

An-Najah National University

Faculty of Graduate Studies

**Evaluation of Eye Health Care Services in the
West Bank and East Jerusalem:
A cross-sectional study**

BY

Aziza Mousa Obaid

Supervisor

Dr. Zaher Nazzal

Co-Supervisor

Dr. Hamzah Al-Zabadi

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

2020

Evaluation of Eye Health Care Services in the West Bank and East Jerusalem: A cross-sectional study

By

Aziza Mousa Obaid

This Thesis was Defended Successfully on 13/8/2020 and approved by:

Defense Committee Members

Signature

- | | | |
|--------------------------------|----------------------------|--------------|
| 1. Dr. Zaher Nazzal | / Supervisor | |
| 2. Dr. Hamzah Al-Zabadi | / Co- Supervisor | |
| 3. Dr. Shaenaz Najjar | / External Examiner | |
| 4. Dr. Nihal Natour | / Internal Examiner | |

III

Dedication

To my beloved parents who made me who I am.

To the Great souls, I have been lucky enough to cross paths with...

To those who have always been there for me, who have done so much without even knowing it, and with whom I have shared the bitter and the sweet.

...

To my future self in times of hesitation.

Acknowledgment

First and foremost, I **thank God** for giving me the strength, knowledge, ability, and opportunity to undertake this work and for the persistence to persevere and complete it well. Without His blessings, this achievement would not have been possible.

I also would like to extend my gratitude...

To my wonderful professor, Dr. Liana Al Labadi, for her assistance, patience, and incredible support in helping me write this thesis.

To my supervisors, Dr. Zaher Nazzal and Dr. Hamzeh Al-Zabadi, for their patient guidance, encouragement, and advice during my time under their direction.

To Dr. Yousef Al-shanti who provided sound advice and assistance when needed.

To the optometry students (Class of 2020) who helped with the data collection.

To An-Najah National University, the Palestinian Ministry of Health, the Palestinian Ophthalmology Society, and the Palestinian Association for Optometrists and Opticians.

الإقرار

أنا الموقعة أدناه مقدمة الرسالة التي تحمل العنوان:

Evaluation of Eye Health Care Services in the West Bank and East Jerusalem: A cross-sectional study

أقر بأن ما اشتملت عليه هذه الرسالة إنما هي نتاج جهدي الخاص، باستثناء ما تمت الإشارة إليه حيثما ورد، وأن هذه الرسالة ككل، أو أي جزء منها لم يقدم من قبل لنيل أية درجة علمية أو بحث علمي أو بحثي لدى أية مؤسسة تعليمية أو بحثية أخرى.

Declaration

The work provided in this thesis, unless otherwise referenced, is the researchers own work, and has not been submitted elsewhere for any other degree or qualification.

Students name:

اسم الطالبة:

Signature:

التوقيع:

Date:

التاريخ:

VI
List of Content

No	Content	Pages
	Dedication	Iii
	Acknowledgment	Iv
	Declaration	V
	List of Tables	Viii
	List of Figures	Ix
	List of Appendices	X
	List of Abbreviations	Xi
	Abstract	Xii
	Chapter One: Introduction	1
1.1	Background	1
1.2	Significance of the study	4
1.3	Study Objectives	5
	Chapter Two: Literature Review	7
2.1	Worldwide	7
2.2	AFRICA	9
2.3	AMERICA AND EUROPE	11
2.4	THE MIDDLE EAST AND ASIA	16
	Chapter Three: Materials and Methods	20
3.1	Study Design, Settings and Population	20
3.2	Inclusion and exclusion criteria	20
3.3	Sample Size	21
3.4	Data collection Tool	22
3.5	Data Management and operational definitions	24
3.6	Ethical considerations	25
3.7	Data Analysis	25
	Chapter Four: Results	27
4.1	Eye health care facilities and services	27
4.1.1	Types of facilities	27
4.1.2	Geographical distribution of eye care facilities and servic	29
4.1.3	The proportion of eye care facilities per population size	31
4.1.4	Spectacle manufacturing workshops	32
4.1.5	Available services	32
4.2	Human resources in eye care	37
4.2.1	Training of eye health professionals	37
4.2.2	Eye health Human resources categories	37
4.2.3	Number of human resources according to facility ownership	44
4.2.4	Distribution of eye health human resources by distri	44

4.3	Ophthalmic equipment	52
4.4	Geographical comparison of operational capacity	55
	Chapter Five: Discussion	56
5.1	Available Services	56
5.2	Human resources in eye care	62
5.3	The Vision 2020 process indicators for the OPT	68
5.4	Study Strengths and limitations	70
5.5	Conclusion and Recommendations	71
	References	73
	Appendices	80
	الملخص	ب

VIII
List of Tables

No	Content	Pages
Table 1	Summarized Ratios Worldwide in Regard to the WHO Recommendations.	8
Table 2	Operational Definitions	24
Table 3	Variables categorization table	26
Table 4	Types of eye care facilities owned by sector (N=227)	28
Table 5	Geographical distribution, years of operation and locality of eye care facilities in the OPT (N=227)	30
Table 6	Comparison of the proportion of eye care facilities to the population size by OPT districts (N=227)	31
Table 7	The type of eye care services available in the OPT districts	34
Table 8	The type of eye care Services provided by ophthalmologists (N=62) and optometrists (N=121)	36
Table 9	Socio-demographic characteristics of eye health cadres (N=524)	38
Table 10	Ophthalmologists practicing in OPT according to their subspecialty Training (N=99)	40
Table 11	Training location of ophthalmologists (N=69)	41
Table 12	Educational qualifications of optometrists in the OPT (N=262)	43
Table 13	Number of human eye care cadres according to the type of sector (N=331)	44
Table 14	Distribution of eye health human cadres by district (N=460)	46
Table 15	Weekend and evening access of human eye care cadres in the OPT (N=331)	47
Table 16	Employment types for eye care cadres in the OPT (N=331)	48
Table 17	Eye health human resources per 50,000 population in the OPT (N=425)	49
Table 18	Ophthalmic equipment in OMD and OPTO practices (N=183)	53
Table 19	Ophthalmic equipment in OMD clinics and hospitals (N=62)	54
Table 20	Vision 2020 operational capacity process indicators for the OPT (N=82)	55

IX
List of Figures

No	Content	Pages
Figure 1	The sectors of eye care facilities in the Occupied Palestinian Territories (OPT)	28
Figure 2	The distribution of Spectacle manufacturing workshops according to locality	32
Figure 3	Geographical distribution of eye care services in the OPT	35
Figure 4	Optometrist population in the OPT	39
Figure 5	Ophthalmologists population in the OPT	39
Figure 6	Distribution of ophthalmologists with subspecialties by district	42
Figure 7	Training location of eye health human cadres	43
Figure 8	Ratio of ophthalmologists to population	50
Figure 9	Optometrists per 50,000 population in the OPT and selected countries*	51
Figure 10	Ophthalmologists per 50,000 in the OPT and selected countries	51
Figure 11	Geographical comparison of operational capacity according to district.	55

List of Appendices

No	Content	Pages
Appendix1	Questionnaires	80
Appendix2	Verbal consent form statement	94

List of Abbreviations

ANU	An-Najah national university
WHO	World health organization
OPT	Occupied Palestinian territories
WB	West bank
IRB	Institutional review board
OMD	Ophthalmologist
OPTO	Optometrist

**Evaluation of Eye Health Care Services in the West Bank and East
Jerusalem: A cross-sectional study**

BY

Aziza Mousa Obaid

Supervisor

Dr. Zaher Nazzal

Co-Supervisor

Dr. Hamzah Al-Zabadi

Abstract

Introduction: Human resources are the most important asset of any health system and their availability and quality are key determinants of efficiency and quality of health services provided.

Aim of the study: To assess and evaluate the eye health care services (facilities & eye care cadres) in the West Bank and East Jerusalem, in addition to the geographical distribution of these services.

Material and Methods: This quantitative cross-sectional study, which is recommended by the WHO Vision 2020 "right to sight" initiative, was conducted at the level of the West Bank cities and East Jerusalem through phone interviews or face-to-face administered questionnaire. The response rate was 76.9% among optometrists and 72.7% among ophthalmologists; the study included 183 out of 227 eye care facility and 331 out of 524 eye care providers in the Occupied Palestinian territories.

Results: The majority of eye care facilities in the OPT N=212 (93.3%) belong to the private sector, including five major hospitals, 58 eye clinics, five eye surgical centers, and 143 optical centers. Civil, NGO and governmental institutions represented only 4.01%, 0.8% and 1.7% of the

facilities respectively. The Occupied Palestinian territories mostly met the WHO vision 2020 criteria for the number of human resources with 1.6 ophthalmologists and 5.7 optometrists per 50,000 populations. However, the OPT did not meet the WHO criteria for the operational capacity; the average in the OPT was 0.5 Eye beds/20,000. Also, the eye care situation in the OPT suffers from an inappropriate distribution of eye care health services and cadres and a lack of subspecialties among eye care practitioners, especially in the governmental sector.

Conclusion: A better distribution of eye care cadres and the establishment of higher degrees and new training programs, especially for optometrists are highly recommended. Optometrists' role should be redefined for primary eye care in rural regions and small towns, for the delivery of eye care services in the underprivileged areas to become more accessible,

Key Words: Evaluation, Eye Care Services, Eye Care Cadres, Optometrist to Population ratio, Ophthalmologists to Population ratio.

Chapter One

Introduction

1.1 Background

Human resources are the most essential resource of any health care system, and their accessibility and quality are key determinants of productivity and efficiency of health care services. They are essential to the achievement and sustainability of all health care delivery.

One of the recommendations of Vision 2020 "right to sight" initiative, which was a joint effort launched by the World Health Organization (WHO) together with more than 20 international nongovernmental organizations to eliminate avoidable blindness by the year 2020, is to assess eye health care workforce and eye health care services(1). The fundamental objective of this initiative is to build up a manageable, equitable, and thorough eye-care system as an essential piece of national health systems, in view of the standards and practice of primary health care. An adequately prepared workforce fills in as the connection between infrastructure and technology from one perspective and the procedures required to control avoidable causes of blindness and visual impairment, on the other. Assessing these eye care workforce can help plan current and future eye care services in countries worldwide(2).

“The World Health Organization Program for the Prevention of Blindness adopted the principles of universal health coverage (UHC) in its latest plan, Universal Eye Health: A Global Action Plan, “2014–2019”. This plan

builds on the achievements of Vision 2020; nevertheless, the WHO at present is a long way from accomplishing universal health coverage for the 226 million individuals on the world, even though a large number of whose visual impairment could have been prevented or could be managed. There is a need for an additional 5.8 dollars per person per year between 2010 and 2020 to control avoidable blindness. Almost half (48%) of this investment being needed in low-income and middle-income countries. (1)

The WHO states that in several countries, the workforce is restricted by the unavailability, low output, mal distribution, and suboptimal outcomes. No place is this more obvious than in the economically disadvantaged countries, where the need is most noticeable. As key indicators of eye health system development, regular measurement of human resources for eye health to population ratios was recommended by the WHO vision 2020 program to evaluate the needs for each country (2).

According to a recent report published in 2016, 1.4 million Palestinians, including refugees, face restricted access to primary health care(3). The blindness rate in the OPT was ten times greater than in the West(4). This is a direct result of the area's access issues, poverty rates, and significant levels of hereditary eye diseases. Living in separated zones prompts a rise in interfamilial marriage, which like this prompts expanded degrees of hereditary eye diseases.

In Area C of the West Bank (WB) (defined as areas under full Israeli control), many Bedouin communities, over 180,000 Palestinians, suffer unequal access to health care due to restrictions placed on the Palestinian Authority in being allowed permission to build any health facilities. The Israeli occupation places restrictions on movement through a combination of physical obstacles, including barriers and checkpoints, bureaucratic constraints, such as permit requirements (3).

The Occupied Palestinian territories (OPT) (WB and East Jerusalem) eye care system is delivered through four main service providers, which include governmental, non-profit, UNRWA (United Nations Relief and Works Agency for Palestine Refugees in the Near East) and privately owned clinics and hospitals. Optical services, which provide spectacle, and contact lens services, are all delivered through the private sector. The human eye resources that offer eye care services to the population consist of ophthalmologists, optometrists, opticians, orthoptists, occupational therapists, and nurses. Although statistics on the supply of these eye health providers are available, only one study in the literature addressed the issue of accessibility to eye care in Palestine(4). Still, it did not provide any statistical information on geographical distribution and eye care personnel: population ratios.

1.2 Significance of the study

There are no statistics reported on the number or type of services provided by a various eye care providers in the OPT. The availability and distribution of human resources and eye care facilities is associated with the quality of eye care delivery, its uptake, and therefore, on blindness prevention(5). It is crucial to ensure that people have access to eye care services that meet their needs, the largest obstacle faced in the fight against blindness in different parts of the world is lack of access to good quality and affordable eye care services, especially in the far rural areas(1). In addition, high eye disease burden may have an adverse impact on a country's productivity, growth, and, ultimately, economic development. There is no evidence-based data relating to whether poor access to eye care among urban, rural and refugee populations in the OPT is related to the geographical distribution of eye care services. Vision 2020 initiative, in an effort to eliminate preventable blindness, has recommended each country assess its eye care workforce to determine the quality and efficiency of eye services provided and ensure the delivery of eye health care services to most of the population.

Even though many countries worldwide have conducted eye care workforce analysis, no such study has tackled this issue in the OPT. To our knowledge, this is the first study to document comprehensive and accurate information about the country's eye care workforce.

1.3 Study Objectives

Aim of the study:

This study primary objective is to identify the number, type of services and geographical distribution of the eye care cadres in the OPT, and to determine whether the available services meet the WHO vision 2020 criteria. Information provided from this study is of high importance as it provides baseline information on the status of eye care services in the WB and East Jerusalem, which will, in turn, help develop policies that will better improve eye care provision in the country.

Specific objectives:

1. To determine the number and geographical distributions of facilities providing eye health services in the West Bank and East Jerusalem during 2019.
2. To classify the type of eye health care service provided by each facility: primary, secondary or tertiary.
3. To sort the type of eye health care service provided by each eye health care carders.
4. To determine the qualifications and training locations of eye health care cadres.
5. To determine the number of eye health care cadres working in each sector.

6. To determine the employment type (Full/ part-time) and working hours (Morning /Evening hours -past four pm-) of each eye health care carders.
7. To determine the quantity and geographical distribution of eye care ophthalmic equipment used in the OPT's eye care facilities.
8. Evaluate the OPT progress toward Vision 2020 process indicators, including the eye health care cadres to population ratios and the operational capacity of eye care facilities.

Chapter Two

Literature Review

2.1 Worldwide

The goal of this literature review is to examine the eye care services and workforce analysis worldwide based on the WHO vision 2020 recommendations. PubMed and Google scholar were the search engines used to conduct this literature review. The search included articles that were focused on geographical distribution and work force analysis of eye care services. Several studies were reviewed and summarized below based on results from each continent. The majority of countries in America and Europe lack ophthalmologists, while there is a specific lack of ophthalmic sub-specialties in Africa and Asia. A large proportion of the world has inadequate optometry services, and uneven distribution of eye care services between urban and rural areas. According to our literature review, several countries did not meet the WHO vision 2020 goal for adequate eye care services, as indicated in table 1.

Table 1. Summarized Worldwide Ratios about the WHO Recommendations.

Continent	Country	Country Ratios	Did It Meet The WHO Recommendations	Vision 2020 Goal
AFRICA	<i>N-C Nigeria (Kware Statien)</i>	1 OMD: 12 eye care worker	NO	-4 OMD: million populations. -10 OPTO: million populations.
	<i>Zambia</i>	3 eye care workers: 100,000	NO	
	<i>Sub-Saharan Africa</i>	4 OMD: million 3 OPTO: million	YES for OMD's NO for OPTO's	
	<i>Ghana</i>	1 OMD: 377,661 1 OPTO: 324,552	NO	
NORTH AMERICA	<i>USA</i>	2.1 OMD: 100,000 11.2 OPTO: 100,000	YES	-1 OMD: 250,000 populations. - To achieve an appropriate amount of optometrists per population. -AOA recommends 1 OPTO: 7,000 pop
	<i>NEW York</i>	1558 OMD: 10 million 1 OPTO: 9,192	NO	
	<i>Alabama</i>	217 OMD: 4,8 million 638 OPTO: 4,8 million	YES	
EUROPE	<i>Europe</i>	8 OMD: 100,000	YES	1 OMD: 250,000 populations. - To achieve an appropriate amount of optometrists per population
	<i>UK</i>	2.27 OPTO: 10,000	YES	
	<i>France</i>	2,000 PTO: 64 million 9 OMD per 100,000	NO for OPTO's YES for OMD's	
	<i>Spain</i>	3.64 OPTO: 10,000	YES	
	<i>Germany</i>	8.3 OMD per 100,000	YES	

ASIA	India	21,000 OMD's - 1 OMD: 20,000 in urban areas - 1 OMD: 2,50,000 in rural areas	NO	-1 OMD: 50,000 populations. -1 OPTO: 50,000 populations.
	Saudi Arabia	1 OMD :43,000 1 OPTO:72,000	YES for OMD's NO for OPTO's	
	Yemen	1.06 OMD: 100,000	NO	
	Iran	2.29 OMD: 100,000 2.56 OPT: 100,000	YES	
	Oman	1 OMD: 1:26,000 1 OPTO:1, 077	YES	
	Qatar	1 OMD: 1:26,000	YES	
	Kuwait	1 OMD: 1:32,000	YES	
	Bahrain	1 OMD: 1:60,000	NO	

2.2 AFRICA

According to studies conducted in Africa, several obstacles relating to the eye care distribution were reported. North-central Nigeria, Zambia and 21 countries in Sub- Saharan Africa have an inadequate distribution of eye care centers and clinics, as well as a wide disparity between provinces concerning the allocation of eye health personnel. In Kware-State in North-Central Nigeria, 80% of eye care workers and facilities are situated in the state capital, with no orthoptists, low vision specialists, patient's counselors, or cataract surgeons. In contrast, optometrists, office managers, and primary eye care workers were insufficient and the staff ratio was one surgeon to 12 other eye care workers(6).

The situation is similar in Zambia, where three human resources for eye health per 100,000 populations in Lusaka were reported. In all of Zambia, there were 18 ophthalmologists, eight cataract surgeons, and 19 optometrists(7). In the Sub-Saharan region, few countries achieved the VISION 2020 target suggested in 2011, which is four ophthalmologists and 10 cataract surgeons per million, and all countries were below target for optometrists, which is 20optometrists per million, probably due to the exclusion of ophthalmologists and optometrists in the private sector(8).

Another reported obstacle was the maldistribution of eye care providers among urban and rural areas. In Enugu state in South-Eastern Nigeria, no ophthalmologists were practicing outside urban areas, and only 4 Optometrists practiced outside urban Enugu state, with a predominance of females over males eye care providers (ratio 6:1)(9). This is compatible with the findings in Zambia (7) where the geographic positions of facilities and services are disproportionately favoring urban areas.

In Ghana, a study was conducted to examine the sufficiency of access and application of eye health care services. It was indicated that the utilization and access to the eye care services were inadequate due to insufficient eye care personnel. The eye care provider to population ratio for ophthalmologists and optometrists was 1:377,661 and 1:324,552, respectively, which is significantly below the vision 2020 recommendations. A huge inequity in the distribution of eye care services was noted, with more than 75% of eye care practices in urban areas(10).

2.3 AMERICA AND EUROPE

In 2011, it was estimated that the county-level means in the united states were 2.1 ophthalmologists and 11.2 optometrists per 100,000 country residents, which meets the WHO 2020 vision recommendations, but there is a significant difference between regions in eye care provider available in the country. It was found that 61% of counties within states in Northern America such as District of Columbia, Louisiana and Alaska had no ophthalmologists, 24.2% of counties had no optometrists, and 24.0% of counties had neither an ophthalmologist nor an optometrist(11). This raises concerns about the possibility of vision health disparities between these regions.

According to the 2010 Optometry workforce study conducted on all counties of New York State, the number of optometrists exceeded those of ophthalmologists by 37%. Optometrists were found in almost every county of the State whereas 16 counties did not have ophthalmologists(12). This was explained by the fact that there is an optometry school in New York City, and 60% of all optometrists who practice in the state are graduates of this school. Thus, the school's presence has certainly been a major factor in providing eye care services to residents of the State. The State has one optometrist for 9,192 populations while the American Optometric Association advocated an optimum ratio of one optometrist for every 7,000 persons. However, the prevalence and incidence of ocular disease has expanded considerably with an aging population. Thus, the American

Optometric Association does not recommends a specific ratio any more. The total number of ophthalmologists is no more than 1,558, and the highly competitive subspecialty fellowships can explain the reason for the limited number of ophthalmologists in the State.

