**Deanship of Graduate Studies**
**Al-Quds University**

# Assessment of physicians' and patients' satisfaction with the implementation of ISO 15189 in Palestinian Medicare Private Medical laboratories

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**M.Sc. Thesis**

**Jerusalem- Palestine**

**1445/2023**

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**A Thesis Submitted in Partial Fulfillment of Requirements for the Degree of Master of Health Policies and Management /School of Public Health /Al-Quds University**

**1445/2023**

**Deanship of Graduate Studies**
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**School of Public Health**

## Thesis Approval

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**Jerusalem-Palestine**

**1445/2023**

# Dedication

I dedicate this thesis:

To the owner of the first and last bounty, to the guide on the straight path... God Almighty.

To my dear father, may God prolong his life, whose unwavering support has been my anchor through the seas of education.

To my dear mother, the unlimited source of encouragement and strength throughout my educational journey.

To my husband and life partner, Amer, who not only facilitated all the difficulties during my journey but also illuminated the path with candles of hope.

To my beloved daughters and sons, your constant encouragement and support served as the driving force behind my determination.

To those who are the joy of my heart and the best friends in my life... my brothers and their wives and sisters and their husbands.

To my dear husband’s family and mother-in-law, thank you for being an integral part of my journey.

To my dear friends and colleagues.

To everyone who contributed to the completion of this study.

With love and deep respect for each one of you.

**Dina Marwan  Abu Zayyad**

## Declaration:

I certify that this thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged, and that this thesis (or any part of the same) has not been submitted for a higher degree to any other university or institution.

27/12/2023

**Signed:**

Dina Marwan Abu Zayyad

## Acknowledgments

At the outset, I express my gratitude to God Almighty, who was always with me, providing the strength that has brought me to the point where I stand today.

I extend my sincere thanks to my supervisor, Dr. Butheina Surkhi, for generously offering her time and valuable insights, which significantly contributed to the successful completion of this dissertation.

Appreciation is also extended to the program coordinator, Dr. Asma Imam, to the Faculty of Public Health, and Al-Quds University administration for accepting me into the Policies and Health Management master program.

I extend my deepest appreciation to Medicare Laboratories, represented by its director, Dr. Bashar Al-Karmi, along with all the managers, supervisors, employees, and laboratory technicians. Their support was essential in accomplishing various aspects of the dissertation process.

I am sincerely grateful to all those who played a role in the completion of this study, contributing to the realization of this research endeavor.

## Abstract

**Background**: Recently, all medical laboratories have become interested in ISO 15189, the first quality management ISO system for medical laboratories. To enhance and deliver high-quality healthcare services, it is important to understand patients' and Physicians' satisfaction levels. International laboratory standards stipulate that the clinical laboratory must monitor customer satisfaction as a crucial metric of the quality management system. However, baseline information on the level of physician and patient satisfaction with laboratory services in privately owned medical laboratories that adhere to ISO 15189 is lacking in Palestine.

**Aim**: The present study aims to assess patients' and physicians' satisfaction with the implementation of ISO 15189 in Palestinian Medicare Private Medical Laboratories.

**Methods**: The study employed a quantitative approach, utilizing a cross-sectional study design involving a survey conducted on 191 patients selected conveniently from a monthly average of 6,300 patients in eight branches of Medicare laboratories (Ramallah, Tulkarm, Hebron, Nablus, Jericho, Al-Eizariya, Bethlehem, and Jenin). Additionally, 123 physicians were conveniently selected from the total of 325 physicians who referred patients to the previously mentioned branches of Medicare laboratories each month. This study covered eight branches of Medicare laboratories in Palestine, all adhering to ISO 15189 standards. A structured questionnaire, self-administered, was used to collect data, and analysis was performed using SPSS[1]. Participants rated their satisfaction on a 5-point Likert scale, with 1 denoting the lowest and 5 the highest satisfaction levels. Statistical significance was determined at a p-value less than 0.05.


[1] SPSS (Statistical Package for the Social Sciences) is a software package used for the analysis of statistical data

**Results:** The study demonstrated high satisfaction levels among patients (89%) and physicians (85%) in Medicare Private Medical Laboratories adhering to ISO 15189 standards. Patient satisfaction correlated positively with factors like work environment, result accuracy and reliability, and service accessibility, but not with socio-demographic variables. Similarly, physician satisfaction is linked to result quality and laboratory accessibility, with no correlation to socio-demographic variables. The results highlight the positive influence of ISO 15189 implementation on the quality of medical laboratory service.

**Conclusion:** The findings from the study highlighted how the implementation of ISO 15189 positively affected the quality of medical laboratory services. This emphasizes the significance of encouraging policymakers to strive to apply ISO 15189 in Palestinian medical laboratories as a tool of assessment. This adoption aims to guarantee that national medical laboratories consistently achieve and maintain higher standards of practice.

**Keywords**: *Laboratory service, ISO 15198, Patient satisfaction, Physician satisfaction, Palestine.*

# تقييم رضا الأطباء والمرضى عن تطبيق المواصفة ISO 15189 في مختبرات ميديكير الطبية الفلسطينية الخاصة

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**اشراف : الدكتورة بثينة السرخي**

**ملخص**

**المقدمة**: في الآونة الأخيرة، أصبحت جميع المختبرات الطبية مهتمة بـISO 15189 ، وهو أول نظام ISO في إدارة الجودة للمختبرات الطبية. لتعزيز وتقديم خدمات رعاية صحية عالية الجودة من المهم فهم مستويات رضا المرضى والأطباء. تنص معايير المختبرات الدولية على أن المختبر السريري يجب أن يراقب رضا العملاء كمقياس حاسم لنظام إدارة الجودة. ومع ذلك، لا توجد معلومات أساسية عن مستوى رضا الأطباء والمرضى عن الخدمات المخبرية في المختبرات الطبية المملوكة للقطاع الخاص والتي تلتزم بمواصفة ISO 15189 في فلسطين.

**الهدف من الدراسة**: تهدف هذه الدراسة إلى تقييم مدى رضا المرضى والأطباء عن تطبيق المواصفة ISO 15189في مختبرات ميديكير الطبية الخاصة في فلسطين.

**المنهجية**: استخدمت الدراسة نهجًا كميًا، وذلك باستخدام تصميم دراسة مقطعية تتضمن مسحًا تم إجراؤه على 191 مريضًا تم اختيارهم بشكل ملائم من متوسط شهري قدره 6300 مريض في ثمانية فروع من مختبرات ميديكير(رام الله، طولكرم، الخليل، نابلس، أريحا، العيزرية، بيت لحم، جنين). بالإضافة إلى ذلك، تم اختيار 123 طبيبًا من إجمالي 325 طبيبًا يقومون بتحويل المرضى إلى فروع مختبرات ميديكير المذكورة سابقًا كل شهر. وقد غطت هذه الدراسة ثمانية فروع مختبرات ميديكير في فلسطين، وجميعها ملتزمة بمعايير ISO 15189 . تم استخدام استبيان منظم ذاتي لجمع البيانات، وتم إجراء التحليل باستخدام برنامج .SPSS قام المشاركون بتقييم رضاهم على مقياس ليكرت المكون من 5 نقاط، حيث تشير 1 إلى أدنى مستويات الرضا و5 إلى أعلى مستويات الرضا. تم تحديد الأهمية الإحصائية عند قيمة p أقل من 0.05.

**النتائج**: بشكل عام، أظهرت الدراسة مستويات رضا عالية بين المرضى (89%) والأطباء (85%) في مختبرات ميديكيرالطبية الخاصة الملتزمة بمعايير ISO 15189 . يرتبط رضا المرضى بشكل إيجابي بعوامل مثل بيئة

العمل، ودقة النتائج وموثوقيتها، وإمكانية الوصول إلى الخدمة، ولكن ليس مع المتغيرات الاجتماعية والديموغرافية. وبالمثل، يرتبط رضا الأطباء بجودة النتائج وإمكانية الوصول إلى المختبرات، دون أي ارتباط بالمتغيرات الاجتماعية والديموغرافية. تسلط النتائج الضوء على التأثير الإيجابي لتطبيق ISO 15189 على جودة خدمة المختبرات الطبية.

**الخلاصة**: أبرزت نتائج الدراسة كيف أثر تطبيق ISO 15189 بشكل إيجابي على جودة خدمات المختبرات الطبية. وهذا يؤكد أهمية تشجيع صناع السياسات على السعي لتطبيق المواصفة ISO 15189 في المختبرات الطبية الفلسطينية كأداة للتقييم. ويهدف هذا الاعتماد إلى ضمان أن تحقق المختبرات الطبية الوطنية باستمرار معايير أعلى للممارسة وتحافظ عليها.

**الكلمات المفتاحية:** خدمة المختبر، ISO 15198، رضا المرضى، رضا الأطباء، فلسطين.

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| | |
|---|---|
| ISO | International Organization for Standardization |
| SPSS | Statistical Package for the Social Sciences |
| QMS | Quality Management System |
| A2LA | American Association for Laboratory Accreditation |
| ISO/IEC | International Electrotechnical Commission |
| ASPs | Antimicrobial Stewardship Programs |
| KAMC-WR | King Abdulaziz Medical City - Western Region |
| dhis-2 | district health information Software 2 |
| HMIS | Health Management Information System |
| HIV | Tuberculosis |
| TB | One-Way analysis of variance |
| MCH | Maternal, and Child Health |
| PNFP | Private Not-for-Profit |
| ART | Anti-Retroviral Therapy |
| QR code | Quick Response code |
| ANOVA | One-Way analysis of variance |
| SD | Standard Deviation |

# Chapter One

# Introduction

# Chapter One

# Introduction

## 1.1 Introduction

It is essential to carry out laboratory procedures in the best way possible to reach the maximum level of accuracy and dependability, Laboratory medicine plays a critical role in clinical decision-making, It is crucial for diagnosis, monitoring, and evaluation of patient outcomes, identifying adverse events. Adhering to the International Standard for Accreditation of Clinical Laboratories, [ISO 15189:2012], is critical for reducing the error rate in the laboratory, which may occur during the pre-analytical to post-analytical processes.

ISO 15189 accreditation for medical laboratories outlines the requirements for medical laboratory management, including laboratory design and operation, technical and diagnostic performance assessment, and results reporting. The standard's goal is to ensure that medical laboratories can produce results that are appropriate for their intended use. ISO 15189, like ISO 17025, is a certification that medical laboratories can use to demonstrate their competence and confidence. Nowadays, legal compliances need laboratories to be ISO 17025 accredited, therefore having medical laboratories that are ISO 15189 accredited is even more important in order to demonstrate integrity, impartiality, competence, and commitment to quality, boosting its reputation and trust among patients and healthcare providers. Certification can also help with continual improvement because the standard necessitates regular evaluation and review of the laboratory's performance (Effective ISO 15189 Accreditation for Medical Laboratories, 2022).

When quality processes are implemented, quality laboratory reports are always kept, Customer satisfaction will, therefore, follow from the establishment and ongoing application of such quality processes.

Customer satisfaction is a key element of a quality management system, the main priority of the International Organization for Standardization, and extremely important to ensure the attitude and expectations of customers regarding health care. Additionally crucial is the generation of information sources for detecting gaps and creating a successful action plan for quality improvement (Agajie Likie & Ajanaw Yizengaw, 2021).

Patient satisfaction has a positive impact on their ability to recover from disease and receive proper clinical care from physicians, as well as work satisfaction for all healthcare professionals (Khadeja et al., 2022).

As a result, medical laboratories will be better able to meet regulatory standards and customer expectations, and most importantly improve and sustain patient care.

## 1.2 Problem statement

ISO 15189 accreditation permits the implementation of a system adhering to the specifications of an internationally recognized standard, created around the unique peculiarities of Laboratory Medicine. In the first place, accreditation also enables encouraging the adoption of a competency standard that should provide efficient patient management (Sciacovelli et al., 2017).

Accredited laboratories are known for their high-test reliability, operational performance, quality management, and competence. The most effective accreditation is founded in a policy framework for assessing laboratory quality and patient safety, In the eight Medicare laboratory branches in which the study was conducted adherence to

such quality standards and involvement in certification programs that vouch for this adherence can enhance operational effectiveness, boost customer satisfaction, and lower the incidence of laboratory errors (Peter et al., 2010).

Factors that affect patient satisfaction with clinical laboratory service including:- The level of service and professionalism of the staff, the provision of adequate information for specimen collection and when and how to receive laboratory results, the waiting period for laboratory results, the availability of ordered laboratory tests, the cleanliness of the laboratory room, the location of the laboratory room, and the availability and accessibility of restrooms (Alelign & Belay, 2019).

The best strategy to measure and improve laboratory service quality is to consider the valuable suggestions of the test-requesting physician, who is the primary user of the laboratory. Laboratory data are used to make 70% of all medical decisions. The laboratory reports add value to clinical expertise by allowing the doctor to make faster decisions and reduce guesswork (Khadeja et al., 2022).

Till now, there are no studies in Palestine about Physicians' and patients' satisfaction and the quality of laboratory services. Therefore, this study was conducted to assess physicians' and patients' satisfaction with the implementation of ISO 15189 in Palestinian Medicare Private Medical Laboratories.

## 1.3 Study justification

ISO 15189 standard is significant for a variety of reasons: (1)It explains how to set up and maintain a quality management system for medical laboratories, so this is critical because it ensures that laboratories can consistently generate accurate and reliable results. (2) It contributes to laboratory worker safety, which is essential since laboratory personnel are frequently exposed to potentially harmful compounds. (3) The ISO 15189

standard contributes to global consistency in the quality of medical laboratory services, it ensures that patients receive the same high standard of treatment regardless of where they live (Safetyculture.Com/Iso-15189, n.d.).

With ISO 15189, it will be easier to detect potential risks and allow medical laboratories to plan and apply risk-mitigation measures. Additionally, it will improve the quality management system (QMS) and help medical laboratories discover problems and implement corrective measures more promptly and efficiently, which can help laboratories to give better quality services and more accurate findings to their clients. This, in turn, will lead to increased consumer (patients and physicians) satisfaction and increase the marketability and attractiveness of a medical laboratory to potential clients.

ISO 15189 certification is vital for laboratories since it helps to ensure that their clients receive accurate and reliable test findings. This, in turn, contributes to the laboratory's ability to create trust and provide quality service to its patients, physicians, and other stakeholders (Safetyculture.Com/Iso-15189, n.d.).

This study was conducted for the following reasons:

1- There is a paucity of studies that are conducted to assess physicians' and patients' satisfaction with the implementation of ISO 15189 in Palestinian Medicare Private Medical Laboratories.
2- This study will provide important insight into the effect of the application of ISO and its standards on physicians' and patients' satisfaction, as it is one of the most essential and current concerns that many institutions are attempting to accomplish.
3- Emphasizing the significance of applying ISO 15189 in private medical laboratories as a tool to improve the quality and effectiveness of laboratory services, aiming to

encourage other medical laboratories at the national level to enhance their performance.

4- This study will set up baseline assessment data of physician and patient satisfaction with medical laboratories' service quality for future improvements and follow-ups.

## 1.4 Aim of the study

This study aimed to assess physicians' and patients' satisfaction with the implementation of ISO 15189 in Palestinian Medicare Private Medical Laboratories.

## 1.5 General Objectives

1. To assess physicians' and patients' satisfaction with accessibility to medical laboratory services in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189.
2. To assess patients' satisfaction with the work environment in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189.
3. To assess physicians' and patients' satisfaction with the quality of laboratory test results in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189.
4. To assess physicians' and patients' satisfaction with services provided to them in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189.
5. To compare between the physicians' and patients' perceptions regarding the quality of medical laboratory services.

## 1.6 Specific Objectives

1. To assess the relationship between patient satisfaction with the quality of service and socio-demographic variables (Age, gender, place of residency, educational level,

health insurance /out-of-pocket, number of visits, and occupation) in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189.

2. To assess physician and patient satisfaction with the turnaround time of laboratory test results, missing results, and laboratory test results reliability in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189.
3. To assess patient satisfaction with the availability of requested service, ways to get the results, the humanity of care, and the Phlebotomist technique skillfulness in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189.
4. To assess the patient satisfaction on waiting time to receive services, accessibility of the laboratory, and clear and understandable advisory service before specimen collection in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189.
5. To assess patient satisfaction with the cleanness of latrines and the cleanliness and adequacy of the waiting area in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189.
6. To assess the relationship between physician satisfaction with the quality of service and socio-demographic variables (Age, gender, place of residency, years of experience, and speciality) in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189
7. To assess physician satisfaction with the availability of requested service, ways to get the results, notification of the newly introduced tests, the laboratory's ability to resolve complaints, legibility, and completeness of laboratory reports, provision of urgent tests in a timely fashion and report critical results in the Palestinian Medicare Private Medical Laboratories that applied ISO 15189.

## 1.7 Research Question

1. Is there a relationship between applying ISO 15189 Standard on physician and patient satisfaction in Palestinian Medicare Private Medical Laboratories?
2. Is there a relationship between applying ISO 15189 Standard on the quality of services that are provided to physicians and patients in th Palestinian Medicare Private Medical Laboratories?
3. Is there a relationship between socio-demographic variables (Age, gender, place of residency, educational level, number of visits, health insurance, and occupation) and patient satisfaction in the Palestinian Medicare Private Medical Laboratories?
4. Is there a relationship between socio-demographic variables (Age, gender, place of residency, years of experience and speciality) and physician satisfaction in Palestinian Medicare Private Medical Laboratories?
5. What is the impact of the work environment on patient satisfaction in Palestinian Medicare Private Medical Laboratories?
6. What is the impact of the quality of laboratory test results on physician and patient satisfaction in Palestinian Medicare Private Medical Laboratories?
7. What is the impact of access to medical laboratory services on physician and patient satisfaction in Palestinian Medicare Private Medical Laboratories?

## 1.8 Feasibility of the study

• The researcher herself is working in Medicare laboratories which facilitated the collection of data.

• Management approval had been obtained from Medicare laboratories to conduct this study in their laboratories.

• Participants' approval had been obtained before conducting this study.

## 1.9 Summary

This chapter presented an overview of the importance of implementing ISO 15189 in medical laboratories, in addition to the problem statement, the study objectives, research questions, and the feasibility of the study.

The next chapter discusses the literature review of the current study related to physicians' and patients' satisfaction with the implementation of ISO 15189 in medical laboratories and how ISO 15189 influenced the quality of services at the national and international levels that support the importance of ISO 15189 in enhancing the quality of medical services and therefore customers satisfaction.

# Chapter Two

# Literature Review

# Chapter Two

# Literature review

## 2.1 Introduction

Implementing and maintaining an extensive laboratory quality control system will help to reduce the variability of test findings and the frequency of errors. This has involved signing up for an accreditation scheme and taking part in routine proficiency testing (PT) in settings in industrialized countries. To ensure accurate and reliable patient testing, the staff's and the environment's safety, laboratories must adhere to quality and competency criteria that have been set. Accredited laboratories are known for their outstanding test reliability, operational performance, quality management, and competitiveness. A functional national laboratory accreditation program within a nation needs at least three components: a framework for laboratory policy that mandates accreditation for laboratories, predetermined quality standards that laboratories can be judged against, and local or foreign accrediting bodies that are qualified to evaluate laboratories and certify their performance concerning the predetermined quality standards, an international standard called ISO 15189 is designed specifically for medical laboratories that want to show their quality and competence (Peter et al., 2010).

The following topics will be covered in this section: ISO definition and concepts, ISO 9001, ISO 17025, ISO 15189, patient and physician satisfaction with ISO 15189 implementation, and previous studies related to the study topic.

## 2.2 ISO definition and concepts

The International Federation of the National Standardizing Associations (ISA), which ran from 1928 to 1942, was replaced by ISO. A meeting on international standards was held in 1946 by members of the ISA and the United Nations Standards Coordinating Committee. The next year, ISO was established as a nongovernmental organization as a result of their work. In 1951, ISO released ISO/R 1:1951 (Standard Reference Temperature for Industrial Length Measurements), which was the organization's first standard. The current name of the standard is ISO 1:2016. The ISO has released more than 24,000 standards as of 2021**.**

An international federation of national standards organizations exists under the name ISO (International Organization for Standardization). ISO comprises standards bodies from over 160 countries, with one standards body representing each member country. National standards organizations that are members of ISO work together to produce and promote global norms for a variety of things, including technology, scientific testing procedures, working conditions, societal challenges, and more. The documentation of these standards is then sold by ISO and its members. Its governing body is the ISO General Assembly. It is made up of elected officials known as primary officers and representatives from the members. The organization's central secretariat is in charge of managing activities from its headquarters in Geneva, Switzerland. One of the most important goals that ISO seeks is to facilitate cooperation and unify industrial standards at the international level to facilitate international trade exchange of goods and services and to develop relations in the areas of development, science, technology, and economics (Loshin, 2021).

Various types of ISO exist, each associated with specific purposes. Some are linked to quality management systems, others serve as primary standards for testing and calibration laboratories, and another type is utilized as a measure of medical laboratory proficiency by regulatory agencies, accreditation bodies, and laboratory clients.

The subsequent content outlines certain categories related to the International Organization for Standardization (ISO).

**ISO 9001**

The International Organization for Standardization released ISO 9001 for the first time in 1987. The current version of ISO 9001 was released in September 2015. The international standard ISO 9001 is known for laying out the specifications for a quality management system (QMS). The standard is used by businesses to show they can consistently deliver goods and services that satisfy consumer and legal requirements. It is the most widely used standard in the ISO 9000 series and the only standard in the series that enterprises can be certified to (American Society for Quality, 2020).

**ISO 17025**

A quality management system known as ISO 17025 serves as the primary standard for testing and calibration laboratories. While ISO 17025 and ISO 9000 have many similarities, ISO 17025 assesses technical proficiency in lab testing and calibration services and applies to businesses that generate testing and calibration results**.**

Originally known as ISO/IEC ( International Electrotechnical Commission)Guide 25, ISO/IEC 17025 was initially issued by ISO/IEC in 1999 (Campbell Scientific Canada, 2021).

**ISO 15189**

The first edition of ISO 15189 was released in 2003, followed by the first revision in 2007 and the release of the third edition in 2012. By guaranteeing the health and safety of patients, and healthcare professionals, and the preservation of data for advancements in the overall quality of care, these standards encourage global improvement and harmonization of clinical practices across healthcare departments. The standard is utilized as a gauge of medical laboratory proficiency by regulatory agencies, accreditation bodies, and laboratory clients. The most recent version of the standard, ISO 15189-2012, was revised in 2012 to include a requirement for assessment against measurement uncertainty and traceability (Ngeno & Kinoti, 2019).

In the field of laboratory medicine, achieving accreditation by ISO 15189 raises expectations among laboratory professionals about the potential to highlight the significance of their contribution to improved outcomes and safety care, therefore, the ISO 15189 accreditation is a guarantee that the laboratory has been evaluated against globally recognized standards intended to prove the existence of a quality system, technical competence and that the staff is competent to produce technically valid results and appropriate information for the intended use of each test.

To ensure efficiency in service delivery, ISO 15189 mandates the development of a resource management system and technical competence. The clinical competence is based on a quality system (in terms of objective definition, recording documents, standard operating procedures, quality assurance tools, etc.), complying with ISO 15189 management requirements, to emphasize the level of compliance with the best laboratory practice for ensuring the best possible patient outcome (Sciacovelli et al., 2017).

ISO 15189 was prepared by Technical Committee ISO/TC 212, Clinical Laboratory Testing and In vitro diagnostic test systems, it includes several of requirements that are divided into two parts, Management requirements, and technical requirements. Furthermore continuous improvement is a fundamental element of the ISO15189 standard, and the purpose of continuous improvement is to improve laboratory operations and services while increasing patient satisfaction.

