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Evaluation of Professional Opinions on the Clinical Effectiveness of Computed Tomography (CT) in Oncology Versus Contemporary Imaging Techniques: A Cross-Sectional Study Conducted in Sirte, Libya

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تقييم الآراء المهنية حول الفعالية السريرية للتصوير المقطعي المحوسب في علم الأورام مقابل تقنيات التصوير الحديثة: دراسة مقطعية أجريت في سرت، ليبيا

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Abstract:
Background: Computed Tomography (CT) remains a cornerstone in cancer imaging due to its high level of detail, rapid image acquisition, and broad accessibility. However, the rapid progress in Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET-CT) has significantly altered the field of cancer detection. This evolution underscores the necessity of continuously evaluating the current role of CT in clinical practice.
Objective: Objective: This research aimed to evaluate the effectiveness of CT scans in detecting tumors, determining their size, and staging metastases, compared to modern imaging techniques, from the perspective of expert healthcare professionals.

Keywords: Computed Tomography (CT); Cross-Sectional Survey; Diagnostic Efficacy; Healthcare Professionals; Oncology Imaging; Sirte.

الملخص
الخلفية: لا يزال التصوير المقطعي المحوسب (CT) حجر الزاوية في تصوير السرطان نظرًا لدقته العالية، وسرعة الحصول على الصور، وسهولة استخدامه. مع ذلك، فقد أحدث التطور السريع في التصوير بالرنين المغناطيسي (MRI) والتصوير المقطعي بالإصدار البوز تروني (PET-CT) تغييرًا جذريًا في مجال الكشف عن السرطان. ويؤكد هذا التطور على ضرورة التقييم المستمر لدور التصوير المقطعي المحوسب في الممارسة السريرية.

الهدف: هدفت هذه الدراسة إلى تقييم فعالية التصوير المقطعي المحوسب في الكشف عن الأورام، وتحديد حجمها، وتصنيف مراحل انتشارها، مقارنةً بتقنيات التصوير الحديثة، من وجهة نظر أخصائي الرعاية الصحية.

الكلمات المفتاحية: التصوير المقطعي المحوسب (CT)؛ دراسة مقطعية؛ الفعالية التشخيصية؛ أخصائيو الرعاية الصحية؛ تصوير الأورام؛ سرت.

1. Introduction

Computed Tomography (CT) continues to be a crucial and essential imaging modality in the realm of clinical oncology. Its critical importance is derived from its capacity to provide comprehensive, three-dimensional anatomical data essential for tumor detection, precise volume assessment, and the evaluation of spatial relationships with adjacent critical structures (Kwee & Kwee, 2019). Due to its exceptional spatial resolution and rapid scanning capabilities, CT is indispensable for accurate diagnosis, clinical staging, and the formulation of treatment plans, including surgical strategies and radiation therapy dose calculations (National Comprehensive Cancer Network [NCCN], 2024; Rehani, 2021). Despite these significant advantages, conventional CT is characterized by inherent limitations, particularly regarding soft-tissue differentiation and the potential long-term risks associated with the accumulation of ionizing radiation (Power et al., 2016; Smith-Bindman et al., 2019).

With the rapid progression of medical imaging technology, modern techniques have emerged to address these diagnostic challenges. Magnetic Resonance Imaging (MRI) has established itself as the premier method for delineating soft-tissue structures, making it the preferred diagnostic tool for malignancies involving the central nervous system, pelvis, and the musculoskeletal system (Turkbey et al., 2019; Wang et al., 2022). Concurrently, hybrid molecular imaging techniques—such as Positron Emission Tomography combined with Computed Tomography (PET-CT)—have revolutionized clinical oncology by merging precise anatomical visualization with the assessment of physiological, functional, and metabolic characteristics (Jadvar, 2020; Beyer et al., 2020). These advanced hybrid systems allow for the detection of metabolic shifts in tumor cells at an earlier stage, often before structural changes become visible on standard CT scans (Giesel et al., 2021).
While the clinical benefits of hybrid and high-contrast imaging are well- established in advanced healthcare systems, the practical implementation, accessibility, and perceived efficacy of these technologies can vary significantly in emerging healthcare environments. In evolving medical settings, such as the healthcare sector in Sirte, Libya, CT often serves as the primary diagnostic tool due to resource constraints, maintenance challenges, and cost-effectiveness (El Taguri et al., 2018). However, there is a notable deficit in localized empirical evidence assessing how frontline healthcare professionals navigate these technological transitions and resource limitations (Bodalal et al., 2020). Furthermore, the lack of advanced hybrid imaging in such environments underscores the necessity for Multidisciplinary Teams (MDTs) to bridge the gap between clinical diagnostic speed and technical accuracy, ensuring optimized patient outcomes (Lamb et al., 2023**)**.

