



**An-Najah National University**  
**Faculty of Graduate Studies**

**ASSESSMENT OF OPTOMETRY SERVICES IN  
THE NORTHERN DISTRICTS OF THE WEST  
BANK - PALESTINE**

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**This Thesis is Submitted in Partial Fulfillment of the Requirements for the Degree  
of Master of Public Health Management, Faculty of Graduate Studies, An-Najah  
National University, Nablus-Palestine.**

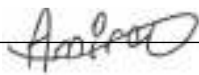
**2022**

# ASSESSMENT OF OPTOMETRY SERVICES IN THE NORTHERN DISTRICTS OF THE WEST BANK - PALESTINE

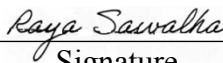
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## **Dedication**

I dedicate this research to my father Faysal Dawwas, mother, brothers, and sister.

To my husband Ghassan Sabbagh, and my daughters Orjwan, Yasmine, and Kinda.

To my family, friends, teachers, and everyone who wished me well.

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My husband, my family, and my in-laws, I cannot thank you enough. You were a real supporter of mine during my study period. I thank you all.


## Declaration

I, the undersigned, declare that I submitted the thesis entitled:

### **ASSESSMENT OF OPTOMETRY SERVICES IN THE NORTHERN DISTRICTS OF THE WEST BANK - PALESTINE**

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

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Date: 08/12/2022

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## Abstract

**Introduction:** optometry is the profession that provided vision and eye examinations and eye care services by optometrists, in addition to the role of providing awareness and eye health guidance. This study aimed to assess the optometry services provided in the Northern Districts of the West Bank (Jenin, Tubas, Nablus, Tulkarm, Qalailyah, and Salfit).

**Method:** a descriptive cross-sectional study, was conducted between November and December 2021, selecting the target group consisting of all optometrists holding a diploma or higher who provide optometry services in the Northern Districts of the West Bank. The participants were 94 optometrists who answered a questionnaire prepared from three previous studies and filled out by the researcher in face-to-face interviews.

**Results:** (72.2%) of optometrists were females, (85.2%) of them had a bachelor's degree or higher, while the private sector provided (97.9%) of optometry services. Optometry services such as subjective refraction, contact lens fitting, and spectacles dispensing were the most provided. However, differences in services provided according to workplace and optometrists' qualifications were found. (14.8%) of optometrists in private optometry, centers provided cycloplegic refraction while (84.6%) of optometrists in hospitals. Furthermore, only (7.7%) of diploma holders and (26.3%) of BSc used diagnostic drugs. Insufficient continuing training was the first barrier faced by optometrists (93.6%), and it had significant associations with gender and qualification. While the economic and political problems barrier was a barrier for optometrists working in private optometry centers (93.8%) and those in other workplaces (38.5%). Optometrists recommended expanding the scope of optometry practice in Palestine and letting optometrists provide vision services in primary health care centers of PMOH.

**Conclusion:** Optometrists in Palestine practice the technology services category and visual function services category in the Model of Scope of Practice in Optometry by the WCO, in absence of ocular diagnostic and ocular therapeutic services categories. That requires expanding optometry scope of practice according to the quality of optometry education in Palestine, in addition to developing continuous training programs to deal with the insufficient training as a barrier faced by optometrists and prevent them from improving their skills.

**Keywords:** Eye care services; Optometrist; Optometry; Palestine; Scope.

# Chapter One

## Introduction and Theoretical Background

### 1.1 Background

Following the increasing number of vision loss and visual impairment cases worldwide, (1 billion) people in the world in 2020 had distance vision impairment or blindness, (2.8 million) blindness cases, and (101 million) moderate to severe vision impairments were due to uncorrected refractive errors, and (826 million) people had near vision impairment due to presbyopia (Bourne et al., 2021). These significant numbers about the prevalence of visual problems show the huge need for primary eye care services that optometrists provide around the world (WHO). In recent years, optometry has become an important profession in our country, especially since optometry has become more prominent among other professions in the world in terms of interest in raising the level of academic education for specialists and practical efficiency through continuous training, in addition to interest in providing optics and eye health services in high-quality and equity and facilitating access to them. While the expansion of private sector roles and self-employed private practitioners in the provision of optometry services led to an increase in employment rates, it also led to the introduction of optometry, which increased the competition in the optical sector and brought the quality of services issue to the forefront.

According to a survey conducted between July 2018 and April 2019, about 130,000 Palestinians who are 50 years old and more complained of avoidable blindness and visual impairments. This survey showed the most common causes of blindness and visual impairments in Palestine were Diabetic Retinopathy and Cataracts (St John Eye Hospital Group, The Fred Hollows Foundation, 2020).

To encourage the profession of optometry, many countries have made structural and legal arrangements for education, training, scope, and private sector interventions. However, due to the direct impact of the economic and cultural structures of the countries on the profession of optometry, each country has developed in different dimensions. The problems encountered in the profession of optometry have been newly identified and solutions have begun to be produced both in public and non-governmental organizations (Ecoo, 2020).

According to the World Council of Optometry (WCO), optometry is the work of the graduates of the optometry college, which provides the optical equipment designed for the correction and elimination of vision disorders and has been trained at a level that can ensure its application to the patient, with the title of the optometrist. An optometrist can prepare and apply optical instruments (glasses, contact lenses, etc.) used to eliminate or alleviate vision disorders according to a patient's prescriptions diagnosed by an optometrist or ophthalmologist (WCO, 2022.)

An optometrist who has at least 4 years of university education in optometry sciences, can perform full eye examination, refractive tests and fit spectacles and contact lenses, perform low-vision tests and fit low-vision appliances, in some cases optometrist can detect ocular pathology, monitor cataract, and glaucoma cases, in addition, to applying diagnostic tests and imaging like perimetry, optical coherence tomography (OCT), corneal topography, fundus fluorescein angiography (FFA), and in special cases Tonometry. In such cases optometry refers the patient to the ophthalmologist or eye hospital, Optician can fit corrective spectacles according to the prescription of the optometrist or ophthalmologist. Some opticians with more education can perform refraction and fit corrective spectacles, which may be called refracting opticians (Ecoo, 2020).

### **1.1.1 The scope of optometry worldwide:**

The scope of optometry differs from one country to another. To identify the comparison in the scopes of optometry, the WCO produced “a Global Competency-Based Model of Scope of Practice in Optometry” (WCO, 2022). The model consists of four categories, the first is related to the optician, the second category, third, and four are related to the optometrist.

The first category called optical technology services is concerned with optical instruments that have been described to improve vision, optical glasses, spectacles dispensing, and low-vision appliances dispensing (WCO, 2022).

The second category called visual function services, it contains the first category plus visual examinations, refraction, and contact lens fitting (WCO, 2022).

The third category is called ocular diagnostic services, it contains the first and second categories plus the ability to perform eye examinations for ocular pathology, diagnose ocular diseases and use diagnostic drugs (WCO, 2022).

The fourth category called ocular therapeutic services contains the first, second, and third categories plus the ability to use pharmaceutical agents and prescribe therapeutic drugs to manage ocular diseases and injuries (WCO, 2022).

In Europe, the WCO competency model is adopted, but differences in categories adaptation are found. Some countries apply the first category only such as France and Turkey; others apply first and second for example Italy, Greece, Belgium, and Poland. Countries that apply the third category are Spain, Germany, Switzerland, and some others. The only European country that applies the fourth category is the United Kingdom (Ecoo, 2020).

Some countries like the United Kingdom and Canada permit all vision primary care tests. In these countries, the optometrist can sell optical appliances, perform subjective and Cycloplegic refraction for adults and children, prescribe spectacles and dispensing, prescribe contact lenses and fitting, perform binocular vision tests and orthoptics, examine the interior and exterior eye, do ophthalmoscopy, tonometry, perimetry, test low-vision patients and prescribe low-vision aids, detect ocular pathology, use diagnostic and therapeutic drugs, deal with pre and post evaluation of refractive surgery, and refer cases to ophthalmologist and eye hospital ((Ecoo, 2020; Ontario, 2021). In Sweden and Switzerland, all of the previously mentioned services are permitted except prescribing therapeutic drugs is prohibited (Ecoo, 2020). Although in India, Singapore, and Australia the prescription of medication by optometrists is prohibited (De Souza et al., 2012; Ecoo, 2020; George et al., 2019) optometrists practice it.

In addition to medication prescription prohibition by optometrists in Australia, orthoptics, and detecting ocular pathology, using diagnostic drugs is also prohibited. In Turkey only selling optical appliances and spectacles dispensing are permitted for optometrists. In Poland and Serbia, all previously mentioned optometric services are prohibited, but optometrists practice them under prohibition (Ecoo, 2020).

## **The optometrists to population ratio**

The World Health Organization in vision 2020 recommended the optometrists to population ratio to be 1 optometrist for 50,000 population in developing countries, and 1 optometrist for 10,000 population in developed countries (Naidoo et al., 2022). The optometrist to population ratio is different around the world, in Central Europe the ratio is (1: 18374), Eastern Europe (1: 55975), High income in North America (1:8679), Central Sub-Saharan Africa (1: 1198141), East Asia (1: 34704), high income Asia Pacific (1: 3889), and North Africa and the Middle East (1: 31438) (Naidoo et al., 2022).

### **1.1.2 Primary eye care and role of optometry**

Optometry is the point where the patient enters the visual health care system. All optometrists are primary care optometrists, they provide examinations of visual health, the only exceptions are specialized optometrists like pediatric optometrists, and low-vision optometrists who receive referrals from other optometrists (Grosvenor, 2007). Optometrists are preventing visual impairments and blindness; also they are providing optometry services to eliminate ocular morbidity (Murthy & Raman, 2009) primary eye care services are as follows (Murthy & Raman, 2009):

1. Ocular health knowledge promotion.
2. Visual acuity examinations.
3. Visual refraction examination.
4. Vision screening to detect asymptomatic ocular anomalies, such as cataracts, glaucoma, and diabetic retinopathy for patients with non-communicable diseases. Refraction for preschool children and aging people. Retinopathy of prematurity for premature infants.
5. Diagnosing of ocular diseases.
6. Referral cases are timely for more investigations.

### **Ocular Examinations and Related Instruments**

To diagnose the disease, some tests and equipment are needed to find out the appropriate treatment. The eye examination begins with the patient's medical and visual history, visual acuity test, ocular motility and binocular vision tests, color vision tests, screening of visual field, tonometry examination, and external and internal eye

examinations. These examinations require equipment, which may be small pieces like a record sheet, pen torch, and visual acuity near chart or maybe big like slit-lamp biomicroscopy (Grosvenor, 2007) see Appendix (A).

### **1.1.3 Optometry in Palestine**

In Palestine, the optometry profession was regulated by the Ministry of Health only until the foundation of the Palestinian Council of Optometry (PCO) in 2005. The optometry profession became better organized due to this cooperation. Optometry Council and MOH developed regulations for optometry practice, and practice certificates for different qualifications, in addition to the conditions for starting new optometry works, also improve the supervision and monitoring of optometry practice in different workplaces that provide optometry services. Furthermore, Optometrists become to have a platform for caring for their issues. Besides holding conferences and lectures that include Palestinian and international optometrists, which increases knowledge and science in the field of optometry and the exchange of experiences. In the past, optometrists inherited the profession from their fathers and grandfathers, until the profession became confined to a few families in Palestine, and they practiced the profession through the experience without formal education and training. However, with the progress years and the development of science, several optometrists were able to obtain a diploma in optics from different countries around the world such as Germany, Britain, and Jordan. The first optical center was in Nablus in 1964 by Mr. Abdallah Tuffaha Senior (PCO, 2021.)

Three universities offer a bachelor's degree in optometry in Palestine, the Islamic University in Gaza, An-Najah National University in Palestine, and the Arab American University in Ramallah. These universities aim to graduate qualified practitioners to work as professional optometrists to achieve the highest level of visual practice and health care to give the correct and appropriate solution and treatment to various visual problems, including getting rid of the causes of preventable vision loss in the occupied Palestinian territories. Optometrists in decision-making positions can emerge science, translate public policy directives to improve patient eye care and work to use knowledge bases and clinical skills to improve models of care delivery and provide academic advancement for optometry in Palestine (AAUP, 2022; IUGaza, 2022; NNU, 2022).

The Palestinian optometric scope of practice allows optometrists to practice either in private practice, ophthalmology clinics and hospitals, or in retail optical settings. Some graduating optometrists become involved in specialty practices such as contact lenses, low-vision, pediatrics, and vision therapy (NNU, 2022).

Optometrists who graduate from Palestinian universities can provide primary health care for the eye, conducting various eye exams for refractive errors, fitting corrective spectacles, fitting contact lenses, performing binocular vision examinations, testing low-vision cases, and fitting low-vision appliances, conducting retinal and corneal examinations and dealing with imaging devices (IUGaza, 2022; NNU, 2022).

Palestinian optometrists have many job opportunities, they can engage in education and academic field, work in the government health sector, Non- Governmental Organizations (NGOs) for eye health, private eye hospitals, eye rehabilitation centers, and private optometry centers (PCO, 2021).

In Palestine, a vision test service is provided to drivers in primary care centers of the Palestinian Ministry of Health, where the service is provided by a nurse, not an optometrist (PMOH, 2022). The examination is based only on the Visual Acuity, and the applicant is transferred for the extensive examination to an optometrist or an ophthalmologist to perform an eye examination and eyeglasses, and then return the Visual Acuity. However, in other countries around the world, all necessary examinations are performed by an optometrist, whereas a driving license requires comprehensive eye examinations, refraction tests, retinoscopy, perimetry, tonometry, ophthalmoscopy, and slit-lamp (Depisteo, 2018).

Vision screening programs had been designed as a very effective tool for vision problems early detection, and treatment in the critical period from birth to 8 years, it was developed in the world vision right to sight for the control of preventable blindness (Gilbert & Foster, 2001). Vision screening is recommended to be undertaken at birth, age 3-6 months, and 4 years of age (APHA, 2001). However in Palestine, visual assessment is applied just in schools, the protocol targets in Palestine are first, fifth, and eighth grade (PMOH, 2022), while the effective treatment for visual disorders in children began before 5 years of age (APHA, 2001).

In a study that was conducted among preschool children aged (3-5) years, in Nablus city in Palestine, 473 children were examined, 127 needed comprehensive eye examinations, 15 had amblyopia, 166 had refractive errors, and 44 had binocular vision disorders (Labadi et al., 2022). The study emphasized the need to make amendments to the policy and protocol for the compulsory vision examination for children, so that it becomes at the age of 3 years, and to add more accurate examinations because studies have confirmed that amblyopia can be treated at this age. The delay in diagnosis makes treatment more difficult and not effective (Labadi et al., 2022).

In Palestine according to the Health Annual Report 2021, among children who were examined in primary healthcare clinics were 54851, about (0.04%) had a visual disability (PMOH, 2022). According to the study of (Akkawi et al., 2018) which was conducted in hospitals with neonatal intensive care units (NICU), (95.7%) of pediatricians in the study refer the neonate for ROP screening. The referring methods are either writing discharge slips or consulting parents verbally. While the reasons for not screening ROP were (37.1%) unavailability of an ophthalmologist in the hospital with NICU, and (26%) the doctor who write the discharge not writing a referral for ROP screening (Akkawi et al., 2018). However, in the retrospective study conducted by (Akkawi et al., 2019) in three neonatal intensive care units in Palestine, 115 children were screened. This is the first study that deals with the ROP epidemiologically. The incidence of Retinopathy Of Prematurity (ROP) was (23%), and the ROP type 1 which needs treatment was (11%). The researchers recommended for clinicians who deal with premature infants to aware of the statistically significant risk factors of ROP, in addition to the requirement for comprehensive studies of ROP, and set up the ROP National Guideline (Akkawi et al., 2019).

School health is a cooperation between the Palestinian Ministry of Health, and the Ministry of Education. School health provides optometry tests as one of its services. It is concerned with examining the vision for school students. The service is provided by a nurse, and the examination is based on visual acuity only. If the child does not see the 20/20 line, the parents will be recommended to present the child to an optometrist or ophthalmologist for further examinations. But a very small percentage of parents pay attention to these recommendations and follow up on children's vision examinations. In the education year, 2019/2020, (34,838) students in the first grade were observed

(71.1%) of the total students. (11%) of students were diagnosed or decreased visual acuity (PMOH, 2021). While in the 2020/2021 year, the number of students in 5<sup>th</sup> grade who were examined was 20038, and the number of students who had visual impairments was 2563 (12.8%). In the 8<sup>th</sup> grade, 22726 students were examined, and 3397 (14.9%) of examined students were diagnosed with visual impairments (PMOH, 2022).

### **The scope of optometry in Palestine**

The categories of optometry practice in Palestine according to the WCO Competency Model are the first category (optical technology services) and the second category (visual function services) (PCO, 2021).

The role of optometrists has been determined in cooperation between the Optometry council and the accreditation and Licensing Department in the Palestinian Ministry of Health (PCO, 2021).

#### **1. The scope of optometry according to the practice setting**

Services provided in Palestine were divided into two types, optometry services had allowed in hospitals and ophthalmologist clinics, and are not allowed in optical centers. Where optometry services that are allowed in optical centers, according to the scope of optometry in Palestine, could be provided by optometrists in optical centers, and no need for an ophthalmologist referral, cannot be provided without the supervision of an ophthalmologist, not necessarily provided in Hospitals, and no need for optometry specialty. contained; subjective refraction, soft contact lens fitting, hard contact lens fitting, selling optical appliances, selling contact lenses, corneal topography, anterior eye examinations, and binocular vision tests. while optometry services that need to provide either in hospitals or surgical centers, with the supervision of ophthalmologists, or need optometry specialties are not allowed in optical centers, like Cycloplegic refraction, orthoptics, low-vision rehabilitation, cataract monitoring, glaucoma monitoring, diagnosis of anterior eye pathology, prescription of simple medications, pre and post-refractive surgery assessment, tonometry, perimetry, OCT, and FFA (PCO, 2021).

## **2. The scope according to the scientific degree**

In Palestine, an optometrist needs a professional certificate to provide optometry services. Practicing the profession depends on a university degree in optics, a diploma, or more.

- **Optometrist with a Bachelor's or Master's degree**

Optometrist in Palestine means the person is a dispenser, refractionist, and contact lens professional. Optometrists can provide visual refraction examinations, prescribe spectacles, and contact lens supply in private centers, but optometrists in eye care hospitals can in addition practice low-vision examination, Cataract, Glaucoma, and Keratoconus monitoring, optic imaging, pre, and post-refractive surgery monitoring, use diagnostic Cycloplegic agents, and sometimes prescribe some therapeutic drugs (PCO, 2021). Optometrists, who have graduated with bachelor's degrees from all universities except An-Najah University, take the professional practice exam to obtain a professional practice certificate. The optometrist takes three examinations: a test for dispensing, an examination for refraction, and a test for contact lenses, both theoretical and practical (PCO, 2021).