Furthermore, there is a difference in the availability of optometrists in different districts, and a mal-distribution of optometrists is evident in New York State. The most checked lack areas were rural upstate provinces, various urban regions, and inner-city areas where a lack of adequate eye care providers were evident. It was also noted that most optometrists in New York State work at the weekend and work evening hours. It was indicated in previous studies that few ophthalmologists have either evening or weekend office hours.(13)

As far as the mode of practice in New York State, 40% of all providers are in solo private practice and 15% in associate or group practice. Another additional 12% of optometrists work as owners of their optical practices. Fourteen percent of all optometrists employed by an optician or by an optical chain. Another 12% of all providers are employed by ophthalmologist or optometrist (12).

In Alabama communities, there are enough ophthalmology and optometry services. In the State of 4,8 million population there are 217 ophthalmologists, 638 optometrists, and 178 rehabilitation providers(14). Which meets the WHO recommendations of one ophthalmologist: 250,000 populations, But similar to New York state, the eye care services are

geographically isolated, since the majority of providers are located in the urban areas. Only 5.4% of the ophthalmologists, 18.7% of optometrists and 17.3% of rehabilitation providers are located in rural areas. Because of long travel separations, individuals living in country regions have expanded obstacles to getting fundamental and particular eye care and low vision services. There is a predominance of male ophthalmologists (88.8%) and female rehabilitation providers (80.3%) in Alabama, while there is an even distribution of males and females among optometrists.

It is noticed that there is a wide variety of specialties among eye care providers in Alabama. Around 50% of ophthalmologists had done a fellowship, and the commonest specialty among them was retina (20.4%), cornea (18.5%), glaucoma (16.7%), pediatric ophthalmology (13%) and oculoplastics (13%). Other areas of practice included anterior segment, cataract, general ophthalmology, nuclear ophthalmology, ocular trauma, and refractive surgery.

The most common specialty among optometrists are family practice (26.9%), geriatric optometry (26.9%), low vision rehabilitation (23.1%), and primary eye care (21.1%). Less commonly, areas of specialty included cornea and contact lenses (9.6%), pediatric optometry (7.7%), vision therapy (3.8%), and refractive and ocular surgery (1.9%). Other fields of specialty training included hospital-based and ocular disease residencies.

Specialties for vision rehabilitation providers in Alabama included education, vision rehabilitation therapy, rehabilitation counseling, and vocational rehabilitation counseling. Very few of them identify themselves as low vision therapists (5.3%).

The majority of ophthalmologists (82.0%) work in private practice with one or more ophthalmologists and the majority of them (73.3%) deliver services in a group practice. A lower percentage of them were accounted for to work in a practice with at least one optometrist (24.3%), and 11.7% worked at a university-based clinic. Some ophthalmologists reported working at the Department of Veteran Affairs clinic or medical center (2.7%) or at optical retail stores (7.2%). None of the ophthalmologists reported being working at rehabilitation hospitals or outpatient rehabilitation clinics.

The majority of optometrist (61.0%) in Alabama work in private practice with one or more optometrist, and many of them (48.8%) provide services in a group practice. A low proportion of optometrists (10.2%) reported working with at least one ophthalmologist, and 8.5% are working at a university-based practice. Although very few of them practice in an optical retail store (18.7%), most (92.5%) said that an optical shop was situated within their practice.

A high percentage of optometrists provide comprehensive eye care services for adults (95.1%) and children (81.3%), as well as the fitting and dispensing contact lenses (86.2%), vision therapy (12.6%) and low vision rehabilitation services (15.0%). Optometrists also provide other services, such as; occupational and environmental services and pre- and post-surgery care and management.

In Europe, the number of eye care workforce differs significantly, just as the split between optometrists and dispensing opticians. Europe has 40,000 ophthalmologists who care for a total of 500 million,— which is equal to eight ophthalmologists per 100,000 people(15),and that meets the WHO recommendations.

There is a 64 million population in France, and it only has 2,000 optometrists to care for them, while having 25,000 opticians (16), there is no indication whether this number meets the WHO criteria or not. As for the ophthalmology services, France meets the WHO recommendations with nine ophthalmologists per 100,000(17). However, there is a high inconsistency between urban and rural areas. While Paris has about 26 ophthalmologists per 100,000 population, Ardèche has only about three professionals per 100,000. Besides, most French ophthalmologists (60.9 %) work in private practice, and 13 % are hospitals or private clinics or academic centers employees (17).

For a slightly lower population, the UK has the most significant optometric workforce in Europe with 11,954 optometrists and 5,655 dispensing opticians, and most of them are located in England (81 % and 90 %, respectively)(17)(16). Except for ophthalmic medical practitioners (OMPs) who work alongside optometrists in optical practices, the rest of the ophthalmology workforce works in hospitals as secondary and tertiary eye care practitioners.

The largest number of optometrists per 10K is located in Spain (3.64 compared to 2.27 in the UK), but this is mostly because there is no separation between optometry and dispensing opticians in the country, whereas in the UK they are two separate professions.

2.4 THE MIDDLE EAST AND ASIA

Among studies reviewed in the Middle East area, a lack of equipment and personnel was reported in several countries.

The ophthalmologist to population ratio in Saudi Arabia achieved the WHO's recommended ratio, which was 1:43,000 according to a 2014 study in 60 institutions in 13 administrative areas in the kingdom(18). It also showed that nearly 2800 and 4400 eye care personnel would be needed by 2015 and 2020 in order to fill the gap of 293 and 700 additional ophthalmologists needed in the country, respectively. However, the study focused on secondary level eye care services in the government sector only; there is 660 ophthalmologists in the private sector who were not considered

in this study. It is still apparent that there is a wide variation in the eye care personnel in the administrative zones, with most eye care workers being located in the capital. Moreover, diagnostic and treatment equipment such as lasers, electrophysiological and ultrasound equipment, and fundus cameras were not available at all institutions. The optometry: populations ratio did not meet the WHO recommendations of 1 optometrist per 50,000 populations in Asia. It was 1:72,000 in the central zone (Riyadh), and it only met the goal in the northern zone of the Kingdom, which was 1:34,000.

The situation in the other gulf countries is better to some extent, with the health institutions in sultanate Oman having adequate resources and personnel for Primary Eye Care with 1:26,000 ophthalmologist: Population ratio(19) while the Primary Eye Care staff: population ratio is 1:1,07710 in the sultanate(20). However, these primary eye care providers were not specified to be optometrists or not. In other countries, the ophthalmologist: Population ratio varies from 1:26,000 in Qatar, 1:32,000 in Kuwait, and 1:60,000 in Bahrain(19).

Regarding the eye care services situation in Yemen, ophthalmologist there accounts for 1.06 per 100,000 populations, which is below vision 2020 targets. There is a significantly unequal distribution of eye care service provision between urban and rural areas, with more than three quarters of the practicing ophthalmologists and equipment are accessible in the five main governorates in urban areas. In contrast, the remaining 17

governorates have human resources shortage in both urban and rural areas(21). There is also a shortage of skilled ophthalmologists in some ophthalmic surgical techniques such as phacoemulsification and vitreoretinal surgery. Despite the availability of operating ophthalmic microscopes in the majority of governorates in Yemen, modern types of equipment (i.e., YAG laser, Argon lasers, and phacoemulsification machines) are only present in the five main governorates. There is almost no optometrist practicing in optical shops in Yemen, and there are only three optometrists in the whole country and they all work in hospitals(22).

In Western Asia, in the Islamic Republic of Iran, it was reported that there is enough ophthalmologists and optometrists as recommended by the WHO, with a reported ratio of 2.29 and 2.56 per 100,000, respectively with a male predominance of both ophthalmologists and optometrists. About 35% of all ophthalmologists and optometrists in Iran practice in the province of the capital (Tehran), and there is a broad variation in the number of ophthalmologists and optometrists in the country outside the capital.(23) In addition, the optometry practices are not widely distributed throughout the country, and they are only concentrated in high-income urban areas. Apparently, in the Islamic Republic of Iran, the practice model of optometry is not that of primary eye care, but rather, it entails a luxurious service in a well-urbanized area. One major reason is the lack of routine coverage of these services by private insurance.

In South Asia, specifically in India, there is an apparent mismatch in the provider-patient ratio. The distribution of eye surgeons is 1:20,000 in urban areas to 1 in 2, 50,000 in rural areas. This means that 80% of the ophthalmologists are located in urban areas where only 24% of India resides. Furthermore, half the ophthalmologists have non-surgical practices(24).Based on sectors of eye care delivery,71.5% of eye care facilities are in the private/NGO sectors, and 28.5% were in the government sector.(25)

There are other eye-care providers in India (optometrists, ophthalmic technicians, and opticians) who primarily provide refractive services. Yet there is no data on how many of such personnel are available or their location or ratios.

Chapter Three

Materials and Methods

3.1 Study Design, Settings and Population

This is a quantitative cross-sectional study.

This study was conducted at the level of whole West Bank cities during the period from January- December 2019, which are (Jenin, Tulkarm, Qalqelia, Nablus, Salfit, Tubas, Ramallah, Bethlehem, Jericho, and Hebron, East Jerusalem).

The **population** of the study included:

- All health care centers and facilities that provide any level of eye care services in the OPT. Including clinics, hospitals and all centers that provide ophthalmological or optometric services.
- All health care cadres providing eye health care services in the OPT. These include ophthalmologists, optometrists, orthoptists, low vision specialists, and residents in ophthalmological departments.

3.2 Inclusion and exclusion criteria

Inclusion includes:

1. Any Palestinian professional involved in the provision of primary, secondary or tertiary eye care services including optometrists, opticians, ophthalmologists, orthoptists, Low vision Specialists and residents in

Ophthalmological departments.

2. Professionals registered or not registered in the Palestinian Ministry of Health.
3. All eye care centers and hospitals in governmental, non-governmental or private sectors.

Exclusion includes:

1. Any eye care provider that does not reside in Palestine on permanent bases.
2. Palestinian eye care cadres who resides and practices outside the West Bank or East Jerusalem.

3.3 Sample Size

This study included all available eye care cadres and facilities providing eye health care services in the OPT that met the inclusion criteria and accepted to participate in the study. The response rate was 76,9% among optometrists and 72.7% among ophthalmologists; the study included 183 out of 227 eye care facility and 331 out of 524 eye care providers in the Occupied Palestinian territories.

3.4 Data collection Tool

An Interviewer-administered questionnaire was used to collect related data. Questionnaire content (Appendix-1) is designed to include Two Main Parts;

- **Eye health care facilities (Institution) Questionnaire.**
- **Eye Health care workers (HCWs) Questionnaire.**

Part A- the Eye health care facilities (Institution) Questionnaire consists of four sections:

The **first** section covered general Institutional information (location, year of operation, type of facility and practice, and level of service).

The **second** section obtained information about the workforce (Institutional cadre). Participants were asked about the number of the workforce for eye health available by role, including information on their gender, and their certificates, place of training and years of practice

The **third** section consisted of names of equipment used to examine and treat patients, including the number of each one that is used in the facility.

Fourth part asked for information on the types of eye health care services offered (refraction, contact lens, dispensing, binocular vision, artificial eye, low vision, cataract surgery, glaucoma surgery, vitreoretinal surgery laser photocoagulation, and exenteration /enucleation /evisceration...etc.).

Part B- the Eye HCWs Questionnaire included employees' general information (age, gender, place of origin, email, degree, Specialty, working hours. Work location, and Years of Practice.

The questionnaire was developed using the literature review conducted for this study and was pretested for validation by performing a pilot study on 12 eye care cadres and 12 eye care institutions, and it was modified accordingly to be suited for the nature of eye care health system in the OPT.

Data was generated by contacting the providers at their facilities by two ways:

- Calling listed phone number.
- Personally visiting them.

Eleven students from the optometry department served as field workers and data collectors. Supervisors were assigned and available from community medicine, public health, and optometry departments to assist with the research proposal, data collection, and writing. Study approval and facilitation letters were obtained from the ministry of health and from the Palestinian Ophthalmology Society and the Palestinian Association for Optimetrists and Opticians to contact the eye care cadres. All data collected was kept at the coordinating center at the Department of public health. Supervisors met regularly with the researcher to ensure the research is running effectively and efficiently.

3.5 Data Management and operational definitions

Table 2: Operational Definitions

Term	Defention
Eye healthcare workforce	Eligible practitioners who provide eye health care services to populations included ophthalmologist, optometrist, optics, vision rehabilitations specialist and ophthalmic nurses. (2)
Primary Eye health care service	Primary eye care comprises a simple but comprehensive set of promotive, preventive and curative actions. Eye health care workforce focusing on education and community participation to prevent visual loss.(2)
Secondary Eye health care service	Secondary eye health care plays an important role as the level to which patient who cannot be managed at primary eye care level are referred and managed of common blind conditions such as cataract, trichiasis, ocular trauma and infections.(26)
Tertiary eye health care services:	tertiary services provided in universities hospitals or similar institutions as the level which sophisticated cases referred.(26)
Patient counseling	It is a simple process of educating beneficiaries about the need and importance of eye care. It builds confidence among potential patients. Counselors assist patients in decision-making by giving detailed information about the operation, pre-operative care, post-operative care, discharge, and follow-up.(27)
Optometrist (OPTO)	Optometrist is a health care professional who examine the eyes and apply visual systems for defects or abnormalities as well as the correction of refractive error with glasses or contact lenses.(2)
Refractionist	A person trained to measure the refraction of the eye and to determine the proper corrective lenses.(2)
Optician	Is a technical practitioner who designs, fits and dispenses corrective lenses for the correction of a person's vision.
Ophthalmologist (OMD)	An ophthalmologist is a medical doctor who specializes in eye and vision care. An ophthalmologist diagnoses and treats all eye diseases and performs eye surgery.(2)
Invasive surgeries	A medical procedure that invades (enters) the body, usually by cutting or puncturing the skin or by inserting instruments into the body.(2)
Glaucoma subspecialists	Is a medical doctor who has specialized in ophthalmology and sub-specialized in Glaucoma. It uses medicine, laser and surgery to manage eye pressure related abnormalities. .(2)
Vitroretinal/ Medical retina specialists	Is a medical doctor who has specialized in ophthalmology and sub-specialized in diseases and surgery of the vitreous body and the retina of the eye. .(2)

Cornea and refractive surgery specialists	A cornea specialist is a medical doctor who specializes in issues related to the cornea. They are able to properly diagnose and treat conditions that might be signing a corneal problem, in addition to performing refractive surgeries, which aims to improve the refractive state of the eye and decrease or eliminate dependency on glasses or contact lenses. .(2)
Pediatric Ophthalmologist	Pediatric ophthalmology is a sub-specialty of ophthalmology concerned with eye diseases, visual development, and vision care in children. .(2)
Oculoplastics	Oculoplastic surgery (also known as ophthalmic plastic surgery) is a specialized dynamic field of medicine that combines the microsurgery of ophthalmology with the cosmetic principles of plastic surgery. This branch of ophthalmology focuses on plastic and reconstructive surgery of the eyelids, tear ducts, and orbit, along with cosmetic surgery of the eyelids and brows. .(2)
Uveitis specialists	Is an ophthalmologist with a special, specific interest in diagnosis and management of patients with uveitis (a form of eye inflammation that affects the middle layer of tissue in the eye wall (uvea). .(2)

3.6 Ethical considerations

Institutional Review Board (IRB) from An-Najah university acceptance was obtained before starting the study tests and procedures. Participants were informed about what this data will be used for and asked to give a verbal consent (Appendix-2) to show their agreement for declared information.

The list of eye health care service providers was obtained from the Ministry of Health, Palestine Medical Council, and the ophthalmological and optometric associations.

3.7 Data Analysis

Data entry and analysis were done using SPSS software version 21.(28). Data was described in summary numbers, frequencies, and cross-tabulations and was presented as frequencies tables and charts as

appropriate. Frequencies analysis technique that was included in SPSS software was used to analyze questionnaires data. Questionnaires results and answers were entered on SPSS analysis program to be tested and analyzed. We used appropriate statistical test to compare the mean differences between our variables that are explained in table 3.

Table 3. Variables categorization table

Name	Type
Independent variables (exposure)	
Distribution of Eye Care Services	Categorical
Dependent variables (outcome)	
Type of Practice	Categorical
Type of Facility	Categorical
Estimated Number of Patients	Continues
Type of Refractive equipment	Categorical
Type of Dispensing Equipment	Categorical
Type of Primary Eye Care Equipment	Categorical
Type of Auxiliary Equipment	Categorical
Type of Contact Lens Equipment	Categorical
Type of Low Vision Equipment	Categorical
Type of Surgical Equipment	Categorical
Level of Eye Care Services (primary , secondary , tertiary)	Categorical
Covariates	
Gender	Dichotomous
Age	Continues
Specialty	Categorical
Employment Status	Categorical
Hours of work	Continues
Days of work	Continues
Work Location	Categorical
Place of Origin	Categorical
Years of Practice	Continues

Chapter Four

Results

4.1 Eye health care facilities and services

4.1.1 Types of facilities

A total of 227 facilities offering eye health care services were identified in the Occupied Palestinian Territories (West Bank and East Jerusalem). 13 hospitals, 62 clinics, five surgical centers, two rehabilitation centers and 145 optic centers or chains. Of the optical centers, 15 refused to participate. 62 of 81 ophthalmology institutions, including hospitals, clinics and surgical centers were included in the study. The lists from the Ministry Of Health for the ophthalmology clinics in the country were all covered. In addition to the private clinics for the ophthalmologists, since we know there is some unregistered clinics in the main list.

The majority of eye care facilities N=212 (93.3%) were identified as private, including 5 major hospitals, 58 eye clinics, five eye surgical centers and 143 optical centers. Civil, NGO, and governmental institutions represented 4.01%, 0.8% and 1.7% respectively, including the only two rehabilitation centers in the country and the university hospital and university clinic in Nablus, as shown in Figure 1.

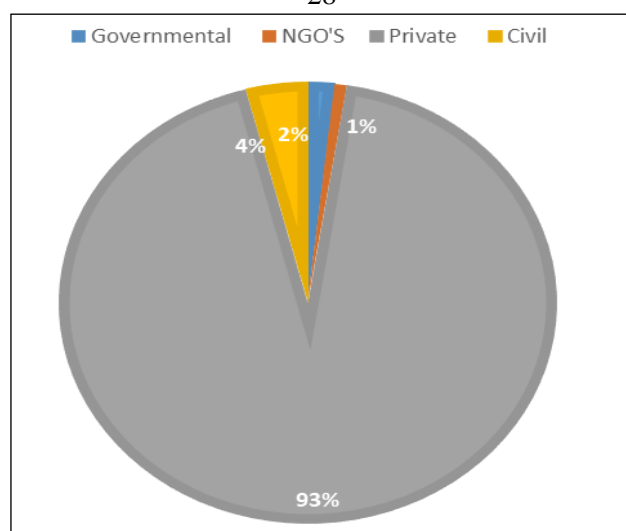


Figure 1: The sectors of eye care facilities in the Occupied Palestinian Territories (OPT).

Only one optical center was identified as NGO, while another optical center was identified as a civil institution. Only 1.7 % of all facilities, all were hospitals, belonged to the governmental sector. The types of eye care facilities owned by sector are summarized in Table 1.

Table 4. Types of eye care facilities owned by sector (N=227)

Sector	N (%)	Facility type	Total
Governmental	4 (1.7)	- Government hospital with secondary eye care.	4
NGO'S	2 (0.8)	- NGO Rehabilitation Hospitals	1
		- NGO optical centers	1
Private for profit	212 (93.3)	- Hospital with secondary eye care services	5
		- surgical ophthalmology centers with secondary eye care	5
		- Eye clinic (outpatient services only)	58
		- Optical services only	143
		- rehabilitation centers	1
Civil-profit non	9 (4.01)	- Hospital with secondary eye care services	3
		- University hospital secondary eye care services	1
		- University optometry clinic	1
		- Eye clinic (outpatient services only)	3
		- Optical services only	1

4.1.2 Geographical distribution of eye care facilities and services

As Table 2 shows, the majority of eye care facilities were located in Hebron (N=49), Nablus (41), and Ramallah (40). A shortage of Hospitals and clinics operating in the northern districts of Salfit, Tubas, Tulkarem, Qalqilya, in addition to Jericho were identified. No eye clinics, hospitals, surgical centers were identified in Salfit or Tubas. Optical centers/chains are fairly distributed along with the country except in Tubas district, which has only two optical shops. There are only two Rehabilitation centers in the west bank, one in Bethlehem and one in Ramallah.