2. Methodology

2.1. Study Design and Setting

This research utilized a descriptive survey design that was cross-sectional to assess clinical practices and the views of professionals concerning computed tomography (CT) in the field of oncology [Setia, 2016; Kesmodel, 2018]. The reason for choosing the cross-sectional method is its effectiveness in evaluating current clinical sentiments, practice trends, and technology choices among healthcare professionals at a given moment [Wang & Cheng, 2020; Spector et al., 2019].

The study was conducted in Sirte, Libya, and included a variety of healthcare institutions to provide a comprehensive and representative view of both the public and private sectors. These institutions included Ibn Sina Teaching Hospital (the main government referral hospital in the region), Sirte Oncology Center (a specialized cancer treatment center), Sirte Specialized Clinic, and Al-Ghad Specialized Clinic. By conducting the research in these diverse settings, the study ensured a fair assessment of diagnostic oncology imaging practices under varying levels of resource availability, equipment quality, and patient numbers, which is essential for identifying systemic diagnostic problems in the region [Bodalal et al., 2020; Libyan Ministry of Health, 2022].

2.2 Participants and Sampling

The demographic focus included a convenience sample of 84 healthcare practitioners engaged in cancer treatment and medical imaging at the chosen institutions [Stratton, 2021; Bornstein et al., 2020]. While convenience sampling was employed because of limitations and ease of access in the participating clinical environments, it serves as a very practical method for obtaining specialized perspectives from difficult-to-access clinical groups in localized research [Moser & Korstjens, 2018; Busert et al., 2021].

To guarantee an equitable representation of the various professionals involved in oncology processes, the participant group was divided into four primary occupational classifications: radiologists (N=33, 39.3%), radiographers/radiological technologists (N=31, 36.9%), oncologists (N=8, 9.5%), and other relevant medical fields (N=12, 14.3%). Incorporating insights from these separate clinical functions is crucial for reducing professional biases and attaining a comprehensive understanding of the value of imaging, constraints in diagnosis, and workflow intricacies in cancer treatment [Taber et al., 2020; Elshami et al., 2021]

2.3. Data Collection Tool and Statistical Analysis

Information was collected through a formal, self-completed survey designed to capture professional insights into CT efficacy. The questionnaire assessed various demographic details, the amount of clinical experience, and the daily frequency of CT scan utilization [Taherdoost, 2022] A 5-point Likert scale was employed to measure the opinions of practitioners regarding diagnostic outcomes, specifically focusing on perceived sensitivity, specificity, and total accuracy [Saha et al., 2021; Joshi et al., 2015].

In addition to examining the competitiveness of CT relative to other imaging methods, the survey also collected data on respondents' perceived incidence of diagnostic errors—namely false positives and false negatives—along with the technical factors contributing to these errors [Brady, 2021; Pinto et al., 2013]. All collected data were processed and managed using Microsoft Excel, which facilitated statistical summarization and the creation of descriptive analytics. The study's findings were visualized through bar charts and pie charts to ensure a clear presentation of professional trends in the Sirte region [Oster & Enders, 2018; Nayak et al., 2021].

3. Demographic Characteristics and Professional Experience

Table 1: Demographic Distribution and Years of Clinical Experience among Surveyed Professionals (N=84**)**

Experience (Years)	Oncologists (N=8)	Radiographers (N=31)	Radiologists (N=33)	Others (N=12)	Total (N=84)
< 5 Years	3(37.5%)	13 (41.9%)	4 (12.1%)	3 (25.0%)	23 (27.4%)
5–10 Years	1(12.5%)	4 (12.9%)	3 (9.1%)	5 (41.7%)	13 (15.5%)
10–15 Years	3(37.5%)	4 (12.9%)	4 (12.1%)	4 (33.3%)	15 (17.9%)
> 15 Years	1(12.5%)	10 (32.3%)	22 (66.7%)	0 (0.0%)	33 (39.3%)
Total (n, %)	8 (100%)	31 (100%)	33 (100%)	12 (100%)	84 (100%)

