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Confidence of Saudi Optometrists with Ocular Therapeutic Pharmaceutical Agents Use in Optometry Practice

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Abstract

This study investigates confidence around Therapeutic Pharmaceutical Agents (TPAs) in optometry practice in Saudi Arabia, determines whether training and education are required, and highlights areas of weakness. Optometrists were invited to participate in a self-administered online survey open for 30 days in November 2023. The survey consisted of seven closed-ended questions covering demographic characteristics and eleven 5-point Likert-scale sentences reflecting confidence regarding TPAs use in practice and their ability to educate patients with ocular conditions regarding drug actions, side effects, and medication adherence. Two hundred and ninety optometrists responded. Most were young (46.6%, ages 25–30), held a Optommetry doctor (OD) degree, and were in practice for 1–5 years (34/1%). The overall confidence scale score is 4.14.1±0.75(SD). Approximately 80% were confident or highly confident in all competencies. No association was found between age, work experience duration, and educational levels with confidence scores. However, female individuals were less confident across all categories. Saudi optometrists have high confidence in using TPAs in practice and patient education. Gender differences were found as female female optometrists perceived themselves as less confident. The optometric workforce in Saudi Arabia must be supported with continuous education in therapeutics to support their role in providing primary eye care.

Keywords: Confidence; TPAs; Ocular; Drugs; Optometrists

Introduction

The optometry profession's status has changed over the past decades from mere refractionists to primary eye care professionals serving a growing population, providing screening and managing chronic eye conditions. World Council of Optometry describes the optometry profession as follows: "*Optometry is a healthcare profession that is autonomous, educated, and regulated (licensed/registered), and optometrists are the primary healthcare practitioners of the eye and visual system who provide comprehensive eye and vision care, which includes refraction and dispensing, detection/diagnosis and management of disease in the eye, and the rehabilitation of conditions of the visual system*." [1] Moreover, the Global Competency-Based Model of Scope of Practice in Optometry, developed by the WCO, is based on four categories of services: optical technology, visual function, ocular diagnostic, and ocular therapeutic services. The latter includes using ocular Therapeutic Pharmaceutical Agents (TPAs) to investigate, diagnose, and manage ocular conditions [1]. Ocular TPAs include topical antibiotics, antihistamines, analgesics, and anti-inflammatories. Nevertheless, in many countries, legislation permits optometrists only to perform refraction and prescribe spectacles [2]. In others, they are allowed to use diagnostic topical ocular drugs, including mydriatics, cycloplegics, local anesthetics, and ophthalmic dyes and stains [3-5]. In contrast, reports from the United Kingdom (UK) [6], Australia [7,8], and Ghana [9] show that health legislation governing the optometry practice in these countries expands the scope of practice, allowing optometrists to prescribe ocular PTAs. In some countries like Australia, legislation was changed, allowing optometrists to use and prescribe topical ophthalmic medications to manage eye conditions [10]. However, this change requires that optometrists possess therapeutic competencies to prescribe medications through training and licensing. This goal can be achieved by including this training during the undergraduate studies or through additional training after graduating [10]. A national survey study by George et al. [3] revealed that approximately 43% of Singapore optometrists indicated their need to continue professional education in ocular pharmacology. Similarly, a survey of Portuguese optometrists regarding the competencies and scope of practice in optometry showed that applied ocular pharmacology received the highest score for the most crucial training needs [4]. This result indicates the need for undergraduate education, curriculum changes, and profes-

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sional training certificates/activities post-graduation. This training was also recommended by Rodríguez-Zarzuelo et al., [11] who recommended updating the curriculum of the university degree in Optics and Optometry at the University of Valladolid to improve the competencies of the graduates to meet the professional requirements of optometry practice.

