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مؤتمر طرابلس الرابع للتقنيات الطبية

يُعد المؤتمر منصة علمية تجمع الأكاديميين والباحثين لمناقشة التطبيقات العملية للذكاء الاصطناعي في الطب، مثل تحليل الصور الطبية، دعم اتخاذ القرار السريري، إدارة البيانات الصحية، والتقنيات الحيوية المتقدمة.

المتحدثين في المؤتمر لهذه السنة

د. محمد السايح
رئيس اللجنة المركزية للذكاء الاصطناعي بوزارة التعليم العالي والبحث العلمي

د. خالد العكروتي
رئيس مجلس إدارة مركز بحوث إدارة الاصول الهندسية بالاكاديمية الليبية

أهداف المؤتمر

تسليط الضوء على أحدث الابتكارات في مجال التقنيات الطبية، مع التركيز هذا العام على دور الذكاء الاصطناعي في تطوير أدوات التشخيص والعلاج

السبت. 22 نوفمبر 2025

9.00 صباحًا - 5.00 عصرا

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4th TCMTs 2025

مؤتمر طرابلس الرابع للتقنيات الطبية
السبت 22-11-2025 م

نبذة عن المؤتمر

مؤتمر طرابلس للتقنيات الطبية هو مؤتمر طبي سنوي ينظم عن طريق قسم البحوث والاستشارات بكلية التقنية الطبية واحد اقسام مركز البحوث والاستشارات بالجامعة

يسعى هذا المؤتمر الى النهوض بالمجتمع و تحقيق التنمية الصحية المستدامة من خلال تطوير البحث العلمي في العلوم الطبية المختلفة، و ذلك من خلال الجمع بين الكوادر الطبية والأكاديمية المختلفة وتعزيز التعاون بينها، ودعم فرص التعاون و البحث في المجال الطبي والأكاديمي.

اهداف المؤتمر

1. اظهار دور التكنولوجيا والابتكار في تطوير التعليم الطبي لتحقيق اهداف التنمية المستدامة .
2. بث روح العمل الجماعي بتكوين فرق عمل لتحقيق أهداف محددة.
3. رفع روح المنافسة العلمية بين الطلاب مما يؤدي إلى رفع المستوى العلمي.
4. تبادل الخبرات والتجارب العلمية ودعم روح المنافسة.

محاور المؤتمر:

- التعليم الطبي
- الذكاء الاصطناعي
- الرعاية الصحية

شروط المشاركة بالمؤتمر

- اختيار موضوع الملخص أو البحث حسب رغبة المشارك بمايلائم محاور المؤتمر
- يجب الالتزام بشروط وقالب النشر الخاص بمجلة القلم للعلوم الطبية والتطبيقية
- يجب التسجيل عبر رابط المؤتمر وارفاق الملخص او البحث حسب رغبة المشارك

المتحدثين الرسميين بالمؤتمر

المتحدث	الجهة التابع لها
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د. خالد العكروتي	الاكاديمية الليبية للدراسات العليا

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Nosocomial Infections in Intensive Care Units (ICUs) at Tripoli University Hospital

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Abstract

An intensive care unit (ICU) offers treatment for severe illnesses and injuries that require around-the-clock monitoring and life support. hospital-acquired infections are a major patient safety concern in ICUs, where a significant number of these infections occur, which are associated with great morbidity and mortality. This study seeks to assess the prevalence and types of nosocomial infections in the ICUs at TCH, emphasizing the identification of antibiotic resistance patterns among isolated pathogens. This single-center study was conducted over three months. A total of 184 samples of ICU medical equipment, medical staff, and patients hospitalized in Tripoli University Hospital's (TUH) six ICUs were recruited for the research. Out of the total samples, 59.8% demonstrated bacterial growth, while 40.2% showed no growth. The results indicated that Gram-positive isolates were the most frequent, accounting for 74.3% of the total isolates. The most prevalent strains were S. epidermidis at 53.8% and S. aureus at 40.4%. Notably, the Pediatric Intensive Care Unit (PICU) was the only unit in which S. pneumoniae was detected. While Gram-negative isolates account for 25.7% of the isolates in the ICUs, the most common strain is K. pneumoniae at 33.3%, followed by A. baumannii at 22.2%. Regarding the antibiotic resistance of Gram-positive bacteria, the results showed a high resistance rate to cefoxitin (53.82%), particularly among isolates from the SICU. In the case of ampicillin, a resistance rate of 51.84% was observed, especially in samples isolated from the MICU and SICU. Conversely, Gram-positive bacteria exhibited the highest resistance rate (56.46%) against gentamicin, predominantly in isolates from the MICU and CCU. The study concluded that the Gram-positive and Gram-negative bacteria isolated from TUH showed different sensitivity patterns to antibiotics, but they were resistant to most of the antibiotics used. This underlines the urgent need for enhanced infection control measures, continuous microbiological surveillance.