As illustrated in Table 1, the descriptive analysis of clinical experience demonstrated a highly experienced cohort, particularly among core diagnostic specialists. Out of the 84 surveyed healthcare professionals, the largest proportion fell into the highly experienced category of over 15 years (n=33, 39.3%). This seniority was predominantly driven by radiologists, where a striking majority (n=22 out of 33, 66.7%) possessed more than 15 years of expertise. Conversely, the early-career group with less than 5 years of experience represented 27.4% (n=23) of the total sample, largely comprised of radiographers (n=13, 41.9%). Mid-career professionals with 5 to 15 years of experience collectively constituted 33.4% of the study population, reflecting a well-balanced distribution of clinical maturity within the surveyed healthcare institutions in Sirte.

3.1 Clinical Utilization Patterns of CT

Analysis of CT utilization indicators demonstrated that this imaging modality serves as a fundamental daily clinical baseline within the surveyed healthcare facilities. Specifically, 100% of radiologists (n=33 out of 33) and 87.5% of oncologists (n=7 out of 8) reported relying on CT scanning on a daily basis in their routine clinical practice for oncological cases. Conversely, variations in daily utilization frequencies were observed among radiographers and other medical specialties, as detailed in Table 2.

Table 2: *Frequency of CT Utilization in Oncological Cases (N=84)*

Frequency of Use	Oncologists (N=8) n (%)	Radiographers (N=31) n (%)	Radiologists (N=33) n (%)	Other Categories (N=12) n (%)	Total (N=84) n (%)
Daily	7 (87.5%)	14 (45.2%)	33 (100.0%)	3 (25.0%)	57 (67.9%)
Weekly	1 (12.5%)	13 (41.9%)	0 (0.0%)	2 (16.7%)	16 (19.0%)
Rarely	0 (0.0%)	4 (12.9%)	0 (0.0%)	7 (58.3%)	11 (13.1%)
Total	8 (100.0%)	31 (100.0%)	33 (100.0%)	12 (100.0%)	84 (100.0%)

"As illustrated in Table 2, the frequency of computed tomography (CT) utilization in oncology cases varied significantly across different specialties (N = 84). All radiologists (100%, n = 33) and the vast majority of oncologists (87.5%, n = 7) reported utilizing CT scans on a daily basis. In contrast, radiographers demonstrated a more distributed usage pattern, with 45.2% (n = 14) using it daily, 41.9% (n = 13) weekly, and 12.9% (n = 4) rarely. Participants in other categories showed the lowest frequency of daily utilization (25%, n = 3), with the majority (58.3%, n = 7) using it rarely. Overall, daily utilization was the most predominant pattern across the entire sample, accounting for 67.9% (n = 57) of the total respondents."

3.2. Diagnostic Performance and Evaluation Metrics

The clinical efficacy of CT imaging was evaluated across three primary diagnostic dimensions using mean scores calculated on a 5.0-point Likert scale, which is a widely recognized method for quantifying professional perspectives in health research [Joshi et al., 2015; Saha et al., 2021]. Among these dimensions, "Metastasis Detection" achieved the highest overall evaluation with a mean score of 4.00/5.0, followed closely by "Tumor Size Delineation" (3.97/5.0) and "Initial Tumor Detection" (3.86/5.0).
Regarding key diagnostic performance metrics" scored the highest overall mean (4.00/5.0), followed by specificity (3.84/5.0), and overall diagnostic accuracy (3.61/5.0). Notably, a stratifying analysis revealed that oncologists and radiologists demonstrated the highest mean evaluation scores for sensitivity (4.50 and 4.45, respectively), indicating a strong consensus among core clinical specialists on the modality's high sensitivity in oncology. These metrics are detailed in Table 3.

