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Pharmacists as Inter professional Collaborators and Leaders through Clinical Pathways

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Abstract: Pharmacists possess essential expertise and understanding when it comes to compound pharmaceuticals (CPs). We provide the pharmacists' point of view on the importance of interdisciplinary teams working together to develop and execute CPs at a tertiary care facility. We helped build CPs since we were important members of interdisciplinary healthcare teams. We studied literature for six months in a weekly team meeting, checking it against hospital formulary and institutional rules to make sure it was up to par. By modifying a number of tools and resources, we were able to standardize treatment according to prescription standards and implement time-bound order sets. For our Computerized Prescriber Order Entry (CPOE) sets, which result in admittance to medical wards, we created and integrated fifteen CPs. Tools and services included (1) reporting of creatinine clearance to guide optimum dosing; (2) advisory flags for dosing and infusion rates; (3) piloting of medication reconciliation and counseling services before discharge were initiated; (4) Arabic drug leaflets were designed to educate patients; and (5) five CPs were included in pragmatic randomized control trials with a clinical pharmacist as co-investigator. Clinical pharmacists acted as guides and mentors to many different types of medical professionals throughout the process. Clinical pharmacists may exemplify interprofessional leadership by collaborating with multidisciplinary teams to create and evaluate patient-centered pharmaceutical services.

Keywords: clinical pathways; pharmacists; clinical pharmacists; interprofessional collaboration; integrated care and patient-centered outcomes

1. Introduction

Clinical pathways (CPs) are best developed and implemented with the help of pharmacists due to their wealth of pharmacological knowledge and other important abilities [1,2]. Case plans (CPs) are defined as time-bound plans for patient care that aim to improve the quality of treatment patients obtain while simultaneously making the most effective use of the resources available to the institution. This sets them apart from suggestions [3,4] and makes them more efficient [5,6].

The use of CPs in healthcare institutions was a direct outcome of a shift in healthcare philosophy away from quantitative measures and toward treatment quality and patient-centered methods [7]. In addition, a multidisciplinary team of healthcare professionals must work together to develop evidence-based patient-oriented pathways for high-volume, high-risk, or high-cost disorders in order to implement CP design [5,8].

Although CPs improved staff documentation and reduced in-hospital difficulties, there was no advantage in terms of length of stay (LOS) according to a meta-analysis of 27 studies with 11,398 individuals [9]. In 12 out of 16 trials, CPs considerably decreased duration of stay, according to an additional study. In four out of six trials, CPs reduced spending, and the weighted mean difference between CPs and the gold standard was -2.5 days [10]. However, the majority of CPs that were studied happened during surgery, reported LOS varied greatly, and the effectiveness of CPs was remained uncertain [10]. The goal of the medical department at our school was to develop CPs and see whether they might improve the treatment and patient flow for a wide range of medical conditions. Journal of Clinical Investigation (JCI) has granted us accreditation.

As opportunities to provide complete pharmaceutical care, the American College of Clinical Pharmacists (ACCP) urges pharmacists to embrace CPs [11]. As a further resource, the American Society of Health-System Pharmacists (ASHP) [12] details the responsibilities of pharmacists in the development, implementation, and assessment of CP. Also, the ACCP and the ASHP have acknowledged CPs as tools that pharmacists can use to design and implement cost-effective patient care plans, integrate pharmaceutical services with organizational culture, and spearhead the development and implementation of these plans [12,13].

Little is known about CPs or the role of pharmacists in their creation and implementation in literature that takes a practice-based approach. Our objective is to disseminate the knowledge we have gained about CPs as a model of multidisciplinary collaboration for improved patient-centered outcomes throughout their development, implementation, and assessment.

2. Materials and Methods

Development of Pathway Team and Pharmacy Team

The Department of Medicine at King Abdulaziz Medical City, Jeddah, Saudi Arabia invited various healthcare professionals in 2011 to formulate a team composed of physicians, nurses, pharmacists, quality specialists, dietitians, social workers, discharge planning, primary health care physicians, and patient educators. The objective of the interprofessional collaborative team was to provide a holistic approach in designing evidence-based and patient-centered pathways. CPs were defined as time-bound plans to deliver patient care from the admission till the discharge day by all healthcare professionals for specific medical diagnoses.

