T.R.N.C.

NEAR EAST UNIVERSITY

INSTITUTE OF HEALTH SCIENCES

Introducing Clinical Pharmacy Practice Experiences into Pharmacy Education Curriculum for Students in Near East University, Northern Cyprus

A THESIS SUBMITTED TO THE GRADUATE INSTITUTE OF HEALTH SCIENCES

BY:

Abdikarim Mohamed Abdi

In Partial Fulfilment of the Requirements for the Degree of

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DEDICATION

I dedicate this work to my beloved Grandma Aisha and my best friend Qusai Al Omar whom both were source of encouragement and inspiring but are now no more here, they are there waiting for us in a better place with Allah's mercy. For them I dedicate this thesis.

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ABSTRACT

Abdikarim M. Abdi, Introducing Clinical Pharmacy Practice Experiences into Pharmacy Education Curriculum for Students of Near East University in Northern Cyprus. Near East University, Institute of Health Sciences, Clinical Pharmacy Doctorate's Thesis', Nicosia, 2017.

Despite global advances of pharmacy practice and education, student's experience opportunities are insufficient to practice activities, and tasks essential to deliver pharmaceutical care.

The aim of this work is to describe the implementation, and assessment of a clinical pharmacy practice (CPP) experience course in internal medicine, more specifically in cardiovascular, drug information and respiratory clinics, which are all newly integrated into curricula at Near East University, Faculty of Pharmacy, Northern Cyprus.

CPP course was designed for fifth year students, with duration of 8 weeks. Student competencies were assessed using Objective Structured Clinical Examinations (OSCEs) and written exams, before and after the course, mapped in 8 main CPP competency domains.

The course utilized a wide variety of learning activities. Competencies that were improved are: Taking medication history, Response to the patient symptoms, Pharmacotherapy application, Patient assessment, Drug Information (DI) interpretation, Public health counseling, Drug Related Problems (DRPs) management, Patient counseling and communication skills.

Student's perception and experience were assessed using semi-structured group interview and questionnaires.

The course provided a rich experiential learning environment rather than just theoretical knowledge delivery of clinical pharmacy. Students were well perceived the course structure assessment and attained knowledge. This experiential course could be implemented in other faculties of pharmacy within the Turkish Higher Ministry of Education.

Key Words: Assessment, Pharmacy practice, clinical pharmacy, hospital pharmacy, OSCEs, pharmaceutical care, pharmacy practice experiences, simulation

TABLE OF CONTENTS

LIST OF ABBREVIATIONS:

ABBREVATIONS	EXPLANATION
AACP	American Association of Colleges of Pharmacy
ABO	Ability Based Outcome
ACPE	Accreditation Council for Pharmacy Education
ACCP	American College of Clinical Pharmacy
APPE	Advanced pharmacy practice experience;
CAPE	Centre for the Advancement of Pharmacy
COPD	Chronic obstructive pulmonary disease
CPE	Continuing professional education
CPP	Clinical Pharmacy Practice
CPPE	Clinical Pharmacy Practice Experience
CPS	Clinical pharmacy services
CVD	Cardiovascular disease
DI	Drug information
DM	Diabetes disease
DRP	Drug related problems
DTP	Drug therapy problem
FDA	Food and Drug Administration
FIP	Pharmacists International Federation
IRB	Institutional Review Board
MDI	Metered dose inhaler
MI	Myocardial infarction
MTM	Medication therapy management
NEU	Near East University
OBE	Outcome Based Education
OSCE	Objective Structured Clinical Examination
ÖSYM	Student Selectıon Placement Centre

PDI	Powdered dose inhaler
PEV	Peek expiratory volume
Q 1 –Q 6	Question 1 – Question 6
RD	Respiratory diseases
S.E.M	Standard error of the mean
SD	Standard deviation
SPSS	Statistical Package for the Social Science
TRNC	Turkish Republic of Northern Cyprus
UK	United Kingdom
URTI	Upper respiratory tract infection
USA	United States of America
WBL	Work Based Learning
WHO	World Health Organization
YÖK	Turkish Higher Education Council

List of Figures:

List of Tables:

1. Introduction:

1.1 Pharmacist's responsibilities in a patient centred healthcare system

"A more responsible approach of pharmaceutical care practice" was what Hepler and Strand called for and since then pharmacy practice continued to evolve to a more patient centred practice, a practice that clearly emphasis on the patient's welfare (Hepler CD, 1990).

This philosophy of practice proposed by pharmacy educators as Hepler is actually what restored pharmacy as unique existing profession after being almost de-professionalized by the end of 19th century and emergence of large drug manufacturing and packaging firms (Hepler CD, 1990; Savage, 1994).

Since then pharmacists kept introducing and evaluating hundreds of new and existing services or interventions using a range of research methodologies and medication-administration modalities, to contribute to the field of patient safety and achieving better therapeutic outcomes (Inc., 2014).
Currently people live longer; thanks to advances in understanding of the causes of diseases, and consequent improvements in diagnostic techniques and effective treatment modalities. However, as living longer people are increasingly living with chronic diseases, which form nine out of ten top causes of death worldwide (Inc., 2014).

The World Health Organization and World Bank Group recently also predicted that 40 to 50 million new health and social care workers are needed if "universal health coverage" is to be achieved, which is greater than all previous expectations (Global Health Workforce Alliance & WHO; 2015).

All these challenges brought out the revolution in global healthcare in the last century as well as the shift in pharmacy practice i.e. illness and drug related morbidity and mortality, in terms of efficacy or adverse effects. All healthcare providers have to be dedicated for collaboration to integrate evidence-based practice that will not just improve the use of medicines, but also the prevention and early detection of diseases (Ayorinde, et al; 2013).

Being the most accessible health care professional, community pharmacists have a crucial role to ensure that patients receive treatment at an earlier stage by screening and simple diagnostic tests, evidence suggests that screening for some diseases in community pharmacies is feasible and would lead to better therapy outcomes (Ayorinde, et al; 2013).

Evidence based pharmacy practice is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients (Sackett DL et al; 1996). It is currently considered as a major requirement to assure good pharmacy practice (World Health Organization & FIP; 2011). Solid grounding in evidence based practice and literature critique is necessary for medication management duties of pharmacists, as clinical evidence grows exponentially (Crotty, Maria, et al; 2004).

Pharmacists being uniquely qualified experts in drug therapy, they deliver direct patient care in many developed countries where they function with expanded scopes performing physical assessment, have prescriptive and laboratory authority, formulate clinical assessments, develop therapeutic plans, provide patient education, care coordination, and follow-up care, manage both acute and chronic disease (Gibberson, R. S., Yoder, C. S., & Lee, C. M. P, 2012).

Pharmacist-provided direct patient care has favorable effects across various patient outcomes, health care settings, and disease states (Gibberson, R. S., Yoder, C. S., & Lee, C. M. P, 2012). Pharmacist led clinical services are effective and of significant value in areas of elderly patient care, hypertension, anticoagulation, dyslipidaemia, congestive heart failure, coronary artery disease, diabetes, osteoporosis, pain management, Antibiotic drugs rational use, antidepressants, asthma, end-stage renal disease and tobacco cessation (Chisholm-Burns MA. et al. 2010; Kaboli PJ, et al. 2006; Van Wijk B, et al 2005; Graabaek T, Kjeldsen LJ, 2013 ; Hanlon JT, Lindblad CI, Gray SL 2004; Aguiar PM, et al. 2012; Machado M, et al. 2007; Charrois TL, 2012; Altowaijri A, Phillips CJ, Fitzsimmons D, 2013; Ponniah A, et al. 2007; Evans CD, et al 2011; Santschi V, et al 2012; Obreli-Neto PR, et al 2011; Wubben DP, Vivian EM., 2008; Cranor CW, Christensen DB., 2003; Cranor CW, Bunting BA, Christensen DB.,2003;43: Elias MN, Burden AM, Cadarette SM., 2011; Bennett MI, et al. 2011; Von Gunten V, Reymond JP, Beney J., 2007; Rubio-Valera M, et al. 2011; Bell S, 2005; Herborg H, et al. 2001;

Herborg H, Soendergaard B, et al. 2001; Soendergaard B, et al. 2000; Schulz M, et al. 2001; Mangiapane S, et al. 2005).

Increasing evidence show also that community pharmacies are a feasible setting in which to deliver health promotion-type intervention and thus actively contribute to public health (Brown, T. J., et al. 2016).

All above mentioned roles go within the "responsibility" pharmacists are committed for and the fathers of modern pharmacy practice called for in their famous paper "Opportunities and Responsibilities in Pharmaceutical Care". To carry such a responsibility; pharmacy schools should develop competent graduates with unique knowledge, skills and attitude as FIP foresight the future in face of global health challenges.

The International Pharmaceutical Federation (FIP) held the first Global Conference on Pharmacy and Pharmaceutical Education in Nanjing, China in 2016. The conference gathered over 500 pharmacy leaders from across the globe to set a global vision for education and workforce development of pharmacists and pharmaceutical scientists. (International Pharmaceutical Federation, 2016)

In this conference the FIP led the adoption of a clear roadmap on which all stakeholders of healthcare profession should rely to advance education and training through a shared vision to accept full responsibility and accountability for improving global health. (International Pharmaceutical Federation., 2016)

Pharmacy undergraduate programs should prepare graduate pharmacists with the adequate knowledge, skills and attitudes to obtain roles in health promotion and providing pharmaceutical care in a variety of settings, including communities and hospitals. Core competences to achieve that goal should be well-assessed and evaluated within curricula to provide accountability for the goals of pharmacy education (Nash, R. E.,et al 2015).

Advanced pharmacy practice experience (APPE) is a practical training course or experience, delivered in the final academic year that enable students to apply and

strengthen their clinical skills, and prepare them to take responsibility as competent pharmaceutical care providers.

In pharmacy faculties under the Turkish Ministry of Higher Education, pharmacy programs were elongated in the year 2005 from a 4 years course programs to a 5 year programs. As the prolongation aimed to increase the number of courses and experiences that may contribute to students pharmaceutical care providing competency development, the last incremented year is reserved for some elective courses, graduation project, and a minimum 6 month mandatory traineeship under the supervision of a pharmacist in the public pharmacy or in the hospital. (YÖK, 2008)

Pharmaceutical care models including mentorship of the students on applying pharmacotherapy are facing many challenges in Turkey. Of mention, newly adopted curriculums doesn't contain sufficient exposure of students to advanced clinical pharmacy practices, while on the other hand senior practitioners carrying students mentorship role deem the competence of providing clinical services. (SANCAR, OKUYAN, APIKOGLU-RABUS, & Vehbi, 2013)

In this thesis project the importance of advanced pharmacy practice experiences according to global pharmacy education standards are reviewed, and most important components and settings of pharmacy practice experiences are reported. The importance of assessment in assuring the outcomes of such crucial learning activity and a comparison between currently used methods are described. Later in this project we introduce an advanced CPPE to students at Near East University Faculty of Pharmacy and assess their competence using OSCE's. Both student scores and perceptions toward OSCEs and the CPPE are measured and reviewed.

2. BACKGROUND

2.1 Theoretical & Conceptual framework

Over the past half century, pharmacy practice and subsequently education undertook major transformations. These transformation were driven mainly by the fact that pharmacy was about to demolish as a profession a process that sociology philosophers call de-professionalization.

Later to the development of large pharmaceutical industries and their stores, pharmacists gradually lost three quarters of their professional function that had characterized their work for nearly one thousand years (Desselle, S. P., 2007).

Later a new focus was set, pharmacy educators called for a patient focused modal of pharmacy practice in which pharmacists as drug experts apply their skills knowledge and attitudes for the purpose of achieving definite outcomes that improve a patient‘s quality of life. As this philosophy restored the profession many scholars derived and further characterized the responsibilities and interventions by which pharmacists could significantly contribute to the well-being of individual patients (Hepler CD, 1990).

Pharmacy education also reshaped to assure the preparedness and fitness of graduates to pursue their proposed role. Education shifted to an objective based learning where the essential competences for pharmaceutical care providing form the final target that all graduates should achieve. For students to reach this stage the curriculums should be well structured and properly assessed within curricula and at the end of a learning activity as an evidence of learning, while mentorship and work-based learning theories form the base for today’s modern pharmacy education curriculums (Hollenback, R. G., 1999; Banta, T. W., & Palomba, C. A., 2014). All these theories and modals explained in details in the following pages form the theoretical and conceptual framework for applying this thesis project.

Three Major Shifts in theoretical debates formulate our framework. A shift pharmacy profession from de-professionalization to knowledge based profession, pharmacy practice shift from a product centered practice to a patient centered care and an educational and learning shift to outcomes based learning.

2.1.1 Shift in Pharmacy Profession and Practice:

From a state of de-professionalization back to a knowledge based profession:

Profession is seen as a disciplined group of individuals possessing special knowledge and skills that adhere to ethical standards their knowledge and skill are derived from research, education and training at a high level, to apply it in the interest of others (Professions Australia, 2016).

The American theorist Talcott Parsons was one of the first to address the role of the professions in theoretical terms, he saw professions as fulfilling useful and necessary social functions (functionalism) he present them as groups of distinct experts who apply esoteric knowledge to particular cases and by doing so control the inherent asymmetry of the expert-client relationship (Parsons, T., 1954).

Parson saw the function of professions as to hold society together in his vision of modern societies and that their commitment is one of service rather than being self-interest (Abbott, A., 2014).

Later other sociologists define profession as a network of strategic alliances across ownership boundaries among practitioners who share a core competence (Savage, 1994).

As such many definitions exist that many argued about defining professions yet most of traits of a profession that many agree on include those outlined by Traulsen and Bissell:

1. Professional authority over the lay person
2. Sanction by the community of the power and privilege of professionals
3. Confidential nature of the professional-client relationship
4. Shared ethical values regulating the profession
5. Theoretical knowledge underlying the practice of the professional
6. The existence of a professional culture that is passed on to new entrants to the profession (Traulsen, J. M., & Bissel, P., 2004).

Pharmacy appears in the early literature of professions, at least in relation to health care and medical profession literature (Pearson, G. J., 2007). Pharmacy had been seen as a profession that provided service of fundamental value to societies. Traditionally, it was regarded as a transitional discipline between the health and chemical sciences and as a

profession charged with ensuring the safe use of medication (Pearson, G. J., 2007). In the early 1900s, pharmacists fulfilled the role of apothecary for medicinal use. By the 1950s, large-scale manufacturing of medicinal products by the pharmaceutical industry, and the introduction of prescription-only legal status for most therapeutic agents, limited the role of pharmacists to mainly dispensing pre-fabricated products (Pearson, G. J., 2007).

According to Parson's theory that we mentioned, professionals has the characteristic in which they exercise their important social function through ``mechanisms of social control'', by applying scientific and rational knowledge to particular cases and maintain progress in societies by deploying certain features that make their actions distinctive from those of nonprofessionals (Professions Australia, 2016). As applying this to pharmacy as it lost three thirds of the functions that characterized it as a unique profession i.e. Compounding, Procuring, Storing and Distributing medicine, many started to question is pharmacy still a profession?! Or is it deprofessionalized.

This debate in sociology is not only concerning pharmacy, as deprofessionalisation and proletarianisation were both debates that were argued for a long concerning the contemporary status of the medical profession since the emergence of Marxist and the critical ideologies (Bissell, P., Traulsen, J. M., & Haugbølle, L. S., 2002)

Proletarianisation is seen as the process by which an occupational category is divested of control over certain prerogatives relating to the location, content and essentiality of its task activities, thereby subordinating it to the broader requirements of production under advanced capitalism (McKinlay, J. B., & Stoeckle, J. D., 1988).

