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The Role of Mentoring Programs for Pharmacy education: A Systematic Review of Observational Studies

Rasha Abdelsalam Elshenawy[1*], Fatma Elzahraa Ahmed Hussein[2], Heba-t-Allah Matar[3], Heba Sayed Yousef[4]
[1]BCPS (AQ-ID), CPHQ, TQM (AUC), SIDP, M.Sc., CEO of FADIC, Tanta University Hospitals, Egypt.
[2]BCPS, M.Sc., CPHQ, Central Administration of Pharmaceutical Affairs, Egypt
[3]BCPS, M.Sc., New Cairo Hospital, Egypt
[4]BCPS, M.Sc., CPHQ, PHS, Prime health group-Mediprime Mizhar, UAE

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***Corresponding author**
Rasha Abdelsalam Elshenawy

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Abstract: Mentorship programs have been established in pharmacy education, both on the undergraduate and graduate levels. These programs are anticipated to improve the learning experience of mentees. The aim of this review was to assess the role and outcome of mentoring on pharmacy education. A systematic search of PubMed/Medline electronic database was conducted from 2000–2017, with relevant keywords (mentor OR mentorship) AND (pharmacy education OR pharmacy practice OR pharmacy training). Studies were screened by two independent reviewers for eligibility and data were extracted. This systematic review focused on the outcomes associated with application of mentorship programs in different educational settings. Our search retrieved 180 unique citations. Eight cross-sectional studies with a total of 662 pharmacy graduates were included. From included participants, there were 36 (5.4%) Masters, 58 (8.75%) pharmacy doctorates, 22 (3.3%) Baccalaureates, 60 (10%) assistant professors, and 20 (3%) PhD. All included studies reported that mentoring programs were successful, effective; and improved research skills, team working; and supported students' confidence. This study demonstrated that mentoring programs are effective, promising, and can be used as an adjunct to enhance student confidence, scientific, and professional efficiency. Outcomes of mentorship can be on organizational level, on mentees' level, and on mentors' level. Thus, applying mentorship in pharmacy educational programs is expected to have significant results. We recommend further follow-up and research for the effectiveness of mentoring programs in all medical fields.

Keywords: Experiential education, Pharmacy, Mentors, Mentorship, Program Development.

INTRODUCTION

The mentoring process or mentorship has been recognized for decades especially in pharmacy areas where the pharmacists must use their knowledge, skills, and experiences in preparing their mentees [1]. The Pharmacy education is continuously developing; this made the participation in mentoring program a requirement for advancement and promotion of effective education of pharmacists [2]. Incorporating mentorship program with the academic study of the faculty was one of the recommendations by both the American Association of Colleges of Pharmacy (AACP) and the Accreditation Council for Pharmaceutical Education (ACPE), which state that schools and colleges of pharmacy should promote student mentoring by faculty throughout the academic curriculum [3].

Definition of mentorship or the mentoring process

Mentorship is defined as leading by role modelling, where a mentor guides a mentee on his road to learning and encourages him. The Institute of Medicine defined a mentor as a faculty advisor, career advisor, and skill consultant [4]. Mentoring is intended for the development of mentees; when a new generation of colleagues need to be trained under a skillful supportive senior in their career to improve their experience and achieve new skills; helping them to achieve success [5]. Mentor-mentee relationship is setup and maintained through the agreement and cooperation of both sides. Effective communication is the key for a strong mentor- mentee relationship [4].

Mentors provide support, challenge, and vision to their mentees through a formal or informal process. Formal mentoring is accomplished when the selection, role, responsibilities and activities of both mentor and mentee are well defined in the curriculum. On the other hand, the process of informal mentoring is not well defined or specified in the program specifications of the

curriculum, and don't require that all faculty members are involved in the process. Informal mentoring develops through a good mentor-mentee relationship and depends on professional respect and friendship between the two sides [6].

