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A Cross-Sectional Study on Board Certified Pharmacists in Arab Countries 2018 Update

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Abstract**—** Board certification is a voluntary process that confirms a pharmacist's capability, competency, education, skills, and proficiency beyond what is essential for licensure. This analysis was intended to investigate the prevalence of board-certified pharmacists in the Arab countries and compare the Board of Pharmacy Specialties (BPS) between Egypt, Saudi Arabia, and Canada. A cross-sectional study was conducted. The data were mined from the BPS website. Data were managed by IBM SPSS Statistics 23.0 and presented as descriptive statistics. Of 36918 Board certified pharmacists (BCPs) until February 2018, only 4038 (10.9%) were from the outside United States of America. From 4038 BCPs, about 1782 (44.1%) were from Arab nations. Egypt has the top prevalence of the BPS among the Arab countries 937 (52.6%) BCPs. However, the Kingdom of Saudi Arabia comes in the second position 442 (24.8%). Pharmacotherapy (BCPS), nutrition support pharmacy (BCNSP), critical care pharmacy (BCCCP) and oncology pharmacy (BCOP) are the highest specialties by 1474 (82.7%), 114 (6.4%), 61 (3.42%) and 60 (3.37%) respectively, while, infectious diseases pharmacy (AQID), cardiology pharmacy (AQCD) and nuclear pharmacy (BCNP) are the lowest prevalence of specialties by 7 (0.4%), 6 (0.3%) and 1 (0.06%) respectively. Added qualifications were canceled and became a new specialty in BPS as the rest of the specialties. Both infectious diseases and cardiology specialties exams are not conducted yet all over the world from the beginning of 2018. Egypt has the second prevalence 937 (2.54%), before Canada 920 (2.49%) and after United States of America 32880 (89.06%) in the worldwide in terms of BCPs. In conclusion the BCPS is the uppermost specialty; however, there is still a need for all the other specialties. In a short period, BCCCP jumped to the third position. Cardiology and infectious disease will be new specialties. Egyptian pharmacists are in the top of Arab countries, and 2nd in worldwide BCPs.

Keywords**—**AQCD, AQID, Arab Countries, BCACP, BCCCP, BCGP, BCNP, BCNSP, BCOP, BCPPS, BCPS, BCPP, Board of Pharmacy Specialties, BPS, Canada, Egypt, Saudi Arabia, USA.

I. Introduction

THE BPS was established in 1976 as an independent part of the American Pharmacists Association (APhA). The BPS mission is the improvement of patient carefulness, and intensification awareness of the requirement for the BPS BCPs as essential members of multidisciplinary healthcare teams through appreciation and advancement of knowledge, specialized skills and training in pharmacy and specialty board certification and recertification of pharmacists through the worldwide. Board Certification through the BPS has become accredited as the gold standard for defining which pharmacists are competent to contribute at advanced practice levels as a result of the rigorous standards mandated by the BPS board certification and recertification [1].

The BPS grants recognition to appropriate pharmacy practice specialties and establishes standards for accreditation of pharmacists in several specialties [2]. BPS specialties are ambulatory care pharmacy (BCACP), cardiology pharmacy (AQCD), critical care pharmacy (BCCCP), geriatric pharmacy (BCGP), infectious diseases pharmacy (AQID), nuclear pharmacy (BCNP), nutrition support pharmacy (BCNSP), oncology pharmacy (BCOP), pediatric pharmacy (BCPPS), pharmacotherapy (BCPS) and psychiatric pharmacy (BCPP).

With the pharmacist's responsibility becoming ever more specialized and dedicated, it is the BPS BCP who is superlatively positioned to take on extra patient care and non-distributive accountabilities. This pharmacist specialist has been intimately tangled in the improvement of anticoagulation services resulting in outstanding quality measurements and the potential for program development. Also, the BPS designation offers new avenues for building an individual's national reputation with professional presentations and other publication opportunities. BPS continually estimates and updates its certification and recertification procedures. Nearly every five years, a new role delineation study is conducted for each specialty, with examinations modified accordingly [3].

Improved outcomes in patient care are the main target of specialization in any healthcare profession. The patient's standard is simple: "How can anyone know which pharmacists are uniquely qualified to monitor my medical plan?" With specialty-trained pharmacists as part of the supportive care team, improved patient satisfaction has been recognized with fewer complications in drug therapy, improved laboratory monitoring, declines in needless drugs, and shorter hospital stay causing lower therapy expenses, cost of illness, patient' outcomes and quality of life [4].

As complex health care issues remain the demand of a multidisciplinary approach, patients progressively will distinguish and expect the fundamental role of the specialty-certified pharmacist in optimal drug therapy. There is more need for specialized skills as the complexities of patient care multiply and drug regimens become more complex. Through the hard standards required by the BPS for both certification and recertification, the BPS BCP is uniquely qualified to deliver specialized patient's care as an integral member of the medical team. Becoming BPS board certified aids pharmacists to distinguish and confirm their knowledge and skills to afford more comprehensive patient care; be prepared to step into pharmacy's evolving position on the multidisciplinary healthcare team; and be acknowledged for the expertise by other healthcare professional, employers, patients, and insurers.

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BPS BCPs also cite greater marketability, improved self-confidence, improved competency, augmented accountability, and a competitive edge in job placement and advancement [5].

Stakeholders can trust that the knowledge base and skill levels of the certified specialists they hire have been thoroughly tested. Many organizations report preferential employment and will cover payment of BPS exam and recertification charges. After reporting the benefits of choosing credentialed practitioners, a national managed care provider "prefers" and "encourages" specialty certification for certain clinical positions. Key federal agencies offer salary rewards, promotions, and extended practice opportunities. For some, the BPS certification is the only credential accepted for special incentives. By description, the BPS BCP brings an extra measure of quality to the hiring procedure with demonstrated initiative and a commitment to professional excellence. BPS certification is a highly visible credential to coworkers. It signals a raised level of superiority in specialty practice, often creating better acceptance by the care team [6]. BPS BCPs frequently serve as role models to help others improve the competency and efficacy of practitioners. Post certification, pharmacists also report receiving more requests for professional consultations, along with invitations for continuing education and academic presentations. As the complexities of patient care rise, so the need for pharmacists who can demonstrate specialized skills and medical knowledge in the specific areas increase [7].

II. Objectives

The study was designed to assess the prevalence of pharmacists holding American board-certification of pharmacy specialties in the Arab Countries. On the other hand, the study evaluates which BPS is more essential in the Arab countries. At the same time, this study compares the findings of Egypt vs. Saudi Arabia and Egypt vs. Canada.

III. Methods and Study Design

A cross-sectional study to determine and analyze the prevalence of BCPs in the Arab countries was done. The data were extracted from the BPS website [8]. The comparison was held between Egypt, Saudi Arabia, and Canada respectively in terms of the BPS. IBM SPSS 23.0 was used in data management. The findings were presented as descriptive statistics

IV. Results

Only 4038 (10.9%) from 36918 BCPs until February 2018, were from the outside USA. About 1782 of 4038 (44.1%) were from Arab countries. Egypt has the highest prevalence of BPS among the Arab countries 937 (52.6%), while the Kingdom of Saudi Arabia has the second prevalence 442 (24.8%) as demonstrated in Fig. 1. BCPS, BCNSP, BCCCP and BCOP are the highest specialties by 1474 (82.7%), 114 (6.4%), 61 (3.42%) and 60 (3.37%) respectively while, AQID, AQCD and BCNP are the lowest prevalence of specialties by 7 (0.4%), 6 (0.3%) and 1 (0.06%) respectively as illustrated in Fig. 2. The top 3 countries in the world with BCPs are United States of America 32880 (89.06%), Egypt 937 (2.54%) and Canada 920 (2.49%) as described in Table I. Egyptian and Saudi Arabian pharmacists focused on BCPS 821 (87.6%) and 346 (78.3%) respectively as proved in Fig. 3 However Canadian pharmacists concentrated in BCGP 589 (64%) as confirmed in Fig. 4.