A classic example is physicians move to hospitals, McKinley argues that physicians worked in independent practices in the past, but that this model has been surpassed because of state sponsored encroachment of capitalism into health care (insurance), the development of complex new technologies and treatments, and more complex organizational structures (McKinlay, J. B., & Stoeckle, J. D., 1988; Traulsen, J. M., & Bissel, P., 2004).

McKinley argues that medicine is increasingly subject to rationalization, as it is divided up into numerous technical tasks, some of which are undertaken by cheaper and less qualified occupational groups (e.g., nurses) and so medical doctors no longer work

altruistically but for large corporations. In short, they have been proletarianised. (McKinlay, J. B., & Stoeckle, J. D., 1988).

Deprofessionalisation on the other hand is more relevant and common in healthcare as its seen as a loss to professional occupations of their unique qualities, particularly their monopoly over knowledge, public belief in their service ethos and expectations of work autonomy and authority over clients'' (Traulsen, J. M., & Bissel, P., 2004). This explains according to Haug, physicians increasing specialization, as a way to cope with decrease of knowledge gab between them and their clients thus maintaining monopoly through specialization. (Traulsen, J. M., & Bissel, P., 2004; Haug, M. R., 1972).

In the case of pharmacy, if we take the trait theory of the professions, it is clear that pharmacy has a number of the characteristics needed to qualify. For instance, it had a monopoly of practice in majority of countries; pharmacists possess specialized knowledge and undergo a lengthy period of training. They have a service orientation, in the sense that they provide a set of pharmaceutical services, treat minor ailments and provide health advice. They also regulate their own professional conduct, via their own bodies, thus this approach indicate that pharmacy is indeed a profession.

However many argued against this, Denzin and Metlin. (Denzin, N. K., & Mettlin, C. J., 1968) in their article entitled `Incomplete professionalization: The case of pharmacy' argued that pharmacy had not succeeded in becoming a ``true'' profession since it lacks control over "drugs" the social object of its practice and that also pharmacists are guided by commercial interests in conflict with service orientation of professions. Knapp and Knapp (Knapp, D. A., & Knapp, D. E. 1968) also concluded by analyzing community pharmacists that pharmacy had not been able to clearly define its professional functions and role as drugs are still controlled by the medical profession, and community pharmacies were torn between professionalism and commercial interest. They conclude that although pharmacy had the potential to become a health profession, it had so far failed to do so (Knapp, D. A., & Knapp, D. E. 1968).

Claesson addressed the professional status of the pharmacist in Sweden from 1500 to the 1980s as pharmacists maintained a high professional status in before 1900 followed by a period of deprofessionalisation throughout the 20th century due to factors mainly the

pharmacists' subordinate position in relation to physicians and the pharmacists' relationship to control over medicine (Claesson, 1989)

Others argued that commercial interests and professional services do not necessarily constitute a problem. Many sociologists (Harding, G. and Taylor, K. 1997; Almarsdóttir AB, Morgall JM., 1999) agree that it is more important to analyze what tasks pharmacists actually conduct, pharmacists had the knowledge and opportunity to accomplish the symbolic transformation of pharmacological entities into medicines (social objects), and that this was possible within the community pharmacy setting (Harding, G. and Taylor, K. 1997).

One problem the pharmacy profession has had to confront is that pharmacy education does not always keep pace with the demands of the labor market (Waterfield, J., 2010). Pharmacists utilized their scientific knowledge to develop the skills necessary to formulate, compound, and dispense medicines. Later the task of dispensing was only left; a task which in its narrowest sense can be approached as marketing and sales and can be completed by a technician. This reality contradicts the idea that the knowledge required for the work of a dispensing pharmacist is inaccessible as in the case of other professions and pre industrial pharmacy practice. As this is no longer the role of the pharmacist, the pharmacist arguably has been ‘‘deskilled’’ and does not have specialist skills (Ritzer G., 2000).

Yet pharmacists are perceived as active members of the health care team, for example, in the case of clinical pharmacy and pharmaceutical care with responsibility for inter-professional as well as patient consultation. This role falls in areas of expertise that do not fit into the technical paradigm but belong to a disease- and patient-oriented approach to pharmaceutical decision-making. Here a question rises; are pharmacists oriented for this role as a trait, or a shared core competence for all pharmacists which distinguish them as profession. (Waterfield, J., 2010; Droege, M., & Baldwin, H. J. 2005)

2.1.2 Shift in Pharmaceutical Education

Educational dimensions and theories:

As pharmacy practice shifted to a more patient centered practice, supported by legislations pharmacists were reported not to be prepared enough for skills required of them in their daily work (Almarsdóttir AB, Morgall JM., 1999)

The ability of a pharmacist to recognize a patient's symptoms or to offer prescribing advice to other healthcare professionals would require'' a more inaccessible body of knowledge, what draws focus into pharmacy education and curricula.

Traditional models of education have tended to focus on formal teaching, with the focus being on the 'transmission' of knowledge from teacher to learner. Transmission models actually emphasized on 'teaching' not learning, their focus was mainly on the individual teacher–learner relationship and on 'knowing' rather than 'doing' or 'behaving'. (Barr & Tagg, 1995).

Such models had significant relevance as professional education was only carried in classrooms, the time higher education had significant limitations in transferring dynamic complex knowledge needed for modern professions. (Spady, 1994)

Such traditional models are said to be based on Behaviorism as a learning philosophy. Behaviorism focuses on one particular view of learning: a change in external behavior achieved through using reinforcement and repetition to shape behavior (Phillips, D.C. & Soltis, J.F., 2009).

Desired behavior is rewarded, while the undesired behavior is punished. (Myers, David G. 2008). Behaviorism has since become one of three domains of behavior analysis, the other two being the Experimental Analysis of Behavior, and Applied Behavior Analysis (Orey, M. 2010). Adopting behaviorism allowed educators to assist their students in excelling both academically and personally (Orey, M. 2010).

Within the behaviorist view of learning, the "teacher" is the dominant person in the classroom and takes complete control; evaluation of learning comes from the teacher who decides what is right or wrong (Orey, M. 2010). The learner does not have any opportunity for evaluation or reflection within the learning process; they are simply told what is right or wrong (Orey, M. 2010).

Following the limitations of behaviorism came by the cognitive theory, his advocates believe that the definition of learning as a change in behavior is too narrow and prefer to study the learner rather than their environment and in particular the complexities of human memory (Yount, William R., 1996).

Cognitive theories grew out of Gestalt psychology. Gestalt psychologists criticize behaviorists for being too dependent on overt behavior to explain learning. They propose looking at the patterns rather than isolated events (Dejong, T., 2010). This approach is based on the assumption that the memory system is an active organized processor of information and secondly that prior knowledge plays an important role in learning that; in order for learning to occur prior knowledge must exist on the topic (Lilienfeld, et al. 2010). Learning is seen as an internal mental process in this approach that include insight memory perceptions and information processing. The educator focuses on building intelligence and cognitive development in such that individual learner is more important than the environment(Smith,M.K, 2003).

Constructivism is a learning theory that sees learners' ability to learn to be largely relaying on what they already know and understand. Students are thought to use this background knowledge and concepts to assist them individually and actively in their acquisition of novel information (Wilson, B. G., & Myers, K. M., 2000). Constructivism is a synthesis of multiple theories diffused in to one form. It is the assimilation of both behaviorialist and cognitive ideals. The "constructivist stance maintains that learning is a process of constructing meaning; it is how people make sense of their experience" (Caffarella, R. S., & Merriam, S. B., 1999; Amineh, R. J., & Asl, H. D., 2015).

When such new information is approached, the learner faces a loss of equilibrium with their previous understanding which demands a change in cognitive structure. This change effectively combines previous and novel information to form an improved cognitive schema (Smith,M.K, 2003; Bodner, G., Klobuchar, M., & Geelan, D., 2001).

Those who advocate constructivism view learning as an active process where learners should learn to discover principles, concepts and facts for themselves, hence the importance of encouraging guess-work and intuitive thinking in learners (Brown, A. L., & Palincsar, A. S., 1989; Ackerman, P. L., 1996).

Other social constructivist scholars emphasize that individuals make meanings through the interactions with each other and with the environment they live in. Knowledge is thus a product of humans and is socially and culturally constructed (Sosa, E., 1991; Prawat, R. S., & Floden, R. E., 1994).

Others social constructivist further state that learning is not a process that only takes place inside our minds, nor is it a passive development of our behaviors that is shaped by external forces and that meaningful learning occurs when individuals are engaged in social activities (McMahon M., 1997).

A combination of these perspectives in curricula is possible seeing them as complementary instead of contradictory; as it's argued to be coexisting. By adopting this combined perspective a broader and even deeper understanding of learning is possible. (Eraut, M.,1994; Sawchuk, P. H., 2008; Wallman, A., 2010)

Outcome based Education:

Outcomes-Based Education (OBE) is an educational model which clearly focus and organize all educational activities around what is essential for all Learners to be able to carry on successfully at the end of their learning experiences.(Spady, 1994) That is to pre define the desired results or "outcomes" from the learning processes and establish assessment measures established to determine whether these educational outcomes are being achieved in individual learners (Hollenback, R. G., 1999; Banta, T. W., & Palomba, C. A., 2014)

The OBE movement began in the 1980s with the idea that curricula should be developed from the standpoint of desired student outcomes (Spady, 1988; Harden et al., 1999; Bradberry et al., 2007; Ho et al., 2009). An educational outcome is a statement that defines the expected performance of a student on completion of a learning activity (Chalmers, R. K., et al.1992). It describes what is to be achieved at the end of a learning experience in much broader terms than learning objectives though it should be also measurable (Payne, D. A., & Payne, D. A. 1997; Huba, M. E., & Freed, J. E., 2000).

In the context of these educational outcomes, decisions should be made about the content of learning program and how it is organized, the educational strategies to be adopted, the teaching methods, the assessment procedures, and the educational environment that the program should be carried on. (Harden *et al.*, 1999)

The educational outcomes of a profesional education should be derived from the educational component of the mission of that professional education institution it should relate to an important role or responsibility that society expects of such profesionals and must be applicable to a variety of practice settings (Beck, D. E., 2000).

Each outcome statement should also embody multiple levels of development, so that it can be broken down into clearly defined steps, each of which corresponds to an increasing level of complexity as the student progresses through a curriculum (Hollenbeck G., 1999).

Since the end of the last century, majority of healthcare educational systems have continuously shifted towards an outcomes-based model of assurance rather than the traditional input-based teaching driven by increasing stakewholders expectations (Harden et al., 1999; Marriott et al., 2008).

Competency based education and assessment is one example of OBE (Gonczi, 1994; Chappell et al., 2000). Competences are defined as knowledge, skills, behaviors and attitudes (International Pharmaceutical Federation Pharmacy Education Taskforce, 2012) that an individual accumulates, develops and acquires through education, training and work experience (Brown et al., 2012). In pharmacy education, the CAPE outcomes constitute an example of competences or outcomes required from pharmacists across their educational curriculums for many schools. The CAPE outcomes (initiative of the Center for the Advancement of Pharmacy (CAPE) within the AACP) form a framework of ability based outcomes to guide pharmacy educators and preceptors in setting their curricula for both didactic and practical courses objectives and outcomes (Medina et al., 2013) The initiative is intended to be the target toward which the evolving pharmacy curriculum should be aimed. Their development was guided by an advisory panel composed of educators and practitioners nominated for participation by practitioner organizations. The CAPE 2013 Educational Outcomes represents the fourth version or revision preceded by CAPE 1992, CAPE 1998 and CAPE 2004 respectively (Medina et

al., 2013). Also accreditation standards for pharmacy programs globally demand that outcomes of teaching must be the emphasis (Barr & Tagg, 1995; Pharmacy Education R&D Reference Group, 2004; Wilson, 2010; General Pharmaceutical Council, 2011; Smith, 2011; Council, A. P., 2014).

The outcomes based or competence based models is currently the main trend in modern higher-level education favored as a quality indicator of tertiary pharmacy education as the programs outcomes can be assessed or evidenced directly through student performance especially when proper assessment methods are adopted within and after the educational programs. (Harden et al., 1999; Draugalis et al., 2002; Anderson et al., 2005; Ried et al., 2007; Marriott et al., 2008; Council, A. P., 2014; Stupariu, 2012; Stupans et al., 2014; International Pharmaceutical Federation,Global vision on Pharmacy education. 2016)

There is no single specified style of teaching or learning activities or assessments in OBE; many organized learning activities may contribute to OBE using different methods for learning, such as work based learning, trainings, meetings with tutors, seminars, and lectures (Beck, D. E., 2000).
The role of the faculty is to adapt into instructor, trainer, facilitator, and/or mentor to help students achieve the specified outcomes (Merriam SB, Caffarella RS. 2012).

Work based learning (WBL):

WBL is a term widely used to refer to learning that is derived specifically from taking on a workplace role (seagraves 1996), it has the potential to meet the needs of practioners by promoting learning that is practice driven (Foster 1996, Walker and dewar 2000) it enables students to identify the learning potential of their experience and relate learning to practice and articulate learning for the purpose of assessment (Swallow et al 2000).

Learning at work is the product of the interaction between different dimensions of individual and social factors, learning can both be explicit and tacit. Many activities, social and individual, formal and informal, contribute to such learning while practitioners focus during WBL on the realities of practice within a theoretical and reflective framework (Burton, J, 2004).

The form and time taken can vary, ranging from short attachments lasting a few days to sandwich placements and company training programmes lasting several weeks or months

(Pavlakou, M., 2016).Whatever form it takes, a programme of WBL should aim to extend the learner beyond a simple awareness of the work place to an actual increase in competence (Burton, J, 2004).

In pharmacy education; pharmacy practice experiences form the main accreditated work based learning providing students with real-life work experiences of a pharmacists in different settings where they can apply their knowledge, skills and attitude to develop their competencies and employability. To achieve the desired educational outcomes of pharmacy graduates, students need opportunities to practice the integration of knowledge, attitudes, and skills in either simulated or actual practice settings (Beck, D. E., 2000).
During early experiantial practices students have opportunities to participate in pharmacy practice in a variety of settings. In late experiantials; experiences should increase in complexity and encompass the attributes of pharmaceutical care. While learning activities carried in early training include shadowing, service learning, miniclerkships, and traditional dispensing experiences (Beck, D. E., 2000).
Characteristics of good quality WBL include : (Blackwell et al ; 2001):

- Mutual understanding of all the underlying intentions between educators and students.
- The quality of work experience is enhanced by prior induction and briefing of all involved, by facilitation of on-going reflection and identification of learning outcomes.
- Work experience is accredited so that it is taken seriously.
- Students build up a work-experience portfolio so that quality is monitored.
- There is effective reflection, that is, students can explain what they have learned.
- Formative assessment is used to support the process of learning.

As a summary for our conceptual framework for this thesis, pharmacy had been a profession provided service of fundamental value to society. Deprofessionalism was about to terminate profession; before new social needs were addressed by pharmaceutical care. Dynamic education reforms and competence based education sustain professional interventions while work based learning is an effective strategy for competence development. In such learning outcomes should properly be assessed both in formative and summative forms.

2.2 Role of EPPE in pharmacists competencies development

Coupled with the dramatic changes in healthcare system, patient needs, and evolving pharmacy practice, pharmacy education faced extensive changes over the last century.
Many experts, organizations and accreditation bodies are continuously working on combining their experience with the latest knowledge to assure pharmacy education that match today's and tomorrow's community needs (International Pharmaceutical Federation, 2016). This objective can be achieved by creating educational programs that compose sufficient practice experiences in different settings, giving the students the opportunity to practice and apply what they have learned in the classroom (International Pharmaceutical Federation, 2016).