Keywords. Healthcare-Associated Infections; Intensive Care Units; Multidrug-Resistant Pathogens; Nosocomial Infections.

Evaluation of Prosthetic and Orthotic Devices and Services Quality in Tripoli-Libya: A Field Study to Measure Patient Satisfaction

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Abstract:
Disability affects individuals' ability to function and participate in society. Prosthetic and orthotic devices help restore independence and quality of life. In Tripoli, Libya, service provision faces challenges such as limited resources and a lack of data. This study aims to assess patient satisfaction with prosthetic services in Tripoli, Libya, and identify the challenges they face in accessing these services. It also provides recommendations for improving quality and effectiveness, ultimately enhancing the quality of life for individuals with physical disabilities. A descriptive analytical study was conducted in Tripoli using the OPUS questionnaire to measure patient satisfaction. The survey included 21 satisfaction-related questions and 10 demographic items. Data were collected from 31 eligible patients. Statistical analysis was performed using SPSS, including frequencies, means, and significance tests. Ethical approval was obtained. Participants were 55% male and 45% female, mostly aged 46–55. Common causes for needing devices included diabetes-related amputation (42%) and trauma (39%). Most used lower limb prostheses (62%) for 3–6 months. Device satisfaction was moderate (mean = 3.65), with concerns about cost. Service satisfaction was high (mean = 4.50), especially for staff respect and timeliness. Satisfaction varied significantly by age and device type, but not by gender or usage duration. Patients reported high satisfaction with services and moderate satisfaction with devices, mainly affected by financial issues. Demographic factors influenced satisfaction, highlighting areas for targeted improvement.

Keywords: Patient Satisfaction, Prosthetics, Orthotics, Quality, Disability, Improvement of Care.

The Role of Artificial Intelligence in Enhancing Diagnostic Accuracy and the Accessibility to Maxillofacial Prosthetics Care: A Systematic Review

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Abstract

Maxillofacial prosthetics aims to restore form and function for individuals affected by facial defects due to congenital anomalies, trauma, or surgical interventions. Traditional diagnostic and fabrication methods, while effective, are limited by high costs, manual errors, and limited accessibility in underserved regions. The integration of Artificial Intelligence (AI) presents an opportunity to revolutionize the diagnosis, planning, and production of maxillofacial prostheses. This study investigates the impact of AI-based technologies on enhancing diagnostic accuracy and the overall quality and accessibility of maxillofacial prosthetic care. A systematic review of literature published between 2010 and 2024 was conducted using databases such as PubMed and Scopus. Studies were selected based on relevance to AI applications in the diagnosis and accessibility of maxillofacial prosthetics. The study revealed a diagnostic accuracy of 97% by integrating 3D and 2D data using open-source AI models. This approach improved efficiency, reduced costs, and addressed data diversity challenges, confirming AI's strong potential in enhancing diagnostic outcomes in maxillofacial prosthetics. Incorporation of AI into maxillofacial prosthetic practice enhances diagnostic reliability, personalized treatment, and improves access to care. Despite challenges related to cost, training, and data availability, AI offers promising avenues for more equitable and efficient
prosthetic rehabilitation. Further interdisciplinary research and clinical integration are essential to fully realise these benefits of AI in this evolving field.

Keywords. Maxillofacial Prosthetics, Digital Technology, Artificial Intelligence, Oral Diagnostic Imaging, Machine Learning.