In response to the invitation, Pharmaceutical Care Department designated a team of pharmacists to provide strategic planning for the participation of the pharmacy and collaboration with the pathway team. The pharmacy team included internal medicine clinical pharmacists who are Board Certified Pharmacotherapy Specialists, inpatient, IV admixture team, and clinical pharmacy supervisors. Additionally, a clinical pharmacist was assigned as a pharmacy coordinator to harmonize the perspectives of the pharmacy team in synchrony with the vision of the pathway team.

Perspectives of the Pharmacy Team

The pharmacy team set up the following goals and perspectives of pharmaceutical care services as detailed in Table 1.

Table 1. Goals and Perspectives of the Pharmacy team.

1.	Collaborate with multidisciplinary pathway team to provide evidence-based, patient-centered therapeutic regimens in the form of order sets within clinical pathways (CPs) to achieve the goals of the Department of Medicine and the institution.
2.	Align CPs with formulary decisions by the Pharmacy and Therapeutics Committee: use of formulary medications, facilitate the adherence to the approved restricted medications, integrate institutional drug use policies and JCI measures to maximize patient safety and seek for optimum use of therapeutic regimens through CPs.
3.	Pilot pharmaceutical services such as medication reconciliation within 24 h of admission, patient counseling before discharge and documentation of therapeutic interventions by pharmacists.
4.	Design effective tools to implement these perspectives such as the integration of order sets into CPOE to optimize the use of standardized cost-effective and safe therapeutic regimens.
5.	Communicate with healthcare professionals effectively to enhance the implementation of these tools.
6.	Identify opportunities within the pathway team to optimize the cost-effective use of medications.
7.	Provide continuous education to pharmacy staff in CPs and other healthcare professionals on the strategies for employing CPs.
8.	Sustain a consistent performance for pharmaceutical activities and services in collaboration with pathway team.

A summary of our interprofessional collaboration based on ACCP and ASHP standards for the roles of pharmacists in the designing and the application of CPs [12–14] is demonstrated in Figure 1.

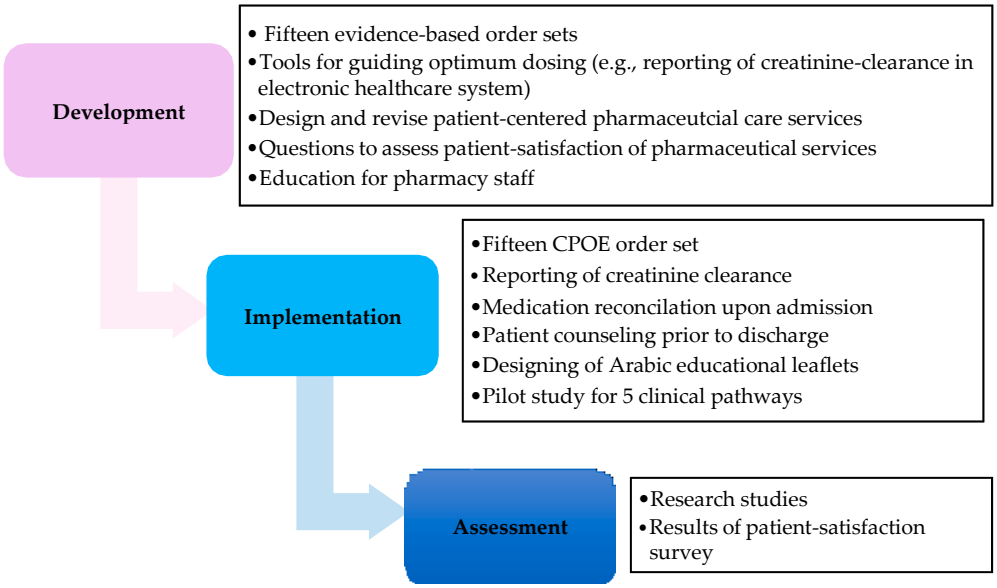

Figure 1. Layout of the roles of pharmacists as interprofessional collaborators in CPs.

