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Original article

Current state of career placement and employment opportunities for Doctor of Pharmacy graduates: A cross-sectional analysis from a college of pharmacy, Saudi Arabia

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ABSTRACT

Background: Traditionally, graduates from colleges of pharmacy in Saudi Arabia work mainly in hospital settings, and only a few graduates work in other practice settings. However, several initiatives and national plans have recently been introduced to facilitate employment in community pharmacies and the pharmaceutical industry/companies. Consequently, the objectives of this study were to explore the current state of career placement, type of employment sectors, and practice settings that Doctor of Pharmacy (PharmD) graduates join based on recent developments in the profession.

Methods: This study is a cross-sectional, descriptive study. The target population was PharmD graduates from Unaizah College of Pharmacy, Qassim University, Saudi Arabia. Consequently, all 162 graduates from three recent cohorts (2018–2020) were contacted to participate in this survey.

Results: A total of 157 graduates participated in this study, yielding a response rate of 96.91 %. Of the participants, 92 (58.6 %) were female graduates. The overall rate of employment was 84.7 %. Moreover, a higher proportion of male graduates than female graduates (97.1 % versus 73.7 %, $P = 0.006$) were employed. In this study, the three main sectors that the graduates joined were the pharmaceutical industry and companies (41.2 %), community pharmacies (29.4 %), and medical cities, hospitals and clinics (23.5 %). In addition, almost the same proportions of male and female graduates joined the pharmaceutical industry and companies (40.3 % versus 42.1 %). However, a higher proportion of male graduates than female graduates joined community pharmacies (32.3 % versus 26.3 %). Conversely, a higher proportion of female graduates joined medical cities, hospitals and clinics compared to male graduates (28.1 % versus 19.4 %).

Conclusion: The current employment of PharmD graduates in the job market is generally high, but further improvement could be made, especially for female graduates. Moreover, the study findings showed that jobs are shifting toward community pharmacies and the pharmaceutical industry. Therefore, we believe that decision-makers in pharmacy education and curriculum developers must consider these trends and ensure that there is adequate preparation for careers in community pharmacy practice and other sectors of the profession in the curriculum.

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1. Introduction

Pharmacy education has evolved rapidly in recent decades, with major developments in terms of the set of competencies addressed in pharmacy curricula and the learning outcomes of professional programs. Moreover, more emphasis in pharmacy education has been placed on patient care services and relevant areas of pharmacy practice to meet the needs of modern health care systems and the expanded roles of pharmacists (Raman-Wilms, 2012). Cur-

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rently, the vast majority of colleges of pharmacy in Saudi Arabia offer a Doctor of Pharmacy (PharmD) program as an entry-level degree for the profession. This program is typically a practice-oriented, six-year program, including five years of didactic curriculum and one year of advanced pharmacy practice experiences (Al-Jedai et al., 2016).

The pharmacy profession is characterized by its diversity. Consequently, pharmacists are equipped to play vital roles in several health care sectors and many areas of practice (Anderson et al., 2008; Bin Saleh et al., 2015; Kelley et al., 2019). These sectors and practice settings include hospitals, community pharmacies, the pharmaceutical industry/plants, pharmaceutical companies, academia and universities, drug regulatory bodies, and other settings (Ilardo and Speciale, 2020). Consequently, PharmD graduates have several opportunities for employment in these sectors and could work in different positions in both the public and private sectors. In 2017, Saudi pharmacists represented 18.6 % of the pharmacy workforce in Saudi Arabia, and the remainder (81.4 %) were expatriate pharmacists from 55 countries (AIRuthia et al., 2018). To meet the shortage of local pharmacists, more than 26 colleges of pharmacy have been established over the last 20 years. Historically, until 2001, there was only one college of pharmacy in Saudi Arabia, the College of Pharmacy at King Saudi University (established in 1959) (Al-Jedai et al., 2016; Badreldin et al., 2020).