For a laboratory to build and maintain a quality management system, it is crucial to follow the management requirements as described in the document (British Standards Institution, 2012). These are the main ideas:

- A documented quality management system should be in place, encompassing procedures to fulfill the quality policy and objectives and satisfy user demands.
- The laboratory must adhere to international laws and local requirements and establish management responsibilities for the quality management system.
- Service agreements should take requests, exams, and reporting into account, and all elements of agreements must be routinely evaluated and documented.
- Proper documentation is essential, including a quality policy, quality objectives, a quality handbook, and records required by the International Standard.
- Referral laboratories and consultants for complex testing should be chosen and assessed according to a documented procedure
- The laboratory should have a process for choosing and purchasing external services and supplies that have an impact on service quality.
- A process to identify and handle nonconformities throughout the quality management system is required.
- A defined protocol must be in place for managing complaints or feedback from diverse sources, with comprehensive documentation of all actions done.

- Corrective steps must be taken to remove the nonconformities' root causes, with the results being documented and their efficacy being evaluated.
- Preventive measures should be implemented, with results documented and effectiveness assessed.
- Through the use of improvement plans, quality indicators, and the identification of potential improvement areas, continuous progress should be documented.
- A system must be designed and documented for monitoring and retaining records.
- Internal audits and regular evaluations are required to guarantee adherence to the quality management system and advancement.
- Management reviews ought to be carried out to confirm the efficacy and applicability of the quality management system.
- Management review-related actions must be finished within predetermined deadlines.

The second part of the requirement of ISO 15189 is a technical requirement (British Standards Institution, 2012) that includes the following :

- Laboratories need to have clear procedures in place for managing their staff, assuring their competency through training and assessment, and carrying out performance reviews and professional development.
- Accommodations and Environmental Conditions: Laboratories require specialized spaces that guarantee product quality, safety, and proper material storage, as well as access to necessary amenities.
- To suit the needs of the examination, procedures for choosing, managing, and replacing laboratory equipment must be devised.

- Pre-examination Processes: Laboratories must have documented protocols for activities before conducting examinations.
- Examination Processes: Validated examination procedures should be used, and the identities of personnel involved must be recorded.
- Ensuring Quality of Examination Results: Examinations must be conducted following defined guidelines and without fabrication of results.
- Post-examination Processes: Laboratories must establish procedures for authorized review of examination results and proper management of clinical samples.
- Reporting Exam outcomes: Proper communication methods and accurate and unambiguous record-keeping of exam outcomes are critical.
- Release of Results: Laboratories must have established procedures in place before providing authorized receivers with examination results.

Indeed, the combination of management and technical requirements outlined in ISO 15189 ensures that the laboratory operates according to quality standards, prioritizing continuous improvement and meeting user needs. Technical specifications guarantee competent workers, appropriate infrastructure, adherence to examination processes, and accurate reporting by ISO 15189. The certification guarantees safe, reliable, and cost-effective clinical services, building trust among stakeholders and offering benefits like global recognition, a competitive edge, standardized data, increased efficiency, and enhanced data security. ISO 15189 leads to accurate diagnoses, improved patient care, and reduced risk exposure, making it a valuable achievement for laboratories striving for excellence(Hoare, 2023).

## 2.3 Implementation of ISO 1518 in Medical Laboratories

The ISO 15189 Standards is a very structured method for implementing and maintaining changes in clinical laboratories. With a strong emphasis on responsiveness to patient and clinician demands, it applies the standards of the quality system to clinical laboratories. Applying performance improvement tactics that concentrate on various stages of the testing process as a whole would greatly minimize errors and, as a result, improve patient safety. In this way, laboratory personnel improve patient outcomes and safety by utilizing an interdisciplinary approach to their work. It is important to not overlook awareness, which is the mainstay of patient safety projects and a crucial element in guaranteeing successful implementation (Serteser et al., 2012).

The application of ISO 15189 in medical laboratories is an important matter, as it was in a study conducted by Beyanga et al.,(2018) to show the experience of implementation of the laboratory quality management system (ISO 15189) in Buganda Medical Centre Clinical Laboratory – Mwanza, Tanzania, The findings demonstrate that after the implementation of ISO 15189, the departments' external quality assessment performance improved (for example, parasitology went from 45% to 100%, molecular biology went from having no records to 100%, biochemistry went from 50% to 95%, tuberculosis microscopy went from 60% to 100%, and microbiology went from 48.1% to 100%). There was a decrease in complaints from eight to two every week. Samples that were rejected went from 7.2% to 1.2%. Turnaround time, which had not been recorded before implementation, met 92% of the predetermined goals, and the percentage of contaminated blood cultures dropped from 16% to 4%.

Another study conducted at Turkish University Hospital by Yesim et al.(2011) about ISO 15189 accreditation experience at the Microbiology Laboratory to

understand the extent of applying the standards of accreditation to minimize laboratory personnel errors to almost zero, supplying ongoing training to staff and hospital staff, combining traditional methods with modern ones, and upgrading knowledge with new reference books. The study details the experience of the ISO/IEC 15189:2007 accreditation process in a University Hospital's Medical Microbiology Laboratory, both before and after assessment. The accreditation process began in 2008, to become the first accredited university hospital laboratory in the country. The laboratory successfully accredited tests in bacteriology, mycology, parasitology, virology, immunology, and molecular serology.

Validation and verification procedures, especially for quantitative analyses, were completed. External and internal quality controls, along with corrective actions, improved control and self-correction. The implementation of a laboratory discrepancy form and training helped enhance the success rate in quality controls. Statistical analyses conducted over a year provided valuable insights for continuous improvement.

In 2009, 60 out of 85 forms were completed in the microbiology laboratory among the central laboratories. The laboratory personnel were encouraged to fill out these forms, fostering a culture of self-assessment and training. The study emphasizes the importance of supporting laboratories in the country to enhance quality. The existence of internal quality controls is seen as a cost-effective measure in the accreditation process. The report also mentions that the laboratory achieved 78 hours and 30 minutes of training during routine processes in one year.

In summary, the study provides insights into the meticulous process of achieving and maintaining ISO/IEC 15189:2007 accreditation in a medical microbiology laboratory. It underscores the importance of a holistic approach,

encompassing quality controls, personnel training, continuous improvement, and broader support for enhancing laboratory standards in the country.

Furthermore, The study conducted in the Kingdom of Saudi Arabia by Kaneez Zamir, et al. (2019) outlines the successful journey of achieving the first A2LA[2] ISO 15189:2012 accreditation in the Medical Laboratory. The primary goal was to enhance the Department of Pathology and Laboratory Medicine's total quality management system by obtaining international accreditation, specifically A2LA ISO 15189. This accreditation aimed to ensure the delivery of accurate, dependable, and timely results for superior patient care and safety.

The decision to pursue A2LA ISO 15189 accreditation was motivated by several advantages, including the reduction of errors in pre-analytical, analytical, and post-analytical processes, facilitation of accurate and rapid diagnostics, participation in accelerating and efficiently treating patients, and the stimulation of continuous improvement.

The study highlights the timeline of the accreditation process, starting from the initial baseline audit in 2015 and concluding with the final exit audit in 2018. Throughout this period, internal audits were consistently conducted. The cooperation and rapport between management and staff were identified as essential elements for the effective implementation of A2LA ISO 15189.

Results from 2016 to 2018 demonstrated a significant increase in compliance, indicating progress and readiness for the final A2LA ISO 15189 audit. As a result, the Department of Pathology and Laboratory Medicine became the first laboratory in Saudi

[2] A2LA is a third-party company that performs accreditations in accordance with different international standards, assuring a fair and impartial assessment of your firm's operations

Arabia to achieve A2LA ISO 15189 accreditation, showcasing leadership in adhering to international quality standards and setting a benchmark for other laboratories in the region.

The study underscores the significance of effective coordination and rapport between management and staff, along with having a well-trained and motivated laboratory staff, in the successful implementation of A2LA ISO 15189. The accreditation process involved an initial gap analysis and continuous monitoring through internal and external assessments, providing crucial tools for accrediting over 250 tests. Additionally, survey results contributed to tailoring an educational curriculum for Antimicrobial Stewardship Programs (ASPs) at King Abdulaziz Medical City - Western Region (KAMC-WR), reflecting a commitment to continuous improvement and adapting practices for enhanced overall patient care (*Laboratory Accreditation & Assessment Services,(A2LA)*, n.d.).

In addition, the necessity for top-notch laboratory services around the world has been highlighted by the COVID-19 epidemic. A longitudinal study conducted by Matovu et al.,(2022) to assess the impact of accreditation on health care services performance in Kiryandongo district in Uganda to effectively respond to public health emergencies and patient outcomes, Uganda started its public health facility certification program in 2016 with sixteen laboratories. As of June 2021, twenty-three public laboratories were accredited to ISO 15189:2012 standards. There are also challenges with few testing options and supply constraints for the sector despite Uganda's impressive development in certified laboratories. They carried out a longitudinal study at eleven medical facilities in the Kiryandongo region from January 1, 2020, to April 30, 2021. They obtained data on the effectiveness of health care services for a variety of factors from the MoH district health information Software 2 (dhis-2) which is a free

and open-source health management data platform, including dhis-2 reporting, human immunodeficiency virus (HIV), tuberculosis (TB), malaria, laboratory (determine testing kits stock out) , maternal, and child health (MCH). The metrics for HIV, tuberculosis, lab, MCH, and reporting to dhis-2 were all positively impacted by accreditation. The data compares the odds between an accredited healthcare facility and both non-accredited public facilities and non-accredited Private Not-for-Profit (PNFP) facilities across multiple healthcare indicators. The observations indicate that the accredited facility generally in comparison to the non-accredited public facilities exhibits higher likelihoods, including a 14% increase in anti-retroviral therapy (ART) enrolment, a 9% decrease in the probability of testing kit stock-outs, a 28% higher chance for TB case diagnosis, a 19% higher likelihood for TB case enrolment, a significant increase (104% for admissions and 63% for deliveries) in maternity services utilization, a 17% higher likelihood of reporting health management information system (HMIS) data to (dhis-2).

When compared to non-accredited PNFP facilities, the accredited facility shows a 26% higher likelihood for ART enrolment, a 33% higher chance for TB case diagnosis, a 24% higher likelihood for TB case enrolment, significantly higher odds (136% for admissions and 76% for deliveries) for maternity services, and a marginal 2% higher likelihood of reporting (HMIS) data to (dhis-2).

Overall, the findings suggest a positive association between accreditation and improved performance across various healthcare parameters, with potential enhancements in service quality, efficiency, and resource management. This influence led to better performance in healthcare services at recognized facilities when compared to non-certified hospitals.

## 2.4 Patient Satisfaction with Laboratories Services

Patients' satisfaction is critical to healthcare quality and medical laboratory quality, it provides accountability and implementation of continuous improvement in medical settings. So, medical laboratories strive for extremely high levels of patient satisfaction to better serve their clients, increase quality, and maintain accreditation. Most medical laboratories have yet to popularize and accept the concept of customer service (S. Etukudoh & M. Obeta, 2022).

A study was conducted by Hailu et al. (2020) to assess patients' satisfaction with clinical laboratory services in Public Hospitals in Ethiopia to enhance and deliver high-quality healthcare. A national survey with an institutional-based cross-sectional study design was conducted from November 1 to November 30, 2017. A total of 60 public hospitals were used to choose 2399 patients at random. Data were entered and analyzed using Epi Info[3], a structured questionnaire, and SPSS software. As a result, 78.6% of patients were overall satisfied with the clinical laboratory services. Patients voiced dissatisfaction with several factors, including the restroom's cleanliness (47 %), the wait time (30%), the advisory service's clarity and understandability (26%), the waiting area's adequacy (25%), the lab's accessibility (20%), the location of the restrooms (18%), the availability of the requested service (18%), the fairness of the payment for the service (17%), and the lack of results (12%), at the level of significance (P value = 0.000).In this study, educational status (P = 0.032) was substantially linked with total client satisfaction.

Also, a study was conducted by Abera et al. (2017a) to assess patient satisfaction with clinical laboratory services at Tikur Anbessa Specialized Hospital, Addis Ababa,

[3] Epi Info is statistical software for epidemiology developed by Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia (US.

Ethiopia. To gather study participants, a practical sampling technique was used in a hospital-based cross-sectional study. There were 210 patients in all who had got laboratory services. Face-to-face interviews were utilized to gather data, and the questionnaire was a self-administered, predesigned, pretested, structured survey. A Likert scale with 5 points with 1 and 5. The patients' satisfaction levels were categorized using the lowest and highest levels of satisfaction, respectively, and their weighted average. A chi-square test was used to determine whether there was any correlation between the degree of satisfaction and the various attributes (with $P< 0.05$ as the statistically significant level). SPSS version 20 was used to analyze the data., The outcomes had a response rate of 210 (100%), and the total level of patient satisfaction with clinical laboratory services was 59.7% in this study. According to the Likert scale data, the mean ratings for patient satisfaction with laboratory services ranged from 3.05 to 4.12 out of a possible 5. Patients were extremely satisfied with the facility's cleanliness (82%), the upkeep of privacy and confidentiality (83.2%), and the price of the laboratory service (86.5%), whereas they were dissatisfied with the laboratory's location (56%), the accessibility and availability of latrines (58.4%), and the cleanliness and comfort of the latrines (63.8%).

Furthermore, in the study conducted by Alelign & Belay (2019) to assess patient satisfaction with clinical laboratory services and associated factors among adult patients attending outpatient departments at Debre Markos referral hospital, Northwest Ethiopia, between April 9 and 16, 2019, 391 patients participated in a cross-sectional study that used a questionnaire that was administered by an interviewer. The systematic random sampling method was used. The result was that 48.3% of patients were satisfied with clinical laboratory services overall. Patients who reported no instances of missing laboratory results (95%), diplomas and higher levels of education (95%), and no place

to store personal goods (95%), were significant factors. The recommendations from the study emphasized that the laboratory staff at Debre Markos Hospital and the hospital's administration should step up their efforts to boost patient satisfaction by focusing on patient educational status, delayed laboratory results, and the availability of spaces to store personal items in the blood drawing area.

In addition, a survey from customer satisfaction survey of corrective actions in laboratory services in a university hospital was conducted by Oja et al. (2006) to determine how satisfied clinical units were with laboratory services at a university hospital in Finland to pinpoint the greatest problems and service faults, implement fixes, and then assess any potential changes in customer satisfaction. A questionnaire-based study of customer satisfaction was done in 2001, and the results highlighted the critical elements of laboratory services. According to the survey's findings, which were confirmed in 2004, the highest levels of dissatisfaction in 2001 were noted for computerized test ordering and reporting, test turnaround times, and the phlebotomy round schedule. Customers' specific issues were clarified, remedial measures were taken, and the survey was repeated in 2004. Major updates to the antiquated laboratory information system were not practicable, therefore it was replaced in 2004-2005. Several clinical units considered turnaround times to be lengthy since the tests were ordered as normal procedures even though there were emergency needs. Instructions on how to request statistics were given to these units. In contrast, the satisfaction rating from the 2004 poll did not show any appreciable changes. Following conversations with the clinics, phlebotomy rounds were rescheduled. As a result, satisfaction dramatically increased in 2004.

Moreover, a study was conducted in Jordan by AL-Sharawnah (2013) to assess the impact of Applying ISO 15189 Standard of Quality and Competence of Medical

Laboratories on patient satisfaction in Jordanian Private Medical Laboratories, all of the patients that visited the laboratories at the Specialist Hospital and Isteshari Hospital in Amman, Jordan, made up the research population, there were (178) patients in these laboratories who took part in the trial. Many statistical methods have been employed. The study findings show that applying the ISO 15189 standard of Quality and Competence of Medical Laboratories has a substantial effect on patient satisfaction in Jordanian private laboratories for each of the following factors: staff technical competency, proper testing environment, sample collection, transportation, and handling procedures. Statistical investigation revealed the presence of high patient satisfaction with Jordanian private laboratories' performance at the level of significance $p \leq 0.05$.

## 2.5 Physicians' Satisfaction with Laboratories Services

A physician is a prominent figure on the clinical laboratory's client list. Monitoring physicians' satisfaction with laboratory services is a significant indicator of the quality management system and is required by international laboratory standards. Phyicians' perspectives are critical components in giving laboratory management chances to identify areas for improvement (Hailu et al., 2020).

A study was conducted by (Hailu et al., 2020b) to assess Phyicians' satisfaction with clinical laboratory services at public hospitals in Ethiopia, between November 1 and 30, 2017, a cross-sectional study with an institutional focus was conducted. A total of 327 doctors were chosen at random from 60 public hospitals located throughout Ethiopia. Self-administered questionnaires that had been tested before data collection were used to analyze, using the SPSS 23 program. To determine the predictors of physician satisfaction with laboratory services, a logistic regression model was

constructed. Statistical significance was defined as a p-value of less than 0.05. The result found that overall, 55% of physicians were satisfied with the clinical laboratory services. More than half of the physicians were satisfied with the existing laboratory request form (69%), legibility and completeness of laboratory report (61%), notification of new tests (78%), and test interruption (70%). On the other hand, many physicians were dissatisfied with the absence of a laboratory handbook (87.5%), the existing test menu (68%), lab-physician interface (62%), availability of referral and/or backup service (62%), notification of Turn Around Time (TAT) (54%), timely notification of panic result (55%), long TAT (33.1%), provision of urgent service (67%), and timely advisory service (57%). The majority of doctors (71%), in their opinion, felt that inconsistent service quality was not provided during all shifts. They could not discover sufficient data to conclude that sex, age, marital status, education level, and experience were significantly associated with physician satisfaction (p-values > 0.05) at the 5% level of significance.

Furthermore, a cross-sectional study conducted by Khadeja et al. (2022) involving 150 doctors and 150 patients was undertaken in the Central Clinical Laboratory, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, India. Extended over a period of nine months, the initiative utilized a phased approach, comprising Phase I (April-June) with 30 participants from clinicians, Phase II (July-September) with 70 participants from clinicians, and Phase III (October-December) with 50 participants from clinicians. The objective was to systematically address and guide improvement in clinical laboratory services. Questionnaires were used to determine the level of satisfaction. A Likert scale was employed. The overall level of 87.3% of patient and 70.7% of physician satisfaction in the current study was high and satisfactory. The improvement in observed satisfaction status from phase I to III was ascribed to laboratory staff training on international laboratory management standards. Although

categories such as turnaround time, the interface between laboratory and hospital information system, and waiting time for specimen collection required improvement .

## 2.6 Summary of the literature review

This chapter presented the literature review of the following:

- ISO definition, concepts, and ISO standards.
- Patients' and physicians' satisfaction with laboratory services.
- Several studies assessing the implementation of ISO 15189 standards in medical laboratories showed that applying ISO 15189 influenced the quality of services and patients' and physicians' satisfaction.

All Previous studies on medical laboratories were conducted in several foreign and Arab countries, but no similar study was found to be conducted in Palestine, hence this study stands out in assessing physicians' and patients' satisfaction with the implementation of ISO 15189 in Palestinian Medicare Private Medical Laboratories.

The next chapter will discuss the conceptual framework of the current study.

# Chapter Three

# Conceptual Framework

# Chapter Three

# Conceptual Framework

## 3.1 Introduction

In research, a conceptual framework is a visual representation that serves to show the expected link between various variables. As a result, a conceptual framework can be used as an analytical tool. It is used to distinguish between concepts and to bring together disparate ideas. Strong conceptual frameworks result in the actual realization of the intended goal (Northcentral University Library, 2021).

The study framework will be presented in this chapter, with a focus on physicians' and patients' satisfaction with the quality of services as a dependent variable. The socioeconomic variables and the factors that reflect the quality of medical laboratories' quality services according to ISO 15189 guidelines will be discussed as independent variables.

## 3.2 Conceptual Definitions

Throughout this study, the following terms are defined:

- ISO15189 standard: is an international standard detailing the requirements for management and technical competencies of a quality management system (QMS).
- Quality of services: It is a measure of how well an organization can meet customer expectations through the services it provides. In response to certain demands, customers receive services. They have standards and expectations about how the services provided by the company will meet their needs, whether they are aware of it or not (Indeed Editorial Team, 2021).

## 3.3 Study variables

### 3.3.1 Demographic data

**Socio-demographic variables** used in this study are:

- Age (in years), gender (Female /Male), place of residency, educational level, health insurance/out-of-pocket, and occupation)

- The number of visits to the laboratory**:** the frequency with which patients visit the lab making a lab test based on the patients' needs (first visit or a previous file).

- Health insurance**:** This is the type of insurance that pays for a policyholder's medical and surgical costs. It either pays the care provider for the covered person directly or reimburses the costs incurred as a result of illness or injury (ICICI Prudential, 2019).

### 3.3.2 Independent variables

In the current study, independent variables include:

A. Services provided to the patient: This variable includes the following factors:

1. The Availability of the requested clinical laboratory test. Clinical laboratory test: means the biological, microbiological, serological, chemical, immune-hematological, hematological, biophysical, cytological, pathological, or other examination of materials derived from the human body to provide information for the diagnosis, prevention, or treatment of a disease or impairment of a human being, or for the assessment of a human being's health,

including procedures to determine, measure, or otherwise describe the presence or absence of an object, substance, or characteristic (Clinical Laboratory Services Definition  Law Insider, n.d.).

2. Modes of receiving the results by (E-mail, WhatsApp application, or Receipt of the result by coming to the laboratory).
3. The humanity of care: The degree to which clients are treated with respect and dignity, particularly through offering emotional support, reducing fear and anxiety, providing information, using appropriate communication when discussing the service, and maintaining privacy and confidentiality (S. Tsukuda & M. Obata, 2022).
4. The phlebotomist technique skillfulness:  A phlebotomist is a person who is in charge of taking blood samples from patients for laboratory testing, transfusions, or donation. Blood can be drawn from a vein using venipuncture, finger pricks, or, in the case of young children, heel pricks by a phlebotomist (Ialongo & Bernardini, 2016).

B. Work environment: the degree to which the physical environment in which laboratory services are provided is safe, comfortable, and suitable for clients' diagnostic needs, this will include:
    1. Cleanness of the latrine
    2. Clean and adequacy of the waiting area (if the waiting area is sufficient to receive patients, comfortable, clean and there are enough seats) (S. Tsukuda & M. Obeta, 2022).
    3. Access to medical laboratory services: The extent to which patients can acquire necessary laboratory services when needed taking into account.

4. Waiting time to receive services (if the waiting time to receive the customer is long, or does he receive the service quickly).
5. Accessibility of the laboratory: if there are signs indicating the presence of the laboratory in the area and if is it easy to reach.
6. Clear and understandable advisory service before specimen collection.

C. Quality of laboratory test results: This will include the following factors:
    1. Turnaround time of laboratory test results: This is the period of time between when specimens are received in the laboratory and when reports with verification are sent out (Bhatt et al., 2019).
    2. Missing results Caused by errors in reception or recording. The missing result means that a laboratory test that should have been performed and its results recorded isn't found in the patient's medical file for some known or unknown reason (Tan et al., 2022).
    3. Laboratory test results were reliable (Test reliability). The term "reliability" describes how regularly or dependably a test assesses a trait. Will a person retake the test and have a similar result this time, or a very different result? It is argued that a test measures a characteristic reliably when a repeat test result shows similar results (U.S. Department of Labor, 1999).

D. The services provided to the physicians include the following:

1- Reporting critical results

   Critical results are determined as values that significantly deviate from the normal range and could potentially pose an immediate health risk to the person or require immediate action from the prescribing doctor (Critical Values, n.d.).

2- Ways to get the results by (E-mail, phone, WhatsApp application).

