

## STATEMENT

### The Challenges of Pharmacy Education in Yemen

Yaser Mohammed Al-Worafi, PhD

Department of Pharmacy Practice and Clinical Pharmacy, Qassim University, Buraidah, Saudi Arabia

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Pharmacy education in Yemen has faced many challenges since its introduction in the 1980s. Most Yemeni pharmacy schools, especially private ones, are experiencing difficulties in providing the right quality and quantity of clinical educational experiences. Most of these challenges are imbedded in a teaching style and curricula that have failed to respond to the needs of the community and country. The slow shift from traditional drug-dispensing to a patient-centered or focused approach in pharmacy practice requires a fundamental change in the roles and responsibilities of both policymakers and educators. The purpose of this paper is twofold: (1) to discuss the challenges facing the pharmacy education in Yemen; (2) to provide recommendations to overcome challenges.

**Keywords:** pharmacy education, Yemen

## INTRODUCTION

The establishment of pharmacy colleges in Yemen is relatively new. There are 4 public and 12 private colleges of pharmacy, but only the public colleges and 3 of the private colleges are officially recognized. The first public pharmacy faculty (college) was established in 1987 in Sana'a. It was first a department in the Faculty of Medicine and Health Sciences at the University of Sana'a. The first class of students graduated in 1993. It became a separate faculty in 2002. The second public pharmacy college was established in 1995 in Aden. Like the program at Sana'a, it was first a department in the Faculty of Medicine and Health Sciences at the University of Aden, and then became a separate college in June 2009. The third and fourth pharmacy programs were established in 2005 at the University of Thamar and in 2011 at the Hodeidah University with these programs being departments within larger colleges at their respective universities.<sup>1-10</sup>

Sana'a University offers bachelor's and master's degrees in Pharmacology, Pharmaceutics, and Pharmacognosy. Students also can pursue a master's degree or PhD in pharmacology and public health under the supervision of the Faculty of Medicine and Health Sciences. At most of the other pharmacy programs, the highest degree one can obtain is a bachelor's. Of all the programs, only the department at Hodeidah University and one of the private colleges offer a doctor of pharmacy (PharmD) degree. The duration of a bachelor's degree program in all public

and private colleges is 5 years. The program is taught in English, with Arabic language used in a few courses such as Arabic and Islamic subjects.<sup>1-10</sup>

Approximately 500 pharmacy students are admitted yearly to the recognized public and private pharmacy colleges in Yemen.<sup>10</sup> According to a report by the Central Statistical Organization,<sup>11</sup> the number of male students significantly outnumber the number of female students in both public and private pharmacy colleges (70% vs 30%, respectively).<sup>11</sup>

Educational and other specifications or minimum competencies required for admission to pharmacy colleges are often stated in terms of admission requirements. These criteria are highly variable between the public and private sector colleges. Currently, there is intense competition for admission to pharmacy programs due to the limited number of positions in the public colleges. In attempt to select the best candidates, colleges generally follow the selection criteria set by the Acceptance Committee supervised by the Ministry of Higher Education and Scientific Research (MOHESR), which was established in 1990 to oversee the higher education system in Yemen. Students are screened on the basis of their past academic achievement and their performance on the college's acceptance examination. The private colleges set their own acceptance criteria, which include a minimum passing grade on the high school exit examination and ability to pay the yearly tuition fees. Although most public colleges utilize essentially the same Ministry of Higher Education admission criteria, the validity and the outcome evidence indicating the relationship between admission criteria and pharmacy graduate performance in pharmacy practice is not strong or consistent. Furthermore, to increase

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**Corresponding Author:** Yaser Mohammed Al-Worafi, PhD, Head of Pharmacy Practice and Clinical Pharmacy Department, Qassim University, Buraidah, Saudi Arabia. Tel: 00966508183085. E-mail: yworafi@yahoo.com

the educational challenges that already exist in the country, it has not been clearly demonstrated that students currently being selected make the best pharmacists.<sup>2-9</sup>