The Development Phase

Order Sets

The pathway team targeted the fifteen most frequent admitting diagnoses in medical wards for designing CPs. The development phase was carried out over a period of 6 months. The coordinating clinical pharmacist conducted an evidence-based literature review, designed order sets for each medical diagnosis, and participated in discussions and appraisal of evidence with members of the pathway team and specialty physicians on a regular weekly basis. Furthermore, order sets for each CP were reviewed by the pharmacy team for feasibility of implementation and suggested changes were communicated back to pathway team through the coordinating clinical pharmacist. The order sets included cost-effective therapeutic plans on a daily basis during the hospital stay for each medicaldiagnosis, and were designed to comply with safety measures for prescribing according to the Instituteof Safe Medication Practice for standard order sets [15].

Patient-Centered Pharmaceutical Care Services

We aimed to conduct medication reconciliation by pharmacists in collaboration with physicians based on Best Possible Medication History (BPMH) [16], to optimize patient safety upon transition of care [17]. Additionally, we redesigned our counseling team to provide patient counseling based on Indian Health Services counseling technique [18], and ASHP standards [19]. Furthermore, we designed educational leaflets in the Arabic language to enhance the education of patients during counseling before discharge. Subsequently, we trained our pharmacy staff working in the inpatient and to take-home medications using role-playing sessions to standardize their performance and provide consistent practical experience for patient-centered services. Both services of medication reconciliation and counseling were carried out during working days only, and involved designated pharmacy personnel.

Tools

We coordinated the integration of the reporting of creatinine clearance in the electronic healthcare system after several meetings with Nephrology team as the major stakeholders and informatics technology. We aimed to facilitate the assessment of kidney function to guide optimum drug dosing for renal patients along with order sets, which served as a clinical decision support system for healthcare providers [20,21]. In addition, we incorporated advisory flags in the order sets for maximum infusion rates and dosing for medications based on the therapeutic indications and special clinical situations for each CPs. Furthermore, we activated the documentation of the therapeutic interventions by

pharmacists in the electronic medical records. Finally, detailed information based on the interview during counseling and medication reconciliation was documented to improve the communication process between pharmacists and other healthcare professionals, thus facilitating holistic patient care.

Research Opportunities

The Department of Medicine aimed to conduct a study to assess the effectiveness of CPs through a Collaborative Healthcare Approach in Monitoring Patient-centered outcomes through Pathways (CHAMP-Path) studies. These are pragmatic, randomized, single-blinded studies comparing five CPs vs usual care to reduce the length of stay and improve patient-centered outcomes. Clinical pharmacists with research certification were invited to participate in the study as leading co-investigators to revise and submit the proposal of the study to the Institutional Review Board (IRB) for approval. Details for the method of the CHAMP-Path study have been reported [22]. The pharmacy was responsible for allocation of the study participants. Additionally, the study included a survey to assess the level of patient satisfaction with the services provided by all healthcare professionals. We designed five questions as a part of the survey to assess the perceptions of patients towards pharmaceutical care services, which are included in Table 2.

Table 2. Questions related to pharmaceutical care services in the pilot phase of CHAMP-Pathpatient-satisfaction survey.

Pharmaceutical Care (الرعاية الصيدلانية)	**Responses**				
1 Did the Pharmacist review your home medication within 24 h of admission? هل راجع الصيدلي أدويتك الخاصة بك التى تتناولها بالمنزل خلال 24 ساعة من تنويمك؟	Yes (نعم) □			No (لا) □	
2 Did you receive counseling by the Pharmacist on your medications before discharge? هل حصلت على معلومات خاصة بادويتك من الصيدلي قبل خروجك من المستشفى؟	Yes (نعم) □			No (لا) □	
	 Excellent ممتا ز	 Very Good جيد جدا	 Good جيد	 Poor ضعيف	 Unsatisfactory غير مقبول
3 How would you describe the process of reviewing your home medication with the Pharmacist upon admission? كيف تصف طريقة مراجعة أدويتك الخاصة مع الصيدلي عند التنويم؟	□	□	□	□	□
4 How would you best describe your level of understanding about your medications based on the educational information you received from your pharmacist before discharge? كيف تصف مستوى فهمك للأدوية الخاصة بك حسب التعليمات التي تلقيتها من الصيدلي قبل خروجك من المستشفى؟	□	□	□	□	□
5 How would you best describe the overall performance of the pharmaceutical services provided during your stay in hospital? كيف تصف الأداء العام للخدمات الصيدلانية المقدمة خلال إقامتك في المستشفى؟	□	□	□	□	□

Statistical Analyses

Survey responses were presented as proportions and 95% Confidence interval. STATA 2014 (StataCorp LLC, College Station, TX, USA) was used for statistical analysis.

