

Exploration of clinical management system: Career ladders, working model and reforms; a cross sectional estimate from Karachi, Pakistan

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Abstract: Clinical and hospital pharmacy services are not just medical and pharmaceutical sciences but also occupy significant placement in healthcare system. Pakistan is a developing state with a huge prerequisite for changes in the general wellbeing framework, specially hospital and clinical aspect of pharmaceutical services. The principal intention of this study is to analyze the services offered by different pharmacies in hospitals of Karachi in terms of infrastructure and personnel service qualities. The study was conducted in a cross sectional way that included stratified sampling technique. Reactions were broken down utilizing descriptive and inferential insights of measurements. The fundamental result procedures incorporated the scope of hospital pharmacy services, the general recruitment of clinical drug specialists (pharmacist), the product and equipment used in hospital pharmacy services, the background of staff (educational), acquisition of proficient training mode, practical involvement and experience. The clinical pharmacy facilities coverage mutually on the departmental scale (median =22.43%) and patient scale (median =17.25%) do not comply the 100% coverage that is obligatory for standard practices. In addition, 48.65% of the pooled hospitals data has shown absence of distinct administration rules for hospital and clinical pharmacists, and 45.33% lacks the use of rational drug software. It is concluded that important parameters like drug monitoring, medication records keeping; appropriate drug information software's and quality assurance in hospitals still need attention for better patient outcomes.

Keywords: Hospitals, clinical pharmacy, pharmacist, management rules, quality assurance.

INTRODUCTION

The provincial and federal government of Pakistan is responsible for diseases control provision and preventions (Dingding and Muhammad, 2017). For better health care system, clinical pharmacist is the essential component in developed countries (Meghani *et al.*, 2014), and considered to be the backbone of clinical and therapeutic knowledge with expertise in minimizing irrational prescribing and side effects of drugs. Moreover, as member of healthcare team clinical pharmacist's role for patient benefits and wellbeing include therapeutic drug benefits, appropriate dosage, safety, efficacy and toxicity management are further integrated (Ali and Khan, 2015).

The clinical pharmacists work with the teams of physicians and other healthcare providers to improve treatment plan, better drug utilization practices and avoidance of drug related problems including drug interactions, poly pharmacy, drug-food interaction, adverse drug reactions and cost effectiveness strategies (Yee and Haas, 2014; Hashmi *et al.*, 2018). Clinical aspects of pharmacy are compulsory part of Pharm. D program. The role of clinical pharmacist is different from hospital to hospital. They work with drug dispensing,

drug counseling, drug decision making and are not limited only to dispensary (Buxton *et al.*, 2015; Aftab and Khan, 2019).

Due to fragile policy and weak health care system, Pakistan has informal approach towards health related issues and its transformation (Zaidi *et al.*, 2019; Naqvi *et al.*, 2019). In current scenario of Pakistan, Physician solely manages all the drug related needs of patients, which ultimately affect the actual treatment strategies, benefits and needs (Rabia *et al.*, 2018). National health policies play an essential part in describing the health strategy of Pakistan. For better health care services, the system comprises both public and private sectors. Ministry of Health (MOH) majorly governs public hospitals; however, private health services work with patient's demands, assistance and needs. Along with other healthcare professionals including doctors, nurses, physiotherapists, technicians, traditional healers; the clinical pharmacist has fundamental role in modernized health system (Bhagavathula and Sarkar, 2014).

For the most part, the clinical practice arrangement of Pakistan is growing obstinately. In the interim, some inescapable issues are likewise happening in Pakistan, including a deficient workforce, absence of exceptionally instructed experts, contradiction between clinical drug

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specialists and doctors brought about by inflexible boundary, misconception of the expert direction of clinical drug specialists by major health stakeholders and patients, etc. As referenced above, clinical pharmacy as part of therapeutic is a detailed general wellbeing administration framework. Subsequently for its progression, investigations of social or legislative organization viewpoints are compulsory and this sort of investigation at first, requires a widespread perception of the existing and future standing of clinical based pharmacy practice (Bhagavathula *et al.*, 2014; Yee and Haas, 2014). The scientific literature of CP (clinical pharmacy) or the hospital based pharmacy framework in Pakistan in numerous databases demonstrated an absence of concrete studies from national and regional perspective. Broad and noteworthy conclusion on the contemporary status of CP is still in the phase of infancy. The greater part of the literature from Pakistan just spotlights on one part of the entire image or a little geographic scale (Dingding *et al.*, 2017; Ali *et al.*, 2015).