Evaluation of Patient Dose and Image Quality in Overweight Individuals Undergoing Abdominal CT

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Abstract

Computed Tomography (CT) is a vital imaging modality for abdominal diagnostics, offering high spatial resolution. However, radiation dose and image quality are significantly affected by patient body size, particularly in overweight individuals. International guidelines advocate the use of Diagnostic Reference Levels (DRLs) as benchmarks to monitor patient exposure and promote optimization. While DRLs are not strict dose limits, they provide a practical framework for identifying unusually high or low doses, ensuring compliance with the ALARA (As Low as Reasonably Achievable) principle. Overweight patients often exceed standard DRLs due to increased tube current and voltage requirements, raising concerns about both radiation safety and diagnostic efficacy. This study aims to evaluate the impact of body diameter on technical parameters, radiation dose, and image quality in abdominal CT examinations. A retrospective analysis of 32 abdominal CT scans was conducted at Tripoli University Hospital. Patients were categorized into two groups based on transverse body diameter at the umbilical level: Group A (25–34 cm) and Group B (35–43 cm). Technical parameters (kVp, mAs), dose metrics (CTDIvol, DLP), and image quality indicators (Noise, Signal-to-Noise Ratio [SNR], Contrast-to-Noise Ratio [CNR]) were assessed using RadiAnt DICOM Viewer. Group B (overweight) patients required significantly higher exposure parameters than Group A (normal weight). Mean tube current increased from 304.1 ± 71.1 mAs (Group A) to 483.8 ± 181.9 mAs (Group B), while tube voltage rose from a fixed 120 kVp (Group A) to 126.6 ± 11.5 kVp (Group B). Radiation dose metrics were also elevated in Group B, with CTDIvol increasing from 19.4 ± 6.7 mGy to 33.8 ± 17.5 mGy, and DLP from 1118.2 ± 571.7 mGy·cm to 1965 ± 1073.7 mGy·cm. Image quality deteriorated in the overweight group, with higher noise levels (14.3–19.6 HU vs. 9.2–19.2 HU), lower SNR (2.7–5.2 vs. 4.9–5.7), and reduced CNR (0.6–1.5 vs. 1.2–1.6). Increased body diameter is associated with higher radiation doses and reduced image quality in abdominal CT scans. These findings highlight the importance of individualized CT protocols and the implementation of Automatic Exposure Control (AEC) systems to optimize both radiation safety and diagnostic performance in overweight patients.

Keywords. Abdominal CT, Overweight Patients, Radiation Dose, Image Quality.

Gender and Stage-Specific Variations and Correlations in Calcium, Phosphate, Parathyroid Hormone, and Creatinine Levels in Chronic Kidney Disease Patients: An Analytical Approach

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Abstract

Chronic kidney disease (CKD) is a global health concern associated with high mortality and significant socioeconomic impact. The kidneys and parathyroid glands are essential in regulating calcium (Ca+2) and phosphate (PO4) concentrations. Dysregulation of these minerals, coupled with changes in parathyroid hormone (PTH), is prevalent in CKD and contributes to metabolic imbalance and disease advancement. This study sought to assess gender- and stage-specific variations in serum Ca+2, PO4, PTH, and creatinine levels in CKD patients, as well as to examine the correlations among these biomarkers as potential indicators of disease severity. A single-center, retrospective study was conducted at the Nephrology Department of Tripoli Central Hospital (TCH) from May to June 2025. The study included 220 patients (90 males, 130 females) aged 17–101 years, categorized into five groups according to CKD stage. Laboratory assessments included serum Ca+2, PO4, PTH, creatinine, and estimated glomerular filtration rate (eGFR). Statistical analyses were performed using SPSS version 27 to compare biochemical markers across stages and between genders and to assess correlations among the parameters. There was no gender-based differences in serum Ca+2, PO4, PTH, or creatinine ($p < 0.05$). CKD stages showed significant variations, with PO4, PTH, and creatinine levels increasing and Ca+2 levels decreasing, especially in stage 5 ($p < 0.05$). Correlation analysis revealed weak negative associations between Ca+2 and both PTH and creatinine, no correlation between Ca+2 and PO4, and moderate-to-weak positive correlations among PO4, PTH, and creatinine. Biochemical abnormalities in mineral metabolism deteriorate progressively with advancing stages of CKD, marked by increased PO4, PTH, and creatinine levels, alongside decreased Ca+2 levels, with no observed gender disparities in these markers.