Ethics

The CHAMP-Path study received IRB approval by King Abdullah International Medical Research Center ((RC 10/134/J) in October 2011. Informed consents were obtained for eligible participants.

3. Results

Implementation

Order Sets

Fifteen (100%) CPs were developed in collaboration with the pathway team, including acute kidney injury, venous thromboembolism, community-acquired pneumonia, asthma, adult left ventricular heart failure, chronic kidney injury, upper gastro-intestinal bleeding, ischemic stroke, hepatic encephalopathy, generalized seizures, palliative care, acute coronary syndrome, meningitis, diabetic ketoacidosis, and hyperosmolar hyperglycemia.

The order sets of the therapeutic regimens for all 15 CPs were integrated into CPOE over a period of three months through collaboration with pathway team and information technology department. Subsequently, CPOE order sets were reviewed by the clinical pharmacist coordinator and the chair of pathway team to ascertain the accuracy and validity for use in direct patient care. Figure 2 is a screenshot of day one for an electronic CPOE order sets for venous thromboembolism.

A pilot study of five clinical pathways started for 6 months in March 2012. We worked with physicians on updating the therapeutic components of CPs during the implementation period based on recent guidelines or new studies. Additionally, we maintained effective communication strategies with CPs team, which facilitated the integration of these therapeutic updates into CPOE order sets promptly.

Patient-Centered Pharmaceutical Care Services

Medication reconciliation by the pharmacist within 24 h of admission started as a pilot phase. The pharmacists provided education for patients and utilized educational leaflets to improve patient's knowledge about their medications. Pharmacists communicated with the physicians for possible necessary changes upon order verification, and documented their therapeutic interventions during the patient interview in the electronic healthcare system.

Tools

Creatinine clearance estimation was reported in the electronic system as well as all cautionary and advisory flags developed in the order sets.

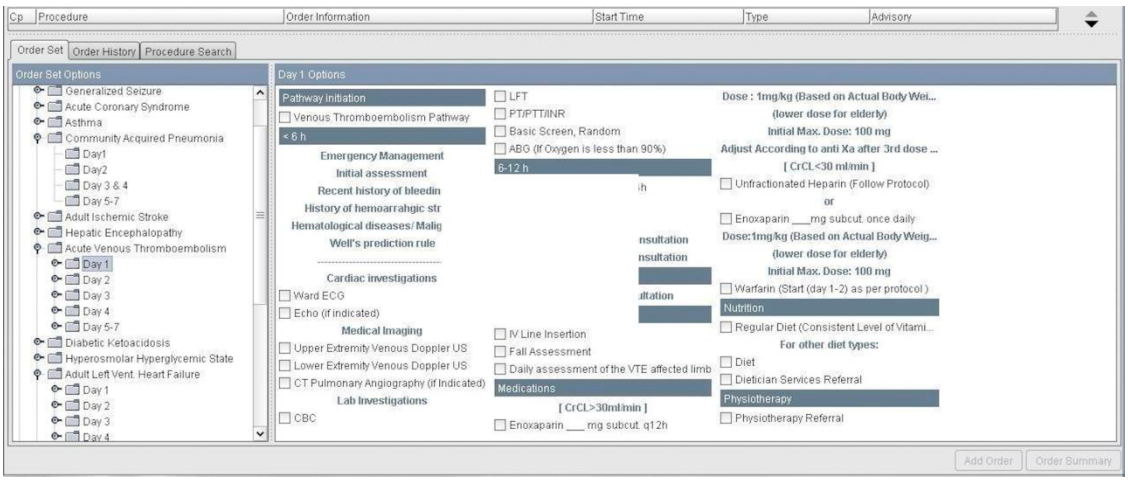

Figure 2. An example of Computerized Order Prescriber Entry of day one for venous thromboembolism pathway.