Moreover, the vast majority of pharmacy graduates from Saudi colleges of pharmacy have joined government health care institutions, including medical cities, Ministry of Health hospitals, and military hospitals, with only a few pharmacy graduates preferring to join other sectors, such as community pharmacies and the pharmaceutical industry (AIRuthia et al., 2018). For example, in 2017, Saudi pharmacists represented only 1.3 % of the pharmacy workforce in community pharmacies, and the remainder (98.7 %) were non-Saudi pharmacists. In contrast, 66.3 % of the pharmacists working in public health care institutions were Saudi pharmacists (AIRuthia et al., 2018). However, national initiatives and policies were recently introduced by the government to encourage and facilitate employment in the private sector. Consequently, more opportunities are available to the graduates in community pharmacies, pharmaceutical companies, and other parts of the private sector. In addition, several types of positions and roles are available in each sector. For example, in pharmaceutical companies, positions include medical representatives, pharmaceutical product specialists, quality assurance pharmacists, regulatory affairs specialists, and other roles in the scientific offices of pharmaceutical companies. However, very limited data are published regarding the actual job placements, sectors, and current state of employment of PharmD graduates based on recent trends in the pharmacy profession in Saudi Arabia. Moreover, the few studies from Saudi Arabia in the literature explored only pharmacy students' views, intentions and preferences regarding their future jobs after graduation. These studies showed that clinical pharmacy and hospitals were the preferred choice among pharmacy students, while other sectors, such as community pharmacies and the pharmaceutical industry, were the least preferred options (Al Ghazzawi et al., 2017; Alhomoud et al., 2019; Almaghaslah et al., 2021; AIRuthia et al., 2018; Balkhi et al., 2020; Bin Saleh et al., 2015).

It is of great importance to know the destination of PharmD graduates and the nature of the jobs that they take postgraduation. This provides valuable information to the colleges to ensure pharmacy graduates are equipped with the necessary skills, knowledge, and training for their future careers during study in their professional programs. Furthermore, curricula at colleges of pharmacy should reflect recent trends in practice, employment, and the profession as a whole. This is especially important, as some studies have indicated that some areas of practice, such as community pharmacies and the pharmaceutical industry, are not adequately

covered in the curriculum, with limited practical training in these areas (Balkhi et al., 2020; Bin Saleh et al., 2015). Consequently, pharmacy programs need to adopt a proactive role to meet the pharmaceutical expertise and pharmacy services required by the health care system. This is essential to contribute to the advancement of the profession, meet society's needs, and bridge the gap between academia and practice (Bhuvan, 2018). This is especially important given that in Saudi Arabia, there are currently 27 colleges of pharmacy with over 14,000 enrolled students (54.3 % are female students), and the number of graduates is estimated to be over 3,000 in 2022 (Saudi Commission for Health Specialties, 2018). In addition to this large supply of graduates, the demand for pharmacists among sectors seems to be different; some areas of practice (e.g., hospitals) are saturated, while other sectors have more job opportunities for Saudi pharmacists (AIRuthia et al., 2018; Balkhi et al., 2020).

Unaizah College of Pharmacy (UCP) at Qassim University, Saudi Arabia offers a six-year PharmD program. The program consists of five years of didactic curriculum and one year of experiential education (i.e., internship year). The didactic curriculum covers all sciences related to contemporary pharmacy education, including biomedical, pharmaceutical, social/behavioral/administrative, and clinical sciences. The internship year provides several rotations and training opportunities in clinical settings, hospitals, community pharmacies and other opportunities (e.g., pharmaceutical companies). Therefore, the objectives of this study were to explore the current state of employment and to describe the actual career placements of PharmD graduates from UCP and the sectors and practice settings that they have joined in the pharmaceutical and health care job market. In addition, the study explored whether there are differences between male and female graduates in terms of the rate of employment, job location/geographic region, and type of sector that they joined postgraduation. This is because the national data showed that the general rate of unemployment among females is higher than among males (General Authority for Statistics SA, 2022). In addition, female pharmacists represented only 14.8 % of the pharmacy workforce in Saudi Arabia in March 2017 (AIRuthia et al., 2018). Moreover, some challenges were identified in the literature regarding female employment in some sectors including community pharmacies and the pharmaceutical industry (Al Ghazzawi et al., 2017; Almaghaslah et al., 2019). However, many of these barriers and challenges have since been addressed to empower women, increase their participation rate in the workforce and target economic growth in line with the Saudi vision 2030 (Alessa et al., 2022; Alghamdi et al., 2022; Parveen, 2022).

Consequently, we believe the findings of this study will be helpful for academic institutions and will provide further guidance for decision-makers in pharmacy education to ensure that pharmacy curricula are up to date and meet the requirements of job markets, national reforms, and employment trends for PharmD graduates.