### 3.3.3 Dependent variable

- The study's dependent variables are physician and patient satisfaction with the quality of services in Palestinian Medicare Private Medical Laboratories that apply the ISO 15198 standard of quality.
- Patient Satisfaction is defined as the degree of agreement between a patient's expectations of the optimal level of care and how they feel about it (Abera et al., 2017).

## 3.4 Conceptual framework

Figure (3.1) Presents the study conceptual framework, physicians' and patients' satisfaction as dependent variables, and the other factors as the independent variable. It shows the relationship between patient satisfaction and socio-demographic variables such as (Age, gender, place of residency, educational level, occupation, health insurance, the number of visits to the lab), quality of laboratory test results, services provided to the patient, work environment and access to medical laboratory services. Also the relationship between physician satisfaction and socio-demographic variables such as (Age, gender, place of residency, experience), quality of laboratory test results, services provided to physicians, and access to medical laboratory services.

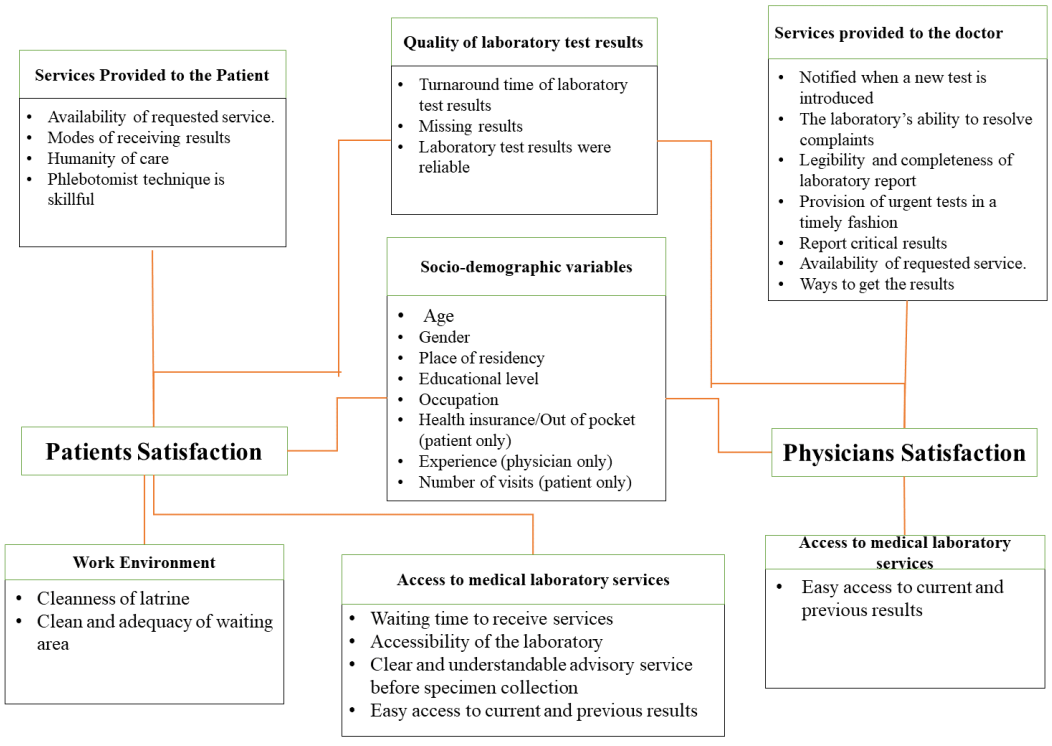


**Figure 3.1 Conceptual Framework**

## 3.5 Summary

This chapter presented the conceptual framework developed based on a literature review. It consisted of two major concepts: the study framework that focuses on patients' and physicians' satisfaction as a dependent variable and independent variables are socio-demographic variables such as (Age, gender, place of residency, educational level, occupation, health insurance, and the number of visits to the lab), quality of laboratory test results, services provided to the patient and physician, work environment and access to medical laboratory services.

The next chapter will discuss the methodology of the current study.

# Chapter Four

# Methodology

# Chapter Four

# Methodology

## 4.1 Introduction

This chapter introduces the study methodology, including the study design, setting, the study's population, and sampling, it also presents the inclusion criteria, study tool, validity and reliability, data collection method, pilot study, ethical considerations, and data analysis.

## 4.2 Study design

This study adopted a descriptive quantitative cross-sectional design. There are various benefits to using a cross-sectional study design: it is relatively quick and inexpensive to carry out, there are no ethical concerns, data for all variables is only collected once, and multiple outcomes and exposures can be investigated. It is simple to generate a hypothesis and many findings can be used to produce an in-depth research study (Wang & Cheng, 2020).

## 4.3 Settings of the study

The study was conducted in eight Medicare branch laboratories in Palestine, which are located in: (Ramallah, Tulkarm, Hebron, Nablus, Jericho, Al-Eizariya, Bethlehem, and Jenin).

Medicare Laboratories started in 1995 and opened its initial location in Ramallah over time grew to become the biggest network of private laboratories in Palestine which

obtained an accreditation certificate in ISO 15189 in 2017. Medicare currently maintains at least one branch in each Palestinian city, with 32 branches spread throughout the West Bank; nevertheless, the Ramallah branch of Medicare serves as the organization's main office.

In Medicare Laboratories, a wide variety of medical laboratory examination services in Palestine are provided to both individuals and groups. Their services are provided by a group of skilled doctors and laboratory experts, and each sample is processed using cutting-edge lab machinery and technology. The Medicare Laboratories are continually striving to make accessing test results easier for all of their clients by utilizing advanced and hassle-free technologies.

More than 2430 diagnostic procedures and lab tests are covered by Medicare. The tests available cover the majority of the tests a doctor would order for a patient; thus, their services aim to help each clinician reach an accurate diagnosis and handle the case appropriately going forward. Since their core values center on offering high-quality services, setting the bar for locally delivered healthcare services, and making the most of their 28 years of experience in the field, patients can access 2430 medical tests at their laboratory branches. The provision of such a wide variety of tests is intended to help medical professionals improve Palestine's entire system of healthcare services (*About Us - Medicare Laboratories*, n.d.).

## 4.4 Period of the Study

The study was conducted in three academic semesters (from September 2022 to December 2023). The first two semesters were for preparing the proposal, obtaining approvals from the Medicare laboratories and public health college committee, piloting the study distributing, and collecting the questionnaire to launch the research. The third semester was for data analysis, and completing the thesis.

## 4.5 Study Population

The target population of the current study is:

1. The study population is patients attending the eight branches of Medicare laboratories in Palestine. The average number was 6300 patients every month.
2. The study population of physicians is physicians who referred to Medicare laboratories, and their number reached 325 physicians per month, according to reports received from the Medicare Medical Laboratories database, for the eight regions in Palestine (Ramallah, Tulkarm, Hebron, Nablus, Jericho, Al-Eizariya, Bethlehem, and Jenin) between 2019-2022.

## 4.6 Sample size

- The total population of patients from the eight branches of the Medicare laboratories was (6300) per month on average. The sample size was found to be 191 participants according to the below formula.

The study sample was calculated by proportional method for patients and physicians by using the following formula:

**The sample size (n) is calculated according to the formula:**

**Sample size =** $\frac{Z^2 \times (P) \times (1-P)/e^2}{1+(z^2 * p(1-p)/e^2 N}$

Where:

- N = population size
- e = Margin of error (percentage in decimal form) =7%
- z = z-score (95% confidence, Z score 5%)
- $p$ = The standard deviation

(Sample Size Calculator: Understanding Sample Sizes | SurveyMonkey, n.d.).

The sample size drawn from each branch will be proportionally calculated. Accordingly, the sample size for each laboratory branch (number of patients recruited from each branch) will be equal to the study sample size (191) multiplied by the percentage of each branch from the total population, as shown in **Table (4.1)**.

**Table 4.1: The sample size of patients according to the Lab branch**

| Medicare lab branches | Branch Population **#patients** | Percentage % from a total sample size | The sample size of patients **#patients** |
|---|---|---|---|
| Ramallah | 1500 | 23.8% | 45 |
| Hebron | 1000 | 16% | 31 |
| Tulkarm | 700 | 11% | 21 |
| Nablus | 1000 | 16% | 31 |
| Jericho | 300 | 4.7% | 9 |
| Al-Eizariya | 600 | 9.5% | 18 |
| Bethlehem | 600 | 9.5% | 18 |
| Jenin | 600 | 9.5% | 18 |
| **Total** | **6300** | **100%** | **191** |

The total population of physicians referring to Medicare laboratories from the eight regions was (325) per month. The sample size was found to be (123) participants. Accordingly, the sample size for the physician in each region will be equal to the study

sample size (123) multiple by the percentage of physicians from the total population, as shown in **Table (4.2)**.

**Table 4.2: The sample size of the physician in each region**

| **Regions** | Branch Population (The total number of physicians referring to Medicare laboratories) | Percentage % from the total sample size | The sample size of physicians **# physicians** |
|---|---|---|---|
| Ramallah | 46 | 14.2% | 18 |
| Hebron | 43 | 13.2% | 16 |
| Tulkarm | 46 | 14.2% | 18 |
| Nablus | 43 | 13.2% | 16 |
| Jericho | 41 | 12.6% | 15 |
| Al-Eizariya | 14 | 4.3% | 5 |
| Bethlehem | 47 | 14.5% | 18 |
| Jenin | 45 | 13.8% | 17 |
| **Total** | **325** | **100%** | **123** |

## 4.7 Sampling

Participants in this study, including both physicians and patients, were chosen through a convenience sampling method. The Physicians selected were referring to Medicare Laboratories working in clinics in Ramallah, Tulkarm, Hebron, Nablus, Jericho, Al-Eizariya, Bethlehem, and Jenin.

Upon receiving approval from the general manager of Medicare Laboratories to conduct the study, the distribution of questionnaires commenced. The researcher personally distributed the patient questionnaires through self-administration and via a questionnaire link (QR code). Subsequently, the completed questionnaires were collected from participants with the collaboration of laboratory branch managers. Data collection took place during April and May of 2023, with patients from each branch selected over six working days per week for two months. Participants independently

filled out the questionnaires, and the researcher's contact information was provided for any inquiries.

For physicians, the questionnaire distribution occurred through email, self-administration, and WhatsApp after obtaining their consent to participate in the study, spanning the period between April and May 2023.

## 4.8 The inclusion criteria

**A. The inclusion criteria for patients were:**

- Patient (male or female)
- Patients aged 18 years and over
- A patient who has a Medicare lab file
- Arabic language proficiency in reading writing and comprehensiveness

**B. The inclusion criteria for Physicians are:**

- A referring physician to the Medicare laboratories in the determined region since 2019-2022.

## 4.9 Data collection process

### 4.9.1 Study tool

The data collection tools used in the current study were two self-administered questionnaires as shown in (Annex 1 and Annex 2).

The questionnaire was prepared by the researchers based on ISO 15189 standards, literature review, and expected customers' needs and preferences, which will answer the study objectives and aim.

The questionnaires included three sections; the first section included a consent form, to be read and signed by the participating patients before filling out the questionnaire. The questionnaire will be anonymous and given specific codes to facilitate the process of data entry analysis and tracking.

The second section included socio-demographic variables such as (Age, gender, place of residency, educational level, occupation, health insurance, experience, specialty, and the number of visits to the lab).

The third section included closed questions on variables related to the conceptual framework and the study aim and objectives which include: quality of laboratory test results (turnaround time of laboratory test results, missing results, laboratory test results were trustworthy), services provided to the patient( availability of requested service, ways to get the results, the humanity of care, phlebotomist technique is skillful), work environment( cleanness of latrine, clean and adequacy of waiting area ) and access to medical laboratory services (waiting time to receive services, accessibility of the laboratory, clear and understandable advisory service before specimen collection and easy access to current and previous results for patients) and Services provided to the physicians (notified when a new test is introduced, the laboratory's ability to resolve complaints ,legibility and completeness of laboratory report ,report critical results,

availability of requested service, ways to get the results). The answers for each question will be 5-Likert scale (excellent, very good, good, neutral, weak).

The number of questions per each of the study domains is shown in **Table (4.3).** In addition, participants were asked to evaluate the overall quality and satisfaction of the laboratory services on a 5-Likert scale.

**Table 4.3: Domain and number of items used in the questionnaire**

| No. | Domain | No. of items |
|---|---|---|
| 1 | Quality of laboratory test results | 3 items |
| 2 | Services provided to the patient | 4 items |
| 3 | Work environment | 2 items |
| 4 | Access to medical laboratory services | 4 items |
| 5 | Services provided to the physicians | 7 items |

### 4.9.2 Validity

The study questionnaire validity was examined by the feedback and comments of a group of experts in a variety of fields. A letter was sent to four experts in the academic and research-conducting fields (Annex 3). The intention was to validate the constructed tool, ensuring its relevance, clarity, and compliance. The letter includes the designed questionnaire, the study title, and objectives. The purpose of this consultation was to solicit their expert opinion. Their valuable feedback prompted requests for adjustments and refinements to the tool, all of which were integrated into the final version.

### 4.9.3 Pilot study

A pilot study was done before the start of actual data collection to assess the feasibility and to improve the study's design. Twenty patients and physicians were chosen, and this sample was included in the final sample size because the participants

were from the same targeted sample, since no significant changes were made to the study questionnaire.

### 4.9.4 Reliability

Reliability relates to the consistency, stability, and repetition of outcomes; that is, a researcher's results are regarded dependable if consistent results have been obtained in identical situations but different circumstances, The reliability coefficient is positioned on a scale from 0 to 1, where a perfect reliability score is represented by 1, while an absence of reliability corresponds to 0. The test-retest and alternate forms are usually calculated reliability by using statistical tests of correlation. Reliability is mainly divided into two types: Stability and Internal consistency reliability, The assessment of internal consistency for the primary domains of the study's questionnaire was conducted using Cronbach's alpha coefficient (Mohajan & Mohajan, 2017), and the results are shown in **Table (4.4)** and **Table (4.5**):

**Table 4.4: Reliability Statistics for patient's questionnaire:**

| Scale | Cronbach's Alpha | No. of Items |
|---|---|---|
| Easy access to the laboratory | 0.664 | 4 |
| Waiting room before receiving service | 0.863 | 4 |
| Health facilities | 0.738 | 4 |
| Reception | 0.850 | 5 |
| Draw blood | 0.886 | 5 |
| Results | 0.852 | 5 |

The results in **Table (4.4)** showed that the values of Cronbach's' alpha coefficients ranged between (66%-88%), and these values are assumed acceptable since all of these values are greater than 60%, indicating good internal consistency and reliability.

**Table 4.5: Reliability Statistics for physician's questionnaire**

| Scale | Cronbach's Alpha | No. of Items |
|---|---|---|
| **Communication** | 0.810 | 2 |
| **Availability of examinations** | 0.889 | 4 |
| **Lab results** | 0.810 | 5 |

Additionally, the reliability was measured for the additional items in the physicians' questionnaire. The results in **Table (4.5)** show that the values of Cronbach's' alpha coefficients ranged between (81%-88%), and these values are assumed acceptable since all of these values are greater than 80%, indicating good internal consistency and reliability.

## 4.10 Data analysis

Data management was the first step, which included reviewing completed questionnaires, coding questions, and data entry. Statistical Procedures for Social Sciences (SPSS) version 25 was used for data analysis in the second step.

The frequencies, percentages, averages, and standard deviations of descriptive statistics were examined, and based on the fact that the P-Value $\leq 0.05$ is significant, the following tests and methods were applied to analyze the outcomes for patients and physicians:

1. Two independent samples t-test: to test physician and patient satisfaction in Palestinian Medicare Private Medical Laboratories that applied ISO 15189.
2. One-way ANOVA: to test the relationship between socio-demographic variables (Age, gender, place of residency, educational level, number of visits, health insurance, and occupation) and patient satisfaction in the Palestinian

Medicare Private Medical Laboratories, in addition, to testing the relationship between socio-demographic variables (Age, gender, place of residency, experience years and specialty) and physician satisfaction in the Palestinian Medicare Private Medical Laboratories.

3. Pearson Correlation coefficient and the simple linear regression analysis: to test the impact of the work environment on patient satisfaction in Palestinian Medicare Private Medical Laboratories and the impact of the quality of laboratory test results on patient satisfaction in Palestinian Medicare Private Medical Laboratories, also to test the impact of access to medical laboratory services on patient satisfaction in Palestinian Medicare Private Medical Laboratories. Moreover, to test the impact of the quality of laboratory test results on physician satisfaction in Palestinian Medicare Private Medical Laboratories and the impact of access to medical laboratory service on physician satisfaction in Palestinian Medicare Private Medical Laboratories.

## 4.11 Response rate

The response rate to a survey has always been considered an important indicator of survey quality, a greater response rate is preferable because the missing data is not random. It is preferable to have a high response rate (>80%) from a small random sample than a low response rate from a large sample. The response rate is typically reported as a percentage in survey research, and is calculated by dividing the number of respondents by the total number of people you sent the survey to, the result is then multiplied by 100 (Lindermann, 2021).

In this study, the response rate for patients was 82.3%, 232 patients received questionnaires, and 191 patients responded. Similarly, the response rate for physicians was 80.4%, 158 physicians received questionnaires, and 123 physicians responded.

## 4.12 Tests of Normality

The results of normality tests for continuous variables (the study domains) in each (patients and physicians) section are given in **Table (4.6)** and **Table (4.7)** to help select whether to use parametric or non-parametric statistical tests in the analysis of this study.

**Table 4.6: Tests of Normality Results for the Study Domains (patient Questionnaire)**

| **Tests of Normality** | | | | | | |
|---|---|---|---|---|---|---|
| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
| | Statistic | Df | Sig. | Statistic | df | Sig. |
| Easy access to the laboratory | .149 | 191 | .000 | .908 | 191 | .000 |
| Waiting room before receiving service | .208 | 191 | .000 | .813 | 191 | .000 |
| Health facilities | .156 | 191 | .000 | .913 | 191 | .000 |
| Reception | .273 | 191 | .000 | .735 | 191 | .000 |
| Draw blood | .250 | 191 | .000 | .753 | 191 | .000 |
| Results | .232 | 191 | .000 | .830 | 191 | .000 |

**Table 4.7: Tests of Normality Results for the Study Domains (Physician Questionnaire)**

| Tests of Normality | | | | | | |
|---|---|---|---|---|---|---|
| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
| | Statistic | df | Sig. | Statistic | Df | Sig. |
| communication | .196 | 123 | .000 | .893 | 123 | .000 |
| Availability of examinations | .163 | 123 | .000 | .852 | 123 | .000 |
| Lab results | .173 | 123 | .000 | .924 | 123 | .000 |

The results of normality tests showed that some variables were not normally distributed (P-values < 0.05). However, the sample size endorses using parametric tests (ANOVA Pearson correlation test, and t-test) in all the analyses (Mishra et al., 2019).

## 4.13 Answers' Coding

The answers of respondents were coded as: (1 for weak), (2 for neutral), (3 for Good), (4 for very good), and (5 for Excellent), and after computing the total degrees of the study domains, the following **Table (4.8)** was used to express the levels of patient's and physician's satisfaction based on the 5-Likert scale key answer.

**Table 4.8: 5-Likert Scale Key Answers of patient's and physician's Satisfaction Levels**

| An interval of the statistical mean | Level of satisfaction |
|---|---|
| 0.00-0.79 | Weak |
| 0.80-1.59 | Neutral |
| 1.60-2.39 | Good |
| 2.40-3.19 | Very good |
| 3.20-4.00 | Excellent |

## 4.14 Ethical consideration

- An official letter of approval to carry out the study was given by the committee after discussions with the Al-Quds University-School of Public Health's ethical committee and the submission of all necessary documents and forms (Annex 4).

- An official letter was sent to the Director General of Medicare Laboratories to inform him of the master's thesis research work in his laboratories (Annex 5).
- After the Director General approved the research, a meeting was held with the directors of the eight branches of Medicare laboratories and inform them of the approval.
- Furthermore, informed consent with straightforward language was attached to the questionnaire to clarify the study's purpose. In addition, all participants (patients and physicians) were guaranteed confidentiality, anonymity, and privacy, and using their information for research purposes only (Annex 6 and 7).

## 4.15 Summary

This chapter discussed the study methodology, including the study design, setting, and inclusion criteria. It also included information about the population and sampling, The validity and reliability of the questionnaires were examined in addition to the data collection method, pilot study, ethical consideration, and data analysis were presented.

The next chapter will discuss the results of the current study.

# Chapter Five

# Results

# Chapter Five

# Results

## 5.1 Introduction

In this chapter, the findings of the statistical analysis of the questionnaire that patients and physicians completed will be presented. The statistical indicators of their responses would be presented through the arithmetic means, standard deviations, frequencies, and percentages for all study variables, along with the relative importance and the statistical indications for each of them in addition to using Pearson correlation ANOVA, T-test coefficient, and Chi-square to testing multiple relationships between different domains. It would describe the participants' demographic and analysis of the study domains, which include physicians' and patients' satisfaction with the quality of services introduced to them in the Palestinian medical laboratories that apply ISO 15189.

## 5.2 Socio-demographic variables

Two descriptive sociodemographic variables exist—one pertaining to patients and the other to physicians.

### 5.2.1 Socio-demographic variables for patients

The following tables show frequencies and percentages of the descriptive demographic variables of patients which include (age, gender, Place of residence, occupation, educational level, number of visits, and health insurance/out-of-pocket).

**Table (5.1)** shows that the percentage of patients between the ages of 18 and 28 was 36.6%, 29-39 was 39.8%, 40-50 was 16.8% and 50 and more was 6.8%, with the biggest percentage being between the ages of 29 and 39.

**Table 5.1: Frequencies and percentages of patients's Age**

| Age category | Frequency | Percent | Cumulative Percent (%) |
|---|---|---|---|
| 18-28 | 70 | 36.6% | 36.6% |
| 29-39 | 76 | 39.8% | 76.4% |
| 40-50 | 32 | 16.8% | 93.2% |
| 50 and over | 13 | 6.8% | 100.0% |
| **Total** | **191** | **100.0%** | |

As depicted in **Table (5.2)** of this study, the proportion of female patients was greater than that of male patients. Specifically, the percentage of female patients was 71.7%, while the percentage of male patients accounted for 28.3%.

**Table 5.2: Frequencies and percentages of patients' gender**

| Gender | Frequency | Percent (%) |
|---|---|---|
| Female | 137 | 71.7% |
| Male | 54 | 28.3% |
| **Total** | **191** | **100.0%** |

In **Table (5.3)** the distribution of patients' residences varied from lower to higher percentages as outlined: the lower percentage was in Jericho at 4.7%, Al-Eizariya at 7.9%, Tulkarm at 9.9%, Jenin at 11.5%, Bethlehem at 11.5%, Nablus at 14.1%, Hebron at 15.2%, and Ramallah at 25.1%.

**Table 5.3: Frequencies and percentages of Place of residence for patients**

| Place of residence | Frequency | Percent (%) |
|---|---|---|
| Jericho | 9 | 4.7% |
| Hebron | 29 | 15.2% |
| Bethlehem | 22 | 11.5% |
| Al-Eizariya | 15 | 7.9% |
| Jenin | 22 | 11.5% |
| Ramallah | 48 | 25.1% |
| Tulkarm | 19 | 9.9% |
| Nablus | 27 | 14.1% |
| **Total** | **191** | **100.0%** |

**Table (5.4)** demonstrates that the proportion of patients who are employed is greater than those who are unemployed, with a recorded value of 73.3%.

**Table 5.4: Frequencies and percentages of patients' employment status**

| Employment status | Frequency | Percent (%) |
|---|---|---|
| Employed | 140 | 73.3% |
| Unemployed | 51 | 26.7% |
| **Total** | **191** | **100.0%** |

**Table (5.5)** illustrates the educational levels of patients, revealing that 2.6% had completed primary school, 15.7% had attained secondary education, a significant 67.5% held Bachelor's degrees, 13.1% possessed master's degrees, and 1% had earned a Ph.D.