Pharmacy practice experiences constitute the core work-based learning experience in pharmacy education that provide students the opportunity to emerge from pharmacy school with an ability to meet the needs of the profession in different settings and also the needs of those who are served by the profession (Nemire, 2006).

Advanced pharmacy practice experiences (APPEs) are practical training courses or experiences, delivered in the final academic years that enable students to strengthen their clinical skills and prepare them to take responsibility as competent pharmaceutical care providers.

APPE courses vary in length and learning outcomes between different countries curriculums and even faculties and also its settings whether a community health centers, tertiary hospitals, community pharmacies and many others (Nemire, 2006).

The ACPE 2016 standards characterize a robust APPE program as being required to support the achievement of the Final Educational Outcomes of Pharmacy education resembled by the CAPE outcomes 2013 (Medina et al., 2013).

The following are the descriptions of CAPE Outcomes addressed by APPE published evidence between 1997- 2014:

The CAPE outcomes require a graduate pharmacist to be a .. :

1.1 Learner

2.1 Caregiver

2.2 Manager

2.3 Promoter

2.4 Provider

3.1 Problem solver

3.2 Educator

3.3 Advocate

3.4 Collaborator

3.5 Includer

3.6 Communicator

4.1 Self-aware

4.4 Professional (Dennis et el., 2016).

Recently in Nov 2016, the International Pharmaceutical Federation (FIP) held the first Global Conference on Pharmacy and Pharmaceutical Education. The conference gathered over 500 pharmacy leaders from across the globe to set a global vision for education and workforce development of pharmacists and pharmaceutical scientists (International Pharmaceutical Federation, 2016). The World Health Organization and World Bank Group recently predicted that 40 to 50 million new health and social care workers are needed if "universal health coverage" is to be achieved which is greater than all previous expectations (Global Health Workforce Alliance and WHO; 2015).

For this; the FIP led the adoption of a clear roadmap on which we can all rely to advance education and training through a shared vision to accept full responsibility and accountability for improving global health (International Pharmaceutical Federation, 2016). The Nanjing conference also stated 64 statements on pharmacy and pharmaceutical sciences education as a guide for all regional and national pharmacy education programs (International Pharmaceutical Federation, 2016).

Regarding experiential practices it was emphasized in Nanjing that it should foster development of problem solving and critical thinking skills relative to drug discovery and medicines use. Students should participate in direct patient care experiences at different practice settings and have access to a warrietties of practice environments, including caring for a diverse group of patients in various cultural and healthcare environments, provided with supervised laboratory and clinical experience throughout the curriculum.

Furthermore, students should be provided with the opportunity to apply the clinical and pharmaceutical knowledge in practical settings, under the supervision of a faculty member or volunteer preceptor and other health care professionals in a collaborative manner. Students need to have enough chance to reflect on their clinical learning experience through patient case presentations and development of pharmaceutical care plans.

Mutually determining learning objectives with the learnes should be considered in internships and rotations with appropriate guidance. Preceptors should be provided with opportunities to contribute to curricular decision-making, assessment and strategic activities. Students may have their elective experiential education internships in non-traditional settings (Hall Kevin et al; 2012) as regulatory agencies.

Finally, as students demonstrate the ability and the right attitude to follow confidentiality policies, they should be familiar with culture of risk assessment, risk management and patient safety should be communicated clearly as an objective for a pharmacist when practicing in different settings (International Pharmaceutical Federation, 2016).

2.3 Core components and structure of an effective APPE

Pharmacy Education in Turkey and Northern Cyprus:

Pharmacy education in Turkey had as such successive changes from 2 years schools before 1850 that was later prolonged into 3 and 4 years programs till 2005 when the Higher Education Institution of Turkey prolonged 4-year pharmacy education programs to a 5-year program due to the EU directive 2005/36/EC (Bilge, Miray, Sevgi, and Selen, 2015;Özkan and Esatoğlu, 2014). As the prolongation aimed at increasing courses and experiences that may contribute to students pharmaceutical care providing competency, the last incremented year is reserved for some elective courses, graduation project, and a minimum 6 month mandatory traineeship under the control of pharmacist in public pharmacy or in hospital a regulation implemented since 2008 (YÖK, 2008).

In Turkish inhibited Northern Cyprus, several universities with pharmacy faculties are placed which yearly mainly students from Turkey are placed according to the Turkish Higher Education Council [YÖK]– Student Selection Placement Center [ÖSYM] exam results.

Students originally from Northern Cyprus do only university entrance exams. The graduate gets a M.Pharm degree at the end of also five years as in Turkey. The curriculum includes basic science courses and specialized coursework in pharmacy (Rümeysa, Hale, and Bülent, 2012).

Yet pharmaceutical care and mentoring students on applying pharmacotherapy is facing many challenges. The currently adopted curriculums doesn't contain sufficient exposure of students to advanced clinical pharmacy practices (Uzun, Gülpınarand Özçelikay, 2017) while also on the other hand older pharmacists mentoring new graduates themselves didn't receive enough clinical knowledge and training before new regulations and reforms took place (Sancar et al., 2013). Students in Turkey and Northern Cyprus were reported as being scarcely introduced to advanced pharmaceutical care services in classes such as: disease state management, identification and resolution of drug therapy problems, drug information utilization etc. With CPD programs being not compulsory for recertification in pharmacy practice in Turkey; students carry their practice also in community pharmacies where pharmacists could be interested in offering pharmaceutical care through patient care services in their pharmacy practice settings but are in fact struggling

with the knowledge, and necessary skills, to implement such services (Sancar et al., 2013). from here rises the need of faculties to establish their own advanced pharmacy practice sites so to enhance student patient care service provision development, and assure their competence to meet the increasingly complex health care needs of societies as done in many countries worldwide (Rodis et al ; 2008).

Characteristics of an Effective APPE:

1- A structured Practice experience: i.e. a practice with pre-declared and continuously revised and updated objectives that can be observed or measured. In other words, a structured APPE is an experiential practice course that must have a clearly detailed schedule, time frame, outline of activities, and assignment of responsibilities having the learning as the primary objective which should be measurable and verifiable. Unstructured programs are considered as an informal learning (Thomas, 2006).

2- Objectives and outcomes should be ability-based:

An educational outcome is a statement that defines the expected performance of a student on completion of a curriculum or program (David, Dennis, Samuel, Edward, and Clarence, 2002). Pharmacy education bodies and their released standards all recommend outcomes to be an ability-based outcome (ABO) (Medina et al., 2013). ABO is a clear statement of what the student is expected to be able to do within a particular learning environment, describing a specific activity, behavior, or performance that involves the integration of knowledge, skills, and attitudes and can be observed and measured (David et al, 2002).

The CAPE outcomes (initiative of the Center for the Advancement of Pharmacy (CAPE) within the AACP) as a framework of ability based outcomes to guide pharmacy educators and preceptors in setting their curricula and both didactic and practical courses objectives and outcomes (Medina et al., 2013). The initiative is intended to be the target toward which the evolving pharmacy curriculum should be aimed. Their development was guided by an advisory panel composed of educators and practitioners nominated for participation by practitioner organizations. The CAPE 2013 Educational Outcomes

represents the fourth version or revision preceded by CAPE 1992, CAPE 1998 and CAPE 2004 respectively (Medina et el., 2013).

As experiential practices constitute the last education module pharmacy students receive before graduation many pharmacy schools and faculties regard CAPE outcomes as the student learning outcomes assessed at end of the modules representing their competencies (Turner et al., 2006).

Effect of the Learning Environment:

All advanced experiential practices should be carried in a direct patient care providing site as the standards state. The outcomes describe what students should be able to do on completion of the curriculum, and strategies that actively involve students are essential during the learning process. This include not only learning processes, but also the content, teaching techniques, physical facilities, services and extents of pharmaceutical care practice provided at that site, qualifications of the faculty members involved in the program setting, and the qualities of the students themselves (Diane, 2000; Hollenbeck, 1999).

Importance of Assessment and different assessment excercises within APPEs:

The assessment component of an effective APPE represents multiple types of measures that reflect the achievement of outcomes of learning. Assessment data may be categorized as one of three major types: the gross general measures such as number of participants and percentage of those who completed .The second level is perceptions measures of students, faculty members, employers, and other stakeholders may be measured by means of surveys, interviews, and focus group discussions, to assess whether these individuals believe students or graduates are achieving the desired outcomes. Both gross measures and perceptions are indirect measures of outcomes because they do not actually measure student abilities, while gross measures do not also provide further information why failing for example is happening.

The third level is direct student ability measuring or competence testing. In this different methods are used worldwide to evaluate experiential practice students these include one or combination of the following evaluations: written, verbal or practical examinations, observations ratings and graded assignments (Diane, 2000).

Donald Kirkpatrick developed a Four-Level Training Evaluation Model that's applicable to experiential education to evaluate the effectiveness of such training programs. The model identified the following four levels (1) reaction, (2) learning, (3) behavior, and (4) results as evidence for learning. Table 1 shows examples for assessments for each level of education evidence (Bates, R.; 2004).

Table 1 Kirkpatrick's hierarchy (KH) and examples of each level's suitable assessment

Kirkpatrick's hierarchy (KH)	**Level 1. Participation**	**Level 2a. Attitudes**	**Level 2.b Knowledge /skill**	**Level 3. Behavior**	**Level 4a. Results**	**Level 4b. Results**
	Reaction	Learning	Learning	Behavioral change	Organisational practice	Benefit for patient
Assessment activities examples	Survey of student satisfaction Self-assessment of learning	Student perceptions or attitudes after a learning experience Preceptor perception of student abilities after a learning experience	Quantitative change/improvement or documentation	Quantitative evidence (compared to baseline)	Implementation of new initiatives based on documented outcomes	Documented change in health care outcomes

As all methods have "pros and cons", written exams are not as subjective as other types of evaluations, but their disadvantages is the difficulty to assess synthesis and evaluation of data with a written exam. As according to blooms taxonomy experiential are categorized at the top of the taxonomy where preceptors should evaluate students on their ability to synthesize and evaluate information in order to optimize the pharmaceutical care of their patients which difficult with a written exam. In addition, written exams cannot evaluate certain outcomes such as professionalism, verbal communication skills, utilization of technology, and literature evaluation (Pancorbo, 1980).

Verbal examinations may assess higher levels of cognition better than written exams since the examiner can ask the student additional questions based on their initial response and can evaluate communication for an extent but yet verbal's are not adequate to evaluate all the outcomes, added to them being subjective to 1 or few examiners as some studies showed the poor reliability of verbal examinations (Pancorbo, 1980).
Practical examinations using stations with standardized patients or OSCEs have the advantage of assessing the student's ability to synthesize and evaluate data, and, if structured correctly can evaluate most of the outcome expectations.

OSCE, an acronym for Objective Structured Clinical Examination is a well-established tool for assessing clinical competence of pharmacy students. It is a performance-based test that evaluates clinical knowledge, professional judgment, communication, interpersonal skills, problem-solving skills, and resolution development (Austin, O'Byrne, Pugsley, and Quero, 2003; Harden, 1988). It was first developed by Ronald M. Harden, and since the first publication of his work in the British Medical Journal in 1975 OSCEs became universally adopted for many medical schools and professional bodies as a standard approach to assessment of clinical competence in a planned, objective and structured way (Evans et el., 2004).
Over 1500 papers have been published that deal with teaching or assessment using standardized patients better known now as Objective Structured Clinical Examination (OSCEs). OSCE's were firstly adopted in North America in a widespread manner, and then widely adopted in the UK in the 1990s. The principle method for clinical skills

assessment in medical schools and licensure bodies across USA, Canada, UK, Australia, New Zealand and other countries, is now the OSCE (Evans et el., 2004).

The OSCE is an approach to the assessment of clinical competence in which the components of competence are assessed in a planned or structured way with attention being paid to the objectivity of the examination (Evans et el., 2004). It was proven that the Objective Structured Clinical Examination (OSCE) are effective for students and practitioner assessment, therefore it has been adopted in disciplines other than medicine, like dentistry, nursing, midwifery, pharmacy and even engineering and law.

OSCE is a form of performance-based testing used to measure candidates' clinical competence. During an OSCE, candidates are observed and evaluated as they go through a series of stations in which they interview, examine and treat standardized patients who present some type of medical problem. The hallway of OSCE exam rooms, each occupied by a uniquely challenging patient, is usually a familiar milieu to the candidate (Evans et el., 2004). Although OSCEs are performed in many settings in regard to the exam purposes, the organizing institution, and available facilities, they all share similar procedures (Gelula, Yudkowsky, and Acad, 2002).

On the examination day, candidates will go through the following steps in sequence:

1. Registration
2. Orientation
3. Escorting to exam position
4. Station Instruction Time
5. The Encounter
6. Post Encounter Question Period
7. Repeat Steps 4 to 6 to complete all stations
8. Exam ended / Escorting to dismissal area

As reported by Sturpe in 2009, only 37% of 87 sampled pharmacy schools in the United States were using OSCEs in their curriculums, while others reported their plans to implement OSCEs in nearest future., Many pharmacy schools around the world have incorporated OSCEs in their curricula as an assessment tool in pharmacotherapy courses, laboratory courses. OSCEs are also part of advanced pharmacy practice experience (APPE), yearly summative examinations, continuing education activities, and licensure processes in Canada, USA, UK, Brazil, Japan and Malaysia as a primary component to assess problem based learning (Sloan et el., 1996; Kirton and Kravitz, 2011; Galato,

Alano, Trauthman,and França, 2011; Tokunaga et el., 2014; Awaisu, Abd, Nik Bux, and Mohamed, 2010).

Role of preceptors as a key factor in APPE success

Preceptors as future pharmacists' mentors; have a critical role in the professional development of student pharmacists. The 2004 AACP Professional Affairs Committee (PAC) report provided guidance on preceptor characteristics thought to be conducive to effective learning. Specifically, a preceptor should be approachable and available to the student for interaction and discussion, demonstrate trust and respect for the student in interactions, and demonstrate interest and enthusiasm in teaching. In addition, the report stressed that an effective preceptor explains the decision-making process to the student, asks questions that promote learning, stimulates the student to learn independently, allows autonomy appropriate to the student's level of experience and competence, and regularly provides meaningful positive and negative feedback to the student in regular and timely manner (Littlefield, 2004).

The AACP Academic-Practice Partnership Initiative (APPI) on preceptor-specific criteria of excellence describes six criteria necessary for effective mentoring: possesses leadership/management skills; embodies a practice philosophy; demonstrates being a role model practitioner; is an effective, organized, and enthusiastic teacher; encourages self-directed learning with constructive feedback; and has well developed interpersonal communication skills (AACP, 2014).

Regardless of preceptor type (US, international, non-pharmacist), at a minimum, APPE preceptors should be able to orient the student to the practice experience site, assist in selection of activities with respect to practice experience objectives, student goals, and level of expertise, outline parameters of responsibility for activities, special projects, and timelines, assess the student's progress, communicate regularly with the experiential learning coordinator on the student's performance (especially if performance is unsatisfactory) and concerns about the student's progress, share information with the pharmacy program, and complete an evaluation of the student's performance after appropriate discussion with the student. Additionally, the importance of intercultural communication (i.e., the sending and receiving of languages across cultures and a

negotiated understanding of meaning in human experiences across societal systems and societies) must be considered by all APPE preceptors. In this context, considerations of differences in educational hierarchy norms and gender roles must be discussed with preceptors to assure a rewarding experience for both preceptor and student (Arent, 2009; Weiner, et al., 2013).

All these fore mentioned components together with a proactive well back grounded and oriented student form the keys for effective APPEs. Pharmacy practice units should assess and evaluate all these components in such a systematic approach that should ensure continuous improvement of the learning environment and achievement of the educational outcomes. This leads to strengthen the graduate's competence via effective APPEs and prepare them to take responsibility as competent pharmaceutical care providers.