Optometry students in Palestinian universities have medical courses in the field of ophthalmology, laboratories, and practical courses, which qualifies the student to diagnose simple eye diseases such as blepharitis, conjunctivitis, and dry eye, and prescribe the appropriate treatment for them, but this work is not included in the scope of optometry in Palestine, although it is found in many other countries of the world such as America, Canada, and Britain. But optometrists who trust their abilities, and have experience and knowledge practice this examination even if it is forbidden. They prescribe the necessary medicines. On the other hand, the failure to practice this examination prompted many centers not to acquire the necessary equipment, such as slit-lamp biomicroscopy.

- **Opticians with Diploma Certificate:**

An optician is a person who is a dispenser and refractionist. Can practice visual refraction examinations, and prescribe spectacles. They can practice contact lens fitting after completing a one-year training course under the supervision of the Palestinian Ministry of Health in the field of contact lenses and undergoing a practice exam in

contact lenses (PCO, 2021). Opticians have to do dispensing exams, and refraction exams for the professional practice certificate, until he undergoes a contact lenses course and submits the professional practice exam for contact lenses; he becomes an optometrist with a diploma certificate (PCO, 2021).

As for those who practice the profession with experience, and who were present before the council was established, they are excluded from the decisions of the optometry scope and membership conditions, as the situation remains the same as before the council was established (PCO, 2021).

#### **1.1.4 Problem statement**

In light of global developments in optometry and optometry regulation, with the WHO vision 2030 for eyesight, and applying the WHO Eye Care Competency Framework to help in eye care planning and development, and the WCO Competency Model which identified the role of optometrists worldwide.

This study was necessary to be conducted to shed the light on the Palestinian optometry scope and compare it with the categories of the WCO Competency Model.

In addition, the researcher's experience in optometry and the knowledge of the barriers prevent optometrists from practicing and developing the profession.

#### **1.1.5 Study aim**

The overall aim of this study is to assess optometry services in the Northern Districts of the West Bank.

#### **1.1.6 Study Objectives**

This descriptive study was carried out to assess the extent of optometry services provided in the northern districts of the West Bank of Palestine. It is expected that the results of this study will assist planners, decision-makers, and optometry providers in better meeting optometry needs, improving care quality, and formulating optometry policies.

1. To find out the optometrist's sociodemographics.
2. To determine the optometrist-to-population ratio.

3. To explore the extent of optometry services available in the Northern Districts of the West Bank.
4. To explore the optometry services available according to the type of workplace and district.
5. To investigate the differences in providing services by optometrists according to gender, qualification, and workplace type.
6. To investigate whether the Palestinian optometrist's role met with that identified by WCO.
7. To find out the barriers faced by Palestinian optometrists.
8. To assess differences in barriers concerning gender, qualification, workplace type, and districts.

#### **1.1.7 Study hypothesis**

1. No relationship between the types of services provided and gender.
2. No relationship between the types of services provided and qualifications.
3. No relationship between the types of services provided and workplace type.
4. No relationship between the type of services provided in optometry centers and the districts.
5. There are no significant associations in the perception of optometrists toward barriers affecting the implementation of optometry services and gender variables.
6. There are no significant associations in the perception of optometrists toward barriers affecting the implementation of optometry services and qualifications.
7. There are no significant associations in the perception of optometrists toward barriers affecting the implementation of optometry services and workplace type.
8. There are no significant differences in the perception of optometrists toward barriers affecting the implementation of optometry services and districts.

#### **1.1.8 Study Significance**

Numerous studies are focusing on optometry services and the optometry scope around the world, due to the importance of this profession in providing eye and vision care.

In Palestine, many studies in eye health care were conducted, including studies on the incidence and prevalence of visual disorders and ocular pathology. Only one study was conducted in Palestine that studied human resources eye health care services generally.

This study is the first to assess the type of optometric services provided by optometrists and the barriers faced by them from the perspective of the optometrists and the degree of their compatibility with the international optometry scope of practice.

It is expected that the results of this study will help in developing the optometry profession and alleviating barriers facing the Palestinian optometrist.

This study was designed to be the first building block for further studies in the field of optometry in Palestine. Furthermore, the profession needs further research to study optometry in terms of administration, quality, and financial resources.

## **1.2 Literature Review**

Many studies were found from all over the world. This provides a strong database to perform our research. Keywords (optometry services, optometry scope, health care management, planning, policies, challenges, barriers, facilitators, recommendations, and opticians) were predetermined, and an advance search was performed using google scholar, Pubmed, and Science Direct to define the time of the last seven years. Mastering the literature helped define the conceptual and theoretical frameworks of this study, and compare the results with similar previous studies.

Similar studies that measured the perceptions of optometrists towards optometry services, factors affecting the extent of optometry services provided, facilitators, and barriers affecting the extent of optometry services provided were explored and reviewed according to chronological order as follows:

### **1.2.1 International studies**

#### **1. Studies from the United Kingdom 2022, 2016**

A survey to study the scope of optometry practice in hospitals in the United Kingdom answered how many optometrists work within the unit or department, whether the optometry service is in a major teaching Eye Hospital, a General Hospital, or a Community Hospital, and the geographical location the optometry service is located in. The provision of essential services, including Refraction, refraction for children, spectacle dispensing, adult contact lens fitting, children contact lenses, adults low-vision examination and rehabilitation, children low-vision, biometry, ultrasonography, color vision, electro-diagnostics, topography, perimetry, imaging, and photography. The

provision of extended role services, in the ophthalmic sub-specialist areas where optometrists provide extended roles including cornea, retina, macula, and its related pathology and investigations. This survey was sent to the head and seniors' optometrists of the Hospitals of Eye Services departments.

In the study of (Harper et al., 2016). the sample size was 70 hospitals, (96%) of respondents performed refraction and children refraction, (87%) fitted contact lenses for adults, 82% fitted contact lenses for children, and low-vision (79%). Extended role services like glaucoma, medical retina and diabetes, and cataract, had been performed by (96%) of participants. In addition to special procedures that were performed in hospitals by optometrists such as punctual plug insertion (32%), suture removal (30%), and foreign body removal (30%).

The second study which was conducted in 2020, on the same population, the survey was based on the previous study survey that was implemented in 2015. The sample size was 90 optometrists who worked in hospitals in the UK. Optometrists who perform refraction were (88%), pediatric refraction (92%), contact lenses fitting for adults (71%), children (61%), and low-vision (67%). The extended role services were performed in this study by (78%) of optometrists. The performance of special procedures improved in the second survey to be (38%) for punctual plug insertion, (36%) for suture removal, and foreign body removal (53%). Since the 2015 survey, the use of independent prescribing was increased to (67%) compared with (18%) in 2015 (Gunn et al., 2022).

## **2. A study from Portugal 2020**

This study was based on a questionnaire survey, it was conducted among optometrists in Portugal. The study sample was 444 optometrists, (78.8%) of optometrists had a Bachelor's degree in optometry, (20.5%) had a Master, and (0.7%) had PhDs. The study aimed to identify the competencies model and training required for Portuguese optometrists.

Optometrists reported that the most frequent procedures they perform were retinoscopy, subjective refraction, slit-lamp, and ophthalmoscopy. While the sometimes performed examinations were binocular tests, contact lenses, and keratoconus assessment. The

rarely performed were low-vision tests, perimetry, and pediatric examinations less than 6 years.

According to training needs, participants are recommended for the total training requirement of ocular pharmacology, contact lens fitting, and low-vision. Binocular vision, pediatric optometry, and diagnostic and therapeutic examinations were recommended for partial training (Carneiro & Jorge, 2020).

### **3. A study from Malaysia in 2020**

A cross-sectional study aimed to ensure eye care services from optometrists in Malaysia (Aziz et al., 2020), was conducted in the private sector practicing optometry in Malaysia with a sample size of 71, using a survey questionnaire that included optometrists' demographics, availability of optical equipment, routinely conducted ophthalmic procedures, the special optometric clinic provided, and the number of referral cases to hospitals and barriers to providing routine procedures. Barriers to not performing full eye examination in this study were the following: (79%) was the unavailability of optical equipment, (56%) restriction of time, (34%) of patients requested to not perform these examinations, (19%) spaces unavailability, (15%) insufficient training and (8%) lack of motivation. In this study, (95.8%) of optometrists had a Snellen chart, (88.7%) had retinoscopy, (78.9%) had an ophthalmoscope, (67.7%) had Slit-Lamp, and (40.8%) had a tonometer. While the services provided were; (93%) of optometrists perform medical history always, (51%) perform retinoscopy for refraction examination, and (42%) do ophthalmoscopy as a routine exam. However, (55%) of private optometrists didn't use tonometry, regarding the unavailability in the private sector. However, (85%) of private optometric performed full contact lens examinations, (26.8%) of them had an RGP trial set, and (49.3%) had fluorescein strips. (45%) performed orthoptics and binocular tests, and (11%) performed low-vision tests (Aziz et al., 2020).

### **4. A study from Singapore 2019**

A survey of optometrists and opticians in Singapore (George et al., 2019) aimed to assess the current scope, evaluate the primary eye care knowledge, views on the extended role in primary eye care, preference for continuing professional education (CPE), and referral behavior of optometrists, using a self-administered questionnaire, sent by emails to optometrists who registered in Optometrist and Optician Board, with a

response rate of 30% as 230 participants. The working centers varied in private clinics and hospitals, governmental hospitals, and academic and research setups with (61%, 28%, and 11%) respectively. the majority of optometrists described the scope of optometry in Singapore as positive, (75%) of optometrists practice primary eye care services and extended role services. In hospitals, optometrists conduct eye examinations and co-manage ocular diseases with ophthalmologists.

In the same study, barriers were identified by optometrists to extended primary care roles by the pay, time, and costs involved in training. (81%) of optometrists reported that they referred patients to ophthalmologists in severe cases (George et al, 2019).

### **5. A study from Australia 2017**

A cross-sectional study aimed to present results from the inaugural Scope of Practice Survey on the clinical practice of optometrists who are members of Optometry Australia, with a particular emphasis on their confidence in diagnosing, use of equipment, prescribing of scheduled medicines, referral practices, and their patient base. It was conducted among Optometry Australia members. This study depended on an online survey that included data on demographic information, patient diagnosis, techniques, therapeutic prescribing, treatment of patients with glaucoma, general practitioner referrals, areas of interest, and average numbers of patients and prescriptions. The study results showed optometrists who had therapeutic endorsement (97%) were more confident than optometrists without therapeutic endorsement (92%) in diagnosing and monitoring cases with anterior and posterior eye pathology like glaucoma, diabetic retinopathy, macular degeneration, uveitis, conjunctivitis, blepharitis, and use special ophthalmic diagnosis technique such as tonometry, perimetry, OCT, slit-lamp biomicroscopy. About (70%) of optometrists monitored glaucoma patients. Approximately half of the participants referred patients to ophthalmologists for more investigations or non-confident medication used (Kiely et al., 2017).

### **6. A study from Mozambique 2016**

A cross-sectional study was conducted on the eye health care services of the national health system aimed to assess the optometric services provided by optometrists in Mozambique including all optometrists providing eye health services in the National

Health System, to measure the extent of eye care services provided, availability of optometric equipment, barriers they faced in practicing and recommendations for improvements (Manuel et al., 2016). It was found that (96%) of optometrists were responsible for refraction, (96%) used diagnostic drugs, (91%) did Cycloplegic refraction, (87%) did contact tonometry, and (57%) removed the foreign body. Of the optometrists who examined patients with refractive errors were (91%), (67%) tested patients with anterior segment disorders, (23%) examines patients with posterior segment disorders, and (38%) of them tested patients with low vision. Optometrists accessed clinical equipment, (100%) trial lenses, (100%) trial frame, (87%) contact tonometer, (78%) slit lamp, (70%) direct ophthalmoscope, (65%) cross cylinder, (61%) for keratometer, and retinoscope. The main barriers for optometrists in this study were lack of equipment, insufficient training, and lack of low-vision rehabilitation resources. They recommended identifying the role of optometry in Mozambique and developing an optometry council to improve the services and training with continuous training and education (Manuel et al., 2016).

#### **7. A study from India in 2015**

A cross-sectional study was published in 2015, aimed to evaluate the range of clinical services offered by optometrists in various modes of optometric practices in India. This study depended on an online questionnaire. The inclusion criteria were the optometrists who completed a 4-year Bachelor of Science in optometry. Optometrists with diploma qualifications were excluded. A purposive non-randomly sampling method was used in selecting the participants. (98%) of optometrists reported they performed routine eye examinations and performed subjective refraction using visual acuity tests, and retinoscopes for objective refraction. Contact lens testing and fitting were performed by (70%) and optical dispensing by (67%). This study showed that optometrists with post-graduation qualifications had more awareness of the importance of comprehensive eye examinations and investigations, in addition, to performing their examinations with confidentiality (Thite et al., 2015).

#### **8. A study from Ghana 2015**

A cross-sectional study conducted by (Boadi-Kusi et al., 2015) aimed to evaluate the optometrists and optometric practices in Ghana. It was conducted among optometrists registered with the Ghana Optometric Association. It depended on an online survey that

included questions about demographics, ophthalmic procedures they conducted routinely, equipment, and the barriers they faced in practicing optometry. This study showed that (100%) of participants always take medical histories for patients, (100%) did subjective refraction, (98%) used ophthalmoscope, (and 89%) used slit-lamp biomicroscopy, and (76%) retinoscope. A minimal number of participants performed contact lenses (10%), and low-vision (9%), because of the unavailability of equipment required for contact lenses or low-vision, limitation of space, low training, and absence of motivation.

## **1.2.2 Regional studies**

### **1. A study from Jordan in 2021**

A cross-sectional study aimed to document the scope of optometry in Jordan, and describe the services provided by optometrists in Jordan. The data collection tool of this study was a questionnaire that was completed by optometrists who provide optometry services across Jordan, 714 optometrists were reached and filled out the questionnaire. More than half were females (57.8%), and (42.2%) were males. The results showed the unequal distribution of optometrists in Jordan and the majority of optometrists (81.5%) practice in big cities. Participants in this study (45.1%) were diploma degree holders, and (54.5%) were Bachelor's degree holders. Basic optometric examinations were the most services provided, then the community eye care services. The most available services were visual acuity (97.9%), refraction (96.8%), (30%) provided ophthalmoscopy, (53.8%) binocular vision, and (12.6%) Cycloplegic-refraction. The least services provided were prescribing ocular medication, vision therapy, and low-vision. The barriers faced by optometrists to not performing spectacle dispensing were lack of equipment, lack of knowledge a barrier to not providing binocular vision and vision therapy, lack of time made ophthalmoscopy difficult to perform, and license restrictions were the barrier to not performing the pediatric examinations and Cycloplegic refraction.

Optometrists unanimously agreed not to prescribe ocular medications. However, about half of the participants can provide anterior and posterior eye examinations. Restrictions imposed by regulations and licenses on practicing the profession of optometry in Jordan were the main reasons that prevent service providers from providing some optometry services as these are not in the job description. However, optometrists in Jordan can

provide more services regarding their knowledge and skills if the scope is expanding (Okasheh-Otoom et al., 2022).

## **2. Studies from Saudi Arabia 2021, 2017**

This study investigated the limitations and difficulties of providing low-vision services among optometrists practicing in Saudi Arabia. A self-administered online structured survey for practicing optometrists was used in this investigation. Responses were gathered to determine the number of low-vision service providers, as well as the rate of awareness and impediments to providing low-vision services. This research involved 154 practicing optometrists (51.2% females, 48.7% males). Optometrists in this study had bachelor's, master's, and Ph.D. degrees in optometry. About (30%) of participants provided low-vision services. Optometrists reported that the main barriers faced them in practicing low-vision were (87%) insufficient training, (76%) lack of low-vision services awareness, unavailability of low-vision equipment (70%), lack of time (55%) and (30%) financial problems. The author recommended improving optometry education and low-vision training, in addition, to increasing the national coverage of patients with low-vision problems (Alsaqr, 2022).

The study of 2017 was a cross-sectional study that utilized a 6-item survey questionnaire; the questionnaire was completed by the head of the ophthalmology department or the registered optometrists in 240 hospitals around the KSA. This study aimed to examine the quality of services provided by Optometrists in Saudi Arabia. The results of this study were that (81%) of facilities didn't provide optometry services for free, the reasons were the lack of knowledge about the profession 22.6%, and 61.02% shortages of qualified optometrists. As a result, 71.8% of physicians refer their patients to

the nearest Optometrists in the city. The result showed no significant difference based on the type of hospital understudy, in addition to a dependency between the type of hospital and the number of patients visited the hospitals because a load of patients in facilities governed by the Ministry of Health (79.4%) is higher than private (5.9%) and military hospitals (14.7%) (Alotaibi, 2017).

### **3. A study from Sudan 2019**

A study was conducted by (Al Rasheed, 2019) to assess the role of Sudanese optometrists in primary eye care in the Khartoum State of Sudan between February 2018 and January 2019. It included 300 optometrists using a self-administered questionnaire that included seven equations, focused on the challenges facing optometrists in practicing and recommendations for improvements, equipment required for providing optometric services, and the perception of the optometrists in their role in primary eye care.

This study showed, that the majority of optometrists in Khartoum (99.7%) take their time with patients and communicate well with them, (99%) depending on the medical and family history of patients while they perform eye examinations, (90%) of participants used only equipment in diagnoses, (43%) used diagnostic drugs, (22%) used diagnostic dyes, (49%) used therapeutic drugs, (96%) reported they referred patients to ophthalmologists for more investigations. Optometrists in Sudan faced barriers, (96%) of optometrists complained of no clear job description, (87%) of lack of equipment, and lack of medical supplements. (95%) of participants recommended improving the role of optometrists in Sudan, (90%) preferred continuous training (AL Rasheed, 2019).

#### **1.2.3 Local studies**

##### **A study from Palestine 2020**

A quantitative cross-sectional study (Obaid, 2020) was conducted in West Bank districts and East Jerusalem between January and December 2019. It aimed to evaluate the healthcare services institutions and staff, in addition to the geographical distribution of services. The study included 331 eye care providers (ophthalmologists, optometrists, opticians, orthoptists, and nurses) and 183 eye care facilities. Two types of data collection tools were used in this study, one for institutions and the other one for healthcare workers. This study found (1.7%) of facilities that provide eyecare services were governmental, (0.8%) were NGOs, (and 97.31%) were private. The total number of optometry services providers was (425) that (320) of which were optometrists, (75) were refractionists, (14) were qualified opticians, (14) were non-qualified opticians, and (2) were orthoptists. Optometrists who had a bachelor's degree were (69.6%), master's

degree (3.43%), Ph.D. degree (0.38%), doctor of optometry (0.76%) diploma (18.32%), orthoptists (0.76%), and opticians without a qualified degree (7.25%). This study studied the eye healthcare resources per 50,000 population, where all districts met the vision 2020 ratio (1 optometrist: 50,000 population).