Research

The coordinating clinical pharmacist worked with the research team as a co-investigator. The study received IRB approval, and five out of fifteen (33%) of CPs were studied in CHAMP-Path study. The five CPs were acute kidney injury, venous thromboembolism, asthma, community acquired pneumonia, and heart failure. Emergency Pharmacy was responsible for the allocation of study participants as per the randomization scheme. Preliminary findings of unpublished data demonstrated that heart failure and venous thromboembolism showed a significant reduction in primary outcome of LOS and further data analysis for the findings of the studies is ongoing.

Assessment

Pilot Study for Validation of Patient-Satisfaction Survey

A pilot study of 20 participants was conducted to assess the validity of CHAMP-Path patient-satisfaction survey. Almost one-quarter of respondents, 26.7% (4/15), asked for clarifications about receiving counseling before discharge, 20% (3/15) had some questions regarding the overall performance of pharmaceutical services, and only 13.3% (2/15) inquiredabout the question pertaining to their understanding of information during the counseling process.

The Cronbach's alpha for internal consistency was 0.39 for pharmaceutical care questions, which were attributed to long questions, word phrasing, and to the fact that medication reconciliation services by pharmacists were not activated at the pilot phase. Subsequently, the survey questions and responses for pharmaceutical services were revised, and the final survey questions for pharmaceutical services are presented in Table 3.

Table 3. Questions related to pharmaceutical care services in the CHAMP-Path patient satisfaction survey.

	Pharmaceutical Care						**الرعاية الصيدلانية**	
1	Did the Pharmacist review your home medications?	Yes No	□ □		نعم لا		هل راجع الصيدلي أدويتك التي تتناولها بالمنزل؟	١-
		 جيد جدا Very Good	 جيدا Good	 محايد Neutral	 ضعيف Poor	 ضعيف جدا Very Poor		
2	How would you rate the process of reviewing your home medication with the Pharmacist upon admission?	□	□	□	□	□ □	ما هو تقييمك لطريقه مراجعة أدويتك مع الصيدلي عند دخولك في المستشفى؟	٢-
		Did not Review				لم يراجع أدويتي		
3	Has the pharmacist counseled you on the medications, which you will be taking home with you?	Yes No Not Applicable (Discharged after-hours)	□ □ □		نعم لا لا ينطبق		هل نصحك الصيدلي عن الأدوية التي ستأخذ معك إلى المنزل؟	٣-
		 فهمت تماما Completely understood	 فهمت كثيرا Understood a lot	 فهمت نوعا ما Understood somewhat	 فهمت قليلا Understood a little	 لم أفهم Did not understand		٤-
4	How would you rate your level of understanding about your medications based on the educational information you received from your pharmacist before discharge?	□	□	□	□	□	ما هو تقييمك لمستوى فهمك للأدوية الخاصة بك حسب التعليمات التي تلقيتها من الصيدلي قبل خروجك من المستشفى؟	٥-
		No Information		□		لم أتلق أي معلومات		
		 جيد جيد جدا Very Good	 جيد ا Good	 محايد Neutral	 ضعيف Poor	 ضعيف جدا Very Poor		
5	How would you rate the overall performance of the pharmaceutical services provided during your stay in hospital?	□	□	□	□	□	ما هو تقييمك عموما للخدمات الصيدلية المقدمة خلال إقامتك في المستشفى؟	٦-

Patient-Satisfaction Survey

We had 338 patients who were enrolled in the CHAMP-Path study from 2012 to 2016, of which 182 (53.85%) completed the patient-satisfaction survey. Some patients had missing responses for the questions related to pharmaceutical services. The results of the patient-satisfaction survey related to pharmaceutical services are presented in Table 4.

Table 4. Results of CHAMP-Path patient-satisfaction survey related to pharmaceutical care services.