TABLE I
BPS Certification by Location

Country/State	All	BCACP	BCGP	BCCCP	BCNP	BCNSP	BCOP	BCPPS	BCPS	BCPP	AQCD	AQID
All Locations	36918	3257	4368	1638	422	579	2548	798	21770	1088	152	298
USA	32880	3173	3386	1538	419	413	2162	757	19608	1016	138	270
Canada	920	16	589	12	1	1	69	11	181	33	5	2
Bahrain	6	0	0	0	0	0	0	0	6	0	0	0
Egypt	937	3	3	24	0	63	22	0	821	0	1	0
Iraq	2	0	0	0	0	0	0	0	2	0	0	0
Jordan	21	1	0	1	0	2	3	0	14	0	0	0
Kuwait	35	0	0	0	0	4	1	0	30	0	0	0
Lebanon	26	2	1	2	0	1	0	1	15	1	1	2
Oman	7	0	0	0	0	0	0	0	7	0	0	0
Palestine	1	0	0	0	0	0	0	0	1	0	0	0
Qatar	94	5	1	6	0	1	6	2	70	1	1	1
Saudi Arabia	442	9	2	19	1	28	18	9	346	6	2	2
Sudan	14	0	0	0	0	1	1	0	12	0	0	0
UAE	197	4	5	9	0	14	9	1	150	2	1	2
Total of Arab Countries	1782	24	12	61	1	114	60	13	1474	10	6	7

BCACP=Ambulatory Care, BCGP=Geriatrics Pharmacy, BCCCP=Critical Care Pharmacy, BCNP=Nuclear Pharmacy, BCNSP=Nutrition Support Pharmacy, BCOP=Oncology Pharmacy, BCPPS=Pediatric Pharmacy, BCPS=Pharmacotherapy, BCPP=Psychiatric Pharmacy, AQCD=Added Qualifications in Cardiology, AQID=Added Qualifications in Infectious Diseases, UAE: United Arab Emirates.

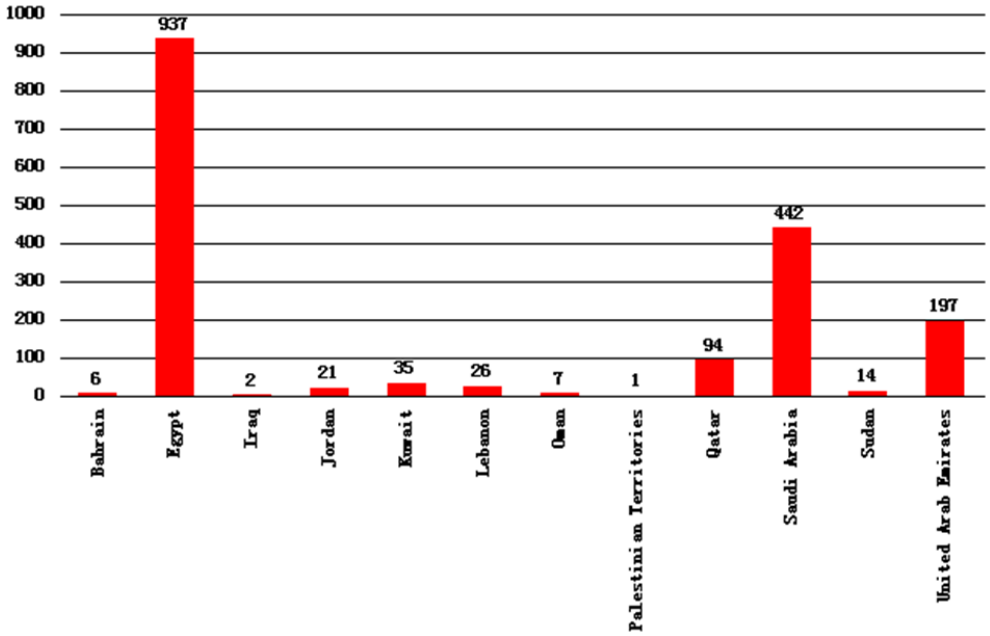

Fig. 1 BCPs in Arab Countries 2018

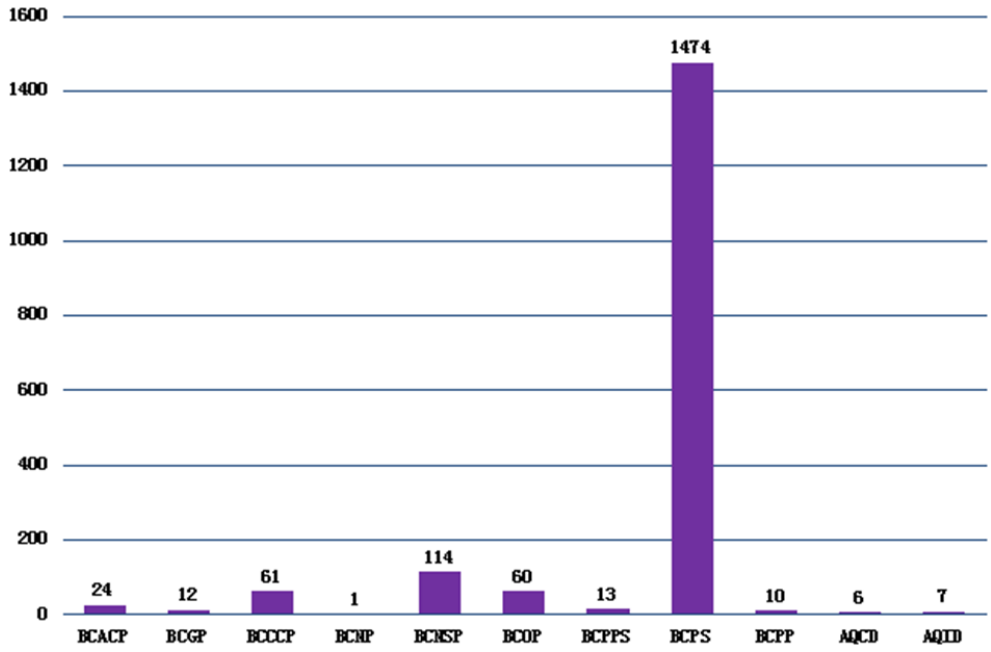

Fig. 2 Certified Arab Pharmacists by BPS, 2018

V. Discussion

In 2017, a cross-sectional study was conducted to determine and analyse the prevalence of BCPs in the Arab countries. The data were extracted from the BPS website [9]. Only 2587 (9%) from 28728 BCPs until March 2017 were from the outside USA. BCPs from the outside USA indicate a growth of (1.9%), from (9%) in 2017 to (10.9%) in 2018. Arab BCPs decrease from (55.4%) in 2017 to (44.1%) in 2018. Egypt still has the highest prevalence of BPS among the Arab countries (52.6%), which is lesser than 2017 (53.2%). However, the Kingdom of Saudi Arabia has the second prevalence (24.8%) by the same percentage of 2017 in BCPs. BCPS and BCNSP are the highest specialties by (82.7%) and (6.4%) in 2018, vs. (85.1%) and (5.4%) in 2017 respectively. In 2018 BCCCP jumped to the 3rd position by (3.42%) and BCOP 60 (3.37%) in the 4th position while, AQID, AQCD and BCNP are the lowest prevalence of specialties by 7 (0.4%), 6 (0.3%) and 1 (0.06%) in 2018 vs. 6 (0.4%), 5 (0.3%) and 1 (0.1%) in 2017 respectively [9], [10].