#### **1.2.4 Systematic review**

A systematic review was prepared to summarize the literature review, many articles were found in searching keywords (optometry, healthcare, eye services, Palestine, the scope of practice, barriers). Many studies had been excluded due to the date of publication (after 2015), or the participants' conditions, all of the studies in the literature review were from the point of optometrists or eye healthcare providers. The literature review summarization is in Appendix (B)

## **Chapter Two**

### **Methods**

#### **2.1 Study design**

A cross-sectional study, in which face-to-face interviews were performed using a questionnaire to assess the optometry services in the Northern Districts of West Bank in Palestine (Jenin, Tubas, Nablus, Tulkarm, Qalqilyah, and Salfit).

#### **2.2 Study population**

All optometrists working in optometry centers (Private, Governmental, Non-governmental) in the Northern Districts of the West Bank were reached and interviewed. The study population consisted of 93 optometrists who represented the centers providing optometry services.

#### **2.3 Sample size and sampling method**

The Census method was conducted. All optometrists working in optometry centers in the Northern Districts of West Bank were reached and interviewed. Based on the information obtained from the Palestinian Ministry of Health for the year 2021, 70 private centers provide optical services in the Northern Districts of the West Bank, 3 private surgical centers, one government hospital, and one NGO-affiliated center, in addition to one optometry school clinic. However, during the data collection, a difference in the number of centers was found, as some centers were permanently closed, others had moved to another city, and other centers were opened and were not included in the data of the Palestinian Ministry of Health. In addition, some centers were not among the inclusion criteria as the centers without an optometrist neither with a diploma or bachelor's degree in optometry, or the centers had to certificate only as the dispensing center. Accordingly, the final number of centers that participated in the sample is 60 and the number of optometrists providing services in these centers that correspond to the inclusion criteria is 94 optometrists.

##### **2.3.1 Inclusion criteria**

- All centers which provide optometry services (private centers, Private hospitals, NGOs centers, Governmental hospitals, and optometry schools)

- Optometrists with bachelor' and Diploma degrees.

### **2.3.2 Exclusion criteria:**

- Practitioners who practice optometry by experience (without an optometry certificate), workers who work without licenses, and optometry students who practice in optometry centers.
- Centers that are certificated as dispensing centers (refraction and contact lenses are not allowed to be practiced in).

### **2.4 Data collection procedures**

A questionnaire (Appendix C, D) was developed from three previous studies (Al Rasheed, 2019; Aziz et al., 2020; Boadi-Kusi et al., 2015), then 3 advisors who had a research background and two qualified professionals evaluated the questionnaire to ensure validity purposes, a pilot study was conducted to ensure the quality of the questionnaire, 13 optometrists out of the sample filled the questionnaire, and then the questionnaire was tested. The reliability of the questionnaire was tested by Cronbach's Alpha analysis = 0.84. The results of the pilot study were not included in the actual results of this study.

The questionnaire contains six parts, the first part consists of the demographic part, and the second part consists of general questions about the availability of optometric services in the optometry centers. The third part consists of questions about the availability of certain tools and equipment. The fourth part consists of questions about the services provided in the centers. The fifth part aims to determine barriers to the development of optometry services. And the sixth part aims to determine optometrist recommendations for the development of the optometry profession. Data were collected through face-to-face interviews that took place between November and December of 2021.

### **2.5 Data analysis**

IBM SPSS statistical program has been used to analyze data. Frequencies have been computed to find out the optometrist's sociodemographic, and the optometrist-to-population ratio, and to explore the extent of optometry services available in the Northern Districts of the West Bank.

The independent t-test analysis was calculated to find out whether there are significant associations between optometry services and workplace types, and the association between services that are provided by optometrists and gender, qualification, and workplace types. In addition to finding out the significant associations between barriers and gender, qualifications, and workplace.

The one-way ANOVA analysis was conducted to find out the significant differences between the available services and the districts, and the relationships between barriers and districts.

The cross-tabulation analysis was calculated to find out the percentages of available services in different workplaces and districts. To explore the frequency of providing optometry services by optometrists according to gender, qualifications, and workplace. In addition, to determine the barriers according to gender, qualification, workplace, and districts.

To determine the optometrist's recommendations for improving optometry practice, recommendations were collected and grouped, then the frequency was calculated.

## **2.6 Ethical approval**

The study proposal was approved by the Institutional Review Board (IRB) at An-Najah National University and the scientific research committee of the Public Health Management Department (Appendix E, F), in addition to the faculty of graduate studies scientific research board at An-Najah National University, and task facilitation book to facilitate the study procedures in Private and Government settings (Appendix G). An explanatory letter was attached to each questionnaire for all participants to explain the aim, importance, and privacy, with optional participation (Appendix H, I). A written and signed consent form was filled out by each participant (Appendix J, K).

## **Chapter Three**

### **Results**

#### **3.1 Descriptive analysis**

##### **3.1.1 Sociodemographic information:**

In this chapter, the results of this study will be presented and tabulated according to the study variables and hypothesis. The first part of this chapter has presented the socio-demographic results (Table 1) which indicated that seventy-two percent (72.3%) of optometrists working in the optometry centers that were reached were females, and most of the optometrists working in these centers were from the 90s and 80s generations (90.4%) together, (85.2%) of optometrists providing services in the Northern Districts of the West Bank are a bachelor's degrees holders or more. with only (6.5%) of optometrists working in these centers having a specialty certificate. It was found that the majority of optometry services in the Northern Districts of the West Bank were provided by the private sector (hospitals, optical centers, NGO clinics, and university clinics) (97.9%). Socio-demographic variables are presented in (Table 1).

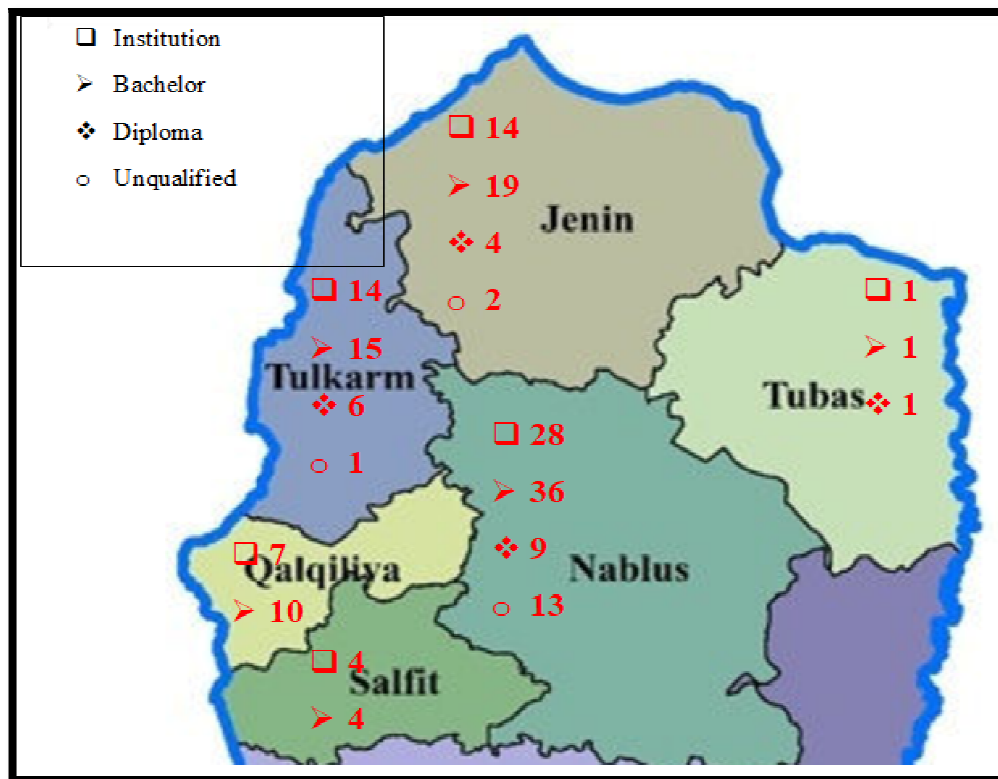
**Table 1***Socio-demographic indicators of the participants*

<b>Demographics</b>	<b>Frequency</b>	<b>%</b>
<b>Gender</b>		
Male	26	27.7%
Female	68	72.3%
<b>Generation</b>		
60s	3	3.2%
70s	6	6.4%
80s	35	37.2%
90s	50	53.2%
<b>Scientific Degree</b>		
Diploma	14	14.9%
Bachelor	76	80.9%
Master	4	4.3%
<b>Experience (Years)</b>		
0-10	52	55.4%
>10	42	44.6%
<b>Workplace Type</b>		
Governmental	2	2.1%
NGOs	2	2.1%
Private Hospital	7	7.5%
Private Optometry Center	81	86.2%
Optometry School Clinic	2	2.1%
<b>Center location</b>		
City	85	90.4%
Village	2	2.1%
Town	7	7.5%
<b>Districts</b>		
Jenin	18	19.1%
Tubas	2	2.1%
Nablus	40	42.6%
Tulkarm	20	21.3%
Qalqilyah	10	10.6%
Salfit	4	4.3%

Figure (1) below, shows the distribution of optometrists and workplaces in northern districts of the West Bank.

**Figure1**

*The distribution of optometrists and optometry services workplaces in the Northern Districts of the West Bank.*



### 3.1.2 Optometrists per 50,000 population

As shown in table (2), the optometrists: population ratio was calculated in the Northern Districts of the West Bank. The best ratio was in Nablus with 5.4 optometrists/ 50000 population, and the lowest ratio was in Tubas with 1.5 optometrists/ 50000 population. These ratios met the Vision 2020 goal by WHO 1 optometrist / 50000 population.

**Table 2**

*Optometrists per 50000 population.*

District	Population in the middle of 2021*	Optometrists	Optometrist/50000 population
Jenin	338919	23	3.39/50000
Tubas	65615	2	1.5/50000
Nablus	415606	45	5.4/50000
Tulkarm	198856	21	5.2/50000
Qalqilyah	121671	10	4.1/50000
Salfit	82099	4	2.4/50000

\* Population in the middle of 2021 (PCBS, 2021)

### 3.1.3 The available optometry services

Table (3) presenting on the frequency of optometry services that are provided by the centers in our study. Visual refraction was provided by (98.9%) of optometrists in the Northern Districts of West Bank, soft contact lens fitting (96.8%), optical spectacles, and contact lens selling (87.1%). Most of these services are classified as essential services that are provided in all types of optometry workplaces. The least optometry services provided by optometrists were FFA (3.2%), and Pre and Post Refractive Surgery Evaluation (6.5%) more details about optometry services provision were clarified in Table (3).

**Table 3**

*Frequencies of the optometry services available in the centers and workplaces in the Northern Districts of West Bank (n= 94).*

No	Items	Available (%)
1.	Visual refraction	98.9
2.	Soft contact lens fitting	96.8
3.	Sell optical spectacles and contact lenses	87.1
4.	Binocular tests	67.7
5.	Hard contact lens fitting	57.0
6.	Anterior eye examination	50.5
7.	Posterior eye examination	36.6
8.	Corneal topography	32.3
9.	Cycloplegic refraction	22.6
10.	Orthoptics	20.4
11.	Cataract monitoring	19.4
12.	Tonometry	18.3
13.	Low-vision appliances sell	18.3
14.	Low-vision fitting	15.1
15.	Glaucoma monitoring	12.9
16.	OCT	9.7
17.	Low-vision appliances fitting	9.7
18.	Perimetry	8.6
19.	Pre and post-refractive surgeries assessment	6.5
20.	FFA	3.2

### 3.1.4 The available optometry instruments

As indicated in the table (4) the most essential instruments were available within a range of (62.4% - 100%) in the studied centers.

**Table 4**

*Frequencies for optometric instruments available in the centers and workplaces in the Northern Districts of West Bank (n= 94).*

No	Items	Available (%)
1	Snellen chart E, log mar, Landolt C, Numbers, alphabet, key's pictures	100
2	Near chart acuity test	100
4	Occluder	100
7	Keratometer	100
8	Complete trial lens set	100
9	Trial frame	100
10	Cross cylinder	98.9
18	Accommodative fixation target	98.9
20	Lensmeter	98.9
3	Pen torch	97.8
17	Contact lens solution	90.3
14	Contact lens trial set SCL	86
6	Retinoscope	80.6
11	Slit lamp	74.2
5	Ishihara test	64.5
16	Fluorescein strip	63.4
12	Ophthalmoscope	62.4
15	Contact lens trial set RGP	62.4
19	Prism par	61.3
13	Tonometer	21.5

### 3.1.5 The frequency of performing optometry services by optometrists

In (Table 5), the results show how often the optometrists perform services in the cases that attending the centers and workplaces in the Northern Districts of the West Bank was explored. It was indicated that all optometrists (100%) in the centers and workplaces in the Northern Districts of the West Bank – Palestine always take patients' history while they perform the eye examination, and perform visual acuity tests. Also, (84.90%) of optometrists sometimes perform children's refraction. Whereas, (89.20%) (84.90%) of optometrists never perform low-vision aid fitting, and performed special tests like perimetry and tonometry, more details in table (5)

**Table 5**

*Frequencies and percentages for the optometry services provided by the optometrists in the Northern Districts of West Bank (n= 94).*

<b>No</b>	<b>Items</b>	<b>Always (%)</b>	<b>Sometimes (%)</b>	<b>Never (%)</b>
1	How often did you perform general observation on patients in your practice?	84.9	15.1	0
2	How often did you take the patient's history while you perform the eye examination?	100.0	0	0
3	How often did you perform visual acuity tests on patients in your practice?	100.0	0	0
4	How often did you perform subjective refraction for patients in your practice?	98.9	1.1	0
5	How often did you perform objective refraction for patients in your practice?	98.9	1.1	0
6	How often did you perform children's refraction?	12.9	84.9	2.2
S7	How often did you perform Cycloplegic refraction in your practice?	14.0	10.8	75.2
8	How often did you perform retinoscopy in your practice?	8.6	54.8	36.6
9	How often did you perform spectacles dispensing?	88.2	1.1	10.7
10	How often did you perform contact lens fitting?	69.9	22.6	7.5
11	How often did you perform Hard contact lens fitting?	17.2	33.3	49.5
12	How often did you use diagnostic dyes in your practice?	19.4	29	51.6
13	How often did you perform Binocular vision tests?	7.5	58.1	34.4
14	How often did you perform Low-vision tests?	1.1	12.9	86
15	How often did you perform Low-vision aid fitting?	4.3	6.5	89.2
16	How often did you use ophthalmoscopy in your practice?	7.5	30.1	62.4
17	How often did you diagnose and treat simple ophthalmic diseases like blepharitis, dry eye, and conjunctivitis?	7.5	43	49.5
18	How often did you perform monitoring cataracts, glaucoma, and keratoconus?	5.4	37.6	57
19	How often did you use diagnostic drugs	6.5	17.2	76.3
20	How often did you use therapeutic drugs	4.3	16.1	79.6
21	How often did you perform optical imaging like corneal topography, OCT, and FFA?	4.3	25.8	69.9
22	How often did you perform special tests like perimetry and tonometry?	3.2	7.5	89.2
23	How often did you perform pre and post-refractive surgery monitoring?	6.5	8.6	84.9
24	How often did you sell optical products?	88.2	0	11.8

### 3.1.6 Barriers faced by optometrists

As indicated in table (6), the main barriers faced by optometrists in providing services in the centers and workplaces in the Northern Districts of the West Bank – Palestine is the insufficient continuing training, followed by economic and political barriers and societal culture towards optometry (93.6%, 86.9%, and 86.9%). Whereas the least barrier related to the lack of time (66.0%).

**Table 6**

*Barriers faced by optometrists in providing services in the centers and workplaces in the Northern Districts of the West Bank (n= 94).*

No	Barriers	Not a barrier	Barrier
<b>Policies and regulations</b>			
1	Insufficient continuing training	6.4%	(88) 93.6%
2	Maldistribution of optometry centers	(17) 18.1%	(77) 81.9%
3	The narrow scope of practice	(18) 19.1%	(76) 80.9%
4	Economic and political problems	(13) 13.8%	(81) 86.2%
5	Societal culture toward optometry	(13) 13.8%	(81) 86.2%
<b>Personal human resources</b>			
6	Lack of motivation	(14) 14.9%	(80) 85.1%
7	Lack of time	(32) 34.0%	(62) 66.0%

### 3.2 Bivariate analysis

#### 3.2.1 The distribution of available services in different workplaces

Table (7) below shows the distribution of available optometry services in workplaces and districts. The independent t-test was analyzed to calculate the significant associations in the type of workplace, and cross-tabulation to explore the percentages for each category of workplaces. Results show a significant association at the level of (0.05) between workplace types in available optometry centers, such as cycloplegic refraction having a statistical difference (.000), and contact lens fitting (.040).

**Table 7***The cross-tabulation between services and workplace type.*

Services	Workplace type		Sig. (2-tailed) *
	Privet optometry centers (n=81)	Others (n=13)	
Sell optical spectacles and contact lenses	(81) 100%	0.00	
Visual refraction	(81) 100%	(11) 84.6%	.165
Cycloplegic refraction	(10) 12.3%	(11) 84.6%	.000*
Soft contact lens fitting	(81) 100%	(9) 69.2%	.040*
Hard contact lens fitting	(44) 54.3%	(9) 69.2%	.317
Anterior eye examination	(35) 43.2%	(13) 100%	.000
Posterior eye examination	(22) 27.2%	(13) 100%	.000*
Binocular tests	(51) 63.0%	(13) 100%	.000
Orthoptics	(7) 8.6%	(13) 100%	.000*
Cataract monitoring	(6) 7.4%	(13) 100%	.000*
Glaucoma monitoring	0.00	(13) 100%	.000*
Corneal topography	(20) 24.7%	(10) 76.9%	.008*
Pre and post-refractive surgeries assessment	0.00	(6) 46.1%	.000*
Tonometry	(5) 6.2%	(13) 100%	.001*
Perimetry	0.00	(8) 61.5%	.000*
OCT	0.00	(9) 69.2%	.082
FFA	0.00	(3) 23.0%	.958
Low-vision fitting	(12) 14.8%	(2) 15.3%	.449
Low-vision appliances fitting	(7) 8.6%	(2) 15.3%	.000*
Low-vision appliances sell	(17) 21.0%	0.00	.165

\* Significant difference

**3.2.2 The distribution of available services in different districts**

As shown in table (8), one way ANOVA test was analyzed for the significance of Districts, and cross-tabulation for explore the percentages for each District. The results show there are significant differences between districts at the level of (0.05) in many services such as cycloplegic refraction, corneal topography, binocular refraction, and low-vision fitting.