**Table 5.5: Frequencies and percentages of educational level for patients**

| Educational level | Frequency | Percent (%) |
|---|---|---|
| Primary | 5 | 2.6% |
| Secondary | 30 | 15.7% |
| Bachelor's | 129 | 67.5% |
| Master's | 25 | 13.1% |
| Ph.D. | 2 | 1.0% |
| **Total** | **191** | **100.0%** |

The information presented in **Table (5.6)**, demonstrates that 14.7% of patients had their first lab visit, 51.3% had between 2 and 5 visits, and the remaining patients, accounting for 34%, had visited the lab more than 5 times.

**Table 5.6: Frequencies and percentages of the number of patients visits in the last year to the laboratory**

| The number of your visits in the last year to the laboratory | | | |
|---|---|---|---|
| | Frequency | Percent (%) | Cumulative Percent (%) |
| First lab visit | 28 | 14.7% | 14.7% |
| 2-5 visits | 98 | 51.3% | 66.0% |
| more than 5 visits | 65 | 34.0% | 100.0% |
| **Total** | **191** | **100.0%** | |

**Table (5.7)** indicates that 35.1% were covered by government insurance, 27.2% possessed private insurance, and 37.7% paid on their account.

**Table 5.7: Frequencies and percentages of patients' health insurance coverage**

| Health insurance/out-of-pocket | Frequency | Percent (%) |
|---|---|---|
| Government insurance | 67 | 35.1% |
| Private insurance | 52 | 27.2% |
| On your account | 72 | 37.7% |
| **Total** | **191** | **100.0%** |

### 5.2.2. Socio-demographic variables for physicians:

The following tables show frequencies and percentages of the descriptive demographic variables of physicians which include (age, gender, Place and area of work, specialty, and year of experience).

**Table (5.8)** shows that 6.5% of physicians were under the age of 30, 74.8% were between the ages of 30 and 50, and 18.7% were 50 and older with the biggest percentage being between the ages of 30 and 50.

**Table 5.8: Frequencies, percentages, means, and standard deviations of age for physicians**

| Age | Frequency | Percent (%) | Cumulative Percent (%) |
|---|---|---|---|
| Less than 30 | 8 | 6.5% | 6.5% |
| 30-50 | 92 | 74.8% | 81.3% |
| 50 and older | 23 | 18.7% | 100.0% |
| **Total** | **123** | **100.0%** | |

As depicted in **Table (5.9)** of this study, the proportion of male physicians was greater than that of female physicians. Specifically, the percentage of male physicians was 69.9%, while the percentage of female physicians accounted for 37 %.

**Table 5.9: Frequencies and percentages of physicians' gender**

| Gender | Frequency | Percent (%) |
|---|---|---|
| Female | 37 | 30.1% |
| Male | 86 | 69.9% |
| **Total** | **123** | **100.0%** |

In **Table (5.10)**, the distribution of the place of work for physicians varied from lower to higher percentages as outlined: The lower percentage was in Al-Eizariya at 4.1%, Jericho at 12.2%, Nablus at 12.2 %, Hebron at 13 %, Jenin at 13.8, Bethlehem at 14.6%, Ramallah at 14.6%., and Tulkarm at 15.4 %.

**Table 5.10: Frequencies and percentages of physicians' place of work**

| Place and area of work | Frequency | Percent (%) |
|---|---|---|
| Jericho | 15 | 12.2% |
| Hebron | 16 | 13.0% |
| Al-Eizariya | 5 | 4.1% |
| Bethlehem | 18 | 14.6% |
| Jenin | 17 | 13.8% |
| Ramallah | 18 | 14.6% |
| Tulkarm | 19 | 15.4% |
| Nablus | 15 | 12.2% |
| **Total** | **123** | **100.0%** |

In **Table (5.11)**, the most notable percentage among physician specialties was observed in general medicine, accounting for 34.1%, followed by gynecology at 19.5%, internal medicine at 14.6%, and pediatrics at 13%. The remaining disciplines constituted relatively minor proportions.

**Table 5.11: Frequencies and percentages of physicians' specialty**

| Specialty | Frequency | Percent (%) |
|---|---|---|
| Pediatrician | 16 | 13.0% |
| Neurologist | 3 | 2.4% |
| Ear, nose, and throat (ENT) | 3 | 2.4% |
| Oncologist | 1 | 0.8% |
| Hematologist | 1 | 0.8% |
| Internist | 18 | 14.6% |
| Cardiac surgery | 1 | 0.8% |
| Kidney surgery and Urologist | 3 | 2.4% |
| General Surgery | 4 | 3.3% |
| Orthopedic surgery | 1 | 0.8% |
| General Doctor | 42 | 34.1% |
| Orthopedic | 5 | 4.1% |
| Pathologist | 1 | 0.8% |
| gynecologist | 24 | 19.5% |
| **Total** | **123** | **100.0%** |

According to **Table (5.12)**, the percentage of physicians with experience years was as follows:

1-5 years were 18.7%, 6-10 years were 22%, 11-15 years were 20.3%, 16-20 years were 15.4%, 21-25 years were 11.4%, and over 25 years were 12.2%, indicating that the largest percentage was between 6-10 years and the lowest was between 21-25 years.

**Table 5.12: Frequencies and percentages of years for physician's experience**

| Years of Experience | Frequency | Percent (%) | Cumulative Percent (%) |
|---|---|---|---|
| 1-5 | 23 | 18.7% | 18.7% |
| 6-10 | 27 | 22.0% | 40.7% |
| 11-15 | 25 | 20.3% | 61.0% |
| 16-20 | 19 | 15.4% | 76.4% |
| 21-25 | 14 | 11.4% | 87.8% |
| over 25 | 15 | 12.2% | 100.0% |
| **Total** | **123** | **100.0%** | |

## 5.3 Analysis of the questionnaire's domains

Two sets of statistical analyses were performed on the questionnaire items, one for patients and the other for physicians.

### 5.3.1 Analysis of patients questionnaire domains

The following tables show the means standard deviation of the patients' responses(N=191) to the study domains. In addition to the frequencies and the percentages of the modes that the patients prefer to receive their results and if they heard or if they had knowledge about the International Quality Certificate (ISO 15189 Certificate) for the quality of medical laboratory services.

**Table 5.13. Means and standard deviations for patients' responses to the study domains**

| | Descriptive Statistics | | | |
|---|---|---|---|---|
| **No.** | **Domains** | **Degree** | **Mean** | **Std. Deviation** |
| | **Easy access to the laboratory** | | | |
| **1** | Transportation is available and easy to reach the laboratory site | excellent | 3.45 | .818 |
| **2** | The presence of billboards that help in finding out about the laboratory | excellent | 3.27 | .973 |
| **3** | The laboratory is located in a building with easy access (elevator, staircase, ground floor) | excellent | 3.34 | .897 |
| **4** | The possibility and ease of access to the laboratory for people who need mobility assistance (accommodation for people with special needs) | very good | 2.54 | 1.479 |
| | **Waiting place before receiving service** | | | |
| **1** | The waiting area is clean and tidy | excellent | 3.57 | .699 |
| **2** | waiting space | excellent | 3.30 | .936 |
| **3** | Comfortable chairs are provided while waiting | excellent | 3.36 | .935 |
| **4** | Provide adequate lighting and ventilation | excellent | 3.41 | .775 |
| | **Health facilities** | | | |
| **1** | provide separate bathrooms for women and men | excellent | 3.21 | 1.223 |
| **2** | provide bathrooms adapted for people with special needs | good | 1.95 | 1.541 |
| **3** | Cleanliness of sanitary facilities | excellent | 3.29 | .960 |
| **4** | Availability of soap and tissues in health facilities | excellent | 3.39 | .911 |
| | **Reception section** | | | |
| **1** | The laboratory receptionist wears a white apron and an identification card | excellent | 3.72 | .644 |

| | | | | |
|---|---|---|---|---|
| **2** | How would you rate the speed of your reception in the reception area | excellent | 3.59 | .591 |
| **3** | The response of the receptionist to your inquiries and the clarity of the information provided before collecting the sample | excellent | 3.61 | .678 |
| **4** | Treating the receptionist in terms of respect and attention (tactful conversation) | excellent | 3.65 | .539 |
| **5** | Availability of required examinations | excellent | 3.74 | .528 |
| | **Blood draw** | | | |
| **1** | Clarifying the information and conditions for the examination, if any (duration of fasting, abstaining from taking medications or vitamins for certain tests) before the blood draw | excellent | 3.60 | .673 |
| **2** | Wear gloves and sterilize the patient's hand before drawing the blood sample | excellent | 3.63 | .600 |
| **3** | Clarifying the information during the blood drawing process (extending the hand horizontally, clenching and extending the hand) | excellent | 3.63 | .658 |
| **4** | Provide privacy during the blood draw process | excellent | 3.58 | .682 |
| **5** | Clarifying the information after the blood is drawn (pressure on the blood draw area until it is confirmed that the blood has stopped) | excellent | 3.67 | .650 |
| **6** | Technician skill in drawing blood | excellent | 3.59 | .666 |
| | **Results** | | | |
| **1** | How do you evaluate the date of receiving the results at the agreed time? | excellent | 3.58 | .643 |
| **2** | How would you rate your degree of confidence in the reliability of laboratory results? | excellent | 3.59 | .665 |
| **3** | How would you rate how you got the result | excellent | 3.66 | .575 |
| **4** | The service of obtaining the previous result of the examination is attached to the current result | excellent | 3.60 | .747 |
| **5** | The service of obtaining a history of previous results upon request | excellent | 3.59 | .740 |

| | About the lab | | | |
|---|---|---|---|---|
| **1** | Multiple methods of delivery of laboratory medical results | excellent | 3.65 | .663 |
| **2** | What is your assessment of your level of satisfaction with the laboratory services? | excellent | 3.55 | .621 |
| **3** | Do you recommend relatives and friends to come and benefit from the laboratory services? | excellent | 3.72 | .517 |
| | **Valid N** | **191** | | |

In **Table (5.14)**, the data showed that the most substantial percentage of patients, 52.7%, expressed a preference for receiving their results through WhatsApp. Additionally, 29.3% preferred receiving results by hand, 7.7% indicated a preference for phone applications, another 7.7% opted by email, and a smaller percentage of 2.7% chose to receive results directly from their doctor.

**Table 5.14: The frequencies and percentages of the mode that the patients prefer to receive their results**

| | How do you prefer to receive results? | Responses | |
|---|---|---|---|
| **No.** | | **N** | **Percent (%)** |
| **1** | By hand | 65 | 29.3% |
| **2** | Through e-mail | 17 | 7.7% |
| **3** | WhatsApp | 117 | 52.7% |
| **4** | Phone applications | 17 | 7.7% |
| **5** | By doctor | 6 | 2.7% |
| | **Total** | **222** | **100.0%** |

According to **Table (5.15)**, it was found that only 52.4% had heard about the International Quality Certificate (ISO 15189 Certificate) for the quality of medical laboratory services, and 47.6% had no awareness of it.

**Table 5.15: The frequencies and percentages of patients heard about the ISO 15189 Certificate**

| Have you ever heard about the International Quality Certificate (ISO 15189 Certificate) for the quality of medical laboratory services? | | |
|---|---|---|
| | **Frequency** | **Percent (%)** |
| No | 91 | 47.6% |
| Yes | 100 | 52.4% |
| **Total** | **191** | **100.0%** |

**Table (5.16)**, indicates that only 47.6% knew about the impact of the international quality certificate on the quality of medical laboratory services, while 52.4% did not know the impact of ISO 15189 on the quality of medical laboratory services.

**Table 5.16: Frequencies and percentages of patients' knowledge about the impact of ISO 15189 certification on the quality of medical laboratory services.**

| Do you have knowledge about the impact of international quality certification (ISO 15189 certification) on the quality of medical laboratory services? | | |
|---|---|---|
| | **Frequency** | **Percent (%)** |
| No | 100 | 52.4% |
| Yes | 91 | 47.6% |
| **Total** | **191** | **100.0%** |

**Table 5.17: Overall percentages of Patients' responses to the study domains according to regions**

| Percentages % of patients' responses to study domains | Study regions | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Jericho | Hebron | Al-Eizariya | Bethlehem | Jenin | Ramallah | Tulkarm | Nablus | **Total** |
| **Cleanliness** | 80.6% | 90.5% | 81.8% | 85.6% | 84.5% | 85.9% | 89.5% | 81.2 | **85 %** |
| **Reception** | 95.8% | 92.5% | 92.9% | 92.9% | 89.5% | 87.8% | 94.7% | 90.1% | **91%** |
| **Blood Draw** | 93.5% | 92.1% | 91.7% | 91.9% | 91.3% | 87.4% | 94.7% | 87.4% | **90%** |
| **Turnaround time to get a result** | 86.1% | 92.2% | 95.5% | 91.7% | 85.2% | 87.5% | 94.7% | 84.3% | **89%** |
| **Multiple modes of receiving results** | 94.4% | 92.2% | 87.5% | 95.0% | 87.5% | 92.2% | 93.4% | 89.8% | **91%** |
| **Reliability in results** | 94.4% | 91.4% | 88.6% | 93.3% | 87.5% | 87% | 92.1% | 90.7% | **90%** |
| **Overall Satisfaction** | 91.7% | 87.9% | 88.6% | 90.0% | 89.8% | 85.4% | 92.1% | 90.7% | **89%** |

Based on the total percentage of patients' responses toward the services provided to them, the collective percentage across all regions for cleanliness stood the lowest at 85%. For the reception section, the figure was 91%, while for their opinion of the blood draw, it reached 90%. Regarding the handling of turnaround time to get a result, the satisfaction level reached 89%, also satisfaction on multiple ways to receive results was 91%, In terms of reliability on results, the satisfaction percentage was recorded at 90%, and overall satisfaction of the services rating of 89% was observed. These results exhibited patients' general sense of contentment with the quality of services provided by Medicare laboratories that had received the ISO 15189 certification in Palestine.

### 5.3.2 Analysis of physicians' questionnaire domains

The upcoming tables display the means and standard deviations of responses from physicians (N=123) across various study domains. These findings reveal a high mean value in the availability of examinations and the quality of lab results, both rated as excellent. Conversely, lower means were observed in communication, rated as very good, and in evaluating the mechanism for obtaining a second copy of missing results, rated as good. Additionally, the tables include frequencies and percentages related to the preferred notification method for new test availability, the favored communication approach from laboratory management, the preferred mode of receiving patient examination results, the provision of a list detailing examination timeframes to physicians, the suitable method for reporting critical results, frequencies, and percentages of time frame suitability for issuing test results based on patients' medical conditions, responses regarding factors enhancing laboratory result reliability, and awareness among physicians regarding the International Quality Certificate (ISO 15189) concerning medical laboratory service quality.

**Table 5.18: Means and standard deviations of the physicians' responses (N=123 toward the study domains)**

| | Descriptive Statistics | | | |
|---|---|---|---|---|
| **No.** | **Domains** | **Degree** | **Mean** | **Std. Deviation** |
| | **Communication** | | | |
| **1** | How would you rate the process of informing you of the availability of a new examination? | very good | 2.88 | 1.060 |
| **2** | How do you rate the laboratory's seriousness in addressing your suggestions and complaints regarding laboratory services? | very good | 2.98 | .958 |
| | **Availability of examination** | | | |
| **1** | How would you rate the abundance and variety of routine examinations required? | excellent | 3.58 | .587 |
| **2** | How do you evaluate the availability and diversity of specialized examinations? | excellent | 3.28 | .835 |
| **3** | How do you evaluate the availability of diagnostic tests for emergency and urgent cases? | excellent | 3.24 | .906 |
| **4** | How do you evaluate the time it takes to perform emergency and urgent diagnostic tests? | very good | 3.08 | .946 |
| | **Lab results** | | | |
| **1** | How do you evaluate the final result report form in terms of clarity and completeness? | excellent | 3.41 | .689 |
| **2** | Is the time period for issuance of test results commensurate with the medical conditions of your patients? | very good | 3.00 | .653 |
| **3** | How would you rate your degree of confidence in the reliability of laboratory results? | excellent | 3.39 | .609 |
| **4** | How do you rate getting a report that contains the results of current and previous patients? | excellent | 3.51 | .751 |

| | | | | |
|---|---|---|---|---|
| **5** | How do you evaluate the degree of compatibility of laboratory results with the clinical situation of the patient? | excellent | 3.36 | .616 |
| | **Critical results** | | | |
| **1** | How would you rate the speed of reporting critical results? | excellent | 3.38 | .587 |
| **2** | Are critical results communicated clearly, accurately, and professionally | excellent | 3.36 | .552 |
| **3** | How do you evaluate the mechanism for obtaining a second copy of the missing result? | good | 1.91 | .314 |
| | **International Medical Laboratory Quality Certificate (ISO 15189)** | | | |
| **1** | How do you evaluate the impact of laboratories obtaining the international quality certificate (ISO 15189 certificate) on the reliability of laboratory results | very good | 3.05 | 1.070 |
| **2** | How do you evaluate the impact of laboratories obtaining the international quality certificate (ISO 15189 certificate) on the laboratory services provided to doctors? | very good | 2.98 | 1.028 |
| **3** | What is your assessment of your level of satisfaction with the laboratory services in general? | excellent | 3.41 | .612 |
| **4** | Do you recommend to your colleagues' doctors and patients to deal with laboratories with international quality certification (ISO 15189)? | excellent | 3.50 | .740 |
| | **Valid N (listwise)** | **123** | | |

Based on the information provided in **Table (5.19)**, physicians' responses regarding their preferred notification method for the availability of a new test were as follows: 28.5% preferred to be notified via social media, 26% chose email notifications, 23.5%

indicated a preference for notifications via phone, and 22% favored being notified by attending the clinic in person.

**Table 5.19: The frequencies and percentages of the method that physicians preferred to be notified when a new test is available**

| | **How would you prefer to be notified when a new test is available?** | | |
|---|---|---|---|
| **No.** | | **Frequency** | **Percent (%)** |
| **1** | Attendance at the clinic | 27 | 22.0% |
| **2** | Through email | 32 | 26.0% |
| **3** | Over the phone | 29 | 23.5% |
| **4** | Via social media | 35 | 28.5% |
| | **Total** | **123** | **100.0%** |

**Table (5.20)** shows that physicians responded to the question as follows: 35% preferred phone communication, 27.6% preferred using WhatsApp, 26% indicated a preference for in-person meetings at the clinic, and 11.4 % opted for communication through email.

**Table 5.20: The frequencies and percentages of the method that physicians preferred for the laboratory management to communicate with them**

| **What communication method do doctors prefer for laboratory management to communicate with physicians?** | | | |
|---|---|---|---|
| **No.** | | **Frequency** | **Percent (%)** |
| **1** | Attendance at the clinic | 32 | 26.0% |
| **2** | WhatsApp | 34 | 27.6% |
| **3** | Through email | 14 | 11.4% |
| **4** | Over the phone | 43 | 35.0% |
| | **Total** | **123** | **100.0%** |

**Table (5.21)**, outlines the preferences of physicians for receiving the results of their patients' examinations. The data indicates that the highest percentage, standing at 46.3%, favored receiving results via WhatsApp, which was the most preferred method. Following this, 35.8% of physicians preferred to receive results directly from the patient. Additionally, 8.1% expressed a preference for e-mail, 6.5% favored using phone applications, and a smaller proportion of 3.3% chose to receive results over the phone.

**Table 5.21: The frequencies and percentages of the way that physicians preferred to receive the results of patients' examinations**

| No. | How do you prefer to receive the results of your patients' examinations? | | |
|---|---|---|---|
| | | **Frequency** | **Percent ()** |
| **1** | Phone applications | 8 | 6.5% |
| **2** | Through email | 10 | 8.1% |
| **3** | Over the phone | 4 | 3.3% |
| **4** | Through the patient | 44 | 35.8% |
| **5** | WhatsApp | 57 | 46.3% |
| | **Total** | **123** | **100.0%** |

As indicated in **Table (5.22)**, **(8.1%)** of respondents reported having received the list of time taken for each examination, while the majority, accounting for 91.9% had not been provided with such a list.

**Table 5.22: The frequencies and percentages of physicians being provided with a list of the time for each examination**

| **Have you been provided with a list of the time taken for each examination?** | | |
|---|---|---|
| | **Frequency** | **Percent (%)** |
| No | 113 | 91.9 |
| Yes | 10 | 8.1% |
| **Total** | **123** | **100.0%** |

**Table (5.23)** depicts the preferred approach among physicians when reporting critical results. Out of the total respondents, 47.2% encountered situations involving critical results, while 52.8% chose not to answer because they hadn't encountered such cases. Among those who did respond, the highest percentage (43.1%) favored reporting critical results over the phone. Additionally, 2.4% opted for using messaging applications like WhatsApp, and 1.6% preferred conveying such results through in-person attendance at the clinic.

**Table 5.23: The frequencies and percentages of the appropriate method for reporting critical results**

| | **What is the appropriate method for physicians when reporting critical results?** | | |
|---|---|---|---|
| **NO.** | | **Frequency** | **Percent (%)** |
| **1** | Attendance at the clinic | 2 | 1.6% |
| **2** | WhatsApp | 3 | 2.4% |
| **3** | Over the phone | 53 | 43.1% |
| | **Total number of physicians who had instances of reporting critical results** | **58** | **47.2%** |
| | Total number of physicians who had no instances of reporting critical results | 65 | 52.8% |
| | **Total Summation** | **123** | **100.0%** |

**Table (5.24)** displays the distribution of percentages regarding the appropriateness of the time period for delivering test results based on the medical conditions of patients as perceived by physicians. The breakdown is as follows: 21.14% of responses indicated that the timing was suitable, 57.72% of responses indicated that the timing was often suitable and 21.14% of responses indicated that the timing was always appropriate. No responses indicated that the timing was not suitable, this suggests an

overall positive outlook on the current practices in this aspect of medical communication.

**Table 5.24: The frequencies and percentages of the suitability of the time period for issuance of test results commensurate with the medical conditions of patients**

| **Is the time period for issuance of test results commensurate with the medical conditions of your patients?** | | |
|---|---|---|
| | **Frequency** | **Percent (%)** |
| Suitable | 26 | 21.14% |
| Often suitable | 71 | 57.72% |
| Always appropriate | 26 | 21.14% |
| Not suitable | 0 | |
| **Total** | **123** | **100.0%** |

In **Table (5.25)**, the data showcased the distribution of responses pertaining to the factors that bolster the reliability of laboratory results. The breakdown of percentages is as follows:27.3% were at the compatibility of the diagnosis with the result of the required examination, 18.1% were at monitoring the international accreditation certificate (ISO),17.1% were at the existence of international accreditation standards, 16% were at the presence of modern machines, 13.7% were at having external and internal quality control samples and 7.8% were at re-examination.

In summary, the distribution of responses in **Table (5.25)** highlights the multifaceted nature of factors influencing the reliability of laboratory results. From compatibility and adherence to international standards to the use of modern technology and quality control measures, each factor plays a role in ensuring accurate and dependable outcomes in the laboratory setting. The varying percentages reflect diverse perspectives on the relative importance of these factors among the respondents surveyed

**Table 5.25: Numbers and percentages of factors that enhance the reliability of laboratory results**

| Number | Factors that enhance the reliability of laboratory results | Responses | |
|---|---|---|---|
| | | N | Percent (%) |
| **1** | Compatibility of the diagnosis with the result of the required examination | 80 | 27.3% |
| **2** | Existence of international accreditation standards | 50 | 17.1% |
| **3** | Monitoring the international accreditation certificate (ISO 15189) | 53 | 18.1% |
| **4** | Re-examination | 23 | 7.8% |
| **5** | The presence of modern equipment | 47 | 16.0% |
| **6** | Having external and internal quality control samples | 40 | 13.7% |
| | **Total** | **293** | **100.0%** |

**Table (5.26)**, revealed that 82.1% of physicians heard of the International Quality Certificate (ISO 15189 Certificate) about the quality of medical laboratory services. Meanwhile, 17.9% did not hear on the matter.