Most facilities have an average practicing period of fewer than ten years, as shown in Table 2. While most facilities are evenly distributed across the country, only one hospital, 3 eye clinics are located in rural areas. No optical centers are located in villages in the West Bank or East Jerusalem.

Table 5. Geographical distribution, years of operation and locality of eye care facilities in the OPT (N=227)

	Hospitals	Clinics	Optical centers/ chains	Rehabilitation centers	Surgical Center	Total
Geographical distribution						
Nablus	4	9	28	0	0	41
Ramallah & Al-Bireh	3	14	19	1	3	40
Jenin	0	5	9	0	1	15
East Jerusalem	1	4	17	0	0	22
Salfit	0	0	4	0	0	4
Hebron	4	16	28	0	1	49
Bethlehem	0	6	13	1	0	20
Tubas	0	0	2	0	0	2
Tulkarem	1	3	12	0	0	16
Qalqilya	0	3	10	0	0	13
Jericho	0	2	3	0	0	5
Total	13	62	145	2	5	227
Years of operation						
<10	7	22	53	1	4	87
10-19	2	6	36	0	1	45
20-29	3	10	22	0	0	35
30-39	0	3	6	0	0	9
≥40	1	1	4	1	0	7
Total	13	42	121	2	5	183
Locality						
Urban	12	39	121	2	5	179
Rural	1	3	0	0	0	4
Refugee camp	0	0	0	0	0	0
Total	13	42	121	2	5	183

4.1.3 The proportion of eye care facilities per population size

The largest number of eye care facilities (21.3%) was located in Hebron governorate, which holds only 24.6% of the population in the country, as indicated in (Table 3). Nablus, Ramallah, and East Jerusalem holding 13.4%, 11.4% and 15.1% of the country's population, had a total of 18.3%, 17.6% and 9.8% of eye care facilities respectively.

Table 6. Comparison of the proportion of eye care facilities to the population size by OPT districts (N=227)

Governorate	Number of facilities	Percent of total facilities	Number of populations	Percent of total
Nablus	41	18.3 %	388,321	13.4 %
Ramallah& Al-Bireh	40	17.6 %	328,861	11.4 %
Jenin	15	6.6%	314,866	10.9 %
East Jerusalem	22	9.8 %	435,753	15.1 %
Salfit	4	1.7 %	75,444	2.6 %
Hebron	49	21.8 %	711,223	24.6 %
Bethlehem	20	8.8 %	217,400	7.5 %
Tubas	2	0.8 %	60,927	2.1 %
Tulkarem	16	7.1 %	186,760	6.4 %
Qalqilya	13	5.7%	112,400	3.9 %
Jericho	5	2.2%	50,002	1.7 %
Total*	227	100 %	2,881,957	100%

* The number of population in this table was based on the Population statistic in the West Bank and East Jerusalem for the year 2017.

4.1.4 Spectacle manufacturing workshops

Eighty fully-equipped glasses manufacturing workshops exist in the country (66.1% of all optometry centers). All of them are located in the urban areas and funded and operated by the private sector (Figure 2). No local optical lenses or low vision equipment manufacturers exist in the country. All optical lenses used in glasses workshops are imported from Israeli manufactures or abroad countries like Turkey and China.

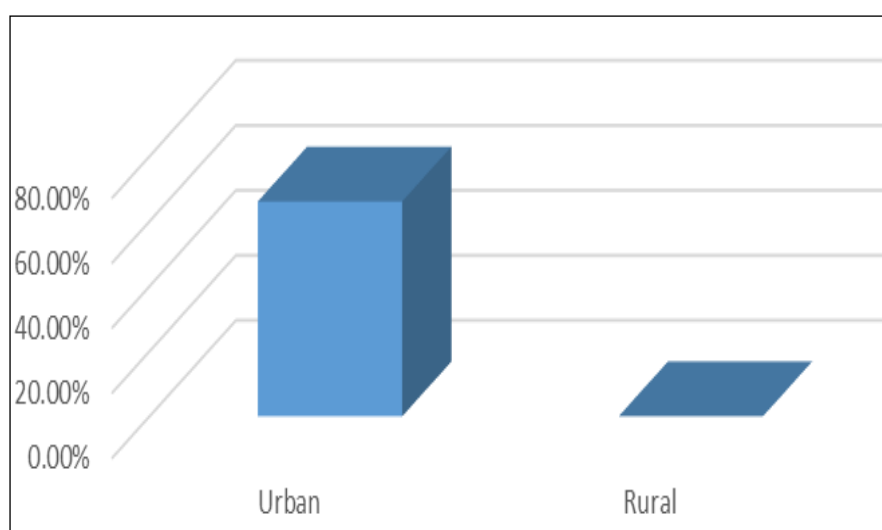


Figure 2: The distribution of Spectacle manufacturing workshops according to locality.

4.1.5 Available services

Primary services, including Refraction and Spectacle dispensing services, are available in all districts. While there is a distinct shortage in emergency, screening, and referral services, especially in the northern districts of Tubas, Salbit, Qalqelia, and Jericho district. Public health promotion is not appropriately available in all districts.

Complex Secondary services, such as invasive surgeries, vitreo-retinal surgery, and laser photo-coagulation, are offered at a large Hospital in Ramallah, Nablus, Hebron, and East Jerusalem. At the same time, comprehensive eye care with diagnosis and treatment seem to be available in all districts.

There is a shortage of Low vision services (figure 3), specialty contact lens fitting in all cities. Residency training is only available in East Jerusalem and Nablus city. Eye care research is almost absent in the northern districts, and a few institutions provide it in Hebron, Bethlehem, Nablus, and East Jerusalem. The type of eye care services available in the OPT districts is shown in Table 4.

Table 7. The type of eye care services available in the OPT districts

	Hebron	Bethlehem	Ramallah	Nablus	Jenin	Tulkarem	Tubas	Salfit	Qalqelia	East Jerusalem	Jericho
Primary services											
Refraction	26	16	33	33	15	9	4	2	12	18	4
Spectacle dispensing	6	2	17	17	9	6	0	3	7	14	2
Emergency	17	5	21	16	5	3	0	1	3	5	2
Screening services	10	4	12	15	5	6	0	3	0	6	0
Public health promotion!	3	3	10	6	2		0	1	0	2	0
Referral protocol	10	8	22	18	10	6	0	2	1	5	1
Secondary services											
Comprehensive eye care with dilation	20	8	21	16	5	7	0	3	2	18	3
Diagnosis and TMT	15	5	20	11	4	3	0	1	3	10	2
Invasive surgical services (cat, gluc, cornea, retina)	3	1	5	4	1	0	0	0	0	1	0
LASEK-LASIK surgery	2	0	2	2	1	0	0	0	0	1	0
Laser photo coagulation	3	0	3	4	1	0	0	0	0	1	0
Tertiary services											
Low vision services	3	1	5	5	2	0	0	0	0	4	0
Specialty contact lens fitting	5	0	13	12	7	0	0	2	0	10	0
Ophthalmic residency training	0	0	0	2	0	0	0	0	0	1	0
Allied eye care personnel training	6	3	15	16	10	4	0	3	1	10	1
Eye care research	1	1	2	3	0	0	0	0	0	1	0

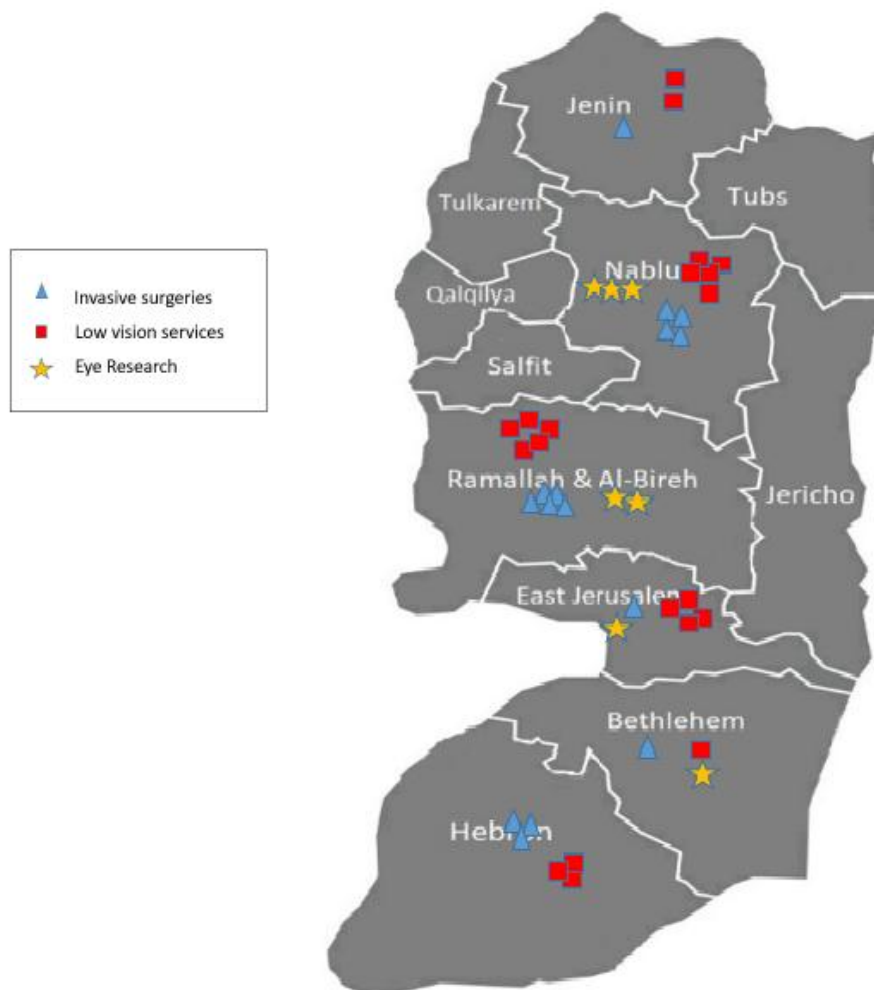


Figure 3: Geographical distribution of eye care services in the OPT.

The type of eye care Services provided by ophthalmologists and Optometrists, as described in Table 5. It shows that all ophthalmology institutions provide Comprehensive eye care with dilation. In contrast, invasive surgeries were provided by 24.2% of them. Other surgeries such as LASEK, Glaucoma, strabismus, corneal-trans, and vitro-retinal are provided by 11.3%, 11.3%, 19.4%, and 12.9%, of the ophthalmology institutions respectively. A small percentage of ophthalmologists (8.1% and

6.5 %) provided Visual rehabilitation and Contact lens fitting and dispensing. Optometrists provided services shows that 100% of the optometry centers in the country provide refractive services, while Comprehensive eye care with dilation is only provided by 4.1% of them. Specialty contact lens fitting and Low vision rehabilitation were delivered by 46.2% and 14.0 %, separately.

Table 8. The type of eye care Services provided by ophthalmologists (N=62) and optometrists (N=121)

Services provided by ophthalmologists	N (%)
Comprehensive eye care with dilation	62 (100)
Invasive surgical services	15 (24.2)
LASEK surgery	7 (11.3)
Corneal transplant surgery	8 (12.9)
Glaucoma surgery	7 (11.3)
Strabismus surgery	12(19.4)
Vitro-retinal surgery	8 (12.9)
Visual rehabilitations	5 (8.1)
Contact lens fitting and dispensing	4 (6.5)
Services provided by optometrists	N (%)
Refractive services	121 (100)
Comprehensive eye care with dilation	5 (4.1)
Specialty contact lens fitting	56 (46.2)
Low vision rehabilitation	17 (14.0)

4.2 Human resources in eye care

4.2.1 Training of eye health professionals

In the West Bank, only one university offers bachelor's degree in Optometry in the city of Nablus. Three hospitals offer residency training in ophthalmology for Palestinian students in East Jerusalem and Nablus.

4.2.2 Eye health Human resources categories

According to the Palestinian Ophthalmology Society records, 88 ophthalmologists and 11 ophthalmic residents are currently practicing in the West Bank. According to the Palestinian Council of Optometry and Optics official registration records, 425-members were identified. Of those, there were 320 optometrists, 75 refractionists, 14 qualified opticians, and 14 non-qualified opticians. Two orthoptists were identified, but they do not have an official council or society to represent them.

Of all ophthalmologists, 61 were males and eight females, with an average age of 35. Whereas 149 of optometrists were females, and 44 of them were males, with an average age of 30. Most ophthalmologists and optometrists have an average practicing period of fewer than ten years. Most refractionists, qualified opticians, and non-qualified opticians are males and have an average practicing period between 20-30 years. Socio-demographic characteristics of eye health cadres are described in Table 7.

Among optometrists 31 does not provide eye care services (Figures 4), only one among ophthalmologist (Figure 5), seven among refractionists, one among qualified opticians and one among non-qualified opticians does not provide eye care services

Table 9. Socio-demographic characteristics of eye health cadres (N=524)

Position	Total	Included Sample	Gender (M /F)	Years of operation (M- category)	Age (M)
Ophthalmologists	99	69	61-8	<10 Y	35
OPTO (TOTAL)	425	262			
Optometrists	320	193	44-149	<10 Y	30
Refractionists	75	48	46-2	10-20	38
Qualified opticians	14	13	12-1	20-30	46
Orthoptists	2	2	2-0	10-20	41
Non-Qualified opticians	14	6	6-0	20-30	55

* Table 9 contains the total number of eye care cadres in the OPT, in addition to the included sample.

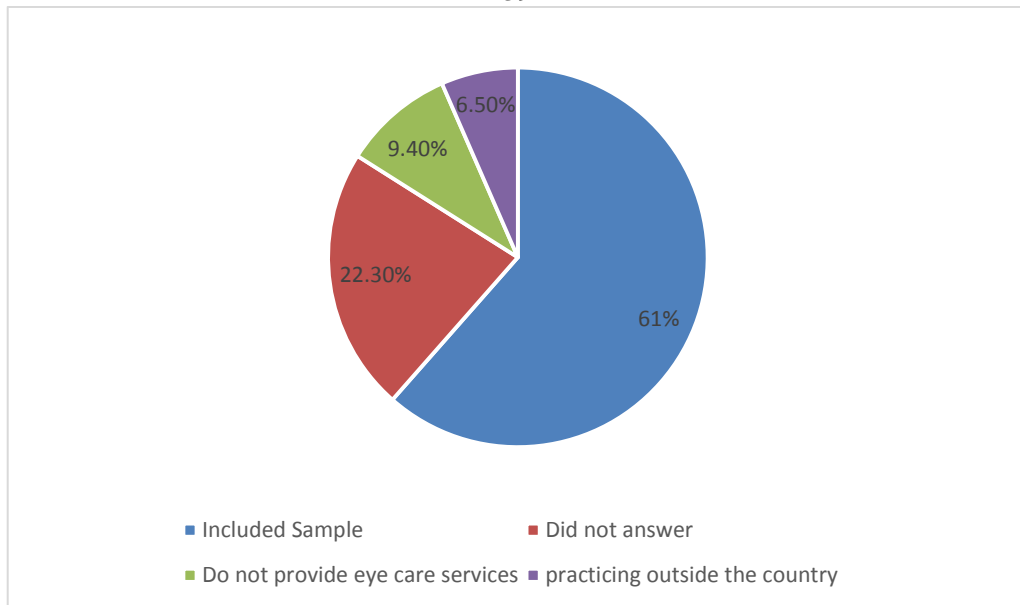


Figure 4: Optometrist population in the OPT.

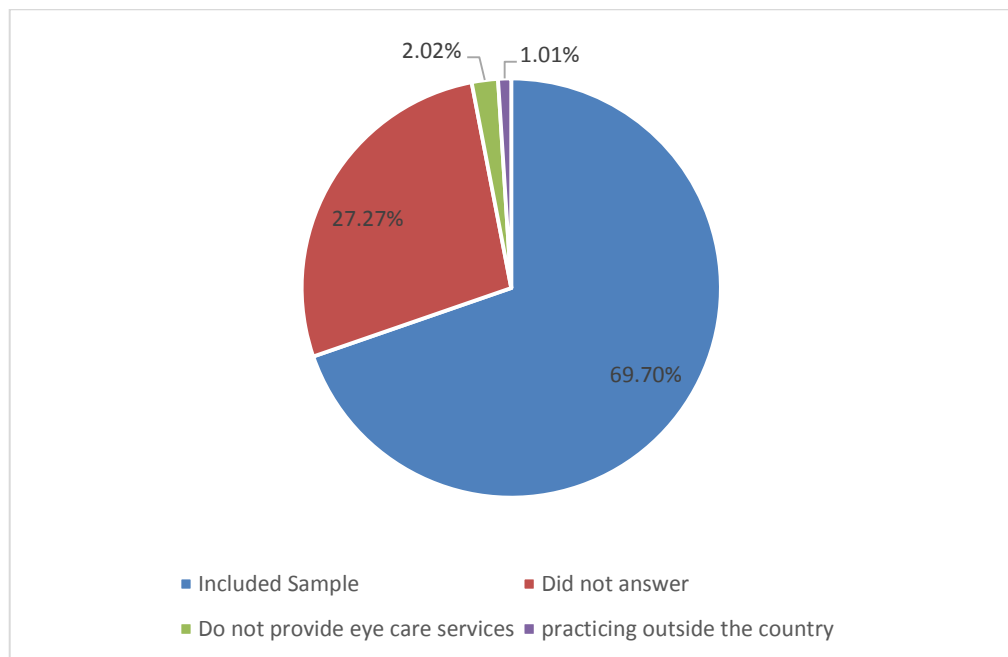


Figure 5: Ophthalmologists population in the OPT.

Of all ophthalmologists, only 1.01% of them have subspecialty -in glaucoma-, 27.2 % have a fellowship post-residency. Seven are specialized in the retina and vitreoretinal surgery or medical retina, five have training in cornea and refractive surgery, four in strabismus and pediatric ophthalmology, two in oculoplasty and two in uveitis. Another six have other post-residency training that included research-based degrees. Table seven lists Ophthalmologists practicing in OPT according to their subspecialty Training.

Table 10. Ophthalmologists practicing in OPT according to their subspecialty Training (N=99)

Fellowship/subspecialty post residency	N / (%)
YES	27(27.2)
Subspecialty field	
Glaucoma	1 (1.01)
Fellowship field	
Vitreoretinal/ Medical retina	7 (7.07)
Cornea and RF	5 (5.05)
Pediatric	4 (4.04)
Oculoplastics	2 (2.02)
Uveitis	2 (2.02)
Others	6 (6.06)

Although 100% of current ophthalmologists are Palestinian nationals, only 11.6% were trained locally in the west bank, as shown in Table 8. Whereas 30.4% of them were trained in 1948 territories, 17.9% were trained regionally, most commonly in Jordan, and 37.7% of them were trained internationally, most commonly in Russia, the United Kingdom, and India

Table 11. Training location of ophthalmologists (N=69)

Fellowship/training location	N (%)
Local. West bank	8(11.6)
Local 48 territories	21 (30.4)
Regional	12 (17.9)
Jordan	6 (8.7)
Egypt	3 (4.3)
Qatar	1 (1.4)
Unknown Regional	2 (2.9)
International	26 (37.7)
RUSSIA	8 (11.6)
UK	4 (5.8)
India	4 (5.8)
Ukraine	2 (2.9)
TURKEY	2 (2.9)
Greece	2 (2.9)
Scotland	1 (1.4)
Canada	1 (1.4)
Pakistan	1 (1.4)
Unknown international	(1.4)
Missing	2

Almost one third (28.5%) of all ophthalmologists hold subspecialties and fellowships in the city of Ramallah, 25% in Nablus, and 21.4% in East Jerusalem, while 14.2% of them practice in the city of Hebron. Figure 6 indicates the distribution of ophthalmologists with subspecialties by the district.