**Table 8***The cross-tabulation between available services and districts.*

Services	Districts						Sig*
	Jenin (n=18)	Tubas (n=2)	Nablus (n=40)	Tulkarm (n=20)	Qalqilyah (n=10)	Salfit (n=4)	
Sell optical spectacles and contact lenses	(17) 94.4%	(2) 100%	(30) 75.0%	(18) 90.0%	(10) 100.0%	(4) 100.0%	.156
Visual refraction	(18) 100.0%	(2) 100%	(38) 95.0%	(20) 100%	(10) 100%	(4) 100.0%	0.751
Cycloplegic refraction	(1) 5.6%	0.00	(10) 25.0%	(3) 15.0%	(4) 40.0%	(3) 75.0%	0.026*
Soft contact lens fitting	(18) 100%	(2) 100%	(38) 95.0%	(18) 90.0%	(10) 100%	(4) 100%	0.687
Hard contact lens fitting	(8) 44.4%	(2) 100%	(23) 57.5%	(13) 65.0%	(7) 70.0%	(4) 100%	0.103
Anterior eye examination	(9) 50.0%	(2) 100%	(24) 60.0%	(8) 40.0%	(3) 30.0%	(2) 50.0%	0.320
Posterior eye examination	(6) 33.3%	0.00	(16) 40.0%	(6) 30.0%	(5) 50.0%	(2) 50.0%	0.736
Binocular tests	(15) 83.3%	(2) 100%	(25) 62.5%	(8) 40.0%	(10) 100%	(4) 100%	0.003*
Orthoptics	(1) 5.6%	0.00	(12) 30.0%	(3) 15.0%	(2) 20.0%	(2) 50.0%	0.192
Cataract monitoring	(1) 5.6%	0.00	(12) 30.0%	(4) 20.0	(2) 20.0	0.00	0.287
(1) Glaucoma monitoring	(1) 5.6%	0.00	(10) 25.0%	(2) 10.0%	0.00	0.00	0.156
Corneal topography	(3) 16.7%	0.00	(12) 30.0%	(14) 70.0%	(1) 10.0%	0.00	0.001*
Pre and post-refractive surgeries assessment	0.00	0.00	(6) 15.0%	0.00	0.00	0.00	0.124
Tonometry	(5) 27.8%	0.00	(10) 25.0%	(3) 15.0%	0.00	0.00	0.341
Perimetry	0.00	0.00	(6) 15.0%	(2) 10.0%	0.00	0.00	0.383
OCT	(1) 5.6%	0.00	(6) 15.0%	(2) 10.0%	0.00	0.00	0.655
FFA	0.00	0.00	(3) 7.5%	0.00	0.00	0.00	0.539
Low-vision fitting	0.00	0.00	(12) 30.0%	0.00	(2) 20.0%	0.00	0.008*
Low-vision appliances fitting	0.00	0.00	(8) 20.0%	(1) 5.0%	0.00	0.00	0.105
Low-vision appliances sell	0.00	0.00	(7) 17.5%	(8) 40.0%	(2) 20.0%	0.00	0.035*

\* Significant differences

### **3.2.3 The relationship between frequency of performing services and gender**

Results in the table (9) in appendix (L) show the differences between males and females according to the frequency of services performed in cases attending centers. The independent t-test was analyzed to calculate the significant associations and cross-tabulation to explore the percentages for males and females. There is a significant association between gender in the level of (0.05) in the services performed by general observation (.012) and low-vision fitting (.043).

### **3.2.4 The relationship between the frequency of performing optometry services and the qualifications**

As shown in table (10) in appendix (L), the independent t-test was analyzed to calculate the significant associations and cross-tabulation to explore the percentages for each category of qualifications. There is a significant difference between diploma holders and BSc and more holders in performing optometry services. There is a significant association in performing children refraction (.007) at the level of (0.05), (.010) in using diagnostic drugs, and (.038) in using therapeutic drugs.

### **3.2.5 The relationship between the frequency of performing optometry services and the workplace type**

Table (11) in appendix (L) shows the differences in performing optometry services according to the workplace type. The independent t-test was analyzed to calculate the significant associations and cross-tabulation to explore the percentages for each type of workplace.

Many significant differences were found in the level of (0.05), in services like cycloplegic refraction, spectacles dispensing, using diagnostic drugs, and selling optical appliances.

### **3.2.6 The relationship between barriers and gender**

In the table (12), the results show the relationship between barriers and gender. The independent t-test was analyzed to calculate the significant associations and cross-tabulation to explore the percentages for males and females. There is a significant difference (.013) in the insufficient continuing training as a barrier at the level of (0.05), (100%) of males considered insufficient continuing training a barrier.

**Table 12***The cross-tabulation between barriers and gender*

No	Barriers	Male		female		Sig. (2-tailed)
		Not a barrier	Barrier	Not a barrier	barrier	
<b>Policies and regulations</b>						
1	Insufficient continuing training	0.00	(26) 100.0%	(6) 8.8%	(62) 91.2%	.013*
2	Maldistribution of optometry centers	(5) 19.2%	(21) 80.8%	(12) 17.6%	(56) 82.4%	.860
3	The narrow scope of practice	(5) 19.2%	(21) 80.8%	(13) 19.1%	(55) 80.9%	.990
4	Economic and political problems	(5) 19.2%	(21) 80.8%	(8) 11.8%	(60) 88.2%	.402
5	Societal culture toward optometry	(6) 23.1%	(20) 79.9%	(7) 10.3%	(61) 89.7%	.174
<b>Personal human resources</b>						
6	Lack of motivation	(1) (4) 5.4%	(22) 84.6%	(10) 14.7%	(58) 85.3%	.935
7	Lack of time	(2) (6) 3.1%	(20) 76.9%	(42) 61.8%	(26) 38.2%	.148

\* Significant difference

**3.2.7 The relationship between barriers and qualification**

As shown in table (13), the independent t-test was analyzed to calculate the significant associations and cross-tabulation to explore the percentages for each category of qualification. There is a significant difference in insufficient continuing training (.013) at the level of (.05). All males in this study reported insufficient continuing training as a barrier.

**Table 13***The cross-tabulation between barriers and qualification*

Barriers	Diploma(n=14)		BSc and more (n=80)		Sig. (2-tailed)*
	Not a barrier	Barrier	Not a barrier	Barrier	
<b>Policies and regulations</b>					
Insufficient continuing training	0.00	(14) 100.0%	(6) 7.5%	(74) 92.5%	.013*
Maldistribution of optometry centers	(6) 42.9%	(8) 57.1%	(11) 13.8%	(69) 86.3%	.059
The narrow scope of practice	(5) 35.7%	(9) 64.3%	(13) 16.3%	(67) 83.8%	.182
Societal culture toward optometry	(3) 21.4%	(11) 78.6%	(10) 12.5%	(70) 87.5%	.377
Economic and political problems	(1) 7.1%	(13) 92.9%	(12) 15.0%	(68) 85.0%	.438
<b>Personal and human resources</b>					
Lack of motivation	(4) 28.6%	(10) 71.4%	(10) 12.5%	(70) 87.5%	.237
Lack of time	(3) 21.4%	(11) 78.6%	(29) 36.3%	(51) 63.8%	.254

\* Significant difference

**3.2.8 The relationship between barriers and type of workplace**

As shown in table (14) in appendix (L), the independent t-test was analyzed to calculate the significant associations and cross-tabulation to explore the percentages for each category of workplaces. There is a significant difference in economic and political problems as a barrier according to workplace type (.002) at the level of (.05), (93.8%) of optometrists in private optometry centers reported economic and political problems as a barrier compared with (38.5%) of other workplaces.

**3.2.9 The relationship between barriers and districts**

As shown in table (15) in appendix (L), the one-way ANOVA test was analyzed to calculate the significant difference and cross-tabulation to explore the percentages for each district. There are no significant differences at the level of (.05) in barriers according to districts.

### **3.3 The optometrists' recommendations**

Most optometrists (63.4%) recommended providing jobs for optometrists in primary health care centers of MOH, school health programs, eye examinations for driving licenses, and Government hospitals. Followed by reconsidering the regulations related to the optometry profession, producing continuing training and education programs in addition to developing postgraduate programs in optometry (50.6%), and compulsory training before obtaining the practice of the profession in approved centers based on scientific standards (46.2%). More recommendations are clarified in table (16) in appendix (L).

## Chapter Four

### Discussions and Conclusions

#### 4.1 Discussion

##### 4.1.1 Sociodemographic information

Results showed that about two-thirds of optometrists are females (72.3%), this result is consistent with the study of (Al Rasheed, 2019) in Sudan in which females (86%), in India (Thite et al., 2015) females were than males (51%), also in Saudi (Alsaqr, 2022) females were (51.2%), and in Jordan, females were (57%) of participants (Okasheh-Otoom et al., 2022). The result is inconsistent with the Ghana study (Boadi-Kusi et al., 2015) in which males (68.9%) were more than females, in regards to family, childcare, and household responsibilities for females. Optometrists of the 90s and 80s generations are the most, and those with bachelor's degrees represented (80.9%) of optometrists providing services in the Northern Districts of the West Bank, but only (6.5%) of participants have specialties after Bachelor's degree, these results are inconsistent with study of Jordan (Okasheh-Otoom et al., 2022) in which optometrists with BSc were (54%) and Diploma (45%), that is according to the existence of diploma collages that educate optometry, but in Palestine only BSc programs of optometry. According to the workplaces providing optometry services, the vast majority are related to the private sector (97.9%), because there is just one governmental hospital in the northern districts of the West Bank in which optometrists provide services in Rafidia Hospital which is a governmental hospital in Nablus. This is very similar to the results of a study in Singapore, where the percentage of services provided by the private sector was (89%) (George et al, 2019), in Saudi Arabia (Alotaibi, 2017) (87%) of services were provided by private sector, in addition to Jordan (Okasheh-Otoom et al., 2022) private sector provide (81%) of optometry services in Jordan. About (90.4%) of workplaces located in cities are consistent with the results of the study in Jordan, due to the social and cultural compatibility between Palestine and Jordan, where (81.5%) of optometrists provide services in large cities (Okasheh-Otoom et al., 2022).

##### 4.1.2 Optometrists to population ratio

In this study, the optometrists to population ratios were more than 1: 50000. These ratios met the WHO recommended optometrists to population ratio in Asia (1:50000)

(WHO, 2007), these results are consistent with the results of (Obaid, 2020), that studied the eye care services human resources in West Bank and East Jerusalem, in which all districts met the recommended optometrists to population ratio. However, there are some differences between optometrists' numbers in 2021 and 2019, that is due to Covid 19, as many workplaces were forced to lay off employees, and some were forced to permanently close their work, which led to a decrease in the number of optometrists. around the world in 2019, half of the countries met the (1:50000) ratio, while the high-income countries met the target of (1:10000)(Naidoo et al., 2022).

#### **4.1.3 The availability of optometry services**

As the result showed visual refraction is the most available service in workplaces providing optometry services, followed by Soft contact lens fitting. Visual refraction is the basis of optometry, and all optometrists have to master it. Workplaces that didn't provide visual refraction are due to the high load of patients, and the lack of optometrists providing services in Governmental workplaces. While not all workplaces have selling optical spectacles and contact lens services. Due to the banning of MOH from selling optical products in hospitals, surgical centers, and ophthalmic clinics (PCO, 2021). These results are consistent with Jordan (Okasheh-Otoom et al., 2022) where visual refraction was available in 96% of workplaces, and in Malaysia, (100%) of centers provide visual refraction(Aziz et al., 2020).

#### **4.1.4 The availability of optometry instruments**

All optometrists had a Snellen chart, near chart, occluder, keratometer, complete trial lens set, trial frame, cross-cylinder, fixation target, and lensmeter. The high rate of having these instruments is related to the mandatorily to have this equipment to obtain a license for the optometry centers (PCO, 2021), in addition to retinoscopes, slit-lamp biomicroscopy, and ophthalmoscopes. These results are consistent with those (Aziz et al., 2020) in Malaysia, in which the vast majority of optometrists had a Snellen chart, retinoscopy, ophthalmoscope, and Slit-Lamp.

These devices are also mandatory to have for the license, but the absence of close supervision over the optometry facilities by the Ministry of Health and the Council of Optometrists is a major reason for the lack of these necessary devices, in addition to the

lack of experience in using them by some optometrists and the transfer of the patient who requires examination of these devices to an ophthalmologist.

In this study, the optometrists who have RGP trial set and fluorescein strip are (62.4%). While Tonometer is the least device available, regarding its high cost and low demand, and requirements to use a local anesthetic, this is forbidden to use in private optometry centers, according to the PMOH regulations (PCO, 2021). These results are inconsistent with those (Aziz et al., 2020) in Malaysia.

#### **4.1.5 The frequency of providing optometry services by optometrists**

All participants confirmed they always take the patient's history and perform visual acuity and subjective refraction while performing eye examinations. Similar results were in studies of the UK, Mozambique, Sudan, Ghana, and India (Aziz et al., 2020; Boadi-Kusi et al., 2015; Gunn et al., 2022; Manuel et al., 2016; Thite et al., 2015)

Objective refraction was performed by all optometrists while just half of them perform retinoscopy, these results are consistent with the results of a study from Mozambique (Manuel et al., 2016), and Malaysia (Aziz et al., 2020). This could be explained by the availability of an auto-refractometer, which performs the role of the retinoscope and keratometer, but the retinoscope remains better in some cases of cataracts, keratoconus, and irregular astigmatism, in addition to being essential in examining children (Grosvenor, 2007).

Of optometrists, there were (12.9%) always performed children refraction (6-9 years), and (84.9%) sometimes. Children's refraction and vision screening are important to prevent vision impairments and amblyopia. Optometrists didn't perform children's refraction when it requires cycloplegic refraction in squint cases, ocular muscle problems, or when a patient is uncooperative. Optometrists, in general, refer patients to ophthalmologists or other optometrists in hospitals and surgical centers. In some cases, the patient's parents may not care about the child's condition and not pay attention to the examination. Note that the cost of the examination by the optometrist is less than the ophthalmologist. This worsens the child's vision. These results are inconsistent with those of (Gunn et al., 2022), where (96%) of optometrists perform children refraction routinely.

Most optometrists in this study were not performing Cycloplegic refraction and were not using diagnostic and therapeutic drugs, as their use is prohibited in private centers by MOH. The banning of cycloplegic refraction and diagnostic drugs in optical centers is the main reason for the unavailability of orthoptic services in two third of centers, besides lack of knowledge, and insufficient training. These results are consistent with the results of (Okasheh-Otoom et al., 2022) study, because of the Jordanian Ministry of Health rules that forbid the use of diagnostic and therapeutic drugs in optical centers. However, these results are inconsistent with the (AL Rasheed, 2019) study in Sudan, in which about half of the optometrists used diagnostic drugs, and therapeutic drugs, because of using the British scope of optometry in Sudan).

In this study, it was found that only a third of optometrists used an ophthalmoscope. This result is consistent with the (Aziz et al., 2020) study and inconsistent with (Manuel et al., 2016) study from Mozambique and with (Boadi-kusi et al, 2015) study in Ghana, in which three-quarters of optometrists used direct ophthalmoscope in a routine examination.

Despite the ophthalmoscope is available for more than half of optometrists in optometry centers, only a third of optometrists use it. This could be explained due to the lack of competence to perform ophthalmoscopy due to the lack of training, which leads to the failure to conduct a posterior eye examination, Cataract monitoring, and Glaucoma monitoring by optometrists in the Northern Districts of West Bank- Palestine. These results are inconsistent with the results of the Australian study (Kiely, et al, 2017), and the UK studies (Gunn et al., 2022; Harper et al., 2016). These previously mentioned studies were conducted in hospitals and National Health centers, where optometrists can perform all these services.

In the Northern Districts of West Bank, soft contact lens service is available in all workplaces except Governmental Hospital. Whereas, just half of the optometrists performed hard contact lens fitting services. This may result from the unavailability of a hard contact lens trial set for a third of optometrists, this could be explained by the lack of knowledge and insufficient training, in addition to the low demand for this service. These results are consistent with (Harper et al., 2016) study in the UK, and (Aziz et al,2020) study in Malaysia and results are inconsistent with the results of (Boadi-kusi et

al, 2015) in Ghana, because of the unavailability of the required equipment and low training.

Spectacles dispensing service was performed by (89.3%) of optometrists in this study, this is not strange as spectacles dispensing is the first optical service provided by optometrists in Palestine. Only (10.8%) of them had never provided and practiced it as they are working either in surgical centers or hospitals, where selling glasses is prohibited. These results are similar to those in Jordan and Sudan (Okasheh- Otoom et al, 2022, (AL Rasheed, 2019), because of the banning of selling glasses and performing dispensing in hospitals.

Not all binocular vision tests require the use of diagnostic drugs. Some tests can be performed without diagnostic drugs, such as a kind of screening, and as routine examinations to ensure that the eyes are straight and free of strabismus or accommodation and vergence problems. For more investigations, patients may need Cyclo-drugs. This study has demonstrated that (65.6%) of optometrists performed binocular vision. This could be related to the lack of knowledge and low training. It is consistent with (Okasheh- Otoom et al, 2022) in which the main reason for not performing binocular vision tests was lack of knowledge, while it is inconsistent with the Malaysian study in which (45%) of optometrists performed binocular tests (Aziz, et al, 2020).

Low-vision examinations are not common according to this study, as it requires special and costly equipment, the optometrist needs special courses in low-vision as a subspecialty of optometry and continuing training to be able to conduct these examinations, and because of the lack of demand for this service, as the Low-vision appliances are very expensive for the patient, difficult to use and dealing with it. Accordingly, low-vision tests are unavailable for (84.9%) of optometrists. These results are in line with the results of a study conducted in Malaysia in which only (11%) of optometrists did low-vision tests (Aziz et al., 2020). And in Jordan (Okasheh-Otoom et al., 2022), (95.8%) of optometrists didn't perform low-vision tests.

However, three-quarters of participants own a slit lamp, and only half of them use it to examine the anterior eye and diagnose ophthalmic diseases. The reason for this relatively high percentage is dry eye diagnosis which is not on the forbidden list.

Optometrists prescribe therapeutic drugs to less than a quarter, of those who either practice optometry in hospitals or prescribe drugs illegally as the prescription of therapeutic drugs by optometrists in optical centers is prohibited by the PMOH (PCO, 2021).