Objectives of the process of mentoring

Mentoring has a beneficial role in reducing workload stress, and encouraging long-term growth and success [7]. Mentoring also assists in recruiting junior faculty members by ensuring they have resources for professional growth upon joining the faculty; and help provide them by a continuing, caring community [8]. Moreover, mentoring process plays a significant role in building new leaders as well as new mentors in the pharmacy education. The mentee and mentoring team will develop defined goals consistent with the objectives of the pharmacy education and development. They will discuss their progress toward their goals and their developmental plans [9]. Mentors will involve mentees in seminars and in mock reviews and discuss their opinions with them.

Mentoring can also lead to increased job satisfaction and enhanced quality of life through the development of a professional mentor-mentee relationship [10].

Ultimately, mentoring is a collaborative relationship between mentor and mentee that allows them to learn from one another and create opportunities for self-improvement and so for their institution [11].

History of Mentoring

Classically, pharmacy education involved standard curriculums at pharmacy schools. This classic model is shifting to clinically focused and experience based curriculums. This model may be regarded as a renovation of the old days, centuries ago, when the only way of entering the profession was through apprenticeship (i.e. the young pharmacist or apothecary, worked side by side with a professional master, learning by observing and doing medication related activities) [12].

The mentoring process has been recognized for decades. It is a process whereby a mentor, with vast knowledge and experience, guides the steps of a mentee on his road to learning. Mentorship is increasingly gaining attention in pharmacy education. The growing number of pharmacy schools increases the demand for high quality pharmacy education. Mentoring programs are thought to be one of the means of improving pharmacy education [13, 14].

The mentorship educational model was recommended by the American association of colleges of pharmacy and the accreditation council for pharmacy education, which stated that the schools of pharmacy should promote student mentoring throughout the curriculum [15].

Formal mentorship programs have been designed by various pharmacy schools to match experienced mentors with suitable mentees, while setting standards for regulating their relationship. The aim of these programs is to provide knowledge, support and guidance by experienced mentors to students through their curriculums, in order to foster their career development [13, 14, 16].

Many studies have been carried out to evaluate the role of mentorship in pharmacy education. Previous studies showed that mentorship can improve development and provide students with guidance [17-19].

In a formal mentorship program implemented by WesternU College of pharmacy, over 90% of the mentees reported that their mentors provided support, knowledge and guidance, helping them to become more successful. They also reported that mentors helped them in planning and preparing for their careers through training them in time-management, prioritization, and work-life balance [19].

These findings were consistent with a study that evaluated formal faculty mentoring program at the Massachusetts College of Pharmacy and Health Sciences. Program evaluations were largely positive. Self-perceived abilities of mentees increased in all areas addressed. Perceived abilities of mentors showed also some increases following the faculty mentoring program [17].

The results of these studies indicate that mentorship is a potential, promising method of enhancing pharmacy education, providing better outcomes, and increasing success rates.

METHODS

Data sources and search strategy

After formulating our question for checking the puplished literature about the role of mentoring programs in pharmacy education**,** a systematic search of the Medline/PubMed electronic database was conducted from searching for studies published during the period of 2000 to 2017. The keywords used for searching were (mentor OR mentorship) AND (pharmacy education OR pharmacy practice OR pharmacy training). The search aimed to retrieve articles that address the following: (1) definition and areas of mentorship, (2) outcome of applying mentorship, (3) mentors qualifications, and (4) obstacles facing mentoring programs.

Two independent reviewers performed the search. The search was filtered to exclude non-English

articles, review articles, non-original studies, editorials, and commentaries. Retrieved articles were arranged chronologically.

Selection criteria

Inclusion and exclusion criteria of the retrieved articles are shown in table 1.

Table-1: inclusion and exclusion criteria for the present systematic review

Inclusion Criteria	Exclusion Criteria
-Original research srticles\ -Pharmacy education -Training and education with mentorship. -Follow up from the start till end of training.	-Other health care professionals' education. -Internship, residencies and training or education without mentorship. -No follow up. - Non-English

Data extraction and quality assessment

Our search retrieved 180 unique citations. The two investigators evaluated independently the titles and abstracts of the retrieved articles; which were screened by reviewing first their titles and abstracts to ensure the relevance of articles to the current research and study quality. After this step, the full-text of all apparently relevant articles was thouroughly reviewed to identify those which met all the inclusion and exclusion criteria. If disagreements arose between the investigators as regards the inclusion of articles, the questionable articles were discussed and a united decision was reached. After selecting the included articles, the two investigators critically appraised each article as regards the methods, robustness of results, internal and external validity. After quality assessment, only eight cross-sectional studies were found to be eligible to be included in this systematic review.