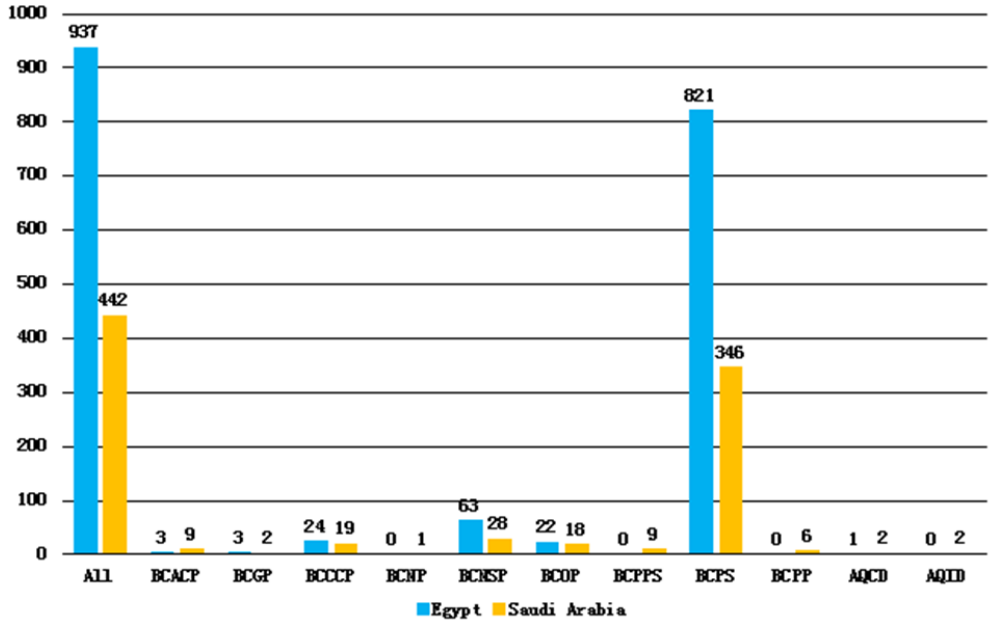

Fig. 3 Egypt vs. Saudi Arabia in the BPS, 2018

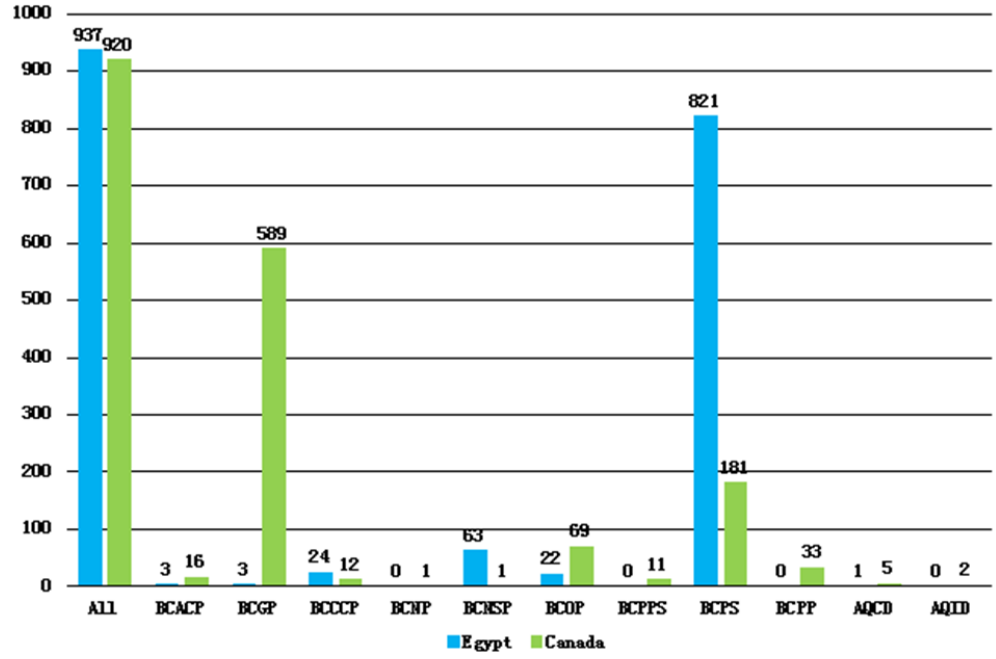

Fig. 4 Egypt vs. Canada in the BPS, 2018

Currently, there are more than 36,900 pharmacists worldwide who are BPS board certified in 11 specialties. The top three countries in the world with BCPs are USA 32880 (89.06%), Egypt 937 (2.54%) and Canada 920 (2.49%) as shown in Table I. The decrease in the prevalence of Arab BCPs in 2018 reflects the bad impact of wars and the hard economic situation in Arab countries which create barriers in front of pharmacists to set for the BPS exam. The fall down of Egyptian Pound value vs. US dollar reduced the ability of Egyptian pharmacists to pay the cost of BPS exam [11]-[15]. The BPS will be ending its Added Qualifications (AQ) programs for Cardiology Pharmacotherapy and Infectious Diseases Pharmacotherapy as of December 31, 2017. Therefore, this will be the last time Board Certified Pharmacotherapy Specialties may apply for AQ credentials that will be active until December 31, 2024. Also, a new compounding specialty is coming in the way as one of the BPS specialty. Nuclear specialty is only available in the USA mainly (only one from Canada and one from Saudi Arabia got it). It requires many infrastructure designs and safety issue to deal with nuclear medicine which is not present in the Gulf Area.

Egyptian BCPs are in the 1st position of Arab countries and

2nd position in the worldwide, in spite of the bad economic situation. This finding tallies with a study in 2017; El-Sobky et al. [16] aimed to characterize the board certification process starting from the motivation, preparation processes and obstacles that faced the applicants. Furthermore, the impression of the board certification on the personal, professional, financial level and health outcome is also investigated. The BCPs have experienced mainly personal and professional benefits. It increases their acceptance by other health care professionals, improves their self-confidence in making clinical decisions. Almost half of BCPs received financial rewards. Most of the participants are satisfied with the certification and encouraged others to apply for it. Being a BCP proved a positive impact on the Egyptian pharmacists. This survey confirmed the positive attitude of Egyptian pharmacists toward professional continuing and education to increase their competency and being BCPs [16].

In Egypt, the trend of BCPs focuses on the wide-field specialty BCPS 821 (87.6%), BCNSP 63 (6.7%) and BCCCP 24 (2.6%) while in Canada BCPs prefer the new and more focused board specialty BCGP 589 (64%), BCPS 181 (19.7%), and BCOP 69 (7.5%) as demonstrated in Fig. 4. This variability among BCPs between Egypt and Canada related to the advance of clinical pharmacy practice in Canada, however, the practice of clinical pharmacy in Egypt is still in the first steps of the milestone.