Optical Coherence Tomography (OCT), and Fundus Fluorescein Angiography (FFA) are optical imaging used to diagnose retinal problems like diabetic retinopathy, detachments, and ischemia, while Corneal Topography is used to diagnose keratoconus. These tests need cost equipment not available in the majority of optometry centers because it is used commonly in surgical centers and hospitals, in addition to the low demand and high cost. These results are consistent with those (Aziz et al, 2020) because tonometry is forbidden in the private sector in Malaysia. On the other hand, these results were inconsistent with (Manuel et al., 2016) study results because this study was conducted among optometrists who work in the National Health Centers in Mozambique.

In light of these results, it can be said that optometry in Palestine provides just the first and the second categories of “a Global Competency-Based Model of Scope of Practice in Optometry” (WCO, 2022).

#### **4.1.6 Barriers faced by optometrists**

##### **1. Policies and regulations**

###### **A. Insufficient continuing training**

Insufficient continuing training was the most mentioned barrier (93.6%) according to the perception of optometrists that affects negatively the development of the optometry profession and optometry services. These results are consistent with (Al Rasheed, 2019, George et al, 2019, Alotaibi, 2017, and, Boadi-kusi et al, 2015) studies where insufficient, costly training and the absence of continuous training were the main causes for inefficient optometry services. In addition to the results of (Carneiro & Jorge, 2020) in Portugal, where optometrists need training in ocular pharmacology, contact lens fitting, and low vision. Binocular vision, pediatric optometry, and diagnostic and therapeutic examinations were recommended for partial training. On the contrary, this result is inconsistent with the results of the (Aziz et al., 2020) study in which Malaysian

optometrists did not consider insufficient training as a barrier to the development of the optometry profession.

### **B. Mal distribution of optometry centers**

In the bylaws of the Syndicate of Optometrists, the distance between any two optical centers is determined as not less than 50 ground meters, measured from the two closest entrances to the two buildings (PCO, 2021). No provision limits the number of centers to the number of residents. Accordingly, the optometrist can open centers anywhere wants, provided the distance is 50 meters from the nearest other optical centers. This led to the accumulation of optics centers in the middle of the cities in some cities. And its lack in the outskirts of the city or suburbs. For example, in the city of Qalqilya, where there are 7 optical centers, all located along one street. There are no other centers in any other location in the city. These results are consistent with (Okasheh-Otoom et al., 2022), in Jordan, the majority of services were performed in big cities. There is a significant difference in the mal-distribution barrier according to qualification. Optometrists with Bachelor's degrees see this as a barrier more than other optometrists.

### **C. The narrow scope of practice**

In this study, (80.9%) of optometrists mentioned the narrow scope of practice as a barrier. Most optometrists thought that the regulations of MOH regarding the optometry profession are a barrier that prevents optometrists from performing optometry like optometrists in the UK, Australia, Canada, and the USA), where optometrists have the authority to diagnose and prescribe some medications, in addition to that some of them can perform some surgical operations like lacrimal system drainage problems and foreign body removal (NCSL, 2022).

These results are consistent with the results of (Okasheh-Otoom et al., 2022) study in which all optometrists reported that the health regulation restrictions were the main reason for not prescribing ocular medications, contact lens fitting, and Cycloplegic refraction. And the (no clear job description) was the reason for not performing refraction, visual acuity, Cycloplegic refraction, and spectacle dispensing. In addition, they recommended expanding the optometry scope in Jordan. Also, these results are consistent with (AL Rasheed, 2019) study, in which Sudanese optometrists reported that the role of optometrist as a primary care provider has to be improved by the Sudanese

Ministry of Health, in addition, (96%) of optometrists in Sudan complaint of no clear job description, and they recommended modifying the scope of optometry and protect optometry legally.

## **2. Economic and political problems**

Optometrists perceive that economic and political problems were the barriers in (86.2%), that prevent the provision of distinguished optical services in some cases. Where the unstable political situation, frequent closures, and repeated strikes in some cities in the North of West Bank lead to poor optometry services. In addition to the economic situation based on half a salary for public sector employees, raising prices and customs on imported goods makes economic movement in the optics sector difficult. In addition to the impact of COVID-19 and the lockdown on the Palestinian economy in general (PCBS, 2021), these results are consistent with the results of (K Karthikeyan et al., 2022) where 46.32% of optometrists participants in the survey were under COVID-19 lockdown, that might affect the firms financially owing to a lack and absence of employees, disrupted services, shipping delay, and consumer apprehension.

## **3. Societal culture toward optometry**

The culture was a barrier facing (86.2%) of optometrists in the Northern Districts of The West Bank.

Some people in Palestine still consider the optometrist to be a spectacle seller, or they limit the optometrist's role to dispensing spectacles. They prefer an eye examination prescribed by an ophthalmologist to a vision examination by an optometrist. Note that refraction is the core of optometry. Female optometrists noticed that the culture of women's work is somewhat less accepted than men's. Where they found that patients' confidence in the examinations of men is higher than that of women in some cases. Where some optometrists admitted that patients ask if there is a male specialist to examine or deal with.

## **4. Personal and human resources**

### **A. Lack of motivation**

Lack of motivation is a barrier for (85.1%) of optometrists in the Northern Districts of West Bank. Wages in the Northern Districts of the West Bank vary from one city to

other. In some cities, the monthly wage for an optometrist is less than the minimum wage established by the Palestinian Cabinet (1880 shekels) (Palestinecabinet, 2021).

The vast majority of jobs in the optometry profession are in the private sector, where there is no health insurance for optometrists and their families, in addition, not all optical centers adhere to the Palestinian Labor Law in terms of the number of working hours and vacations. The optometrist is forced to accept this situation due to the need for the job. While in the government sector, the employee receives annual and sick leaves, incentives, and health insurance. In the government sector or private hospitals, the employee feels job security, while in private optical centers, it is possible to terminate the work easily due to the existence of an annual contract or sometimes work without a contract.

Optometrists in Palestine do not practice the profession as they studied it, and this is because of the large gap between what they study and what they apply in the labor market (Labadi et al., 2022).

This study is consistent with (Boadi-Kusi et al., 2015), optometrists in Ghana said they didn't perform services regarding the absence of motivation. And inconsistent (Aziz et al., 2020), the lack of motivation was the least barrier to providing services in Malaysia because of the awareness of optical center owners of the importance of training and motivation for improving optometry.

## **B. Lack of time**

Lack of time is a barrier from the view of (66.0%) of optometrists in the Northern Districts of West Bank. Time is a barrier to performing some examinations as many examinations require a long time to perform such as ophthalmology, binocular vision tests, retinoscopy, and anterior eye examinations. In addition to the patient overload and the lack of optometrists to cover all patients in some workplaces like a governmental workplace in this study, that leads to not performing basic examinations such as refraction. In addition, it is a barrier for optometrists to continue education, training, and skills development. These results are in line with (Okasheh–Otoom et al., 2021) study in which the lack of time is the main reason for not performing ophthalmoscopy in Jordan, and (Aziz et al, 2020) study in which (56%) of optometrists in the private sector of

Malaysia, said they didn't perform full eye examinations due to lack of time. In Singapore time constraints and high costs are obstacles to training and continuing education (George et al, 2019).

#### **4.1.7 The relationship between services and the workplace**

According to this study's results, significant associations were found in services of a cycloplegic refraction, anterior and posterior eye examination, binocular vision, cataract and glaucoma monitoring, corneal topography, perimetry, tonometry, and low-vision tests. these services are provided in hospitals or surgical centers, and a little amount of private optometry centers provide these services. While there was a statistical difference in contact lens fitting services, which are mostly provided in private optics centers. These results are consistent with (Okasheh-Otoom et al., 2022) results, cycloplegic refraction was performed in (2.1%) of private optometry centers compared with (59.1%) in other workplaces, there was a significant association in pediatric refraction, binocular refraction, fundus examination (posterior eye examination), and low-vision.

#### **4.1.8 The relationship between services and districts**

Most of the services in the northern districts of West Bank are similar, except some services are provided in more cities than others, such as Low-vision, which is available only in the Nablus district, and optometrists in other cities refer patients to the center in Nablus to receive the service. The statistical difference in Cycloplegic refraction, binocular tests, and corneal topography related to the difference in workplaces between districts.

There is a shortage of hospitals and surgery centers in the districts of Tulkarm and Jenin. While it is absent in Tubas, Salfit, and Qalqilyah. Patients need to go to the other districts for receiving services such as cataract and glaucoma monitoring, corneal topography, and low-vision.

These results are consistent with those of (Obaid, 2020), in which Nablus was the center of optometry services in the northern districts of West Bank, and other districts had either shortages in services or absentees.

#### **4.1.9 The relationship between the frequency of performing optometry services by optometrists and the gender**

There is a significant association between low-vision fitting according gender, females provide this service more than males in this study, and this is a pure coincidence that has nothing to do with gender.

#### **4.1.10 The relationship between the frequency of performing optometry services by optometrists and the qualification**

In this study, many significant associations were found in children's refraction, diagnosing and treating simple eye diseases, and using diagnostic and therapeutic drugs. The favorite of providing these services is for bachelor's degree holders, optometrists with diplomas don't perform these services, the reason is the optometrists who employees in workplaces provide these services hold a bachelor's degree.

Clinicians who hold a diploma degree in optometry are called opticians, and the scope of opticians differs from the scope of optometrists according to the Model of Scope of Practice in Optometry of WCO, Opticians' work is optical dispensing (WCO, 2022). But in Palestine, opticians (2 years) have refraction and contact lens authority exactly like optometrists (4 years and more).

As the results show, little amount of BSc and more optometrists perform diagnose simple ocular pathology, and use diagnostic drugs like cycloplegia for performing Cycloplegic refraction which is the third category in the Model of Scope of Practice in Optometry of WCO (ocular diagnostic services), the fourth category (therapeutic services) also are not applied in Palestine, (77.5%) of optometrists didn't use therapeutic drugs related to the regulations' restrictions.

In this point, It is possible to say that the scope of optometry practice in Palestine is very narrow and does not exceed the second category of the Model of Scope of Practice in Optometry of WCO, unlike many countries in the world such as India, Ghana, Singapur, Mozambique, Australia, United Kingdome, and America.

These results are consistent with the results of (Okasheh-Otoom et al., 2022), in which optometrists with a BSc or higher are likely to perform cycloplegic refraction, pediatric refraction, and fundus examinations more than those with a diploma.

#### **4.1.11 The relationship between barriers and gender**

in this study, a significant association was found between gender and insufficient continuing training as a barrier. Males are concerned insufficient continuing training is a barrier more than females.

#### **4.1.12 The relationship between barriers and the qualification**

There is a significant association between qualification and insufficient continuing training as a barrier. Optometrists with a diploma degree perceived insufficient continuing training as a barrier more than BSc holders. In general, other barriers are the same according to qualification, this may result in the fact that almost the same working conditions exist for all optometrists' qualifications, which makes their perception of the barriers that prevent them from performing their tasks and developing themselves similarly.

While there was one university that had a program of bachelor's degrees in optometry in the West Bank, and the vast majority of optometrists of the 90s and 80s generations were graduates of the same university, this produced a lack of knowledge diversity. In addition to a lack of diversity of disciplines among the teaching and training staff at the university (Obaid, 2020). Now, there is another university that educates a bachelor's degree in optometry, this may affect optometry study and training.

#### **4.1.13 The relationship between barriers and workplaces**

The results found, there is a significant association between workplace and economic and political problems as a barrier. Optometrists working in private optometry centers recognized economic and political problems as a barrier more than those working in hospitals and surgical centers. The matter is due to the affected of private centers by changing economic and political conditions in Palestine more than hospitals since the centers depend heavily on market changes, high prices, and shipping rates and policies. In addition to being affected by the political conditions in Palestine, frequent closures, and strikes.

## **4.2 Recommendation**

### **Palestinian Ministry of Health**

1. Expanding the optometry scope of practice, to meet the WCO Competency Model of Scope of Practice in Optometry.
2. Hiring optometrists in primary care centers and government hospitals to provide vision examinations for school health, driving license examinations, and diabetics.
3. Creating a mandatory training period for optometrists before opening centers. To alleviate the problem of the lack of knowledge, and insufficient training.
4. Establishing deliberate inspection and control mechanisms for the optometry profession, concerning licenses and personnel affairs such as vacations, salaries, and equipment.
5. Disseminating and applying of job descriptions of optometrists in various workplaces providing optometry services.
6. Inserting the low-vision services and low-vision appliances under the Palestinian Health Insurance, due to the high cost and the necessity of these services.

### **Palestinian Council of Optometry**

1. Produce continuous education and training for optometrists, in low-vision, hard contact lens fitting, cycloplegic refraction, and monitoring keratoconus. To keep pace with the development taking place in these services in terms of new methods and equipment to provide., and to alleviate the problem of the lack of knowledge, and insufficient training.
2. Creating incentive programs and competitions in scientific research in optics, and international participation of optometrists in international conferences.

### **Universities**

1. Developing postgraduate programs and specialization programs in optometry.
2. Studying the actual market need for optometrists and determining the number of students accepted into the optometry programs in universities according to it.
3. Diversifying the teaching staff's specializations in the faculties of optometry can increase the efficiency of optometry graduates and their intimate knowledge of all optometry specialties.

4. Allowing student exchange between optometry faculties in Palestine and other faculties in Europe, Canada, and America.
5. Conducting research studies on the optometry profession and its services, and evaluating the competence of optometrists to work on empowering them and developing the profession.

### **The optometrists**

1. Increase self-confidence and the quality of the services they provide, through continuous training and training courses.
2. Work to develop the services they provide and add value to the service for the sake of excellence and competition.
3. Increasing community volunteer work to stimulate community awareness towards the optics profession and optometrists.
4. Awareness of the importance of volunteering and training in eye hospitals and surgical centers.

### **4.3 Strengths of study**

1. No previous studies had studied optometry services in Palestine from a healthcare management perspective.
2. The idea of the study is a result of the researcher's experience in the optometry field, which represents here irony and challenges faced due to the lack of proper stewardship in the optometry profession.

### **4.4 Study limitations**

1. The geographical distribution of optometry centers in cities and villages made some difficulties in face-to-face data collection.
2. Lack of accurate data in MOH and optometry during the data collection, a difference in the number of centers was found, as some centers were permanently closed, others were transferred to another city, and other centers were opened that were not included in the data of the Palestinian Ministry of Health

#### **4.5 Conclusion**

The optometry profession in Palestine is mostly provided by private optometry centers, which leads to the limited services provided, and the limitation of the optometry profession on refraction and its relations unlike the scope produced by the WCO. Optometrists in the northern districts of the West Bank faced many barriers that prevent them from improving the optometry profession such as insufficient continuing training, the limited scope of practice, economic and political barriers, and human resources barriers. Many optometrists have recommended the necessity of expanding the scope of work in the optometry profession for optometrists in their centers in line with the efficiency of the education they receive in Palestinian universities. The optometry profession in Palestine needs more studies and evaluation to develop the optometry profession on a scientific basis that keeps pace with scientific and professional development in this necessary profession.

## **List of Abbreviations**

<b>Abbreviation</b>	<b>Meaning</b>
F	Frequency
FFA	Fundus Fluorescein Angiography
MOH	Ministry Of Health (in Palestine)
NGOs	Non- Governmental Organizations
OCT	Optical Coherence Tomography
PCO	Palestinian Council of Optometry and Optics
PMOH	Palestinian Ministry Of Health
RGP	Rigid Gas Permeable
ROP	Retinopathy Of Prematurity
WCO	World Council of Optometry
WHO	World Health Organization

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## Appendices

### Appendix A

#### Examinations and instruments definition

Examination		Required instruments
<b>Patient's history</b>	Optometrists ask the patient about demographic information and patient profile, ocular history, health history, and the chief complaint (Grosvenor, 2007).	Record sheet
<b>Visual acuity</b>	Examination to confirm any blurred vision compliant in the history(Grosvenor, 2007).	Distance charts and near charts. These charts vary according to age and cognitive stages like Snellen chart E, LogMar, Landolt C, Numbers, alphabet, and key pictures (Grosvenor, 2007)
<b>Binocular tests</b>	Unilateral (cover-uncover test), and alternating cover test.	Occlude
	Corneal reflex test	Pen torch
	Convergence and accommodation tests	Pen torch and accommodative fixation target
	Ocular motility test	Pen torch
<b>Color vision test</b>	Is an examination mainly used to evaluate hereditary fundus dystrophies (Kanski, 2011)	Ishihara color test, city university, and Farnsworth (Kanski, 2009).
<b>Objective refraction</b>	Determination of the refraction state is based on the optical principles of refraction, with no requirement of the patient's response. Objective refraction makes subjective refraction easier and faster Grosvenor, 2007).	<p>Keratometry is used for the determination of the refractive power of the cornea, it provides information on astigmatism of the cornea (Grosvenor, 2007). Keratometry findings are important in hard and soft contact lens cases, and keratoconus patients.</p> <p>Retinoscopy provides information about both astigmatism and spherical errors. Static retinoscopy; a distance target (6m) fixation is used, while dynamic retinoscopy is used near objects for the patient's fixation (Grosvenor. 2007).</p> <p>The auto refractometer is an instrument that provided both keratometry and retinoscopy</p>

<b>Examination</b>		<b>Required instruments</b>
		findings, it uses useful in general observation, easy and fast, but it may be inaccurate compared with retinoscopy in cases of keratoconus, corneal lesion, children examinations without Cycloplegic agents (Grosvenor. 2007).
<b>Subjective refraction</b>	It determines the combination of spherical and cylindrical lenses required to place the far point of the eye at infinity. It provides the best vision for the patient through the best correction (Grosvenor, 2007).	Objective refraction Distance visual acuity chart Near visual acuity chart Illumination Trial lenses set Trial frame Jackson cross-cylinder Lens-meter
<b>Cycloplegic refraction</b>	Refraction using Cycloplegic agents like Atropine, Homatropine, Cyclopentolate, and Tropicamide. It helps in relaxing the ciliary muscles thus relaxing the accommodation. It is required for children's examination, in latent hyperopia patients, Esotropia cases, accommodative spasms, and asthenopia (Grosvenor, 2007).	Cycloplegic agent and subjective refraction instruments.
<b>Soft contact lens fitting</b>	Soft contact lens fitting is for the best correction and best comfortable contact lens experience. The optometrist has to examine the anterior eye and tear film, perform keratometry to determine the meridians of the cornea, and do refraction for the best vision.	Keratometer Slit-lamp biomicroscopy Refraction
<b>Hard contact lens fitting</b>	It is mostly used in high myopia and keratoconus cases (Grosvenor, 2007).	Keratometer Refraction Slit-lamp biomicroscopy, fluorescein strips RGP trial set.
<b>Anterior eye examination</b>	Examine the eyelids and conjunctiva, pre-corneal film, cornea, anterior chamber angle, anterior chamber, iris, and lens (Grosvenor, 2007).	Slit-lamp biomicroscopy is an instrument to assess eye components and determine any abnormalities (Kanski, 2009). It consists of an illumination system and an observation system (Grosvenor, 2007).