In Saudi Arabia, optometry education started at King Saud University in the early 1980s, by establishing a bachelor's degree in optometry. It provided the country with qualified optometrists who served as healthcare specialists in government and private hospitals. For a decade, the Optometry Doctor program has replaced the old curriculum and provided the graduates with intense clinical training and insight into ocular diseases and management. This study aims to determine the prevalence of prescriptions/recommendations of ocular TPAs by optometrists in different health sectors in Saudi Arabia. Moreover, it assesses optometrists' self-confidence regarding TPA prescriptions and patient education, This is the first study in Saudi Arabia to address the optometrists' opinions regarding confidence in their ability to prescribe ocular drugs and pharmaceutical preparation.

Materials and Methods

Study Population

This cross-sectional, internet-based questionnaire design study was conducted between November and December 2023. Licensed optometrists by the Saudi Commission for Health Specialties (SCFHS) were invited to complete an online survey. Participants were recruited with assistance from the SCFHS (https://www.scfhs.org.sa/en), who sent invitations to registered optometrists in their database. Additionally, the author forwarded invitations to optometrists through social media such as Twitter and official WhatsApp groups. Participants who worked for one year or less with at least a bachelor's degree in optometry were included in the study.

Ethical Considerations

This study was approved by the Subcommittee of Human and Social Research Ethics at King Saud University (Approval number KSU-HE-23-910). The author did not obtain written informed consent; instead, an electronic version containing elements of consent in Arabic was provided at the start of the survey. The consent included the study's title in Arabic and English and its purpose, the estimated time required to answer the survey, and information about anonymity, data security, and voluntary participation. Additionally, the author's contact information was provided.

Sample Size and Research Tool

The sample size was estimated using Cochran's equation for small populations of a known size. The estimated sample size of registered optometrists in Saudi Arabia was 1886 in 2021 [12]; the number was rounded to 2000. Based on the population size of 2000 and a margin of error of +/- 5% at Confidence Interval (CI) levels of 95% with a z score of 1.96. The final sample size was 323, and 290 participants completed the survey. The research tool consists of two sections. First, demographic data was collected, including age, sex, educational degree, years of experience, confirmation of current employment status, and the type of pharmaceutical therapeutic agents the optometrist recommends or prescribes. The second section contains 11 sentences that participants need to rate using a 5-Likert confidence scale (1=*not at all confident*, 2=*not confident*, 3=*somewhat confident*, 4=*confident*, and 5=*completely confident*), with the scores ranging between 11 and 55, and higher scores indicate higher levels of self-efficacy.

Statistical Analysis

Data was analyzed using GraphPad Prism (Version 10.1.1 (270) for Mac OS, GraphPad Software, Boston, Massachusetts USA, www.graphpad.com). Descriptive statistics were calculated in which continuous variables like confidence scores were presented as mean ± Standard Deviation (SD). In contrast, categorical variables such as age groups and duration of experience were presented as absolute and relative frequencies. The comparison of confidence scores for each question between male and female participants was achieved using the Mann-Whitney U-test. The association between the confidence level and the demographic variables was found using the Chi-square or Fisher test as appropriate. The result was considered significant at $P<0.05$. The internal consistency of the confidence scale was determined using Cronbach's alpha and the inter-item correlation.

Results

Internal Consistency

The internal consistency of the confidence scale was determined using Cronbach's alpha and the inter-item correlation. Cronbach's alpha for the scale is 0.92, indicating excellent consistency. The mean inter-item correlation for the 11 items in the scale is 0.51, indicating a good correlation of all statements in the confidence scale. Table 1 shows the details of the item analysis.

Demographic Characteristics

Of the 290 participants, approximately 50.7% were male, while the rest were female. The majority were young (46.6%), aged 25–30 years, held an optometry doctor degree (48.3%), and were early-career optometrists with 1-5 years of work experience. Most participants (75.9%) earned their educational qualifications at all degree levels in Saudi Arabia, while the rest (24.1%) were earned abroad. Most optometrists (30%) work in governmental hospitals or healthcare clusters. However, 27 participants do part-time work in optical shops or practice in a university hospital or private clinics and hospitals. Table 2 shows the participants' characteristics.