**Table 5.26: The frequencies and percentages of physicians who heard about the ISO 15189 Certificate**

| **Have you ever heard about the International Quality Certificate (ISO 15189 Certificate) for the quality of medical laboratory services?** | | |
|---|---|---|
| | **Frequency** | **Percent (%)** |
| No | 22 | 17.9% |
| Yes | 101 | 82.1% |
| **Total** | **123** | **100.0%** |

**Table (5.27)** presents data revealing that 56.9% of physicians possess knowledge of how international quality certification (specifically ISO 15189 certification) impacts the quality of medical laboratory services. Meanwhile, 43.1% indicated a lack of knowledge on the subject.

**Table 5.27: The frequencies and percentages of physicians' knowledge about the impact of ISO 15189 certification on the quality of medical laboratory services**

| Do you have knowledge about the impact of international quality certification (ISO 15189 certification) on the quality of medical laboratory services? | | |
|---|---|---|
| | **Frequency** | **Percent (%)** |
| No | 53 | 43.1% |
| Yes | 70 | 56.9% |
| **Total** | **123** | **100.0%** |

**Table 5.28: A total percentage of responses towards domains and services provided to physicians in all study regions**

| **Percentages % of responses towards domains and services provided to physicians** | **Place and area for physicians'work** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Jericho | Hebron | Al-Ezarika | Bethlehem | Jenin | Ramallah | Tulkarm | Nablus | **Total** |
| Communication% | 66.7% | 70.3% | 77.5% | 70.8% | 77.2% | 72.9% | 77.6% | 75.% | **73%** |
| Abundance of tests % | 80.4% | 81.3% | 82.5% | 79.9% | 84.9% | 80.9% | 85.9% | 82.9% | **82%** |
| Lab results % | 77.3% | 80.6% | 89% | 81.9% | 85% | 81.7% | 87.6% | 87% | **83%** |
| Critical results% | 72.9% | 79.2% | 100% | 88.9% | 85% | 85.2% | 87.5% | 82.5% | **84%** |
| Satisfaction in general | 76.7% | 85.9% | 90% | 84.7% | 88.2% | 86.1% | 85.5% | 86.7% | **85%** |
| Access to laboratory services % | 84.4% | 86.5% | 83.3% | 87% | 92.2% | 88.9% | 98.2% | 96.7% | **90%** |

Based on the total percentage of physicians' responses toward the services provided to them, the collective percentage across all regions for communication stood the lowest at 73%. For the abundance of tests, the figure was 82%, while for their opinion of the

laboratory results, it reached 83%. Regarding the handling of critical results, the satisfaction level reached 84%, and an overall satisfaction rating of 85% was observed. In terms of accessibility to laboratory services, the satisfaction percentage was recorded at the highest of 90%.

These results showed that physicians exhibited a general sense of contentment with the quality of services provided by Medicare laboratories that had received the ISO 15189 certification in Palestine. However, the study encountered a limitation due to the absence of data regarding physicians' satisfaction with services before the ISO 15189 certification was obtained.

## 5.4 Testing the relationships between patients' and physicians' perceptions of applying ISO 15189 standard and study domains

Statistical tests were conducted to explore the relationships between the perceptions of patients and physicians involving the implementation of the ISO15189 standard and the study domains. One was from the perspective of patients, while the other was conducted from the viewpoint of physicians.

### 5.4.1 Patients' perceptions

The subsequent tables examine the relationship between the application of ISO 15189 standards in medical laboratories and various study domains based on patients' perceptions. Multiple statistical tests, including ANOVA, Pearson correlation, and t-test coefficients, were employed to determine the significance of the relationship at an alpha level of $\leq 0.05$.

**A. The relationship between socio-demographic variables and patients' satisfaction:**

In **Table (5.29)** we used the One-way ANOVA testing method to illustrate the relationship between socio-demographic variables and patient satisfaction.

Results indicate that there were no significant relationships between patient satisfaction and socio-demographic data at alpha ($\alpha$) > 0.05.

**Table 5.29: Testing socio-demographic variables and patient satisfaction**

| **One-way ANOVA** | | | |
|---|---|---|---|
| **Patient satisfaction %** | **F** | **df** | **Sig.** |
| Age | 1.953 | 3 | 0.123 |
| Gender | 0.909 | 1 | 0.342 |
| Place of residency | 0582 | 7 | 0.770 |
| Educational level | 0.673 | 4 | 0.612 |
| Number of visits | 0.028 | 2 | 0.972 |
| Health insurance | 2.002 | 2 | 0.138 |

**B. The impact of the work environment on patient satisfaction**

In **Table (5.30)**, the outcomes of tests (Pearson Correlation, ANOVA, and t-test coefficients), demonstrated that there was a **positive relationship** between patient satisfaction and work environment with a significance level of $\alpha < 0.05$.

**Table 5.30: Testing the work environment with patients' satisfaction**

| **Correlations** | | |
|---|---|---|
| | | **Percent (%) of the laboratory environment** |
| Satisfaction in general % | Pearson Correlation | **.568**** |
| | Sig. (2-tailed) | .000 |
| | N | 191 |
| ****. Correlation is significant at the 0.01 level (2-tailed).** | | |

| **Annova** | | | | | |
|---|---|---|---|---|---|
| **Model** | | **Sum of Squares** | **do** | **F** | **Sig.** |
| 1 | Regression | 14762.007 | 1 | 89.895 | .000[b] |
| **a. Dependent Variable: Satisfaction in general %** | | | | | |
| **b. Predictors: (Constant), laboratory environment %** | | | | | |

| **Coefficients** | | | | | | |
|---|---|---|---|---|---|---|
| **Model** | | **Unstandardized Coefficients** | | **Standardized Coefficients** | **t** | **Sig.** |
| | | **B** | **Std. Error** | **Beta** | | |
| 1 | (Constant) | 50.205 | 4.169 | | 12.042 | .000 |
| | % of the laboratory environment | .484 | .051 | .568 | 9.481 | .000 |
| **a. Dependent Variable: Satisfaction in general %** | | | | | | |

## C. The impact of the quality of laboratory test results on patients' satisfaction

In **Table (5.31)**, the results of tests (Pearson Correlation, ANOVA, and t-test coefficients), showed that there was a **positive relationship** between patient satisfaction and the quality of laboratory results with a significance level of $\alpha < 0.05$.

**Table 5.31: Testing the quality of laboratory test results with patients' satisfaction**

| **Correlations** | | |
|---|---|---|
| | | **Satisfaction in general %** |
| Percentage (%) of quality of laboratory Results | Pearson Correlation | **.610**** |
| | Sig. (2-tailed) | .000 |
| | N | 191 |
| ****. Correlation is significant at the 0.01 level (2-tailed).** | | |

| **ANOVA[a]** | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 17037.889 | 1 | 17037.889 | 111.965 | .000[b] |
| **a. Dependent Variable: Satisfaction in general%** | | | | | | |
| **b. Predictors: (Constant), quality of laboratory Results%** | | | | | | |

| **Coefficients[a]** | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 22.670 | 6.308 | | 3.594 | .000 |
| | Quality of laboratories Results% | .872 | .082 | .610 | 10.581 | .000 |
| **a. Dependent Variable: Satisfaction in general %** | | | | | | |

**D. The impact of access to medical laboratory services on patients' satisfaction**

In **Table (5.32)** the outcomes of tests (Pearson correlation, ANOVA, and t-test coefficients), demonstrated that there was a **positive relationship** between patient satisfaction and easy access to medical laboratory services with a significance level of $\alpha < 0.05$.

**Table 5.32: Testing access to medical laboratory services with patients' satisfaction**

**Correlations**

| | | Satisfaction in general % |
|---|---|---|
| Easy access to medical laboratory services % | Pearson Correlation | .343** |
| | Sig. (2-tailed) | .000 |
| | N | 191 |

****. Correlation is significant at the 0.01 level (2-tailed).**

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 5403.181 | 1 | 5403.181 | 25.280 | .000[b] |

**a. Dependent Variable: Satisfaction in general %**

**b. Predictors: (Constant), Easy access to medical laboratory services %**

**Coefficients**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 66.560 | 4.537 | | 14.670 | .000 |
| | Easy access to medical laboratory services % | .282 | .056 | .343 | 5.028 | .000 |

**a. Dependent Variable: Satisfaction in general %**

**E. The relationship between the educational level of patients and their awareness of ISO 15189 certification for the quality of medical laboratory services**

In **Table (5.33)**, the outcome of the Chi-square test demonstrates that there was no significant relationship between the educational level of patients and their awareness of the ISO 15189 certificate at alpha ($\alpha$) > 0.05.

**Table 5.33: Testing the educational level of patients and their awareness of ISO 15189 certification**

| **Crosstabulation** | | | | | |
|---|---|---|---|---|---|
| | | | **Have you ever heard about the International Quality Certificate (ISO 15189 Certificate) for the quality of medical laboratory services?** | | Total |
| | | | No | Yes | |
| **Educational level** | Primary | Count | 4 | 1 | 5 |
| | | | 80.0% | 20.0% | 100.0% |
| | Secondary | Count | 19 | 11 | 30 |
| | | | 63.3% | 36.7% | 100.0% |
| | Bachelors | Count | 56 | 73 | 129 |
| | | | 43.4% | 56.6% | 100.0% |
| | Master's | Count | 10 | 15 | 25 |
| | | | 40.0% | 60.0% | 100.0% |
| | PhD | Count | 2 | 0 | 2 |
| | | | 100.0% | 0.0% | 100.0% |
| Total | | Count | 91 | 100 | 191 |
| | | | 47.6% | 52.4% | 100.0% |

| **Chi-Square Tests** | | | |
|---|---|---|---|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 8.769[a] | 4 | .067 |
| Likelihood Ratio | 9.689 | 4 | .046 |
| Linear-by-Linear Association | 2.915 | 1 | .088 |
| N of Valid Cases | 191 | | |

### 5.4.2 physicians' perceptions.

The subsequent tables examine the relationship between the application of ISO 15189 standards in medical laboratories and various study domains based on physicians' perceptions. Multiple tests, including ANOVA, Pearson correlation, and t-test coefficients, were employed to determine the significance of the relationship at an alpha level of $\leq 0.05$.

**A. The relationship between socio-demographic variables and physicians' satisfaction**

**Table (5.34)** indicates that there were no significant relationships at all between socio-demographic variables and physicians' satisfaction with medical laboratory services at Alpha ($\alpha$) > 0.05 when tested by One-way ANOVA and Pearson correlations.

**Table 5.34: Testing socio-demographic variables and physicians' satisfaction**

| **One-way ANOVA** | | | |
|---|---|---|---|
| **physician satisfaction %** | **F** | **df** | **Sig.** |
| place of residency | 0.864 | 7 | 0.0537 |
| Gender | 0.111 | 1 | 0.740 |
| Experience years | 0.064 | 5 | 0.997 |

| **Correlations** | | |
|---|---|---|
| | | **Age** |
| Satisfaction in general | Pearson Correlation | .037 |
| | Sig. (2-tailed) | .681 |
| | **N** | **123** |

**B. The impact of the quality of laboratory test results on physicians' satisfaction**

In **Table (5.35)** the results of tests (Pearson Correlation, ANOVA, and t-test coefficients), showed that there was a **positive relationship** between physicians' satisfaction and the quality of laboratory results with a significance level of $\alpha < 0.05$.

**Table 5.35: Testing the quality of laboratory test results with physicians' satisfaction**

| **Correlations** | | |
|---|---|---|
| | | **Satisfaction in general** |
| Quality of laboratory test results % | Pearson Correlation | .696** |
| | Sig. (2-tailed) | .000 |
| | N | 123 |
| ****. Correlation is significant at the 0.01 level (2-tailed).** | | |

| ANOVA[a] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 13826.507 | 1 | 13826.507 | 113.654 | .000[b] |
| **a. Dependent Variable: Satisfaction in general** | | | | | | |

| Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 14.365 | 6.715 | | 2.139 | .034 |
| | Lab results % | .849 | .080 | .696 | 10.661 | .000 |
| **a. Dependent Variable: Satisfaction in general**<br>**b. Predictors: (Constant), Lab results %** | | | | | | |

**C . The impact of physicians' accessibility to medical laboratory services on their satisfaction**

In **Table (5.36)**, The results of tests (Pearson Correlation, ANOVA, and t-test coefficients), showed that there was a **positive relationship** between physicians' satisfaction and accessibility to medical laboratory services with a significance level of $\alpha < 0.05$.

**Table 5.36: Testing of physicians' accessibility with their satisfaction**

| Correlations | | | |
|---|---|---|---|
| | | Satisfaction in general | |
| Access to laboratory services % | Pearson Correlation | .553** | |
| | Sig. (2-tailed) | .000 | |
| | N | 123 | |
| ****. Correlation is significant at the 0.01 level (2-tailed).** | | | |

| ANOVAa | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | do | Mean Square | F | Sig. |
| 1 | Regression | 8738.491 | 1 | 8738.491 | 53.380 | .000[b] |
| **a. Dependent Variable: Satisfaction in general** | | | | | | |
| **b. Predictors: (Constant), Access to laboratory services %** | | | | | | |

| Coefficients | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 36.388 | 6.775 | | 5.371 | .000 |
| | Access to laboratory services % | .540 | .074 | .553 | 7.306 | .000 |
| **a. Dependent Variable: Satisfaction in general** | | | | | | |

## 5.5 Physician's and patient's satisfaction on applying ISO 15189 Standard in medical laboratories

In **Table (5.37)**, Statistical analysis (T-test) showed that there was a statistically significant satisfaction among patients and physicians on applying ISO 15189 standard in medical laboratories at (alpha < 0.05).

**Table 5.37: Testing physicians' and patient' satisfaction**

| **Independent Samples Test** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Levene's Test for Equality of Variances | | T-Test for Equality of Means | | | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference |
| (The quality of laboratory Results) % | Equal variances not assumed | 4.260 | .040 | -5.496 | 233.480 | .000 | -7.56677 |
| Satisfaction in general | Equal variances assumed | .069 | .794 | 2.007 | 312 | .046 | 3.58085 |

## 5.6 The comparison between patients' and physicians' perceptions

The study domains that are common in patients' and physicians' questionnaires were examined to compare the perceptions of patients and physicians. One aspect considered was overall satisfaction, with patients indicating a satisfaction rate of 89%, slightly higher than the physicians' reported rate of 85%. Another area explored was their knowledge and awareness of ISO 15189. Additionally, the quality of laboratory results emerged as a common domain. **Table (5.38)** depicts the contrast in overall satisfaction and satisfaction with the quality of laboratory results, utilizing statistical

measures like mean and standard deviation to reveal nuanced differences between patients and physicians as follows :

- There was a significant difference in the degree of **satisfaction with the domain quality of laboratory results** between patients and physicians.
- There was a significant difference, but less strongly, in the degree of overall **satisfaction from the laboratory services** between patients and physicians

**Table 5.38: Testing a comparison between patients' and physicians' perceptions**

| **Group Statistics** | | | | |
|---|---|---|---|---|
| | type | N | Mean | Std. Deviation |
| With the Domain( the quality of laboratory Results )% | patient | 191 | 75.8072 | 10.86464 |
| | physician | 123 | 83.3740 | 12.53676 |
| Comparing two domains patients' and physicians' satisfaction (Overall Satisfaction with laboratory services) | patient | 191 | 88.7435 | 15.52560 |
| | Physician | 123 | 85.1626 | 15.29672 |

## 5.7 Summary

This chapter offers a detailed exploration of participant demographics and conducts an in-depth analysis of various study domains. The main emphasis is on evaluating the satisfaction levels of both physicians and patients regarding the quality of services provided by Palestinian medical laboratories that adhere to ISO 15189 standards. The study compares and contrasts the perceptions of patients and physicians, highlighting the relative importance of different factors influencing their views on medical laboratory services. Overall, the chapter provides a comprehensive understanding of satisfaction dynamics and perceptions within the context of medical laboratory services in Palestine.

The next chapter will provide the discussion, Conclusion, Recommendations of the findings of this study and limitations.

# Chapter 6

# Discussion, Conclusion,

# Recommendations, and Limitations

# Chapter 6

# Discussion, Conclusion, Recommendations, and limitation

## 6.1. Introduction

This chapter includes a discussion of the study findings related to prior studies, encompassing, physicians' and patients' satisfaction with the implementation of ISO 15189 in medical laboratories. Ultimately, this chapter concludes with conclusions and recommendations.

## 6.2. Socio-demographic variables

As previously stated, two sociodemographic variables were considered, one for patients and one for physicians.

### 6.2.1 Socio-demographic variables for patients

The survey participants were predominantly female, comprising 71.7% of the respondents, while males accounted for the remaining 28.3%. Data from the Information Technology (IT) Department at Medicare Laboratories revealed that in 2022, 62.4% of patients were female, with 37.6% male. Notably, these statistics experienced a minor change in 2023, where 64.6% of patients were identified as female, while 35.4% were male. It's important to note that while survey participants had a higher percentage of females, the patients' gender distribution showed a similar trend with a slightly change between the two years.

Their age ranges were between 18 and 50 years and over; the highest percentage was between 29 and 39 years with 39.8%; and the lowest percentage was 50 years and over with 6.8%. They were distributed in different regions; Ramallah had the highest representation at 25.1%, while Jericho had the lowest at 4.7%. These differences may

be attributed to population density, leading to a concentration of physicians in densely populated regions, where hospitals and healthcare facilities are more prevalent. Regarding their employment status, a significant portion of respondents (73.3%) were employed, there were variations in employment rates across regions, with Ramallah having the highest percentage at 25.1%, suggesting that the majority of the population is part of the workforce. Moreover, it's worth mentioning that this study's highest percentage age group fell within the 29-39 range, which typically characterizes the working-age population. This corresponds with the outcomes of the Palestinian Central Bureau of Statistics, where the employment rate in Palestine for the year 2021 stood at 85.9% (PCBs, n.d.).

The predominant educational attainment among the surveyed participants was a bachelor's degree, with 67.5% reporting this as their highest level of education. Conversely, those holding a Ph.D. constituted only 1%, while individuals with only primary education accounted for the lowest percentage at 2.6%. These findings suggest that the surveyed population generally possesses a higher level of education. This aligns with the 2022 data on the illiteracy rate in Palestine, which stood at 2.2%, and the percentage of individuals with a bachelor's degree and high reached 17.8% (PCBs, n.d.).

The majority of respondents (51.3%) had between 2 and 5 visits to the laboratory in the last year. A significant proportion (34%) had more than 5 visits, indicating frequent healthcare utilization, also, it reflects the patient's confidence in the laboratory. While 14.7% were first-time visitors, which could represent new patients only in the eight Medicare laboratory branches in which the study was conducted. Data from the IT Department at Medicare Laboratories revealed that the percentage of new patients compared to the total patient count across all branches (32 branches) stood at 36% in 2022 but slightly declined to 35% by September 2023. This provides an overview of

the percentage of first-time visitors and the evolving proportion of new customers over the mentioned period, as per data from the IT Department at Medicare Laboratories.

Regarding health insurance, the research findings indicated varying percentages: 37.7% relied on personal accounts(out-of-pocket), 35.3% had governmental insurance, and 27.2% had private insurance. This diversity in healthcare payment methods reflects a multifaceted approach. According to the PCBS, the distribution of health expenditure in Palestine in 2021 included 47.3% from the central government (public spending), 33.5% from out-of-pocket payments by households, 16.2% from Non-Profit Institutions Serving Households (NPISH), and 3% from Insurance Corporations (PCBS, 2023). This array of funding sources underscores the need for a comprehensive strategy to ensure accessible and affordable healthcare services for the Palestinian population.

Testing a relationship between socio-demographic variables (age, gender, place of residency, educational level, number of visits, and health insurance) and patient satisfaction with a one-way ANOVA has shown no significant relationship with alpha ($\alpha$) > 0.05. This implies that, in this specific context, these socio-demographic factors did not significantly impact patient satisfaction. This data provides valuable insights into the socio-demographic characteristics of the surveyed population. The lack of significant relationships between these factors and patient satisfaction suggested that other variables or factors considered in this survey may play a more critical role in these outcomes.

In contrast, a study conducted by Abera et al.(2017) showed that there were significant associations between sociodemographic characteristics and the satisfaction of respondents with the laboratory services given at Tikur Anbessa Specialized Hospital (TASH) except for gender, place of residence, and the problem of overcrowding.

However, the study demonstrated a statistically significant difference in patient satisfaction concerning age and educational level. These findings were considered valuable because they shed light on the factors influencing patient satisfaction with laboratory services at TASH. Identifying these factors is important for healthcare providers and administrators as they can use this information to tailor their services and improve patient experiences. For example, if certain age groups or educational backgrounds consistently report lower satisfaction levels, healthcare institutions can design targeted interventions to address these specific concerns and enhance overall patient satisfaction.

### 6.2.2 Socio-demographic variables for physicians

Around 69.9% of the physicians were male, a notably larger portion than the 31.1% of female physicians. Data sourced from the IT department at Medicare Laboratories reveals that in both 2022 and 2023, the proportion of female physicians who referred tests to Medicare Laboratories was 19% and 20%, respectively, while the corresponding percentages for male physicians were 81% in 2022 and remained steady at 80% in 2023.

Physicians age was been between the ages of 30 and 50, with the majority (74.8%) falling within this age range. Only 6.5% of physicians were under the age of 30, while 18.7% were 50 or older. The lowest concentration of physicians was found in Al-Eizariya at 4.1%, Jericho at 12.2%, Nablus at 12.2%, Hebron at 13%, Jenin at 13.8%, Bethlehem at 14.6%, Ramallah at 14.6%, and Tulkarm at 15.4%. The number of physicians distribution found in each region varied, these variances can be linked to population density, resulting in a clustering of physicians in areas with higher population densities, where hospitals and healthcare facilities are more readily available.

Regarding the specialty of physicians, the most notable percentage among physician specialties was observed in general medicine, accounting for 34.1%, followed by gynecology at 19.5%, internal medicine at 14.6%, and pediatrics at 13%. The remaining disciplines constituted relatively minor proportions, in addition, the percentage of physicians with experience years from 1–5 years was 18.7%, this category represents relatively new practitioners who are likely in the early stages of their medical careers, 6–10 years were 22%, 11–15 years were 20.3%, 16–20 years were 15.4%, 21–25 years were 11.4%, and over 25 years were 12.2%, indicating that the largest percentage was between 6–10 years and the lowest was between 21–25 years. The observed distribution reflects a diverse mix of experience levels among the physicians in the study. The higher concentration in the 6-10 years range may indicate that this is a cohort of healthcare professionals who have recently completed their training and are actively practicing, while the lower percentage in the 21-25 years' range suggests that there are fewer physicians with a long history of practice in the study.

However, when testing a relationship between socio-demographic variables (age, gender, place of residency, specialty and experience years) and physicians' satisfaction, the statistical analysis indicated no significant relationship using one-way ANOVA and Pearson correlations. The p-values (Alpha) were greater than 0.05, indicating that no statistically significant relationships existed. These findings align with the results of previous studies. For instance, in a study conducted by Hailu et al. in 2020, it was observed that 50% of clinicians were satisfied with general laboratory services, However, At 5% level of significance, they did not find enough evidence to conclude that sex, age, marital status, education level, and experience were statistically associated with physician satisfaction (p-values> 0.05)

In contrast, another study conducted by Khadeja et al. in 2022 reported different results, study findings revealed that the gender of clinicians was associated with their satisfaction status, while factors like the departments they belonged to and their age were not found to be associated with satisfaction status. These variations in findings across different studies highlight the complexity of factors that can influence physicians' satisfaction. It underscores that satisfaction is influenced by a combination of socio-demographic variables and other context-specific factors.