Examination		Required instruments
<b>Posterior eye examination</b>	Examination of the Vitreous and Retina (Grosvenor, 2007).	<p>A direct ophthalmoscope is a portable device that has illumination and a pen hole with magnification to see the inner eye components, sometimes requiring mydriatics to dilate the pupil (Grosvenor, 2007). The indirect ophthalmoscope is an ophthalmoscope that provides a stereoscopic view of the retina, using a condensing lens (Kanski, 2011). It is held on the head of the examiner to examine the fundus and retina, the image is seen inverted and reversed. It requires mydriatic agents. (Grosvenor, 2007).</p> <p>Slit-lamp biomicroscopy with condensing lens (15D for posterior pole examination, 20D for fundus general examination, 25D shows 50° of field, 30D is used for patients have small pupils, and 40D is used to examine children) (Kanski, 2011).</p>
<b>Corneal topography</b>	Corneal topography is an imaging test for the corneal surface that provides a color-coded map. Also provides the power and the axis of the corneal steepest meridian and the flattest one. It is used in the early detection of keratoconus, in pre and post-refractive surgery evaluation, and irregular astigmatism in contact lens wearers (Kanski, 2011).	Corneal Topography device.
<b>Orthoptics (strabismus tests)</b>	Is non-surgical management of eye movement disorders (squint or strabismus), and it is an investigation for binocular Vision tests. (ION, 2022).	Pen torch, prism par, binocular vision test instruments, and subjective refraction instruments.
<b>Pre and post-refractive surgeries assessment</b>	Evaluation of the case pre-refractive surgery by examining the refraction, corneal topography, and complete eye examination like anterior and posterior eye examinations, tonometry, and dry eye testing (Vinciguerra et al., 2021).	See (objective refraction, subjective refraction, anterior eye examination, posterior eye examination, corneal topography, and tonometry)

Examination		Required instruments
<b>Tonometry</b>	Tonometry is used in the measurement of Intra Ocular Pressure (IOP). It measures the force needed to flatten the cornea, as the force on the cornea equals the force in the eye (Kanski, 2011).	Goldmann applanation tonometer holding on a slit-lamp, and needs topical anesthesia and fluorescein. Other types of tonometers like Perkins, Tono- Pen, and Air-puff tonometers (Kanski, 2011).
<b>Visual field examination</b>	This examination can be done quickly, manually as a screening test, with minimum equipment, especially for glaucoma patients; as glaucoma is responsible for loss of visual field. So it is used in monitoring glaucoma, and optic disc diseases. Or perimetry for more investigations (Grosvenor, 2007)	Fixation target, Amsler Grid Chart, and Tangent screen (Grosvenor, 2007) A perimeter is a device for visual field assessment.
<b>OCT</b>	It is a non-contact, non-invasive imaging technique, that provides a high-resolution cross-sectional image for the vitreous, optic nerve, and retina. It is used to diagnose macular pathology, monitor the progression of macular diseases, and diagnose retinal detachment and retinoschisis (Kanski, 2011)	OCT device
<b>FFA</b>	Provides photographic surveillance for the retinal and choroidal circulation by injection of the fluorescein intravenously. It is used in Diabetic Retinopathy, Central and Branch Retinal Vein Occlusion, and Age-Related Macular Degeneration. (Kanski, 2011).	Fluorescein Cannula FFA Device
<b>Low-vision fitting</b>	Low vision is a condition in which the vision doesn't be improved or corrected by medical, surgical, spectacles, or contact lenses. Low vision is characterized by less than 6/18 in visual acuity or a	Visual acuity, visual field, ocular health examination, refraction, trial vision with distance and near aids like the afocal telescope, hand magnifiers, and telescopes with reading caps (Grosvenor, 2007)

Examination		Required instruments
	<p>visual field less than 10° from the fixation point, with the best correction possible (Vaishali &amp; Vijayalakshmi, 2020). Low-vision fitting and rehabilitation aim to improve the quality of life for vision impairment patients. Vision impairments may occur related to congenital eye disorders, age-related macular degeneration, Diabetic Retinopathy, Cataracts, Glaucoma, and retinal Detachment (Grosvenor, 2007)</p>	

## Appendix B

### Literature review summarization

	Country	Study	Author, year	Data collection tool	Study population	Sample size	Results
International studies	UK	Scope of practice of optometrists working in the UK Hospital	(Gunn et al., 2022)	Survey Monkey online	Optometrists working in the UK Hospital	90	<p>In the study of 2020, (88%) performed refraction, pediatric refraction (92%), adult contact lenses (71%), children (61%), and low vision (67%).</p> <p>The extended role services were performed in this study by (78%). (38%) for punctual plug insertion, (36%) for suture removal, and for foreign body removal (53%).</p> <p>In 2015 (96%) performed adult and children refraction. (87%) fitted contact lenses for adults, 82% for children, and (79%) for low vision.</p> <p>Extended role services had been performed by (96%) of participants. Punctual plug insertion (32%), suture removal (30%), and foreign body removal (30%).</p>
			(Harper et al., 2016).			70	
	Portugal	Competencies and training needs of the Portuguese optometrists – a national	(Carneiro & Jorge, 2020).	Self-administered an online questionnaire	Portuguese optometrists	444	<p>Retinoscopy, subjective refraction, slit-lamp, and ophthalmoscopy were most frequently performed. While binocular tests, contact lenses, and keratoconus assessments are performed sometimes. The rarely performed were low vision</p>

		inquiry					tests, perimetry, and pediatric examination Participants require training in ocular pharmacology, contact lens fitting, and low vision. Binocular vision, pediatric optometry, and diagnostic and therapeutic examinations were recommended for partial training.
	Malaysia	The private optometry practices in Malaysia: the professional services 2019	(Abd Aziz et al,2020)	An online questionnaire, by emails	All private optometrists, in the private sector	71	Barriers to not performing full eye examination in this study were the following: (79%) was the unavailability of optical equipment, (56%) restriction of time, (34%) of patients requested to not perform these examinations, (19%) spaces unavailability, (15%) insufficient training and (8%) lack of motivation. (93%) of optometrists perform medical history always, (51%) perform retinoscopy for refraction examination, and (42%) do ophthalmoscopy as a routine exam. (55%) of private optometrists who didn't use tonometry, (85%) of private optometrists performed full contact lens examinations, (26.8%) of them had an RGP trial set, and (49.3%) had fluorescein strip. (45%) performed orthoptics and binocular tests, and (11%) performed low-vision tests

	Singapore	Is there scope for expanding the optometrist's scope of practice in Singapore? – A survey of optometrists, and opticians in Singapore 2019	(George et al., 2019)	Self-administered questionnaire	Members of the Optometrist and Optician Board	230	(75%) of optometrists practice primary eye care services and extended role services. barriers were identified by optometrists to extended primary care roles by the pay, time, and costs involved in training. (81%) of optometrists reported that they referred patients to ophthalmologists in severe cases
	Australia	Optometry Australia Scope of Practice Survey	(Kiely, et al, 2017)	The online survey, by emails	Optometry Australia members	587	optometrists who had therapeutic endorsement (97%) were more confident than optometrists without therapeutic endorsement (92%) (70%) of optometrists monitored glaucoma patients. Approximately half of the participants referred patients to ophthalmologists for more investigations or non-confident medication used.
	Mozambique	assessment of Optometry Services in Mozambique 2016	Manuel et al., 2016	Self-administered questionnaire	all optometrists providing eye health services in the National Health System	36	(96%) of optometrists were responsible for refraction, (96%) used diagnostic drugs, (91%) did Cycloplegic refraction, (87%) did contact tonometry, and (57%) removed the foreign body. (91%) examined patients with refractive errors (67%) anterior segment disorders, (23%) posterior segment disorders, and

							(38%) low vision. The main barriers for optometrists in this study were lack of equipment, insufficient training, and lack of low-vision rehabilitation resources. They recommended identifying the role of optometry in Mozambique and developing an optometry council to improve the services and training with continuous training and education.
	India	The pattern of Optometry Practice and Range of Services in India 2015	(Thite, et al, 2015)	Online questionnaire	An optometrist who completed a 4-year Bachelor of Science in optometry	641	(98%) performed routine eye examination, subjective refraction, visual acuity test, and retinoscope for objective refraction. (70%) contact lens fitting and optical dispensing by (67%). This study showed that optometrists with post-graduation qualifications had more awareness of the importance of comprehensive eye examinations and investigations, in addition, to performing their examinations with confidentiality.
	Ghana	A cross-sectional survey of optometrists and optometric practices in Ghana 2015	(Boadi-kusi et al,2015)	Online survey	Optometrists registered with the Ghana Optometric Association	90	(100%) take medical histories always, (100%) did subjective refraction, (98%) used ophthalmoscope, (89%) used slit-lamp biomicroscopy, and (76%) retinoscope. A minimal number of participants performed contact lenses (10%), and low vision (9%), because of the

							unavailability of equipment required for contact lenses or low vision, limitation of space, low training, and absence of motivation.
Regional studies	Jordan	The scope of Optometry Practice in Jordan 2021	(Okasheh-Otoom et al., 2021)	Online questionnaire	Optometrists who provide optometry services across Jordan	714	<p>(57.8%) females. (81.5%) practice in big cities. (45.1%) diploma degree holders, (54.5%) Bachelor's degree holders. Basic optometric examinations were the most services provided, then the community eye care services. The most available services were visual acuity (97.9%), refraction (96.8%), (30%) provided ophthalmoscopy, (53.8%) binocular vision, and (12.6%) Cycloplegic-refraction. The least services provided were prescribing ocular medication, vision therapy, and low vision.</p> <p>The barriers faced by optometrists to not performing spectacle dispensing were lack of equipment, lack of knowledge a barrier to not providing binocular vision and vision therapy, lack of time made ophthalmoscopy difficult to perform, and license restrictions were the barrier to not performing the pediatric examinations and Cycloplegic refraction. Optometrists unanimously agreed not to prescribe ocular medications.</p>

							Restrictions imposed by regulations on optometry were the main reasons that prevent providing some optometry services as these are not in the job description.
	Saudi Arabia	Barriers to Low Vision Services Among Optometrists in Saudi Arabia	(Alsaqr, 2022)	Self-administered an online survey	Optometrists in 23 cities in Saudi Arabia	154	(51.2%) females. Optometrists in this study had bachelor's, master's, and Ph.D. degrees in optometry. (30%) of provided low vision services. Optometrists reported that the main barriers faced them in practicing low vision were (87%) insufficient training, (76%) lack of low vision services awareness, unavailability of low vision equipment (70%), lack of time (55%) and (30%) financial problems. The author recommended improving optometry education and low-vision training, in addition, to increasing the national coverage of patients with low-vision problems.
		Optometry Services in Saudi Arabia	(Alotaibi, 2017)		The registered optometrists in 240 hospitals around the KSA.	240	(81%) of facilities didn't provide optometry services for free, because of the lack of knowledge (22.6%), and (61.02%) shortages of qualified optometrists. As a result, (71.8%) of physicians refer patients to the nearest Optometrists in the city. The result showed no significant difference based on the type of hospital understudy, in

							addition to a dependency between the type of hospital and the number of patients visited the hospitals because a load of patients in facilities governed by the Ministry of Health (79.4%) is higher than private (5.9%) and military hospitals (14.7%).
	Sudan	The Role of Optometrists on the Primary Eyecare in Khartoum State of Sudan 2019	(AL Rasheed, 2019)	Self-administered questionnaire	Optometrists provide optometry services in Khartoum State	300	the majority of optometrists in Khartoum (99.7%) take their time with patients and communicate well with them, (99%) depended on the medical and family history of patients while they perform eye examinations, (90%) of participants used only equipment in diagnoses, (43%) used diagnostic drugs, (22%) used diagnostic dyes, (49%) used therapeutic drugs, (96%) reported they referred patients to ophthalmologists for more investigations. Optometrists in Sudan faced barriers, (96%) of optometrists complained of no clear job description, (87%) of lack of equipment, and lack of medical supplements. (95%) of participants recommended improving the role of optometrists in Sudan, (90%) preferred continuous training
Local studies	Palestine	Evaluation of eye healthcare	(Obaid, 2020)	Face to face or telephone questionnaire	All eye healthcare cadres and	331 eye care provider	(1.7%) of facilities that provide eyecare services were governmental, (0.8%) were NGOs, (and 97.31%) were private.

		services in the West Bank and East Jerusalem			eye facilities	183 eye care facilities	The total number of optometry services providers was (425) that (320) of which were optometrists, (75) were refractionists, (14) were qualified opticians, (14) were non-qualified opticians, and (2) were orthoptists. Optometrists who had a bachelor's degree were (69.6%), master's degree (3.43%), Ph.D. degree (0.38%), doctor of optometry (0.76%) diploma (18.32%), orthoptists (0.76%), and opticians without a qualified degree (7.25%). This study studied the eye healthcare resources per 50,000 population, where all districts met the vision 2020 ratio (1 optometrist: 50,000 population).
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## Appendix C

### The questionnaire in Arabic

استبيان دراسة تقييم خدمات البصريات في منطقة شمال الضفة الغربية

الجزء الأول: (المعلومات الشخصية) الرجاء وضع دائرة حول الخيار المناسب.

						تاريخ المقابلة
						الرقم التسلسلي
	2000s	90s	80s	70s	60s	الجيل
				أنثى	ذكر	الجنس
		دكتوراه	ماجستير	بكالوريوس	دبلوم	الدرجة العلمية
						التخصص بعد البكالوريوس
		20<	20-11	10-6	5-0	الخبرة (سنوات)
	UNRWA	مركز بصريات	مستشفى خاص	NGOs	حكومي	نوع المؤسسة الصحية
		مخيم	بلدة	قرية	مدينة	مكان المؤسسة الصحية
سلفيت	قلقيلية	طولكرم	نابلس	طوباس	جنين	المحافظة

الجزء الثاني: الرجاء وضع (√) في مربع الخيار المناسب.

ماهي الخدمات الصحية المتوفرة في المركز أو المؤسسة الصحية التي تعمل بها؟

غير متوفر	متوفر		الرقم
		بيع النظارات الطبية	1.
		فحص النظر Visual refraction	2.
		فحص النظر بالقطرة Cycloplegic refraction	3.
		فحص العدسات اللاصقة اللينة	4.
		فحص العدسات اللاصقة الصلبة	5.
		بيع العدسات اللاصقة	6.

		فحوصات العين الأمامية	.7
		فحوصات العين الخلفية	.8
		فحوصات ازدواجية الرؤية Binocular tests	.9
		فحص الحول Orthoptics	.10
		مراقبة Cataract	.11
		مراقبة Glaucoma	.12
		صورة Corneal Topography	.13
		عمليات تصحيح النظر	.14
		فحص ضغط العين	.15
		فحص المجال البصري	.16
		فحص (OCT)	.17
		فحص (FFA)	.18
		فحوصات Low-vision	.19
		ملاءمة اجهزة Low-vision	.20
		بيع اجهزة Low-vision	.21
			.22

الجزء الثالث: الرجاء وضع (√) في مربع الخيار المناسب.

ماهي المعدات البصرية المتوفرة في المركز او المؤسسة التي تعمل بها؟

الرقم	متوفر	غير متوفر
.1		Snellen chart E, log mar, Landolt C, Numbers, alphabet, key's pictures
.2		Near chart acuity test
.3		Pen torch
.4		Occluder
.5		Ishihara test
.6		Retinoscope
.7		Keratometer
.8		Complete trial lens set
.9		Trial frame
.10		Cross cylinder
.11		Slit lamp
.12		Ophthalmoscope
.13		Tonometer
.14		Contact lens trial set SCL
.15		Contact lens trial set RGP
.16		Fluorescein strip
.17		Contact lens solution

		Accommodative fixation target	.18
		Prism par	.19
		Lensmeter	.20

الجزء الرابع:: الرجاء وضع (٧) في مربع الخيار المناسب.

ما هو تكرارك لاجراء الفحوصات التالية في المؤسسة التي تماري مهنتك فيها؟

No	السؤال	دائما	أحيانا	أبدا
.1	أجري فحص عام استكشافي للمريض			
.2	أخذ التاريخ المرضي للمريض خلال فحص البصر الروتيني			
.3	أجري فحص visual acuity من ضمن فحوصاتي الروتينية للمريض			
.4	أجري فحص subjective refraction للمريض أثناء فحص البصر			
.5	أجري فحص objective refraction للمريض أثناء ممارسة فحص البصر			
.6	أجري فحوصات النظر للأطفال >9 سنوات			
.7	أجري فحص Cycloplegic refraction للمرضى			
.8	أجري فحص retinoscopy			
.9	أقوم بتجهيز النظارات الطبية			
.10	أجري فحص ملائمة العدسات اللاصقة اللينة			
.11	أجري فحص ملائمة العدسات اللاصقة الصلبة			
.12	أستخدم الصبغات الملونة للعين أثناء اجراء فحوصات العين			
.13	أجري فحوصات Binocular vision			
.14	أجري فحوصات Low-vision			
.15	أقوم بملاءمة أجهزة مساعدة Low-vision			
.16	أستخدم جهاز ophthalmoscope أثناء الفحص			
.17	أقوم بفحص وتشخيص وعلاج بعض امراض العيون مثل التهاب الجفن وجفاف العين والتهاب الملتحمة			
.18	أقوم بمراقبة مرض Cataract, Glaucoma, Keratoconus			
.19	أستخدم القطرات التشخيصية أثناء الفحص			
.20	أستخدم الأدوية العلاجية للمرضى			
.21	أجري فحوصات التصوير البصري: OCT, FFA, Topography			
.22	أجري فحوصات ضغط العين والمجال البصري			
.23	أجري فحوصات التقييم ما قبل وما بعد عمليات تصحيح البصر			
.24	ابيع النظارات الطبية			

#### الجزء الخامس:

Save translation إلى أي درجة توافق على العبارات التالية ، فيما يتعلق بالمعوقات التي تمنع التوسع في

خدمات البصریات؟

الرقم	ليست عائق	عائق
1.		عدم كفاءة التدريب المستمر للبصريات
2.		نقص التحفيز
3.		محدودية مجال العمل
4.		الأوضاع الاقتصادية والسياسية في فلسطين
5.		قلة الوقت
6.		التوزيع غير الجيد لمراكز البصريات
7.		الثقافة المجتمعية تجاه مهنة البصريات

#### الجزء السادس:

ماهي مقترحاتك لتطوير مهنة البصريات وتحسين أداء اختصاصيي البصريات؟

## Appendix D

### The questionnaire in English

Title: Assessment Of Optometry Services in The Northern Districts Of The West Bank- Palestine

**In the first part (personal information) please circle the suitable choice**

<b>Date of interview</b>						
<b>Serial number</b>						
<b>Generation</b>	60s	70s	80s	90s	2000s	
<b>Gender</b>	Male	Female				
<b>Scientific degree</b>	Diploma	Bachelor	Master	PHD		
<b>Specialty</b>						
<b>Experience (year)</b>	0-5	6-10	11-20	>20		
<b>Workplace/ center</b>	Governmental	NGOs	Private hospital	Private optometry center	UNRWA	Optometry school clinic
<b>Place</b>	City	village	Town	Camp		
<b>district</b>	Jenin	Tubas	Nablus	Tulkarm	Qalqilyah	Salfit

**The second part:** Please put (√) in the quarter of the appropriate answer.

What are the Optometry services available in your center, and workplaces?