	Questions	Responses	Proportions n/N (%)	95% Confidence Intervals
Medication Reconciliation upon admission				
1	Received medication reconciliation by pharmacist	Yes	119/166 (71.7)	64.8–78.6
2	Evaluation of Medication reconciliation by pharmacist	Did not review	49/159 (30.8)	23.6–38.0
		Poor [a]	20/159 (12.6)	7.4–17.8
		Good [b]	90/159 (56.6)	48.9–64.3
Patient counseling before discharge				
3	Received counseling by pharmacist	Yes	102/147 (69.4)	62.0–76.8
		Not applicable [c]	28/147 (19.0)	12.7–25.3
4	Level of understanding about medications based on counseling by pharmacist	No information provided	14/145 (9.7)	4.9–14.5
		Poor understanding [d]	5/145 (3.4)	0.5–6.3
		Good understanding [e]	126/145 (86.9)	81.4–92.4
Overall performance of Pharmaceutical Services				
5	Evaluation of overall performance of the pharmaceutical services provided	Poor [a]	38/144 (26.4)	19.2–33.6
		Good [b]	106/144 (73.6)	66.4–80.8

[a] Poor: Poor is a collapsed category of very poor, poor and neutral; [b] Good: good is a collapsed category of good and very good; [c] Not applicable was due to discharge during the weekend or patient discharge after working hours for counseling pharmacist; [d] Poor understanding: is a collapsed category of did not understand and understood a little; [e] Good understanding: is a collapsed category of somewhat understand, understood a lot and understood completely.

Continuous Education

Clinical pharmacy coordinator presented regular orientation sessions for pharmacy staff on their roles and duties during the implementation process of CPs. Furthermore, we actively participated in the pathway workshops to enhance the awareness of various healthcare professionals on the process of pathway development and strategies for integration into CPs. Additionally, the clinical pharmacy coordinator collaborated with pathway team to provide regular annual orientations to the medical residents on the use of CPOE order sets and the study-related logistics, such as screening and enrollment.

4. Discussion

We have been fortunate to have several chances to provide patient-centered pharmacist care via multiple treatments thanks to our interprofessional cooperation with the multidisciplinary team of healthcare professionals. We made an effort to adhere to the criteria set forth by ACCP, ASHP, ISMP, and worldwide guidelines on the pharmacist's involvement in developing CPs due to the lack of a defined practice model. An important step toward medication adherence and lowering hospital readmission rates, the patient satisfaction survey found that counseling sessions helped 86.9% of respondents have a more positive view of their prescriptions. Patient counseling improved interprofessional cooperation, decreased mortality, and morbidity, according to a systematic study [24]. Despite the fact that 71.7% of those who participated in our poll did get medication reconciliation, only 56.6% thought it was excellent or very good. We need to make some changes to our configuration because of the poor satisfaction rate. Nonetheless, more than half of the medical staff participated in a 2012–2013 research at our institution that compared pharmacists to physicians in terms of medication reconciliation.

The amount of medication discrepancies found by pharmacists and doctors differed significantly across patients [25]. Based on these results, we need to reevaluate how well pharmacists in our context are able to provide medication reconciliation services, which have shown to improve patient care and pharmaceutical safety [26].

There were a number of restrictions and difficulties with our collaboration experience: (1) We were only able to evaluate the efficacy of five of the fifteen CPs we developed; this was because we ran into problems with randomizing doctors into teams for different subspecialties in our pragmatic randomized-controlled trial. (2) Because of technical issues and the pragmatic design, which allows doctors to go off the CPs when treating individual patients, we couldn't keep tabs on how often patients took their medications as prescribed. (3) Because of staffing shortages, we experienced periods of inconsistent pharmaceutical care services, including medication counseling and reconciliation, over the weekends and holidays. This disrupted continuity of care and reduced the impact of these services on patient-centered care. Additionally, because of technological difficulties in accessing these therapeutic interventions for auditing reasons, we were unable to evaluate the impact of pharmacists' therapeutic interventions on patient care.

Our experience in developing and implementing CPs has shown numerous merits. One is that it offers a unique paradigm for pragmatic interprofessional cooperation with different interdisciplinary teams that strive to enhance patient-centered results. In order to equip the next generation of healthcare professionals with the skills and abilities they'll need, the Institute of Medicine has supported interprofessional cooperation as an essential component of medical education [29]. Second, CPs made it easier to include pharmacists in clinical trials, develop several patient-centered pharmaceutical care services, and conduct pilot programs. In addition, it sent important information about improvement areas and showed that pharmacists are willing to adapt to changes in order to reach the institution's strategic objectives. Third, it provided clinical pharmacists with chances to take the lead in developing safe and cost-effective prescription regimens, which is an important role for them in the organization's therapeutics [7]. Research on clinical pathways in the future could include more forms of interprofessional cooperation between pharmaceutical services and pharmacists in order to enhance patient outcomes.