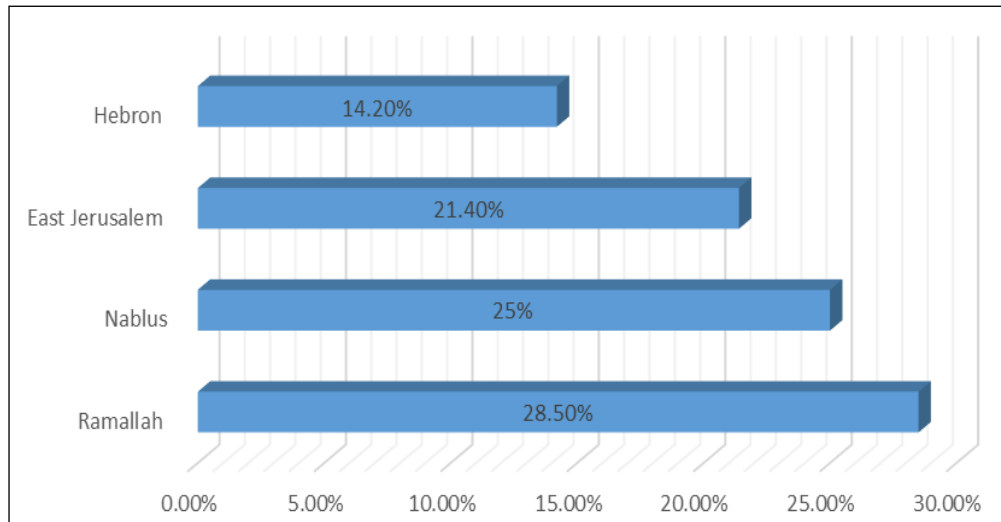


Figure 6: Distribution of ophthalmologists with subspecialties by district.

Among optometrists, 69.1% have Bachelor degrees, 3.4% have master's degrees, 0.76% have Doctor of Optometry degree, and 0.38% have Doctor of Philosophy Degree. Refractionists holding two years diploma, a qualified optician with at least one year of training, and non-qualified opticians with no official degrees accounted for 18.3%, 4.8%, and 2.3% of all optometrists respectively. Orthoptists account for 0.76%. Educational qualifications of optometrists in the OPT are described in Table 9.

Table 12. Educational qualifications of optometrists in the OPT (N=262)

Highest level of education	N (%)
Bachelor degree	181 (69.09)
Master degree	9 (3.43)
PHD degree	1 (0.38)
Doctor of optometry degree	2(0.76)
Refractionist	48 (18.32)
Qualified opticians	13 (4.96)
Non- Qualified opticians	6 (2.29)
Orthoptists	2 (0.76)

Of all optometrists, refractionists and opticians, (64.1%) received their training locally in the West Bank, 0.38% received their training in 1948 territories, 17.1% received their training regionally, and 14.8% received their training from international institutions. Figure 7 indicates the training locations of all eye health human cadres.

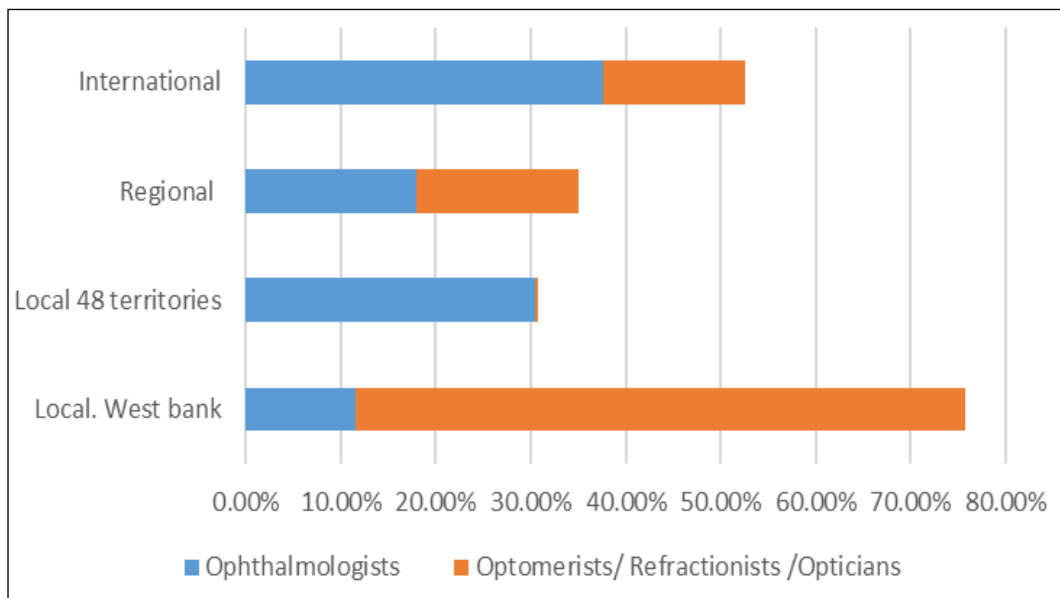


Figure 7: Training location of eye health human cadres.

4.2.3 Number of human resources according to facility ownership

A total of 275 (83.1%) eye care human resources work in the private sector. The governmental sector holds 4.5% of the eye care human resources, eight optometrists, and seven ophthalmologists. No optometrists or Refractionists work for NGO institutions. Twelve ophthalmologists, 13 optometrists, and two Refractionists work for the civil sector, accounting for 8.15% of eye care human resources. The Number of human eye care cadres according to the type of sector are listed in Table 10.

Table 13. Number of human eye care cadres according to the type of sector (N=331)

Position	Total (N)	Governmental (N)	Private for profit (N)	NGO (N)	Civil(N)
Ophthalmologists	69	7	36	14	12
Optometrists	193	8	172	0	13
Refractionists	48	0	47	0	2
Qualified opticians	13	0	13	0	0
Orthoptists	2	0	1	1	0
Non- Qualified opticians	6	0	6	0	0
Total N (%)	331 (100)	15 (4.5)	275 (83.1)	15 (4.5)	27 (8.15)

4.2.4 Distribution of eye health human resources by district

Of all eye health human resources, most of them (97) practice in Nablus city followed by East Jerusalem with (87) and Hebron (80), Ramallah city have (75) human resources, Bethlehem have (41), Tulkarem have (32), Jenin (19), Qalqelia (15), Salfit (6), and Tubas with only three human resources.

Most ophthalmologists (24) and optometrists (57) practice in East Jerusalem. As for Refractionists, the largest number (15) work in Bethlehem city. Tubas city has no ophthalmologists and only (2) optometrists and (1) Refractionists. The Distribution of eye health human cadres by district is shown in Table 11.

Table 14. Distribution of eye health human cadres by district (N=460)

Position	Hebron	Bethlehem	Ramallah	Nablus	Jenin	Tulkarem	Tubas	Salfit	Qalqelia	East Jerusalem	Jericho	Total
Ophthalmologists	16	8	16	23	6	4	0	1	3	24	2	103
Optometrists	48	16	44	51	8	16	2	5	11	57	3	261
Refractionists	11	15	9	13	3	11	1	0	1	4	0	68
Qualified-opticians	3	1	3	2	1	1	0	0	0	2	0	13
Orthoptists	1	1	0	0	0	0	0	0	0	0	0	2
Non-Qualified opticians	1	0	3	8	1	0	0	0	0	0	0	13
Total	80	41	75	97	19	32	3	6	15	87	5	460

*Ophthalmologists who work full and/or part time were included in table 14 as separate individuals.

A total of 310 (93.6%) of eye care human resources were reported to be working at the weekends. Of those, 49.3% of Ophthalmologists, 60.1% of Optometrists, and 56.2% of Refractionists work only on Saturdays. Eye human resources working evening hours were identified in 52.2% of Ophthalmologists, 25.9% of Optometrists, and in 37.5%, 53.8% of Refractionists and Qualified opticians, respectively. No Orthoptists work past four in the country. About 60.9% of Ophthalmologists, 54.9% of Optometrists, 62.5% of Refractionists, and 69.2% of qualified opticians work in their place of origin. Table 12 shows the complete list of weekend and evening access of eye care human cadres in the OPT.

Table 15. Weekend and evening access of human eye care cadres in the OPT (N=331)

Position	Total	WEEKEND – Access N (%)	EVENING-Access N (%)	Practice in place of origin N (%)
Ophthalmologists	69	66(95.7) 34 (49.3) SAT	21(30.4) always 36(52.2) as needed	42 (60.9)
Optometrists	193	177 (91.7) 116 (60.1) SAT	50 (25.9) always 49 (25.3) as needed	106 (54.9)
Refractionists	48	47 (97.9) 27 (56.2) SAT	18 (37.5)	30 (62.5)
Qualified opticians	13	13 (100) SAT	7 (53.8)	9 (69.2)
Orthoptists	2	2 (100)	0	Unknown
Non-Qualified opticians	6	5 (83.3) 3 (50.0) SAT	4 (66.6)	1 (16.6)
TOTAL	331	310 (93.6)	100 (30.2)s	188 (56.7)

A total of 295 (89.1%) of eye care human resources are currently working full time in the OPT, as shown in (Table 13). One hundred ninety-six of them work as an employee's whereas 164 were self-employed. Two-third (66.7%) of Ophthalmologists were self-employed, and 56.5% practice in more than one location. As for optometrists, 35.7% were self-employed, and only 13.4% practice in more than one place.

Table 16. Employment types for eye care cadres in the OPT (N=331)

Position	Total	Full time/ part time N (%)	Employed/ self- employed N (%)	Practice in more than one location N (%)
Ophthalmologists	69	66 (95.7) / 31 (44.9)	51 (73.9) / 46 (66.7)	39 (56.5)
Optometrists	193	165 (85.4)/ 27 (13.9)	123 (63.7) / 69 (35.7)	26 (13.4)
Refractionists	48	46(95.8)/3(6.2)	18(37.5)/31(64.5)	8 (16.6)
Qualified opticians	13	12 (92.3)/1 (7.6)	1 (7.6)/12(92.3)	2 (15.3)
Orthoptists	2	2 (100)/ 1 (50)	2 (100)/ 1 (50)	2 (100)
Non-Qualified opticians	6	4(66.6)/2(33.3)	1(16.6)/5(83.3)	1(16.6)
Total	331	295 (89.1)/65 (19.6)	196 (59.2)/164 (49.5)	78 (23.5)

Almost all districts in the West Bank and East Jerusalem had at least one ophthalmologists and one optometrist per 50,000 population (Figure 8). The country's average was 5.7 optometrist and 1.6 ophthalmologists per 50,000 population, except for the cities of Tubas, Salfit, and Jenin. Table 14 shows the Eye health human resources per 50,000 populations in the OPT.

Table 17. Eye health human resources per 50,000 population in the OPT (N=425)

District	Number of population	OMD/OPT	Governorate ration for OMD OPTO	Vision criteria 2020	Does it meet vision 2020 goal?
Nablus	388,321	23/64	2.9 OMD / 50.000 8.2 OPTO / 50.000	1 OMD: 50,000 populations. 1 OPTO: 50,000 populations.	Yes Yes
Ramallah & Al- Bireh	328,861	16/53	2.4 OMD / 50.000 8.05 OPTO / 50.000		Yes Yes
Jenin	314,866	6/11	0.95 OMD / 50.000 1.7 OPTO / 50.000		No Yes
East Jerusalem	435,753	24/61	2.7 OMD / 50.000 6.9 OPTO / 50.000		Yes Yes
Salfit	75,444	1/5	0.66 OMD / 50.000 3.3OPTO / 50.000		No Yes
Hebron	711,223	16/59	1.1 OMD / 50.000 4.1 OPTO / 50.000		Yes Yes
Tubas	60,927	0/3	0 OMD / 50.000 2.4OPTO / 50.000		No Yes
Tulkarem	186,760	4/27	1.07 OMD / 50.000 7.2 OPTO / 50.000		yes Yes
Bethlehem	217,400	8/31	1.8 OMD / 50.000 7.1OPTO / 50.000		Yes Yes
Qalqilyae	112,400	3/12	1.3 OMD / 50.000 5.3 OPTO / 50.000		yes Yes
Jericho	50,002	2/3	1.9 OMD / 50.000 2.9 OPTO / 50.000		Yes Yes
Total (west bank and east Jerusalem)	2,881,957	96/329	1.6 OMD / 50.000 5.7 OPTO / 50.000		Yes Yes

*OMD: ophthalmologists

*OPTO: optometrists

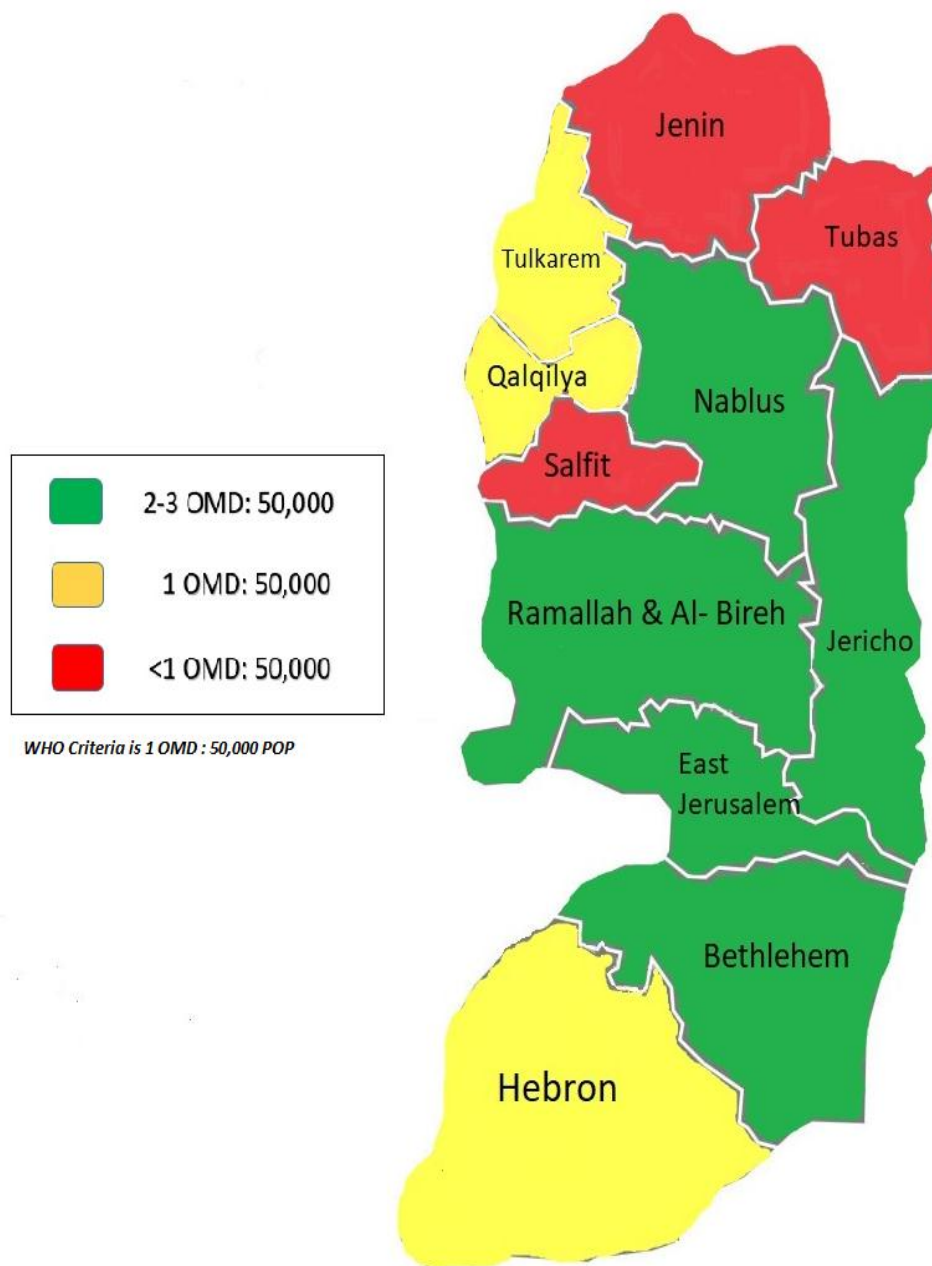


Figure 8: Ratio of ophthalmologists to population.

Figures 10 and 11 shows the ratio of eye care cadres in the OPT compared to other countries' ratios.

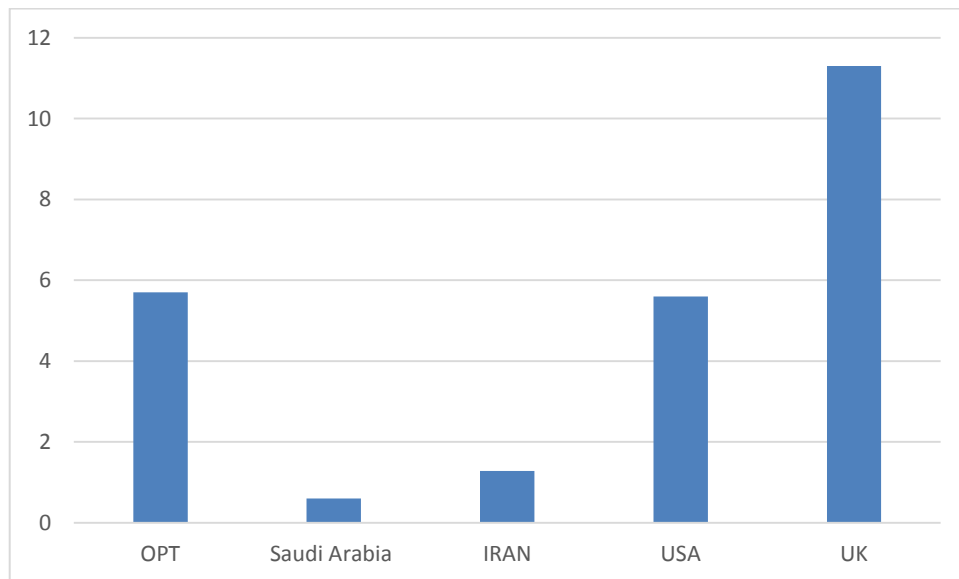


Figure 9: Optometrists per 50,000 population in the OPT and selected countries* *Saudi Arabia study included only the governmental sector in the country.

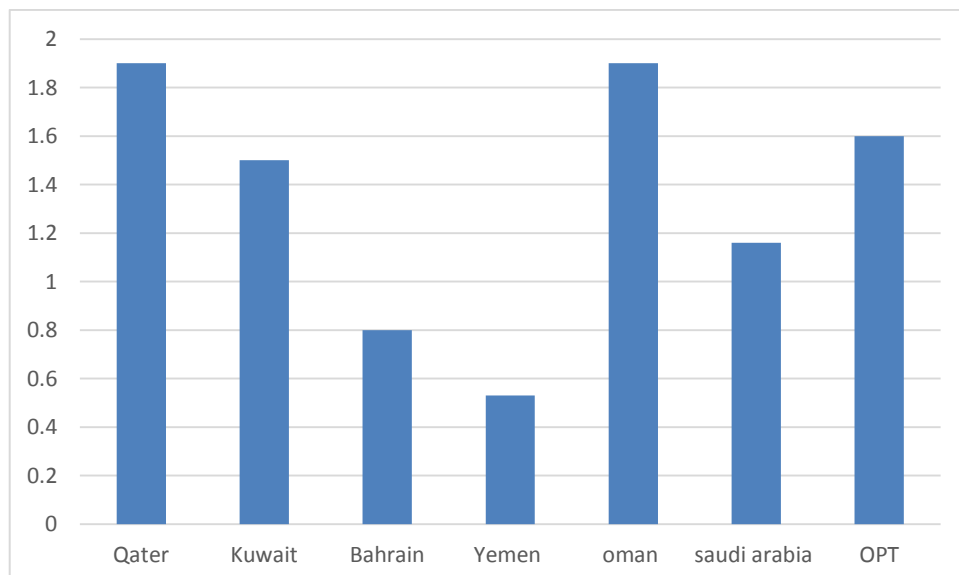


Figure 10: Ophthalmologists per 50,000 in the OPT and selected countries

4.3 Ophthalmic equipment

Of those who have refractive equipment, 82.4 % of optometry centers and 77.4% of eye clinics & hospitals have Retinoscopes, and approximately 47% of both OMD and OPTO practices have phoropters. Of those who primary eye care diagnostic equipment, 100% of OMD clinics and 64.7% of OPTO centers have slit lamps, and 91.9% of eye clinics and in 66.4 of OPTO centers have Direct Ophthalmoscopy. Prism bar is available in 39.5% of optometry centers, whereas it exists in 85.5% of OMD clinics.

Low Vision equipment is available in 8.1% of OMD clinics, and in 5% of OPTO centers. A fundus camera is available in 19.4% of OMD clinics and 0.8% of OPTO centers. There are 12 pentacam machines in OMD practices in the country, whereas there is none in OPTO centers. Scleral/ mini scleral lenses and Hybrid sets are available in 13.4% and 17.6% of OPTO centers, respectively. An overview of available equipment's in both OMD, and OPTO practices with their status are presented in Table 15.