No	Services	Available	Not available
1.	Sell optical spectacles		
2.	Visual refraction		
3.	Cycloplegic refraction		
4.	Soft contact lens fitting		
5.	Hard contact lens fitting		
6.	Sell contact lenses		
7.	Anterior eye examination		
8.	Posterior eye examination		

9.	Binocular tests		
10.	Orthoptics		
11.	Cataract monitoring		
12.	Glaucoma monitoring		
13.	Corneal topography		
14.	Refractive surgeries		
15.	Tonometry		
16.	Perimetry		
17.	OCT		
18.	FFA		
19.	Low-vision fitting		
20.	Low-vision appliances fitting		
21.	Low-vision appliances sell		

**The third part:** Please put (√) in the quarter of the appropriate answer.

What are the Optometric instruments available in your center or workplace?

No	Instruments	Available	Not available
1.	Snellen chart E, log mar, Landolt C, Numbers, alphabet, key's pictures		
2.	Near chart acuity test		
3.	Pen torch		
4.	Occluder		
5.	Ishihara test		
6.	Retinoscope		
7.	Keratometer		
8.	Complete trial lens set		
9.	Trial frame		
10.	Cross cylinder		
11.	Slit lamp		
12.	Ophthalmoscope		
13.	Tonometer		
14.	Contact lens trial set SCL		
15.	Contact lens trial set RGP		
16.	Fluorescein strip		
17.	Contact lens solution		
18.	Accommodative fixation target		
19.	Prism par		
20.	Lenmeter		

**The fourth part**

Please put (√) in the quarter of the appropriate answer.

What is the frequency of optometry services provided by you?

No	Question	Always	Sometimes	Never
1.	How often did you perform general observation on patients in your practice?			
2.	How often did you take the patient's history while you perform the eye examination?			
3.	How often did you perform visual acuity tests on patients in your practice?			
4.	How often did you perform subjective refraction for patients in your practice?			
5.	How often did you perform objective refraction for patients in your practice?			
6.	How often did you perform children's refraction?			
7.	How often did you perform Cycloplegic refraction in your practice?			
8.	How often did you perform retinoscopy in your practice?			
9.	How often did you perform spectacles dispensing?			
10.	How often did you perform contact lens fitting?			
11.	How often did you perform Hard contact lens fitting?			
12.	How often did you use diagnostic dyes in your practice?			
13.	How often did you perform Binocular vision tests?			
14.	How often did you perform Low-vision tests?			
15.	How often did you perform Low-vision aid fitting?			
16.	How often did you use ophthalmoscopy in your practice			
17.	How often did you diagnose and treat Simple ophthalmic diseases like blepharitis, dry eye, and conjunctivitis?			
18.	How often did you perform Monitoring cataracts, glaucoma, and keratoconus?			
19.	How often did you use diagnostic drugs			
20.	How often did you use therapeutic drugs			
21.	How often did you perform optical imaging like corneal topography, OCT, and FFA?			

22.	How often did you perform special tests like perimetry and tonometry?			
23.	How often did you perform Pre and post-refractive surgery monitoring?			
24.	How often did you sell optical products?			

**The fifth part:**

To which degree do you agree with the following statements, regarding the barriers that prevent the expansion of optometry services in optometry centers?

No	Barriers	Not a barrier	barrier
	<b>Policies and regulations</b>		
1	Insufficient continuing training		
2	Maldistribution of optometry centers		
3	The narrow scope of practice		
4	Economic and political problems		
5	Societal culture toward optometry		
	<b>Personal human resources</b>		
6	Lack of motivation		
7	Lack of time		

**The sixth part:**

**What are your recommendations for improving the optometry profession and the performance of optometrists?**

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## Appendix E

### The Graduate studies faculty approval of the thesis title and supervisor

An-Najah  
National University  
Faculty of Graduate Studies  
Dean's Office



جامعة  
النجاح الوطنية  
كلية الدراسات العليا  
مكتب العميد

التاريخ: 2021/10/10

حضرة الدكتورة مريم الطل المحترمة  
مديرة برنامجي ماجستير إدارة الصحة العامة والصحة العامة  
تحية طيبة وبعد،

#### الموضوع: الموافقة على عنوان الأطروحة وتحديد المشرف

فور مجلس كلية الدراسات العليا في جلسته رقم (410) المنعقدة بتاريخ 2021/10/7، الموافقة على مشروع الأطروحة المقدم من الطالب/ة ايناس فيصل دواس ابو عواد، رقم التسجيل 11952046، تخصص ماجستير إدارة الصحة العامة، عنوان الأطروحة:

تقييم خدمات البصريات المقدمة في شمال الضفة الغربية  
Assessment of Optometry Services in North District of West Bank - Palestine

بإشراف: د. أميرة شاهين

ملاحظة: لاعتماد الأطروحة وتسجيلها على الفصل الأول 2022/2021.

يرجى اعلام المشرف والطالب بضرورة تسجيل الأطروحة خلال اسبوعين من تاريخ اصدار الكتاب. وفي حال عدم تسجيل الطالب/ة للأطروحة في الفترة المحددة له/ا ستقوم كلية الدراسات العليا بإلغاء اعتماد العنوان والمشرف

وتفضلوا بقبول وافر الاحترام ...

عميد كلية الدراسات العليا

أ.د. وليد صويح

نسخة: د. رئيس قسم الدراسات العليا للعلوم الطبية والصحية المحترم

: عميد القبول والتسجيل المحترم

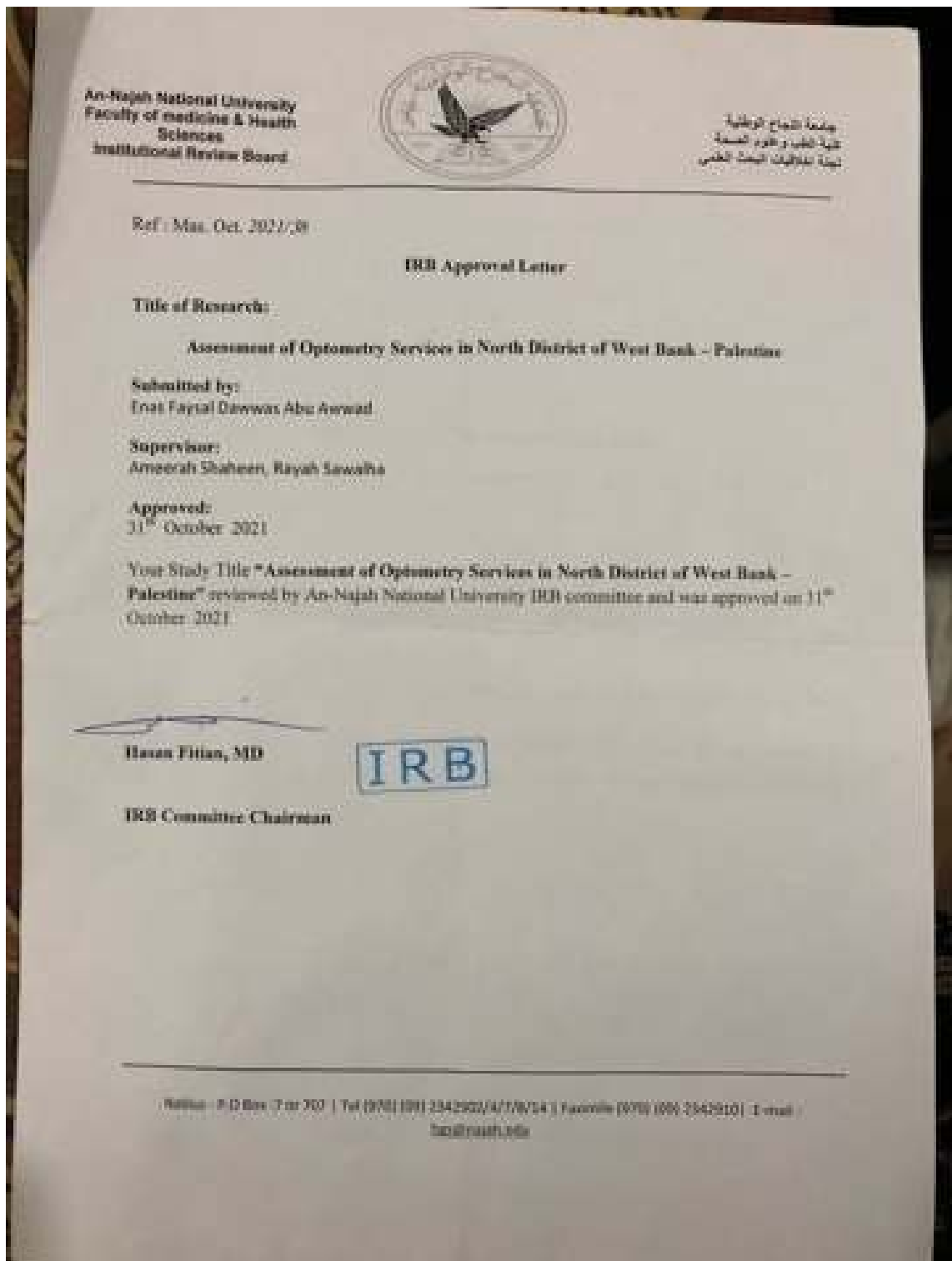
: مشرف الطالب

: ملف الطالب

جامعة النجاح الوطنية من الفصل 500 جامعة على مستوى العام في تصنيف النابز البريطاني 2022

تلفون: نابلس من 7-707 هاتف: 2345115، 2345114، 2345113 (09) 972 \* فاكس: 2342907 (09) 972  
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**Appendix F**  
**IRB Approval letter**



## Appendix G

### Facilitation request

An-Najah  
National University  
Faculty of Graduate Studies

جامعة  
النجاح الوطنية  
كلية الدراسات العليا

التاريخ: 2021/11/7

حضرة الدكتور وليد الطاطيب مدير التعويض والخدمات المساندة المحترم  
مستشفى سانت جون للعيون / عنتابا

تحية طيبة وبعد،

الموضوع: تسجيل مهمة الطالبة/ ايدان فيصل نواس ابو عواد، رقم تسجيل (11952046)  
تخصص ماجستير الصحة العامة

الطالبة/ ايدان فيصل نواس ابو عواد رقم تسجيل (11952046)، تخصص ماجستير الصحة العامة في كلية الدراسات  
العليا، وهي بصدد اعداد الأطروحة الخاصة بها والتي عنوانها:

تقييم خدمات البصريات المقدمة في شمال الضفة الغربية  
Assesment of Optometry Services in North District of West Bank – Palestine

يرجى من حضرتكم تسجيل مهملها في جميع البيانات والمعلومات المتعلقة بأطروحتها من خلال لجنة ابحاثها  
وتجاءا لوجه مع الياختة.

خلفاً بأن المعلومات التي يتم جمعها من لأشخاص التبعات العظمى فقط، وسوف يتم الحفاظ على السرية التامة  
وعدم استخدام هذه المعلومات لأشخاص آخرين.

شاكرون لكم حسن تعاونكم ومساعدتكم للمصلحة التعليمية.

مع وافر الاحترام،

محمد نبيه الدراسات العليا  
أ. د. وليد كصالح

صندوق بريد: 7-707 هاتف: 2345113، 2345114، 2345115 \* فاكس: 2342987، 2342987 \* بريد إلكتروني: info@najah.edu  
3200 (5) 3200 (5) Najah, P. O. Box (7) \* Fax: 972 + 2345113, 2345114, 2345115  
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## **Appendix H**

### **The study explanation in English**

**Dear colleagues.**

The aim of this study is, to explore optometry services provided in the optometry centers and classify them. To assess optometrists' perceptions, barriers that prevent them from expanding their services, and recommendations to enhance and develop the profession of optometry in Palestine. This survey consists of six parts. The first part consists of questions prepared for obtaining personal information, the second part consists of general questions about the availability of optometric services in your center. The third part consists of questions about the availability of sufficient tools and equipment. The fourth part consists of questions about the services provided in your center. The fifth part aims to determine barriers to the development of optometry services. And the sixth part aims to determine your recommendations for the development of the optometry profession.

Your answers will be kept confidential and will be used only for scientific purposes. For the survey results to be reliable, you must answer the questions sincerely and accurately. Please do not put names on the questionnaires.

**Thank you in advance for your interest and help.**

## Appendix I

### The study explanation in Arabic

بسم الله الرحمن الرحيم

زملاتي الاعزاء.

الهدف من هذه الدراسة هو استكشاف خدمات قياس البصر المقدمة في مراكز قياس البصر وتصنيفها. لتقييم تصورات أخصائيي البصريات ، والعوائق التي تمنعهم من توسيع خدماتهم ، والتوصيات لتعزيز وتطوير مهنة البصريات في فلسطين. يتكون هذا المسح من ستة أجزاء. يتكون الجزء الأول من أسئلة معدة للحصول على معلومات شخصية ، ويتكون الجزء الثاني من أسئلة عامة حول توفر خدمات قياس البصر في مركزك. الجزء الثالث يتكون من أسئلة حول توافر الأدوات والمعدات الكافية. الجزء الرابع يتكون من أسئلة حول الخدمات المقدمة في مركزك. الجزء الخامس يهدف إلى تحديد العوائق التي تحول دون تطوير خدمات البصريات. والجزء السادس يهدف إلى تحديد توصياتكم لتطوير مهنة البصريات.

ستبقى إجاباتك سرية ولن تُستخدم إلا للأغراض العلمية. لكي تكون نتائج الاستطلاع موثوقة ، يجب الإجابة على الأسئلة بصدق ودقة. من فضلك لا تضع أسماء على الاستبيانات.

شكرا لك مقدما على اهتمامك ومساعدتك.

الباحثة: إيناس أبو عواد

عنوان البحث: تقييم خدمات البصريات في منطقة شمال الضفة- فلسطين

## **Appendix J**

### **Consent form in English**

#### **Consent form**

I, the undersigned, am an optometrist with a bachelor's degree or diploma in optometry, and I practice the profession with an optometrist license and a professional practice certificate. I acknowledge that I have read and understood the information provided to me by the researcher and all my questions have been answered clearly. I agree to participate in this research with the right to withdraw from it at any time without reason and without being subjected to any prejudice. The researcher informed me of the objectives of the research, its importance, the data that will be collected, and how to deal with this data after the end of the research. I understand that all the information I provide will be treated confidentially and will not be made public in any way that leads to my identity being known. I also agree to publish the search results anonymously.

Signature:.....

Date:.....

## Appendix K

### Consent form in Arabic

بسم الله الرحمن الرحيم

الموضوع: نموذج موافقة

أنا ، الموقع أدناه ، أخصائي بصريات حاصل على درجة البكالوريوس أو دبلوم في البصريات ، وأمارس المهنة بترخيص اختصاصي بصريات وشهادة ممارسة مهنة. أقر بأنني قد قرأت وفهمت المعلومات التي قدمتها لي الباحثة وأن جميع أسئلتني قد تمت الإجابة عليها بوضوح. أوافق على المشاركة في هذا البحث مع الحق في الانسحاب منه في أي وقت دون سبب ودون التعرض لأي تحيز. أطلعتني الباحثة على أهداف البحث وأهميته والبيانات التي سيتم جمعها وكيفية التعامل مع هذه البيانات بعد انتهاء البحث. أفهم أن جميع المعلومات التي أقدمها سيتم التعامل معها بسرية ولن يتم نشرها بأي طريقة تؤدي إلى معرفة هويتي. أوافق أيضاً على نشر نتائج البحث بشكل مجهول.