5. Conclusions

Clinical routes provide one-of-a-kind chances for pharmacists to work with interdisciplinary teams, showcase their interprofessional leadership abilities, and build and assess patient-centered pharmaceutical services.

References

1. 1. According to the study by Saseen et al., citation: 1. McBane et al. 2. Sackey et al. 3. Sanoski et al. 4. Simonyan et al. 5. Burke et al. 6. Cohen et al. 7. McBane et al. 8. Clinical pharmacy competences recognized by the American College of Clinical Pharmacists (2022). Paper published in 2017 in the journal Pharmacotherapy, volume 37, pages 630-636. "CrossRef" phrase Source: PubMed
2. Second, the American Society of Health-System Pharmacists. 1. The American Society of Health-System Pharmacists has adopted standards for the administration of pharmaceuticals. American Journal of Health System Pharmacy, 1996, 53, 1713-1716.
3. Separation of key routes from alternative health care management methods (Jaggers, L.D., 2003). "American Journal of Health" Organon. Pharmaceutica, 1996, 53, 311-313. Source: PubMed
4. 4. Petitta, A. Clinical pathways and treatment recommendations for evaluating the value of health-systemwide services provided by pharmacists. The article was published in the journal Pharmacotherapy in 2000 and ran from page 327 to 332. "CrossRef" phrase Source: PubMed
5. 5. Campbell, Hotchkiss, Bradshaw, and Porteous was authored by. Integrated care routes. 316, 133–137, BMJ 1998.
6. "CrossRef" phrase Source: PubMed
7. 6. EPA has been recognized. Healthcare Routes. It may be found online at http://e-p-a.Org/care-pathways; the date of availability is May 14, 2016.
8. 7. A primer on clinical pathways by Hipp, Abel, and Weber, R.J. Public Health Pharmacy 2016, 51, 414–420. "CrossRef" phrase

9. Source: PubMed

10. This sentence is a citation for a work by Kinsman, Rotter, James, Snow, and Willis. Clinical pathways are what? Creation of a definition to guide discussion. Medical Letters, 2010, 8, 31. References: [CrossRef] [PubMed]}

11. 9. Rootter et al., T., Kinsman L., James E., Machotta A., Willis J., Snow P., and Kugler J. Professional practice, patient outcomes, hospital expenditures, and length of stay as a result of therapeutic pathways: a meta-analysis and systematic review conducted by the Cochrane Collaboration. Review of Medical Practice, 2012, 35, 3-27. References: [CrossRef] [PubMed]}

12. A group of researchers including Rotter, Koch, Kugler, Gothe, Twork, van Oostrum, and Steyerberg have published a paper. Investigating the impact of clinical pathways on patient outcomes, hospital expenditures, and duration of stay via a comprehensive review and meta-analysis. 8 and 265, BMC Health Service Research, 2008. "CrossRef" phrase Source: PubMed

13. The moment has come for pharmacist engagement in critical routes, according to Kirk, Michael, Markowsky, Restino, and Zarowitz (2011). American college of clinical pharmacy. Paper published in the journal Pharmacotherapy in 1996, volume 16, pages 723–733. Source: PubMed

14. American Society of Health-System Pharmacists, 12th edition. Critical route formulation, implementation, and evaluation according to ASHP standards for pharmacists. American Journal of Health Systems Pharmacy, 2004, 61, 939-945.

15. 13. Critical pathways: The role of pharmacy now and future. Eds. Dobesh, Bosso, Wortman, Dager, Karpiuk, Ma, and Zarowitz. The article was published in the journal Pharmacotherapy in 2006 and ran from page 1358 to 1368. "CrossRef" phrase Source: PubMed

16. number fourteen, the American Society of Health-System Pharmacists. Joint statement from the American Society of Hospitalists and Pharmacists on cooperation between hospitalists and pharmacists. Journal of Health Systems Pharmacy, 2008, 65, 260-263.

17. 15. Organization that ensures the proper use of medications. ISO/IEC Establishes Rules for Regular Order Sets. The article may be seen online at: http://www.Ismp.Org/newsletters/acutecare/articles/20100311.Asp. (as of February 3, 2018).