2. Methods

2.1. Study design and setting

This study is a cross-sectional, interviewer-administered study. It was conducted with PharmD graduates from Unaizah College of Pharmacy (UCP), Qassim University, Saudi Arabia. The first cohort graduated from the college in 2018. At the time of this study, three cohorts had graduated. The total number of graduates in these three recent cohorts (2018–2020) was 162. The numbers of graduates for 2018, 2019, and 2020 were 25, 51, and 86, respectively. The study was conducted from April–May 2021.

2.2. Sample size and sampling method

The study employed a universal sampling method in which all PharmD graduates from UCP during the period of 2018–2020 were invited to participate. Consequently, all 162 graduates (male and female) were approached to participate in this study.

2.3. Data collection method

Data were collected using a standard data form to elicit the key information relevant to the study variables and objectives (Appendix 1). To ensure its simplicity, practicality, and accuracy, the data collection form was reviewed by three academics specializing in pharmacy practice and education and with expertise in quantitative studies. The data collection included the name and gender of the participant, year of graduation, current employment status (employed or not) and relevant information (i.e., name of the employer), geographic location of the current job, and current area of practice (i.e., the field or sector, such as community pharmacy, hospital, pharmaceutical company, academic field, etc.). In this study, the rate of employment was calculated as the total number of graduates from 2018 and 2019 who were employed divided by the total number of graduates during these two years. The rate of employment of graduates within six months of graduation was calculated from the cohort of 2020. The rate of employment for 2020 graduates was not included in the overall employment rate since they were considered fresh graduates during the study period. Consequently, it was more suitable to use their data to determine the six-month employment rate.

Prior to data collection process, the data collectors were briefed and trained on the best practice for conducting phone-based interviews and communication with the graduates. The participants were then contacted via phone by the data collectors. The data collectors were seven faculty members and lecturers at UCP with active involvement in UCP alumni unit activities. Contact information (i.e., mobile phone numbers), names of graduates, gender, and their cohort were obtained from the alumni database at UCP, Qassim University.

2.4. Data management and analysis plan

The data were initially entered into Microsoft Excel and then transferred to SPSS for Windows, version 22. Descriptive statistics (e.g., frequencies and percentages) were used to summarize the data. In addition, inferential statistics such as the chi-squared test (and its alternative, Fisher's exact test, when applicable) were used to explore the associations between the variables. The statistical significance was set at a *P* value of <0.05.

2.5. Ethical considerations

The study was approved by the Committee of Research Ethics, Deanship of Scientific Research, Qassim University, Saudi Arabia (approval no. 20-08-02). Participation in the study was entirely voluntary, and no incentives were offered to the participants to take part. The participants' information was kept confidential and used strictly for the research purpose. The study adhered to the ethical principles of the Declaration of Helsinki.

3. Results

3.1. Response rate

Of the 162 graduates, 157 participated in the study, the first cohort that graduated in 2018 up to and including the graduates

from 2020, yielding a response rate of 96.91 %. All the participants provided complete responses and were included in the study. In terms of gender distribution, 92 (58.6 %) were female graduates, and 65 (41.4 %) were male graduates.

3.2. Rate of employment

The overall rate of employment (for 2018 and 2019) was 84.7 % (n = 61), while only 15.3 % (11) were not employed. In this study, a higher proportion of male graduates than female graduates were employed (97.1 % versus 73.7 %, *P* = 0.006). However, there was no statistically significant difference in terms of year of graduation (*P* = 0.901). The results are summarized in Table 1.

In addition, we calculated the rate of employment within the first six months for the most recent cohort that graduated in 2020. The overall rate of employment of recent graduates was 68.2 % (58 of 85). It was noted that the rate of employment of male graduates (n = 29 out of 31; 93.5 %) was statistically significantly different from that of female graduates (n = 29 of 54; 53.7 %) (*P* < 0.001).

The overall rate of employment of UCP graduates, the rates of male and female employment, and the comparison with the national rate of employment of pharmacy graduates in 2019 in Saudi Arabia are illustrated in Fig. 1.