Table 18. Ophthalmic equipment in OMD and OPTO practices (N=183)

Tool	Available in OMD clinics N (%) Available in OPTO center N (%)	Status % (Excellent)
Slit Lamp	62(100) OMD 77(64.7) OPTO	(100) (76.6)
Direct Ophthalmoscopy	57(91.9) OMD 79(66.4) OPTO	(100) (70.1)
Retion scopes	48(77.4) OMD 98 (82.4) OPTO	(97.9) (93.8)
Phoroptoers	29(46.8) OMD 57(47.9) OPTO	(100) (100)
Prism Bar	53(85.5) OMD 47(39.5) OPTO	(100) (100)
Topography	20(32.3) OMD 8(6.7) OPTO	(90.9) (87.5)
Tonometer	59(95.2) OMD 21(17.6) OPTO	(100) (80.9)
Low Vision Equ	5 (8.1) OMD 6(5.0) OPTO	(100) (100)
Fundus Camera	12(19.4) OMD 1(0.8) OPTO	(90.9) (100)
Pentacam	12(19.4) OMD 0(0) OPTO	(100) (0)
Scleral/ mini scleral lenses set	2(3.2) OMD 16(13.4) OPTO	(100) (73.5)
Hybrid set	2(3.2) OMD 21(17.6) OPTO	(100) (71.4)

*OMD: ophthalmologists

*OPTO: optometrists

OCT, VF, and FFA are available in 33.9%, 21%, and 12.9% of OMD clinics, respectively. A-scan and B-Scan are available in 37.1% and 32.3% of OMD clinics, separately. YAG-laser is available in 19.4%, whereas ARGON- laser is available in 24.2% of OMD clinics. 11.3% of clinics have LASEK set, whereas 22.6% have PCIOL set. Glaucoma, Strabismus, and Vitroretinal sets are available in 11.3%, 19.4%, and 12.9% respectively. Corneal-transplant and CXL set exists in 12.9% and 22.6% of OMD

clinics. Ophthalmic equipment in OMD clinics and hospitals only are presented in Table 16.

Table 19. Ophthalmic equipment in OMD clinics and hospitals (N=62)

Tool	Available in OMD clinics N (%) Available	Status % (Excellent)
OCT	21(33.9) OMD	(95.2)
VF	13(21.0) OMD	(100)
FFA	8 (12.9) OMD	(75)
A-Scan	23(37.1) OMD	(100)
B-Scan	20(32.3) OMD	(100)
YAG-Laser	12(19.4) OMD	(100)
ARGON-Laser	15(24.2) OMD	(100)
LASEK Set	7(11.3) OMD	(100)
PCIOL Set	14 (22.6) OMD	(100)
Glaucoma Set	7(11.3) OMD	(100)
Strabismus Set	12(19.4) OMD	(100)
Vitroretinal Set	8(12.9) OMD	(100)
Corneal-trans Set	8(12.9) OMD	(100)
CXL Set	14 (22.6) OMD	(100)

*OMD: ophthalmologists *OPT: optometrists

The ophthalmic medical equipments were found to be highly allocated in Ramallah, Nablus, Hebron, and East Jerusalem cities compared to the rest of the country. As detailed in figure 9, most OCT (38.10%) and VF (46%) equipments were located in Hebron city. A-scan and tonometer were found mostly in Ramallah and Hebron cities. Topography devices are highly located in Ramallah (39.20%). LASEK set was available in Ramallah (28.50%) and Nablus (28.50%) in equal amounts. (45.4%) and (45.4%) of Low vision equipment's were located in east Jerusalem and Ramallah, respectively. Scleral/Mini-scleral set were available in (34.20%) in both Nablus and East Jerusalem.

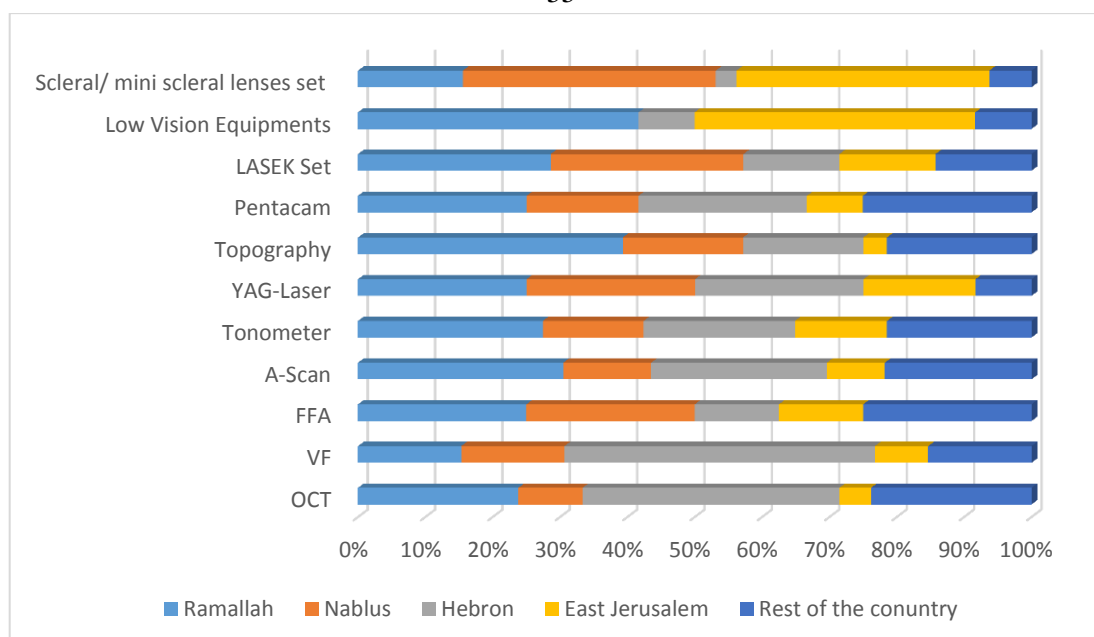


Figure 11: Geographical comparison of operational capacity according to district.

4.4 Geographical comparison of operational capacity

A total of 20 Staffed eye surgery hospital/clinic were identified in the country. Most cities in the west bank had an average 0.5 Eye beds/20,000. East Jerusalem had one eye bed per 20,000 population. Table 17 described the Vision 2020 operational capacity process indicators for the OPT.

Table 20. Vision 2020 operational capacity process indicators for the OPT (N=82)

Governorate	Number of populations	Ratio of eye bed per 20,000	Eye beds/20,000	Staffed eye surgery hospital/clinic
Nablus	388,321	0.5	10	3
Ramallah & Al-Bireh	328,861	0.3	6	6
Jenin	314,866	0.06	1	1
East Jerusalem	435,753	1.9	42	2
Salfit	75,444	0	0	0
Hebron	711,223	0.3	13	5
Tubas	60,927	0	0	0
Tulkarem	186,760	0.1	1	1
Bethlehem	217,400	0.18	2	2
Qalqilya	112,400	0	0	0
Jericho	50,002	0	0	0
Total (west bank and east Jerusalem)	2,881,957	0.5	75	20

Chapter Five

Discussion

This study evaluates the numbers of eye care cadres and facilities in the Occupied Palestinian Territories (West Bank and East Jerusalem) and their locations. It provides descriptive information about the providers' demographics, training, qualifications, and experience. Based on the WHO Vision 2020 "right to sight" initiative, which recommended each region to assess eye health care workforce and eye health care services, some highlights of this study results will be analyzed below. Our major results indicate that eye care in the OPT lacks adequate distribution of eye care health services and cadres and subspecialties among eye care practitioners in certain areas. It is our hope that study results will be utilized by researchers and policymakers to improve eye care services in the OPT.

5.1 Available Services

The majority of eye care facilities in the country were identified as private, while only 1.7% of the country's facilities are governmental, which were all hospitals. Of all Civil and NGO eye care institutions identified, there were only two providing optometric services. This means that Palestinians in the OPT rely mainly on private eye care services and payout of pocket for spectacles, with minimal funding available to civil and NGO optometric centers to provide low-cost spectacles. This puts a moral and ethical obligation to ensure that patients, who cannot afford optometric services, receive the minimum standard of eye health care services. This same issue

was reported in many developed and developing countries around the world. The dominance of the private sector in these countries affected the accessibility and affordability of eye care services for the public. These studies suggested the approach of public-private partnerships with uniform guidelines. This can be achieved by including primary eye care service in existing government health facilities rather than separating it out as stand-alone service. Besides, a collaboration between the private sector and government can be developed by referring patients with governmental insurance to the private sector through using already established equipment and infrastructure. This approach is expected to improve the implementation, performance, efficiency, and quality of eye care service in these countries(29)(30). The application of such strategies by relevant stakeholders in the OPT may be needed to improve the quality of eye health care services and reduce the patient load in governmental hospitals.

The majority of eye care facilities in the OPT were located in the Hebron district, followed by the Nablus and Ramallah & Al-Bireh districts, which is expected, as these three districts hold the highest percentage population in the OPT. Conversely, East Jerusalem, which contains the second-highest population in the OPT, had a limited number of eye care facilities compared to other districts with larger population percentages. This is expected since this study included only eye care facilities owned by Palestinians, and excluded Israeli eye care facilities, which Palestinian citizens living in east Jerusalem have access to. There was a clear shortage of eye care facilities in the Salfit and Tubas districts, as they only had two

and four facilities, respectively, all optometry centers. The Qalqilya district had 10 facilities, and of those there were three ophthalmology primary eye care centers, while the rest were optometry centers.

Approximately half of the current eye care facilities are new, with an average practicing period of fewer than ten years. New graduates nowadays may prefer to establish their own practices instead of working in established facilities, possibly due to low salary levels.

Inadequate distribution of eye care services was apparent, as most of the facilities were located in urban areas, with only one hospital and three eye clinics located in rural areas in the OPT, none of which are found in any of the refugee camps. In addition, no optical centers existed in any rural Palestinian regions. Therefore, there are no proper eye care services that are easily accessible to Palestinians living in villages and refugee camps, which can reflect on eye care and eye health of rural areas population negatively, such as is the case in rural areas of south Hebron, where some of these villages are 16 km away from the major facilities in Hebron city. These results are comparable to the situation in other countries. In Yemen, there is a significant unequal distribution of eye care services between urban and rural areas(21). In Zambia, the proportion of facilities is highly unbalanced, particularly in rural areas. (7) In Alabama, a southern state in the United States, the eye care services are geographically isolated, and most providers are located in urban areas (14). The same issue is also apparent in France, the UK ,and Germany. (16)(17). Worldwide, access to eye care remains a

significant concern among rural populations, and a better distribution of eye care services is highly required.

Furthermore, 66.1% of all optometry centers had fully equipped workshops to manufacture glasses. However, none of these were located in rural areas, and none were funded by a non-private facility. According to our results, low vision services are available in the OPT except in the following districts: Tubas, Jericho, Qalqilya and Salfit, and it should be noted that multidisciplinary tertiary low vision services are provided only at one center in the southern OPT, while secondary low vision services are provided at two centers, one in the center of OPT and one in northern OPT. The rest of the low vision services offered in the OPT are considered primary services. In addition, no local optical lenses or low vision equipment manufacturing exist in the country., All optical lenses used in glasses workshops are imported from Israeli manufacturers or from abroad countries like Turkey and China. As a result, high spectacles prescriptions and low vision equipment are highly overpriced, and even the simple magnification glasses are not affordable to many of the low vision population. Even though, developing local manufacturing of optical lenses and low vision devices in the OPT is the fundamental solution for this overpricing issue, this may be challenging since we have restrictions on establishing local manufacturing factories imposed by Israeli authorities due to political reasons. Other studies showed the same mismatch between the need and the uptake of low-vision services. This has been attributed to several factors that occur at several levels. In some countries, there was

limited availability of low-vision services or a lack of training in low-vision.(31)(32) Lack of awareness of low-vision services from ophthalmologists and optometrists and a need for increased co-operation and referral between providers have been identified by others.(33)

Primary and secondary services, including Refraction, comprehensive eye exam, and Spectacle dispensing services are available in all districts. Yet, there is a distinct shortage in emergency, screening, and referral services, especially in the northern districts of Tubas, Salbit, Qalqelia, and to Jericho. Although all optometrists provide refractive services, very few provide primary comprehensive eye services with dilation. This is clearly due to the limited scope of practice for optometrists in the OPT, as they are not legally allowed to provide primary eye care services, including using diagnostic ocular agents for early detection and management. Increasing the scope of practice for optometrists in the OPT can fill this shortage since optometrists far outnumber any other eye care practitioners, especially since their education period is less, and their cost of education is not as high as medical doctors. This means that optometrists can be more accessible to patients, specifically in underprivileged areas The profession of optometry must be considered in playing a more significant role on the front end of eye care to affect better long-term eye health.

Complex Secondary services, including invasive ocular surgeries, are provided by only 24.2% of ophthalmology facilities. Vitreo-retinal surgery and Glaucoma surgery services were provided by 12.9%, and 11.3% of ophthalmology facilities. All invasive surgeries were offered only in large

Hospitals in Ramallah, Nablus, Hebron and East Jerusalem. There is a special need for these secondary services to detect and manage diabetic retinopathy (DR) in particular. Diabetes mellitus (DM) is a common chronic disorder and one of the main causes of death in the OPT. According to studies, The Middle East will have the second highest increase in percentage of people with DM in 2030 compared to other parts of the world (34). Even though there are no official numbers on the prevalence of DR in the OPT, recent unpublished study results revealed that the Prevalence of all DR in the West Bank was 41.8%.(35) These studies suggested that early diagnosis of DR through primary eye care can reduce the prevalence of DR and prevent sight-threatening DR and additional complications.

Another unpublished study on the barriers to DR screening in the OPT revealed that there were financial barriers, including eye exam cost, increased cost of DR treatment, cost of transportation to the referral clinics, and the long waiting times due to inadequate numbers of ophthalmologists or screening facilities. This study suggested that these barriers should be taken into consideration by policymakers to increase the uptake and quality of services. (36) This strongly indicates the need for better distribution of these services across the country and the need to develop a national diabetic retinopathy screening program as part of primary health care services. Other studies suggested that including DR screening by optometrists would be cost-effective from the perspective of the health care systems as optometrists outnumber ophthalmologists and technically well

suited for the primary screening role and maybe suited for the purpose of identifying the majority of DR cases that are not undergoing hospital and ophthalmologists supervision. (37)(38)

5.2 Human resources in eye care

Almost all of the participating ophthalmologists, optometrists, refractionists, qualified and non-qualified opticians, and orthoptists in the OPT are Palestinian nationals. Compared to optometrists, ophthalmologists were on average, approximately five years older. Only 5.5% of ophthalmologists were women, in comparison to 77.2% of women optometrists. Similarly to ophthalmologists, the vast majority of refractionists were males and older, since most of them studied abroad before there were optometry programs in the country. This gender disparity for eye care providers in the OPT is consistent with national demographic estimates for these providers in the United States. The Association of Schools and Colleges of Optometry estimates that the majority (66.2%) of optometrists graduating in 2017 were women, while the American Academy of Ophthalmology estimates for the year 2012 that approximately 20% of practicing ophthalmologists were women(14)(39). The percentage of women ophthalmologists in the OPT remains very low, as is the case in the Middle East and other parts of the world. Different studies justified this gender imbalance to several factors including, increased years of training, which it may not be feasible for women in the Middle East in particular, in addition to traditional beliefs or preconceptions reasons about women's role in society.(40)(41)

The majority of ophthalmologists were trained either locally in 1948 or internationally, most commonly in Russia, the United Kingdom or India. This is expected since the local residency training program in ophthalmology is relatively new in the OPT, as it was open for applicants in 2011, and very limited numbers of residents are accepted every few years. Most ophthalmologists, holding subspecialties, practice in the city of Ramallah, Nablus and East Jerusalem, while only 14.2% of ophthalmologists holding subspecialties practice in Hebron, which has the highest population in the country. As indicated previously regarding eye care services, it is also apparent from the results that most ophthalmologists with subspecialties practice in urban settings, leaving rural populations with limited access to subspecialty care.

Even though only one university offers a bachelor of optometry degree in the OPT, the majority of optomerists, refractionists and opticians received their training locally in the West Bank. There is an appearant lack of academic and clinical optometric teaching staff. with the increasing number of accepted optometry students yearly, it is unclear whether this will affect the quality of education for graduating students. Patients satisfaction is known to be linked with the level of proffesionalty and confident the student gains from their learning clinical experince during optometry training(42) and certainly with higher rates of student acceptance, the quality of education and service provision is ultimately expected to be affected.

Currently, the unemployment rate is low in the OPT, and most eye health cadres hold full-time or part-time positions. This is an indication that there is a high demand for eye care services. This could be due to increased awareness among Palestinians on the importance of regular eye care, or it could be due to increased age-related eye conditions among the elderly population. On the other hand, as the number of optometry graduates are rapidly increasing, whether this can lead to an increase in the unemployment rate in the future is unknown.

Our results indicated that there is a clear shortage of ophthalmology subspecialties. Only 1.01% of ophthalmologists have received subspecialty training, and another 27.2 % of them have a fellowship post-residency. These results are similar to other developing countries. In Yemen, there is a shortage of skilled ophthalmologists in some ophthalmic surgical techniques such as phacoemulsification and vitreo-retinal surgery, (21) while in India, half the ophthalmologists are non-surgical practitioners. (24) The situation in the developed countries is better to some extent, in Alabama, where approximately 50% of ophthalmologists had completed a fellowship(14), and in the UK, where high rates of Ophthalmologists with subspecialties were reported(43). This shortage of ophthalmology subspecialties in the OPT is = affecting the quality of the services provided to those patients in need of specific eye care. Also, this places more pressure on the small percentage of those Ophthalmologists with subspecialties as they have high patient load. Different financial and non-

financial incentives should be initiated to increase the number of specialists, especially in underserved areas.

Currently, only 3.43% of optometrists have master's degrees, 0.76% have Doctor of Optometry degree, and 0.38% have Doctor of Philosophy Degree, which means that most optometrists do not hold higher academic or clinical degrees, despite the increasing number of optometry students yearly. This is because there are no local or regional higher education or specialized training programs for optometrists. The fact that scholarship opportunities to study abroad are scarce in the optometry field. This also resulted in creating an apparent shortage in a variety of specialty training areas in the OPT, including specialty contact lens fitting, binocular vision anomalies, low vision rehabilitation, and primary eye care in all cities.

There is a lack of published eye care related research in the OPT. Research in the medical sciences plays an important role in a country's economic growth, long-term sustainable development, and improvement in living standards and quality of life (44). Unfortunately, Middle-Eastern countries are lag behind in the number of original research publications and the number of publications in top journals and citation frequency(45). The number of medical publications, including eye care research, from Arab institutions in all 22 Arab countries until 2012, is equivalent to almost half that of Turkey and equal to only 4% of medical publications from United States based institutions(46). This lack probably is due to limited resources, limited funding, and lack of academic eye care researchers. This indicates a

strong need for systemic interventions at the country and institutional levels to improve the quality of the eye care research in the OPT.

Since most of the facilities belong to the private sector, most eye care cadres (83.1%) are private sector workers compared to only 4.5% who work in the governmental sector, where eye care services were inadequate. Previous studies suggested that introducing optometrists within the public sector improves quality access to services, especially in rural communities(47). Still, due to their limited scope of practice, optometrists are not fully recognized as health care providers, and thus, they are not likely to be employed in governmental, NGOs, or civil institutions. Moreover, local insurance companies accept spectacle prescriptions signed by ophthalmologists only and not optometrists due to an outdated optometry law regulated by the ministry of health. As a result, most institutions rely on ophthalmology for essential refraction services. It is important that the Palestinian Association for Optometrists and Opticians take clear steps to adjust the Optometry law and expand the scope of practice. This is essential since our results indicate that there is a lack of eye care workforce in northern OPT, where some districts, like Tubas, have no practicing ophthalmologists. Optometrists can step in to fill the gap by providing primary eye care services.

A great percentage of eye care cadres work during the weekends, mostly on Saturdays. Only 21.2% of those are ophthalmologists, and 57% of them are optometrists. A smaller percentage, approximately 30.2% of all eye care cadres, work evening hours, and the majority (50%) of them are

optometrists. With higher numbers of optometrists, optometry is more accessible to communities. This is highly indicated in other studies in the United States, where Optometrists provide more than two-thirds of the primary eye care services. They are more widely distributed geographically than other eye care providers, and they are readily accessible for the delivery of eye and vision care services(48). Optometry practice hours in the OPT are more convenient with most optometrists providing weekend and evening eye care. Unfortunately, the limited scope of practice for optometrists in the OPT prevents them from providing adequate primary and emergency eye care services.