Keywords: Chronic kidney disease, calcium, phosphate, Parathyroid hormone, glomerular filtration rate.

Testing the Validity of Drawing-In Exercises for Predicting Endurance in Core Stability Muscles

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Abstract

This study aims to evaluate the endurance time of trunk core stabilizers under submaximal exertion during a drawing-in maneuver, and to examine its correlation with optimal stability performance. The goal is to establish a simple and rapid method for assessing trunk core stability in clinical settings. Physiotherapy students from the University of Tripoli, aged 18–30 years, were randomly recruited via social media. Exclusion criteria included physical disabilities, pregnancy, menstruation, illness, musculoskeletal complaints, and working more than 25 hours per week. Informed consent was obtained both orally and in writing. Measurements were conducted over three consecutive days with controlled intervals between sessions. Data collection was performed by trained examiners. Of the 15 participants, 7 completed all three days of data collection. The drawing-in maneuver performed at 75% of one repetition maximum (1RM) was found to be predictive of trunk stability performance, based on Cori Lefkowith's exercise levels and repetition standards. Bilateral hip extension showed a positive correlation with drawing-in endurance and core stability, while a shorter trunk height relative to body height was associated with improved core muscle endurance. The drawing-in maneuver at 75% 1RM is a valid and clinically useful method for predicting trunk stability performance. It offers insight into both deep segmental and global muscle coordination.

Keywords: Endurance time, 75% 1RM, submaximal strength, maximal strength, Cori Lefkowith exercises, pressure cuff.

Advancements in Embedded Neurorehabilitation: Integrating Robotics, Artificial Intelligence, and Virtual Reality for Upper Limb Recovery in Children with Cerebral Palsy

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Abstract

Cerebral palsy (CP) remains one of the most common motor disabilities in childhood, often leading to significant impairments in upper limb function that affect activities of daily living (ADLs). This study introduces an innovative embedded neurorehabilitation system that synergistically combines robotics, artificial intelligence (AI), and virtual reality (VR) to target elbow rehabilitation in children with CP. Two male participants, aged 8 and 14 years, underwent an 8-week intervention protocol at Barak General Hospital (BGH) and Wadi Alshatti University (WAU), consisting of 5 sessions per week, each lasting 70 minutes. The system facilitated personalized, adaptive therapy through real-time AI-driven adjustments and immersive VR environments. Pre- and post-intervention assessments demonstrated remarkable improvements: both children achieved full restoration of elbow range of motion (ROM) and regained ADL capabilities, as measured by standardized tools such as the Modified Ashworth Scale (MAS), Goniometry for ROM, and the Pediatric Evaluation of Disability Inventory (PEDI). These findings underscore the potential of integrated technologies in enhancing neuroplasticity and functional outcomes in pediatric CP populations. Limitations include the small sample size, warranting larger-scale trials. This work paves the way for scalable, home-based neurorehabilitation solutions.

Keywords: Cerebral palsy, neurorehabilitation, robotics, artificial intelligence, virtual reality, upper limb, elbow function, activities of daily living.

Evaluating the impact of Robotics, AI, and virtual environment on shoulder neuro-rehabilitation in children with Cerebral Palsy from birth: Pilot study

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Abstract

This pilot study investigates the feasibility and efficacy of a novel neuro-rehabilitation system combining robotics, artificial intelligence (AI) and a virtual environment to restore shoulder motion in children with cerebral palsy (CP) from birth. At BARAK General Hospital (BGH) and Wadi Alshatti University (WAU), two children with CP participated in a 2-month intervention using the proposed system targeting the right (affected) shoulder. We measured restoration of all degrees of freedom (flexion/extension, abduction/adduction, internal/external rotation) in the right shoulder. At the end of the intervention, each child achieved full restoration of the right shoulder degrees of freedom. We discuss the multiple benefits of using robotics, AI and virtual reality (VR) in paediatric neurorehabilitation, including motivation, repetition, objective measurement, adaptive difficulty and engagement. While the sample size is very small, the positive results suggest promise for further larger-scale studies. We provide provisional results and leave space for detailed tabulated data of shoulder kinematics for each subject.