3.3. Sectors and professional fields

In this study, the three main sectors that the graduates joined were the pharmaceutical industry and companies (41.2 %), community pharmacies (29.4 %), and medical cities, hospitals, and clinics (23.5 %). The remainder (5.9 %) joined other sectors, including academia, postgraduate studies, and other fields. The results are summarized in Table 2 and Fig. 2.

In this study, we explored the association between the gender of graduates and the professional field/sector that they joined. As shown in Table 3, almost the same percentages of male and female graduates joined the pharmaceutical industry and companies (40.3 % versus 42.1 %). However, a higher proportion of male graduates than female graduates joined community pharmacies (32.3 % versus 26.3 %). Conversely, a higher proportion of female graduates than male graduates joined the medical city, hospital, and clinic sector (28.1 % versus 19.4 %).

3.4. Distribution of employed graduates according to geographic location/region

We also explored the distribution of jobs in terms of geographic location. As shown in Table 4, the majority of participants were employed in the Qassim region (n = 66; 55.5 %), followed by the Riyadh region (n = 33; 27.7 %). The remainder (n = 20; 16.8 %) obtained jobs in other regions of Saudi Arabia, as well as one graduate conducting postgraduate study abroad.

Table 1
Comparison of employment rates in terms of gender and year of graduation.

Variable	Rate of employment		P value*
	Employed (n = 61) % (n)	Unemployed (n = 11) % (n)	
Gender			0.006
Male	33 (97.1 %)	1 (2.9 %)	
Female	28 (73.7 %)	10 (26.3 %)	
Year of graduation			0.901
2018	21 (84.0 %)	4 (16.0 %)	
2019	40 (85.1 %)	7 (14.9 %)	

* Chi-squared test.

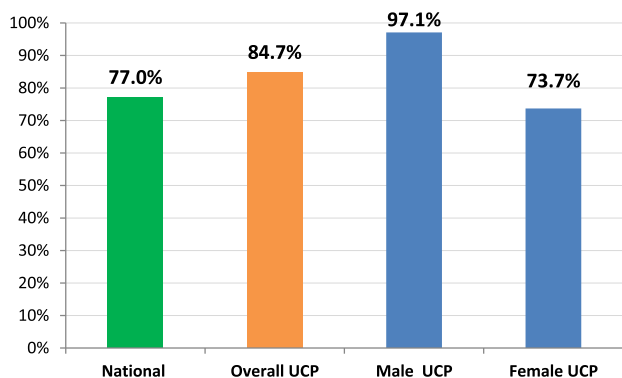


Fig. 1. Rate of employment of PharmD graduates from UCP in comparison with the national rate of employment of Pharmacy graduates in 2019 in Saudi Arabia.

Table 2
Types of sector and professional fields that graduates joined.

Sector	n (%)
Pharmaceutical industry and companies	49 (41.2 %)
Community pharmacies	35 (29.4 %)
Medical cities, hospitals, and clinics	28 (23.5 %)
Academia	2 (1.7 %)
Postgraduate studies	2 (1.7 %)
Other fields	3 (2.5 %)
Total	119 (100 %)

In this study, we explored the association between the gender of graduates and the geographic location of the jobs obtained. As shown in Table 5 and Fig. 3, a higher proportion of female graduates than male graduates joined jobs in the Qassim region (64.9 % versus 46.8 %, P = 0.047 %).

4. Discussion

We believe that this study is the first from Saudi Arabia to examine the types of fields that PharmD graduates joined in recent years based on new developments in the pharmacy profession. In this study, the overall rate of employment of UCP graduates was 84.7 %. This rate is higher than the national rate for pharmacy graduates in Saudi Arabia, which was 77 % for graduates in 2019 (National Observatory of Labor of Ministry of Human Resources and Social Development, 2020). We believe several factors could

Table 3
Comparison between male and female graduates by sector.

Sector	Male	Female	P value*
Pharmaceutical industry and companies	25 (40.3 %)	24 (42.1 %)	0.560
Community pharmacies	20 (32.3 %)	15 (26.3 %)	
Medical cities, hospitals, and clinics	12 (19.4 %)	16 (28.1 %)	
Academia	1 (1.6 %)	1 (1.8 %)	
Postgraduate studies	1 (1.6 %)	1 (1.8 %)	
Other	3 (4.8 %)	0 (0.0 %)	
Total	62 (100 %)	57 (100 %)	

* Fisher's exact test.