Half of eye care cadres in the OPT are self-employed, most of those are ophthalmologists. Whereas, most optometrists are new graduates and females with limited funds to open private practices. This is well-matched with the situation in other countries where smaller percentages of optometrists are self-employed as owners of their franchise or optical establishment.(12)(14) Moreover, more than half of ophthalmologists practice in more than one location, while only 13.4% of optometrists practice in more than one location. This is expected since most Ophthalmologists work in their own private clinics beside their main jobs at hospitals or surgical centers. In contrast, this is rarely the case for optometrists.

5.3 The Vision 2020 process indicators for the OPT

The Vision 2020 process indicators for human resources recommend a ratio of at least one ophthalmologist per 50,000 population and one optometrist per 50,000 people(1)(2). The average ratio in the OPT was 1.6 ophthalmologists and 5.7 optometrist per 50,000 population. Almost all districts in the West Bank and East Jerusalem met the recommended criteria for human resources, except for Tubas, Salfit, and Jenin districts, as they did not meet the recommended ratios for ophthalmologists.

Compared to other Middle East countries, the OPT had a higher optometrist: population ratio. Iran has an average of 1.28 optometrist per 50,000 population, according to a 2016 study, and Similar to the situation in the OPT, Iran has a broad variation in the density of ophthalmologists and optometrists in the country (23). Saudi Arabia have 0.6 optometrist per 50,000 population according to a 2014 study(18). However, it is not easy to compare the ratio in OPT to Saudi Arabia since their study design is different. The study in Saudi Arabia focused on optometrist working in governmental sectors only. If we are to compare the optometrist: population ratio in the government sector only in the OPT, it would be 0.13 per 50,000 population less than that of Saudi Arabia, and would not meet the WHO criteria.

The ratio for ophthalmologists in the OPT was consistent with other Middle East countries. Including Kuwait(19), Qatar(19) and Oman,(20) the reported ratios 1.5, 1.9, and 1.9 ophthalmologists per 50,000 population,

respectively. On the other hand, Yemen has only 0.53 ophthalmologists per 50,000 population, which does not meet the WHO recommended criteria.

The ophthalmic medical equipment, including OCT, VF, A-scan, in addition to low vision equipment and Scleral/Mini-scleral contact lens set, was found to be highly allocated in Ramallah, Nablus, Hebron, and East Jerusalem cities compared to the rest of the country. Recent studies in the OPT(49)(50) showed that the prevalence of Keratoconus (KC) among tertiary students in Palestine is relatively high (1.5%), and among the highest in the world. These studies recommended a Public health outreach and intervention for KC, including screening programs for early detection. The equipment used in KC screening and treatment, including Pentacam, Topography, and cross-linking, are of limited number and mostly found in ophthalmology clinics in Ramallah and Nablus districts , in addition to a small amount of topography devices that are used for KC screening in optometry centers. Still, almost none of these equipment is available in governmental institutions. This means that patients in the OPT do not have free access to early diagnosis and management of chronic diseases like KC.

Another Vision 2020 goal is to have at least one operating theatre for eye surgery and one eye-bed in every district.(1)(2) While most districts in the OPT have at least one eye surgery theatre, not all of these surgery theatres are staffed with skilled cadres able to undertake surgery. Most of them do not have enough eye beds, with the average number of eye beds in the country being 0.5 per 20,000, Which does not meet the WHO criteria. Like other services, the vast majority of these operating theatres were located in

Ramallah, Nablus, and Hebron cities. Therefore, patients in need of major eye surgery in underserved areas of Salfit, Tubas, Qalqilya, and Jericho must reach other cities for these services.

5.4 Study Strengths and limitations

This study was based on the recommendation by the WHO Vision 2020 "right to sight" initiative. It is the first study in the OPT to comprise a comprehensive look at the distribution and the services provided for eye care, and it is the first study to give assessments on human resources distribution in public and private eye care.

During this study, a few difficulties were encountered, such as cadres unavailable via telephone or inaccessible in person. Mainly, we were unable to reach several cadres in Jerusalem, as special permits must be obtained from the Israeli Military Forces to enter the city. Additionally, some eye care cadres refused to participate in the study or would not answer their phone on multiple occasions. This primarily affected the ability to reach the ophthalmic-nurse population, as most of them practice in one hospital in Jerusalem, which resulted in excluding them from the sample. Another limitation that may have affected our results includes information bias, as some participants may have answered some questions inaccurately. Time shortage also limited the ability to re-attempt to complete more questionnaires to decrease the non-response rate.

5.5 Conclusion and Recommendations

The prospects in eye health and world blindness prevention will depend mainly on the availability of resources, including appropriate services and well-trained cadres. There is a vast inconsistency between what is possible and what is being done. This issue has its underlying cause in the shortage or irrational usage of resources. Despite the fact that the OPT mostly met the WHO vision 2020 criteria for the number of human resources, our study concluded that there is a lack and a mal-distribution of eye care institutions in rural areas and human resources with specialized training. Some of these constraints could be overcome with better distribution of eye care cadres and the establishment of new higher education and training programs, especially for optometrists. For the delivery of eye care services in the underprivileged areas to become more accessible, Optometrists' role should be redefined for primary eye care in rural regions and small towns. This is essential for identifying and treating common ocular problems and reducing avoidable blindness, including the provision of affordable, equitable, accessible, efficient, and sustainable eye care to the general population. This should also be accompanied by an increase of the scope of practice for optometrists, who are increasing in numbers yearly. More efforts should be made with an organized protocol for recognizing of optometry as a health care profession and employing more optometrists in the governmental sectors. The Palestinian Ophthalmology Society and the Palestinian Association for Optometrists and Opticians have a significant responsibility to ensure that eye care is accessible to all. They must place

more pressure on governmental stakeholders to ensure access to eye care is a top priority within the ministry of health.

Follow up studies should be conducted to evaluate the quality of eye care services in the OPT. This study focused primarily on the quantity and the distribution of eye care services. Collaboration between research facilities and eye care cadres in the OPT to include the Gaza strip in future studies should be pursued.

References

1. world health organization. **Universal eye health: a global action plan 2014–2019.** 2013.
2. Vision 2020: the right to sight, WHO. **The global initiative for the elimination of avoidable blindness.** WHO Libr Cat Data. 2007;12:32.
3. Palestinian Central Bureau of Statistics. **Occupied Palestinian Territory: Humanitarian Needs Overview [Internet].** 2011. 2015. Available from: <http://www.pcbs.gov.ps/post.aspx?lang=en&ItemID=1721>
4. Chiang F, Kuper H, Lindfield R, Keenan T, Seyam N, Magauran D, et al. **Rapid assessment of avoidable blindness in the occupied palestinian territories.** PLoS One. 2010;5(7):1–8.
5. Prozesky D. **Advocacy for eye health.** Community Eye Heal J. 2002;20(57):8.
6. Adepoju F, Adekoya B, Ayanniyi AA. **Poor cataract surgical output : Eye care workers perspective in north central Nigeria.** 2012;(May 2016).
7. Bozzani F, Griffiths UK. **Situation analysis of eye health care in Zambia.** 2011.

8. Palmer JJ, Chinanayi F, Gilbert A, Pillay D, Fox S, Jaggernath J, et al. **Mapping human resources for eye health in 21 countries of sub-Saharan Africa : current progress towards VISION 2020.** 2014;12(1): 1–16.
9. Eze BI, Maduka-okafor FC. **An assessment of the eye care workforce in Enugu State, south-eastern Nigeria.** BioMed Cent. 2009;7(38):1–6.
10. Ilechie A, Otchere H, Darko-Takyi C, Abraham CH. *Access to and Utilization of eye Care Services in Ghana.* Int J Heal Res. 2013;6(3): 7–15.
11. Gibson DM. **The geographic distribution of eye care providers in the United States: Implications for a national strategy to improve vision health.** Prev Med (Baltim). 2015;73:30–6.
12. Soroka M. *The New York State optometry workforce study.* J Community Health. 2012;37(2):448–57.
13. Soroka M. **Comparison of Examination Fees and Availability of Routine Vision Care by Optometrists and Ophthalmologists.** 1988;10(4).
14. Providers EC, Owsley C. **Census of Alabama Eye Care Providers.** 2012.

15. Violato M, Dakin H, Chakravarthy U, Reeves BC, Peto T, Hogg RE, et al. **Cost-effectiveness of community versus hospital eye service follow-up for patients with quiescent treated age-related macular degeneration alongside the ECHoES randomised trial.** 2016;1–11.
16. Council E. **European Council of Optometry and Optics.** 2015.
17. Thomas D, Weegen L, Walendzik A, Wasem J, Jahn R. **Comparative Analysis of Delivery of Primary Eye Care in Three European Countries.** 2011.
18. Al Motowa S, Khandekar R A-TA. *Resources for Eye Care at Secondary and Tertiary Level Government Institutions in Saudi Arabia.* **Middle East Afr J Ophthalmol.** 2014;21(2):142–6.
19. world health organization. **Implementation of VISION 2020 in the Eastern Mediterranean Region Report on a regional planning workshop.** 2004.
20. Khandekar R, Mohammed AJ. *Health Facilities for Primary Eye Care in Sultanate of Oman Primary Eye Care Study 2000.* **SULTAN QABOOS Univ Med J.** 2006;6(1):22.
21. Al-Akily S, Al-Shaer M, Bamashmus M, Al-Barrag A, Alkhatib T, Al-Akhlee H. *Analysis of Eye Care Services in Yemen.* **Ophthalmol Res An Int J.** 2017;7(1):1–7.
22. **International council of ophthalmology.** Access to Cataract Surgical Services. 2010.

23. Mohammadi S-F, Lashay M-R, Ashrafi E, Haghdoust A-A, Alinia C, Lashay A-R, et al. *Distribution of ophthalmologists and optometrists in Islamic Republic of Iran and their associated factors*. **East Mediterr Health J**. 2017;22(12):880–6.
24. Verma R, Khanna P, Prinja S, Rajput M, Arora V. *The national programme for control of blindness in India*. **Australas Med J**. 2011;4(1):1–3.
25. Murthy GVS, Gupta SK, Bachani D, Tewari HK, John N. *Human resources and infrastructure for eye care in India: Current status*. **Natl Med J India**. 2004;17(3):128–34.
26. world health organization. **Strategies for the prevention of blindness in national programmes**. 1997;7–11.
27. Sivakumar AK. *Professional management for eye care*. **Community Eye Heal J**. 2006;19(59):50–1.
28. Norman H. Nie. **SPSS Latest version 25.0.0.0**. 2017.
29. Tynkkynen L, Lehto J. **Health Research Policy and Systems An analysis of ophthalmology services in Finland - has the time come for a Public-Private Partnership ?** 2009;12:1–12.
30. Senjam SS. **BAOJ Ophthalmology Public-Private Partnership for Eye Health Care Delivery in BAOJ Ophthalmology Public-Private Partnership for Eye Health Care Delivery in Developing Nations**. 2018;(March).

31. Khan SA, Shamanna B NR. *Perceived barriers to the provision of low vision services among ophthalmologists in India*. Indian J Ophthalmol. 2005;53: 69–75.
32. Okoye OI, Aghaji AE, Umeh RE, Nwagbo DFE CA. **Barriers to the provision of clinical low vision services among ophthalmologists in Nigeria**. Vis Impair Res. 2005;53: 69–75.
33. Adam R P. **Where are all the clients? Barriers to referral for low vision rehabilitation**. Vis Impair Res. 2007;9: 45–50.
34. Shaw JE, Sicree RA, Zimmet PZ. **Global estimates of the prevalence of diabetes for 2010 and 2030**. Diabetes Res Clin Pract. 2010;87(1):4–14.
35. Taha IA. **Prevalence and Associated Factors of Diabetic Retinopathy among Diabetic Patients in the West Bank: A Cross Sectional Study** Prevalence and Associated Factors of Diabetic Retinopathy among Diabetic Patients in the West Bank: A Cross Sectional Study. Vol. unpuplishe. 2018.
36. Zink T. *Diabetic retinopathy screening barriers among Palestinian primary health care patients: A qualitative study*. J Diabetes Metab Disord. 2020;manuscript(submitted for):puplication.

37. van Katwyk S, Jin Y ping, Trope GE, Buys Y, Masucci L, Wedge R, et al. **Cost-Utility Analysis of Extending Public Health Insurance Coverage to Include Diabetic Retinopathy Screening by Optometrists.** Value Heal [Internet]. 2017;20(8):1034–40. Available from: <http://dx.doi.org/10.1016/j.jval.2017.04.015>
38. Mason J, Drummond M. **Screening for diabetic retinopathy by optometrists: effectiveness and cost-effectiveness [Internet].** 1995. Available from: <http://www.york.ac.uk/che/pdf/DP137.pdf>
39. Year A. **ANNUAL STUDENT Academic Year 2017-2018.** 2018.
40. Khan H, Moosajee M. **Facing up to gender inequality in ophthalmology and vision science.** Eye [Internet]. 2018;32(9): 1421–2. Available from: <http://dx.doi.org/10.1038/s41433-018-0147-7>
41. Economist T. Men, Women and Work. **The Gender Pay Gap. Women still earn a lot less than men, despite decades of equal pay laws. Why?** 2017.
42. Shah, Kajal*; Naidoo, Kovin†; Bilotto, Luigi‡; Loughman J-. **Factors Affecting the Academic Performance of Optometry Students in Mozambique,.** Optom Vis Sci. 2015;92(6):719–29.
43. Dean WH, Grant S, McHugh J, Bowes O, Spencer F. **Ophthalmology specialist trainee survey in the United Kingdom.** Eye [Internet]. 2019;33(6):917–24. Available from: <https://doi.org/10.1038/s41433-019-0344-z>

44. MacIlwain C. **Science economics: What science is really worth.** Nature. 2010;465(7299):682–4.
45. Benamer HT, Bakoush O. **Arab nations lagging behind other Middle Eastern countries in biomedical research: A comparative study.** BMC Med Res Methodol. 2009;9(1):1–6.
46. El Rassi R, Meho LI, Nahlawi A, Salameh JS, Bazarbachi A, Akl EA. **Medical research productivity in the Arab countries: 2007-2016 bibliometric analysis.** J Glob Health. 2018;8(2):2007–16.
47. Maake ME, Moodley VR. **An evaluation of the public sector optometric service provided within the health districts in KwaZulu-Natal, South Africa.** African Vis Eye Heal. 2018;77(1): 1–9.
48. Mitchell M. Scheiman PA, Amos CS, Ciner EB, Marsh-Tootle W, Bruce D. Moore, Rouse MW. **Pediatric Eye and Vision Examination.** Am Optom Assoc [Internet]. 2002;1–34. Available from: <http://www.aoa.org/documents/optometrists/CPG-2.pdf>
49. Shanti Y, Beshtawi I, Zyoud SH, Abu-Samra A, Abu-Qamar A, Barakat R, et al. **Characteristics of keratoconic patients at two main eye centres in Palestine: A cross-sectional study.** BMC Ophthalmol. 2018;18(1):1–7.
50. Shehadeh MM, Diakonis VF, Jalil SA, Younis R, Qadoumi J, Al-Labadi L. **Prevalence of Keratoconus Among a Palestinian Tertiary Student Population.** Open Ophthalmol J. 2016;9(1):172–6.

Appendices

Appendix-1: Questionnaires

Eye care facilities (Institution) Questionnaire.

Institution Information	Institution Code
1. Institution Name (Institute)& Acronym	
2. Phone Number	
3. State year of operation اي سنة تأسست قسم/مركز/عيادة العيون في المؤسسة وبأشرت عملها في تقديم الخدمات	
4. Years of Operation (OpYr) عدد سنوات العمل/ تقديم الخدمات	<input type="checkbox"/> <10 ¹ <input type="checkbox"/> 10-19 ² <input type="checkbox"/> 20-29 ³ <input type="checkbox"/> 30-39 ⁴ <input type="checkbox"/> >39 ⁵
5. Specify exact name of city, village or town etc حدد موقع المؤسسة الدقيق	
6. Select Directorate where institute is located: (Direct) في أي محافظة تقع المؤسسة	<input type="checkbox"/> Nablus (N) ¹ <input type="checkbox"/> Ramallah and Al-Bireh (R&A) ² <input type="checkbox"/> Jenin (JN) ³ <input type="checkbox"/> East Jerusalem (EJ) ⁴ <input type="checkbox"/> Salfit (S) ⁵ <input type="checkbox"/> Hebron (H) ⁶ <input type="checkbox"/> Bethlehem (B) ⁷ <input type="checkbox"/> Tubas (TB) ⁸ <input type="checkbox"/> Tulkarm (TK) ⁹ <input type="checkbox"/> Qalqilya (Q) ¹⁰ <input type="checkbox"/> Jericho (JC) ¹¹ <input type="checkbox"/> Other ¹²
7. Select exact location of institute: (Loc) المؤسسة موقعها يعد بمدينة؟ قرية؟ بلدة؟ مخيم؟	<input type="checkbox"/> City ¹ <input type="checkbox"/> Town ² <input type="checkbox"/> Village ³ <input type="checkbox"/> Refugee Camp ⁴ <input type="checkbox"/> Other ⁵ : Specify
8. Is the location of institute considered urban or rural? (IUR) وتعتبر المنطقة مدنية/حضرية ولا ريفية؟	<input type="checkbox"/> Urban ¹ <input type="checkbox"/> Rural ² <input type="checkbox"/> Others ³ Specify:
9. Type of Facility (FacType) <i>You can select more than one</i> نوع المنشأ؟ الانواع: مستشفى، عياده، مركز بصريات، عدة مراكز/فروع، مركز تاهيل، عيادات جامعية، ؟	<input type="checkbox"/> Hospital ¹ <input type="checkbox"/> Clinic ² <input type="checkbox"/> Optical Center ³ <input type="checkbox"/> Optical Chain ⁴ <input type="checkbox"/> Rehabilitation Center ⁵ <input type="checkbox"/> University Service Clinic ⁶ <input type="checkbox"/> University Hospital ⁷ <input type="checkbox"/> Other: Specify ⁸
10. Practice Sector (Sector) <i>You can select more than one</i> المؤسسة تابعة لأي قطاع نوع القطاع: حكومي/ غير حكومي غير ربحي/ اهلي/خاص ربحي/ خاص مع مجموعة اطباء او اخصائيي وكالة	<input type="checkbox"/> Governmental ¹ <input type="checkbox"/> Non-Profit Governmental Organization ² <input type="checkbox"/> Civil ³ <input type="checkbox"/> Private (For profit) ⁴ <input type="checkbox"/> Private group practice (For profit) ⁵ <input type="checkbox"/> UNRWA ⁶ <input type="checkbox"/> Other: Specify ⁷

<p>11. Do you know the Estimated Number of Patients serviced by the institution Per Year (CatchR) Catchment Rate العدد التقديري للمرضى الذين تخدمهم المؤسسة سنويا</p>	<p><input type="checkbox"/> Yes the number is¹: (<i>specify number</i>) <input type="checkbox"/> I do not know² <input type="checkbox"/> I do not want to answer³ <input type="checkbox"/> Not applicable⁴</p>
<p>12. Availability of in-patient services? هل يوجد خدمات لمرضى داخليين ؟ اذا كانت المؤسسة مشن مستشفى لازم نسال السؤال للتأكد...ما في طبعا اي خدمات جراحية لمرضى داخليين (</p>	<p><input type="checkbox"/> Yes¹ <input type="checkbox"/> No² <input type="checkbox"/> Not applicable³</p>
<p>13. Are there beds available for ophthalmic patients only? (Only ask this question if answer to Q12 us YES) هل يوجد اسرة محددين لطب وجراحة العيون فقط ؟</p>	<p><input type="checkbox"/> Yes¹. Please specify Number: <input type="checkbox"/> No² <input type="checkbox"/> Not applicable³</p>
<p>14. Are there beds available for ophthalmic patients on as needs basis? (Only ask this question if answer to Q12 us YES) عدد الاسرة التي تستخدم عند الحاجة فقط</p>	<p><input type="checkbox"/> Yes¹. Please specify Number: <input type="checkbox"/> No² <input type="checkbox"/> Not applicable³</p>
<p>15. Are there available major eye surgery theater rooms? هل يوجد قاعات/غرف خاصة لإجراء العمليات الجراحية المعقدة/الاساسية؟ و كم عددها؟</p>	<p><input type="checkbox"/> Yes¹. Please specify Number: <input type="checkbox"/> No² <input type="checkbox"/> Not applicable³</p>
<p>16. Are there available minor eye surgery rooms? هل يوجد قاعات/غرف خاصة لإجراء العمليات الجراحية البسيطة؟ و كم عددها؟</p>	<p><input type="checkbox"/> Yes¹. Please specify Number: <input type="checkbox"/> No² <input type="checkbox"/> Not applicable³</p>
<p>17. Are there available exam lanes? هل يوجد غرف خاصة للفحص؟ و كم عددها؟</p>	<p><input type="checkbox"/> Yes¹. Please specify Number: <input type="checkbox"/> No² <input type="checkbox"/> Not applicable³</p>