Table 1: Inter-item correlation of confidence scale.

Statements (S)											Average inter-item correlation	Cronbach's alpha
S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11		
0.48	0.58	0.57	0.54	0.35	0.44	0.54	0.54	0.48	0.51	0.57	0.51	0.92

Table 2: Participant characteristics.

Characteristics	Categories (n)	%
Sample size (n)	290	100
Gender		
Male	147	50.7
Female	143	49.3
Age groups (years)		
25–30	135	46.6
31–40	115	39.7
41–50	30	10.3
50–60	6	2.1
>60	4	1.4
Education		
Bachelor of Optometry Science	63	21.7
Optometry Doctor	140	48.3
Master of Science	57	19.7
Clinical Master	16	5.5
Doctorate	14	4.8
Work sector		
Optical shop	77	26.6
Private clinic/hospital	68	23.4
Governmental/healthcare cluster hospitals	88	30.3
Military hospitals	24	8.3
University hospital	13	4.5
Teaching staff at university	20	6.9
Duration of work experience (years)		
<1	41	14.1
1–5	99	34.1
6–10	74	25.5
11–15	39	13.4
16–20	19	6.6
>20	18	6.2

Prescription of TPAs

Regarding the prescription pattern of eye drops, 218 participants (75.9%) prescribed artificial tears, while 63 (24.1%) prescribed nothing. Among the optometrists who recommend or prescribe the artificial drops, 36 (16.5%) prescribe antibiotics, 78 (35.8%) antihistamines, 22 (10.1%) analgesics, and 31 (14.2%) confirmed prescribing anti-inflammatory drugs. The open-ended question regarding the prescription revealed that few optometrists also prescribe atropine, cyclopentolate, contact lens solution, and Blephaclean eyelid wipes. One participant stated: "*In my previous workplace, I was mostly prescribing therapeutic eye drops, but in my current job, I only prescribe artificial eye drops and antihistamines*." Conversely, another optometrist who works in an optical shop disagreed by saying, "*The optometrist does not prescribe or recommend any medication*." Those working in optical shops tend to prescribe nothing, while optometrists in governmental hospitals prescribe nothing or two TPAs, mainly artificial tears and antihistamines. Those who prescribe all categories of TPAs are more likely to work in military, university, or private hospitals.

Confidence of Optometrists with TPAs

Overall, the confidence level for the scale is 4.1±0.75 (SD), indicating a good level of self-efficacy among practicing optometrists of different age groups and educational backgrounds. Table 3 shows the score for each competency. Categorizing the confidence on a 5-point Likert scale shows the following response levels: completely confident (n=141, 47.2%), confident (n=98, 33.8%), somewhat confident (n=41, 14.1%), slightly confident (n=7, 2.4%), and not at all confident (n=3, 1.03%). The score for each confidence statement is shown in Table 3. The highest confidence score was found with skills that optometrists practice during routine ocular examinations, including

Table 4: Factors affecting confidence level.

Characteristics	Statistical test	P-value
Gender		
Male	Mann-Whitney U	<0.0001
Female		
Age groups		
25–40	Fisher's exact test	0.61
41–≥60		
Education		
Bachelor's	Fisher's exact test	0.95
Master		
Doctorate		
Duration (years)		
≤1–10	Chi-square	0.5
11–≥16	$\chi 2=1.4$, df=2	

Table 3: Confidence level of optometrists.