Table 4
Distribution of employed graduates according to geographic location/region.

Region/city	n (%)
Qassim	66 (55.5 %)
Riyadh	33 (27.7 %)
Eastern region	9 (7.6 %)
Makkah	4 (3.4 %)
Medinah	4 (3.4 %)
Tabuk	1 (0.8 %)
Najran	1 (0.8 %)
Abroad	1 (0.8 %)
Total	119 (100 %)

have helped to achieve this good rate of employment. The UCP PharmD curriculum was designed to provide rigorous foundations in the four broad science domains related to pharmacy education and practice (i.e., biomedical, pharmaceutical, social/behavioral/administrative, and clinical sciences) and to ensure that the graduates are ready for entry-level practice in different sectors of the profession in Saudi Arabia. Moreover, at an early phase of the program, the PharmD students were introduced to the different roles of pharmacists in several practice settings and sectors in Saudi Arabia. In the later phase of the program, the students were provided with numerous opportunities for training during the internship in several settings as core and elective rotations (i.e., hospital/institutional settings, community pharmacies, outpatient settings, pharmaceutical industry/companies, drug regulatory affairs departments). In addition, PharmD interns were provided with a career orientation program that covers interview skills, how to compose a curriculum vitae (CV) and résumé, how to apply to jobs, and the current job opportunities during their internship year. Moreover, after an appropriate orientation and preparation at the

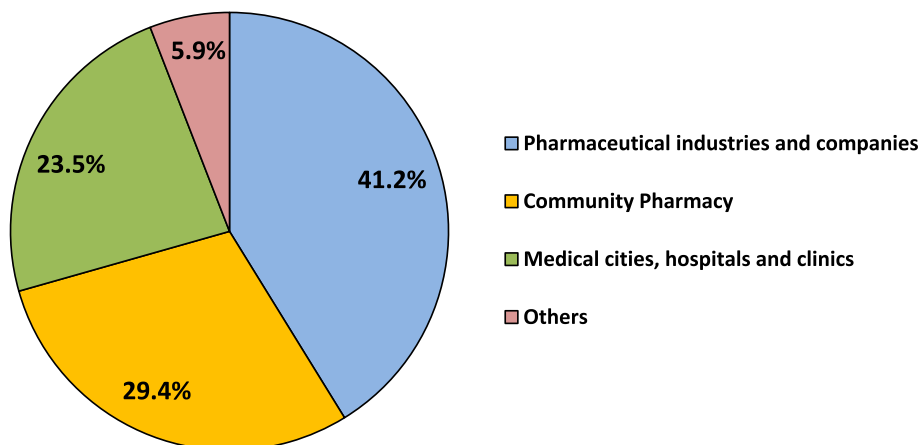


Fig. 2. The main sectors that the graduates joined.

Table 5
Comparison between male and female graduates in terms of geographic location.

Region/city	Male	female	P value*
Qassim	29 (46.8 %)	37 (64.9 %)	0.047
Other regions	33 (53.2 %)	20 (35.1 %)	
Total	62 (100.0 %)	57 (100.0 %)	

* Chi-squared test.

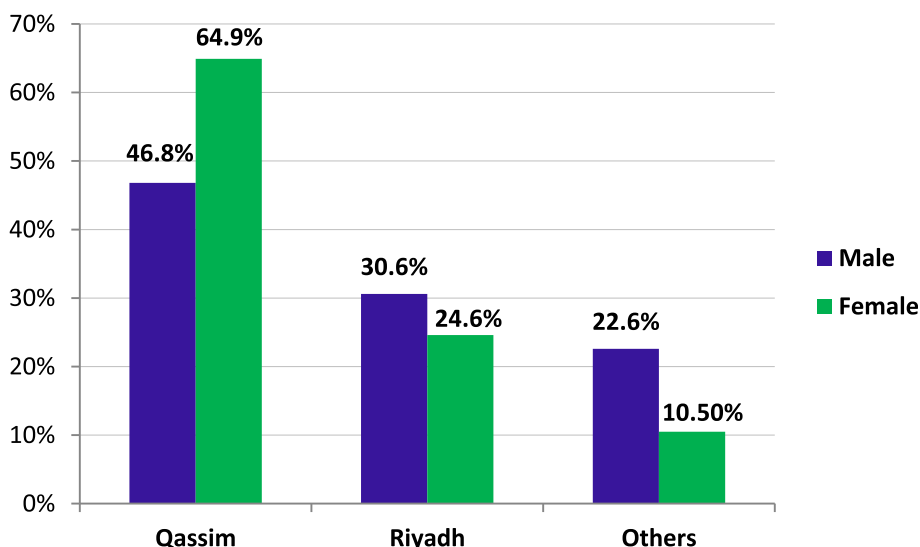


Fig. 3. Comparison between male and female graduates in terms of geographic location.