In summary, this dataset is highly valuable for Medicare laboratories, offering assistance in making informed decisions about investment strategies, refining marketing methods, and launching initiatives to improve healthcare quality. Furthermore, it acts as a valuable asset in healthcare planning, facilitating more efficient allocation of resources and fostering a deeper understanding of the composition of the physician workforce within a particular geographical area or healthcare system.

## 6.3 Analysis of the questionnaire items

Two analysis of the questionnaire items were conducted, one analysis done on patients' perceptions and the other on physicians' perceptions. Furthermore, the upcoming information will illustrate the levels of satisfaction expressed by both patients and physicians regarding the quality of medical services provided in private medical laboratories in Palestine that apply ISO 15189 standards.

### 6.3.1. Analysis of the patients' questionnaire items

Descriptive statistical analysis was conducted for the domains of the study, focusing on patients' perspectives as shown in **Table (5.13)**. Mean values and standard deviations were employed to assess various aspects of the study domains. According to the Likert scale data, patients’ satisfaction with laboratory services fell within the excellent range,

with mean ratings ranging from 3.20 to 4.00, also the standard deviation measures the spread or variability in the ratings. A higher standard deviation indicates greater variability in ratings, whereas a lower standard deviation suggests more consistency among responses. The following data illustrates patients' satisfaction across the various domains examined in the study.

#### 6.3.1.A. Patients' satisfaction with the work environment

The provided information highlights several aspects related to healthcare facilities and the patient experience. Here are the key points from the text:

- **Healthcare facilities:** In the context of healthcare facilities, certain aspects were evaluated. This included the presence of separate bathrooms for men and women, which received a mean rating of 3.21 with a SD of 1.223. The cleanliness of the sanitary facilities garnered a mean rating of 3.29 with a SD of 0.96. Likewise, the availability of soap and tissues within the health facilities received a mean rating of 3.29 with a SD of 0.96. These ratings collectively indicate a high level of satisfaction, categorized as 0.775. healthcare facilities clean and sanitary is critical for infection control and patient well-being, as many laboratory tests such as urine tests require using the toilets. Furthermore, the presence of separate facilities for men and women, as well as vital hygiene products such as soap and tissues, helps to a comfortable and respectful patient experience. These positive ratings indicate a healthcare center that prioritizes patient comfort and safety in these critical areas.
- However, the provision of bathrooms adapted for individuals with special needs, with a mean rating of 1.95 and a standard deviation of 1.541, was rated as satisfactory but fell under the "good" category. There appears to be a need to address this issue and explore ways to provide adapted bathrooms for individuals with special needs, especially in laboratories that currently lack such facilities.

- **Waiting area**: The waiting place before receiving service was evaluated as excellent, particularly in terms of cleanliness and tidiness in the waiting area with a mean of 3.57 and a SD of 0.699. Additionally, the adequacy of space received a commendable rating, with a mean of 3.3 and a SD of 0.936. The availability of comfortable seating while waiting for service also garnered positive feedback with a mean of 3.36 and a SD of 0.935. Lastly, the quality of lighting, and ventilation in the waiting area received an excellent rating with a mean of 3.41 and a SD of 0.775. In summary, the findings showed that patients had extremely pleasant experiences and ratings of the waiting room before receiving service at the laboratory. They were highly satisfied with the cleanliness and tidiness of the room, thought it was adequate, enjoyed the availability of comfortable sitting, and were satisfied with the lighting and ventilation quality. Positive feedback is critical since the waiting room has a big impact on the overall patient experience. Patients' comfort and contentment in this area can help to improve their overall perception of the healthcare institution.
- **Reception section**: within the reception section, the responses were highly favorable. This was evident in the assessment of the laboratory receptionist's attire, which included wearing a white apron and an identification card, earning an excellent rating with a mean of 3.72 and a standard deviation of 0.644. This shows that respondents viewed the clothing, to be appropriate and professional consistently.

This research examined the relationship between patients' satisfaction and the work environment. The results showed that the significance level was $\alpha < 0.05$, indicating a statistically significant relationship. This suggests that when the work environment is improved, it leads to an increase in patient satisfaction.

A study was conducted by AL-Sharawnah (2013) in Jordan to assess the impact of implementing the ISO 15189 Standard of Quality and Competence in Medical

Laboratories on patient satisfaction within Jordanian private medical laboratories. The research findings indicated that patients exhibited a high level of satisfaction with the quality of their testing environment, and this satisfaction was found to be statistically significant at a significance level of $\alpha < 0.05$. In summary, the study by Al-Sharawnah in 2013 highlights the importance of maintaining high-quality standards in medical laboratories, especially in private healthcare settings. Adhering to ISO 15189 standards not only ensures the accuracy of medical tests but also contributes to improving patient satisfaction, which is a fundamental aspect of healthcare quality.

Additionally, a study conducted by Abera et al. (2017a) to assess Patient satisfaction with clinical laboratory services at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia revealed that patients expressed high levels of satisfaction with the facility's cleanliness, with 82% satisfaction reported. However, they were dissatisfied with the cleanliness and comfort of the latrines, with a dissatisfaction rate of 63.8%. The study by Abera et al. throws light on crucial factors of patient satisfaction in a healthcare context. While the hospital earns a high level for general cleanliness, resolving issues about toilet cleanliness and comfort should be a priority to improve the overall quality of treatment and patient experiences at Tikur Anbessa Specialized Hospital in Addis Abeba, Ethiopia.

Furthermore, Hailu et al. (2020) conducted a study to evaluate Patients' satisfaction with clinical laboratory services in Public Hospitals in Ethiopia, aiming to improve the delivery of high-quality healthcare. This study found that patients were dissatisfied with several factors, including restroom cleanliness (47% dissatisfaction) and waiting area adequacy (25% dissatisfaction), so it focuses on patient dissatisfaction with clinical laboratory services in Ethiopian public hospitals, specifically regarding the appropriateness of restroom cleanliness, and waiting area appropriateness. Addressing

these concerns is critical for improving patient satisfaction, healthcare delivery quality, and overall patient experience in these facilities. It emphasizes the significance of patient-centered treatment and ongoing quality improvement initiatives in healthcare settings and with the implementation of ISO 15189 in medical laboratories, improvement may occur in these aspects.

### 6.3.1.B. Patients' satisfaction with the quality of laboratory results

Regarding the service for delivering results, the following aspects were excellent:

- **Turnaround time of laboratory test results:** The results were received on the agreed-upon date and time as scheduled with a mean rating of 3.58 and a SD of 0.643, This indicates that the laboratory or healthcare facility met the patients' expectations by adhering to its agreements about result delivery.

- **Reliability of test results:** There was a high level of confidence in the reliability of the laboratory results receiving a mean rating of 3.59 and a SD of 0.665, this demonstrates that patients have trust in the accuracy and validity of the test results, which is critical in healthcare services.

In conclusion, the results-delivery service demonstrated a consistent and high-quality approach. It not only ensured that results were provided promptly but also instilled trust in the credibility of the results. This level of reliability and confidence in the service is essential for maintaining patient satisfaction and upholding the standards of healthcare delivery.

The study results were consistent with a study conducted by Abera et al. (2017a) suggests that this particular study investigated patient satisfaction in a healthcare

setting, focusing on the maintenance of privacy and confidentiality. The key point highlighted in the statement is that patients expressed an extremely high level of satisfaction, with 83.2% of respondents indicating their satisfaction with the privacy and confidentiality measures. This underscores the importance of healthcare providers and facilities upholding these principles to build trust, improve patient experience, and deliver high-quality care.

Moreover, A study conducted by Hailu et al. (2020) to assess Patients' satisfaction with clinical laboratory services in Public Hospitals in Ethiopia to enhance and deliver high-quality healthcare shows that patients are dissatisfied with the missing results with a rating (12%). This finding underscores the importance of addressing this issue to enhance the delivery of high-quality healthcare services and improve patient satisfaction within the Ethiopian healthcare system.

Additionally, in the study conducted by Alelign & Belay (2019) to assess patient satisfaction with clinical laboratory services and associated factors among adult patients attending outpatient departments at Debre Markos referral hospital, in Northwest Ethiopia, it was found that a high percentage of patients, specifically 95%, reported no occurrences of missing laboratory results. Timely access to laboratory results is crucial for clinical decision-making and patient care. This high satisfaction rate suggests that the hospital's laboratory services were efficient in delivering test results to patients.

Furthermore, a survey from customer satisfaction survey of corrective actions in laboratory services in a university hospital was conducted by Oja et al. (2006) to determine how satisfied clinical units were with laboratory services at a university hospital in Finland to pinpoint the greatest problems and service faults, this survey revealed that the highest levels of dissatisfaction in 2001 were related to computerized

test ordering and reporting, as well as test turnaround time. Computerized systems play a crucial role in modern healthcare by streamlining processes, reducing errors, and improving patient care. The dissatisfaction in this area suggests a need for technological improvements, in addition, addressing issues related to test turnaround time may require process optimization, resource allocation, and workflow improvements.

In summary, the studies by Alelign and Belay (2019) and Oja et al. (2006) provide valuable insights into patient and customer satisfaction with laboratory services. While the Ethiopian hospital demonstrated high satisfaction regarding the availability of laboratory results, the Finnish university hospital faced challenges related to computerized test ordering, reporting, and test turnaround time. Both studies underscore the significance of timely and accurate laboratory services in delivering high-quality healthcare and the need for continuous quality improvement efforts to meet patient and customer expectations, so these aspects may improve as a result of the application of ISO 15189 in medical laboratories.

In the context of this study, which tested the relationship between patient satisfaction and the quality of laboratory results it was found that the significance level was $\alpha < 0.05$ which means that patient satisfaction increases when the quality of laboratory results increases.

**6.3.1.C. Patients' satisfaction with accessibility to medical laboratory services**

Patients expressed high levels of satisfaction with the accessibility of the laboratory, as evidenced by their positive evaluations of various factors. These factors included:

- **Accessibility to the laboratory**: The availability of transportation, with a mean rating of 3.45 and a standard deviation (SD) of 0.818, reflecting that patients

generally had positive experiences when it came to getting to the laboratory, however the presence of informative signs directing patients to the laboratory, with a mean of 3.27 and a SD of 0.973, indicates that patients thought the signage was useful and effective and the ease of reaching the laboratory building, with a mean of 3.34 and a SD of 0.897. All of these aspects were deemed excellent, these findings are useful for healthcare professionals and administrators because they identify areas of strength and show that initiatives to improve accessibility, such as transportation and providing signage, have contributed to patient satisfaction with laboratory services.

In contrast, other studies such as (Abera et al., 2017a) expressed dissatisfaction with the laboratory's location, accessibility, and availability of latrines, with a dissatisfaction rate of 58.4%. This highlights the importance of capturing patient feedback and addressing areas of concern to improve the quality of healthcare services and patient satisfaction.

Similarly, a study conducted by AL-Sharawnah (2013) in Jordan showed patients' satisfaction with transportation, and another study conducted by (Hailu et al., 2020) assessed Patients' satisfaction with clinical laboratory services in Public Hospitals in Ethiopia to enhance and deliver high-quality healthcare, patients voiced dissatisfaction with various factors. This included dissatisfaction with the laboratory's accessibility (20%) and the location of the restroom facilities (18%).

In summary, while a significance level of $\alpha < 0.05$ suggests a statistically significant relationship between patient satisfaction and ease of access to medical laboratory services, it's critical to recognize that patient satisfaction is a multifaceted construct influenced by various factors. These factors can include not only access to laboratory services but also the location of the laboratory, transportation alternatives, and the

availability of essential facilities such as restrooms. Healthcare providers should consider these diverse factors when seeking to improve patient satisfaction and provide high-quality healthcare services. Furthermore, tailoring improvements to meet the specific needs and preferences of their patient population might be critical for achieving high levels of satisfaction.

- **Waiting time to receive service and clear advisory service**: The speed of service in the reception area, with a mean of 3.59 and a standard deviation of 0.591, as well as the receptionist's responsiveness to inquiries and the clarity of information provided before sample collection, both received excellent ratings with a mean of 3.61 and a standard deviation of 0.678. Ensuring consistently positive experiences for all patients or customers could be a goal for improvement.
- **Access to current and previous results:** The service of obtaining previous examination results and attaching them to the current result was excellent with a mean rating of 3.6 and a SD of 0.747. Also, the service of obtaining a history of previous results upon request was commendable with a rating of 3.59 and a SD of 0.74. This provided efficient delivery ways to accommodate patient preferences and enabled easy access to both current and prior examination results. These findings highlight the significance of effective result delivery in healthcare, which improves the entire patient experience and satisfaction.

Furthermore, the study's findings shed light on a crucial aspect that warrants attention: the accessibility of the laboratory for individuals requiring **mobility assistance**, particularly those with special needs. In contrast to the characteristics mentioned earlier, this aspect received a rating of "very good," though slightly lower on the Likert scale, with an average rating of 2.54. Notably, it also exhibits a relatively wide standard deviation of 1.479. This indicates that patients' opinions and experiences

in this regard varied considerably. Some patients might have given it a higher rating, signifying a positive experience, while others might have rated it lower, indicating challenges or areas that need enhancement. To address this variation and work towards improvement, physical modifications to the facility, such as installing ramps, handrails, and accessible entrances, as well as training staff to provide appropriate assistance to those with special needs, may be necessary.

Moreover, collecting feedback from individuals with impairments can prove valuable in pinpointing specific areas that require attention. In summary, the study highlights the importance of addressing and improving the accessibility of the laboratory for individuals with mobility challenges, emphasizing the need for staff training to ensure a more inclusive and accommodating healthcare environment.

In this research, The relationship between patients' satisfaction and easy access to medical laboratory services was tested and it gave a significance level of $\alpha < 0.05$, This implies that if access becomes easier, patient satisfaction tends to rise.

### 6.3.1.D. Patient's satisfaction with services provided to them

The provided information discusses the positive impact of ISO 15189 accreditation in medical laboratories on various aspects of patient satisfaction and healthcare service quality. Here are some key points from the information:

- **Blood Draw section:** In the blood draw section the responses reflected the following:

1. The clarity of the information and instructions provided before the blood draw, including details about fasting duration and medication or vitamin restrictions for certain tests, received an excellent rating, with a mean of 3.6 and a standard

deviation of 0.673, this indicates that respondents thought the directions on fasting time, medication limitations, and other specifics were clear and informative.

2. The use of gloves and the sterilization of the patient's hand before drawing the blood sample were both performed excellently, with a mean rating of 3.63 and a standard deviation of 0.6, This suggests that respondents consistently thought these hygiene and safety procedures were excellently performed.
3. The process of explaining and guiding the patient during the blood drawing procedure, such as extending the hand horizontally and clenching and extending the hand, was executed excellently, receiving a mean rating of 3.63 and a standard deviation of 0.658, this suggests that respondents felt comfortable and well-informed during the blood draw process.
4. Providing privacy during the blood draw process was done effectively, with a mean rating of 3.58 and a standard deviation of 0.682. This suggests that patients felt their privacy was respected during this medical procedure. This is an important aspect of providing high-quality and patient-centered healthcare.
5. The clarification of information after the blood was drawn, including applying pressure to the blood draw site until it was confirmed that bleeding had stopped, was carried out excellently, with a mean rating of 3.67 and a standard deviation of 0.65, this indicates that the post-blood-draw procedures were consistently well-executed, and responders appreciated the attention to detail.
6. The skill of the technician in drawing blood was also excellent, receiving a mean rating of 3.59 and a standard deviation of 0.66 this implies that the technical proficiency of the laboratory staff performing the blood draws was consistently regarded as excellent by the respondents.

Overall, all these aspects of the Blood Draw section were rated excellent by respondents and the feedback suggests that the laboratory facility excels in ensuring a smooth and satisfactory blood drawing experience for its patients or clients.

- **The humanity of care:** The respectful and attentive treatment of the receptionist, characterized by tactful conversation, was also rated as excellent, with a mean of 3.65 and a standard deviation of 0.539. This critical component of patient-centered care underscores the importance of empathy and compassion in healthcare interactions, contributing to overall patient satisfaction and well-being.
- **Availability of requested service:** The availability of the required examinations received an excellent rating, with a mean of 3.74 and a standard deviation of 0.528. This indicated that these laboratories effectively meet the needs of their patients. Ensuring that required examinations are readily available is a critical component of patient-centered care, enhancing overall patient satisfaction and healthcare quality.
- **Way to get the results**: The method used to provide the results was satisfactory and efficient with a mean rating of 3.66 and a SD of 0.575, This suggests that the chosen method of result communication was well-received by patients, presumably contributing to a smooth and trouble-free encounter.

As shown in **Table (5.14)**, the data showed that the most substantial percentage of patients, 52.7%, expressed a preference for receiving their results through WhatsApp. Additionally, 29.3% preferred receiving results by hand, 7.7% indicated a preference for phone applications, another 7.7% opted by email, and a smaller percentage of 2.7% chose to receive results directly from their doctor. This diverse set of preferences emphasizes the importance of offering multiple communication channels to cater to the varied preferences and needs of patients when delivering their test results.

In summary, the reception section of the assessment reflects a positive experience for individuals utilizing the laboratory's services. overall, the feedback suggests a well-managed and customer-centric reception area, which is crucial for ensuring a positive experience for patients and clients visiting the laboratory.

**6.3.1.E Overall patient satisfaction:**

The data in **Table (5.17)** indicates that patients expressed high levels of satisfaction across various aspects of medical laboratory services. This includes cleanliness, reception, blood draw process, turnaround time for results, multiple result delivery methods, and result reliability. Overall, patient satisfaction reached an impressive 89%. Furthermore, the percentages of satisfaction were consistently close among branches in all regions.

The high patient satisfaction levels in the discussed study were compared with findings from other studies. For example, Hailu et al. (2020) reported 78.6% overall satisfaction with clinical laboratory services in Ethiopian public hospitals, while Khadeja et al. (2022) found an overall satisfaction rate of 87.3% in an Indian clinical laboratory. The study's results suggest that ISO 15189 accreditation plays a significant role in enhancing the quality of medical laboratory services. This is supported by the experience shared in the study conducted by Beyanga et al. (2018), to show the experience of implementation of the laboratory quality management system (ISO 15189) in Buganda Medical Centre Clinical Laboratory – Mwanza, Tanzania which showed improvements in external quality assessment performance in various departments after ISO 15189 implementation (e.g. Parasitology from 45% to 100%, Molecular Biology from no records to 100%, Biochemistry 50% to 95%, Tuberculosis Microscopy 60% to 100%, and Microbiology from 48.1% to 100%). There was a

reduction in complaints, from eight to two per week. Rejected samples were reduced from 7.2% to 1.2%. Turnaround time was not recorded before implementation but reached 92% (1644/1786) of the defined targets, and the proportion of contamination in blood cultures decreased from 16% to 4%.

Furthermore, the study at the Turkish University Hospital (Yesim et al., 2011) underscores that accreditation is a continuous learning process. It involves ongoing updates and improvements in laboratory procedures and practices, with a focus on minimizing errors.

In the case of the Kingdom of Saudi Arabia, a study by Kaneez Zamir, et al. (2019) demonstrates the successful journey of obtaining A2LA ISO 15189:2012 accreditation. The Department of Pathology and Laboratory Medicine in KSA achieved this accreditation, highlighting its commitment to delivering accurate and dependable results for patient care and safety.

Moreover, Matovu et al. (2022) conducted a study in Uganda to assess the impact of accreditation on healthcare services performance. Accredited public laboratories in Kyadondo district showed noticeable improvements in healthcare service performance compared to non-certified hospitals. This highlights how accreditation can positively affect healthcare outcomes.

Furthermore, in the context of the study the patients' "excellent" assessment of satisfaction with laboratory services, as well as their enthusiastic recommendations to relatives and friends, demonstrate the laboratory's success in providing high-quality treatment. This good feedback not only enhances the laboratory's reputation but also serves as a vital asset for acquiring new patients and cultivating patient loyalty. To

sustain this level of satisfaction and strong word-of-mouth referrals, the laboratory must continue to prioritize quality and patient-centered care.

In summary, ISO 15189 accreditation appears to be a valuable quality management system for medical laboratories, contributing to higher patient satisfaction, improved laboratory performance, and enhanced healthcare service quality. These findings underscore the importance of accreditation in ensuring accurate and reliable diagnostic services and, ultimately, better patient care and safety.

### 6.3.1.F Patients' Awareness and Knowledge of the ISO 15189 Certificate:

Based on the data presented in **Table (5.15)**, it was observed that only 52.4% of respondents were aware of the International Quality Certificate (ISO 15189 Certificate) associated with the quality of medical laboratory services. Conversely, 47.6% of respondents indicated no awareness of this certificate. These findings suggest a need for a higher level of awareness among patients regarding the significance of the ISO 15189 Certificate in laboratories.

In addition, **Table (5.16)**indicates that only 47.6% had knowledge about the impact of the international quality certificate on the quality of medical laboratory services, and 52.4% had no knowledge of it, which indicates the need for education of patients about its impact on the quality of medical laboratory services. This information highlights a lack of awareness among the surveyed population regarding the influence of international quality certificates on the quality of medical laboratory services. This suggests that there is a clear need for educational initiatives to inform patients about the importance and implications of such certificates for ensuring high-quality laboratory services.

In the context of the study, testing the relationship between the educational level of patients and whether they heard and had knowledge about the ISO 15189 certificate by using chi-square, there was no significant relationship at a P-value (alpha) > 0.05. This indicates that patients' educational levels were independent of their awareness and knowledge of the ISO 15189 certificate since ISO 15189 implementation in medical laboratories in West Bank is not familiar.

### 6.3.2 Analysis of the physicians' questionnaire items

Descriptive statistical analysis was conducted within the domains of the study, focusing on physicians' perspectives, as shown in **Table (5.18)**. Mean values and standard deviations were employed to assess various aspects of the study domains. According to the Likert scale data, physicians' satisfaction with laboratory services fell within the excellent range, with mean ratings ranging from 3.20 to 4.00. The following data illustrates physicians' satisfaction across the various domains examined in the study**.**

#### 6.3.2.A. Physicians' satisfaction with the quality of laboratory results

The Physicians' satisfaction with the quality of laboratory results is a crucial dimension in healthcare as it directly impacts patient care and treatment decisions. The following aspects are being discussed here:

I. **Confidence in Laboratory Results:** The confidence level in the reliability of laboratory results was excellent, with an average rating of 3.39 and a standard deviation of 0.609. This means that the reliability of laboratory results received an impressive 83% rating, signifying a very high level of trustworthiness and dependability associated with the results provided by these laboratories.

II. **Compatibility of Laboratory Results:** The responses toward the degree of compatibility of laboratory results with the clinical situation of the patient were rating excellent with a mean of 3.36 and SD of 0.616. This indicates a high level of proficiency and satisfaction in the interpretation and relevance of laboratory findings in the context of patient care.

III. **Turnaround Time of laboratory test results:** The time that examinations take to perform emergency and urgent diagnostic tests was rated very good with a mean of 3.08 and a SD of 0.946. It is advisable to monitor and improve the turnaround time for emergency and urgent diagnostic tests to speed up the issuance of results for such cases, reducing the turnaround time for critical tests not only contributes to better patient care but also aligns with healthcare quality and safety standards.