The colleges of pharmacy at Sana'a University and Aden University employ 30 and 23 faculty members, respectively.<sup>2,12</sup> In addition, there is collaboration with the colleges of medicine, health sciences, and science to help with teaching. Several visiting faculty members also help with teaching. Graduates with high grades are often offered scholarships to pursue higher degrees abroad (usually a master's degree or doctor of philosophy degree). Other pharmacy colleges are suffering from lack of faculty members.<sup>13,14</sup> Many faculty members are not satisfied with their work in Yemen. The migration of academic staff from Yemeni universities, including pharmacy colleges, has been reported by the Ministry of Immigration Affairs.<sup>14</sup> Interviews with faculty members highlighted the following reasons for not staying in Yemen: (1) low salaries, (2) high cost of living, (3) lack of adequate facilities in the colleges of pharmacy, (4) lack of jobs, (5) lack of resources to attend conferences and workshops, (6) lack of research facilities and funds, (7) lack of teaching facilities, (8) lack of electronic and print materials, (9) poor work environment, and (10) attractive work environments outside Yemen (phone/in person interviews conducted over the course May 1-20, 2013).

The pharmacy curriculum in Yemen is outlined in Table 1. Both public and private pharmacy colleges adapted their curriculum from that of the Faculty of Pharmacy, Sana'a University. The pharmacy curriculum was designed to provide students with all the necessary information and knowledge in both basic and pharmaceutical sciences to help them in the practice of pharmacy. Knowledge of the basic sciences, such as chemistry, biology, physics, and mathematics, is required not only for education at the college of pharmacy but also for pharmaceutical research. Patient-centered education is rapidly becoming an essential component of pharmacy education

in developed countries.<sup>15-20</sup> However, undergraduate pharmacy programs in Yemen, as well as in other Arab countries, remain influenced by traditional pharmaceutical sciences with limited application of knowledge to patient care (faculty member phone/in person interviews conducted over the course March 1-15, 2013).

Generally, basic subjects are being taught as the foundational elements necessary for the pharmaceutical, biomedical, and clinical sciences fields according to the Accreditation Council for Pharmacy Education's Accreditation Standards and Guidelines.<sup>21</sup> The curriculum is primarily focused on the biomedical and pharmaceutical sciences in Yemen. There are few clinical and pharmacy practice subjects and an absence of clinical training from the pharmacy curriculum.

Many Yemeni pharmacists are not satisfied with the pharmacy curriculum in Yemen, especially those who graduated from private colleges. The author was able to meet with 10 pharmacy graduates from public colleges and 10 from private colleges, and 9 out of 10 were not satisfied with the quality of the education they received. They highlighted many reasons such as: lack of study facilities, outdated curriculum, lack of clinical pharmacy and pharmacy practice courses, no clinical practice experience provided, and lack of qualified lecturers in the private colleges (in-person interviews conducted over the course February 1-15, 2013).

Teaching methods used by pharmacy colleges in Yemen include traditional lectures, tutorials, seminars, laboratories, and research. Officially, there is no e-learning in the public higher education sector. The students do not typically have computers at their place of study and do not have access to the Internet. Generally, lecturers still use the traditional system of writing on a chalkboard and asking students to take notes or they distribute handouts to the students. The reference texts are generally not available in the college or university libraries. Assessment methods include quizzes, midterm and oral examinations,

Table 1. Pharmacy Curriculum in Yemen

<b>Year</b>	<b>Curriculum</b>
1 <sup>st</sup> year	General Chemistry, General Physics, Physical Chemistry, Biology, English Language, Arabic and Islamic Culture.
2 <sup>nd</sup> year	Pharmaceutics I, Analytical Chemistry I, Physiology, Biostatistics, Psychology, Organic Chemistry I, Anatomy & Histology, Business Administration and Botany.
3 <sup>rd</sup> year	Organic Chemistry II, Analytical Chemistry II, Biochemistry, Microbiology, Pharmaceutics II and Pharmacognosy.
4 <sup>th</sup> year	Phytochemistry, Toxicology, Public Health, Pathology, Pharmaceutics III, Medical Chemistry I and Pharmacology.
5 <sup>th</sup> year	Medical Chemistry II, Industrial Pharmacy, Clinical Pharmacy, Quality Control Of Drugs, Applied Pharmacognosy, Therapeutics, Hospital & Community Pharmacy Practice, First Aid and Graduation Research Project.

small research projects and assignments, and laboratory and final examinations. The examinations are usually in English. The graduation requirements for each student are to receive passing grades in all courses and completion of a research project in the final year. The research project must be in pharmacognosy, pharmacology, medicinal chemistry, pharmaceuticals, or public health. Because of the large number of students and shortage of faculty members, students work together in groups of 10 under the supervision of 1 faculty member to conduct their research project.