3. AIMS AND OBJECTIVES

Despite global advances of pharmacy practice and education, students experience opportunities are insufficient to practice activities, and tasks essential to deliver pharmaceutical care.

Generally the aim of this thesis project is to describe the implementation, and assessment of a clinical pharmacy practice (CPP) experience course in internal medicine, more specifically in cardiovascular, drug information and respiratory clinics, which are all newly integrated into curricula at Near East University, Faculty of Pharmacy in Northern Cyprus. (Table 2 summary of aims and objectives)

The aim of the first paper is to describe how a formative OSCE was developed and applied and to evaluate and quantify the performance of the students in the OSCEs in the areas of knowledge, clinical and social skills, as a pilot study before formally incorporating OSCEs into the curriculum.

The objectives of the second paper is to implement an advanced clinical pharmacy practice experience to: (1) enhance the clinical competency and confidence of 5^{th} year students of NEU faculty of pharmacy to deliver advanced patient care services and meet ACPE standards for certification. (2) Introduce and implement sustainable advanced clinical pharmacy services in hospitals, and (3) increase the number of quality advanced pharmaceutical care providing training sites for the NEU faculty of pharmacy students. The purpose of this paper is to describe implementation, and assessment of clinical pharmacy practice (CPP) experience course in internal medicine, cardiovascular, respiratory clinics and drug information Centre (DIC), all newly integrated into curricula at a university in Northern Cyprus, and highlights possible features that could be also adopted at other Turkish and Northern Cyprus faculties of pharmacy to improve experiential education and patient care.

In the third paper, we describe student experience and perception of OSCEs as an assessment tool for an experiential clinical pharmacy practice course newly adopted by a pharmacy school in Northern Cyprus.

This initiative started among faculty members during the process of international certification provided by Accreditation Council for Pharmacy Education (ACPE) as a direct response to ACPE International Quality Criteria for Certification of Professional Degree Programs in Pharmacy 2012 and FIP Global Framework for Quality Assurance in Pharmacy Education, launched in 2014.

Table 2. Summary of aims and objectives of the carried studies.

Introducing OSCEs	To validate OSCE in evaluating and quantifying the performance of the students in a resource attenuated setting.
Introducing CPPE	describe implementation, and assessment of clinical pharmacy practice (CPP) experience course in internal medicine, cardiovascular, drug information and respiratory clinics
Student's perceptions toward OSCEs & APPE.	describe student experience and perception of OSCEs as an assessment tool for an experiential clinical pharmacy practice course newly adopted by a pharmacy school in Northern Cyprus

4. DESIGN AND METHODOLOGIES

Table 3 shows summary for the methodologies adopted in the three studies carried within this thesis project.

Table 3. Summary of Methodologies adopted in the carried studies.

Methods & Material:				
Study	Population	Design	Outcomes	Statistical analysis
Introducing OSCEs	**4th year Students Second semester**	**Interventional** A blueprint guided 13 stations OSCE exam based on experiential course objectives was developed, validated, and conducted	**Students' scores on rubric**	• Scores in mean ± S.E.M • One-way ANOVA and Tukey's tests • Fisher extract test • $P < 0.05$ • GraphPad Prism (version6.0)
Introducing CPPE	**5th year first semester**	**Interventional** An 8 weeks structured CPP course was designed for fifth year students. Student competence was assessed using OSCEs and written exams before and after the course, mapped in 8 main CPP competence domains. The course utilized a wide variety of learning activities. Competencies strengthened include: taking medication history, response to symptoms, pharmacotherapy application, patient assessment, DI interpretation, public health counseling, DRP management, patient	**Students' scores on rubric compared to baselines.** **Preceptor student evaluation** **Student self-evaluation** **Written summative exam**	• Scores in mean ± S.E.M • Chi-square test • One-way ANOVA & Paired Tukey's tests • Fisher extract test • $P < 0.05$ • GraphPad Prism (version6.0)

		counseling and communication skills.		
Student's perceptions toward OSCEs & APPE.	**5th year first semester**	A cross-sectional survey was conducted using a face validated 24-item questionnaire tool validated by experienced faculty members and educators. Semi structured not audiotaped group interview.	**Students Perceptions & response**	• Frequency tables • Statistical package for social sciences (SPSS) version 16.0

4.1 Design of the study Evaluating Students using OSCE's

The OSCE methodology, purpose and structure were introduced to fourth year pharmacy students in Northern Cyprus seven days prior to the exam. A 13-station examination was prepared by the Faculty Assessment Committee (12 of them were clinical cases and one was a feedback station). Members of the Committee were initially trained at a two-day workshop on designing and implementing OSCE exams by an international lecturer. The committee was comprised of clinical preceptors (n = 5) and lecturing professors (n=4). A blueprint was developed to guide case scenario preparation, based on the material covered by the students in a clinical pharmacy course, which the students had taken in the preceding semester as stated in the course description. A committee of three persons was assigned to develop 12 station cases and one feedback station and then all were peer-reviewed. Suggested changes were incorporated into the final versions of all 13 stations.
A checklist with a grading scale for skills and knowledge evaluation was developed for all clinical cases. An examiner and a standardized patient were assigned to each station with a clinical case. Examiners were predominantly faculty members (70 %) and preceptors (30 %), while standardized patients included faculty members (33 %), postgraduate students (33 %), and some undergraduate fifth-year students (33 %).

Both examiners and standardized patients were introduced to the OSCE exam methodology and objectives three weeks prior to the exam. They were all included in the OSCE case scenario acting training session, held one week before the exam.

A verbal declaration of commitment to ensure exam confidentiality was provided by all patients and examiners, as written case scenarios were given to them three days prior to the exam. Each standardized patient and assessor was requested to assign 30 minutes on the training days for a training session on their respective case, so that they could be instructed on how to interact with different types of OSCE examinees. Participants were asked to role-play the cases during the training sessions and individual performances were reviewed and discussed by both patients and assessors. On the exam day, a pilot round was administered before students' enrollment to the exam. In addition, a brief pre-OSCE orientation was provided for all students.

Twelve clinical cases were developed and paired into two sets of six cases, assessing comparable skills, knowledge or attitudes but within a different case scenario. This was done to maintain examination security and confidentiality without isolating the students for a long period of time. Students were grouped into two shifts; a morning or an afternoon shift. Each student was assigned to run one loop of six cases, followed by a feedback station.

After the end of the exam, the students' perceptions were collected at the feedback station in an interview with two non-examiner committee members and two international education experts. Answers were immediately recorded in electronic format and interviews were not audiotaped. Students were questioned about their perception of the exam, case difficulties or ambiguities, standardized patient performance, the exam setting and timing, and whether they had enough pre-guidance. They also shared their opinions about the advantages and disadvantages regarding incorporating OSCE's regularly as a primary method for student clinical skills assessment.

Competencies evaluated in the OSCE included response to symptoms and history taking, pharmacotherapeutic knowledge, systems based client assessment, data retrieval and interpretation using an evidence-based approach, providing general health advice, clinical prescription management problems, patient counseling and communication skills. The Institutional Review Board at Near East University determined that the study did not require ethical review.

Statistical analysis**:**

Statistical analysis was performed using GraphPad Prism (version 6.0). Student scores or grades were expressed as the mean ± S.E.M. One-way ANOVA and Tukey's tests were used for comparing student performance at each station. Fisher extract test was used for comparing student's performance in written exam compared to OSCE. $P < 0.05$ was considered as statistically significant.

4.2 Design of the study Introducing CPPE into Curricula

Setting and practice site:

The program was set at Near East University Hospital (NEUH) during the spring semester of the academic year 2015-2016. NEUH is a tertiary hospital that provides acute, intermediate, rehabilitation and outpatient health services, it's one of the largest healthcare centers of Northern Cyprus with 500 beds and one of the leading medical facilities affiliated with the Near East University. Clinical pharmacy services were first established in respiratory disease clinic and ICU patients later for cardiology, internal, gynecology, geriatrics, infectious diseases clinics, nephrology and drug information center all under the supervision of clinical pharmacy and drug information center department of the hospital.

Preceptor training and competence in both delivering pharmaceutical care services and mentoring students was assured. Preceptors pharmaceutical care competency was proofed by delivering direct care to patients in ward based clinical practice, and evaluating the impact of their interventions on therapeutic outcomes (yet unpublished studies). Also all preceptors attended two workshops each for two days one on active learning skills and the second one on assessing clinical competency via objective tools and methods

Program Objectives and Structure:

An 8 weeks structured clinical pharmacy practice course was designed for fifth year students. Course objectives and learning outcomes were stated as:

- To be knowledgeable in drug therapy planning and evaluation in hospitals

- To be capable of disease state management and monitoring for therapeutic endpoints in different clinical settings
- Being capable to provide public heath advice and create awareness of general health issues.
- Searching for drug information in timely manner by using evidence based resources.
- Critique primary, secondary and tertiary resources.
- Patient interviews, education and counseling
- Effectively communicate verbally and nonverbally in patient case and drug information presentations and in communication with other healthcare providers.
- Professionalism in all aspects of practice, including team interaction, motivation, communication skills, reporting and service documentation.

Students had full time training in 4 modules; drug information, internal medicine, cardiology and respiratory diseases. The course utilized a wide variety of learning activities including formal and informal case presentations, in-service and therapeutic newsletters preparation, pop quizzes, direct patient care providing and counseling, journal clubs and collaborative rotations participation. Competencies strengthened include: taking medication history, response to symptoms, pharmacotherapy application, patient assessment, DI interpretation, public health counseling, DRP management, patient counseling and communication skills.

Minimum requirements per student per a week was one formal case presentation, two informal case presentations, 4 inpatient follow up 2 discharge patient counseling, collaborative rounds participation and an in-service. Journal clubs, article critique monographs and drug newsletters were further requirements for drug information center rotation.

Program outcomes assessment:

Both summative and formative assessment methods were adopted, both objective and subjective approaches were used to evaluate student performance and program components, student competence on 8 main domains were mapped pre-pro-program via a formative blueprint-guided 13 stationed Objective Structured Clinical Examination (OSCE), measures to improve the validity and reliability of OSCEs included developing

realistic case scenarios, station development guided by a blueprint that pre-defines exam domains to be assessed, all activities were prepared by a team of preceptors and educators totally 7 organizers, case scenarios were peer reviewed and set with appropriate scoring rubrics. Prior training of standardized patients and examiners was carried before each OSCE, as well as pilot testing of the OSCE stations just before the exam. Preceptors evaluated students throughout the program on daily performance, presentations, services, daily interventions, quizzes final summative exam and a survey of course objectives

Data extraction and statistical analysis:

Students evaluated the program settings, site and preceptors' performance, their learning experience and used assessment method via a 5 domain Likert survey of 65 items. Student's assessment and perception of OSCEs is reported separately in another manuscript.

Students self-evaluation of their experience post course, preceptors evaluation and grading of students' knowledge skills and attitude, and students' scores on OSCE pre and post course using the same blueprint were all compared and analysed for outcomes. The data collected were analysed using GraphPad Prism (version 6.0). The methods used to analyse the data include descriptive statistics such as percentages and frequency for the categorical variables. The continuous variables as student's scores were expressed as the mean ± S.E.M and analysed using One-way ANOVA and then the paired Tukey's- test as a post hoc test or Chi-square test. Level of significance is $p < 0.05$.

Ethical considerations:

Institutional Reviews Board (IRB) of Near East University Hospital approved the study and assigned this research as being educational activity. Students were instructed to use only patient initials during the study without recording patient's location or other related not clinical essential individual data.

4.3 Design of the study Student Perceptions toward OSCE

A blueprint guided 13 stations OSCE exam based on experiential course objectives was developed, validated, and conducted for fifth year students of a pharmacy school in Northern Cyprus.

Competences assessed involved drug information retrieval and interpretation, systems based client assessment of anticoagulant toxicity and DM complications, management of DTPs in respiratory and cardiovascular diseases patients' prescriptions, pharmacotherapy knowledge of DM, asthma, COPD, hypothyroidism, anticoagulants use and toxicity management. Also response to symptoms and history taking was assessed with patient education skills on DM, insulin use and inhalers use. General health advice providing skills for respiratory and cardiovascular diseases patients, and finally communication skills with patients with different attitudes was also tested.

A cross-sectional survey was conducted using a face validated 24-item questionnaire tool validated by experienced faculty members and educators. The questionnaire was originally retrieved based on a comprehensive literature review and modified from a previously validated instrument used to evaluate a group of students. (Ahmed, 2007) It was comprised of items to gather questions evaluating the level students' satisfaction, OSCE stations, and rating the OSCE.

The questionnaire was administered on the 13th station immediately after all students completed the examination. Students were asked to complete the questionnaire on a voluntary basis.

The questionnaire comprised of questions to evaluate the content and structure of the examination, student's perceptions of OSCE reliability, and rating of individual OSCE stations and also rating OSCEs compared to other assessment methods used during the experiential course. A 4-point Likert-type scale that indicated degrees of agreement consisting of disagree, normal, agree and no comment was used for 14 items. Rating and compares of specific stations was carried with 7 items with a "none of the stations" option. In addition, an item evaluated the general rating of students of the conducted OSCE followed by an open-ended follow-up request for comments to generate qualitative data.Statistical package for social sciences (SPSS) version 16.0 for windows was used for analysis of data.

5. RESULTS AND DISCUSSIONS

5.1 Results and Discussion of the study Evaluating Students using OSCE's

5.1.1 Results:

A total of 77 out of 81 fourth-year students participated in the OSCE exam. The highest mark achieved in the examination was 29 / 30 and the lowest was 3.5 / 30, with an average grade of 17 / 30. As shown in Table 4, the students scored their highest marks in Station 10 (hypertensive patient on atenolol with misconceptions about his medication, mean 4.4 ± SEM = 0.23), followed by Station 5 (pediatrics patient with URTI, mean 3.68 ± SEM = 0.18).

The lowest grades were recorded at Station 8 (managing drug-drug interactions, 2.00 ± 0.21), followed by Station 4 (CVD risk assessment and providing medical information, 2.04 ± 0.22). When comparing average student performance for the same scenarios performed by different standardized patients and assessors, no significant differences (Question1a (Q1a) Vs Q1b **p = 0.69**; Q2a Vs Q2b **p = 0.67**; Q3a Vs Q3b **p = 0.74**) were seen in parallel simultaneous circuits in which faculty members were the assessors. However, significant differences were found in those in which the assessors were postgraduate students (Q4a Vs Q4b **p = 0.0001**; Q5a Vs Q5b **p = 0.001**; Q6a Vs Q6b **p = 0.003**).

Table 4: Students' average performance in each OSCE station

Station	**Description Of Competency**	Mean ± S.E.M.	Max score	Min score	N
1	Clinical prescription management in pregnancy	2.6 ± 0.2 ****; #	4	0	47
2	Systematic approach to patient medication history and symptoms of drug toxicity in pregnancy	2.52 ± 0.22 ****; ##	5	0	47
3	Inspecting an adverse reaction to antihypertensive medication	2.7 ± 0.22 ****; #	5	0	47
4	CVD risk assessment and providing medical information	2.04 ± 0.22 ****; ####; ΔΔΔ	5	0	47

5	Systematic approach to patient medication history and symptoms for a pediatric patient with URTI	3.68 ± 0.18	5	0	47
6	Compliance to an MDI drug regimen for a pediatric asthmatic patient	2.12 ± 0.23 ****; ####; ΔΔ	5	0	47
7	Pain assessment and management in geriatric patients	3.55 ± 0.24	5	0	31
8	Clinical prescription management in a patient on levothyroxine with multiple chronic diseases.	2.00 ± 0.21 ****; ####; Δ	5	0	31
9	Inspecting DRP in a pregnant woman on antihypertensive medications	3.19 ± 0.33 *; ¥	5	0	31
10	Educating a hypertensive patient on misconceptions about his medication.	4.4 ± 0.23	5	1	31
11	Counseling an asthmatic patient on PDI inhalation techniques	2.9 ± 0.31 **	5	0	31
12	Managing the drug related problems of a sinusitis patient on anticongestants who developed Rhinitis medicamentosa	3.02±0.26 **	5	0	31

* p<0.05; ** p<0.01; **** p<0.0001 compared vs ST 10

# p<0.05; ## p<0.01; #### p<0.0001 compared vs ST 5

Δ p<0.05; ΔΔ p<0.01; ΔΔΔ p<0.001 compared vs ST 7

¥ p<0.05 compared vs ST 4.