In past few years a noteworthy extent of studies have been reported that signifies clinical pharmacist's contribution towards effective drug therapy, evidence based drug management, drug decision facilitation, cost valuation and minimization (Saima *et al.*, 2017). However, just a small number of studies that deliberate the influence of such processes have been established (Naqvi, 2016; Dingding and Muhammad, 2017). Additional and more structured investigations are still required in this vicinity to improve and cover the system gaps. The reason of present investigation is to evaluate the existing status of the clinical pharmacy (CP) structure, working models and reforms acquisition in tertiary care hospitals. For this purpose a structured questionnaire with stratified tool of sampling was used to obtain and develop an exact, wide-ranging and important understanding of clinical pharmacy setup in Karachi Pakistan.

MATERIALS AND METHODS

This survey based study is conducted in various tertiary care setups of Karachi ((n=10). The major focus was the availability of clinical pharmacists in the hospitals and their assigned roles and responsibilities. To check that whether the hospitals meet the requirements and standards of hospital and clinical services and related practices in the light of the *Rules of Pharmaceutical Affairs*, that were released and modified in 2002 and 2011 respectively. These guidelines necessitate clinical pharmacy administrations in medical clinics and hospitals, which characterized the clinical drug specialists (clinical pharmacist) as members of diagnostic and treatment group (Rules of Pharmaceutical Affairs, 2011).

In the present investigation, structured questionnaire was designed to cover the accompanying factors;

- a. Fundamental data about the medicinal organization
- b. The inclusion and extent of the clinical services offered
- c. The status of the clinical related programming and equipment (hard and software's)
- d. Mode of charging for clinical services offered
- e. The Educational qualification and competence level of the clinical drug specialists
- f. Status of clinical pharmacy professional training for drug specialists
- g. Valid experience of the clinical pharmacist
- h. The passage way of the clinical drug specialists entry.

Every viewpoint above includes a few indicated factors.

Protocol for data collection

For data collection, volunteers with an advanced education levels in pharmaceutical sciences were selected. Research team with appropriate professional experiences carried out investigators' (volunteers) training. This study was conducted during February to April 2019. To guarantee the legitimacy and nature of the information, an interview-based pattern was used to control the selected polls. Gathered data was analyzed and in case of incomplete information, return interviews were conducted.

Ethical approval

The ethical approval of this investigation was acquired from independent Institutional board. Prior permission was attained from medical institutes/hospitals before data collection. Privacy of the record was supported and kept confidential entirely through the time of research. Informed consent forms were filled prior to study inclusion by executive and clinical personnel of each unit engaged with the review and the study directed in the wake of obtaining composed agreement regarding every individual above.

STATISTICAL ANALYSIS

Distinct descriptive and inferential measurable techniques for statistical investigation were applied. The clinical administration indicators coverage that included age, work rank (seniority) of personnel were determined with the lowest limit, inferior quartile, Median value, superior quartile for all selected units. Markers of the general setting of clinical drug specialists were examined with the mean estimations of these hospitals. The data is presented as mean \pm SD. Markers of the product and equipment of clinical pharmacies administration were investigated with proportion of hard and software available, contemporary position of clinical pharmacist (aside from age and work precedence) were scrutinized by utilizing SPSS 20. Frequency and percentages were calculated and values of $p < 0.05$ are considered significant.

