics - Theory and Methods 2015; 44(8): 1621-1639.

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