Confidence statement	Mean ± SD	Median (95% CI)	Min	25th Quartile	75th Quartile	Max
1. I am confident in my ability to prescribe/recommend artificial eye drops and other therapeutic pharmaceutical agents (TPAs).	4.2±0.9	4(4-5)	1	3	5	5
2. I am confident in communicating drug-related information to patients.	4.2±0.9	4.5(4-5)	1	4	5	5
3. I am confident in explaining how drugs act on the eye.	4.0±1.0	4(4-4)	1	3	5	5
4. I am confident in explaining the ocular side effects of commonly prescribed drugs for chronic conditions such as anti-glaucoma.	3.8±1.1	4(4-4)	1	3	4	5
5. In the clinic, I can use diagnostic drugs such as mydriatics, cycloplegics, and local anesthetics in the appropriate dose and avoid side effects.	4.3±1.0	5(5-5)	1	5	5	5
6. I am confident in my ability to routinely explain the side effects of mydriatics, cycloplegics, and local anesthetics to patients in the clinic and provide instructions when they leave the clinic.	4.4±0.9	4(5-5)	1	4	5	5
7. I am confident in my ability to educate patients with ocular disease regarding adherence to ocular medications.	4.4±0.8	5(5-5)	1	4	5	5
8. I am confident in my ability to educate patients about different forms of ophthalmic drugs available in the market.	3.8±1.1	4(4-4)	1	3	5	5
9. I am confident in my ability to teach patients how to administer eye drops.	4.5±0.8	5(5-5)	2	4	5	5
10. I am confident in my ability to understand new information regarding new ocular drug discoveries, as I have a solid background in pharmacology.	3.5±1.1	4(3-4)	1	3	4	5
11. If the law changes, I am confident in my ability to prescribe ocular TPAs.	4.1±1.1	4(4-5)	1	3	4	5

Table 5: Gender and median scores of confidences (n=290).

	Statements										
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
Male participants' median score	5	5	5	4	5	5	5	4	5	4	5
Female participants' median score	4	4	4	4	5	5	5	4	5	3	4
Mann-Whitney U	8149	8140	8203	8853	9163	9238	8872	8830	8572	7955	7902
P-value	0.0004	0.0003	0.0006	0.02	0.003	0.04	0.01	0.01	0.001	0.0002	0.0001

the appropriate use of mydriatics, cycloplegics, and local anesthetics. Similarly, optometrists showed higher self-efficacy in educating patients about the side effects of these TPAs and teaching patients how to administer eye drops. Moreover, the optometrists were most confident in prescribing TPAs (4.2±0.9), communicating drug-related knowledge (4.2±0.9), educating patients (4.0±1), and increasing their medication adherence (4.4±0.8). However, optometrists perceived the following three competencies as low: explaining the side effects of commonly used ocular drugs (3.8±1.1), educating patients about different ophthalmic preparations in the market (3.8±1.1), and being able to stay updated about new advancements regarding ocular medications (3.5±1.1), which scored the lowest. A comparison of the confidence score of all statements shows that the three competencies have statistically significantly lower scores than other characteristics (Kruskal-Wallis test, $P<0.05$). Table 4 presents the confidence level according to age, gender, and education. A comparison of the scores based on these characteristics revealed no significant difference except for sex. The overall confidence level of female optometrists was viewed as significantly less than the male optometrists' levels (Mann-Whitney $U=7697$, $P<0.0001$). The self-efficacy of female optometrists was significantly lower ($P<0.05$) for each competency than that of male optometrists (Table 5).

Discussion

Optometrists contribute to primary eye care in Saudi Arabia. Having vast experience in optometry's core areas and clinical confidence are the keys to an optometrist's professional success. To our knowledge, this study is the first in Saudi Arabia to address optometrists' self-efficacy regarding using TPAs in clinical practice. The study included practitioners in optometry of different age groups and educational qualifications. Respondents reported a high level of self-efficacy across all competencies. They reported high confidence in dispensing and recommending therapeutic and non-therapeutic drops, including artificial tears, to patients. However, the prevalence of this practice is unknown. Optometry dispensing services are mainly linked to spectacles, contact lenses, and visual aid prescriptions rather than therapeutic agents. Nevertheless, prescribing therapeutic ophthalmic preparation was questioned in this study as the hospital's regulations may allow optometrists based on their qualifications and professional practice.