There is no quality assurance (QA) system for higher education in Yemen. Colleges of pharmacy get their accreditation from MOHESR, but there has been increasing interest in establishing quality assurance and accreditation systems in higher education since 2001.<sup>22</sup> To that end, through the World Bank-funded Higher Education Learning and Innovation Project (a US\$5 million credit), MOHESR developed the National Strategy for the Development of Higher Education (NSDHE) to improve the quality of education in all university programs. The strategy was approved by the Yemeni government in 2006 following extensive stakeholder consultation. A major step was taken in 2009 with the establishment of the Higher Education Quality Assurance Council (QAC), which opened the way for development of a system for institutional quality assurance at the national level.<sup>22</sup> The project development objective is to create the enabling conditions for the enhancement of the quality of university programs and graduate employability.<sup>22</sup>

Pharmacy graduates can work as community and hospital pharmacists, industry pharmacists, medical representatives, and teaching assistants.<sup>23</sup> However, many Yemeni pharmacists work outside Yemen because of the lack of jobs in Yemen and higher salaries offered in the Kingdom of Saudi Arabia, United Arab Emirates, and other countries.<sup>10,24</sup> Moreover, there are significant challenges in terms of standards for pharmacy education and internship training for newly graduated pharmacists. These challenges include the different standards set by different colleges in the private and public sectors. There are no universal standards that set criteria for education and training related to continuing education after graduation from pharmacy colleges. Compounding the issue is the fact that a licensure examination is not required to practice pharmacy in Yemen. Requiring one would help improve the quality of pharmacy programs.

## **CHALLENGES AND RECOMMENDATIONS OF PHARMACY EDUCATION**

These are all well-publicized problems, in particular the shortage of pharmacy faculty, especially in private colleges, and under-qualified pharmacists in practice.

This results in poor standards and greatly impedes progress into the new era of clinical pharmacy. On a government level, difficulties have been caused by a failure of appropriate planning and monitoring, and confusion caused by curricula. A further problem lies not only in the large number of pharmacists who are not qualified to practice, but also in the lack of continuing education opportunities available to them.

When graduates find jobs, it is extremely difficult to implement any kind of shift toward providing pharmaceutical care services because of outdated attitudes about pharmacy practice in Yemen. Increased awareness about the new roles pharmacist can play in health care is necessary.

Following are some practical recommendations that can strengthen pharmacy education and lead to better outcomes in terms of qualified practicing pharmacists focused on patient-centered care:

- Update the pharmacy curriculum in Yemeni universities to meet the actual needs of current and developing pharmacy practice. Special attention should be given to the integration of objectives, the addition of learning activities, and the assessment of the pharmacist-physician relationship in professional training programs.
- Integrate new teaching methods such as problem-based learning, team-based learning (TBL), case discussion (CD), and simulation-based education.
- Foster collaboration with university teaching hospitals, government hospitals, private hospitals, community and hospital pharmacies, and pharmaceutical industries; establish drug information centers, laboratories for therapeutic drug monitoring (TDM) and total parenteral nutrition (TPN), simulated pharmacy settings (for teaching purposes), continuing professional development, and community services and research.
- Improve and increase collaboration between pharmacy colleges and MOHESR to address the shortage of qualified academic staff members and find solutions to this significant problem.
- Establish a college program accreditation committee that would collaborate with and take advice from the experts of internationally accredited programs such as those in US schools. Each college should create a strategy plan to acquire accreditation.