Table 3: *Mean Scores of Diagnostic Performance Metrics for Computed Tomography (N = 84)*

Mean Score (Out of 5.0)	Diagnostic Performance Metric
4.00	Sensitivity
3.84	Specificity
3.61	Overall Accuracy

As presented in Table 3, the diagnostic performance metrics of computed tomography (CT) were evaluated based on mean scores out of 5.0. Among the assessed metrics, sensitivity received the highest evaluation with a mean score of 4.00, followed by specificity with a mean score of 3.84. Overall accuracy received the lowest evaluation among the three metrics, though it still maintained a relatively high evaluation with a mean score of 3.61. These findings, derived from the study in Sirte, Libya, indicate that the participants generally perceive CT imaging as highly effective, particularly in terms of diagnostic sensitivity. All statistical findings were visualized through descriptive analytics to ensure clarity in presenting professional trends [Nayak et al., 2021].

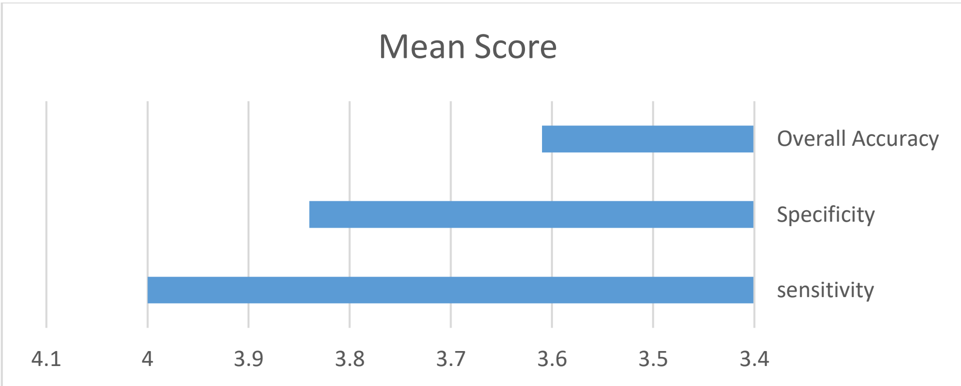

Figure 1: Mean scores of diagnostic performance metrics for CT scans.

3.3. Diagnostic Errors and Technical Challenges
Investigation into diagnostic error rates revealed a notable variation among the respondents regarding the clinical challenges faced in Sirte. Approximately 44.0% of the participants considered the false-negative rate to be a high-level clinical challenge, whereas 36.9% viewed false-positive rates at the same high severity level (Table 4).

This heightened concern for false negatives reflects a strict clinical awareness among the surveyed professionals regarding the risks associated with missed oncological diagnoses, a trend that aligns with global radiological concerns where missed findings often pose a greater clinical risk than over-diagnosis [Brady, 2021].

Table 4: *Distribution of Perceived Levels of Diagnostic Errors (N=84)*

Metric	Low (%)	Moderate (%)	High (%)
False Positive	17.9%	45.2%	36.9%
False Negative	9.5%	46.4%	44.00%

When analyzing the technical causes behind these diagnostic discrepancies, "small tumor size (< 1 cm)" emerged as the primary obstacle, cited by 36.9% (n = 31) of the respondents. This finding highlights potential resolution limitations of CT in detecting early-stage or sub-centimeter lesions compared to hybrid modalities **[Beyer & Czernin, 2020].** Additionally, the study identified "low equipment quality/readiness" (17.9%, n = 15) and "complex anatomical location" (16.7%, n = 14) as significant secondary challenges in the local clinical environment as detailed in Table 5."

Table 5: *Primary Technical Causes of Diagnostic Errors (N=**84**)*

Cause	Frequency	Percentage (%)
Small tumor size (< 1 cm)	31	36.9%
Low equipment quality/readiness	15	17.9%
Complex anatomical location	14	16.7%
Lack of user experience/training	12	14.3%
Poor contrast enhancement	5	6.0%
Total	84	100.0%