The quality of the health services delivered by the Egyptian hospitals will not improve unless the pharmacists start to enhance themselves by taking care of there continues the education process and seeks postgraduate degrees [17]. A new generation of pharmacists appears to become interested in improving pharmacy practice, and some of them succeeded to implement clinical pharmacy services in different hospitals across Egypt [18]. The awareness of the importance of the continuous education programs now become a distinct intention for most of the pharmacy practitioners. Many pharmacists improve their practice through attending continuing education programs and conferences, participating in different workshops, having a postgraduate diploma from the Egyptian universities, proceed in academic degrees like Masters and Ph.D. The BPS (American board) became an intention for clinical pharmacists that were first earned by an Egyptian pharmacist in Oncology specialty in 2007 [16], [19]. Recently, being a specialized pharmacist becomes a noticeable trend due to the market needs. The BPS specialties recognized the pharmacist in a specific specialty that qualifies him/her to contribute at advanced practice levels [20].

In Japan, Hazama [24] reported that the proportion of older adults had grown up to 23% in 2009. The number of elderly people in long-term nursing facilities or nursing homes will enhance in the next decade. By 2025, the utmost of the elderly people would have developed cancer, cardiovascular diseases [21], chronic kidney diseases, stroke and dementia [22], [23]. Nearly all of them would be treated with prescribed medications. They would also have dysphagia and have troubles in recalling their drugs in the long term. Therefore, for the profit of such a community, the workforce, especially in the field of drug distribution, will require increasing to prevent the occurrence of patients who disremember to administer their medicines. Moreover, the educational syllabus for pharmaceutical students has been reformed to a novel version, and some Japanese pharmacy shops have been converting over to "Pharmacy 3.0," which is the next generation model. In this pharmacy, the pharmacists will show an additional new role; they will not only dispense medications but also support home recuperation leveraging some vital signs and physical assessments. In his opinion, this new scheme of medical service developed by pharmacists playing this novel role may be a benefit to the patient/elderly community in Japan who are facing the decline of healthcare systems. They concluded that Collaborative Drug Therapy Management (CDTM) in the practice of the pharmacists is essential for increasing the efficiency of the healthcare systems. The increase in the percentage of elderly people pushes BPS to establish a new BPS under the name board-certified geriatric pharmacist (BCGP) [24].

Elderly usually had several comorbidities including asthma [25], diabetes mellitus [26]-[28], hypertension [29], [30], dyslipidemia [31]-[33], chronic kidney disease [34], [35], anemia [36], [37], retinopathy [38], cataract [39], organ transplantation, cancer [40], surgery [41], [42] and infectious diseases [43], [44]. Older people at high risk for cardiovascular diseases, Alzheimer's disease, dementia, medication non-adherence and falling need medication management [45]-[49]. Elderly often suffer from polypharmacy which increases the probability of drug interactions and adverse effects [50], [51]. So, BCGP will have a functional role in improving elderly's therapeutic outcomes and quality of life.

The importance of board certification systems is growing in parallel with modifications in the social situations surrounding general medical practice. As a consequence, in April 2001 system of board certification for the Japanese Society of General Hospital Psychiatry was introduced. The clinical abilities required for liaison psychiatrists in this method can be summarized as follows: Firstly, the capacity to sufficiently treat patients with physical/ psychiatric comorbidity or somatization. Secondly, the ability to form an appropriate and adequate relationship with patients with physical diseases and to collaborate with medical and surgical professionals. Finally to have an excellent social and ethical awareness of general medical practice [52].

Pradel et al. [53] did a study to address the value of Board of Pharmaceutical Specialties (BPS) certification, mainly as perceived by different stakeholders (academia, employers, government, and pharmacists), and to draw a parallel between specialization and certification in pharmacy and medicine. Pradel et al. investigated the electronic databases (International Pharmaceutical Abstracts, Medline, and Sociological Abstracts), associations/healthcare organizations websites, outside reports, and clinical pharmacists involved in certification processes. The authors selected studies and reports that addressed the value of specialty certification. Pradel et al., 2004, found that pharmacists with specialty certification report enhanced feelings of self-worth, improved competence, and

more affordable positions [53]. Other values of certification include increased acceptance by healthcare professionals, salary increases, and job promotions. Employers have acknowledged BCPs through public recognition, growth in accountability and some types of monetary reimbursement. In some governmental organizations, certified pharmacists obtain salary increases and are approved prescribing authority. However, the overall worth of specialty certification in pharmacy as perceived by the payers or public lags behind when matched with the status of specialty certification in medicine. Pradel et al. concluded that BCPs appreciate the value of pharmacy specialty certification, and in some organizations and practice settings, BCPs are perceived as valuable. Still, unlike board-certified physicians, BCPs are not widely recognized outside or even within the pharmacy profession. To address this challenge, BCPs ought to market their services to assure that other stakeholders acknowledge their value, which supports our findings [53].

Lofgren [54] stated that experience in dealing with physicians and their assistance along with board certification would take the pharmacist to the next level in recommending suitable therapy. Placing new graduates in clinical positions without experience and predicting them to build relationships with clinicians is not the best-case scenario for establishing clinical pharmacist teams. Board certification confirms an elevated degree of knowledge, attitude, skill, and experience. Board certification will be a requirement in hospital pharmacy practice [54]. The findings of the 2016 American Society of Health-System Pharmacists (ASHP) national survey of pharmacy practice [55] in hospitals presented that utmost common service presented by pharmacists to outpatients is managing of anticoagulation (26.0%) while pharmacists practice in ambulatory care clinics, (64.5%) have to prescribe authority through collaborative practice consensus. Pharmacists continue to develop their role in improving the prescribing of medications in both hospital and outpatient settings [55]-[57].

In the USA, Chisholm-Burns et al. [58] conducted a comprehensive systematic review with attentive meta-analyses to examine the effects of pharmacist-provided direct patient care on therapeutic, safety, and humanistic outcomes. The following databases were investigated from the database establishment until January 2009: ABI/INFORM; Academic Search Complete; ClinicalTrials.gov; Cochrane Database of Systematic Reviews; NLM PubMed; Ovid/MEDLINE; Health Business Fulltext Elite. Also, these databases were searched; International Pharmaceutical Abstracts; PsycINFO; National Guideline Clearinghouse; Database of Abstracts of Reviews of Effects; Google Scholar and LexisNexis Academic Universe. Studies designated encompassed those recording pharmacist-delivered care, matching groups, and patient-associated consequences. Of these, 56,573 citations were involved. Multidisciplinary study evaluation teams mined data. Variables inspected comprised study criteria, patient features, pharmacists' services/interventions, and study results. Data for meta- analyses were mined from randomized controlled trials assembly the meta-analysis characteristics. About 298 studies were incorporated. Hopeful values were found in therapeutic and safety consequences, and meta-analyses conducted for adverse drug reactions, blood pressure, hemoglobin A1c, and low-density lipoprotein cholesterol were significant ($P < 0.05$), favoring pharmacists' direct patient care over comparable facilities. Consequences for humanistic results were promising with variability. Medication adherence, knowledge of patient, and patients' quality of life and general health quality meta- analyses were significant ($P < 0.05$), favoring pharmacists' direct patient care. Pharmacist-provided direct patient care has favorable effects on disease states, health care settings, and various patient outcomes. Joining pharmacists as healthcare team memberships in direct patient care is a viable solution to help improve US health care [58]. Patient safety is a critical issue and represents a fundamental part of pharmacy education and pharmacy practice provided by the BCPs [59].

Shay et al. [60] evaluated the application of specialty pharmacy services; however, this service implementing can be a competent way for health systems to create extra revenue, enhance the affordability of clinical management services to the patient, and widen the model of patient-centered care. The opportunities and benefits of applying specialty pharmacy services can be substantial, but alternative options can bring value to the institution by helping in managing excess costs and enhancing the continuity of care for patients [60].