RESULTS AND DISCUSSION

In this systematic review, our search retrieved 180 unique citations. Eight cross-sectional studies met the inclusion and exclusion criteria [20-25, 14, 26]. Data collection tools in the selected studies varied from using focus groups [20] as the method of qualitative data collection, or using structured surveys, 21or mixed methods [22, 24, 14, 26, 21, 23, 25]. Table-2 summarizes the eight included studies as regards the country, study design, study duration, sample size, gender, degree pursued, methods, and outcome.

Table 2: studies that were included in the systematic review

Study ID	Study Design	Study Period	Country	Sample Size	Male	Degree currently pursuing	Year in the program	Methods	Outcome
Alsharif 2006 [20]	Cross-sectional (Focus Group)	N/A	USA	48	N/A	PhD (27%), PharmD (48%), MS (17%), and BS Pharm (RPh) (8%)	N/A	A focus group chaired by the associate director of the Web pathway worked on defining the title of the individuals who were to be hired.	The educational mentor program has become an invaluable component of the Web pathway and has enhanced the interactions of students with the content and mentor.
Dalton 2007 [22]	Cross-sectional	N/A	Australia	56	33 (59%)	N/A	1 Year	The educational process was formatively evaluated with a print-based 46-item questionnaire, using a 5 point Likert scale.	The outcomes of the project have been highly successful in all sites where the program trailed.
George 2007 [23]	Cross-sectional	N/A	UK	330	166 (50.3%)	N/A	N/A	Using information gathered from 2	Mentoring programs provided an

								focus groups with supplementary prescribing pharmacists (n = 5 and 7) and one-to-one telephone interviews with DMPs (n = 13), conducted by the research team	opportunity for professional development and team working for many pharmacists and DMPs.
Cho 2011 [21]	Analytical Study	1 year	USA	29	20 (70%)	Professor (40%), Associate Professor (15%), Assistant Professor (30%), and other (15%).	1 year	Analysis of 53 Recommendation letters in support of the top 10 nominees in 2008.	Have positive finding and guide academic leaders on how to train and evaluate mentors.
Kiersma 2012 [25]	Cross-sectional	1 year	USA	21	9 (42.9%)	Masters 3 (14.3%) PhD 18(85.7%)	<1year= 5 (23.8%) 1-4 years=12 (57.2%) ≥ 5 years=4 (19.0%)	Mentors completed a pre- and post-assessment of their perceptions about themselves as mentors and their confidence in mentoring.	A graduate student mentoring program may help improve students' perceptions of research and graduate students' confidence in mentoring.
Metzger 2013 [14]	Cross-sectional	4 Weeks	USA	61	N/A	N/A	N/A	The AACP Pharmacy Practice Section Faculty Development Committee created the 13-item survey instrument, which was sent electronically to 129 faculty members identified as department chairs or division heads of pharmacy practice departments at US colleges or schools of pharmacy. Data were collected in spring 2011.	Mentoring programs lead to increased productivity and job satisfaction for both junior and senior academicians.

Jackeviciu s 2014 [24]	Cross-sectional	N/A	USA	51	44 (85.7%)	assistant professors	4 Years	The voluntary program was implemented after mentors received training, and mentors and protégés were matched and received an orientation. Evaluation consisted of conducting annual surveys and focus groups with mentors and protégés.	-no significant improvemen ts in the protégés number of grant submissions, retention rates, or success in promotion. - A formal mentorship program was successful as measured by self-reported assessments of mentors and protégés.
Wilbur 2015 [26]	cross-sectional	N/A	Qatar	66	43 (65.15%)	Baccalaureat e 22 (33.3%) Masters 25 (37.87) PhD 2 (3%) PharmD 17 (26.7%)	3 years	The final questionnaire [20] was ultimately comprised of 33 items (2 items added in years subsequent to 2011) encompassing respondent demographics, as well as broad domains assessing perceived quality and quantity of faculty support during site visits and subject preferences for and satisfaction with faculty liaison participation in internship activities.	Mentoring programs provided a valuable opportunity to interact and support preceptors and students during advanced pharmacy internships in a nascent PharmD program. .