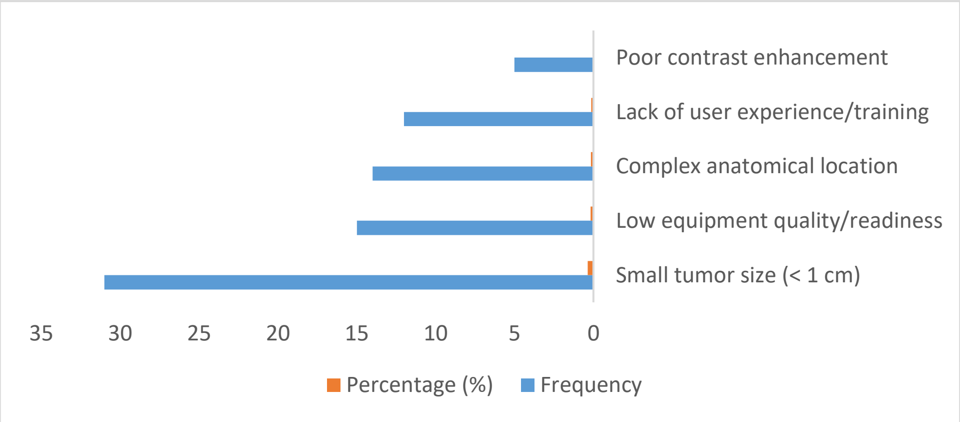

Figure 2: Primary technical causes of diagnostic errors in CT scans (N=84)

3.4 Technical Quality Parameters

Operational parameters of CT imaging within the studied facilities in Sirte received highly favorable evaluations from the surveyed professionals. Specifically, "scanning speed" achieved an "excellent" rating by 64.5% (n = 54) of the participants, followed by "ease of operation" (58.1%, n = 49) and "image quality" (48.4%, n = 41). Furthermore, a significant majority of professionals (61.9%, n = 52) emphasized that the quality of technical protocols and contrast media dosages strongly impact tumor detection accuracy, highlighting the critical role of technical optimization in oncological outcomes [Elshami et al., 2021; Oster & Enders, 2018].

Table 6: Evaluation of CT Operational Parameters and Technical Protocol Impacts (N=84)

Parameter / Evaluation Criteria	Frequency (n)	Percentage (%)
Operational Ratings ("Excellent"):		
• Scanning speed	54	64.5%
• Ease of operation	49	58.1%
• Image quality	41	48.4%
Protocol Impact on Accuracy:		
• Strongly impacts tumor detection	52	61.9%

Note. Percentages represent the proportion of professionals who rated the operational parameters as "Excellent" or indicated that technical protocols and contrast media dosages "Strongly impact" tumor detection accuracy.

As illustrated in Table 6, the technical infrastructure of the surveyed facilities is perceived positively, with high satisfaction rates regarding core operational features. The high rating for scanning speed (64.5%) is particularly critical in oncological imaging, as faster acquisition minimizes motion artifacts and improves patient throughput. Furthermore, the strong consensus (61.9%) on the impact of technical protocols and contrast media dosages highlights that diagnostic accuracy is not solely dependent on hardware capabilities but relies heavily on the precise optimization of imaging parameters and standardized clinical protocols [Elshami et al., 2021].

3.5 Comparative Analysis with Modern Modalities and Future Perspectives

A comparative evaluation between Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) demonstrated distinct modality-specific advantages based on mean evaluation scores. CT excelled significantly in "scanning speed" with a mean score of 4.30 versus 3.38 for MRI, reinforcing its role as a rapid diagnostic tool in acute and high-throughput oncological settings. Conversely, MRI was perceived as superior in both "image resolution" (4.29 vs. 4.02) and "diagnostic accuracy" (4.19 vs. 3.90), highlighting its strength in detailed soft-tissue characterization.

Regarding hybrid and functional molecular imaging modalities—specifically Positron Emission Tomography-Computed Tomography (PET-CT) and Positron Emission Tomography-Magnetic Resonance Imaging (PET-MRI) —there was an absolute 100% consensus among participants that PET-CT is significantly better in metabolic activity assessment. Furthermore, 92.9% (n = 78 out of 84) of the respondents rated PET-CT as superior for early tumor detection, a finding that aligns with global literature on the clinical superiority of fusion imaging over standalone anatomical modalities [Beyer & Czernin, 2020].

Despite the advanced clinical capabilities of hybrid imaging, CT maintained a decisive advantage regarding practical and logistical parameters within the local healthcare environment in Sirte. Within these logistical metrics, "speed of obtaining clinical results" achieved the highest mean score of 4.37/5.0, followed by "equipment availability and accessibility" (4.32/5.0), and the "economic cost-to-benefit ratio" (3.58/5.0). These logistical strengths remain critical in the Libyan oncology context, where accessibility and resource optimization are paramount for patient care [Bodalal et al., 2020].