However, the rating of the period for issuance of test results commensurate with the medical conditions of their patients was very good, with a mean of 3 and a SD of 0.653. It is advisable to monitor and improve the period for the issuance of test results to benefit the patient's health and treatment.

IV. **ISO 15189 Certification:** The physicians' responses on the impact of laboratories obtaining the international quality certificate (ISO 15189 certificate) on the reliability of laboratory results were very good, with a mean of 3.05 and a SD of 1.07. Similarly, their rating of the impact of laboratories obtaining the international quality certificate (ISO 15189 certificate) on the laboratory services provided to doctors also was very good with a mean of 2.98 and a SD of 1.028. This necessitates finding ways such as producing publications or conducting lectures to educate and raise awareness about the influence of implementing the ISO 15189 certificate on the quality of laboratory services and the reliability of test results.

V. **Missing results retrieval mechanism**: The mechanism for obtaining a second copy of the missing result was rated good with a mean of 1.91 and SD of 0.314. It is essential to monitor this issue and ensure that physicians are informed about the various methods available to retrieve missing results from a patient's file. These methods include utilizing the doctor's application service, or accessible through phone calls, applications, or email communication.

In a study conducted by Hailu et al. in 2020, which aimed to evaluate Physicians' satisfaction with clinical laboratory services at public hospitals in Ethiopia, it was observed that a majority of physicians expressed satisfaction with various aspects, including the legibility and completeness of laboratory reports (61%), which is a percentage that needs improvement comparing to a result in this study was excellent with a mean of 3.41 and a SD 0.689 in terms of clarity and completeness in the final result report, which emphasizes the importance of the existence of ISO 15189.

In the context of this study, which tested the relationship between physicians' satisfaction and the quality of laboratory results it gave a significant level of $\alpha < 0.05$, this suggests that as the quality of laboratory results improves, physician satisfaction tends to rise.

**6.3.2.B. Physicians' satisfaction with accessibility to medical laboratory services**

The high rating of 90% for physician access to laboratory services signifies an outstanding level of service, suggesting that healthcare providers can easily access and utilize laboratory services when needed, which is crucial for patient care.

Additionally, their rating for receiving reports containing current and previous patient results was excellent and exceptional, with an average score of 3.51 and a standard

deviation of 0.751. This implies a high level of competence and satisfaction in handling and receiving such reports within the laboratories being evaluated.

Moreover, this study tested the relationship between physicians' satisfaction and accessibility to medical laboratory services it found a significance level of $\alpha < 0.05$. This implies that an improvement in access to services corresponds to a rise in physician satisfaction.

### 6.3.2.C. Physicians's satisfaction with the provided services

The provided information discusses various aspects of physician satisfaction with laboratory services, focusing on the impact of implementing ISO 15189, a standard designed to ensure the quality and competence of medical laboratories. The feedback and ratings from physicians indicate several key points:

I. **Communication and information Provision:** The feedback regarding communication with physicians garnered a rating of 73%, which falls within the "good" range, suggesting room for enhancement in this area. This might suggest an opportunity to establish more effective coordination or novel means of information exchange between the laboratory and physicians to further elevate the performance in this domain. It is crucial to pay close attention to these areas and ensure that physicians are consistently notified about any new examinations and implementing improvements as needed, laboratories can enhance their overall service quality and maintain positive relationships with the medical professionals who rely on their services.

   It's worth highlighting that Jericho had the lowest percentage, while Al-Eizariya and Tulkarm registered the highest percentages. This requires further investigation into the underlying factors contributing to these variations.

The procedure for informing physicians about the introduction of a new examination was rated as "very good," with an average score of 2.88 and a standard deviation of 1.06. It indicates that the majority of physicians perceive the process as effective, but there may still be opportunities for refinement to ensure that it meets the needs and expectations of all physicians.

II. **laboratory's ability to resolve complaints**: The laboratory's dedication to addressing feedback, including suggestions and complaints related to laboratory services, also received a "very good" rating, with an average score of 2.98 and a standard deviation of 0.985. It suggests that the laboratory is dedicated to actively engaging with feedback from its stakeholders, but there may be room for further enhancements to ensure that all feedback is effectively addressed and utilized for quality improvement.

III. **Clarity and Completeness of Result Reports:** The responses of physicians regarding the clarity and completeness of the final result report were excellent with a mean of 3.41 and a SD of 0.689, highlighting the high quality of these reports indicates the well for patient care, clinical decision-making, and the overall quality of healthcare services provided by the laboratory.

The consistency in the "excellent" ratings across these measures, along with relatively low standard deviations, indicates a strong consensus among physicians regarding the positive impact of ISO 15189 on laboratory services. ISO 15189 is designed to ensure the quality and competence of medical laboratories, including factors like accuracy, reliability, and documentation. These results suggest that the application of this international standard has effectively enhanced the quality of laboratory services, instilling confidence among physicians in the accuracy and utility of the laboratory data they receive.

Overall, this positive feedback reflects not only the successful implementation of ISO 15189 but also the commitment of the laboratory to maintaining high standards in delivering crucial healthcare services. It reinforces the importance of standardized quality management systems in healthcare settings, ultimately benefiting patient care and outcomes.

IV. **Availability of Examinations:** The abundance of tests offered, the total rating was 82%, indicating that these laboratories offer a wide range of tests to meet various medical needs effectively.

The availability and variety of routine examinations were rated excellent with a mean of 3.58 and a SD of 0.587, similarly, the availability and diversity of specialized examinations were also deemed excellent with a mean of 3.28 and a SD of 0.835. Furthermore, the availability of diagnostic tests for emergency and urgent cases was rated excellent with a mean of 3.24 and a SD of 0.906.

Overall, these findings highlight the importance of a well-equipped and diverse diagnostic laboratory in supporting healthcare delivery. Physicians' high ratings in these areas indicate that they have access to a wide range of tests, both for routine care and emergencies. Ensuring the availability of a comprehensive suite of tests contributes to better patient care, accurate diagnoses, and effective treatment plans.

V. **Turnaround Time and Information Provision:** Only 8.1 % of respondents had received a list of the time taken for each examination, and the majority, accounting for 91.8%, had not been provided with such a list. This needs to provide physicians with a list to help them know the time it takes to conduct this examination and the resulting acceleration of the patient's treatment.

VI. **Communication of Critical Findings:** Regarding the communication of critical findings, the rating stood at 84%, indicating a very strong performance in this

regard. This suggests that the laboratories effectively communicate critical findings to healthcare providers demonstrating a commitment to promptly addressing patients' health needs. In addition, their responses toward the speed of reporting critical results were rated excellent with a mean of 3.38 and a SD of 0.587, and the responses of physicians regarding the critical results communicated clearly, accurately, and professionally were rated excellent with a mean rating of 3.36 and a SD of 0.552, this contributes to the overall goal of providing timely and high-quality healthcare services, particularly in cases where immediate action is required to benefit patients' well-being and outcomes.

In summary, the study reveals that physicians generally have high levels of satisfaction with laboratory services, but there are areas, such as turnaround time and information provision, where improvements could be made to enhance the quality and efficiency of these services.

In a study conducted by Hailu et al. (2020), which aimed to assess Physicians' satisfaction with clinical laboratory services at public hospitals in Ethiopia, it was revealed that a significant proportion of physicians expressed satisfaction with various aspects, such as being notified of new tests (78%) and managing test interruptions (70%). Conversely, many physicians reported dissatisfaction with several factors, including the absence of a laboratory handbook (87.5%), the available test menu (68%), the lab-physician interface (62%), the availability of referral and/or backup services (62%), notification of Turn Around Time (TAT) (54%), timely notification of panic results (55%), prolonged TAT (33.1%), the provision of urgent services (67%), and timely advisory services (57%), this demonstrates the need for improvement in these domains, in other words, the areas where physicians expressed dissatisfaction highlight specific aspects of clinical laboratory services that require attention and enhancement.

This is important because addressing these areas of concern can lead to improved physician satisfaction, which, in turn, can contribute to better patient care and overall healthcare outcomes. In contrast, the results of this study, emphasize the importance of implementing ISO 15189, which reflects positively on physicians' satisfaction.

### 6.3.2.D Overall Physician's Satisfaction:

The overall satisfaction score reached with physicians an impressive 85%, they expressed excellent levels of overall satisfaction with laboratory services, with a mean of 3.41 and a SD of 0.612. This high level of satisfaction demonstrates the excellent quality of service provided within the laboratory analyzing variations through the standard deviation could offer opportunities to further enhance the quality of services and maintain this level of physician satisfaction.

The study by Khadeja et al. (2022) conducted at the Central Clinical Laboratory, Karpaga Vinayaga Institute of Medical Sciences and Research Centre in India, spanned nine months and employed a phased approach (Phase I: April-June with 30 participants from clinicians, Phase II: July-September with 70 participants from clinicians, Phase III: October-December with 50 participants from clinicians) to address and guide improvements in clinical laboratory services. Involving 150 doctors and 150 patients, the research revealed a significant increase in clinician satisfaction scores, rising from 60% in Phase I to 60.9% in Phase II and a substantial improvement to 88.2% in Phase III (p-value=0.01). So, the overall degree of clinicians' satisfaction status was 70.7%. The positive trend in clinician satisfaction was attributed to the study's design, incorporating distinct phases, and variations in sample sizes. As the study progressed, training initiatives positively impacted laboratory employees' compliance, contributing to an overall enhancement in clinician satisfaction levels. Identified areas for

improvement included turn-around time, the interface between the laboratory and hospital information system, and waiting time for specimen collection.

The study emphasized the crucial role of training interventions aligned with international standards of laboratory management in elevating satisfaction levels across phases. It underscores the effectiveness of targeted training programs and phased interventions in enhancing clinical laboratory services, ultimately contributing to the overall effectiveness of healthcare delivery. The findings highlight the ongoing need for training and continuous quality improvement initiatives in healthcare settings to meet and exceed international standards.

Additionally, another study conducted by Hailu et al. (2020), assessing Physicians' satisfaction with clinical laboratory services at public hospitals in Ethiopia, revealed that 55% of physicians expressed contentment with the overall quality of clinical laboratory services. The study identified several factors contributing to the relatively low satisfaction rate, including the absence of a laboratory handbook, an insufficient test menu, delayed notification of critical results, and a lack of prompt provision of urgent services. Additionally, deficiencies in timely advisory and expert services, along with inconsistent service quality across all working shifts, were identified as key contributors to the observed dissatisfaction.

It's worth noting that medical laboratories in Ethiopian public hospitals are overseen by qualified laboratory professionals. These professionals undergo essential technical and managerial training and undergo regular competency assessments by the requirements of ISO 15189:2012. However, the study emphasizes the importance of addressing the identified issues to enhance the overall satisfaction of physicians with clinical laboratory services.

In conclusion, the overall physician satisfaction level in this study is quite high (85%) which demonstrates that applying ISO 15189 in Medicare laboratories raises the level of physicians' satisfaction higher than what was reported in similar studies conducted in India and Ethiopia, these findings provide evidence of the positive impact of implementing ISO 15189 in medical laboratories and its significant role in enhancing the quality of medical services indicating a strong level of satisfaction among the physicians in this particular setting.

### 6.3.2.E Physicians' Awareness and Knowledge of the ISO 15189 Certificate:

Certainly, the data from **Table (5.26)** and **Table (5.27)**provide insights into physicians' awareness and knowledge regarding the International Quality Certificate, specifically the ISO 15189 certification, and its impact on the quality of medical laboratory services.

**Table (5.26)** shows that a significant majority, specifically 82.1% of physicians, were aware of the existence of the ISO 15189 Certificate about ensuring the quality of medical laboratory services. This suggests that a substantial portion of physicians had been informed about the presence of this international quality certification.

Conversely, 17.9% of physicians reported not hearing about the ISO 15189 Certificate. This lack of awareness among a minority of physicians is important as it signifies that there's a portion of the medical community potentially unaware of this particular certification and its significance in ensuring quality standards within medical laboratory services.

Moving on to **Table (5.27)**, the data reveals that a little over half, specifically 56.9% of physicians, know how the ISO 15189 certification, an international quality standard, influences the quality of medical laboratory services. This indicates that more than half

of the physicians possess some understanding of the impact this certification has on maintaining quality standards within laboratory services.

However, a substantial 43.1% of physicians admitted to lacking knowledge about how the ISO 15189 certification impacts the quality of medical laboratory services. This suggests that a significant proportion of physicians might not fully understand the direct influence of this specific international quality certification on ensuring and maintaining the quality of medical laboratory services.

In summary, while a large portion of physicians have heard about the existence of the ISO 15189 Certificate, there is a noteworthy percentage that lacks a comprehensive understanding of its direct impact on the quality of medical laboratory services. This highlights the importance of further education and dissemination of information within the medical community regarding the significance and implications of such international quality certifications in ensuring high-quality laboratory services

Furthermore, their feedback regarding whether they would recommend laboratories with international quality certification (ISO 15189) to their colleagues and patients was overwhelmingly positive, receiving an excellent rating with a mean of 3.5 and a standard deviation of 0.74. The overwhelmingly positive rating of 3.5 for the willingness of physicians to recommend laboratories possessing ISO 15189 international quality certification to their colleagues and patients is a strong indicator of the trust and credibility placed on these certified laboratories within the medical community. It highlights the importance of such certifications in influencing both medical practices and patient trust in the pursuit of high-quality healthcare services.

## 6.4 A comparison between physicians and patients satisfaction on applying ISO 15189 Standard in medical laboratories

The comparison of overall satisfaction between patients and physicians reveals that patients registered a satisfaction rate of 89%, whereas physicians reported a slightly lower rate of 85%. Moreover, there was another common domain—the quality of laboratory results. **Table (5.38)** illustrates the contrast in general satisfaction and satisfaction with the quality of laboratory results, utilizing statistical measures such as mean and standard deviation to uncover the nuanced differences between patients and physicians. Additionally, there were areas for comparison including the knowledge and awareness of ISO 15189 and its impact on the quality of medical laboratory services among both patients and physicians.

When testing a relationship between physician and patient satisfaction on applying ISO 15189 in medical laboratories using T-test a statistical analysis showed that there was a significant satisfaction among patients and physicians at (alpha < 0.05).

Also, when comparing patients' and physicians' satisfaction in general and their satisfaction with the results, statistical analysis (mean and standard deviation) found that:

- There was a significant difference in the degree of **satisfaction with the domain quality of laboratory results** between patients with a mean of 75.8% and a SD of 10.8 and physicians with a mean of 83.3% and a SD of 12.5, where the degree of satisfaction of physicians was greater than the patients and they pay more attention to this matter because it helps them to provide the correct diagnosis, upon which the appropriate medicine and treatment are given to patients.
    - There was a significant difference in the degree of overall **satisfaction from the laboratory services** between patients with a mean of 89 % and a SD of 15.5

and physicians with 85% and SD of 15.2, where the degree of satisfaction of patients is greater. This suggests that the implementation of the ISO 15189 standard may have a positive effect on patient and physician satisfaction, as patients are generally more satisfied because they are utilizing the laboratory and receiving the service there, giving them a wider perspective to assess the environment of the location and the way to deal with the reception, the laboratory, and its facilities in general. Additionally, the majority of patients are recurrent customers, contributing to their sustained contentment with the services provided.

In summary, the statistical analysis shows that ISO 15189 Standard implementation has had a significant impact on both patient and physician satisfaction with laboratory services. Patients are generally more satisfied with the overall service, but physicians are significantly more satisfied with the quality of laboratory results. These findings indicate that while both groups benefit from the ISO 15189 Standard, there are differences in their perceptions of specific aspects of laboratory services.

Regarding the knowledge and awareness of ISO 15189 and its impact on the quality of medical laboratory services among both patients and physicians. The discussion is outlined as follows:

- Awareness:

  Physicians have a higher awareness of the ISO 15189 Certificate compared to patients, 82.1% of physicians heard about it, while only 52.4% of patients were aware.

- Knowledge of Impact:

Physicians also have a higher level of knowledge about the impact of the ISO 15189 Certificate on the quality of medical laboratory services. 56.9% of physicians possess this knowledge, compared to only 47.6% of patients.

The study identifies a gap in awareness and knowledge about the ISO 15189 Certificate among patients, indicating a potential need for education on its implications for medical laboratory services. Physicians exhibit higher awareness, likely due to their professional exposure and training. In summary, the comparison reveals notable differences in awareness and knowledge between patients and physicians regarding the ISO 15189 Certificate and its influence on the quality of medical laboratory services.

## 6.5 Comparison between patients' satisfaction before and after ISO 15189 in Medicare labs

Medicare Laboratories achieved accreditation with ISO 15189 in 2017 and implemented in all branches starting from 2019. A study for comparing patient satisfaction levels before and after ISO 15189 accreditation was conducted by aligning our study's factors with previously available data. These factors were determined by referencing the information provided by the Quality Department at Medicare Laboratories, which had data for the years 2014, 2016, and 2017. Each year, the questionnaires had different sample sizes and variety in places of Medicare branches. To facilitate comparison, the average data for these three years was calculated. A comparison of specific categories of patient services before and after Medicare Laboratories obtained ISO 15189 accreditation is shown in **Figure (6.1).** This comparison aims to analyze the impact of ISO 15189 accreditation on patient satisfaction levels.

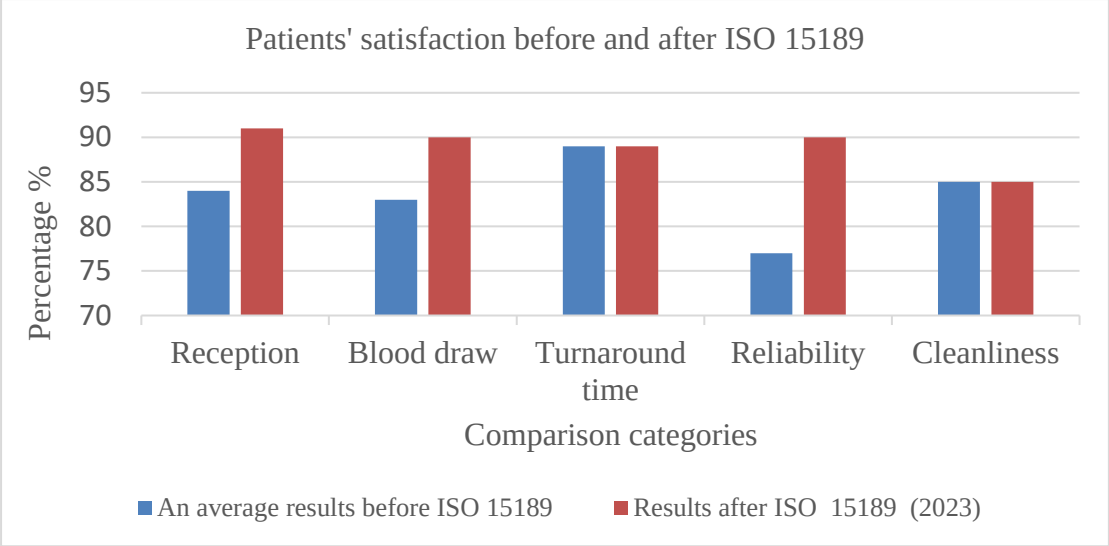


**Figure 6.1 Patient's Satisfaction befor and after ISO 15189**

This data comparing different factors before and after the implementation of ISO15189 revealed that:

- **Reception Section**: The percentage of patient satisfaction with the reception section increased from 84% before accreditation to 91% after accreditation. This suggests that patients perceived a significant improvement in the quality of reception services, which can greatly impact their overall experience.
- **Blood Draw Process**: Patient satisfaction with the blood draw process increased from 83% to 90% after accreditation. This improvement indicates a positive change in the blood draw procedure and training for staff, which is crucial for patient comfort and safety.
- **Turnaround Time for Results**: Before accreditation, 89% of patients were satisfied with the time it took to receive their results. This satisfaction rate remained consistent at 89% after accreditation. A shorter turnaround time is often associated with improved efficiency and timely medical decision-making.

- **Reliability of Results**: Patient satisfaction regarding the reliability of test results increased from 77% before accreditation to 90% after accreditation. This is a significant improvement and indicates that patients had greater confidence in the accuracy and dependability of the laboratory's results post-accreditation.
- **Cleanliness of Location**: Patient satisfaction regarding the cleanliness of the facility remained consistent at 85% both before and after the accreditation. The significance of a clean and well-maintained environment cannot be understated when it comes to ensuring patient safety and comfort.

The unchanged satisfaction rate, staying at 85% after accreditation, indicates that there was no noticeable shift in how patients perceived the cleanliness of the facility. This consistency in satisfaction rates might suggest that the accreditation did not significantly impact this specific aspect or that the standards were already being effectively maintained even before accreditation. Maintaining this level of satisfaction is crucial for upholding patient comfort and safety, highlighting the importance of ongoing efforts to sustain high cleanliness standards within the facility, regardless of accreditation status.

The general trend in these findings to a significant improvement in patient satisfaction with laboratory services across several aspects following ISO 15189 accreditation. Also, the strict quality requirements and commitment to best practices in medical laboratories are recognized as characteristics of ISO 15189 accreditation. Adopting these strict standards is responsible for the gains in patient satisfaction that have been seen, in addition, improved patient trust, improved Medicare laboratories' reputation, and perhaps even better health outcomes can all result from higher patient satisfaction since people are more inclined to use healthcare services they trust.

Furthermore, the findings also reflect positively on the Quality Department at Medicare Laboratories, whose efforts in acquiring and maintaining accreditation have resulted in noticeable improvements in patient experiences.

In summary, the data shows that patient satisfaction with laboratory services has increased significantly and favorably as a result of ISO 15189 accreditation. These advancements show Medicare Laboratories' dedication to delivering high-quality care and observing global standards, which ultimately serves the interests of both patients and the healthcare organization as a whole through the implementation of quality management standards in their medical laboratories.

## 6.6 Conclusion

This study aims to assess Physicians' and patients' satisfaction with the implementation of ISO 15189 in Palestinian Medicare Private Medical Laboratories.

The key findings include a positive correlation between patients' satisfaction and factors like the work environment, quality of laboratory results, and ease of access to medical services in private medical laboratories that applied ISO15189. Patients also reported a high overall satisfaction rate of 89%. However, there was no significant relationship between patients' satisfaction and certain socio-demographic variables, as well as no significant relationship between their education and their awareness and knowledge about the ISO 15189 certificate and its impact on the quality of medical laboratory services.

Moreover, the study found a positive relationship between Physicians’ satisfaction with the quality of laboratory results and accessibility to medical laboratory services in private medical laboratories that applied ISO 15189, in addition to a level of overall

satisfaction with laboratory services was high with a rate of 85%, also the study found that there was no relationship between physicians' satisfaction and socio-demographic variables

Furthermore, the study findings revealed the positive impact of implementing ISO 15189 on the quality of medical service, which encourages policymakers to strive to apply ISO 15189 in Palestinian medical laboratories as a tool of assessment to ensure that national medical laboratories are meeting and maintaining high standards of practice.

## 6.7 Recommendation

This study contributes significant insights into the limited literature on patients' and physicians' satisfaction with the implementation of ISO 15189 in private medical laboratories, particularly in Palestine. The findings underscore the significance of adopting ISO 15189 standards in medical laboratories, emphasizing its role in elevating the quality of medical laboratory services, which, in turn, has a positive effect on healthcare and the well-being of patients.

Based on the findings of the study, the following recommendations are made.:

1. Implementation of ISO 15189 Standards: According to the study, medical laboratories in Palestine, particularly private ones, should consider applying ISO 15189 standards. This step is seen as essential for enhancing the quality of laboratory services.
2. Quality improvement: Laboratories should focus on improving the quality of laboratory results. This can be accomplished through adherence to ISO 15189 standards, which emphasize stringent quality control and quality assurance measures.