N/A: not available

The included studies were reported from various countries including USA [20, 21, 24, 25, 14] Australia, UK, and Qatar [22, 23, 26]. In the terms of gender, there were 315 (47.58%) males. Of the included participants, there were 36 (5.4%) Masters, 58 (8.75%) pharm doctorates (Pharm D), 22 (3.3%) Baccalaureate, 60 (10%) Assistant Professor, and 20 (3%) PhD (Figure-1).

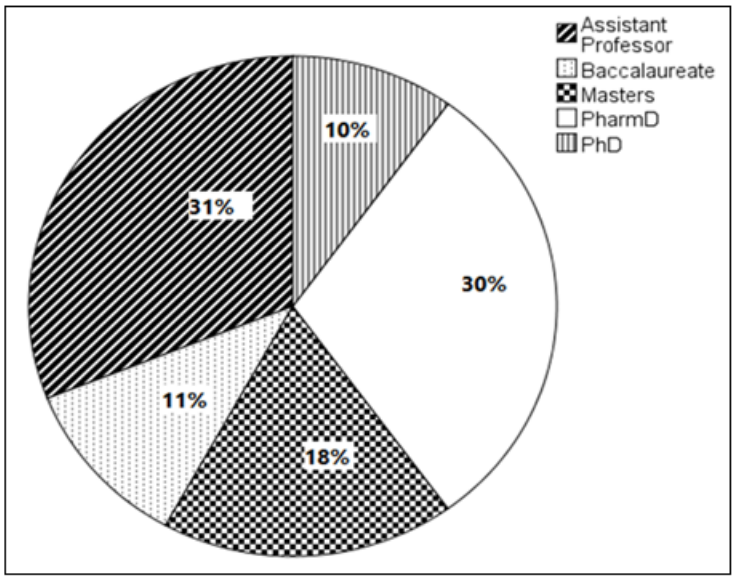

Fig-1: Qualifications of the participants in the included studies

We have found that partcipants included in those studies can be categorized into 3 major strata: 1) pharmacy doctorate candidates; 2) student pharmacists who served as mentors to pre-pharmacy protégés; and 3) junior faculty members who participated in scholarship-intensive mentoring programs [24].

Models of formal mentoring programs and relationships tend to utilize the input-process-outcome frameworks. These models share many common structural features (mentor, mentees, relationship, program characteristics, and organizational culture), process characteristics (meeting frequency and mentoring functions), and outcomes (mentees, mentor, and organizational culture).

The outcome was generally in favor of the mentorship process. All included studies reported that mentoring programs were successful, effective; and improved research, leadership, and communication skills; enhanced team working; and supported the students' confidence [20-25, 14, 26]. We found that mentoring programs have provided a valuable opportunity for professional development, interaction, and support of pharmacy students during advanced pharmacy internships. This is accomplished by mentors who provide their mentees with teaching, sponsoring, encouraging, counseling, and friendship. Also, they provided guidance on time management, prioritization, and work-life balance.

One of the impressive outcomes was the increased productivity and job satisfaction for both junior and senior academicians and the improvement in both the students' perceptions of research and confidence in mentoring. Also, for online education, the educational mentor through the Web pathway has enhanced the interactions of students with the content and offered positive finding [20].

As regards the reported effect of the different mentorship programs (assessed by pre and post assessments), mentorship could foster behavioral, attitudinal, health-related, relational, motivational, and career outcomes for both mentors and mentees [25]. Also, qualitative analysis indicated that the mentees' perceptions of research improved and that the mentors believed their mentoring skills improved [25]. Both mentors and mentees reported that the mentees most needed guidance on time management, prioritization, and work-life balance [24]

In addition, direct experiences help in developing the organization's board of knowledge leading to improving its learning goals as well as increased rates of students satisfaction (through greater involvement, goal attainment, and meeting their students' expectations). In general, mentorship was found to be helpful in enhancing the interactions of students with the content and the mentor; led to increased productivity and job satisfaction for both junior and senior academicians; and provided an opportunity for professional development and team working. Although institutions may use different methods of evaluating the success of their program, the development of an effective mentoring program at any institution is a core component of enhancing its culture of teaching and scholarship, and ensuring the success of its academicians specially with the growing number of new colleges and schools of pharmacy.