Keywords: robotics, artificial intelligence, virtual reality, neuro-rehabilitation, hemiplegia, paediatric upper limb, shoulder, pilot study

A Comparison of Statistical Models for the Analysis of Recurrence Data

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Abstract

This study aims to demonstrate and compare several statistical models suitable for analyzing recurrence data, which arise when two or more events occur for the same subject. The motivating example is the recurrence of bladder cancer, as documented by Wei [1], and publicly available at http://lib.stat.cmu.edu/jasadata/tumor. . The models examined include the ordinary proportional hazards model, which considers only the time to the first event, as well as variance-corrected models such as the Andersen–Gill model, the marginal risk set model, and two forms of the conditional risk set model—one based on time from entry and the other based on time from the previous event. In addition, frailty models are considered, in which within-subject dependence is modeled as a random effect. Frailty terms can be incorporated into all variance-corrected models to account for unobserved heterogeneity. The results indicate that the conditional parametric shared frailty model, based on time from the previous event and assuming a Weibull distribution, produced consistent estimates while effectively accounting for within-subject dependence and the ordering of events. This model appears to be the most appropriate for analyzing recurrence data of this nature.

Keywords: recurrence data, bladder cancer, variance-corrected models, frailty models

A Descriptive Statistical Analysis of a Retrospective Study on Polycystic Ovary Syndrome

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Abstract

This study presents a descriptive statistical analysis of a retrospective study on Polycystic Ovary Syndrome (PCOS), a common endocrine disorder among women of reproductive age that can lead to various metabolic, hormonal, and reproductive complications. Data were collected from the Misurata Infertility Center between 2023 and 2024 from 250 women undergoing infertility evaluation. Demographic data, including age and body mass index (BMI), along with medical records, were reviewed. Hormonal parameters assessed were Luteinizing Hormone (LH), Follicle-Stimulating Hormone (FSH), Estradiol, Prolactin, Anti-Müllerian Hormone (AMH), and Thyroid-Stimulating Hormone (TSH). Biochemical markers included blood sugar (BS), HbA1c, and Vitamin D levels. Results indicated that the average BMI was 28.72, which is above the World Health Organization's ideal range (18.5–24.9), suggesting that most patients were overweight. The mean Estradiol level was 47.95 pg/mL (within the ideal range of 0–80), and the mean FSH was 7.704 mIU/mL (within the ideal range of 1.37–9.9). In contrast, the mean Prolactin level was 23.148 ng/mL, exceeding the ideal range (4.5–21.5), indicating hyperprolactinemia in most patients. The mean Vitamin D level was 21.22 ng/mL, below the ideal range (30–50), indicating a deficiency. The mean BS was 105.92 mg/dL (within normal range: 70–110), and the average HbA1c was 5.622%, suggesting most patients were not diabetic.

Keywords: Polycystic Ovary Syndrome; Demographic Data; Medical Records; Hormonal Levels; Misurata Infertility Center.

Evaluating the Role of Artificial Intelligence in Ultrasound-Guided Regional Anesthesia

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Abstract

Regional anesthesia is a cornerstone of modern surgical care, providing targeted pain control, reduced opioid use, and accelerated postoperative recovery. Ultrasound guidance is standard for administering regional anesthesia, particularly for peripheral nerve blocks (PNBs). However, this technique requires significant expertise to accurately identify anatomical structures. Artificial intelligence (AI) has emerged as a tool to enhance ultrasound visualization, potentially reducing procedure time, operator error, and complication rates. This research evaluates the current clinical applications of AI assistance in ultrasound-guided PNBs and its effect on complication rates. Recently, AI-based systems (e.g., ScanNav) have been developed to provide automated color overlays for anatomical recognition, guiding needle insertion and mitigating associated risks. A structured literature review was performed using databases including PubMed and Google Scholar, focusing on publications from 2020 to 2025. Studies were selected based on criteria outlining AI accuracy, risk reduction, or clinical outcomes. One cited study, in which three experts reviewed 720 ultrasound images across nine PNB regions from 40 volunteers, utilized a consensus-based scoring method. The AI-generated highlighting (ScanNav) demonstrated an accuracy of 93.5% and was shown to reduce the risk of accidental needle trauma to nerves, arteries, pleura, and peritoneum by 62.9–86.4%. Furthermore, it achieved an 81.2% reduction in block failure rates. These findings suggest that AI can provide accurate, real-time anatomical guidance, thereby reducing complications and improving procedural success. Limitations of this review include its focus on a single, FDA-approved AI system (ScanNav) and the system's restriction to peripheral nerve blocks. This analysis provides a foundation for future research to further evaluate the clinical effectiveness of AI assistance, optimize its functionality, and extend its application to other regional anesthesia techniques, such as neuraxial anesthesia.