College, the PharmD interns were provided with the opportunity to sit for the Saudi Pharmacist Licensure Examination (SPLE) during their internship year so that they could be ready to obtain their license and begin practice upon graduation. This is because the Saudi Commission for Health Specialties regulations permit the PharmD students to sit for SPLE at an earlier stage (e.g., during the internship) based on approval from the college (Saudi Commission for Health Specialties, 2019). Consequently, we believe these factors and initiatives collectively helped to achieve this rate of employment. Therefore, they should be maintained and further promoted to enhance the employability of graduates and provide them with greater opportunities to join the workforce immediately after graduation.

In this study, we noted a higher rate of employment of male graduates compared to that of female graduates (97.1 % versus 73.7 %, respectively). These findings are consistent with the results of Labor Force Survey Q4 2021 by the General Authority for Statistics (2022), which estimated the unemployment rates to be 5.2 % for Saudi males and 22.5 % for females. For the PharmD graduates in our study, several factors potentially contributed to this difference. One of the factors influencing job choice is geographic location, since it was considered important/very important by 80.2 % of final-year pharmacy students in a recent study that included students from 15 pharmacy colleges in Saudi Arabia (Almaghaslah et al., 2021). In our study, we noted that 64.9 % of female students were working in jobs in their region (i.e., the Qassim region) compared to 46.8 % of male students, meaning more male graduates left to work in other regions. This difference is potentially due to logistics and some cultural barriers, but it is expected to change with the recent initiatives and national regulations that have been implemented to further empower women in line with Saudi Vision 2030 (Alghamdi et al., 2022; AlRuthia et al., 2018). Moreover, community pharmacies have traditionally been run by male pharmacists, and female pharmacists have only

recently been allowed to work in community pharmacies, starting with pharmacies affiliated with private hospitals or clinics or located in shopping malls (Almaghaslah et al., 2019; Almaghaslah et al., 2021). Consequently, providing more opportunities for female graduates at community pharmacies would enhance the rate of employment.

The study findings showed that the main sectors that the graduates joined were the pharmaceutical industry (41.2 %), the community pharmacy sector (29.4 %), and hospital settings (23.5 %). These findings reflect current employment trends across the pharmacy profession in Saudi Arabia. Until recently, graduates from Saudi colleges of pharmacy worked mainly in government and hospital settings, with few pharmacists joining the private sector and other practice settings, such as community pharmacies and the pharmaceutical industry. Moreover, in many previous studies from Saudi Arabia, clinical pharmacy and hospitals were the preferred choice among pharmacy students for their future jobs, while community pharmacies and the pharmaceutical industry were the least preferred choices (Al Ghazzawi et al., 2017; Alhomoud et al., 2019; Almaghaslah et al., 2021; AlRuthia et al., 2018; Balkhi et al., 2020; Bin Saleh et al., 2015). There are many factors contributing to this phenomenon, including a preference for the government sector, salaries and other benefits, work schedules, the nature of the job, social and cultural issues, and a lack of or limited training or orientation in the undergraduate pharmacy curricula (Almaghaslah et al., 2021; Balkhi et al., 2020; Bin Saleh et al., 2015). In the USA, a study was conducted to describe the career placement of PharmD graduates from eight Midwestern United States schools of pharmacy in 2013. The study reported that among those who accepted job offers, the major settings were community pharmacies (84 %), followed by hospital pharmacies (9 %) (Sweet et al., 2015). In the USA, pharmacists held approximately 322,200 jobs in 2020, and the main sectors for employment were pharmacies and drug stores (42 %), hospitals (27 %), food and beverage stores

(8 %), and ambulatory health care services (5 %) (Bureau of Labor Statistics, 2022).