Table 1: Coverage of clinical pharmacy services

LEVELS	Departmental coverage*	Patient based coverage**
Minimum Limit	8.73%	4.47%
Inferior Quartile	12.12%	9.63%
Median	22.43%	17.25%
Superior Quartile	28.95%	23.43%
Maximum Limit	40.85%	32.31%

*Coverage on the departmental scale is calculated by the percentage of clinical departments giving a hospital/clinical pharmacy services amongst all medical departments.

** Coverage on the patient scale is measured by the proportion of patients who received clinical pharmacy service among all outpatients and inpatients.

Table 2: Relative capacity of clinical pharmacists and related pharmacy services

Relative capacity of Hospital/clinical pharmacists			
Number of sickbeds		1-100	> 100
Mean value: Sickbeds		75± 23.34	165 ± 40.27
Mean value: Pharmaceutical professionals**		10 ± 2.13	13.85±7.38
Mean value: Clinical pharmacists		2 ±1.57	2.7 ±2.26
Ratio of clinical pharmacists and pharmaceutical professionals**		0.20	0.194
The status of Programming (software and hardware) used in pharmaceutical services/Rules and charged services			
Factors	Applied Clinical Pharmacy Management regulations***	Software installed for rational drug use	Charged services
Present	51.35%	54.67%	6.44%
Not established	48.65%	45.33%	93.56%

**Pharmaceutical professional: including pharmacy administrators, distribution pharmacists, clinical pharmacists and pharmacy technicians.

***Management rules and guidelines for the clinical pharmacists issued and applied within the hospital.

Table 3: Qualification, training and professional title of clinical pharmacists

Graduate Degrees (N=193) N (%)		Professional Titles of Pharmacist (N=193) N (%)		
Pharmacy	173 (89.66%)	Initial Title	Assistant Pharmacist	66 (34.19%)
others	20 (10.34%)			
Higher/Master degree (N=84)		Middle stage	Pharmacist	67 (34.71%)
Clinical pharmacy	4 (4.76%)			
Pharmaceutics	30 (35.71%)	Sub seniority stage-1	In charge Pharmacist	21 (10.88%)
Pharmacology	20 (23.80%)			
Pharmaceutical chemistry	5 (5.95%)	Sub seniority stage-II	Senior Pharmacist	19 (9.84%)
Pharmacognosy	7 (8.33%)			
Pharmaceutical marketing	11 (10.36%)	Senior stage	Manager pharmacy	12 (6.21%)
Others	7 (8.33%)	Executive stage	Chief Pharmacist	8 (4.14%)
Standards and extent of Professional training (N=193) N (%)				P value
Local /provincial level		92 (47.66%)		0.002*
No training (devoid of any certified training of CP at any level)		101 (52.34%)		
Profession entry mode (N=193) N (%)				P value
By choice and willingness		78 (39.89%)		0.001**
others		115 (59.58%)		

*/** significant

RESULTS

Tertiary care hospital teams comprise of physician, pharmacist and nurses. This covers 100% clinical coverage of all patients' care pharmacies. The minimum limit, inferior, Median, superior quartile, and most extreme point of confinement were functional to depict service attention of the clinical administration in two scales (table 1). Clinical pharmacy services were found

massively low on both selected scales (departmental and patient level) (table 1). The inclusion of clinical services on departmental scale (median value =22.43%) and patient scale (median value= 17.25%) did not meet the 100% limit that is obligatory for the customary practices. While maximum levels of department and patient coverage were well below 50% i.e., 40.85% and 32.31% respectively. The ratio between clinical pharmacist, pharmaceutical professionals and patients indicates the

actual efficiency, capability and quality services related to clinical pharmacy.