A study by Rim et al. [61] is designed to ensure standardization of services and successful preparation for increasing numbers of specialty prescriptions, all specialty pharmacy services were centralized to the healthcare system's Pharmacy Ambulatory Clinical Care Centre (PAC (3)). PAC (3) focused on the prior-authorization process to select specialty clinics. A call center was developed at PAC (3) to provide centralized specialty pharmacy services, including 24-7 patient support, a medication adherence program, home delivery service, and patient education. The program resulted in a 137% increase in specialty pharmacy revenues over a two-year period. PAC (3) processed 1860 prior-authorization cases and enrolled approximately 700 new patients in the specialty pharmacy program within nine months [61].

The Vanderbilt Specialty Pharmacy (VSP) model at Vanderbilt University Medical Centre (VUMC) provides an example of a patient-centered, collaborative care prototype that places pharmacists directly into specialty clinics to assist with comprehensive management of patients on specialty medications. The VSP integrates specialty pharmacy services within existing specialty clinics based on the needs of each clinic. At least, a clinical pharmacist and a pharmacy technician are needed for the operation of a pharmacy in any clinic. The pharmacist is integrally involved in medication selection, initiation, and monitoring. The specialty pharmacy team ensures appropriate medication access and cost, provides extensive medication education, ensures that patients are adherent to treatment, and coordinates care between patients and providers using the electronic medical record. Integration of pharmacists within specialty clinics at VUMC benefits providers, the health system, and patient care. This model has

confirmed reduced provider and clinic burden, decreased time to medicine approval and initiation, excellent patient and provider satisfaction, substantial patient budget savings, optimal medication adherence, and overall better steadiness of care for patients on specialty medicines. Since 2011, VSP has integrated 17 pharmacy technicians and 24 clinical pharmacists into 20 specialty clinics, with continued quarterly growth. The VSP model advances the role of pharmacists in managing patients on specialty medications in collaboration with providers. The integrated collaborative approach as presented by the VSP represents a best practices model for those establishing and advancing specialty pharmacy services within academic health systems [62]. A specialty pharmacy program was created along with operational and infrastructure improvements, resulting in increased revenue, system-wide services, and a fully accredited specialty pharmacy.

Mullican and Francart [64] reviewed specialty drugs used in patients with inflammatory disease states, with an emphasis on the pharmacist's roles in supporting the clinical management of affected patients and medicines procurement. Pharmacists in the community settings and ambulatory care are strategically employed to be actively involved in specialty drug procurement, generic medication, drugs substitutes [63] and clinical management of patients with inflammatory illnesses such as ankylosing spondylitis, inflammatory bowel disease, plaque psoriasis, psoriatic arthritis, and rheumatoid arthritis. Medications given in the treatment of these illnesses contain interleukin inhibitors, anti-tumor necrosis factor (TNF) disease-modifying antirheumatic drugs (DMARDs), and non-TNF DMARDs. Involvement of pharmacist in medication procurement in this part encompasses crossing insurance barricades and serving patients address high out-of-pocket costs. Clinical management accomplishments can comprise of providing drug-specific patient education, confirming proper baseline screening and vaccine administration, and performance routine track-up and evaluation. Patient education is the single most significant zone where pharmacists can have a direct impression on the overall clinical management of patients getting specialty medications for the therapy of inflammatory illnesses. These patients require being educated about administration, dosing, storage and disposal, prospects of drug consequence, common and rare adverse reactions, adverse-effect management strategies, and considerations for unique circumstances such as sickness and intended surgery. Specialty medications represent one of the fastest-developing arenas of pharmacy expenditure, with inflammatory illness therapies at the front position. As pharmacists are reachable healthcare practitioners, their responsibilities should encompass clinical and financial management of patients with co-morbidities who are prescribed specialty medications [64].

In 2016, a paper described the objectives of the "American Society of Health-System Pharmacists' Pharmacy Practice Model Initiative (PPMI)" and its guidelines for health-system pharmacy practice renovation to encounter future patient care needs and raise the role of pharmacists as patient care suppliers. Pharmacists' PPMI visualizes a future in which pharmacists have more accountability for medication-related outcomes and technicians undertake greater liability for product-related activities. Although the Pharmacists' PPMI commendations have raised the level of practice in many situations, additionally, they possibly have impact on present clinical pharmacy specialists, in specific and clinical pharmacists, in overall. Moreover, although more consistent patient care can be accomplished with an extended team of pharmacists, the clinical pharmacy specialists had a useful role that must not be reduced, especially in the care of complex patients and populations. Specialist practitioners with credentials and progressive preparation must be accessible to train and model pharmacists in generalist positions, students, and residents. Indeed, specialist practitioners are often the practice leaders and innovators. Negotiation between hospitals and pharmacy schools is required to guarantee an ongoing role for academic clinical pharmacists and their charities as researchers and educators. Lessons can be applied in disciplines such as nursing and medicine, which have established novel models of care containing effective and operative cooperation amongst specialists and generalists. Numerous different pharmacy practice models have been designated to encounter the PPMI objectives, grounded on accessible personnel and native aims. Studies quantifying the impact of these innovative practice models are required [65].

In USA, an article labeled vital actions in pharmaceutical education, training, practice, and research that have happened over the previous 55 years. Some of these events involved the progress of the doctor of pharmacy grade, residency training, and co-location of clinical pharmacists in patient care zones. This progress in pharmacy education is training-based certificates that are more specialized after that, directed to board certification to update the pharmacists' knowledge, increase their attitude and enhance the advanced practice and pharmaceutical care which guarantee the quality of patient care. Clinical pharmacy services and direct patient care have a promising future in many countries. Clinical pharmacists are now more specialized for specific services or complicated care than before. Recent advances in education and clinical pharmacy research enabled the progress of clinical pharmacy services in many countries all over the world. The significant increase in complicated older patient populations suggests that the contribution of clinical pharmacists in interdisciplinary care will become more critical to improve medication safety, efficiency and efficacy. However, clinical pharmacy is well positioned for this growth, primarily because of the changes in education, residency training, and board certification that have settled over the last 40 years [66].

BPS rationalized its policy concerning the implementing procedure for all BPS certifications. From January 1, 2019, each applicant must prove his eligibility for any BPS qualifications by giving an employer confirmation that 50% of his experience time stayed in some or all of the actions definite by the applicable certification contented outline of pharmacy board specialty. Also, this practice experience must have extended within the previous seven years of submission [67].

BPS stopped the receiving of submissions for AQ in Infectious Diseases or Cardiology. Persons presently holding

AQ, or who earned the credential throughout the 2017 submission round will continue to hold the credential of AQ certification until the duration expires after seven years from the date of accreditation but will not be capable to renew them. The first BPS Board Certified Cardiology Pharmacist (BCCP) and the first BPS Board Certified Infectious Diseases Pharmacists (BCIDP) certification examinations were started by fall 2018 [68].

The foundational participants of the "Compounded Sterile Preparations (CSP) Pharmacy Specialty Council" were forecasted on May 22, 2018. The Specialty Council will be charged with emerging appropriateness standards, which are anticipated to be circulated in September 2018. In the summer of 2018, a group of volunteer experts will be invited to write the exam items of CSP. In fall 2019, the first exam of CSP will be held [69].