Regarding the future perspective of CT clinical utility, 66.7% (n = 56) of the surveyed specialists believed that standalone CT would remain essential only "partially," serving primarily as an integrated component of hybrid imaging systems. Moreover, 59.5% (n = 50) of the cohort selected PET-CT as the ultimate future modality for comprehensive oncological diagnostics, indicating a strong professional drive towards adopting advanced molecular imaging in the region.

3.6 Logistical Parameters and Comparative Synthesis

The study identified that while advanced modalities offer superior technical features, the operational utility of imaging is significantly influenced by practical and logistical factors within the local healthcare environment. These parameters for CT scans are detailed in Table 7.

Table 7: *Practical and logistical parameters of CT scans* (84)

Mean Score (Out of 5.0)	Practical Criteria
4.37	Speed of obtaining clinical results
4.32	Equipment availability and accessibility
3.58	Economic cost-to-benefit ratio

he comparative and prospective data reflects a nuanced clinical consensus regarding the evolution of oncological imaging. While standalone MRI is favored for its technical parameters like resolution (4.29), and advanced hybrid modalities like PET-CT are universally recognized for metabolic superiority (100%) and early detection (92.9%), standalone CT remains the operational backbone of the local healthcare infrastructure in Sirte.

This reliance is heavily driven by its practical parameters, specifically the rapid turnaround time for clinical results (4.37) and its high local accessibility (4.32). These factors are particularly vital in the Libyan context, where resource optimization and timely diagnosis are critical for oncology patient management [Bodalal et al., 2020]. However, the future projections from the specialists indicate a clear transitional mindset; the high consensus on partial reliance (66.7%) and the endorsement of PET-CT (59.5%) imply that while CT is logistically indispensable today, its long-term utility is envisioned to shift from a standalone modality toward an integrated fusion baseline within hybrid diagnostic systems [Beyer & Czernin, 2020]

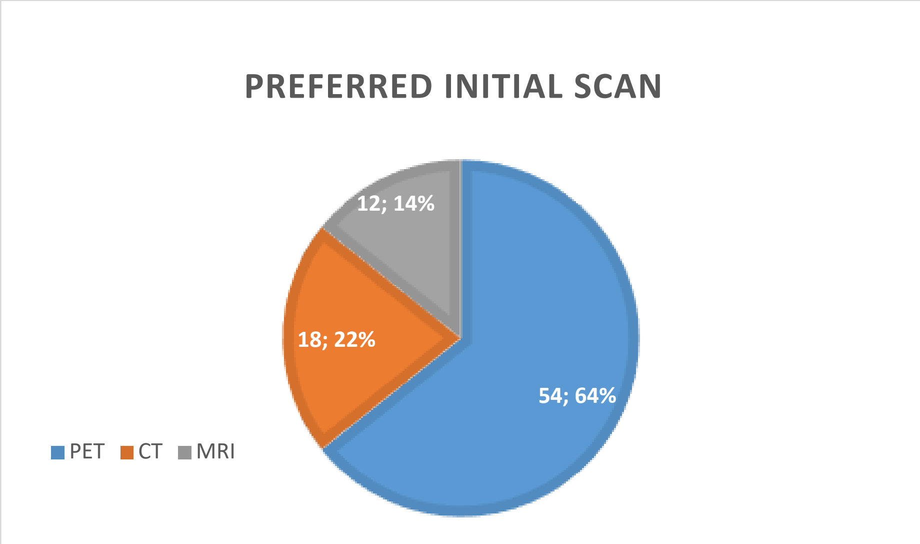

Figure 3: Practical and logistical parameters of CT scans**.**

4. Discussion

The results of this research validate that Computed Tomography (CT) is an essential diagnostic element in the framework of cancer care in Sirte, Libya. This prominent role is supported by CT's marked advantage in practical and logistical aspects, particularly its swift processing time (4.37/5.0) and significant local accessibility (4.32/5.0) at major institutions such as Ibn Sina Hospital. These functional benefits correspond with the wider obstacles faced by oncology services in Libya, where efficient use of resources and access are vital components in managing patient care [Bodalal et al., 2020].

Despite its logistical dominance, the study highlights a significant "specialized technical gap." The 100% consensus among participants regarding the superiority of PET-CT in metabolic assessment directly addresses the reported limitations of standalone CT. Specifically, "small tumor size (< 1 cm)" was identified as the primary cause of diagnostic errors (36.9%). Scientifically, while CT provides essential morphological data, it often fails to detect early-stage malignancies where structural changes are not yet evident—a limitation that hybrid molecular imaging (PET-CT) overcomes by evaluating cellular metabolic activity [Beyer & Czernin, 2020].