Keywords: Artificial intelligence, ultrasound guidance, regional anesthesia, peripheral nerve block.

The Effect of Combining Transcranial Direct Current Stimulation with Conventional Therapy for Dysphagia in Post-Stroke Patients: A Case Study.

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Abstract
Dysphagia is a common and debilitating complication following stroke, often resulting in malnutrition, aspiration, and a significant decline in quality of life. Although conventional dysphagia rehabilitation techniques are beneficial, recovery is frequently slow and incomplete. Recent evidence suggests that non-invasive brain stimulation methods, such as transcranial direct current stimulation (tDCS), may enhance cortical excitability and promote neural plasticity when integrated with standard therapy. However, evidence regarding the quantitative effects of such combined interventions in post-stroke patients remains limited. This study aimed to evaluate the effect of combining tDCS with conventional dysphagia therapy on swallowing function, self-perceived swallowing handicap, and depressive symptoms in a post-stroke patient. Ten treatment sessions were administered using anodal tDCS (2 mA for 20 minutes) over the primary motor cortex, followed by conventional therapy including the Shaker exercise, Masako maneuver, and thermal tactile stimulation. Assessments were conducted pre, mid, and post the intervention using the Gugging Swallowing Screen (GUSS), Dysphagia Handicap Index (DHI), and Geriatric Depression Scale (GDS). Swallowing ability, as measured by the GUSS (out of 20), improved from 4 at baseline to 18 post-interventions, reaching 90% of the maximum possible score. The DHI (out of 100) decreased from 34 to 14, representing an 86% reduction toward the optimal score. Meanwhile, the GDS (out of 30) remained unchanged (4), indicating a stable emotional status throughout the treatment period. In conclusion, combining tDCS with conventional dysphagia therapy resulted in meaningful improvements in swallowing performance and reduced dysphagia-related handicap, while emotional status remained stable. These findings support the potential of tDCS as an effective adjunct to conventional rehabilitation. Further controlled studies with larger sample sizes are recommended to validate these preliminary findings and refine stimulation protocols for optimal therapeutic outcomes.

Keywords: Dysphagia, tDCS, Swallowing Rehabilitation, GUSS, DHI, GDS, Neuroplasticity

Hormonal Disorders in Women with Infertility

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Abstract

Hormonal imbalances are a major cause of female infertility, disrupting the hypothalamic-pituitary-ovarian (HPO) axis. The coordinated action of FSH, LH, estradiol, and prolactin is essential for follicular development, ovulation, and endometrial preparation. Elevated prolactin can suppress gonadotropin-releasing hormone (GnRH), reducing FSH and LH release and impairing ovulation. These disturbances may lead to primary infertility (inability to achieve pregnancy) or secondary infertility (inability to conceive after a previous pregnancy). This cross-sectional study was conducted on 70 women diagnosed with either primary or secondary infertility, recruited from the Tripoli Center for Infertility Treatment between May 5 and July 5, 2025. Control samples were collected from Al-Ferdaws Clinic and analyzed using the COBAS e411 analyzer to assess serum levels of FSH, LH, prolactin, and estradiol. The results showed that primary infertility was characterized by elevated FSH and LH and variable estradiol levels, while secondary infertility showed a higher prevalence of hyperprolactinemia. No significant correlation was observed between age and hormone levels. The study concludes that hormonal disorders—particularly hyperprolactinemia and imbalances in FSH, LH, and estradiol—play a central role in female infertility. Routine hormonal evaluation is therefore essential for accurate diagnosis and effective management.

Keywords: Infertility, Hormonal imbalance, FSH, LH, Estradiol, Prolactin, Hyperprolactinemia, HPO axis