Participant students in a semi-structured group interview (30 - minute sessions for each of the seven groups, n = 12 students/group) stated that they highly enjoyed the experience and felt that the exam resembled actual practice. This provided them with self-confidence, clarified more clearly their defects and also what they needed to improve regarding both their skills and knowledge. The groups interviewed all agreed with the need to review the educational curriculum, incorporating patient care focused courses with more OSCE assessments, which some groups saw as being a good assessing and teaching tool.

Students were generally satisfied with the knowledge and skill levels required in all cases.

They saw that the cases had been realistic, while most groups were also satisfied with the pre-OSCE preparation and instructions.

The average grading of the OSCE setting according to the students' view was 9 out of 10, while five groups out of the seven felt that station 5, which assessed "The response to symptoms and medication history taking for a pediatric patient", was the station they liked most. All seven groups agreed that the "drug information manipulation" station was the most difficult for them.

All groups also agreed that the five-minute timeframe given for each station was enough, according to their experience. Student responses in the interviews are summarized in Table 5.

Table 5: Participant students' perceptions in a semi-structured group interview (30 minutes session for each of the 7 groups, n = 12 students/ group)

Group	Positive comments	Negative comments	Suggestions
All groups	• Highly enjoyed and perceived the exam, feeling it resembles actual practice. • OSCE provided self-confidence and more clearly clarified defects and what to improve regarding both skills and knowledge. • Students were satisfied with the level of cases, believing them to be realistic. • Most groups were satisfied with the pre-OSCE preparation and instructions. • The average grading of the OSCE settings according to the students' opinions was 9 out of 10, • 5 out of 7 groups saw station 5 as being the station they liked most (assessing response to symptoms and history taking for a pediatric patient) • Five-minute timeframe given for each station was enough, according to their experience.	• All seven groups agreed that the DI station was the most difficult for them.	• The groups interviewed all agreed on the need to review educational curricula, incorporating patient-care focused courses with more OSCE assessments. • The OSCE seemed suitable, both as an assessing and as a teaching tool. • Students suggested that other pharmaceutical science courses such as pharmacology and phytotherapy and also basic science courses like clinical biochemistry could be discussed within the patient cases.

Individual groups' opinions	• "We wish to start OSCEs in the 2nd year of our course" • OSCEs pilot in the 4th year is "a good exercise for clinical pharmacy practice experiences in the 5th year" • The OSCE was a chance to understand the role of a pharmacist "I am now really aware what the profession is and what I am required to do. Now I am more aware of what I am doing" • "There are pharmacists and	• "We would be more relaxed if someone else is coming to examine us, because we are afraid to answer incorrectly in front of our professors". • A student commented "I think my knowledge was not sufficient' • "We were surprised about the way we had to answer". • Some students did not feel comfortable using	• Students suggest that a patient care course as a new subject that could be included in the curriculum, while industrial and technology pharmacy could be assigned as electives instead. • Students saw a need for more interactive learning and cases to be introduced to their curriculum, saying that "PowerPoint presentations are not enough to teach pharmacy".

5.1.2 Discussion:

According to the literature on OSCE settings and critiques, recommended measures to improve the validity and reliability of OSCEs include developing realistic case scenarios, station development guided by a blueprint that pre-defines exam domains to be assessed and all activities should be prepared by a team rather than an individual. Case scenarios should be peer reviewed and set with appropriate scoring rubrics to increase the examination reliability. (ACPE, 2012; Stowe and Gardner, 2005)

Prior training of standardized patients and examiners is critical to assure station consistency, as well as pilot testing of the OSCE stations just before the exam.

An appropriate number of stations should also be developed to evaluate a wide range of competences and skills and also to reduce sampling errors. There is no clear definition for the optimal number of independent assessments, however, between 12-16 stations is the amount commonly used in OSCEs for pharmacy licensing in the US and Canada.(Austin et el., 2003; Awaisu et el., 2010)

In this OSCE exam, all mentioned practices were considered and successfully applied. This was largely attributable to the pre-training the OSCE team received from an

international expert in pharmacy education. The exam was guided by a blueprint; cases were prepared by a group of clinical pharmacists and hospital preceptors with clinical experience. Standardized patients and examiners were well prepared for the OSCE settings and trained on role-playing in their specific case scenarios. A total of 13 stations were developed and students were divided into two groups; each group enrolled at a set of seven stations; the seventh being the feedback station.

Quality assurance procedures were carried out, including defining methods for reporting and managing errors, receiving announcements and scheduling break times.

No significant differences were noticed when comparing the average student scores in the OSCE and the subject written exam held a month prior, as shown in Figure 1. Students considered OSCEs to be more reflective of their real knowledge and skills than the written exam had been. In the semi-structured interview, the students were extremely positive regarding the method, seeing it as an effective assessment method that could guide important skills that they required for further development.

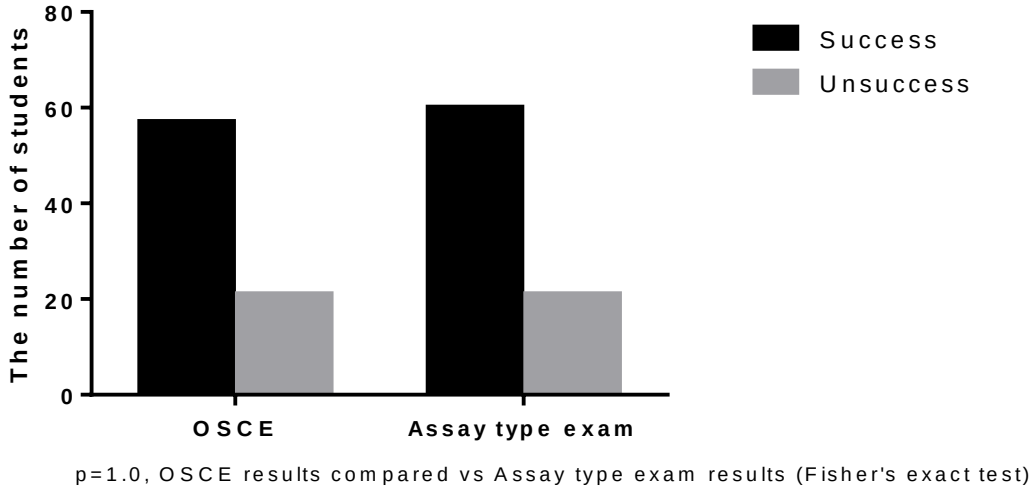

Figure 1: OSCE results compared to written exam results.

The exam was highly efficient in terms of timing, facilities and cost; it did not require considerable financial resources and faculty time, which was the opposite of reports by Stowe and Gardner and others. (Stowe and Gardner, 2005)High costs and difficulties associated with development and implementation are generally the principle reason for the lack of development of OSCE's in pharmacy education (DA, 2010).

A total of 77 students were assessed on a range of skills with 29 people on the examining committee including examiners, standardized patients, timekeepers, waiting room respondents and a general coordinator.

Minimal available resources and settings were used, including 12 rooms (offices and classrooms), while faculty members, postgraduates students and undergraduate volunteer students acted as standardized patients, which helped in reducing the exam costs to a negligible level.
In order to ensure exam consistency and confidentiality, examinees were kept isolated for the entire exam time with no telephone usage allowed, which may have led to student discomfort.

Two approaches were adopted to assure confidentiality without isolating students for a long period. The first was to divide students into two groups - a morning shift and an afternoon shift. Each shift was assigned to a different set of cases that were comparable in terms of skills, domains, and difficulty to the other set of scenarios. The group of 40 students in each shift took 180 minutes in total to carry out their exam.

This approach prevented each group from being isolated for more than two hours; however, a significant difference was still noted in the average student score in the morning shift compared to the afternoon shift. This could be attributed to cases of varying difficulties or ambiguity in the two shifts that the exam committee had not anticipated.

The second approach was to develop two exam arms with the same set of cases carried out parallel to each other. In this scenario, when comparing the average student scores in the individual stations compared to the parallel station, no significant differences were noted (Q1a Vs Q1b $p = 0.69$; Q2a Vs Q2b $p = 0.67$; Q3a Vs Q3b $p = 0.74$) in the stations assessed by faculty members. However, significant differences were noticed (Q4a Vs Q4b $p = 0.0001$; Q5a Vs Q5b $p = 0.001$; Q6a Vs Q6b $p = 0.003$) in those assessed by postgraduates. This may suggest the need for further training and consistency assurance for postgraduate examiners and standardized patients compared to faculty members. This would make the approach more preferable as it would allow more stations to operate concurrently, thereby reducing the student isolation time without affecting exam consistency.

Fourth year pharmacy students scored most highly in patient counseling tasks and identification/resolution of DRPs while they were significantly inferior in the drug information tasks and drug-drug interaction management. This was the same result that was reported in a study of OSCEs that was carried out on pharmacy students in Malaysia. (Awaisu et el., 2010)This suggests the need to reinforce such skills for Turkish students, as this is a crucial competency for pharmacy graduates and practitioners.

In assessing students' perceptions and experience, it was notable that the attitude of Turkish students towards advancing and developing their clinical skills to cope with the global shift in pharmacy practice toward more clinical service providing profession was positive. The students suggested that more clinical courses and practice examples should be included in the current pharmacy curriculum. They perceived the OSCE to be a suitable assessment tool, expressing the wish to have more OSCEs during their time of study.

Positive student attitudes towards more patient care based education along with the Turkish Parliament 2014 pharmacy legislation,(Eğitim Platformu, 2015)which permits all hospitals and clinics to assign more positions for clinical pharmacists, both promote the need to review pharmacy education in Turkey and Northern Cyprus to ensure that graduates are sufficiently competent to provide advanced pharmaceutical care services.
The exam as a pilot study was highly feasible and successful and, to our knowledge, this was the first OSCE to be carried out for pharmacy students in either Turkish or North Cypriot pharmacy schools.

Limitations of the study:
The main drawback of this exam was the inconsistency of cases between the two shifts, since not all students carried out the same tasks. Other methods could be considered in the future in order to maintain the balance between consistency, confidentiality and student comfort.

5.2 Results and Discussion of the study Introducing CPPE into Curricula

5.2.1 Results:

81 students completed the Clinical pharmacy practice experience, out of them 77 students attended both pre-course formative OSCE while all 81 attended the compulsory formative OSCE after the course. All 81 students were assessed individually by preceptors and attended final summative exam. Self-evaluation and program assessment 65 itemed survey was distributed to all students manually but only completely filled by 36 students (response rate 44%).

As such the APPE is evaluated as follows from these 3 perspectives: student's scores on an objective structured clinical examination pre and post APPE; preceptor evaluation of student learning beside summative final exam, and finally student evaluation of their experience and perceptions toward the core elements of the APPE.

OSCE results:

A total of 77 out of 81 fourth-year students participated in baseline OSCE exam, while all 81 students enrolled in the APPE participated in the final formative OSCE. The highest mark achieved in both evaluations was 29/30 and the lowest was 3.5/30 on baseline and 7.0/30 on final OSCE. Average rounded grade in first and final assessments were 16.90 ±0.51 and 20.19 ±0.51 out of 30 respectively showing overall enhancement ($p<0.0001$). As shown in Table 6, in the initial assessment the students scored their highest marks in Station 10 (hypertensive patient on atenolol with misconceptions about his medication, mean 4.4 ±0.23), followed by Station 5 (pediatrics patient with URTI, 3.68 ±0.18). The lowest grades were recorded at Station 8 (managing drug-drug interactions, 2.00 ±0.21), followed by Station 4 (CVD risk assessment and providing medical information, 2.04 ± 0.22).

As within each station several skills and attitude were assessed per each case, Table 7 shows average students' scores for the 8 main competences assessed within the stations.

In the final assessment post the practice experience (Table 8) students scored highest in station 1 (Clinical prescription management for a patient with multiple chronic disease and manipulation of drug information requests,4,62 ±0,09) followed by station 9

(Counseling asthmatic patient on dry powder inhaler (PDI) inhalation techniques, Mean 4,42 ±0,14). The lowest grades were recorded at station 11 (Inspecting DRP in a geriatric patient with ISDN prescription and multiple morbidities with polypharmacy, 2.24 ±0.24) and station 3 (Inspecting adverse reaction of antihypertensive medication, 2.5 ±0.25). A significant student improvement was found in Data retrieval and interpretation competence (P< 0.0001), communication skills and attitude (P< 0.0001) and general health advice (P< 0.0064) compared to baseline assessment (Table 9). Also pharmacotherapy knowledge application and patient counseling skills are seen improved but not significantly compared to initial assessment. The student's scores in both OSCEs were not affected by the set of 7 stations which they were assigned to randomly (p = 0.48; p = 0.76 respectively (p values for Chi-square Test)).

Table 6: Students' average performance in each OSCE station pre APPE

Station	**Description Of Task**	Mean ± S.E.M.	Max score	Min score	N
1	Clinical prescription management in pregnancy	2.6 ± 0.2 ****; #	4	0	47
2	Systematic approach to patient medication history and symptoms of drug toxicity in pregnancy	2.52 ± 0.22 ****; ##	5	0	47
3	Inspecting an adverse reaction to antihypertensive medication	2.7 ± 0.22 ****; #	5	0	47
4	CVD risk assessment and providing medical information	2.04 ± 0.22 ****; ####; ΔΔΔ	5	0	47
5	Systematic approach to patient medication history and symptoms for a pediatric patient with URTI	3.68 ± 0.18	5	0	47
6	Compliance to an MDI drug regimen for a pediatric asthmatic patient	2.12 ± 0.23 ****; ####; ΔΔ	5	0	47
7	Pain assessment and management in geriatric patients	3.55 ± 0.24	5	0	31

8	Clinical prescription management in a patient on levothyroxine with multiple chronic diseases.	2.00 ± 0.21 ****; ####; Δ	5	0	31
9	Inspecting DRP in a pregnant woman on antihypertensive medications	3.19 ± 0.33 *; ¥	5	0	31
10	Educating a hypertensive patient on misconceptions about his medication.	4.4 ± 0.23	5	1	31
11	Counseling an asthmatic patient on PDI inhalation techniques	2.9 ± 0.31 **	5	0	31
12	Managing the drug related problems of a sinusitis patient on anticongestants who developed Rhinitis Medicamentosa	3.02±0.26 **	5	0	31
Average total score out of 30		16.90 ± 0.51	29	3	78

* p<0.05; ** p<0.01; **** p<0.0001 compared vs ST 10

# p<0.05; ## p<0.01; #### p<0.0001 compared vs ST 5

Δ p<0.05; ΔΔ p<0.01; ΔΔΔ p<0.001 compared vs ST 7

¥ p<0.05 compared vs ST 4.