The study findings showed that current jobs in the market are changing toward community pharmacies and the pharmaceutical industry because the government sector, led by the Ministry of Health and other public institutions, is largely saturated, and few new vacancies are announced annually (Balkhi et al., 2020). In addition, more initiatives and national plans to facilitate and encourage employment in the private sector, especially in vital sectors such as the pharmaceutical industry and community pharmacies, have recently been introduced. These plans have provided more opportunities in pharmaceutical companies and the community pharmacy sector. Given this major shift in the nature of jobs, we believe that decision-makers in pharmacy education and curriculum developers must consider these changes. It is necessary to ensure that curricula include adequate components of community pharmacy practice and other sectors of the profession. The topics in contemporary community pharmacy practice include self-care pharmacotherapy, point-of-care testing in pharmacies, health and wellness screenings, public health promotion, medication therapy management (MTM), vaccines and immunizations, leadership, business management, effective communication, patient counseling, and other direct patient care services (Bullock and Horne, 2019; O'Sullivan et al., 2020). Moreover, having more rotations and field training in the various sectors of the pharmacy profession, such as rotations in community pharmacies and the pharmaceutical industry, is now an essential part of the advanced pharmacy practice experiences (i.e., internship year) and the introductory pharmacy practice experiences.

In this study, we noted that only 1.7 % of the graduates took on postgraduate studies, highlighting the limited opportunities currently available for pharmacists to pursue postgraduate studies. In fact, a report by the Saudi Commission for Health Specialties on the health workforce in Saudi Arabia showed that only 2.6 % of the 2017 pharmacy workforce were employed as specialized pharmacists (i.e., with postgraduate qualifications) (Saudi Commission for Health Specialties, 2018). In comparison, a study from the USA that determined the five-year trend of outcomes for PharmD graduates from ten colleges of pharmacy during the period 2013–2017 reported that 41.7 % accepted postgraduate placements, including residencies, fellowships, and other graduate programs (Kelley et al., 2019). In Australia in 2020, 9.6 % of pharmacy graduates proceeded to further full-time study (Graduate Outcomes Survey, 2020). Consequently, we believe that there is an urgent need in Saudi Arabia to increase the opportunities for PharmD graduates to pursue postgraduate training in different pharmacy fields. Colleges of pharmacy and other accredited training institutions should invest more in establishing postgraduate programs and expanding the capacity of current pharmacy programs. These programs should include more training seats in residency and fellowship programs, master's degrees, and doctoral qualifications. This would produce more pharmacists with advanced training and specialization, especially in clinical pharmacy and practice. Consequently, this would help to create more career placements in clinical and hospital pharmacy settings and expand the role of pharmacists to provide specialized patient care services in the health care system.

5. Strengths and limitations

We believe that this study is the first to examine the sectors that graduates from a PharmD program have joined in recent years based on the new developments in the pharmacy profession in Saudi Arabia. The study had a high response rate of 96.91 % and included graduates from three cohorts (2018–2020). However,

the study has some limitations, including the fact that the participants came from only one college of pharmacy. Therefore, the findings might not be generalizable to other colleges in Saudi Arabia. In this study, the data collection was not anonymous, as the data collectors needed to have the contact information and the names of graduates to contact them. We have studied only the state of employment, career placement, type of sector, and geographic location, and we did not explore other factors related to graduate characteristics, such as grade point average (GPA), marital status, and job characteristics, such as job type (part-time versus full-time) and salary, as they were out of the scope of this study. Therefore, we hope future studies could look at this. In addition, as a cross-sectional study, it reflected the situation at the time of the study period. Consequently, the overall rate of employment and employment in the different sectors need to be monitored on a regular basis. However, given the limited literature in this field, we believe that this study provides useful information and future guidance for educators, academic institutions, and policy-makers in pharmacy education.

6. Conclusion

The current employment of PharmD graduates is generally high in the job market, but further improvements could be made, especially for female graduates. Moreover, the study findings show that jobs in the labor market are shifting toward community pharmacies and the pharmaceutical industry. There are now more opportunities in pharmaceutical companies and the community pharmacy sector than in other sectors. Therefore, due to this major shift in the nature of jobs, we believe that decision-makers in pharmacy education and curriculum developers must consider these trends and ensure that there is adequate preparation for careers in community pharmacy practice and other sectors of the profession in the curriculum.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jsps.2022.07.010>.

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