However, table 2 describes the relationship between sickbeds, pharmaceutical professionals and clinical pharmacists. This could be interpreted as a decline level of clinical pharmacy staffing when hospitals are arranged in ascending array. In 46.89% investigated medical units, the staffing did not comply with the necessity and the numbers of clinical pharmacist were found to be lesser in bigger hospital setups as per requirement. Clinical pharmacist ratio with respect to pharmaceutical personnel's was found to be low in case of 100 bedded and more than 100 bedded hospitals i.e., in order of 0.20 and 0.194. The data is presented as mean \pm SD. Furthermore, table 2 portrays that 48.65% of surveyed units did not have the management/board rules for the clinical and hospital drug specialists, and 45.33% did not have drug rationalization tools that includes soft and hardware's. Regarding expenses, 93.56% of the pooled hospital units were found with no charges for clinical pharmacy coverage. Table 3 exhibited information regarding educational and instructional level of pharmacy staff. It has been reported that 10.34% of respondents were with non-professional degrees, and among respondents with qualified degree, 52.34% of respondents came up with poor and inadequate specialist clinical training. Just 39.89% of respondents picked this occupation by personal eagerness. Professional titles with respect to seniority levels and standards and extent of professional trainings of working cohorts are described in table 3. Values of $p < 0.05$ are considered significant. Extent of professional training was significant amongst the trained and untrained cohort with p value 0.002 and professional entry mode with choice are also found significant with p value of 0.001.

DISCUSSION

Since the emergence of Pakistan, pharmacy practice in Pakistan in the form of clinical assistance and pharmaceutical care for the wellbeing of the individuals stays tragically in early stages. Pakistan has an expanded number of enlisted pharmacists. The pharmacist's role is considered to be more identified with industry arrangement in comparison to patient orientation and the job of clinical drug specialist is yet fluctuating between the health experts and community personnel. For the most part, CP is in budding stage in growing countries, particularly in thickly populated nation like Pakistan where pharmacist's role is very limited in healthcare team of multifaceted hospitals as decision making professional (Khan *et al.*, 2015; Hashmi *et al.*, 2018). On the other hand, the disease-based maladies are expanding systematically due to cosmopolitan status of cities and putting the general population in danger. In such countries with great social and economic issues, clinical pharmacy

person assumes contributing job in the upgrades towards patient wellbeing and health improvement. Number of studies stressed that proficient specialists, authorities and associations in developing nations should cooperate in settling the issues that obstruct the institutionalization of clinical pharmacy practice in medical units of small and large setups of hospitals (Norwood and Wright, 2016; Ali *et al.*, 2015;). Moreover, the present status of CP practice is clumsily beneath standards and doesn't coordinate with the expert prerequisites. It is a need, not a desire to include more drug specialists at the ground level to counter patients' normal medication issues and diminishing the disease load from society.

In this investigation, particularly concerning general wellbeing of public, clinical administrations related to pharmacists are surveyed in different tertiary care settings. Captivating the liability of the hospitals and the medical coverage offered by them, the present status of clinical pharmacy administrations and drug specialists in these medical units, somewhat, speaks to the state of the whole arrangement of healthcare setup in Pakistan. It can be taken as the beginning point for more profound and structured assessment of this scenario. A systematic review finding indicate that when pharmacists are counseling and interacting with patients, the clinical outcomes, their quality of life, patient's knowledge about drug and disease, patient's satisfaction with service, and economic outcomes are improved (Saira *et al.*, 2011; Ali *et al.*, 2011).

The leading purpose behind this examination was to report the basic status of clinical pharmacy and hospital administrations in general practices, yet a few amiable actualities were found to be dependent on the gathered information. Infrastructure foundation, which comprises of programming/equipment (hard and software) and work force, decides the directness and nature of the clinical administration and services somewhat. In this study infrastructure parameters determined a few establishing predictive markers, which are equivalent to related authoritative principles in line with existing systems. Collected data recommend that there is lacking in programming infrastructure, equipment mechanism, and clinical personnel staffing. Data reveals that 54.67% of the selected hospitals are prepared with the software's. It speaks to a possible limitation of the current clinical arrangement in different hospitals. Another conceivable clarification for the insufficiency and shortage of the software and hardware settings could be the hospital administration's misconception towards the significance, purpose, or necessities of the CP services (Zhang, 2012; Sun *et al.*, 2010). In addition, it was also noted that 48.65% of the sample hospitals do not have well defined and limited management rules for hospital and clinical pharmacists.