Mentoring programs designed to develop academicians are integral to helping new faculty members cope with the challenges of balancing

personal, teaching, practice, research, and service responsibilities while developing skills.

The outcomes of applying mentorship programs in pharmacy education were related to the students, the mentors, and the organization.

On students' level

Some students thought that successful mentorship programs gave them enough passion and fulfillment with having a career in pharmacy. They reported increased satisfaction with the study through expectation, confirmation, goal attainment and equitable exchange. Students described their mentors as "role model," "very concerned," "highly professional," and "very helpful" [20]. It was found that students regard their mentors as role models, both from professional and personal perspectives.

Moreover, mentorship helped them to change beliefs, behaviors, and attitude; as well as to form professional network and identify collaborators. Participants thought that they could use their mentoring experiences during job or residency interviews. In addition, participants felt that the mentors provided a big picture perspective of scholarship, teaching, and service; outlined strategies for applying for grant funding; and offered insights into handling the stresses of an academic career. Also, the mentorship process prepared the students to eventually be in the mentor position someday. Mentoring programs provided an opportunity for professional development and team working for many pharmacists as they help to interact and support preceptors and students during advanced pharmacy. All students who participated in mentor programs showed significant progress in both academic and clinical fields as well as increased productivity and job satisfaction for both junior and senior academicians. Also, graduate student mentoring program was found to help improve students' perceptions of research [25].

On mentors' level

Mentorship was reported to increase mentors' professional networks, override generation gaps, and build a growing lifelong learning relationship - which is the best outcome for both mentors and mentee. There was a positive finding that mentorship programs guide academic leaders on how to train and evaluate mentors. The mentor should be a confidant of the mentee, allowing the mentee to honestly express positive and negative feelings and helping the mentee learn to express his/her thoughts and opinions, and deal with disappointments. The mentor should listen and offer advice, but always encourage and support the younger mentee. Mentors should possess admirable personal and professional characteristics and abilities that guided mentees to start careers, commit time, and demonstrate balance in both their personal and professional lives [27, 28].

On the organizational level

The organizations which applied formal mentorship programs found that many of their students were willing to give back to a college, not necessarily monetarily, one might think about taking an adjunct faculty position or something like that [29]. Increased rates of students' satisfactions were obtained through greater involvement, goal attainment, and meeting their students' expectations. In addition, direct experiences help in developing the organization's hoard of knowledge leading to improvements in the organizational learning goals [30].

As regards the obstacles that faced the implementation of mentorship programs, there were concerns - particularly - among first semester students towards the mentor program. These concerns resulted mainly from some defect of communications between instructors and mentors and unclear explanation of the mentor responsibilities; however, subsequent semesters showed improvements [20, 23]. Other reported obstacles or barriers were time limitations; besides lack of resources, external pressures such as budget cuts, as well as organizational issues that negatively affect the process of getting mentoring program started [23, 25].

Potential solutions to the obstacles involve strategies such as rewarding mentors through formal recognition programs as well as restructuring the annual evaluation, promotion, and tenure process.

CONCLUSIONS

This study demonstrated that mentoring programs are effective, promising, and can be used as an adjunct to enhance student confidence, scientific, and professional efficiency. Outcomes of mentorship can be either on organizational level, on mentees' level, and on mentor's level.

Thus, applying mentorship in pharmacy educational programs - such as pharmacotherapy education - will be expected to have significant results. Moreover, we recommend further follow-up and research for the effectiveness of mentoring programs in all medical fields. Future work should include larger evaluations of mentees' expectations and experiences using these frameworks as a guide. Additional qualitative work could clarify mentor and administrator experiences with formal mentoring.

Conflicts of interest: None

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