Table 7: Students' average performance in OSCE's assessed competences pre APPE

2015 scores out of 5	Mean Score ± SEM
Respond to symptoms and history taking	3.1 ± 0.2
Clinical prescription management problems	3.1 ± 0.25
Patient counseling skills	3.1 ± 0.14
Pharmacotherapeutic knowledge	2.5 ± 0.12
Systems based client assessment	2.9 ± 0.3
Data retrieval and interpretation	1.6 ± 0.12
Communication skills and attitude	3.3 ± 0.15
General health advice	3.2 ± 0.18
Average	2.85 ± 0.1825

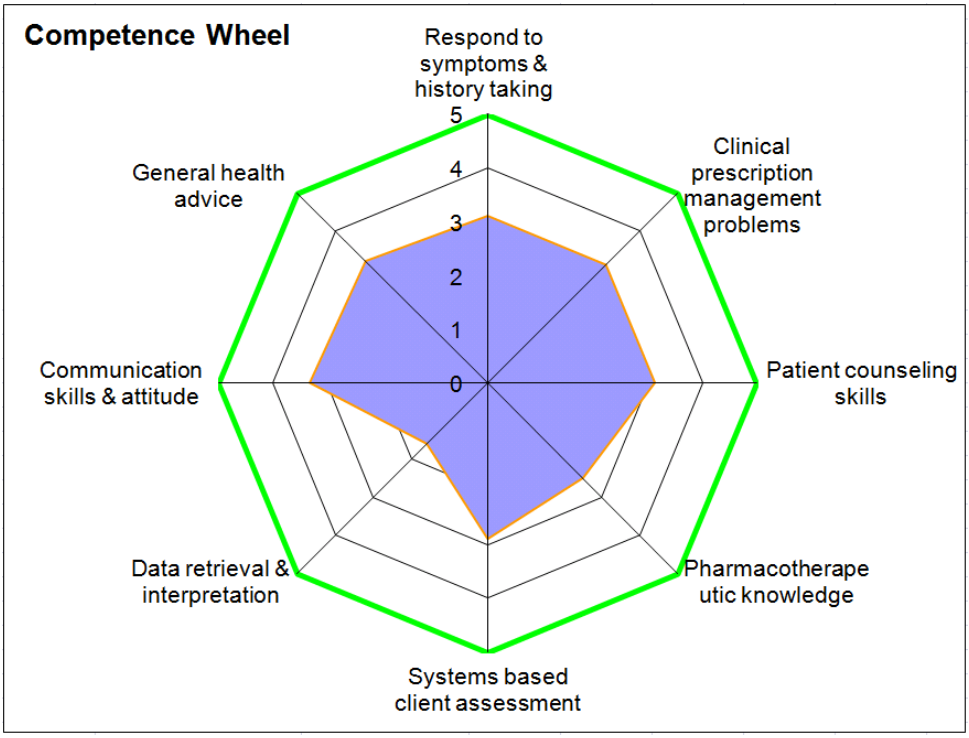

Figure 2: Student initial assessment mapped on competence wheel

Table 8: Students' average performance in each OSCE station post APPE

Station	**Description Of Task**	Mean ± S.E.M.	Max score	Min score	n
1	Clinical prescription management for a patient with multiple chronic disease and manipulation of drug information requests.	4.62 ± 0.09	5	3.00	41
2	CVD risk assessment and Providing medical information	4.33 ± 0.13	5	2.00	41
3	Inspecting adverse reaction of antihypertensive medication	2.50 ± 0.25	5	0	41
4	Systematic approach to the patient medication history and symptoms of anticoagulant drug toxicity.	2.93 ± 0.26	5	0	41
5	Counseling COPD patient on handihaler inhalation techniques and general health measures.	3.10 ± 0.18	5	1.00	41
6	Counseling on insulin regimen for a T1DM patient and patient education on DM.	3.06 ± 0.23	5	0	41
7	Clinical prescription management in a patient on levothyroxine with multiple chronic diseases.	3.89 ± 0.19	5	1.00	38
8	Education of T2DM patient and assessment for therapeutic goals and outcomes.	2.87 ± 0.21	5	1.00	38
9	Counseling asthmatic patient on dry powder inhaler (PDI) inhalation techniques	4.42 ± 0.14	5	2.00	38
10	Systematic approach to the patient medication history and symptoms for a	2.89 ± 0.27	5	1.00	38

	pediatric patient with URTI				
11	Inspecting DRP in a geriatric patient with ISDN prescription and multiple morbidities with polypharmacy.	2.24 ± 0.24	5	0	38
12	Optimizing therapy for a T2DM patient and managing complications.	3.03 ± 0.22	5	0	38
Average total score out of 30		20.19 ± 0.51 ****	29	7	81
**** p<0.0001 compared vs total baseline score					

Table 9: Students' average performance in OSCE's assessed competences post APPE

2016 scores out of 5	Mean Score ± SEM
Respond to symptoms and history taking	3.1± 0.2
Clinical prescription management problems	2.5 ± 0.23
Patient counseling skills	3.5 ± 0.13
Pharmacotherapeutic knowledge	2.54 ± 0.18
Systems based client assessment	3.2 ± 0.25
Data retrieval and interpretation	4.4 ± 0.13
Communication skills and attitude	4.2 ± 0.09
General health advice	3.92 ± 0.12
Average	3.42 ± 0.17

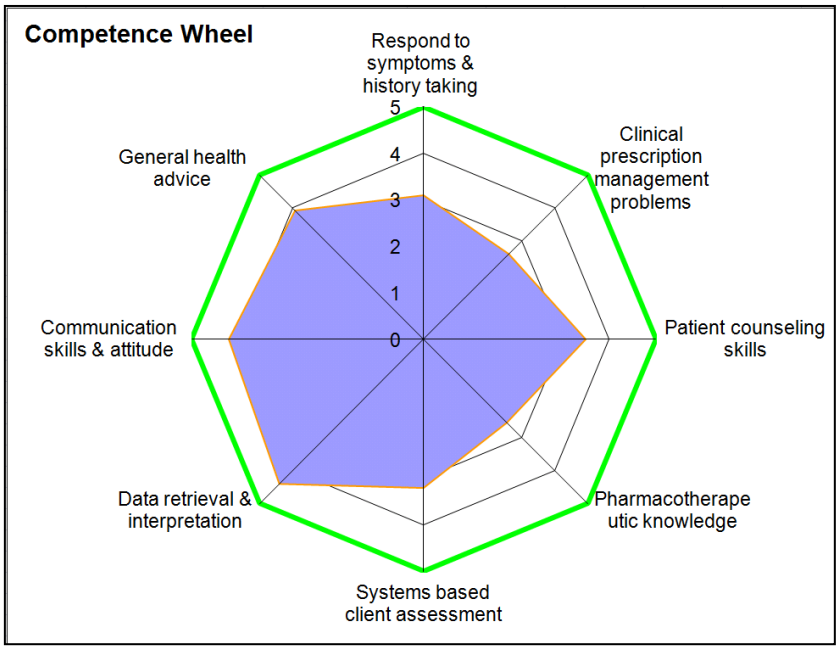

Figure 3: Student's performance mapped on competence wheel

Students and preceptor evaluations:

36 students completely filled student's perception survey out of 81 (44%), the surveyed students identified drug information search and utilization, literature critique and patient case presentations as the most enhanced skills during their experiential practice (3.50 ± 0.184; 3.48 ± 0.211; 3.42 ± 0.220 respectively), followed by Pharmacotherapeutic knowledge application and disease state management (3.38±0.216) Patient education (3.35 ± 0.202), and delivering public health advices with professionalism (3.3 ± 0.194). While drug therapy planning and monitoring for endpoints skills where identified to be less enhanced compared to others (3.18±0.214) (see Table 10).

Majority of the students well perceived preceptors individual evaluation and saw them as being knowledgeable in their practice area (60% and 54% agreed Vs 14.30% and 22.9% disagreed respectively), they also perceived Near East University Hospital as a sui practice site that foster their learning and practice (52% Vs 26%). Informal case presentations were identified as the learning activity most beneficial (27%) though all learning activities sounded beneficial for a significant number of surveyed students (36%) (Table 11). While vast majority of students prefer multiple choice questions in final summative exams (50%).

Students rated the clinical pharmacy practice experience newly added to curricula as practice course of most positive impact on their practice experience followed by their final clerkship course NEPHAR 540 (67% and 54% respectively) (see Table 12).

Table 10: Student's self-evaluation on course objectives:

Statements		Mean	S.E.M
To be knowledgeable and capable of disease state management.		3.38	0.215667
1	Efficiently perform a medication history or a patient interview	3.06	±.228
2	Formulate a care plan to include drug selection, dosing, length of therapy, monitoring parameters, and desired outcomes of common diseases	3.23	±.225
3	Assess allergies, weight/height, organ function, and laboratory values	2.91	±.255
4	Knowledge of Pathophysiology	2.77	±.205
5	Knowledge of pharmacology	3.31	±.200
6	Knowledge of pharmacotherapy	3.29	±.223
7	Apply the knowledge base to patient disease management	3.37	±.213
8	Think critically and prioritize and solve problems	3.49	±.211
Drug therapy planning and evaluation in hospitals		3.18	0.21425
9	Assess the need for current or additional medications	3.24	±.189
10	Identify untreated medical conditions	2.89	±.204
11	Identify medications used without indications	3.06	±.238
12	Identify therapeutic duplications	3.06	±.227
13	Identify improper medication selection	3.12	±.214
14	Identify inappropriate dosing	3.14	±.236
15	Identify drug interactions. adverse drug reactions, and side effects	3.66	±.192

16	Review medications used and drug orders	3.26	±.214
Monitoring for therapeutic endpoints in different clinical settings		3.18	0.216333
17	Perform a pharmacokinetic monitoring plan	3.03	±.207
18	Make a pharmacokinetic dosing recommendation	3.14	±.229
19	Monitor events to prevent drug-related problems and achieve therapeutic outcomes	3.37	±.213
Patient case and Drug Information presentations both in written and oral forms		3.42	0.2202
20	Use appropriate language skills in all verbal and written communication	3.51	±.218
	Provide appropriate verbal and written explanation of plan or recommendation to practitioners	3.65	±.223
22	Effectively write using proper writing skills	3.56	±.208
23	Adhere to requirements for presentations	3.29	±.217
24	Make an appropriate patient case decision	3.11	±.235
Patient interviews, education and counseling.		3.35	0.2015
25	Provide patient education or counselling	3.40	±.210
26	Respect the needs and concerns of others	3.34	±.235
27	Provide appropriate verbal explanation to patients and family	3.54	±.202
28	Assess medication adherence	3.29	±.181
29	Reconcile all Rx and OTC therapies for a patient	3.26	±.155
30	Find counseling materials needed to improve medication adherence	3.28	±.226
Searching for drug information in timely manner by using evidence based resources.		3.50	0.184
31	Provide drug information responses by interpreting the literature to different healthcare providers in timely manner	3.60	±.175
32	Appropriately select or use clinical and scientific information resources	3.40	±.193
Critique primary, secondary and tertiary resources		3.48	0.211667

33	Appropriately interpret literature in solving drug-related problems	3.43	±.218
34	Think critically and problem solve	3.49	±.211
35	Read articles, textbooks, and other resources to solve patient problems and to use the findings to support recommendations and plans	3,51	±.206
Being capable to provide public heath advice and create awareness of general health issues.		3.33	0.193667
36	Provide appropriate verbal explanation to patients and family	3.54	±.202
37	Counsel patients or family members on appropriate OTC agents	3.20	±.224
38	Capable of educating on lifestyle modification and providing advice on general community health issues.	3.26	±.155
Professionalism in all aspects of practice, including team interaction, motivation, communication skills, reporting and service documentation.		3.3	0.2205
39	Acquired essential knowledge skills and attitude to carry the role of pharmacist professionally	3.37	±.246
40	Self-learning promotion Identify learning issues that must be answered to resolve medication-related problems and develop a plan	3.34	±.217
41	Properly prepare monitoring forms	3.29	±.203
42	Document clinical interventions in a clear, logical manner	3.20	±.216

Table 11: Students site and preceptor evaluation				
	Preceptors and site	**disagree**	**Neutral**	**Agree**
1.	The preceptor was interested in teaching this practice.	25.70	25.7	48.6
2.	The Amount of information about the practice given for the students was sufficient	22.90	34.3	42.9
3.	The goals and objectives of the practice were outlined and/or explained at the beginning of the practice.	17.10	34.3	48.6
4.	I had adequate patient and preceptor contact on this practice to meet the learning objectives.	14.30	40.0	45.7
5.	I had access to necessary patient information and was involved in managing cases and resolving therapeutic problems.	25.70	28.6	45.7
6.	The preceptor was readily available to answer questions and concerns.	22.80	28.6	48.7
7.	Good direction and feedback were provided.	22.80	25,7	48.6
8.	The preceptor was knowledgeable in their response to questions and approach to therapy.	22.90	22,9	54.4
9.	This preceptor evaluated me at the end of the rotation in a manner which was helpful to me	14.30	25,7	60
10.	This preceptor served as a role model for a pharmacist practicing in this practice setting.	25.70	25,7	48.6
11.	The NEU hospital practice provided an environment (physical and philosophical) that facilitated my learning and valuable for students	25.70	22,9	51.5

Table 12 : Student's perception of assignment, assessments and experiential practices						
Statements		Disagree		Neutral	Agree	
1.	The students assignment procedure and placing was fare and uncomplicated	27.2		30,4	42.4	
2.	Which evaluation approach was most beneficial for you	quiz	Formal Case presen-tations	Final exam	Informal case discussion	All
		6,1	15.2	15.2	27.3	36.3
3.	The final exam questions were suitable for the assessment of knowledge and skills obtained from this practice.	20.6		31.4	47.0	
4.	The final exam questions were clear challenging but not too much difficult	35		24.2	45.4	
5.	Best assessment method as a final exam	all	Assay	OSCE	Oral examination	Multiple choices
		8.8	5.9	17.6	17.6	50
	General perceptions about experiential practices					
6.	Pharmacy practice experiences were essential and important for being professional pharmacist.	25.7		25.7	48.5	
	Your evaluation to pharmacy practice courses positive impact on your practice development					
7.	Pharmacy practice NEPHAR 490	15.6		31.3	53.1	
8.	Pharmacy practice NEPHAR 491	22.9		28.6	48.6	
9.	Pharmacy service clinical	17.1		17.1	65.7	

	rotations NEPHAR 810			
10.	Pharmacy practice NEPHAR 540	25.8	20.0	54.3
11.	Experiential practices provide students with essential knowledge skills and attitude to carry the role of pharmacist professionally	23.5	17.6	58.8

5.2.2 Discussion:

Globally pharmacy educators work on developing pharmacy practitioners capable of providing pharmaceutical care, promoting wellness and public health (International Pharmaceutical Federation, 2016). This can be achieved by creating educational programs that compose sufficient practice experiences in different settings, giving the students the opportunity to practice and refine what they have learned in the classroom (ACPE, 2015). Pharmacy practice experiences constitute the core work-based learning experience in pharmacy education that provide students the opportunity to emerge from pharmacy school with an ability to meet the needs of the profession in different settings and also the needs of those who are served by the profession (Nemire and Meyer, 2006).

Accordingly came by the CAPE outcomes (initiative of the Center for the Advancement of Pharmacy (CAPE) within the AACP) as a framework of ability based outcomes to guide pharmacy educators and preceptors in setting their curricula and both didactic and practical courses objectives and outcomes (Medina et el., 2013). The initiative is intended to be the target toward which the evolving pharmacy curriculum should be aimed. Their development was guided by an advisory panel composed of educators and practitioners nominated for participation by practitioner organizations. The CAPE 2013 Educational Outcomes represents the fourth version or revision preceded by CAPE 1992, CAPE 1998 and CAPE 2004 respectively (Turner et al., 2006).