BPS established the formal request to distinguish Solid Organ Transplantation pharmacist specialists on March 28, 2018. The request evaluation procedure of the BPS Board of Directors characteristically continues to about six months to achieve the final drafting. If accredited, the nominations call for first Specialty Council arrangements and test progress would start in early 2019, with the earliest certification exam intended to be in fall 2020 [70].

BPS is preparing the final role delineation study report on The BPS Board Certified Transplant Pharmacist (BCTXP) for review by the BPS Board of Directors. BCTXP is established in 2019. The first test of BCTXP will be hold in fall, 2020. The projected beginning date for the opening application will be May, 2020 [1].

VI. Conclusion

In Arab countries, Pharmacotherapy Specialty is the leading specialty; however, there is still a room and chance for all the other specialties. In a short time, Critical Care Pharmacy Specialty jumped to be in the third spot. On the other hand, no more AQ title will be held by a pharmacist. AQ title was replaced by BCCP and BCIDP. Egyptian pharmacists are in the highest prevalence of Arab countries, and 2nd in the world as BCPs.

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References

[1] Board of Pharmacy Specialties. About BPS Board of Pharmacy Specialties. Available from: https://www.bpsweb.org/bps-specialties/. (Accessed on 29- Jan- 2018).

[2] About BPS - Board of Pharmacy Specialties". www.bpsweb.org. Retrieved 24 January 2018.

[3] D. Witt. BPS Board Certification in the Real World. Available from: https://www.bpsweb.org/impact-of-bps-certification/bps-board-certification-in-the-real-world/ (Accessed: 29- Jan- 2018).

[4] M. A. Hammad, Khaled M. AL-Akhali, Asif S. Mohammad, Rahaf M. Alqahtani, Sahar H. Alshhrany, Nada M. Alhassan, Fatma R. Abo Essa. Prospective Study on Adherence and Pharmacoeconomics of Antibiotic Switching from Intravenous to Oral Route. Journal of Pharmaceutical Research & Clinical Practice, Oct-Dec 2015;5(4): 7-13.

[5] J.J. Saseen, S. E. Grady, L. B. Hansen, B. M. Hodges, S. J. Kovacs, L. D. Martinez, J. E. Murphy, et al. Future Clinical Pharmacy Practitioners Should Be Board-Certified Specialists. Pharmacotherapy, 2006;26(12): 1816-1825.

[6] Board of Pharmacy Specialities. Making a Difference. Available from: https://www.bpsweb.org/impact-of-bps-certification/making-a-difference/. (Accessed on: 29- Jan- 2018).

[7] K. Erickson. BPS certification: Keeping the profession moving forward. Pharmacy Today. JULY 2013;19(7): 8.

[8] Board of Pharmacy Specialties. Find A Board Certified Pharmacist. Available from: https://portalbps.cyzap.net/dzapps/dbzap.bin/apps/assess/webmembers/managetool?webid=BPS&pToolCode=certrecord&pRecCmd=StatsByLocation&pPrint=Yes. (Accessed on: 31- Jan- 2018).

[9] M. A. Hammad, M. A. Al-Mansoub, M. Qamar. Board Certified Pharmacists in Arab Countries: Data Analysis and Current Needs. AMPSR, 2017;1(2): 36-38.

[10] M. H. Elnaem, S. Q. Jamshed, R. M. Elkalmi. Board specialty certifications for pharmacists in Arab Countries: Current needs and recommendations. Arch Pharma Pract, 2017;8(1): 1-2. DOI:10.4103/2045-080X.199618.

[11] N. M. El Agroudy, F. A. Shafiq, S. Mokhtar. The Effect of the Rise in the Dollar Rate on the Egyptian Economy. Middle East J. Appl. Sci. 2015;5(2): 509-514.

[12] Z. Alkhalisi. Why Egypt just let its currency crash by 48%. CNN Money. 2016 available from: http://money.cnn.com/2016/11/03/news/economy/egypt-pound-devaluation-bailout/index.html. (Accessed on: 30- Jan- 2018).

[13] The World Bank. Economic Effects of War and Peace in the Middle East and North Africa. Available from: http://www.worldbank.org/en/news/press-release/2016/02/03/economic-effects-of-war-and-peace-in-the-middle-east-and-north-africa.

[14] P. Justino. How Does Violent Conflict Impact on Individual Educational Outcomes? The Evidence So Far. 2011/ED/EFA/MRT/PI/30.

[15] United Nations Educational, Scientific and Cultural Organization (UNESCO). The hidden crisis: Armed conflict and education. Paris, France 2011.

[16] Y. El-Sobky, D. A. Atta, A. Derzawy, M. A. Hammad. The Impact of the American Board Certification on the Egyptian Pharmacists. Arch Med Pharm Sci Res, 2017;1(1): 02-10.

[17] S. Suzuki, H. Sakurai, K. Kawasumi, M. Tahara, S. Saito, K. Endo. The impact of pharmacist certification on the quality of chemotherapy in Japan. Int J Clin Pharm, 2016;38: 1326. PMID: 27573721. DOI: 10.1007/s11096-016-0374-6.

[18] L. K. Sharp, P. G. Bashook, M. S. Lipsky, S. D. Horowitz, S.H. Miller. Specialty board certification and clinical outcomes: the missing link. Acad Med, 2002;77(6): 534–42. PMID: 12063199.

[19] J. P. Engle, B. L. Erstad, D. C. Anderson, M. H. Bucklin, A. Chan, A. R. Donaldson, et al. Minimum Qualifications for Clinical Pharmacy Practice Faculty. American College of Clinical Pharmacy. Pharmacotherapy 2014;34(5): e38–e44. DOI: 10.1002/phar.1422.

[20] E. N. Grosch. Does specialty board certification influence clinical outcomes? J Eval Clin Pract, 2006;12(5): 473–81. PMID: 16987109 DOI: 10.1111/j.1365-2753.2006.00556.x.

[21] M. A. Hammad, D. A. Mohamed Noor, S. A. Syed Sulaiman, A. Kharshid, N. A. Aziz, T. M. Elsayed. A Prospective Study on the Evaluation of Statins Usage on HbA1c Control among Type 2 Diabetes Mellitus in an Outpatients Setting. World Academy of Science, Engineering and Technology International Journal of Pharmacological and Pharmaceutical Sciences 2017;4(8): 805. DOI10.13140/RG.2.2.27914.36806.

[22] M. A. Hammad, A. A. Khamis, K. M. Al- Akhali, T. M. Elsayed, A. M. Alasmri, E. M. Al-Ahmari, E. M. Mossa, N. M. Al-Gahtani, Y. El-Sobky. Evaluation of Drug Dosing in Renal Failure. IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS). 2016;11(5)3: 39-50. DOI: 10.9790/3008-1105033950.

[23] M. A. Hammad, D. A. Mohamed Noor, S. A. Syed Sulaiman, A. Sha'aban. The equivalence between the Malay and UK English versions of mini-Addenbrooke's cognitive examination. Malaysian Journal of Pharmacy. 2017;3(1): 28.

[24] K. Hazama. "Pharmacy 3.0" and the meaning of vital signs for pharmacists. Yakugaku Zasshi. 2012;132(1): 17-20. PMID: 22214574.

[25] M. A. Hammad, K. M. Alakhali, M. Hattan, D. A. Mohamed Noor, S. A. Syed Sulaiman, A. M. Kharshid, A. A. Khamis. Asthma in Saudi Arabia: Risk Factors and Pharmacotherapy. Indo American Journal of Pharmaceutical Research, 2016;6(11): 6814-6821. DOI10.1044/1980-iajpr.161043.