Furthermore, the divergence in professional perspectives—where oncologists prioritize CT for its speed, while radiologists favor MRI for its superior soft-tissue contrast (4.19 vs. 3.90)—underscores the necessity of a collaborative approach. The lack of hybrid imaging in the local clinical environment of Sirte makes the implementation of Multidisciplinary Tumor Boards (MDTs) paramount. Structured MDT pathways have been globally proven to bridge the gap between practical diagnostic speed and technical accuracy, ensuring that imaging choices are tailored to the specific anatomical complexity of the tumor [Lamb et al., 2023; Elshami et al., 2021]. Ultimately, the transition in professional mindset in Sirte—evidenced by the 59.5% endorsement of PET-CT as the future of oncology—indicates a strong readiness for technological advancement. However, until such infrastructure is realized, optimizing current CT protocols and fostering interdisciplinary collaboration remain the most viable strategies for enhancing oncological outcomes in the region.

5. Conclusion

In summary, this research emphasizes that Computed Tomography (CT) continues to be the essential logistical and clinical foundation for cancer diagnostics in Sirte, Libya, especially in significant institutions like Ibn Sina Hospital and the Sirte Oncology Center. The results indicate that the excellent local availability of CT (average 4.32/5.0) and the swift delivery of clinical results (average 4.37/5.0) make it the preferred practical instrument for cancer staging and ongoing monitoring**.**

Nevertheless, the research also highlights a notable technical deficiency, especially concerning the identification of minor lesions (less than 1 cm), which continues to be a key factor in diagnostic inconsistencies. Even though there is a complete agreement among professionals (100%) regarding the enhanced metabolic capabilities of

combined techniques such as PET-CT, their present lack of accessibility in the local setting demands the improvement of current resources.
To improve the quality of cancer treatment in Sirte, it is crucial to establish ongoing educational programs for radiographers and investigate the use of artificial intelligence (AI) technologies to reduce mistakes in diagnosis. Additionally, promoting teamwork among various specializations will be necessary as the area gears up for a shift towards combined hybrid diagnostic systems, making certain that patient care is directed by both rapid clinical responses and technical accuracy.

6. Recommendations

In light of the empirical research and the viewpoints obtained from the healthcare sector in Sirte, the following suggestions are presented to improve the effectiveness of cancer imaging:

1. Refinement of CT Procedures: Considering that 36.9% of healthcare professionals pointed out "small tumor size (< 1 cm)" as a significant factor contributing to diagnostic mistakes, medical facilities in Sirte should adopt advanced, high-resolution thin-slice CT protocols specifically aimed at detecting early-stage cancer and lesions smaller than one centimeter.
2. Formation of Multidisciplinary Tumor Boards (MDTs): To address the differences between oncologists, who focus on swift results, and radiologists, who emphasize accuracy, the establishment of organized MDTs at Ibn Sina Hospital and the Sirte Oncology Center is crucial. This will guarantee that the choice of imaging techniques is adapted to the specific anatomical and biological challenges of each patient case.
3. Strategic Infrastructure Enhancements: In response to the 17.9% issue related to "poor equipment condition/preparedness," a detailed preventive maintenance program and a staged hardware improvement strategy ought to be implemented to ensure elevated diagnostic criteria.
4. Prospective Integration of Hybrid Imaging: Given the unanimous agreement on the metabolic advantages of PET-CT, regional health officials ought to commence strategic assessments regarding the implementation of hybrid imaging in central Libya. This approach would reduce the necessity for patient travel and deliver the metabolic information that conventional standalone CT fails to provide.
5. Ongoing Professional Education: Tailored training initiatives that concentrate on intricate anatomical areas (identified as an issue by 16.7% of those surveyed) and the incorporation of Artificial Intelligence (AI) technologies for analyzing images ought to be emphasized for radiologists and radiographers alike.
6. Efficient Use of Economic Resources: Given that the "cost-to-benefit ratio" achieved a fair score of 3.58 out of 5.0, healthcare managers ought to prioritize making the most of the current CT scanners as a budget-friendly starting point while considering future significant financial commitments in PET-MRI or PET-CT technologies.

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