As experiential practices constitute the last education module pharmacy students receive before graduation many pharmacy schools and faculties regard CAPE outcomes as the student learning outcomes assessed at end of the modules representing their competencies (Krathwohl, 2002).

In the case of our study an 8 weeks structured clinical pharmacy practice course was designed for fifth year students with 8 stated course objectives and outcomes that fall within 8 different CAPE 2013 outcomes as shown in Table 13.

Table 13: CAPE 2013 outcomes matched with course objectives

CAPE 2013 outcomes	**Course objectives and outcomes**	**Preceptor evaluation**	**Student self-evaluations**
1.1 Learner :	• "To be knowledgeable in Drug therapy planning and evaluation in hospitals"	2.90+0.065	3.38+215
2.1 Caregiver	• "To capable of disease state management and monitoring for therapeutic endpoints in different clinical settings"	3.11 +0.10	3.18+0.21
2.3 Promoter	• "Being capable to provide public heath advice and create awareness of general health issues."	3.47+0.086	3.33+0.194
3.1 Problem solver	• "Searching for drug information in timely manner by using evidence based resources. Critique primary, secondary and tertiary resources.	3.25+0.097	3.49+0.19
3.2 Educator	• "Patient interviews, education and counseling"	3.10 +0.10	3.35+0.20
3.6 Communicator	• "Effectively communicate verbally and nonverbally in patient case and drug Information presentations and in communication with other healthcare providers.	3.37+0.093	3.42+0.22
4.1–4.4 Self-awareness and Professionalism.	• "Professionalism in all aspects of practice, including team interaction, motivation, communication skills, reporting and service documentation."	3.23+0.096	3.3+0.22

Students after the APPE become overall more competent in carrying activities related to the domains Learners, Caregivers, Educators and Self-aware but more significantly in activities related to being Communicator, Problem solver, Promoter and being Professionals.

To assess such competences (i.e. skill knowledge and attitude) Bloom's taxonomy categorizes cognitive skills as knowledge, comprehension, application, analysis, synthesis, and evaluation. Thus experiential practices are assumed to be categorized at the top of the taxonomy where preceptors should evaluate students on their ability to synthesize and evaluate information in order to optimize the pharmaceutical care of their patients (Dennis et el., 2016).

Different methods are used worldwide to evaluate experiential practice students these include one or combination of the following evaluations: arbitrary assignment of grades, written, verbal or practical examinations, observations ratings and graded assignments. (Yardley and Dornan, 2012) In Turkey and Northern Cyprus to our knowledge mainly students are graded upon a final verbal exam with or without a student filled portfolio.

Donald Kirkpatrick developed a Four-Level Training Evaluation Model [(1) reaction, (2) learning, (3) behavior, and (4) results] to evaluate the effectiveness of training programs generally which is as well applicable to experiential education. A review published recently evaluated published APPE in the United States using Kirkpatrick's hierarchy (KH) has reported that more than two thirds of programs are assessed using lower levels of KH i.e. level 1 Reactions; by either student or preceptor surveys, level 2 Learning by activities such as exams and quizzes (Patterson, 2008).
Table 14 shows the distribution of activities carried in assessment of the APPE in this study.

Table 14: Distribution of activities carried in assessment of the APPE

Levels of assessment using Kirkpatrick's hierarchy (KH)	**Level 1. Reaction**	**Level 2.Learning**	**Level 3.Behavior**	**Level 4. Results**
All assessment Activities	• Student self-enhancement survey • Preceptor student learning outcomes evaluation survey	• Quizzes • Written final exam	• Case discussions • Informal and formal case presentations • Simulation and actual patient counselling • Journal clubs • OSCE's	• Clinical interventions • In-services
Course activities' scores weight %	0	40%	40%	20%

The program in this study was evaluated using multiple levels of evaluation according to KH during the course. Students in the survey regarded all these different assessment methods as beneficial for their learning (36%) while case discussions were indicated to be of most benefit to students (27.3%). The students also fairly evaluated the beneficial impact of experiential practices for them indicating this program as being the most beneficial for them (65.7%).

Students in OSCE's showed a significant overall enhancement of their competences post experience. This was significantly pronounced in communication skills, drug information utilization, and public health advices and health promotion. Drug utilization skills enhancement could be attributed to the relatively new drug information center recently opened at the university hospital and drug information experience carried within it.

According to students evaluation preceptors had good knowledge background and evaluated students individually in a pleasing manner (60% and 54.7% respectively) while almost quarter of surveyed students (25.7%) have a debt in preceptor interest in teaching and access to needed patient information in the practice institution. As preceptor role is crucial for the success of an APPE, preceptor training and encouragement can contribute in their pro-activeness and performance.

The Student self-assessment of their learning resembles their scores showing to be realistic though their satisfaction is inferior to other reported APPE elsewhere (Creekmore, 2007; Roden, 2009; Bock, Duong, and Williams, 2008) which necessitate more enhancement of course components settings and quality.

The OSCEs revealed student's overall enhancement, significant enhancement in communication skills, Drug information utilization and providing public health advice (Fig 4). While partially enhanced in patient counseling and pharmacotherapy knowledge application, but no enhancement was noticed in DTP recognition and management necessitating more activities and focus to that competence development.

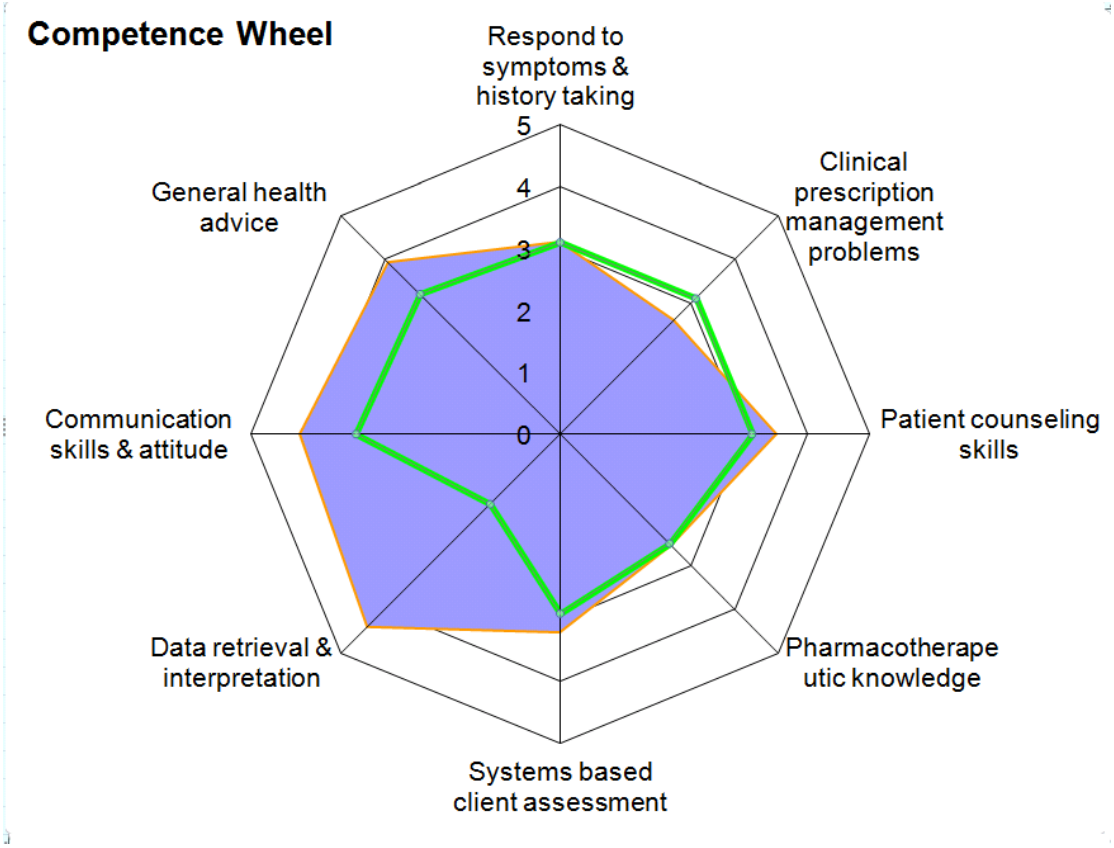

Figure 4: Student's scores compared to baseline

Poor student response to self-assessment survey was noticed mainly attributed to the length of the survey (65 items) which may limit the generalization of the acquired survey results. Also not critically evaluating the student impact on healthcare setting is a limitation for this study though positive economic and quality of care for patients was observed elsewhere by student experiential practices and interventions (Bock et el., 2008).

Yet this is the first study reporting the experience of a structured experiential practice for students from Northern Cyprus and Turkey. Assessment methods used were of both subjective and objectiveness. OSCEs where set according to be best practices of OSCEs with rigid statistically analysis to assure reliability.

Further studies should assess the barriers for successful APPEs in this region and develop experiential practices in multiple diverse settings to optimize care provided by new graduates of Pharmacy in Turkey and Northern Cyprus.

5.3 Results and Discussion of the study Student Perceptions toward OSCE

5.3.1 Results

74 fifth year clinical pharmacy students filled the questionnaire. With shift -A students consist 48.6% (n=36) of respondents while shift-B students represented 51.4% (n=38) of responded students. 90% of the surveyed students agreed that wide knowledge area and clinical skills were covered in the exam.

Over 80% of the students saw that OSCE beside that it provided them with an opportunity to learn real life scenario it was well administered and run in the faculty and better organized compared to a previous pilot OSCE (68%). The majority of students saw the OSCE as an unprecedented opportunity to encounter real-life scenarios.

75 % of the students saw that the 7 minutes time allocated per station was adequate, while a close percentage also agreed that the standardized patients were competent in their role playing. Majority of students though they identify that OSCEs highlighted areas of weakness in their skills and knowledge but still disagree with incorporating OSCEs marks into final marks and thus prefer it as an formative assessment (Table 15).

The evaluation of the OSCE stations was different related to shifts. The most difficult stations in shift-A was station 4 (33.3%) whereas in shift-B station 6 was the most difficult (30.3%). While the stations perceived to be of moderate educational value were assessing the same skills (station-2) (23.5% , 38.7%) (See table 16 and 17). Overall 80% of students rated the OSCE exam settings as good or excellent.

Table 15: Students satisfaction with OSCE

	Questions	**level satisfaction**			
		Disagree	**Neutral**	**Agree**	**No comment**
Q3	Wide knowledge area and clinical skills were covered in OSCE	4(5.3%)	3(4.0%)	68(90.7)	0(0.0%)
Q4	Exams was well structured andsequenced	4(53%)	24(32.0%)	44(58.7%)	3(4.0%)

Q5	Exam was well administered and run	3(4.0%)	12(16.0%)	59(78.7%)	1(1.3%)
Q6	Time at each station was adequate	10(13.3%)	6(8.0%)	58(77.3%)	1(1.3%)
Q7	Enough information was provided before the exam	9(12.0%)	18(24.0%)	42(56.0%)	6(8.0%)
Q8	All assessed skills were covered in the practice course	25(20.0%)	17(22.7%)	42(56.0%)	1(1.3%)
Q9	OSCE provided opportunity to learn real life scenarios	1(1.3%)	11(14.7%)	62(82.7%)	1(1.3%)
Q10	OSCE was less stressful than other exams	20(26.7%)	22(29.3%)	26(34.7%)	7(9.3%)
Q11	Good direction and feedback were provided.	3(4.0%)	22(29.3%)	44(58.7%)	6(8.0%)
Q12	OSCE highlighted areas of weaknesses in skills and knowledge	4(5.3%)	23(30.7%)	45(60.0%)	3(4.0%)
Q13	This year OSCE was better organized than last year pilot OSCE	7(9.3%)	13(17.3%)	51(68.0%)	4(5.3%)
Q14	The OSCE cases were clear challenging but not too much difficult	19(25.3%)	25(33.3%)	28(37.3%)	3(4.0%)
Q15	Standardized patients seemed competent in their role playing	8(10.7%)	8(10.7%)	53(70.7%)	6(8.0%)
Q16	OSCE would been more beneficial if it was part of final mark	41(54.7%)	15(20.0%)	14(18.7%)	5(6.7%)

Table 16: Students in group A evaluation of OSCE stations

Questions		**OSCE Stations Shift A**					
		Station 1	**Station 2**	**Station 3**	**Station 4**	**Station 5**	**Station 6**
Q17	Most difficult station	6(16.7%)	-	10(27.8%)	12(33.3%)	4(11.1%)	4(11.1%)
Q18	Most easiest station	2(5.6%)	20(55.6%)	2(5.6%)	-	7(19.4%)	5(13.9%)
Q19	Station which you liked most	3(8.3%)	10(27.8%)	1(2.8%)	3(8.3%)	14(38.9%)	5(13.9%)
Q20	Best standardized patient: ……	4(12.5%)	11(34.4%)	7(21.9%)	3(9.4%)	5(15.6%)	2(6.3%)
Q21	Which station would you think to have **high** educational value	2(5.7%)	5(14.3%)	4(11.4%)	7(20.0%)	13(37.1%)	4(11.4%)
Q22	Which station would you think to have **moderate** educational value	8(23.5%)	8(23.5%)	6(17.6%)	4(11.8%)	3(8.8%)	5(14.7%)
Q23	Which station would you think to have **low** educational value	9(28.1%)	7(21.9%)	8(25.0%)	2(6.3%)	2(6.3%)	4(12.5%)

Table 17. Students in group B evaluation of OSCE Stations

Questions		**OSCE Stations Shift B**					
		Station 1	**Station 2**	**Station 3**	**Station 4**	**Station 5**	**Station 6**
Q17	Most difficult station	7(21.2%)	4(21.1%)	2(6.1%)	7(21.2%)	3(9.1%)	10(30.3%)
Q18	Most easiest station	5(15.6%)	6(18.8%)	15(46.9%)	2(6.3%)	3(9.4%)	1(3.1%)
Q19	Station which you liked most	2(5.9%)	4(11.8%)	13(38.2%)	4(11.8%)	7(20.6%)	4(11.8%)
Q20	Best standardized patient: ……	1(3.0%)	5(15.2%)	9(27.3%)	5(15.2%)	10(30.3%)	3(9.1%)

Q21	Which station would you think to have **high** educational value	1(3.1%)	8(25.0%)	9(28.1%)	2(6.3%)	8(25.0%)	4(12.5%)
Q22	Which station would you think to have **moderate** educational value	4(12.9%)	12(38.7%)	8(25.8%)	4(12.9%)	1(3.2%)	2(6.5%)
Q23	Which station would you think to have **low** educational value	4(13.3%)	3(10.0%)	4(13.3%)	8(26.7%)	5(16.7%)	6(20.0%)

5.3.2 Discussion:

The OSCE was one of the useful assessment methods recently added into the students' curriculum as a formative assessment of experiential practices and an objective tool for evaluating clinical skills. (Amina, 2009)Hence, this survey is important so to assess how the students perceived this evaluation and if the setting and the stations were carried properly and fairly. OSCE was seen as a useful practical experience by most students; also most of them provided a positive feedback about the quality of OSCE performance in terms of the clarity of the provided information before the exam; the sequence of OSCE stations; the reflection of the tasks taught and the time at each station. These findings are consistent with Pierre et al. (2004) study results (Amina, 2009).

The majority of students saw the OSCE as an unprecedented opportunity to encounter real-life scenarios. The finding that an overwhelming proportion of the students (82.7%) admitted that the OSCE provided a useful and practical learning experience was consistent with similar studies reported elsewhere (Ahmed, 2007).

Austin et al, reported that students expressed in a survey considerable concern that there was so much variability between cases and patient-actors that it might adversely affect their academic standing and believed that it was problematic within an evaluation perspective.(Austin et el., 2006) Conversely, in this study the standardized patients seemed competent in their role playing was evaluated as good (70.7%) .