[26] M. A. Hammad, D. A. Mohamed Noor, S. A. Syed Sulaiman, N. A. Aziz, Y. Elsobky. A prospective study of prevalence of uncontrolled glycaemia in Type 2 diabetes mellitus outpatients. Pharmacotherapy 2016;36(7): e83–e138. DOI: 10.13140/RG.2.1.4848.0247/1.

[27] M. A. Hammad, D. A. Mohamed Noor, S. A. Syed Sulaiman, M. A. Al-Mansoub, M. Qamar. A Retrospective Study on the Age of Onset for Type 2 Diabetes Diagnosis. World Academy of Science, Engineering and Technology International Journal of Pharmacological and Pharmaceutical Sciences 2017;4(8): 807. DOI: 10.13140/RG.2.2.24224.69124.

[28] J. Beck, D. A. Greenwood, L. Blanton, S. T. Bollinger, M. K. Butcher, J. E. Condon, et al. 2017 National Standards for Diabetes Self-Management Education and Support. The Diabetes Educator 2017;43(5): 449–464. https://doi.org/10.1177/0145721717722968.

[29] K. M. Alakhali, A. Ansari, M. A. Hammad, Analysis of Prevalence, Risk Factor and Pharmacotherapy of Hypertension in Outpatients. The 10th Annual Scientific Research Day for Medical, Applied and Basic Sciences, King Khalid University, May 5, 2014: P68. DOI: 10.13140/RG.2.1.3687.5288.

[30] M. A. Alakhali, M. A. Ansari, M. A. Hammad. Analysis of Prevalence, Risk Factor and Pharmacotherapy of Hypertension in Outpatients. Indian Journal of Pharmacy Practice. Oct-Dec, 2013;(6)4: 64-66.

[31] M. A. Hammad, D. A. Mohamed Noor, S. A. Syed Sulaiman, A. A. Khamis, A. Kharshid, N. A. Aziz Comparison of Statins Dose Intensity on HbA1c Control in Outpatients with type 2 Diabetes: A Prospective Cohort Study. ICDDCPT 2017: 19th International Conference on Drug Development, Clinical Pharmacy and Therapeutics. International Journal of Pharmacological and Pharmaceutical Sciences 2017;4(8): 806. DOI: 10.13140/RG.2.2.19669.93922.

[32] M. A. Hammad, D. A. Mohamed Noor, S. A. Syed Sulaiman, A. A. Khamis, A. Kharshid, N. A. Aziz. Comparison of Statins Dose Intensity on HbA1c Control in Outpatients with Type 2 Diabetes: A Prospective Cohort Study. World Academy of Science, Engineering and Technology International Journal of Medical, Health, Biomedical, Bioengineering and Pharmaceutical Engineering 2017;11(8): 423-428. scholar.waset.org/1999.9/10007661.

[33] MA Hammad, Sulaiman SA, Aziz NA, Noor DA. Prescribing statins among patients with type 2 diabetes: The clinical gap between the guidelines and practice. J Res Med Sci 2018;23:XX-XX. DOI: 10.4103/jrms.JRMS_100_18

[34] S. A. Syed Sulaiman, D. A. Mohamed Noor, M. A. Hammad, K. M. AlAkhali, A. M. Alasmri, E. M. Al-Ahmari, E. M. Mossa, N. M. AlGahtani. Prospective study of evaluation of antibiotics dosage adjustment in patients with chronic renal failure at Aseer hospital. JAASP 2015;1: 142.

[35] M. A. Hammad et al., Prospective Study of Evaluation of Drug Dosage Adjustment in Patient with Chronic Renal Failure at Aseer Hospital. The 10th Annual Scientific Research Day for Medical, Applied and Basic Sciences, King Khalid University, 5.05.2014: P92. DOI: 10.13140/RG.2.1.1918.0567.

[36] K. Al Akhali, M. A. Hammad, M. A. Ansari. Evaluation of Prevalence and Pattern of Anemia – A Hospital Based Study in Aseer Province, Kingdom of Saudi Arabia. Journal of Experimental Medical & Surgical Research. 2013;2: 32 -35.

[37] M. Luisetto, B. Nili-Ahmadabadi, G. R. Mashori. The Clinical Pharmacists Main Focus. J Appl Pharm 2017;9: 4. DOI: 10.21065/1920-4159.1000e114.

[38] M. A. Hammad, D. A. Mohamed Noor, S. A. Syed Sulaiman, Tarek Mohamed Elsayed. Statins Effects on Diabetic Retinopathy Among Patients with Type 2 Diabetes Mellitus. International Journal of Ophthalmology & Visual Science. 2017;2(4): 106-114. DOI: 10.11648/j.ijovs.20170204.15.

[39] M. A. Hammad, D. A. Mohamed Noor, S. A. Syed Sulaiman, A. Sha'aban, N. A. Aziz. Statins Effects on Cataract Among Patients with Type 2 Diabetes Mellitus. Malaysian Journal of Pharmacy. 2017;3(1): 28.

[40] S. M. Carolyn. Role of pharmacists in optimizing the use of anticancer drugs in the clinical setting. Dovepress. 2014;3: 11-24. DOI: https://doi.org/10.2147/IPRP.S40428.

[41] K. M. Alakhali, M. Selim, M. A. Hammad. Evaluation of therapeutic drug monitoring of cyclosporine and tacrolimus in kidney transplant patients. JPCS Jan-March 2014;8: 18-25. Available from: https://www.researchgate.net/publication/270337774_Evaluation_of_therapeutic_drug_monitoring_of_cyclosporine_and_tacrolimus_in_kidney_transplant_patients.

[42] M. A. Hammad, K. M. AL-Akhali, A. T. Mohammed. Evaluation of surgical antibiotic prophylaxis in Aseer area hospitals in Kingdom of Saudi Arabia. JPCS Jan-March 2013;6: 1-7. Available from: https://www.researchgate.net/publication/268777168_Evaluation_of_surgical_antibiotic_prophylaxis_in_Aseer_area_hospitals_in_Kingdom_of_Saudi_Arabia.

[43] M. Luisetto. Infectious Disease Pharmaceutical Care: The Role of the Clinical Pharmacists to Improve Clinical Outcomes 2017. J Antimicrob Agents 2017;3: 143. DOI:10.4172/2472-1212.1000143.

[44] M. Qamar, M. A. Hammad, F. A. Shaikh, S. Ahmad. Knowledge and Attitude Towards Antibiotic Usage Among General Public in Kuala Lumpur, Malaysia. Malaysian Journal of Pharmacy. 2017;3(1): 38. Available from: https://www.researchgate.net/publication/321097366_knowledge_and_attitude_towards_antibiotic_usage_among_general_public_in_kuala_lumpur_malaysia.

[45] E. B. McNeely. Treatment Considerations and the Role of the Clinical Pharmacist Throughout Transitions of Care for Patients with Acute Heart Failure. Journal of Pharmacy Practice. 2017;30(4): 441-450. PMCID: PMC5524196 DOI: 10.1177/0897190016645435.

[46] T. J. Schindel, N. Yuksel, R. Breault, J. Daniels, S. Varnhagen, C. A. Hughes. Perceptions of pharmacists' roles in the era of expanding scopes of practice. Research in Social and Administrative Pharmacy 2017;13(1): 148–161. DOI: http://sci-hub.tw/10.1016/j.sapharm.2016.02.007.