التوقيع.....:

تاريخ.....:

**Appendix L**  
**Tables**

**Table 9**

*The cross-tabulation between the frequency of performing optometry services and gender*

Services	Male (n= 26)			Female (n=68)			Sig. (2-tailed)
	always	sometimes	never	Always	sometimes	never	
How often did you perform general observation on patients in your practice?	(26) 100.0%	0.00	0.00	(54) 79.4%	(14) 20.6%	0.00	.012*
How often did you take the patient's history while you perform the eye examination?	(26) 100%	0.00	0.00	(68) 100.0%	0.00	0.00	.
How often did you perform visual acuity tests on patients in your practice?	(26) 100%	0.00	0.00	(68) 100.0%	0.00	0.00	.
How often did you perform subjective refraction for patients in your practice?	(26) 100.0%	0.00		(66) 97.1%	(2) 2.9%	0.00	.382
How often did you perform objective refraction for patients in your practice?	(26) 100.0%	0.00	0.00	(68) 100.0%	0.00	0.00	.
How often did you perform children's refraction?	(2) 7.7%	(24) 92.3%	0.00	(10) 14.7%	(56) 82.4%	(2) 2.9%	.638
How often did you perform Cycloplegic refraction in your practice?	(3) 11.5%	(3) 11.5%	(20) 76.9%	(10) 14.7%	(7) 10.3%	(51) 75.0%	.761
How often did you perform retinoscopy in your practice?	0.00	(17) 65.4%	(9) 34.6%	(8) 11.8%	0.00		.569
How often did you perform spectacles dispensing?	(24) 92.3%	0.00	(2) 7.7%	(58) 85.3%	(1) 1.5%	(9) 13.2%	.406
How often did you perform contact lens fitting?	(17) 65.4%	(6) 23.1%	(3) 11.5%	(48) 70.3%	(15) 22.1%	(5) 7.4%	.529

How often did you perform Hard contact lens fitting?	(4)	15.4%	(13) 50.0%	(9) 34.6%	(12) 17.6%	(18) 26.5%	(38) 55.9%	.276
How often did you use diagnostic dyes in your practice?	(3)	11.5%	(11) 42.3%	(12) 46.2%	(15) 22.1%	(156) 23.5%	(37) 54.4%	.901
How often did you perform Binocular vision tests?	(2)	7.7%	(15) 57.7%	(9) 34.6%	(5) 7.4%	(39) 57.4%	(24) 35.3%	.941
How often did you perform Low-vision tests?	0.00		(2) 7.7%	(24) 92.3%	(1) 1.5%	(10) 14.7%	(57) 83.8%	.182
How often did you perform Low-vision aid fitting?	0.00		(1) 3.8%	(25) 96.2%	(4) 5.9%	(5) 7.4%	(59) 86.8%	.043*
How often did you use ophthalmoscopy in your practice	0.00		(9) 34.6%	(17) 65.4%	(7) 10.3%	(19) 27.9%	(42) 61.8%	.273
How often did you diagnose and treat Simple ophthalmic diseases like blepharitis, dry eye, and conjunctivitis?	0.00		(12) 46.2%	(14) 53.8%	(7) 10.3%	(28) 41.2%	(33) 48.5%	.285
How often did you perform Monitoring cataracts, glaucoma, and keratoconus?	0.00		(14) 53.8%	(12) 46.2	(5) 7.4%	(21) 30.9%	(42) 61.8%	.553
How often did you use diagnostic drugs	0.00		(6) 23.1%	(20) 76.9%	(6) 8.8%	(10) 14.7%	(52) 76.5%	.493
How often did you use therapeutic drugs	0.00		(6) 23.1%	(20) 76.9%	(4) 5.9%	(9) 13.2%	(55) 80.9%	.874
How often did you perform optical imaging like corneal topography, OCT, and FFA?	(1)	3.8%	(8) 30.1%	(17) 65.4%	(3) 4.4%	(16) 23.5%	(49) 72.1%	.638
How often did you perform special tests like perimetry and tonometry?	0.00		(1) 3.8%	(25) 96.2%	(3) 4.4%	(6) 8.8%	(59) 86.8%	.053
How often did you perform Pre and post-refractive surgery monitoring?	(1)	3.8%	(2) 7.7%	(23) 88.5%	(5) 7.4%	(6) 8.8%	(57) 83.8%	.521
How often did you sell optical products?	(24)	92.3%	0.00	(2) 7.7%	(58) 85.3%	0.00	(10) 14.7%	.367

\* Significant difference

**Table 10***The cross-tabulation between optometry services and qualification*

Services provided by optometrists	Diploma			BSc and more			Sig. (2-tailed)*
	Always	sometimes	never	Always	sometimes	Never	
How often did you perform general observation on patients in your practice?	(14) 100.0	0.00	0.00	(66) 82.5%	(14) 17.5%	0.00	0.00*
How often did you take the patient's history while you perform the eye examination?	(14) 100%	0.00	0.00	(80) 100%	0.00	0.00	.
How often did you perform visual acuity tests on patients in your practice?	(14) 100%	0.00	0.00	(80) 100%	0.00	0.00	.
How often did you perform subjective refraction for patients in your practice?	(14) 100%	0.00	0.00	(78) 97.5%	(2) 2.5%	0.00	.555
How often did you perform objective refraction for patients in your practice?	(14) 100%	0.00	0.00	(80) 100%	0.00	0.00	-
How often did you perform children's refraction?	0.00	(14) 100%	0.00	(12) 15.0%	(66) 82.5%	(2) 2.5%	.007*
How often did you perform Cycloplegic refraction in your practice?	(1) 7.1%	0.00	(13) 92.9%	(12) 15.0%	(10) 12.5%	(58) 72.5%	.101
How often did you perform retinoscopy in your practice?	0.00	(9) 64.3%	(5) 35.7%	(8) 10.0%	(42) 52.5%	(30) 37.5%	.648
How often did you perform spectacles dispensing?	(13) 92.9%	0.00	(1) 7.1%	(69) 86.3%	(1) 1.3%	(10) 12.5%	.529
How often did you perform contact lens fitting?	(10) 71.4%	(2) 14.3%	(2) 14.3%	(55) 86.8%	(19) 23.8%	(6) 7.5%	.827
How often did you perform Hard contact lens fitting?	(2) 21.4%	(5) 35.7%	(6) 42.9%	(13) 16.3%	(26) 32.5%	(41) 51.3%	.537

How often did you use diagnostic dyes in your practice?	(3) 14.3%	(4) 28.6%	(7) 57.1%	(16) 20.0%	(23) 28.8%	(41) 51.3%	.611
How often did you perform Binocular vision tests?	0.00	(8) 57.1%	(6) 42.9%	(7) 8.8%	(46) 57.5%	(27) 33.8%	.302
How often did you perform Low-vision tests?	0.00	(2) 14.3%	(12) 85.7%	(1) 1.3%	(10) 12.5%	(69) 86.3%	.950
How often did you perform Low-vision aid fitting?	0.00	(2) 14.3%	(12) 85.7%	(4) 5.0%	(4) 5.0%	(72) 90.0%	.958
How often did you use ophthalmoscopy in your practice?	(3) 7.1%	(5) 28.6%	(8) 64.3%	(6) 7.5%	(24) 30.0%	(50) 62.5%	.908
How often did you diagnose and treat Simple ophthalmic diseases like blepharitis, dry eye, and conjunctivitis?	0.00	(3) 21.4%	(11) 78.6%	(7) 8.8%	(37) 46.3%	(36) 45.0%	.004*
How often did you perform Monitoring cataracts, glaucoma, and keratoconus?	0.00	(4) 28.6%	(10) 71.4%	(5) 6.3%	(31) 38.8%	(44) 55.0%	.127
How often did you use diagnostic drugs?	0.00	(1) 7.1%	(13) 92.9%	(6) 7.5%	(15) 18.8%	(59) 73.8%	.010*
How often did you use therapeutic drugs?	0.00	(1) 7.1%	(13) 92.9%	(4) 5.0%	(14) 17.5^	(62) 77.5%	.038*
How often did you perform optical imaging like corneal topography, OCT, and FFA?	0.00	(3) 21.4%	(11) 78.6%	(4) 5.0%	(21) 26.3%	(55) 68.8%	.363
How often did you perform special tests like perimetry and tonometry?	0.00	(1) 7.1%	(13) 92.9%	(3) 3.8%	(6) 7.5%	(71) 88.8%	.531
How often did you perform Pre and post-refractive surgery monitoring?	0.00	(1) 7.1%	(13) 92.9%	(6) 7.5%	(7) 8.8%	(67) 83.8%	.093
How often did you sell optical products?	(13) 92.9%	0.00	(1) 7.1%	(69) 86.3%	0.00	(11) 13.8%	.500

\* Significant difference

**Table 11**

*The cross-tabulation between performing optometry services and type of workplace.*

Services	Private optometry centers (n= 81)			Others (n= 13)			Sig. (2-tailed) *
	Always	Sometimes	never	always	Sometimes	never	
How often did you perform general observation on patients in your practice?	(69) 85.3%	(12)14.8%	0.00	(11) 84.6%	(2) 15.4%	0.00	.958
How often did you take the patient's history while you perform the eye examination?	(81) 100.0%	0.00	0.00	(13) 100.0%	0.00	0.00	.
How often did you perform visual acuity tests on patients in your practice?	(81) 100.0%	0.00	0.00	(13) 100.0%	0.00	0.00	.
How often did you perform subjective refraction for patients in your practice?	(81) 100.0%	0.00	0.00	(11) 84.6%	(2) 15.4%	0.00	.165
How often did you perform objective refraction for patients in your practice?	(81) 100.0%	0.00	0.00	(13) 100.0%	0.00	0.00	.
How often did you perform children's refraction?	(3) 4.9%	(77) 95.1%	0.00	(8) 61.5%	(3) 23.1%	(2) 15.4%	.081
How often did you perform Cycloplegic refraction in your practice?	(4) 4.9%	(7) 9.9%	(69) 85.2%	(9) 69.2%	(2) 15.4%	(2) 15.4%	.000*
How often did you perform retinoscopy in your practice?	(4) 2.5%	(48) 59.3%	(31) 38.3%	(6) 46.2%	(3) 23.1%	(4) 30.8%	.066
How often did you perform spectacles dispensing?	(81) 100.0%	0.00	0.00	(1) 7.7%	(1) 7.7%	(11) 84.6%	.000*
How often did you perform soft contact lens fitting?	(59) 72.8%	(21) 25.9%	(1) 1.2%	(6) 46.2%	0.00	(7) 53.8%	.018*
How often did you perform Hard contact lens fitting?	(11) 13.6%	(29) 35.8%	(41) 50.6%	(5) 38.5%	(2) 15.4%	(6) 46.2%	.306

How often did you use diagnostic dyes in your practice?	(13) 16.0%	(25) 30.9%	(43) 53.1%	(5) 38.5%	(2) 15.4%	(60) 46.2%	.211
How often did you perform Binocular vision tests?	(5) 6.2%	(52) 64.2%	(24) 29.6%	(2) 15.4%	(2) 15.4%	(9) 69.2%	.087
How often did you perform Low-vision tests?	0.00	(11) 13.6%	(70) 86.4%	(1) 7.7%	(1) 7.7%	(11) 84.6%	.414
How often did you perform Low-vision aid fitting?	0.00	(6) 7.4%	(75) 92.6%	(4) 30.8%	0.00	(9) 69.2%	.066
How often did you use ophthalmoscopy in your practice	(5) 3.7%	(25) 30.9%	(53) 65.4%	(4) 30.8%	(3) 23.1%	(6) 46.2%	.094
How often did you diagnose and treat Simple ophthalmic diseases like blepharitis, dry eye, and conjunctivitis?	(6) 3.7%	(37) 45.7%	(41) 50.6%	(4) 30.8%	(3) 23.1%	(6) 46.2%	.241
How often did you perform Monitoring cataracts, glaucoma, and keratoconus?	(1) 1.2%	(31) 38.3%	(49) 60.5%	(4) 30.8%	(4) 30.8%	(5) 38.5%	.056
How often did you use diagnostic drugs	(1) 1.2%	(9) 12.3%	(70) 86.4%	(5) 38.5%	(6) 46.2%	(2) 15.4%	.000*
How often did you use therapeutic drugs	0.00	(14) 17.3%	(67) 82.7%	(4) 30.8%	(1) 7.7%	(8) 61.5%	.073
How often did you perform optical imaging like corneal topography, OCT, and FFA?	(1) 1.2%	(17) 21.0%	(63) 77.8%	(3) 23.1%	(7) 53.8%	(3) 23.1%	.303
How often did you perform special tests like perimetry and tonometry?	0.00	(4) 4.9%	(77) 95.1%	(3) 23.1%	(3) 23.1%	(7) 53.8%	.019*
How often did you perform Pre and post-refractive surgery monitoring?	0.00	(4) 4.9%	(77) 95.1%	(6) 46.2%	(4) 30.8%	(3) 23.1%	.000*
How often did you sell optical products?	(81) 100.0%	0.00	0.00	(1) 7.7%	0.00	(12) 92.3%	.000*

\* Significant difference

**Table 14***The cross-tabulation between barriers and type of workplace.*

<b>Barriers</b>	<b>Private optometry centers (n=81)</b>		<b>Others (n=13)</b>		<b>Sig. (2-tailed)*</b>
	<b>Not a barrier</b>	<b>Barrier</b>	<b>Not a barrier</b>	<b>Barrier</b>	
<b>Policies and regulations</b>					
Insufficient continuing training	(4) 4.9%	(77) 95.1%	(2) 15.4%	(11) 84.6%	.346
Maldistribution of optometry centers	(15) 18.5%	(66) 81.5%	(2) 15.4%	(11) 84.6%	.788
The narrow scope of practice	(12) 14.8%	(69) 85.2%	(6) 46.2%	(7) 53.8%	.055
<b>Economic and political problems</b>	<b>(5) 6.2%</b>	<b>(76) 93.8%</b>	<b>(8) 61.5%</b>	<b>(5) 38.5%</b>	<b>.002*</b>
<b>Societal culture toward optometry</b>	(8) 9.9%	(73) 90.1%	(5) 38.5%	(8) 61.5%	.069
<b>Personal and human resources</b>					
Lack of motivation	(11) 78.6%	(70) 86.4%	(3) 23.1%	(10) 76.9%	.468
Lack of time	(27) 33.3%	(54) 66.7%	(5) 38.5%	(8) 61.5%	.721

\* Significant difference

**Table 15**

*The cross-tabulation between barriers and districts.*

Barriers	Jenin		Tubas		Nablus		Tulkarm		Qalqilyah		Salfit		Sig.
	Not a barrier	Barrier	Not a barrier	barrier	Not a barrier	Barrier	Not a barrier	Barrier	Not a barrier	Barrier	Not a barrier	barrier	
<b>Policies and regulations</b>													
Insufficient continuing training	0.00	(18) 100.0%	0.00	(2) 100.0%	(6) 15.0%	(34) 85.0%	0.00	(20) 100%	0.00	(10) 100%	0.00	(4) 100%	.124
Maldistribution of optometry centers	(3) 16.7%	(15) 83.3%	0.00	(2) 100%	(7) 17.5%	(33) 82.5%	(6) 30.0%	(14) 70.0%	(1) 10.0%	(9) 90.0%	0.0	(4) 100%	.607
The narrow scope of practice	(5) 27.8%	(13) 72.2%	0.00	(2) 100%	(7) 17.5%	(33) 82.5%	(6) 30.0%	(14) 70.0%	0.00	(10) 100%	0.00	(4) 100%	.292
Economic and political problems	0.00	(18) 100%	0.00	(2) 100%	(7) 17.5%	(33) 82.5%	(4) 20.0%	(16) 80.0%	(2) 20.0%	(8) 80.0%	0.0	(4) 100%	.397
Societal culture toward optometry	(2) 11.1%	(16) 88.9%	(1) 50.0%	(1) 50.0%	(5) 12.5%	(35) 87.5%	(3) 15.0%	(17) 85.0%	(1) 10.0%	(9) 90.0%	(1) 25.0%	(3) 75.0%	.725
<b>Personal and human resources</b>													
Lack of motivation	(1) 5.6%	(17) 94.4%	0.00	(2) 100%	(9) 22.5%	(31) 77.5%	(4) 20.0%	(16) 80.0%	0.00	(10) 100%	0.00	(4) 100%	.289
Lack of time	(4) 22.2%	(14) 77.8%	0.00	(2) 100%	(16) 40.0%	(24) 60.0%	(6) 30.0%	(14) 70.0%	(6) 60.0%	(4) 40.0%	0.00	(4) 100%	.159

**Table 16***Participants (optometrists) recommendations.*

<b>Recommendations</b>	<b>(%)</b>
Providing jobs for optometrists in primary care centers of PMOH, school health, driving tests, and Government hospitals.	63.4%
Reconsidering and amending the rules and regulations applicable to the optics profession, in addition, to expanding the scope of practice.	51.6%
Continuing education and training for specialists to keep pace with developments in the profession and modern technologies, and developing postgraduate programs in optometry in Palestinian universities	50.6 %
Compulsory training before obtaining the practice of the profession in approved centers based on scientific standards	46.2%
Providing government-subsidized optical services covered by government health insurance, and connecting optometrists affiliated with the Optometrists Syndicate with health insurance.	31.1%
Oversight and inspection of the optics profession according to a well-studied mechanism.	17.2%
Community awareness of optometry and its importance in primary eye care.	12.9%
Reducing the number of admissions students of optometry in Palestinian universities.	12.9%
Determining the work of ophthalmologists in examining eye diseases, not examining vision examinations.	6.5%
Reconsidering the geographical distribution of optics services and supporting the diversity of specialized services in the governorates of the country.	5.4%
Amending the bylaw of the union like the rest of the unions in Palestine.	6.5%



جامعة النجاح الوطنية  
كلية الدراسات العليا

## تقييم خدمات البصريات المقدمة في محافظات شمال الضفة الغربية

إعداد

إيناس فيصل دواس أبو عواد

إشراف

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د. راية صوالحة

قدمت هذه الرسالة استكمالاً لمتطلبات الحصول على درجة الماجستير في إدارة الصحة العامة، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس-فلسطين.

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### الملخص

**مقدمة:** علم البصرات هو المهنة التي تقدم خدمات فحص البصر والعيون من قبل أخصائيو البصرات، بالإضافة إلى دور التوعية والإرشاد الصحي للعيون. هدفت هذه الدراسة إلى تقييم خدمات البصرات المقدمة في مناطق شمال الضفة الغربية (جنين، طوباس، نابلس، طولكرم، قلقيلية، و سلفيت).

**المنهجية:** تم إجراء دراسة مقطعية وصفية بين شهري تشرين الثاني وكانون الأول 2021 ، حيث تم اختيار الفئة المستهدفة المكونة من جميع أخصائيي البصرات الحاصلين على دبلوم فما فوق والذين يقدمون خدمات البصرات في المحافظات الشمالية من الضفة الغربية. كان المشاركون 94 من أخصائيي البصرات الذين أجابوا على استبيان تم إعداده من ثلاث دراسات سابقة وملاء الباحث في مقابلات وجهاً لوجه.

**النتائج:** (72.2%) من فاحصي البصرات من الإناث ، (85.2%) من الاختصاصيين حاصلين على بكالوريوس فأعلى، وكانت مساهمة القطاع الخاص (97.9%) من خدمات البصرات المقدمة. كانت خدمات قياس البصر مثل فحص النظر وتركيب العدسات اللاصقة وتجهيز النظارات هي الأكثر توفراً. ومع ذلك ، تم العثور على اختلافات في الخدمات المقدمة وفقاً لمكان العمل ومؤهلات أخصائيي البصرات. حيث ان (14.8%) فقط من فاحصي البصرات في مراكز البصرات الخاصة أجروا فحص

النظر باستخدام قطرات طبية بينما أجراه (84.6%) من فاحصي البصريات في المستشفيات. علاوة على ذلك ، فقط (7.7%) من حملة الشهادات و (26.3%) من البكالوريوس استخدموا الأدوية التشخيصية. كان عدم توفر التدريب المستمر للبصريات هو العائق الأول الذي يواجهه أخصائيو البصريات (93.6%) ، وكان له ارتباطات كبيرة بالجنس والمؤهلات. بينما كانت المشاكل الاقتصادية والسياسية عائقا أمام أخصائيي البصريات العاملين في مراكز البصريات الخاصة (93.8%) وأولئك في أماكن العمل الأخرى (38.5%). أوصى أخصائيو البصريات بتوسيع نطاق ممارسة فحص البصريات في فلسطين والسماح لأخصائيي البصريات بتقديم خدمات الرؤية في مراكز الرعاية الصحية الأولية التابعة لوزارة الصحة الفلسطينية.

**الخلاصة:** تحتاج مهنة البصريات واختصاصيي البصريات لمزيد من الاهتمام والدراسات من أجل رفع كفاءة المهنة وتطويرها أسوة بالدول المتقدمة. إضافة إلى رفع الوعي المجتمعي حول أخصائي البصريات والخدمات المقدمة، فأخصائيي البصريات الفلسطينيين قادرين على تقديم الخدمات التخصصية في حال توسيع نطاق العمل والسماح لهم بممارسة مهنتهم وفقا لكفاءتهم.

**الكلمات المفتاحية:** البصريات ، فاحص البصر ، نطاق العمل ، فلسطين ، خدمات العناية بالعيون