Institutional Cadre (Cadre): <small>بدنا نسال هلا عن الكوادر الموجودة بالمؤسسة وناخد فكرة عن مؤهلاتهم العلمية وتخصصاتهم</small>		
18. Do you have Ophthalmologist employees? (OMD) <small>عدد اطباء العيون في المؤسسة يرجى تحديد العدد الاجمالي تحديد العدد الذين يعملون اقل او اكثر 30 ساعة/اسبوع</small>	<input type="checkbox"/> Yes ¹ . If the answer is yes please answer the next questions	
	1. Please specify the number of OMD at your facility	
	1. Please specify how many OMD work ≥ 30 hr/week	
	2. Please specify how many OMD work <30 hr/week	
	<input type="checkbox"/> No ²	
19. Do you have Optometrist employees? (Optom) <small>عدد اخصائيين البصريات اللي حاصلين على درجات البكالوريوس في المؤسسة يرجى تحديد العدد الاجمالي تحديد العدد الذين يعملون اقل او اكثر 30 ساعة/اسبوع</small>	<input type="checkbox"/> Yes ¹ . If the answer is yes please answer the next questions	
	1. Please specify the number of Optom at your facility	
	2. Please specify how many Optom work ≥ 30 hr/week	
	3. Please specify how many Optom work <30 hr/week	
	<input type="checkbox"/> No ²	
20. Do you have qualified Ophthalmic Nurse (ON) employees? <small>عدد الممرضين المؤهلين وحاصلين على شهادات في تخصص العيون في المؤسسة</small>	<input type="checkbox"/> Yes ¹ . If the answer is yes please answer the next questions	
	1. Please specify the number of ON at your facility	
	2. Please specify how many ON work ≥ 30 hr/week	
	3. Please specify how many ON work ≤ 30 hr/week	
	<input type="checkbox"/> No ²	
21. Do you have Qualified Opticians (QOptician) employees? <small>عدد(فنيين البصريات المؤهلين وحاصلين على شهادات في قص وتركيب العدسات) في المؤسسة</small>	<input type="checkbox"/> Yes ¹ . If the answer is yes please answer the next questions	
	1. Please specify the number of QOptician at your facility	
	2. Please specify how many QOptician work ≥ 30 hr/week	
	3. Please specify how many QOptician work ≤ 30 hr/week	
	<input type="checkbox"/> No ²	
22. Do you have Non-Qualified Opticians (NQOptician) employees? <small>عدد(فنيين البصريات الغير حاصلين على شهادات في قص وتركيب العدسات/ واكتسيو مهارتهم خلال سنوات الخبرة) في المؤسسة</small>	<input type="checkbox"/> Yes ¹ . If the answer is yes please answer the next questions	
	1. Please specify the number of NQOptician at your facility	
	2. Please specify how many NQOptician work ≥ 30 hr/week	
	3. Please specify how many NQOptician work ≤ 30 hr/week	
	<input type="checkbox"/> No ²	
23. Do you have Ophthalmic assistants/technicians (OTA) employees?	<input type="checkbox"/> Yes ¹ . If the answer is yes please answer the next questions	
	Please specify the number of OTA at your facility	
	Please specify how many OTA work ≥ 30	

<p>عدد(مساعدين/تقنيين في مجال العيون) في المؤسسة</p> <p>غير اخصائيين البصريات</p> <p>مجال عملهم: مساعدة الطبيب في الفحوصات الأولية: قياس النظر، قياس النظارات، اخذ تاريخ الحالة الطبية،...تقطير، تعقيم،صيانة بسيطة... على الاقل دوره سنة بعد المدرسة</p>	<p>hr/week</p> <p>Please specify how many OTAwork <30 hr/week</p> <p><input type="checkbox"/>No ²</p>	
<p>24. Do you have Refractionists (Ref) employees?</p> <p>عدد(مساعدين/تقنيين يمارسون تصحيح الاخطاء الانكسارية) في المؤسسة</p> <p>غير اخصائيين البصريات</p> <p>وحاصلين على مؤهل علمي في الريفراكشن</p> <p>على الاقل دوره/تدريب سنة بعد OTA</p>	<p><input type="checkbox"/>Yes ¹. If the answer is yes please answer the next questions</p> <p>Please specify the number of Ref at your facility</p> <p>1. Please specify how many Ref work ≥ 30 hr/week</p> <p>2. Please specify how many Ref work ≤ 30 hr/week</p> <p>3. <input type="checkbox"/>No ²</p>	
<p>25. Do you have Ophthalmic Technologists (OTech) employees?</p> <p>عدد(مساعدين/تقنيين في مجال تكنواوجيا العيون) في المؤسسة</p> <p>غير اخصائيين البصريات</p> <p>مجال عملهم: المساعدة في تصوير اجزاء العين باستخدام اجهزة متعددة...ومساعدة في العمليات البسيطة مثل الليسك والليزر... على الاقل دوره/تدريب سنة بعد OTA</p>	<p><input type="checkbox"/>Yes ¹. If the answer is yes please answer the next questions</p> <p>1. Please specify the number of OTech at your facility</p> <p>2. Please specify how many OTech work ≥ 30 hr/week</p> <p>3. Please specify how many OTech work ≤ 30 hr/week</p> <p><input type="checkbox"/>No ²</p>	
<p>26. Do you have Orthoptists (Ortho) employees?</p> <p>عدد(اخصائيي الحول)الحاصلين على دبلوم او باكالوريوس في تخصص الحول في المؤسسة</p>	<p><input type="checkbox"/>Yes ¹. If the answer is yes please answer the next questions</p> <p>1. Please specify the number of Ortho at your facility</p> <p>2. Please specify how many Ortho work ≥ 30 hr/week</p> <p>3. Please specify how many Ortho work ≤ 30 hr/week</p> <p><input type="checkbox"/>No ²</p>	
<p>27. Do you have Biomedical Technicians (BioTech) employees?</p> <p>عدد(فنيين او مهندسين الاجهزة طبية) التي مسوولين عن صيانة الاجهزة في المؤسسة</p>	<p><input type="checkbox"/>Yes ¹. If the answer is yes please answer the next questions</p> <p>1. Please specify the number of BioTech at your facility</p> <p>2. Please specify how many BioTech work ≥ 30 hr/week</p> <p>3. Please specify how many BioTech work ≤ 30 hr/week</p> <p><input type="checkbox"/>No ²</p>	
<p>16. Do you have Low Vision Specialists (LV)?</p> <p>عدد(مساعدين مساندين في تخصص التاهيل البصري) في المؤسسة</p> <p>غير اخصائيين البصريات</p>	<p><input type="checkbox"/>Yes ¹. If the answer is yes please answer the next questions</p> <p>Please specify the number of LV at your facility</p> <p>Please specify how many LV work ≥ 30 hr/week</p> <p>Please specify how many LV work ≤ 30 hr/week</p> <p><input type="checkbox"/>No</p>	
<p>17. Do you have Orientation & Mobility</p>	<p><input type="checkbox"/>Yes ¹. If the answer is yes please answer the next questions</p>	

Trainers (O&M)? عدد(مدربين او مرشدين الارشاد الحركي) في المؤسسة	Please specify the number of O&M at your facility	
	Please specify how many O&M work ≥ 30 hr/week	
	Please specify how many O&M work ≤ 30 hr/week	
	<input type="checkbox"/> No ²	
18. Do you have Cataract Surgeons (Cat)? عدد(العاميين الممارسون لعمليات كاتاركت غير مؤهلين لممارسة الطب) في المؤسسة تفسير: في بلاد مثل الهند ما عندهم جراحين كفاية... مضطرين يدربو ممرضين يعملو عمليات	<input type="checkbox"/> Yes ¹ . If the answer is yes please answer the next questions	
	Please specify the number of Cat at your facility	
	Please specify how many Cat work ≥ 30 hr/week	
	Please specify how many Cat work ≤ 30 hr/week	
	<input type="checkbox"/> No ²	
19. Do you have Primary Health Care Workers (PHCW)? عدد(العاميين في مجال الرعاية الصحية الاولى) في المؤسسة يعني الاشخاص اللي يشتغلو بمجال الصحة العامة اساسا ومدربين في الرعاية الاولى للعين: يعملو مسح للنظر، بفحصو حالات طارئة، يحضروا برامج توعوية وتنقيفية للمجتمع	<input type="checkbox"/> Yes ¹ . If the answer is yes please answer the next questions	
	Please specify the number of PHCW at your facility	
	Please specify how many PHCW work ≥ 30 hr/week	
	Please specify how many PHCW work ≤ 30 hr/week	
	<input type="checkbox"/> No ²	
20. Do you have Eye Care Managers (ECM)? عدد(المساعدين الاداريين الغير اطباء) في المؤسسة اللي يساعدو بتنظيم الامور الادارية للمؤسسة/ قسم	<input type="checkbox"/> Yes ¹ . If the answer is yes please answer the next questions	
	Please specify the number of ECM at your facility	
	Please specify how many ECM work ≥ 30 hr/week	
	Please specify how many ECM work ≤ 30 hr/week	
	<input type="checkbox"/> No ²	
21. Do you have any (Other) employees involved in eye care care at your facility? هل لديكم أي موظف اخر يشارك في تقديم الرعاية بالعين في منشأتك لم يتكم ذكره؟	<input type="checkbox"/> Yes ¹ . If the answer is yes please answer the next questions. Please list their roles/specialty :	
	<input type="checkbox"/> No ²	

Equipment	Please indication the availability of the following Equipment بدي هلا اسال عن الاجهزة اللي موجودة عندكم القائمة شوي طويلة بس بدنا نحدد عدد الاجهزة المتوفرة وتحديد ان كانت في حالة جيدة، معطلة او غير قابلة للاستخدام؟			
Refractive Equipment (RefEq) اجهزة قياس النظر	Total Number	Functional Status		
		Excellent/Good	Need Repair	Not functional
<input type="checkbox"/> Trial Lens Frame& lens Set ¹				
<input type="checkbox"/> Retinoscopes ²				
<input type="checkbox"/> Retino racks ³				
<input type="checkbox"/> Phoropter ⁴				
<input type="checkbox"/> Illuminated distancetest chart or projector chart ⁵				
<input type="checkbox"/> Near Vision tests (adults&children) ⁶				
<input type="checkbox"/> Manual Keratometer ⁷				
<input type="checkbox"/> Auto refractor ⁸				
<input type="checkbox"/> Others: please specify ⁹				
<input type="checkbox"/> None ¹⁰				
Optical Workshop Equipmnt (OWE) معدات قص وتركيب النظارات / العدسات	Total Number	Functional Status		
		Excellent/Good	Need Repair	Not functional
<input type="checkbox"/> Metal frames ¹				
<input type="checkbox"/> Plastic frames ²				
<input type="checkbox"/> Optical Lenses (cylindrical, SV, Bifocal) ³				
<input type="checkbox"/> Ready Made spectacles (with various powers and sizes) ⁴				
<input type="checkbox"/> Surfacing Equipment (Polishing cloth, Disco Pad, Polishing Lap) ⁵				
<input type="checkbox"/> Edging Equipment ⁶				
<input type="checkbox"/> Others: please specify ⁷				
<input type="checkbox"/> None ⁸				
Primary Eye Care Diagnostic Equipment (1 Eq) معدات واجهزة فحص وتشخيص صحة العين				
<input type="checkbox"/> Direct Ophthalmoscope ¹				
<input type="checkbox"/> Cover paddles ²				
<input type="checkbox"/> Slit Lamp ³				
<input type="checkbox"/> Tonometer or any other IOP eq. ⁴				
<input type="checkbox"/> Prism Bar ⁵				
<input type="checkbox"/> FB Removal Kit ⁶				

<input type="checkbox"/> Indirect Ophthalmoscope ⁷				
<input type="checkbox"/> Penlight ⁸				
<input type="checkbox"/> Diagnostic slit lamp lenses ⁹				
<input type="checkbox"/> Others: please specify ¹⁰				
<input type="checkbox"/> None ¹¹				
Auxiliary Equipment (Aux Eq) معدات واجهزة تصوير				
<input type="checkbox"/> Visual Field Perimeter ¹				
<input type="checkbox"/> OCT ²				
<input type="checkbox"/> Topography ³				
<input type="checkbox"/> A-Scan Ultrasound ⁴				
<input type="checkbox"/> B-Scan Ultrasound ⁵				
<input type="checkbox"/> Color vision test ⁶				
<input type="checkbox"/> Stereopsis test ⁷				
<input type="checkbox"/> Contrast Sensitivity ⁸				
<input type="checkbox"/> FFA ⁹				
<input type="checkbox"/> Fundus Camera ¹⁰				
<input type="checkbox"/> Tomography/pentacam ¹¹				
<input type="checkbox"/> Others: please specify ¹²				
<input type="checkbox"/> None ¹³				
Contact Lens Equipment (CL Eq) معدات واجهزة عدسات لاصقة	Total Number	Functional Status		
		Excellent/Good	Need Repair	Not functional
<input type="checkbox"/> RGP set ¹				
<input type="checkbox"/> RGP polishing eq ²				
<input type="checkbox"/> Hybrid Set ³				
<input type="checkbox"/> Mini-scleral Set ⁴				
<input type="checkbox"/> Scleral sets ⁵				
<input type="checkbox"/> OrthoK set ⁶				
<input type="checkbox"/> Radioscope ⁷				
<input type="checkbox"/> Others: please specify ⁸				
<input type="checkbox"/> None ⁹				
Low Vision Equipment (LV Eq) معدات واجهزة تاهيل بصري				
<input type="checkbox"/> Telescopes ¹				
<input type="checkbox"/> CCTVs ²				
<input type="checkbox"/> Hand Magnifiers ³				
<input type="checkbox"/> Stand Magnifier ⁴				
<input type="checkbox"/> Spectacle Magnifiers ⁵				
<input type="checkbox"/> Bar Magnifiers ⁶				

<input type="checkbox"/> Dome Magnifiers ⁷				
<input type="checkbox"/> Max TV/ details ⁸				
<input type="checkbox"/> Others: please specify ⁹				
<input type="checkbox"/> None ¹⁰				
Laser Equipment (LaserEq) معدات واجهزة الليزر				
<input type="checkbox"/> Diode Laser ¹				
<input type="checkbox"/> FD-NdYAG Laser ²				
<input type="checkbox"/> NdYAG Laser (Capsulotomy&Iridotomy) ³				
<input type="checkbox"/> Laser Lenses ⁴				
<input type="checkbox"/> Others: please specify ⁵				
<input type="checkbox"/> None ⁶				
Operating Room Equipment (OpEq) معدات واجهزة غرف العمليات	Total Number	Functional Status		
		Excellent/Good	Need Repair	Not functional
<input type="checkbox"/> Sutures ¹	NA			
<input type="checkbox"/> Gloves ²	NA			
<input type="checkbox"/> Needles & Syringes ³	NA			
<input type="checkbox"/> Dressings ⁴	NA			
<input type="checkbox"/> Intraocular lenses & supplies (PMMA lenses, foldable lenses, square edge PMMA etc) ⁵	NA			
<input type="checkbox"/> Cataract kits ⁶				
<input type="checkbox"/> Cautery Machines ⁷				
<input type="checkbox"/> Sterilisers/Autoclaves ⁸				
<input type="checkbox"/> Anterior Vitrectomy Equipment ⁹				
<input type="checkbox"/> Operating Microscope (portable or static) ¹⁰				
<input type="checkbox"/> Operating Lights ¹¹				
<input type="checkbox"/> Cryotherapy Machines ¹²				
<input type="checkbox"/> Equipment for all local anaesthetic procedures ¹³	NA			
<input type="checkbox"/> Paediatric Anaesthesia Equipment & Drugs ¹⁴	NA			
<input type="checkbox"/> Necessary furniture ¹⁵	NA			
<input type="checkbox"/> Others: please specify ¹⁶				

<input type="checkbox"/> None ¹⁷				
Surgical Equipment (SurgEq) معدات واجهزة جراحية				
<input type="checkbox"/> Evisceration, Chalazion&Tarsorrhaphy set ¹				
<input type="checkbox"/> Entropion set ²				
<input type="checkbox"/> ECCE set ³				
<input type="checkbox"/> PCIOL set ⁴				
<input type="checkbox"/> Vitreoretinal Set, 23 gauge ⁵				
<input type="checkbox"/> LASEK Set ⁶				
<input type="checkbox"/> Corneal Transplant Surgery Set ⁷				
<input type="checkbox"/> Glaucoma Surgical Sets ⁸				
<input type="checkbox"/> Strabismus Surgery Set ⁹				
<input type="checkbox"/> Others: please specify ¹⁰				
<input type="checkbox"/> None ¹¹				
Please list any additional equipment that your institution has that was not mentioned: معدات واجهزة اخرى لم يتم ذكرها				

Eye Health care workers (HCWs) Questionnaire

Level of Eye Care Services: حدد الخدمات التي يتم تقديمه في المؤسسة	
21. Does your institution provide primary eye care services (PECS) ¹ خدمات طوارئ عيون ² خدمات تصحيح أخطاء انكسارية ³ نظام تحويلات ⁴ توزيع نظارات مجانية ⁵ برامج توعوية مجتمعية / برامج تعزيز صحة العين والرؤية ⁶ وبرامج تعاون مع المهن الأخرى ⁷ برامج مسح نظر في المدارس ⁸ برامج مسح للسكري والضغط	<input type="checkbox"/> Emergency eye care: Red eye, Pain, Sudden loss of vision management ¹ <input type="checkbox"/> Refractive services ² <input type="checkbox"/> Ocular health screening services (recognition) ³ <input type="checkbox"/> Referral protocol ⁴ <input type="checkbox"/> Distribute spectacles ⁵ <input type="checkbox"/> Community awareness of eye care/ Public Health Promotion ⁶ <input type="checkbox"/> Collaborate with other eye care providers ⁷ <input type="checkbox"/> Public health promotion ⁸ <input type="checkbox"/> School and community screenings ⁹ <input type="checkbox"/> Screen for diabetes and hypertension ¹⁰
22. Does your institution provide secondary eye care services (SECS) ¹ فحص شامل لنظر وصحة العين ² تشخيص وعلاج مختلف امراض العيون ³ عمليات جراحية كبيرة/معقدة مثل ... ⁴ Exentration/ Enucleatio/ evisceration ⁵ عمليات جراحية بسيطة مثل .. ⁶ عمليات قرنية ⁷ عمليات ليزر للشبكية ولضغط العين	<input type="checkbox"/> Comprehensive eye care with dilation ¹ <input type="checkbox"/> Diagnosis and treatment of all eye conditions ² <input type="checkbox"/> Invasive surgical services of cataract, glaucoma, cornea and retina with blinding and non blinding condition ³ <input type="checkbox"/> Exentration/ Enucleatio/ evisceration ⁴ <input type="checkbox"/> Minor surgical procedure. (Eyelid repair, chalazion surgery, Pterygium excision, nasolacrimal surgeries, foreign body removal) ⁵ <input type="checkbox"/> Corneal and refractive surgeries ⁶ <input type="checkbox"/> Laser procedure for glaucoma & retinal (SLT, PRP, ALT etc) ⁷
23. Does your institution provide tertiary eye care services (TECS) ¹ بنك تبرع العيون ² مشاركة في تخطيط وتغيير السياسات المتعلقة بالمهنة ³ التأهيل البصري ... ⁴ عدسات لاصقة صلبة الخ ... ⁵ مشغل قص وتركيب النظارات/ العدسات ⁶ برنامج تدريب مقيمين في تخصص طب وجراحة العيون ⁷ برنامج تدريب لاختصاصي البصريات والمهن المساعدة ⁸ برامج البحث العلمي ⁹ تصنيع محلي لادوية وقطرات عيون	<input type="checkbox"/> Eye banking services ¹ <input type="checkbox"/> Advocacy and policy planning ² <input type="checkbox"/> Low vision rehabilitation ³ <input type="checkbox"/> Specialty contact lens fitting ⁴ <input type="checkbox"/> Spectacle manufacturing workshops ⁵ <input type="checkbox"/> Ophthalmic residency Training ⁶ <input type="checkbox"/> Training programs for optometrists and allied eye care personnel ⁷ <input type="checkbox"/> Eye care research ⁸ <input type="checkbox"/> Local production of eye drops ⁹