[47] M. A. Hammad, S. Azhar Syed Sulaiman, A. Aly, D. A. Mohamed Noor. Malaysian Adaptation of the Mini-Addenbrooke's Cognitive Examination (M-ACE). World Applied Sciences Journal 2017;35(11): 2315-2320. DOI: 10.5829/idosi.wasj.2017.2315.2320.

[48] M. A. Hammad, D. A. Mohamed Noor, S. A. Syed Sulaiman. The effect of patients' adherence on HbA1c control. AMPSR, 2017;1(1): 30-35. Available from: https://www.researchgate.net/publication/318909992_the_effect_of_patient%27s_adherence_on_hba1c_control.

[49] J. J. Saseen, T. L. Ripley, D. Bondi, J. M. Burke, L. J. Cohen, S. McBane, et al. ACCP Clinical Pharmacist Competencies. Pharmacotherapy 2017;37(5): 630-636. PMID: 28464300 DOI: 10.1002/phar.1923.

[50] M. A. Hammad, B. Tangiisuran, A. M. Kharshid, N. Abdul-Aziz, Y. Hassan, N. A. Aziz, et al. Drug-drug interaction-related uncontrolled glycemia. J Pharm Bioall Sci 2017;9: 221-8. DOI: 10.4103/JPBS.JPBS_26_17.

[51] M. A. Hammad, B. Tangiisuran, N. Abd El Aziz, Y. Hassan. A prospective study of uncontrolled glycaemia secondary to drug- drug interactions in type 2 diabetes mellitus patients at Penang general hospital in Malaysia. Pharmacotherapy 2013;33(5): e50. DOI: 10.1002/phar.1300.

[52] N. Horikawa, N. Kuroki, T. Hosaka, S. Nomura, H. Nishimura, K. Yamashita, et al. Introduction of a board certification system for the Japanese Society of General Hospital Psychiatry. Seishin Shinkeigaku Zasshi, 2003;105(3): 320-3. PMID: 12728518.

[53] F. G. Pradel, F. B. Palumbo, L. Flowers, C. D. Mullins, S. T. Haines, D. S. Roffman. White paper: value of specialty certification in pharmacy. J Am Pharm Assoc, 2004'44(5): 612–20.

[54] B. Lofgren. Should Pharmacists Become Board Certified? Pharmacy Time. January 13, 2015. Available from: http://www.pharmacytimes.com/contributor/beth-lofgren-pharmd-bcps/2015/01/should-pharmacists-become-board-certified. (Accessed on: 29-Jan- 2018).

[55] C. A. Pedersen, P. J. Schneider, D. J. Scheckelhoff. ASHP national survey of pharmacy practice in hospital settings: Prescribing and transcribing—2016. American Journal of Health-System Pharmacy September 2017;74(17): 1336-1352; DOI: http://sci-hub.tw/10.2146/ajhp170228.

[56] M. Y. L. Siaw, Y. Ko, D. C. Malone, K. Y. K. Tsou, Y. J. Lew, D. Foo, et al. Impact of pharmacist- involved collaborative care on the clinical, humanistic and cost outcomes of high- risk patients with type 2diabetes (IMPACT): a randomized controlled trial. J Clin Pharm Ther. 2017;42: 475–482. https://doi.org/10.1111/jcpt.12536.

[57] A. Sha,aban, A. Jatau, A. Aly, M. A. Hammad, E. A. Casmir, O. O. Olubukola. Drug utilisation pattern and associated adverse drug events in hypertensive patients at a tertiary healthcare facility in south-west Nigeria. Malaysian Journal of Pharmacy. 2017;3(1): 55. Available from: https://www.researchgate.net/publication/320919252_drug_utilisation_pattern_and_associated_adverse_drug_events_in_hypertensive_patients_at_a_tertiary_healthcare_facility_in_south-west_nigeria.

[58] M. A. Chisholm-Burns, J. K. Lee, C. A. Spivey, M. Slack, R. N. Herrier, E. Hall-Lipsy, et al. US pharmacists' effect as team members on patient care: systematic review and meta-analyses. Med Care. 2010 Oct;48(10): 923-33. DOI: 10.1097/MLR.0b013e3181e57962.

[59] A. Aly, Z. Yusoff, S. Othman, S. A. Syed Sulaiman, A. Kharshid, M. A. Hammad, A. Sha'aban. Patient safety knowledge, attitudes, and skills of undergraduate pharmacy students at University of Science, Malaysia. PHARMACOTHERAPY. 2017;37(6): e44. DOI: 10.1002/phar.1815.
[60] B. Shay, L. Louden, B. Kirschenbaum. Specialty Pharmacy Services: Preparing for a New Era in Health-System Pharmacy. Hospital Pharmacy. 2015;50(9): 834-839. DOI: 10.1310/hpj5009-834.
[61] M. H. Rim, L. Smith, M. Kelly. Implementation of a patient-focused specialty pharmacy program in an academic healthcare system. American Journal of Health-System Pharmacy June 2016;73(11): 831-838; DOI: http://sci-hub.tw/10.2146/ajhp150947.
[62] Carver, J. B. Lee, B. Newman. Advancing Patient Care Through Specialty Pharmacy Services in an Academic Health System. J Manag Care Spec Pharm, Aug 2017;23(8): 815-820. https://doi.org/10.18553/jmcp.2017.23.8.815.
[63] N. A. Ahmad, N. H. Abd-Jabar, N. H. Awaluddin, N. Kamaruddin, N. Mohd-Rasid, T. M. Elsayed, et al. How community pharmacists perceive generic substitution impact on community pharmacies profits in absence of medicines price control policy: A Malaysian pilot nationwide study. Journal of Generic Medicines. 2017;13(2): 64–72. DOI: 10.1177/1741134316680390.
[64] K. A. Mullican, S. J. Francart. The role of specialty pharmacy drugs in the management of inflammatory diseases. American Journal of Health-System Pharmacy June 2016;73(11): 821-830; DOI: http://sci-hub.tw/10.2146/ajhp150727.
[65] J. Jacobi, S. Ray, I. Danelich, E. D. Ashley, S. Eckel, R. Guharoy, et al. Impact of the Pharmacy Practice Model Initiative on Clinical Pharmacy Specialist Practice. Pharmacotherapy 2016;36(5): e40–e49. DOI: 10.1002/phar.1745.
[66] B. L. Carter. Evolution of Clinical Pharmacy in the US and Future Directions for Patient Care. Drugs & aging. 2016;33(3): 169-177. doi:10.1007/s40266-016-0349-2.
[67] Washington, D.C. BPS To Introduce Practice Eligibility Attestation Requirement in 2019. Retrieved on 11 November 2018 from https://www.bpsweb.org/2018/05/29/bps-to-introduce-practice-eligibility-attestation-requirement-in-2019/
[68] Board of Pharmacy Specialties (BPS). Added Qualifications. Retrieved on 11 November 2018 from https://www.bpsweb.org/bps-specialties/added-qualifications/
[69] Board of Pharmacy Specialties (BPS). Board of Pharmacy Specialties Seeks Pharmacists to serve on its Compounded Sterile Preparations Pharmacy Specialty Council. Mar 6, 2018. Available from: https://www.bpsweb.org/2018/02/27/new-specialty-compounded-sterile-preparations/.
[70] S. Anders, V. Basalyga, M. Campara, A. Condon, N. A. Pilch, J. B. Skelton, C. E. Webb. A Petition to the Board of Pharmacy Specialties Requesting Recognition of Solid Organ Transplantation Pharmacy Practice as a Specialty. March 2018. Available from: https://www.bpsweb.org/wp-content/uploads/BPSSOTPetition032818.pdf.