Most optometrists who prescribed TPAs held an optometry doctor degree. The drugs most commonly prescribed by optometrists were antihistamines, followed by antibiotics. An earlier study by Needle et al. [6] reported that the conditions managed by practicing optometrists in the UK are dry eye, blepharitis, simple corneal abrasion, and allergic conjunctivitis. For these presentations, optometrists prescribe ocular lubricants and antihistamines. Moreover, chloramphenicol and fusidic acid are available to all UK optometrists. Despite being allowed to prescribe, the survey found that only 12 and 2% of respondents reported using chloramphenicol and fusidic, respectively [6].

Similar privileges for using diagnostic and TPAs were confirmed in optometric practices in Ghana [9]. In contrast, a recent study conducted in Trinidad and Tobago reported that approximately 50% of surveyed optometrists commonly use diagnostic agents such as local anesthetics, mydriatic, and cycloplegics without prescribing or using any therapeutic drugs for ocular conditions [5]. This finding is in line with a previous report by Lundmark and Luraas [13], who found that in optometric practices in Norway, diagnostic drugs are used in 4% of ophthalmic examinations without undertaking a role in prescribing ocular pharmaceutical agents. An early study by Schmid et al. [14] surveyed Australian optometrists about using TPAs in practice. Most optometrists (80%) wanted to be able to prescribe ocular TPAs, and over 50% perceived themselves as competent and capable of treating ocular conditions. Consistent with current results, over 90% of Australian optometrists were confident in recommending ocular lubricants and antihistamines. Fewer optometrists (65%) were confident about prescribing topical antibiotics. In our study, optometrists use diagnostic agents as part of hospital-based optometric practice. Therefore, optometrists were asked to rate their confidence regarding the safe use of these agents and their ability to educate patients post-treatment, and they reported a high confidence level. Working at optical centers limits the clinical practice to refraction procedures, as reported by 26.6% of the surveyed optometrists. Therefore, they are expected only to report prescribing "nothing" or artificial tears. In Jordan, Okasheh-Otoom et al. [2] surveyed 727 optometrists, 81.5% of whom work in optical shops, and described their role as refractionists. Ocular medications were not prescribed as the professional license in Jordan does not permit optometrists to engage in such practice, undermining their potential as primary eye care specialists. With the emergence of the Doctor of Optometry degree, the optometrist's role has expanded to screening and managing ocular conditions, including cataracts, glaucoma, diabetic retinopathy, and age-related macular degeneration. This certification is achieved with more practical and clinical activities and training during the five-year program. However, the survey respondents showed similar high confidence scores despite their academic qualifications and duration of experience. Optometrists expressed a high confidence level regarding education competencies in how ocular drugs work, correct use of doses, side adverse reactions, and methods of drop administration. Further, the optometrists also expressed that they are highly confident in encouraging adherence to ocular medication. Although optometrists rated all competencies as "confident" or "highly confident," a lower confidence level was expressed regarding educating patients about different forms of ophthalmic drugs available on the market

and explaining the ocular side effects of commonly prescribed medications for chronic conditions such as anti-glaucoma. The lowest confidence score of 3.5±1.1 (SD) concerning self-learning and the ability to understand new ocular drug discoveries indicates the need for continuing professional education. Interestingly, respondents expressed their interest in undertaking a prescribing role if legislation allows it. In contrast, Needle et al. [6] reported that UK optometrists were less interested in having extended prescribing roles because of the lack of remuneration, cost and time for training, and fear of litigation. In the current study, the reason female optometrists perceived themselves as less skilled or confident than their male counterparts remain unclear. Gender differences in self-perceived confidence have been reported in the literature. Studies have shown that female individuals feel unsure about their competencies, while male individuals overestimate their abilities. This discrepancy has been reported with female individuals in health disciplines [15–17] and contributes to increased stress and anxiety when undertaking tasks and duties. In conclusion, a significant number of Saudi optometrists perceive themselves as highly competent professionals, as most hold a minimum optometry doctor qualification that allows them to practice confidently and perceive themselves as qualified prescribers of ocular medications if legislation approves this role.

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