Employee Information	Employee Code:
1. Email	
2. Phone No.	
3. DOB تاريخ الميلاد	
4. Place of Origin (POO) انت الاصل من وين؟ من اي محافظة؟ حدد اسم البلد	<input type="checkbox"/> Nablus (N) ¹ Specify: <input type="checkbox"/> Ramallah and Al Bireh (R&A) ² Specify: <input type="checkbox"/> Jenin (JN) ³ Specify: <input type="checkbox"/> East Jerusalem (EJ) ⁴ Specify: <input type="checkbox"/> Salfit (S) ⁵ Specify: <input type="checkbox"/> Hebron (H) ⁶ Specify: <input type="checkbox"/> Bethlehem (B) ⁷ Specify: <input type="checkbox"/> Tubas (TB) ⁸ Specify: <input type="checkbox"/> Tulkarm (TK) ⁹ Specify: <input type="checkbox"/> Qalqilya (Q) ¹⁰ Specify: <input type="checkbox"/> Jericho (JC) ¹¹ Specify: <input type="checkbox"/> Other ¹² :
5. Is your place of Origin located in urban or rural (POOUR) بلدك الاصل تعتبر موجودة بالمدينة او الريف	<input type="checkbox"/> Urban ¹ <input type="checkbox"/> Rural ² <input type="checkbox"/> Others ³ Specify:
6. Gender	<input type="checkbox"/> Male ¹ <input type="checkbox"/> Female ²
7. Age ممكّن اسالك قديش عمرك	<input type="checkbox"/> 20-29 ¹ <input type="checkbox"/> 30-39 ² <input type="checkbox"/> 40-49 ³ <input type="checkbox"/> 50-59 ⁴ <input type="checkbox"/> 60-65 ⁵ <input type="checkbox"/> >65 ⁶
8. Years of Practice (YOP) Years of experience can be determined as more or less experience based on whether the individual's years of practice is was above or below the sample's mean عدد سنوات العمل	<input type="checkbox"/> <10 ¹ <input type="checkbox"/> 10-19 ² <input type="checkbox"/> 20-29 ³ <input type="checkbox"/> 30-39 ⁴ <input type="checkbox"/> >39 ⁵ <input type="checkbox"/> Others ⁶ . Please specify:
9. This question is for doctors with doctor of medicine degrees: Specify the highest level of training received by selecting one of the following: (MD) ¹ Sub-specialist ophthalmologist ² Ophthalmologist with fellowship ³ Ophthalmologist with diploma ⁴ Medical officers practicing eye surgery ⁵ Medical officers providing non-surgical eye surgery ⁶ Community ophthalmologist ايش اعلى مؤهل علمي حصلت عليه	<input type="checkbox"/> Ophthalmologist with minimum 6 months sub-specialty training after fellowship/residency in ophthalmology accredited institution/ council/body/college ¹ <input type="checkbox"/> Ophthalmologist with minimum 3 years post graduate training in ophthalmology accredited institution/ council/body/college ² <input type="checkbox"/> Ophthalmologist with a minimum of 1 year postgraduate training in ophthalmology accredited institution/ council/body/college ³ <input type="checkbox"/> Medical doctor with no post graduate qualification (fellowship, residency, or diploma) but are practicing surgery in the form of cataract, lid surgery etc ⁴ <input type="checkbox"/> Medical doctor with no post graduate qualification (fellowship, residency, or diploma) but are providing non-surgical eye care ⁵ <input type="checkbox"/> Doctors with a minimum 1-year postgraduate training in community ophthalmology accredited by recognized institution/ council/body/college ⁶ <input type="checkbox"/> Others- Please specify ⁷ :

<p>10. This question is for <u>Optometrists</u> only. Specify the highest level of training received by selecting one of the following: (OPT)</p> <p>¹ Optometrist ² Masters- trained optometrist ³ PhD-trained optometrist ⁴ OD ⁵ OD with residency/fellowship training ⁶ Ophthalmic technologist ⁷ Others</p> <p>ايش اعلى مؤهل علمي/او شهادة حصلت عليه</p>	<p><input type="checkbox"/> Optometrists with Bachelor of Optometry degrees (minimum 3-years training) ¹ <input type="checkbox"/> Optometrists with master degree ² <input type="checkbox"/> Optometrists with Doctor of Philosophy degree ³ <input type="checkbox"/> Optometrists with Doctor of Optometry degrees (minimum 6-years training) ⁴ <input type="checkbox"/> Doctor of Optometrist with residency or fellowship training ⁵ <input type="checkbox"/> Qualified optometrists with a minimum of 1 year training in ophthalmic technology ⁶ <input type="checkbox"/> Others- Please specify ⁷:</p>
<p>11. This question is for allied personnel involved in eye care. Specify the highest level of training received by selecting one of the following: (AEP)</p> <p>¹ Ophthalmic assistant/technician ² Ophthalmic nurse ³ Refractionists ⁴ Biomedical technicians ⁵ Qualified opticians ⁶ Non-qualified opticians ⁷ Low vision specialists ⁸ Orientation & Mobility trainers ⁹ Cataract surgeons ¹⁰ Primary eye care workers- health profs, nurses, midwife, lab tech etc ¹¹ Eye care managers-Computer professionals, Admins, Secretary ¹² Orthoptist ¹³ Others</p>	<p><input type="checkbox"/> Allied personnel with a minimum of 1 year training in eye after 10 years of schooling ¹ <input type="checkbox"/> Qualified nurse with a minimum of 1 year training in eye care ² <input type="checkbox"/> Allied personnel with a minimum 1 year training in refraction in addition to ophthalmic assistant/technician course ³ <input type="checkbox"/> Personnel trained in maintenance of equipment ⁴ <input type="checkbox"/> Allied personnel with a minimum of 1 year training in dispensing optics ⁵ <input type="checkbox"/> Allied personnel practicing dispensing optics without any accredited qualifications in dispensing optics ⁶ <input type="checkbox"/> Ophthalmic allied personnel providing low vision assessment and devices ⁷ <input type="checkbox"/> Ophthalmic allied personnel or non-eye care allied personnel providing orientation & mobility training ⁸ <input type="checkbox"/> Eye care workers who are not doctors but practicing cataract surgery ⁹ <input type="checkbox"/> Existing primary health care workers trained in eye care ¹⁰ <input type="checkbox"/> Non-medical personnel providing eye care management ¹¹ <input type="checkbox"/> Allied personnel with BSc or Diploma in Orthoptics ¹² <input type="checkbox"/> Others ¹³</p>
<p>12. Location of institution where highest level of training is received: (TrainLoc)</p> <p>وين حصلت اعلى مؤهل علمي؟ هون بالبلد ولا برا البلد؟ إذا برا البلد وين بالزبط؟</p>	<p><input type="checkbox"/> Local. West Bank ¹ <input type="checkbox"/> Local. 48' Territories ¹ <input type="checkbox"/> Regional. Please specify location: ² <input type="checkbox"/> International. Please specify location: ³</p>
<p>13. Are you registered with the official optometry, ophthalmology, or allied eye care association? (Reg-Asc)</p> <p>مسجل في النقابة الرسمية لمهنتك؟</p>	<p><input type="checkbox"/> Yes ¹ <input type="checkbox"/> No ²</p>
<p>14. Do you provide eye care services in multiple locations? (MLoc)</p> <p>بتقدم الخدمات الصحية للمرضى او المراجعين في أكثر من موقع؟</p>	<p><input type="checkbox"/> Yes ¹ <input type="checkbox"/> No ² <input type="checkbox"/> I do not provide eye care services</p>
<p>15. Type of Facility (FacType) <i>You can select more than</i></p> <p>نوع المنشأ؟</p> <p>الانواع: مستشفى، عيادة، مركز بصريات، عدة مراكز/فروع، مركز تاهيل، عيادات جامعية، اكاديميا وابحث؟</p>	<p><input type="checkbox"/> Hospital ¹ <input type="checkbox"/> Clinic ² <input type="checkbox"/> Optical Center ³ <input type="checkbox"/> Optical Chain ⁴ <input type="checkbox"/> Rehabilitation Center ⁵ <input type="checkbox"/> University Service Clinic ⁶ <input type="checkbox"/> Academic & Research ⁷ <input type="checkbox"/> University Hospital ⁸ <input type="checkbox"/> Other: Specify ⁹ <input type="checkbox"/> Non-Applicable ¹⁰</p>

<p>16. Practice Sector (Sector) <i>You can select more than one</i> ومكان عملك تابع لاي قطاع نوع القطاع: حكومي/ غير حكومي غير ربحي/ اهلي/خاص ربحي/ خاص مع مجموعة اطباء او اخصائيي/ وكالة</p>	<input type="checkbox"/> Governmental ¹ <input type="checkbox"/> Non-Profit Governmental Organization ² <input type="checkbox"/> Civil ³ <input type="checkbox"/> Private (For profit) ⁴ <input type="checkbox"/> Private group practice (For profit) ⁵ <input type="checkbox"/> UNRWA ⁶ <input type="checkbox"/> Other: Specify ⁷ <input type="checkbox"/> Non-Applicable ⁸
<p>17. Mode of Practice [Mode] <i>You can select more than one</i> وانت بمكان عملك تعتبر موظف؟ ولا مكان العمل ملك خاص لك؟</p>	<input type="checkbox"/> Employed ¹ <input type="checkbox"/> Self-employed ² <input type="checkbox"/> Retired ³ <input type="checkbox"/> Unemployed ⁴ <input type="checkbox"/> Mix of employed and self-employed ⁵
<p>18. How many hours per week do you spend providing eye care services as an employee? ¹ Full-time Employee ² Part-time Employee ³ Non-employee اكم من ساعه بالاسبوع بتقديم خدمات للمرضى كموظف؟</p>	<input type="checkbox"/> ≥ 30 hours/ week ¹ <input type="checkbox"/> <30 hours/ week ² <input type="checkbox"/> I am not an employee ³ <input type="checkbox"/> I do not provide eye care services ⁴
<p>19. How many hours per week do you spend providing eye care services as a self-employed? ¹ Full-time Self-Employed ² Part-time Self-Employed ³ Not self-employed اكم من ساعه بالاسبوع بتقديم خدمات للمرضى بمكان عملك الخاص؟</p>	<input type="checkbox"/> ≥ 30 hours/ week ¹ <input type="checkbox"/> <30 hours/ week ² <input type="checkbox"/> I am not self-employed ³ <input type="checkbox"/> I do not provide eye care services ⁴
<p>20. Please specify exact primary location where you provide eye care services (1PDir): <i>You can select more than one location (i.e. Full-Time Practice directorate)</i> باي محافظة موجود عملك الاساسي؟ حدد اسم المنطقة الدقيق</p>	<input type="checkbox"/> Nablus ¹ Specify: <input type="checkbox"/> Ramallah and Al Bireh ² Specify: <input type="checkbox"/> Jenin ³ Specify: <input type="checkbox"/> East Jerusalem ⁴ Specify: <input type="checkbox"/> Salbit ⁵ Specify: <input type="checkbox"/> Hebron ⁶ Specify: <input type="checkbox"/> Bethlehem ⁷ Specify: <input type="checkbox"/> Tubas ⁸ Specify: <input type="checkbox"/> Tulkarm ⁹ Specify: <input type="checkbox"/> Qalqilya ¹⁰ Specify: <input type="checkbox"/> Jericho ¹¹ Specify: <input type="checkbox"/> Not applicable ^{5,12}
<p>21. Primary practice location (where you practice full-time): (1RU) <i>You can select more than one (i.e. Full-Time Practice Location)</i> ومكان العمل الاساسي موجود بالمدينة او الريف؟</p>	<input type="checkbox"/> Urban ¹ <input type="checkbox"/> Rural ² <input type="checkbox"/> Both ³ <input type="checkbox"/> Others ⁴ Please specify: <input type="checkbox"/> Not applicable ⁵
<p>22. Please specify exact secondary practice location (2PDir): <i>You can select more than one location (i.e. Part-Time Practice directorate)</i> باي محافظة موجود مكان عملك الثاني/ الجزئي ان وجد؟ حدد اسم المنطقة الدقيق</p>	<input type="checkbox"/> Nablus ¹ Specify: <input type="checkbox"/> Ramallah and Al Bireh ² Specify: <input type="checkbox"/> Jenin ³ Specify: <input type="checkbox"/> East Jerusalem ⁴ Specify: <input type="checkbox"/> Salbit ⁵ Specify: <input type="checkbox"/> Hebron ⁶ Specify: <input type="checkbox"/> Bethlehem ⁷ Specify: <input type="checkbox"/> Tubas ⁸ Specify: <input type="checkbox"/> Tulkarm ⁹ Specify: <input type="checkbox"/> Qalqilya ¹⁰ Specify: <input type="checkbox"/> Jericho ¹¹ Specify: <input type="checkbox"/> Not applicable ¹²

<p>23. Secondary practice location (where you practice part-time): (2RU) <i>(i.e. Part-Time Practice Location)</i> ؟ومكان العمل الجزئي موجود بالمدينة او الريف</p>	<input type="checkbox"/> Urban ¹ <input type="checkbox"/> Rural ² <input type="checkbox"/> Both ³ <input type="checkbox"/> Others ⁴ Please specify: <input type="checkbox"/> Not applicable ⁵
<p>24. Do you provide eye care services during the weekends? (WE-Access) ؟بتقدم خدمات للمرضى او المراجعين خلال فترات الاجازة الاسبوعية؟ جمعه او سبت؟</p>	<input type="checkbox"/> Yes. On Friday of every week ¹ <input type="checkbox"/> Yes. On Saturday of every week ² <input type="checkbox"/> Yes. On Friday & Saturday of every week ³ <input type="checkbox"/> Yes. On Friday as needed & Saturday of every week ⁴ <input type="checkbox"/> Yes. As Needed on Friday ⁵ <input type="checkbox"/> Yes. As Needed on Saturday ⁶ <input type="checkbox"/> Yes. As Needed on Friday & Saturday ⁷ <input type="checkbox"/> No ⁸ <input type="checkbox"/> Not applicable ⁹
<p>25. Do you provide eye care services during the evening? (Eve-Access) ؟بتقدم خدمات للمرضى او المراجعين خلال الساعات المسائية</p>	<input type="checkbox"/> Yes. Every week ¹ <input type="checkbox"/> Yes. As Needed ² <input type="checkbox"/> No ³ <input type="checkbox"/> Not applicable ⁴
<p>26. Do you practice in your city/town/village of origin? (PCO) ؟بتقدم خدمات للمرضى او المراجعين بنفس بلدك الاصل؟</p>	<input type="checkbox"/> Yes ¹ <input type="checkbox"/> No ² <input type="checkbox"/> Not applicable ³

Appendix-2**Verbal consent form statement****English Edition**

I am [*name of investigator/ data collector*], A public health / optometry student from An-Najah national university, I am currently working on my master degree thesis. I am conducting a research study on the Evaluation of the Eye Health Care Services in the West Bank and East Jerusalem The research will help to provide information on the status of eye care services in the west bank, which will in turn help develop policies that will better improve eye care delivery in the region.

Today you will be participating in an individual phone interview, which should take approximately ten to fifteen minutes. Your participation is voluntary. If you do not wish to participate, you may stop at any time. Responses will be completely anonymous; your name will not appear anywhere in the final write up and the data collected will not be used for any purpose other than to fulfil this study's objectives. Taking part in this phone interview is your agreement to participate.

Arabic Edition

أنا (الاسم) من برنامج ماجستير الصحة العامة /قسم البصريات في جامعة النجاح الوطنية. هل يمكن ان تشاركنا بالإجابة عن هذا الاستبيان الذي سيأخذ من وقتك عشرة دقائق؟

نحنقوم حالياً بإجراء دراسة عنوانها " تقييم خدمات الرعاية الصحية للعين في الضفة الغربية والقدس الشرقية"

سنقوم من خلال هذه الدراسة بإحصاء أعداد أخصائيين البصريات وأطباء العيون وأي شخص يشارك في تقديم الرعاية الصحية للعين. كما سنحصى أعداد المراكز الصحية وما هي الخدمات التي تقدمها والتي لها علاقة برعاية العين والبصر. مثل المستشفيات والعيادات ومراكز البصريات.

سوف تفيدنا هذه الدراسة في معرفة عدد أخصائيين البصريات وأطباء العيون في فلسطين ونسبتهم لعدد السكان وهل هذه النسب تعتبر نسب معقولة وحسب النسب الموصى بها حسب منظمة الصحة العالمية أم لا!

سنخرج من هذه الدراسة ايضاً بخطة استراتيجية وسنشاركها مع أصحاب القرار حتى نحفظ المهنة من مشاكل كثيرة مثل البطالة وزيادة عدد المراكز والعيادات بشكل غير مدروس كما يحدث حالياً في كثير من المهن في فلسطين مثل الصيدلة والتمريض والهندسة.

هذه الدراسة تم عملها في معظم دول العالم حتى تنظم المهن الصحية الي لها علاقة بالعيون. والاستمارة هذه الي بين ايدينا اخذناها من دراسات سابقة حول العالم قامت بعمل نفس هذه الدراسة لتقارن الوضع في بلادها بمعايير منظمة الصحة العالمية.

اجابتك عن هذا الاستبيان سيعتبر موافقتك الشفوية على المشاركة بالدراسة وبالتأكيد هذه المعلومات ستكون سرية وسنستفيد منها لأغراض البحث العلمي فقط.

جامعة النجاح الوطنية

كلية الدراسات العليا

تقييم خدمات الرعاية الصحية للعيون في الضفة الغربية والقدس الشرقية:

-دراسة مقطعية-

إعداد

عزيزة موسى عبيد

إشراف

د. زاهر نزال

د. حمزة الزبيدي

قدمت هذه الأطروحة استكمالاً لمتطلبات الحصول على درجة الماجستير في برنامج الصحة العامة لطلبة الدراسات العليا في جامعة النجاح الوطنية - نابلس - فلسطين.

2020

ب

تقييم خدمات الرعاية الصحية للعيون في الضفة الغربية والقدس الشرقية:

-دراسة مقطعية-

إعداد

عزيزة موسى عبيد

إشراف

د. زاهر نزال

د. حمزة الزبيدي

الملخص

المقدمة:

تعتبر الموارد البشرية من أهم مكونات النظام الصحي، حيث إن توفرها وجودتها يعتبران من المحددات الرئيسية لفاعلية وجودة الخدمات الصحية المقدمة في أي دولة.

هدف الدراسة:

تهدف هذه الدراسة الى تحديد وتقييم خدمات الرعاية الصحية للعيون بالإضافة الى انتشارها الجغرافي، بحيث تناولت الدراسة، المؤسسات والكوادر العاملة في مجال العيون بالضفة الغربية والقدس الشرقية.

أسلوب البحث والطريقة:

إن هذه الدراسة هي دراسة مقطعية لقطاع العيون وهي احدى توصيات منظمة الصحة العالمية، وذلك كجزء من مبادرة "الحق - بالرؤية" لعام 2020م، حيث تم عمل هذه الدراسة على مستوى مدن الضفة الغربية جميعها، بالإضافة للقدس الشرقية وتمت الدراسة من خلال تعبئة استبيانات عبر الاتصال الهاتفي او من خلال المقابلات الشخصية مع الكوادر الطبية.

النتائج:

لقد كان معدل الاستجابة للاستبيانات بين أطباء العيون 76.9%، أما معدل الاستجابة بين أخصائيين البصريات فكان 72.7%.

استوفت الأراضي الفلسطينية المحتلة معايير منظمة الصحة العالمية فيما يخص اعداد الكوادر البشرية الخاصة بالعيون، حيث بينت الدراسة ان هناك (1.6) طبيب عيون و(5.7) أخصائي بصريات لكل 50,000 نسمة، وكشفت الدراسة ان وضع النظام الصحي الخاص بالعيون في فلسطين يعاني من خلل بالانتشار الجغرافي للخدمات والطواقم الطبية بين المدن والقرى والمخيمات تبعاً للتواجد السكاني، بالإضافة الى وجود نقص بالكوادر الطبية الذين يحملون شهادات تخصصية من أطباء العيون، وتظهر الدراسة أيضاً نقصاً في تواجد الخدمات التخصصية والموارد البشرية في القطاع الحكومي.

الخلاصة:

نوصي بالاهتمام بتوزيع كوادر العناية بالعيون بشكل أفضل في فلسطين، ونوصي بطرح برامج تدريبية جديدة للكوادر في الجامعات الفلسطينية خصوصاً لأخصائيي البصريات، ولا بد أن يكون ذلك مصحوباً بزيادة الصلاحيات الممنوحة لأخصائيي البصريات الذين يتزايدون بالعدد سنوياً من أجل تسهيل الوصول إلى خدمات رعاية العيون في المناطق المحرومة.