Under the joined impact of the low rate of clinical services existence, the clinical administration framework in Karachi, Pakistan is confronting a hindrance in terms of sound infrastructure. This explicates the remarkably small coverage of service with respect to the department and patient scales. Enhancements of programming based software and related hardware are desperately required in local settings. In many developed countries, pharmacy services are chargeable, although in Pakistan, the strategies, guidelines and methodologies for charging clinical services are still in development phase (Pawłowska *et al.*, 2016; Koehler and Brown, 2017). As per our information, 93.56% of units have no clear charged policies, and among the paid administrations unit, pharmaceutical services and pharmacy based counseling units like INR clinics and diabetes clinics represent the biggest extents. Critical parts of the investigation centers around the staffing of clinical drug specialists. This alludes to the quantity of beds and the quantity of pharmacy staff, as prime markers for estimating the extent along with the nature of the CP practices. The way for entering the clinical drug specialist into profession may influence the initiative and professional development activity and advancement of a clinical specialist; accordingly, we determined this parameter in our study to assess the future aspect of clinical personnel. The extents of two significant passageways that the respondents took are detailed in table 3. Practically more than half i.e., 59.58% of the respondents picked up their positions of CP by their employer deployment. In the meantime, 39.89% of respondents indulged in this field by development program of the advanced education framework and individual thought. In spite of the fact that the advanced education structure and the emerging clinic framework are placing extensive endeavors into clinical drug specialist development, still, a small extent of clinical specialists in the hospital entered this profession by their own consideration (Yao *et al.*, 2017). In spite of a present knowledge of pharmacotherapy, pharmacists being drug specialists, needs the information and ability to give feasible and precise patient training and guidance. They must know about their patients; societies, particularly wellbeing and disease beliefs, manners, and practices. Clinical practice is contingent on particular information and reasonable experience of the experts and a standard for the aptitude of the clinical drug specialist is fundamental (Rotta *et al.*, 2015; Fernandes *et al.*, 2015). With this thought, both the instructive/preparative foundation and the work understanding of drug specialists are executed in present study. Henceforth, the educational/training milieus and the work related experience in terms of working rank and seniority orders of pharmacists are investigated in this survey (table 3).

In the Rules of Pharmaceutical Affairs, Pharmacist requirements are apparently discussed according to current study; some clinical drug specialists are unfit in

both the element of most noteworthy training level and major of advanced education culture. Prerequisite qualification acquiescence in the major field appears to be especially self-evident and limiting in studied cohort in this investigation. We found that over 80% of respondents had not gained degree of CP, which is an explicitly expressed prerequisite for the entrance of clinical drug specialist in the field. Some data in related research uncovered diversely situated issues about this condition (Hale, 2015; Khan *et al.*, 2020). The deficit of work experience intensified the circumstance referenced above. Most of respondents hold an essential or medium expert title with senior working rank of around 20%. Qualification barrier deficiency and discrepancy of educational exercises and lack of experience of clinical pharmacists reveals a systemic inadequacy and turmoil of the faculty development and clinical management framework (Aftab and Khan, 2019; Ali *et al.*, 2015). Moreover, government ought to furnish grants, which can be great motivational forces to improve more information and abilities in clinical settings and its related territories. Additionally, to grow the clinical set-up in each medical/clinical unit, advance mechanical and programming level of rational drug utilization software's can encourage further advancement in general wellbeing of the populace. It is further recommended that a well-established clinical pharmacy unit in each hospital is required to institute and pertain related rules. Moreover, strategy and design to modernize the structure of clinical pharmacy services are strongly needed.

CONCLUSION

Sound health policies, allocation of responsibility and appointment of capable professionals are essential for the smooth functioning of medical and healthcare units. The existing healthcare framework in Pakistan needs modernization for the wellbeing of the populace to cultivate social progression and monitoring aspect countrywide. It is need of time to include clinical drug specialist in public hospitals to resolve medication management problems of patient cohorts. The elevated burden of illness in Pakistan has incredible opportunity to diminish with the inclusion of trained and specialized pharmacist in decision-making policies. These reforms will produce great impact in general wellbeing of public.

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