Precedents have been established in neighboring countries to meet the challenges presented in the first 3 items, which Yemeni colleges of pharmacy could adapt to meet their needs. With regard to updating curriculum, in 2008, the College of Pharmacy at King Saud University in

Saudi Arabia reformed and adopted a new curriculum, taking into consideration the curricula of 10 well-known, top American universities.<sup>25,26</sup> In addition, the college has proposed several agreements of services with the pharmacy departments in hospitals in the region as a means of fostering collaboration with other health care-related institutions in the country.<sup>26</sup>

In terms of current teaching methods, the College of Pharmacy at Qassim University in Saudi Arabia introduced new teaching methods in 2011, such as TBL, CD, and simulation-based education for many courses including pharmacotherapy, pharmacokinetic, pharmacy profession, and pharmacy practice.<sup>27,28</sup> Integration of such teaching methods could benefit pharmacy colleges in Yemen, which suffer from outdated teaching and teacher-centered methods, lack of facilities, inadequate infrastructures, large number of students in the lecture halls, lack of interest and motivation among most students to join in discussion in the lectures, and inadequate training of many faculty members especially in the private colleges.

To address the shortage of qualified academic faculty members at Yemeni pharmacy colleges, MOHESR could help by: (1) providing pharmacy colleges with more teaching scholarships; (2) collaborating with international universities to hire their faculty members as visiting professors; (3) establishing PhD study in all areas of pharmacy at all pharmacy colleges with collaboration from international universities; and (4) recruiting more full-time faculty members from other countries, such as the United States, who have excellent experience of higher standards of education in pharmacy colleges. Other universities in the region are already meeting this challenge as well. For example, the Faculty of Pharmacy at Jordan University invited Strathclyde University lecturers, Fulbright scholars, and DAAD (German Academic Exchange Services) participants. The Faculty of Pharmacy at Kuwait University hired academic staff from America and Europe, and colleges of pharmacy in Saudi Arabia and the United Arab Emirates hired staff from various Arab and non-Arab countries.<sup>29</sup>

Accreditation standards must also be established. MOHESR's National Strategy for the Development of Higher Education is a step in the right direction and, once again, the College of Pharmacy at King Saud University has taken action in this regard. The college implemented a new "program accreditation," established a college committee, and hired international advisors for the accreditation project.<sup>25</sup>

The International Pharmaceutical Federation (FIP, in the UNESCO branch of the World Health Organization) recommends "that in order to support the development of an adequate and appropriate pharmacy workforce and the

academic and institutional infrastructure to deliver the required competency-based education and training, each country should have its own standards-based system for the QA of pharmacy education."<sup>30</sup> The QA system recommended by FIP should: (1) reflect the vision for pharmacy practice and education developed through profession-wide consensus; (2) allow appropriate input from all stakeholders, including students and the public; (3) ensure educational programs are evidence- and competency-based, of high quality, and are meeting the needs of the people and pharmacists in their respective countries; (4) evaluate programmatic outcomes as well as institutional structures and processes; (5) be transparent and be free of inappropriate influences and appearances of conflicts of interest in its development and implementation; (6) promote and foster self-assessment and continuous quality improvement of educational institutions; and (7) be accountable to the appropriate governmental authorities.<sup>30</sup>

Finally, according to FIP, the development of pharmacy education should progress through an action plan that first seeks to "identify local needs, the pharmaceutical services needed to meet these needs, the competences needed to provide these pharmaceutical services and the education required to achieve/ensure these competences."<sup>31</sup> FIP's Pharmacy Education Action Plan is oriented toward identifying locally determined pharmaceutical service needs and then facilitating comprehensive education development and competency achievement to meet those local needs.

## CONCLUSION

Pharmacy education in Yemen faces major challenges. More efforts toward improving pharmacy education are needed, such as updating curricula and teaching methods, collaborating with health care institutions for professional development, working with MOSEHR to increase faculty numbers, seeking input, faculty, and collaboration with international universities for improved quality, and establishing accreditation standards. Job satisfaction among pharmacists and faculty members of pharmacy colleges, as well as factors influencing research in pharmacy colleges are recommended topics for future studies.

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