A comparison of traditional testing methods and simulated examination for therapeutics was carried by Gardener and his colleagues who reported a moderate positive correlation between performance on the simulated cases evaluation and the traditional examinations.
While Monaghan and his colleagues reported that all examinees believed that OSCE compared to other traditional methods of evaluation was a much better indicator of how they would perform in the real world, as so reported from Malaysian students and also agreed by vast majority in our assessment (82%).

Further, many students felt that the OSCE was an extremely anxiety-producing examination. In our current study (34.7%) agreed that OSCE was less stressful than other exams. Brewin and Cantwell (1997) related students' stress and anxiety to new experience with OSCEs, (Ross et el., 1988) yet carrying OSCEs as only formative assessment not a final exam may relax students added to the entity of standardized patient which may also contribute to students anxiety.
The evaluation of OSCE by pharmacy students highlighted some areas that need to be enhanced in future, such as the inadequate information and guidance before OSCE as many students did not realize the formativeness of the exam.
Most of students indicated that suitable time was allocated to perform tasks in contrast to other observations elsewhere. This maybe contributed to the team setting and reviewing of cases and real pilots before exam which enhance the quality and reliability of the assessment setting. Yet a significant percent of surveyed students did not agree on the exam cases toughness, 35% vs 25% agreed that the cases were challenging but not difficult.
The evaluation of the OSCE stations differed between the morning and evening shift. The most difficult stations were different in term of their assessed skills between shift-A and shift-B. While the stations perceived to have moderate educational value were the same (station-2).

From this discussion we recommend students' orientation prior to OSCE should be well planned and assured. Written descriptions of expectations and objectives of formative assessments beside exam blueprint maybe more beneficial (Ross et el., 1988).

6. CONCLUSION

Pharmacy practice is continuously evolving in the direction of preserving the profession, addressing society needs, and a more patient-care centred practice. Pharmacy education takes the role in preserving the profession of pharmacy practice by assuring graduate competence in delivering pharmaceutical care which keeps pharmacists as professionals with unique competence that address the society needs. Clinical pharmacy practice experiences are scarcely reported from Turkey and North Cyprus, experiential practices are mainly unstructured with a need for faculty developed and supervised APPE to assure student competence.

The carried studies show that undergraduate pharmacy students in a Turkish school of pharmacy performed better in patient counselling and identification/resolution of DRPs than in the drug information tasks. This reveals the need for reviewing and reinforcing curricula to strengthen the relevant areas in students' knowledge and skills. More emphasis should therefore be placed on drug information and literature interpretation.

Introducing a hospital based APPE model into fifth year students in Northern Cyprus provided a rich experiential learning environment for the students rather than just theoretical knowledge of clinical pharmacy. Student's competence was strengthened overall in 8 domains of CAPE 2013 outcomes assessed using evaluations within the higher levels of Kirkpatrick's learning evaluation hierarchy (KH).

Students well perceived the APPE course structure assessment and the knowledge attained. They also highly perceived the OSCE exams feeling that it more resembles actual practice providing them with self-confidence and more clearly their defects and what they need to improve regarding both skills and knowledge. Students feel they need additional clinical knowledge and practice to be incorporated into the pharmacy curriculum. They saw OSCEs as being a beneficial formative assessment that should not be included as marks into finals. They also suggested that more exercises of solving cases and other problem based learning approaches should be more prevalent in their program.

It is therefore extremely important to invest in the Turkish students' positive perception toward advancing pharmacy education in Turkey and Northern Cyprus, in order keep up to date with global practice demands and to shift to a more patient-centred profession and patient-cantered educational system. Such educational interventions could be further implemented in other faculties of pharmacy within the Turkish Higher Ministry of Education.

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6. Appendices:

Appendix I. Sample of OSCE's stations file & evaluation rubric sample

Shift A : Case 1 **Case Cover**	
Case author/s	**Abdikarim Abdi**
Scenario reviewers	**Bilgen Basgut ; Onur Gultekin; Ihsan Caliş; Duygu Hanoğlu**
Case title	**Post MI medications Drug information**

Setting	Near East University Hospital
Discipline	Cardiovascular medicine
Time for task	5 minutes
Patient information	60 years old , Woman , from UK Previous MI and Hypertension
Problem	The patient Doctor wants to ask information about a Drug that he could not know what it is.
Information for SP:	Demographics, past medical history, opening statement , questions
Skills needed	• Data retrieval & interpretation (Drug Information search) • Clinical prescription problems management • Communication skills
Room setup	• Office • Computer with internet • BNF
SP	• Duygu Hanoğlu • Fulya Gundogdu
Examiner	• Prof.Dr. Ihsan Caliş • Dr.Ilker Gelisen

Shift A : Case 1
Simulated Patient version

2	A doctor in near east university hospital needs your consultation on : a 60-year-old Cypriot woman with a history of hypertension and Myocardial Infarction (MI). She presents to the clinic for a follow-up visit. she used to live in UK and moved from there recently . She is using the following medications. Meds : 1- lisinopril 40 mg once daily 1x1 2- Metoprolol XR 100 po once daily 3- Clopidogril 40 mg PO once daily before sleep 4- Lipex75 mg po once daily The Physician wants to know what is Lipex? He could not find in RXmedia, is the dose that he wrote right.
☐	a- Search for drug information using reliable resources

Student name: Candidate Number:

- **how much were you satisfied with this student :**

Very dissatisfied	**Dissatisfied**	**Neutral**	**Satisfied**	**Very Satisfied**
⬭	⬭	⬭	⬭	⬭
1	**2**	**3**	**4**	**5**

- **If you were a real patient or healthcare provider would you visit again this pharmacist?**

☐ **Yes, i would** ☐ **No; I would search for better pharmacist**

Shift A : Case 1
Station Assessor version

1	A doctor in near east university hospital needs your consultation on : a 60-year-old Cypriot woman with a history of hypertension and Myocardial Infarction (MI). She presents to the clinic for a follow-up visit. she used to live in UK and moved from there recently . She is using the following medications. Meds : 5- lisinopril 40 mg once daily 1x1 6- Metoprolol XR 100 po once daily 7- Clopidogril 40 mg PO once daily before sleep 8- Lipex75 mg po once daily The Physician wants to know what is Lipex he could not find in RXmedia, is the dose that he wrote right .
☐	b- Search for drug information using reliable resources

Key for rating: 0 non done, 1 poor but some done, 2 good almost done.

Student name: Candidate Number:
Examiners: 1- 2-

	QUESTION CHECKLIST	Yes	No	Not applicable	Scale 0,1,2	Q points	Notes
1	Use of a reliable reference Rxlist, BNF , Lexicomp etc. not Wikipedia	☐	☐	☐	X	1	F1
2	Identify Lipex (simvastatin)	☐	☐	☐	X	2	F1
3	Wrong doses for simvastatin and clopidogril	X	X	X		1	B1
4	Communication skills with healthcare providers: listening, questioning, answering, eye contact voice tone.	X	X	X		1	G1
	Total point						

Further remarks about the student:

Appendix II. Sample of OSCE's Final Report.

NEAR EAST UNIVERSITY
FACULTY OF PHARMACY
DEPARTMENT OF PHARMACOLOGY &CLINICAL PHARMACY

Clinical Pharmacy Practice Experience CPPE

Formative Osce Report

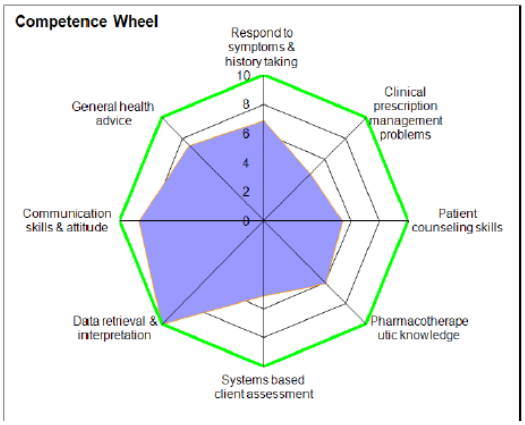
Student Name & Surname:		Student ID No:	

Overall student competence

Un acceptable	Bordline unacceptable	Acceptable	Very good performance	Excellent performance	Not applicable
○	○	○	●	○	○
≤ 6	7-12	13 - 18	19-24	25-30	N/O

Average Students Performance on core Competence elements & Competence Wheel:

Competences	P/T	%
Respond to symptoms & history taking	2,1/3	69%
Clinical prescription management problems	0,9/2	46%
Patient counseling skills	2,8/5	55%
Pharmacotherapeutic knowledge	4,86/8	61%
Systems based client assessment	0,512/1	51%
Data retrieval & interpretation	3,0/3	100%
Communication skills Professionalism& attitude	4,327/5	86,5%
General health advice	2,2/3	73%
Total	20,64	68,8%



The following are description of expected performance levels per competency

Competence: **Respond to symptoms & history taking**
Expectation :**Use structured approach to questioning in response to patients queries regarding signs and symptoms,&offer appropriate advice and information to tackle minor ailments**

Competence :Clinical prescription management problems
Expectation:**review prescriptions and identify clinical management problems,&retrieve appropriate material in order to solve the problems identified.**

Competence :Patient counseling skills
Expectation:**counsel patients about medications & demonstrate how to use inhalers, sublingual spray , oral syringe, nasal spray, suppository , eye drops, insulin preparations**

Competence :Pharmacotherapeutic knowledgeApplication
Expectation:Discusses therapeutic management (including but not limited to pharmacotherapy, adverse effects, goals of therapy and patient safety, disease prevention and health promotion), when appropriate. Selects appropriate treatments (including monitoring, counseling, follow-up); considers risks of therapy and instructs the patient or healthcare provider accordingly.

Competence :Systems based client assessment
Expectation: obtain a systemic clinical history, describe stages of clinical examination,and recognizeemergency events.

Competence :Data retrieval & interpretation
Expectation:Search for drug information in timely manner by using evidence based resources.
Also critique primary, secondary and tertiary resources, and draw evidence based therapeutic alternatives.

Competence :Communication skills Professionalism & attitude
Expectation:Professionalism in all aspects of relations, including team interaction, motivation, communication skills both written and oral with proper questioning, listening, interviewing skills, reporting and service documentation.

Competence : General health advice
Expectation: **provide evidence-based advice to patients presenting in a community pharmacy on a range of areas related to general health advice with appropriate clarification and simplification.**

Performance Levels Description

UNACCEPTABLE :

- History and respond to symptoms elicited (if applicable) is incomplete and unstructured
- Clinical prescription problems (if applicable) were not detected or incorrectly managed
- Therapeutics and management priorities (if applicable) were not appropriate
- Patient counseling (if applicable) is inappropriate
- Systems based client assessment is inappropriate
- Data retrieval & interpretation (if applicable) is incorrect
- Communication skills Professionalism & attitude(if applicable) is not appropriate
- General health advice (if applicable) was not provided or incorrect

BORDERLINE UNACCEPTABLE :

- History and respond to symptoms elicited (if applicable) is somewhat incomplete and/or unstructured
- Clinical prescription problems (if applicable) were detected but not managed completely
- Therapeutics and management priorities (if applicable) were somewhat incomplete
- Patient counseling (if applicable) is somewhat incomplete and/or unstructured
- Systems based client assessment is is limited or indiscriminate
- Data retrieval & interpretation (if applicable) is somewhat incomplete
- Communication skills Professionalism & attitude(if applicable) is some how poor
- General health advice (if applicable) was some how incomplete

ACCEPTABLE :

- History and respond to symptoms elicited (if applicable) is reasonably structured and includes some of the essential elements
- Clinical prescription problems (if applicable) were detected and managed
- Therapeutics and management priorities (if applicable) were somewhat appropriate
- Patient counseling (if applicable) is just adequate and somehow structured
- Systems based client assessment is just adequate
- Data retrieval & interpretation (if applicable) is just adequate
- Communication skills Professionalism & attitude(if applicable) is moderate & adequate
- General health advice (if applicable) was) is just adequate

Very Good Performance :

- History and respond to symptoms elicited (if applicable) includes most of the essential elements
- Clinical prescription problems (if applicable) were detected and managed completely
- Therapeutics and management priorities (if applicable) were appropriate
- Patient counseling (if applicable) is adequate and well structured
- Systems based client assessment is adequate and structured
- Data retrieval & interpretation (if applicable) is adequate and appropriate
- Communication skills Professionalism & attitude(if applicable) is good and adequate
- General health advice (if applicable) was) is adequate and complete

Excellent performance : Competent and achieved all course learning outcomes excellently

- Knowledge, skills and clinical judgment clearly exceed the above criteria for an Acceptable performance

Appendix III. Sample OSCE Blueprint

NEAR EAST UNIVERSITY
FACULTY OF PHARMACY

OSCE Exam Blueprint :

	Respond to symptoms & history taking A	Clinical prescription management problems B	Patient counseling skills C	Pharmacotherapeutic knowledge D	Systems based client assessment E	Data retrieval & interpretation F	Communication skills Professionalism & attitude G	General health advice H	
Cardiovascular Pharmacotherapy 1		1		1		3	3	2	10/30
Respiratory Pharmacotherapy 2	1	1	3	3			1	1	10/30
Internal medicine Pharmacotherapy 3	2		2	4	1		1		10/30
Total = 30	3	2	5	8	1	3	5	3	
Cardiovascular Pharmacotherapy	1		1	2		3	3		10/30
Respiratory Pharmacotherapy	1	2	4	1			1	1	10/30
Internal medicine Pharmacotherapy	1			5	1		1	2	10/30
Total =30	3	2	5	8	1	3	5	3	

Appendix IV. Questionnaire 1

Student's OSCE Evaluation Forms

This evaluation is for the STUDENTS to fill regarding their experience and perceptions about OSCE

1- Circle **ALL** clinics did you had:	• **Cardiology** • **Respiratory**	• **Internal** • **DIC**

2- Which OSCE shift are you:	• **Shift A**	• **Shift B**
3- Which Floor was your exam?	• **First Floor**	• **Second floor**

Use the Following scale of five to indicate your level satisfaction of your OSCE exam.
1 = Disagree, 2 = Neutral, 3= Agree, NC = No comment

Questions	**Disagree**	**Neutral**	**Agree**	**NA**
Wide knowledge area and clinical skills were covered in OSCE				
Exams was well structured &sequenced				
Exam was well administered and run				
Time at each station was adequate				
Enough information was provided before the exam				
All assessed skills were covered in the practice course				
OSCE provided opportunity to learn real life scenarios				
OSCE was less stressful than other exams				
Good direction and feedback were provided.				
OSCE highlighted areas of weaknesses in skills and knowledge				
This year OSCE was better organized than last year pilot OSCE				
The OSCE cases were clear challenging but not too much difficult				
Standardized patients seemed competent in their role playing				
OSCE would been more beneficial if it was part of final mark				

OSCE Stations Questions	**Station 1**	**Station 2**	**Station 3**	**Station 4**	**Station 5**	**Station 6**	**Non 0**
Most difficult station	1	2	3	4	5	6	0
Most easiest station	1	2	3	4	5	6	0
Station which you liked most	1	2	3	4	5	6	0
Best standardized patient: ……	1	2	3	4	5	6	0
Which station would you think to have **high** educational value	1	2	3	4	5	6	0
Which station would you think to have **moderate** educational value	1	2	3	4	5	6	0
Which station would you think to have **low** educational value	1	2	3	4	5	6	0

Overall, how would you rate the OSCE exam you had?	Very Poor	Poor	Fair	Good	Excellent
	1	2	3	4	5

Please give comments: _____

_____

_____

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