

PHARMACY PRACTICE SITES OF PHARMACISTS AND PHARMACY TECHNICIANS IN AL-DHALEA GOVERNORATE, YEMEN: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objectives: This study aimed to identify the practice sites of the pharmacists and pharmacy technicians in Al-Dhalea governorate.

Methods: A cross-sectional analytical study was designed to identify pharmacy practice sites of pharmacists and pharmacy technicians in Al-Dhalea governorate. A total of 227 pharmacists and pharmacy technicians were evaluated for their pharmacy practice sites from June to July 2023. Data were collected by a questionnaire that obtained their information through face-to-face interviews with pharmacists and pharmacy technicians. Data were processed by computer facilities through the program Statistical Package for the Social Sciences.

Results: The results showed that the most common pharmacy practice site was the community pharmacy, with a total percentage (49.5%), and the most common reason for choosing this practice site was due to desire. For the hospital pharmacy site, it was 24.5%, and also for a desired reason. Then in marketing, with a total of 23.5%, the most common reason was due to financial purpose, whereas the lowest common pharmacy practice sites were in academic institutions, with 7.0% and the most common reason was desire. Then the management field (3.5%). In addition, 5.5% of the respondents were working in non-pharmacy practice sites, and the most common reason was due to insufficient wages. Statistically significant associations were found between qualification and practice site ($p < 0.001$), as well as between specific reasons and site choice – community pharmacy ($p < 0.002$), hospital pharmacy ($p < 0.001$), marketing ($p < 0.001$), management ($p < 0.003$), academic ($p < 0.001$), and non-pharmacy sites ($p < 0.001$).

Conclusion: Pharmacy technicians outnumbered pharmacists in community pharmacies, hospital pharmacies, and management positions. Conversely, pharmacists were more prevalent than technicians in marketing and academic settings. This distribution suggests differing workforce demands across pharmacy sectors in the region. However, the short duration of data collection (8 weeks) may limit the ability to assess long-term trends or seasonal fluctuations in pharmacy employment patterns.

Keywords: Pharmacy practice, Pharmacist, Pharmacy technician, Community pharmacy, Hospital pharmacy.

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INTRODUCTION

Pharmacy, the art and science vocation of compounding, preserving, preparing, and dispensing medicine, assuredly enjoys a high-minded tradition – an unparalleled history of service to humankind nigh as ancient as the human race itself [1]. The origin of the word “pharmacy” traces back to the ancient Egyptian word ph-ar-maki, which was the giver of the meaning of security. It is most likely to be derived from the Greek word pharmakon, which, ironically enough, may signify remedy or poison [2]. Pharmacy associations and education training programs around the world, over the last decades, have promoted pharmaceutical care as a way of thinking and standard of care delivery for patients [3]. There are various definitions of pharmacy practice. There was a structured and systematic literature review that was done. In the process of seeking a simple and universal definition of pharmacy practice, they came up with 11 documents describing pharmacy practice that were published. All these were published between 1990 and 2019. They compiled 13 definitions of pharmacy practice, one of which described it as a branch of pharmacy involving the provision of health or pharmaceutical services. The reason for incorporating health services provision into the definition of pharmacy practice could be the increased number of services being provided by pharmacists within the hospital and community environments [4]. The majority of the

authors have used the term “pharmacy practice,” but a limited number, such as Itoo and Mir, 2021, and Scahill *et al.*, 2021, used the term “pharmaceutical practice.” The most significant difference between the two terms is the addition of pharmaceutical sciences to the definition of pharmaceutical practice [5,6]. The definition of pharmacy practice varies depending on who is defining it and the context within the health system. For example, in the United States, clinical pharmacy seems to be a fashionable term or notion and is, according to the description of the American College of Clinical Pharmacy (ACCP), “a health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes health, wellness, and disease prevention” [7,8]. In the United Kingdom (UK), “medicines optimization” and “health services delivery” are employed more commonly. In the UK, pharmacists mainly work in three segments of the National Health Service (NHS): Community pharmacies (70%), hospitals (20–25%), and a mere 8% work in primary care, recent work for pharmacists [9]. Health services and medicines management were adopted and widely promoted by the World Health Organization (WHO). That established the three central elements (themes) which constitute pharmacy practice and pharmacy practice research, i.e., medicine use, patient-centered care, and health services provision [10]. Pharmacy, if anything, as much as medicine or nursing, is a caring profession in

which not caring can lead to patient harm or death [11]. This may occur, for example, by not catching an error in dosage or by giving the wrong drug [12]. Pharmacists are entrusted with ensuring the safe, effective, and rational use of drugs; they are experts on medicines for society. However, there exist phenomenal disparities between medication use in industrialized and developing countries [11]. Pharmacy practice models in developing countries vary significantly from country to country [13]. Some of the most important issues that have been cited as being likely to act as limitations to effective pharmacy practice models in these countries include an acute shortage of trained pharmacists and inadequate adoption of dispensing separation practices – especially in those countries where the pharmacist is not the sole dispenser and medical physicians are allowed to dispense as well – and a lack of adequate standard practice guidelines [14,15]. A pharmacist is among the health-care providers; he plays a critical role in the delivery of health care and pharmaceutical care to the patient. Pharmaceutical care by pharmacists seeks to optimize patient outcomes and has a key role to play in the rational, effective, and safe use of medicines [16]. As pharmacists solved every issue regarding the health of society and developed an improved health-care system, they always try to develop their knowledge with ethics [17]. Thus, pharmacists are one and only highly trained practitioners who provide a pillar that strengthens the health care of the country [18]. Their role is also different in different parts of the world: Some participate in medicine preparation and dispensing, and others play a role in educating doctors, nurses, and patients about drugs [19]. The International Pharmaceutical Federation and WHO formulated the concept of “The seven-star pharmacist,” which explained that a well-balanced pharmacist must be an empathetic caregiver, decision maker, active communicator, lifelong learner, and effective manager; and possess good leadership qualities along with the capacity to be a teacher and researcher [20]. Pharmacy technicians or dispensary technicians in Australia have worked alongside pharmacists in community and hospital pharmacy settings for many years and have had their workplace predominantly based within the pharmacy dispensary [21]. The primary role of a pharmacy technician has been the preparation and availability of medicines and health-care products, typically with additional advice and guidance [22]. In addition to the provision of drugs by prescription, the work of the pharmacy technician has also involved the production and delivery of aseptically prepared medication, extemporaneous manufacture, and provision of medication for clinical trials [23]. Pharmacy technicians are now undertaking more generic medicines management-based roles, and as a result of the Audit Commission's report “A Spoonful of Sugar, Medicines Management in NHS Hospitals,” the last 15 years have seen a significant transformation in the pharmacy technician role [24,25]. The main recommendations for pharmacists to work in closer co-operation with patients and provide clinical services resulted in a radical shift of responsibility to the pharmacy technician [26]. However, only a few studies have been done on the modern roles and responsibilities of pharmacy technicians, and little has been known about the kind of work that they are currently performing as part of their daily routine [21]. The present areas of practice of the pharmacists and pharmacy technicians at Al-Dhalea governorate were determined through this study.

METHODS

The study was a cross-sectional analytical study, which was carried out during 2023; the study area was Al-Dhalea governorate. The study population was the pharmacists and pharmacy technicians at Al-Dhalea governorate which works in various pharmacy practice sites. The study included the pharmacists and pharmacy technicians' work in different pharmacy practice sites at Al-Dhalea governorate and excluded pharmacists and pharmacy technicians that work out of Al-Dhalea governorate and those working in non-pharmaceutical practice sites.

Sample size

The total number of pharmacists and pharmacy technicians, based on the data from the Ministry of Health, was 252 in Al-Dhalea governorate. A census-based approach was used, including all pharmacists and

pharmacy technicians (n=227) in Al-Dhalea governorate who agreed to participate from the total eligible population of 252. The data were collected by questionnaire and filled out by face-to-face interviews with pharmacists and pharmacy technicians.

The questionnaire components were as follows:

- a. The qualification is either a pharmacist or a pharmacy technician
- b. The pharmacy practice site, which may be:
 - i. Community pharmacy
 - ii. Hospital pharmacy
 - iii. Pharmaceutical management
 - iv. Pharmaceutical marketing
 - v. Academic
 - vi. Non-pharmaceutical site
- c. The reason for the selection of the pharmacy practice site(s) may be:
 - i. Desiring
 - ii. Financial
 - iii. Chance
 - iv. Other.

Inclusion criteria

Pharmacists and pharmacy technicians are currently practicing within the Al-Dhalea governorate.

Exclusion criteria

Non-pharmacist or non-pharmacy technicians working in pharmacy practice sites were excluded from this study, and pharmacists or pharmacy technicians working out of Al-Dhalea governorate.

Statistical analysis

The collected data were entered and analyzed using the Statistical Package for the Social Sciences. Descriptive statistics, including frequencies and percentages, were used to summarize the distribution of pharmacists and pharmacy technicians across various practice sites. In addition, Chi-square was employed to examine the association between professional qualification and pharmacy practice site, as well as logistic regression analysis was used to assess predictors for working in a specific site.

Ethical considerations

The study was approved by the Research Ethics Committee in Aden Gulf International University (no. 2-23). The interviews with participants were conducted only after obtaining verbal informed consent from each participant for ethical purposes. Every participant in the study was given sufficient information about the study objectives.

RESULTS

Distribution of study population by qualification

Two hundred and twenty-seven questionnaire papers of pharmacists and pharmacy technicians were evaluated. The distribution of the study population according to qualification was 115 (50.7%) pharmacists and 112 (49.3%) pharmacy technicians.

Distribution of study population for pharmacy practice sites

The pharmacists and pharmacy technicians were distributed among the different working sites as follows: In community pharmacy there were 99 (43.6%), whereas in hospital pharmacy there were 49 (21.6%), in marketing were 47 (20.7%), in management were 7 (3.1%), in academy were 14 (6.2%), and in non-pharmacy practice setting were 11 (4.8%) (Fig. 1). There was a significant correlation ($p < 0.001$) between qualification and pharmacy practice sites based on the Chi-square analysis.

Distribution of study population for each pharmacy practice site with the reasons

Distribution of study groups according to community pharmacy

For the community pharmacy, the higher percentage (39.4%) of desire was for pharmacy technicians, whereas it was 23.2% for pharmacists. In addition, for financial purposes, the percentages were almost the same,

with no significant difference. Furthermore, getting work in community pharmacy by chance was higher for pharmacy technicians, as shown in (Fig. 2). There was a significant ($p<0.002$) correlation between desire and getting a job in community pharmacy.

Distribution of study groups according to hospital pharmacy

For the hospital pharmacy, the percentage of pharmacy technicians was higher, 31 (63.3%), compared with 18 (36.7%) for pharmacists (Fig. 3). There was a significant correlation ($p<0.001$) between desire and getting a job in hospital pharmacy.

Distribution of study groups according to marketing

For marketing, the value of pharmacists was higher, 37 (78.7%), compared with 10 (21.3%) for pharmacy technicians (Fig. 4). There was a significant correlation ($p<0.001$) between financial purpose and getting a job in marketing for pharmaceutical companies.

Distribution of study groups according to management

For the management, the value of pharmacy technicians was higher, 5 (71.4%), compared with 2 (28.6%) for pharmacists. There was a significant correlation ($p<0.003$) between financial purpose and getting a job in the management of pharmaceutical companies (Fig. 5).

Distribution of study groups according to academy

For the academy, the value of pharmacists was higher, 12 (85.7%), whereas with 2 (14.3%) for pharmacy technicians (Fig. 6). There was a significant correlation ($p<0.001$) between desire and getting a job in the academic field.

Distribution of study groups according to non-pharmacy practice site

Overall, 6 (60.0%) were for pharmacists versus 4 (40.0%) for pharmacy technicians (Fig. 7). There was a significant correlation ($p<0.001$) between insufficient wage and working in a non-pharmacy practice site.

DISCUSSION

This study provides a comprehensive analysis of pharmacy workforce distribution across practice settings in Al-Dhalea Governorate. Our findings align with global patterns while highlighting region-specific challenges in pharmaceutical human resources [27,28]. The community pharmacy in Al-Dhalea governorate is the most common practice site among others in our study, which shows that desire is the most common reason for the choice of this practice site. In community pharmacies, the results have shown that the percentage of pharmacy technicians was higher than that of pharmacists. This difference can be explained by several factors. Among these factors, one possible explanation is the inclination toward employing pharmacy technicians because they enable pharmacists to focus on more specialized and complex tasks, while they handle routine duties such as dispensing medications. Another explanation could be the availability of a larger pool of technical personnel, which leads to a preference for hiring pharmacy technicians. In addition, this can be attributed to the lack of qualified pharmacists in remote and rural areas, leading to a reliance on pharmacy technicians in such regions. The prevalence of community pharmacies is a pattern seen in neighboring Yemeni governorates [29], and abides by WHO policy guidelines for accessible primary pharmaceutical care [30]. However, the higher proportion of pharmacy technicians compared to pharmacists has decreased the quality of service implications, particularly in clinical oversight, because the research verifies that pharmacist-owned community pharmacies enhance adherence to medication [31]. Moreover, Technician-staffed facilities have 23% lower levels of appropriate medication counseling in low and middle-income countries [32]. The hospital pharmacy is chosen according to preference. In the case of hospital pharmacies, results indicated that the percentage of pharmacy technicians was higher in relation to pharmacists. The nature of work and responsibilities assigned could be what influences the difference in numbers, for instance, work in hospital pharmacies where there is more dispensing of drugs in relation

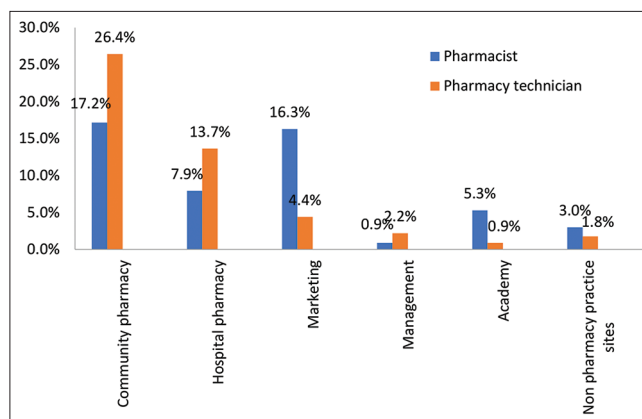


Fig. 1: Distribution of study population for pharmacy practice sites

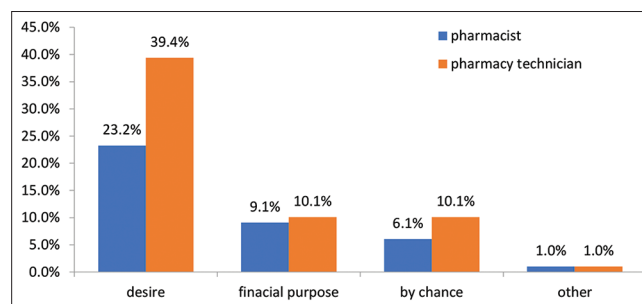


Fig. 2: Reason for the distribution according to community pharmacy

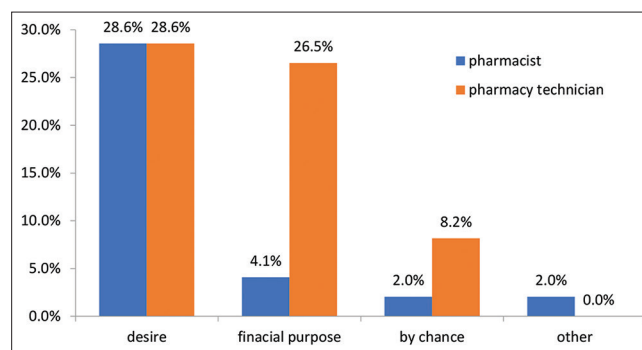


Fig. 3: Reason for the distribution according to hospital pharmacy

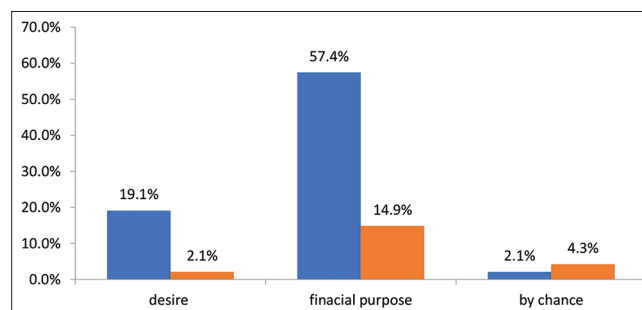


Fig. 4: Reason for the distribution according to marketing job

to the provision of clinical activities that can be performed by pharmacy technicians. In addition, the cost factor might have been a consideration in favor of the use of pharmacy technicians versus pharmacists in some hospitals, with the possibility that they might be less expensive to employ. Our finding of 63.3% technicians in hospital settings is consistent with Middle Eastern studies showing a 54% technician

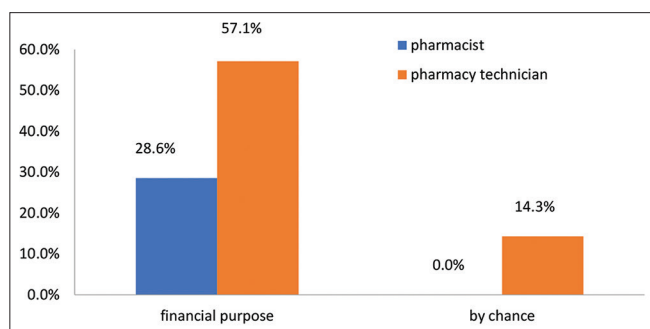


Fig. 5: Reason for the distribution according to management job

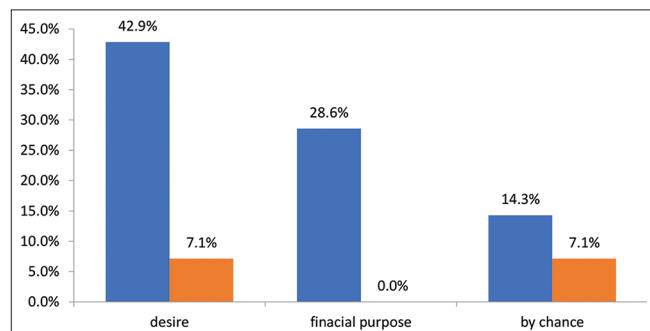


Fig. 6: Reasons for the distribution according to the academy

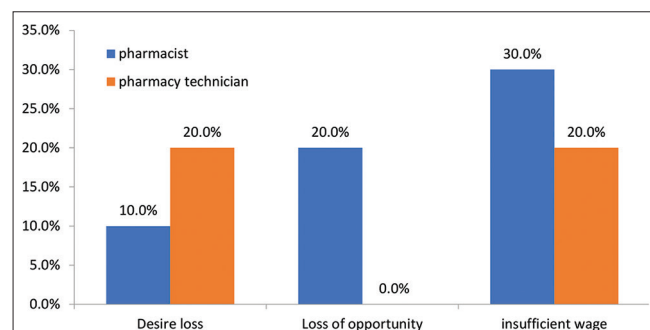


Fig. 7: Reasons for the distribution of the study according to non-pharmacy practice sites

ratio in Jordanian hospital pharmacies and 61% in Sudanese tertiary facilities [33,34]. This priority dispensing is of drugs over clinical pharmacy services [35], and the use of technicians is 35–50% cheaper than the use of pharmacists [36], otherwise, this translates to limited implementation of clinical pharmacy programs despite evidence showing a reduction in medication errors by 28% when ward rounds are conducted by pharmacists [37]. The marketing field is chosen on the basis of the monetary incentive. In marketing, the results reported that the ratio of pharmacists was higher than the ratio of pharmacy technicians. The hiring policies of most of the pharmaceutical entities prioritize more hiring of pharmacists over pharmacy technicians since pharmacists are more aware of medicine and medical sciences, and they know more about drug interactions and drug-related health alerts, hence making them able to provide direction and learning to the target medical groups more efficiently. Otherwise, pharmacists preferred this career due to the salary and other incentives it offers compared to other practice sites, as seen in our study. In addition, pharmacists would have an extended range of professional contacts and connections with physicians and health-care providers, offering them an additional marketing outlet. The 78.7% marketer coverage of pharmacists is higher than global averages (67%) [38], and this could potentially be explained by requiring pharmacist involvement in drug promotion, such as that

of Gulf nations [39]. In addition, pharmacist-led marketing improves prescription accuracy by 19% relative to non-pharmacists [40]. The medical management in Al-Dhalea governorate is a less common practice site than others in our study, which shows that financial motivation is the most common reason for choosing this practice site. In management, the results have shown that the percentage of pharmacy technicians was higher than that of pharmacists. In our study, the results showed that financial motivation was the most common response. However, in reality, the majority of them are investors and capital owners or obtained their positions through favoritism. Due to the lack of medical and pharmaceutical in the country, these individuals exploited these opportunities to become managers in certain medical and pharmaceutical institutions. The concerning management findings showed 72% pharmacy technicians contrast sharply with WHO benchmarks recommending 100% pharmacist leadership in medicine supply chains [41]. In a study conducted in the United Arab Emirates, the data showed 91% pharmacist medical directors [42]. In addition, the current findings regarding the academic field are chosen according to desire. In the academic field, the results have shown that the percentage of pharmacists has been higher than that of pharmacy technicians. This could be attributed to the fact that the academic domain often requires a higher level of expertise, clinical knowledge, and research skills, which are typically acquired through advanced training and education [43].

CONCLUSION

In Al-Dhalea Governorate, the distribution of pharmacists and pharmacy technicians was balanced in number. The primary pharmacy practice sites included community pharmacies, hospital pharmacies, marketing, management, and academic institutions. Among these, community pharmacies were the most prevalent, likely due to high demand for accessible pharmaceutical services, whereas management roles were the least common. Notably, pharmacy technicians outnumbered pharmacists in community pharmacies, hospital pharmacies, and management positions. Conversely, pharmacists were more prevalent than technicians in marketing and academic settings. This distribution suggests differing workforce demands across pharmacy sectors in the region. In addition, the findings of this study emphasize the need for policy-makers and health-care planners to take into account the distribution of pharmacists and pharmacy technicians when planning workforce development and health policies.

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AUTHOR'S CONTRIBUTION

Tareq Maqlam and Abdullah H Maad: Designed the study and developed the methodology. Mohamed Jamal Qasim: Collected data. Abbas Abdulridha Mehihi: Wrote the initial manuscript. Mohammed Ali Ahmed Saeed: Performed statistical analysis and revised the manuscript. Tareq Maqlam: Supervised the project and approved the final version.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest exist.

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