3. Work Environment: Laboratories should make it a top priority to establish a supportive work environment. This may encompass enhancements in the laboratory's infrastructure and facilities to guarantee efficient and precise service provision. Special attention should be given to accommodating individuals with specific needs, such as the provision of accessible bathrooms. Furthermore, it is crucial to prioritize the installation of elevators and the design of corridors to ensure easy and convenient access to the laboratory.
4. Access to Services: Efforts should be made to ensure that medical laboratory services are easily accessible mainly geographically accessible places with available public and private transportation. This includes simplifying processes and lowering obstacles to service access.
5. Education and awareness: Initiatives should be launched to raise awareness among patients and physicians about ISO 15189 standards and their importance and impact on the quality of laboratory services This can aid in improving understanding and appreciation of these requirements.
6. Policymakers should be aware of the favorable impact of ISO 15189 implementation on the quality of medical services. They should think about encouraging and motivating the implementation of these standards throughout the medical laboratories on a national scale.

In summary, the study recommends that implementing ISO 15189 standards, along with improvements in laboratory quality, work environment, and access to services, can lead to higher satisfaction levels among patients and physicians. Additionally, education, and awareness, should be integral to these efforts. Policymakers are encouraged to support and facilitate the adoption of ISO 15189 as a means to enhance healthcare quality in medical laboratories in Palestine.

## 6.8 Limitations of the study

I. There are no physicians' satisfaction data available before Medicare laboratories obtained ISO 15189 for comparison after the laboratories obtained ISO 15189 in 2019.

II. Lack of related local studies and literature about physicians' and patients' satisfaction with the implementation of ISO 15189 in private medical laboratories.

III. There are few related international studies and literature about physicians' and patients' satisfaction with the implementation of ISO 15189 in medical laboratories.

IV. The study utilized a convenience sampling method in selecting physicians and patients, introducing a potential weakness due to the lack of randomization and the risk of sample bias. However, the study overcomes this issue by the sample variation in key demographic factors such as age, sex, years of experience, and education levels among the participants. This approach aimed to enhance the representativeness of the convenience sample, thereby strengthening the study's validity.

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# Annexes

## Annex 1: Arabic patient's questionnaire

**القسم الثاني** :

العمر :

☐ 28- 18 ☐ 39-29 ☐ 50-40 ☐ 50 سنة فما فوق

الجنس :

☐ ذكر ☐ انثى

مكان الاقامة :.....

المهنة :.....

ما هو التحصيل العلمي الخاص بك ؟

☐ ابتدائي ☐ ثانوي ☐ بكالوريوس ☐ ماجستير ☐ دكتوارة

ما هو عدد زياراتك في السنة الاخيرة للمختبر ؟

☐ الزيارة الاولى ☐ 2-5 ☐ اكثر من 5

هل تمتلك تأمين صحي

☐ تأمين خاص ☐ تأمين حكومي ☐ على حسابك الخاص

**القسم الثالث:**

## أولاً: سهولة الوصول للمختبر

| الرقم | البند | ممتاز | جيد جيداً | جيد | محايد | ضعيف |
|---|---|---|---|---|---|---|
| 1 | وجود مواصلات متاحة وسهله للوصول الى موقع المختبر | | | | | |
| 2 | وجود لوحات اعلانية تساعد في الاستدلال على المختبر | | | | | |
| 3 | المختبر موجود في مبنى تتوفر فيه امكانيات الوصول بسهولة (مصعد ،درج، طابق أرضي) | | | | | |
| 4 | امكانية وسهولة الوصول للمختبر للأشخاص الذين هم بحاجة للمساعدة الحركية (مواءمة لذوي الاحتياجات الخاصة ) | | | | | |

## ثانياً: مكان الانتظار قبل تلقي الخدمة

| الرقم | البند | ممتاز | جيد جيداً | جيد | محايد | ضعيف |
|---|---|---|---|---|---|---|
| 1 | مكان الانتظار نظيف و مرتب | | | | | |
| 2 | مساحة مكان الانتظار | | | | | |
| 3 | توفر كراسي للجلوس مريحة اثناء الانتظار | | | | | |
| 4 | توفر اضاءة وتهوية مناسبه | | | | | |

## ثالثاً: - المرافق الصحية:

| الرقم | البند | ممتاز | جيد جيداً | جيد | محايد | ضعيف |
|---|---|---|---|---|---|---|
| 1 | توفر حمامات منفصلة للنساء والرجال | | | | | |
| 2 | توفر حمامات مواءمة لذوي الاحتياجات الخاصة | | | | | |
| 3 | نظافة المرافق الصحية | | | | | |
| 4 | توفر الصابون و المحارم في المرافق الصحية | | | | | |

**رابعاً: قسم الاستقبال :**

| الرقم | البند | ممتاز | جيد جيداً | جيد | محايد | ضعيف |
|---|---|---|---|---|---|---|
| 1 | ارتداء موظف استقبال المختبرالزي الرسمي المريول الابيض و بطاقة التعريف | | | | | |
| 2 | كيف تقيم سرعة استقبالك في منطقة الاستقبال | | | | | |
| 3 | استجابة موظف الاستقبال عن استفساراتك ووضوح المعلومة المقدمة قبل جمع العينة | | | | | |
| 4 | تعامل موظف الاستقبال من حيث الاحترام والاهتمام(لباقة الحديث) | | | | | |
| 5 | توفر الفحوصات المطلوبة | | | | | |

**خامساً: سحب الدم :**

| الرقم | البند | ممتاز | جيد جيداً | جيد | محايد | ضعيف |
|---|---|---|---|---|---|---|
| 1 | توضيح المعلومة والشروط للفحص ان وجدت (مدة الصيام , الامتناع عن تناول ادوية او فيتامينات لفحوصات معينة ) قبل عملية سحب الدم | | | | | |
| 2 | لبس القفازات وتعقيم يد المريض قبل سحب عينة الدم | | | | | |
| 3 | توضيح المعلومة خلال عملية سحب الدم (مد اليد بشكل افقي . قبض وبسط اليد ) | | | | | |
| 4 | توفر الخصوصية اثناء عملية سحب الدم | | | | | |
| 5 | توضيح المعلومة بعد سحب الدم (الضغط على منطقة سحب الدم لحين التأكد من توقف نزول الدم ) | | | | | |
| 6 | مهارة الفني في سحب الدم | | | | | |

**سادساً: النتائج**

| الرقم | البند | ممتاز | جيد جيداً | جيد | محايد | ضعيف |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | كيف تقيم موعد استلام النتائج في الوقت االمتفق عليه | | | | | |
| 2 | كيف تقيم درجة ثقتك في مصداقية النتائج المخبرية | | | | | |
| 3 | كيف تقيم طريقة حصولك على النتيجة | | | | | |
| 4 | خدمة حصولك على النتيجة السابقة للفحص مرفقة مع النتيجة الحالية | | | | | |
| 5 | خدمة حصولك على سجل النتائج السابقة عند الطلب | | | | | |

5- هل سبق ان واجهت مشكلة في فقدان عينة مخبرية و عدم حصولك على نتيجة الفحص ؟

☐ غالباً ☐ احياناً ☐ نادراً ☐ ابداً

## سابعاً : عن المختبر

1- ما هي الطريقة التي تفضلها في استلام نتائج الاختبار

☐ باليد ☐ عبر الايميل ☐ واتس اب ☐ تطبيقات الهواتف ☐ الطبيب

2- تعدد طرق تسليم النتائج الطبية المخبرية :

☐ ممتاز ☐ جيد جداً ☐ جيد ☐ محايد ☐ ضعيف

3-هل سبق وان سمعت عن شهادة الجودة الدولية (شهادة الايزو 15189) لجودة الخدمات المخبرية الطبية ؟

☐ نعم ☐ لا ☐ محايد

4-هل لديك معرفة عن مدى تأثير شهادة الجودة الدولية (شهادة الايزو 15189 على جودة خدمات االمختبرات الطبية ؟

☐ نعم ☐ لا ☐ محايد

5- ما تقييمك لمستوى رضاك عن خدمات المختبر ؟

☐ ممتاز ☐ جيد جداً ☐ جيد ☐ محايد ☐ ضعيف

6- هل توصي اقرباء و اصدقاء للقدوم والاستفادة من خدمات المختبر ؟

☐ دائماً ☐ غالباً ☐ احياناً ☐ نادراً ☐ ابداً

**Annex 2: Arabic physician's questionnaire**

**القسم الثاني**

العمر :.....

مكان ومنطقة العمل :.....

التخصص :.....

الجنس :

☐ ذكر ☐ انثى

سنوات خبرة العمل:

☐ 5-1 ☐ 10-6 ☐ 15-11 ☐ 20-16 ☐ 25-21 ☐ اكثر من 25

**القسم الثالث :**

**أولاً : التواصل**

| الرقم | البند | ممتاز | جيد جيداً | جيد | محايد | ضعيف |
|---|---|---|---|---|---|---|
| 1 | كيف تقيم عملية تبليغك بتوفر فحص جديد | | | | | |
| 2 | كيف تقيم جدية المختبر في معالجة اقتراحاتك والشكاوى المقدمة والمتعلقة بالخدمات المخبرية | | | | | |

3- ما الطريقة التي تفضلها لإعلامك عند توفر فحص جديد ؟

☐ عبر الهاتف ☐ عبر الايميل ☐ الحضور للعيادة ☐ عبر وسائل التواصل الاجتماعي

4- ما هي الطريقة التي تفضلها لتواصل ادارة المختبر مع الاطباء ؟

☐ عبر الهاتف ☐ عبر الإيميل ☐ الواتس اب ☐ الحضور للعيادة

**ثانياً: وفرة الفحوصات**

| الرقم | البند | ممتاز | جيد جيداً | جيد | محايد | ضعيف |
|---|---|---|---|---|---|---|
| 1 | كيف تقيم وفرة وتنوع الفحوصات الروتينية المطلوبة | | | | | |
| 2 | كيف تقيم توفر وتنوع الفحوصات التخصصية | | | | | |
| 3 | كيف تقيم توفر الفحوصات التشخيصية للحالات الطارئة والمستعجله | | | | | |
| 4 | كيف تقيم الوقت المستغرق لعمل الفحوصات التشخيصية الطارئة و المستعجلة | | | | | |

**ثالثا : نتائج المختبر**

1- كيف تقيم نموذج تقريرالنتيجة النهائي من حيث الوضوح و الاكتمال ؟

☐ ممتاز ☐ جيد جداً ☐ جيد ☐ محايد ☐ ضعيف

2 - ما هي الطريقة التي تفضلها في استلام نتائج فحوصات مرضاك ؟

☐ عبر الهاتف ☐ عبر الايميل ☐ واتس اب ☐ تطبيقات الهواتف ☐ من خلال المريض

3 -هل المدة الزمنية لصدور نتائج الفحوصات تتناسب مع الحالات الطبية لمرضاك ؟

☐ مناسبة دائماً ☐ مناسبة غالباً ☐ مناسبة ☐ مناسبة أحياناً ☐ غير مناسبة

4-هل تم تزويدكم بقائمة بالوقت المستغرق لكل فحص ؟

☐ نعم ☐ لا ☐ محايد

5- كيف تقيم درجة ثقتك في مصداقية النتائج المخبرية ؟

☐ ممتاز ☐ جيد جداً ☐ جيد ☐ محايد ☐ ضعيف

6- من العوامل التي تعزز مصداقية النتائج المخبرية (يمكن اختيار) اكثر من خيار واحد ؟

1-توافق التشخيص مع نتيجة الفحص المطلوب 2-اعادة الفحص 3- وجود معايرالاعتماد الدولية

4-وجود اجهزة حديثة 5-مراقبة شهادة الاعتماد الدولية (الايزو ) 6- وجود عينات مراقبة الجودة الخارجة و الداخلية 7- جميع ما ذكر

7- كيف تقيم الحصول على تقرير يحتوي على نتائج المرضى الحالية و السابقة ؟

☐ ممتاز ☐ جيد جداً ☐ جيد ☐ محايد ☐ ضعيف

8- كيف تقيم درجة توافق النتائج المخبرية مع الوضع السريري للمريض؟

☐ ممتاز ☐ جيد جداً ☐ جيد ☐ محايد ☐ ضعيف

**رابعا: النتائج الحرجة**

هل سبق أن تم ابلاغك بنتائج حرجة ؟

☐ نعم ☐ لا

اذا كانت اجابتك نعم اجب عن التالي :

أ - كيف تقيم سرعة الابلاغ عن النتائج الحرجة؟

☐ ممتاز ☐ جيد جداً ☐ جيد ☐ محايد ☐ ضعيف

ب - ما هي الطريقة المناسبة لك عند التبليغ عن النتائج الحرجة ؟

☐ عبر الهاتف ☐ الواتس اب ☐ الحضور للعيادة ☐ بواسطة المريض اواحد من افراد العائلة

ج - هل يتم الإبلاغ عن النتائج الحرجة بوضوح ودقة ومهنية ؟

☐ دائماً ☐ غالباً ☐ أحياناً ☐ نادراً ☐ أبداً

**خامسا: فقدان النتائج :**

1 - هل سبق ان فقدت نتيجة لاحد من مرضاك ؟

☐ كثيراً ☐ أحياناً ☐ نادراً ☐ أبداً

2- كيف تقيم آلية الحصول على نسخة ثانية للنتيجة المفقودة ؟

☐ متوفر بسهولة ☐ متوفر بصعوبة ☐ غير متوفر

## سادسا : شهادة جودة المختبرات الطبية الدولية (ايزو 15189)

1-هل سبق وان سمعت عن شهادة الجودة الدولية (شهادة الايزو 15189) لجودة الخدمات المخبرية الطبية ؟

☐ نعم ☐ لا ☐ محايد

2-هل لديك معرفة عن مدى تأثير شهادة الجودة الدولية (شهادة الايزو 15189 على جودة خدمات االمختبرات الطبية؟

☐ نعم ☐ لا ☐ محايد

3-كيف تقيم تأثير حصول المختبرات على شهادة الجودة الدولية (شهادة الايزو 15189 ) على **موثوقية النتائج المخبرية ؟**

☐ ممتاز ☐ جيد جداً ☐ جيد ☐ محايد ☐ ضعيف

4-كيف تقيم تأثير حصول المختبرات على شهادة الجودة الدولية (شهادة الايزو 15189 ) على **الخدمات المخبرية المقدمة للأطباء ؟**

☐ ممتاز ☐ جيد جداً ☐ جيد ☐ محايد ☐ ضعيف

ج- ما تقييمك لمستوى رضاك عن خدمات المختبر بشكل عام ؟

☐ ممتاز ☐ جيد جداً ☐ جيد ☐ محايد ☐ ضعيف

د- هل توصي زملائك الأطباء و المرضى بالتعامل مع مختبرات حاصلة على شهادة الجودة الدولية (أيزو 15189)؟

☐ دائماً ☐ غالباً ☐ أحياناً ☐ نادراً ☐ أبداً

**Annex 3: Panel of Experts**

| NO. | Name | Workplace | Qualification |
|---|---|---|---|
| 1 | Dr. Khalid Younis | Al-Quds University | Khalid Younis<br>Assist. Professor of Clin. Hematology<br>Al-Quds University<br>Thalassemia and Hemophilia Activist<br>Palestine |
| 2 | Mr.Ibrahim Ghannam | Al-Quds University | Ibrahim Ghannam, M.Sc.<br>Lecturer, Faculty of Health Professions<br>Al-Quds University |
| 3 | Dr.Yacoub Dhaher | Hebron University | Yacoub Dhaher, MT. PhD<br>Faculty of Pharmacy and Medical Sciences<br>Hebron University |
| 4 | Dr.Mohammed Qaisiya | Hebron University | Mohammed Qaisiya, Ass. Prof. of Molecular Biomedicine<br>Head of Department, Laboratory Medical Sciences<br>College of Pharmacy and Medical Sciences<br>Hebron University |

## Annex 4: Approval of the Scientific Research Ethics Committee


**Al-Quds University**
**Jerusalem**
**School of Public Health**

**جـامـعـة الـقـدس**
**القدس**
كلية الصحة العامة


**التاريخ: 31/1/2023**

**عزيزتي الطالبة دينا ابو زياد المحترمة**
**برنامج ماجستير السياسات والادارة الصحية**

**الموضوع: موافقة لجنة اخلاقيات البحث العلمي**

قامت اللجنة الفرعية لأخلاقيات البحث التابعة لكلية الصحة العامة بمراجعة مشروع الرسالة بعنوان:
**" Assessment of Physicians' and patients' satisfaction with the implementation of ISO 15189 in Palestinian private medical laboratories."**
المقدم من (مشرف البحث/د. بثينة السرخي).
يعتبر مشروعك مستوفيًا لمتطلبات أخلاقيات البحث في جامعة القدس.
نتمنى لكم كل التوفيق في تسيير المشروع.
ملاحظة: في حالة الحاجة الى موافقة من اللجنة المركزية في الجامعة، تستطيع التقدم باستخدام هذه الموافقة على الرابط.https://research.alquds.edu/en/ethics/48-how-to-apply.html

**رئيسة اللجنة الفرعية لاخلاقيات البحث**
**كلية الصحة العامة**
**د. نهى الشريف**

نسخة/ أعضاء لجنة البحث
نسخة/ الملف


**Jerusalem Branch/Telefax 02-2799234**
**Gaza Branch/Telefax 08-2644220 -2644210**
**P.O. box 51000 Jerusalem**

فرع القدس / تلفاكس 02-2799234
فرع غزة / تلفاكس 08-264420-2644210
ص.ب. 51000 القدس

## Annex 5: Approval from Director General of Medicare Laboratories

Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة

التاريخ: 2023/3/27

حضرة الدكتور بشار الكرمي المحترم
المدير العام لمختبرات ميديكير

الموضوع: تسهيل مهمة للطالبة دينا مروان أبو زياد

تحية طيبة وبعد،،

تقوم الطالبة دنيا مروان أبو زياد/ برنامج ماجستير السياسات والإدارة الصحية/ كلية الصحة العامة/ جامعة القدس بإجراء بحث الرسالة بإشراف د. بثينة السرخي وبعنوان:

Assessment of Physicians' and patients' satisfaction with the implementation of ISO 15189 in Palestinian private medical laboratories

وهي دراسة بحثية تهدف الى تقييم رضا الأطباء والمرضى في تطبيق الايزو 15189 (شهادة الجودة الدولية) في المختبرات الطبية الخاصة في فلسطينية وقد اعتمد هذا البحث لوجود نقص في الأبحاث بهذا الموضوع، وتم اختيار مختبرات الميديكير الاخذ عينة الدارسة، والطالبة بحاجة الى توزيع استبانة الدراسة على الاطباء المحولين المرضى والمرض المتوجهين الى المختبر لإجراء الفحوصات، لذا نرجو من حضرتكم السماح لها بتوزيع الاستبانة على عينة الدراسة، علما بان المعلومات ستكون لأغراض البحث العلمي فقط.

وتفضلوا بقبول فائق الاحترام،

د. عازر أغا
عميد كلية الصحة العامة

نسخة: الملف

Jerusalem
P.O.Box 51000
Telefax +970-2-2799234
Email: sphealth@admin.alquds.edu

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ص.ب. 51000 القدس
البريد الالكتروني: sphealth@admin.alquds.edu

## Annex6: Consent form for patient's

### القسم الأول

### نموذج الموافقة

**عنوان الدراسة**: تقييم رضى الأطباء والمرضى عن تطبيق الايزو15189 في المختبرات الطبية الخاصة في فلسطين .

**Assessment of Physicians' and patients' satisfaction with the implementation of ISO 15189 in Palestinian private medical laboratories**

انا طالبة دراسات عليا في برنامج السياسات والادارة الصحية في جامعة القدس . لقد تم اختيارك لمشاركتي في دراستي البحثية حيث ان الهدف منها هو تقييم رضى الأطباء والمرضى عن تطبيق الايزو 15189 (شهادة الجودة الدولية ) في المختبرات الطبية الخاصة في فلسطين وتم اختيار الموضوع لوجود نقص في الابحاث حول هذا الموضوع . المشاركة تطوعية فإذا اخترت المشاركة في الدراسة ، فسوف يستغرق الأمر من 10 إلى 15 دقيقة تقريبًا من وقتك وسيتم اخفاء هوية المشارك في هذه الدراسة . ستكون إجابتك عن اسئلة متعلقة بالعمر، الجنس ، مكان الإقامة ، المستوى التعليمي و المهنة ، إلخ ، و كذلك الخدمات المقدمة للمرضى ، جودة نتائج الفحوصات والوصول إلى خدمات المختبرات الطبية. الحد الأدنى لمن المشاركة هو 18 عامًا. لكم الحرية في عدم المشاركة أو الانسحاب من الدراسة. اذا رغبت في الانسحاب يمكنك ذلك في أي وقت تريده ، أي معلومات مقدمة من قبلك سيتم إلغائها و ستبقى جميع اجاباتك في غاية السرية . فقط أولئك الذين يشاركون بشكل مباشر في هذا المشروع سيكون لهم حق الوصول إلى البيانات. سوف تتخذ جميع الخطوات لحماية هويتك. يمكنك تخطي أي سؤال لا ترغب بالاجابة عليه. لا توجد مخاطر متوقعة في هذه الدراسة. إذا كان لديك أية أسئلة حول الدراسة ، يرجى التواصل معي عبر الايميل .

dina.zayyad@students.alquds.edu

دينا أبو زياد

شكرًا لك على الوقت الذي قضيته في مساعدتي في هذا البحث.

## Annex 7: Consent form for physicians

### القسم الأول

### نموذج الموافقة

**عنوان الدراسة**: تقييم رضى الأطباء والمرضى عن تطبيق الايزو15189 في المختبرات الطبية الخاصة في فلسطين .

**Assessment of physicians' and patients' satisfaction with the implementation of ISO 15189 in Palestinian private medical laboratories**

انا طالبة دراسات عليا في برنامج السياسات والادارة الصحية في جامعة القدس . لقد تم اختيارك لمشاركتي في دراستي البحثية حيث ان الهدف منها هو تقييم رضى الأطباء والمرضى عن تطبيق الايزو 15189 (شهادة الجودة الدولية ) في المختبرات الطبية الخاصة في فلسطين وتم اختيار الموضوع لوجود نقص في الابحاث حول هذا الموضوع . المشاركة تطوعية فإذا اخترت المشاركة في الدراسة ، فسوف يستغرق الأمر من 10 إلى 15 دقيقة تقريبًا من وقتك وسيتم اخفاء هوية المشارك في هذه الدراسة . ستكون إجابتك عن اسئله متعلقه بالعمر، الجنس ، مكان الإقامة ، التخصص وسنوات الخبرة و الخدمات المقدمة للأطباء ، و جودة نتائج الفحوصات والتواصل مع الاطباء والوصول إلى خدمات المختبرات الطبية. والحد الأدنى لسن المشاركة هو 18 عامًا. لكم الحرية في عدم المشاركة أو الانسحاب من الدراسة. اذا رغبت في الانسحاب يمكنك ذلك في أي وقت تريده ، أي معلومات مقدمة من قبلك سيتم إلغائها و ستبقى جميع اجاباتك في غاية السرية . فقط أولئك الذين يشاركون بشكل مباشر في هذا المشروع سيكون لهم حق الوصول إلى البيانات. سوف تتخذ جميع الخطوات لحماية هويتك. يمكنك تخطي أي سؤال لا ترغب بالاجابة عليه. لا توجد مخاطر متوقعة في هذه الدراسة. إذا كان لديك أية أسئلة حول الدراسة ، يرجى التواصل معي عبر الايميل.

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شكرًا لك على الوقت الذي قضيته في مساعدتي في هذا البحث.

التاريخ: