Original Article

Evaluation of Impact of Prescribing Safety Assessment Workshop on Medical Doctors Using Kirkpatrick Model

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Abstract

Introduction: Clinical pharmacology training is a prerequisite for all medical graduates. Prescription writing errors are not infrequent at primary health care level leading to threat to patient safety. Prescribers' lacks uniform structured training and assessment which is one of the major factors for this situation across the country. In lots of institutions despite proper curriculum, learners lack interest because the subject importance is insignificant. Hence to bring more interest in pharmacology for prescribers there is a dire need for innovative and interesting methods of teaching and assessment, one of which is prescribing safety assessment (PSA).

Objectives:

a) To assess if the PSA is superior method of training prescription writing than CPW.
b) To evaluate the workshop on prescription writing using guidelines of Kirkpatrick Model.

Materials and Methods: It was an experimental study. 44 medical doctors participated; a pre-test was taken 01 week before the workshop. Afterwards, they were randomized into 02 groups, group A went through PSA and group B followed conventional prescription writing (CPW) 01-day workshop. At the end, post-test was taken from both groups. The qualitative data was also collected from participants on feedback proforma consisting of few closed ended questions on Likert scale.

Results: The independent t-test was used to compare the data as it was in normal distribution. Post-test performance of PSA group significantly increased $P < 0.001$ as compared to CPW. Reaction to closed ended 13 questions on Likert scale showed high satisfaction from 4.32 to 4.84 on 5 points Likert scale on workshop satisfaction.

Conclusion: PSA is an effective teaching and assessment strategy for learning clinical pharmacology. The study objectively proves its effectiveness in comparison to CPW and provides a guideline to implement this innovative and useful tool for teaching and assessment.

Keywords: Prescribing safety assessment, conventional prescription writing, Faculty development, Workshop, Impact, Kirkpatrick model.

Introduction

Medication errors are estimated to be the third leading cause of death (1). Prescribing is one of residents' commonest tasks. Mistakes, which compromise patient safety. Major prescribers consider themselves quite least well-prepared in terms of prescribing skills. Pharmacology as a subject is being taught both in the traditional and integrated system in preclinical years. There is no evidence that competence-based education is preventing harm (2).

An educational intervention such as the PSA needs to be accompanied by a suite of other undergraduate and postgraduate initiatives to improve prescribing safety (3). Assessing competence in prescribing is crucial within a framework of clinical governance and promoting patient safety (1). Final year medical students must pass PSA prior to their licensing exams competency internationally (4).

PSA certifies students as prepared to prescribe for real clinical practice. PSA was developed as a part of response to emerging concerns about the quality of prescribing in modern healthcare system. PSA gain will be a part of a wider drive to improve patient outcomes, which will also include better supervision and team-working, point of care decision support, improved prescribing systems and avoiding unfeasible individual workloads (5).

The construct of PSA permits medical students in demonstrating that they have the said essential competency in terms of judging, learning, inculcating skills to start off role as a potential prescriber. The blueprint of PSA includes eight portions encompassing item styles covering various characteristics of the clinical settings (1).

Prescribing skill and accuracy are essential if patients are to be given the preferred drug with correct dose, and better safety profile. Medication without harm considered as WHO 3rd global patient safety challenge, the goal is to lessen it to half in terms of severity, preventable drug- related complication in less than a decade (6).

PSA encompasses teaching and assessment of various areas of pharmacology-related therapy, work on curriculum which adds value to therapeutics. PSA gives provision to learners to experience real life clinical settings of case presentations where they can get a chance to officially practice prescription writing and review prescription of any prescriber from various aspects, with well-timed teaching and learning essentials (3).

One of the previous studies suggests a considerable knowledge gap in medical doctors following passing out and postgraduate training, in the field of rational prescribing of medicines (7).

Modern medical science demands to accept that standardizing the facilitation, and assessment of clinical skill sets, and academic knowledge would make certain doctors were well-trained to follow safe practicing (8).

It is now a compulsion for the graduating doctors to go through situational mindfulness, improve learning, and skills assessments. In the case of prescribing education, appearing in standardized assessment of the PSA gives certification to graduating doctors ready with prescribing skills to prescribe in clinical settings (2).

Most staff development programs focus on teaching improvement, but not much work has been done regarding emerging educational priority addressing PSA (9).

Staff development is an essential consideration for self-grooming as well as life-long learner skill acquisition. It achievable by means of different activities as well as programs involving faculty. There is a need for trainers training programs and the training of teaching medical teachers. Staff development aims to bring change, and which is measured through KP in best possible way.

Materials and Methods

The study was experimental, and it was carried out at Poonch Medical College Rawalakot, (PMCR) on graduates, postgraduates. It was done 06 months after approval of synopsis from ERC Riphah.

Seventy-five participants from PMCR attended mandatory interactive lecture on ethical principles of prescription writing 01 week before the conduction of workshop and out of 75,

44 prescribers came back for the follow up of the workshop. Prescribers with less than 06 months prescribing writing experience were excluded from this study. Sampling technique was simple random. We ensured equal demographic distribution and participants were divided into 02 groups PSA and CPW respectively, 22 participants in each.

We constructed 02 different papers of the same difficulty level for pre-posttest, consisting of 40 item styles of 40 minutes each. After taking pre-test, participants were randomized into PSA and CPW cohorts respectively. Group A followed PSA and group B followed CPW one day each 07-hours

workshop. Teaching and learning during workshop sessions was based on adult learning principles. It was followed by a posttest.

In the last step we conducted a posttest and analyzed the results and performed statistical analysis, as our distribution was normal, so we conducted parametric independent t- test.

Data Analysis Procedure: Data was analyzed quantitatively using guidelines of KP to measure participants' reaction satisfaction level, learning i.e., gain in knowledge. The data was collected for participant's performance in both pre-posttests. It was entered and analyzed by using SPSS version 25. The difference in score obtained in pre-posttest was considered the effectiveness measure of interventions. Shapiro-Wilk test was used to check distribution. For normal distributed data independent t-test and for non-normal distributed Mann-Whitney test was used. Responses of participants to quantitative closed ended questions on 5-point Likert scale was measured in terms of frequency and percentages.

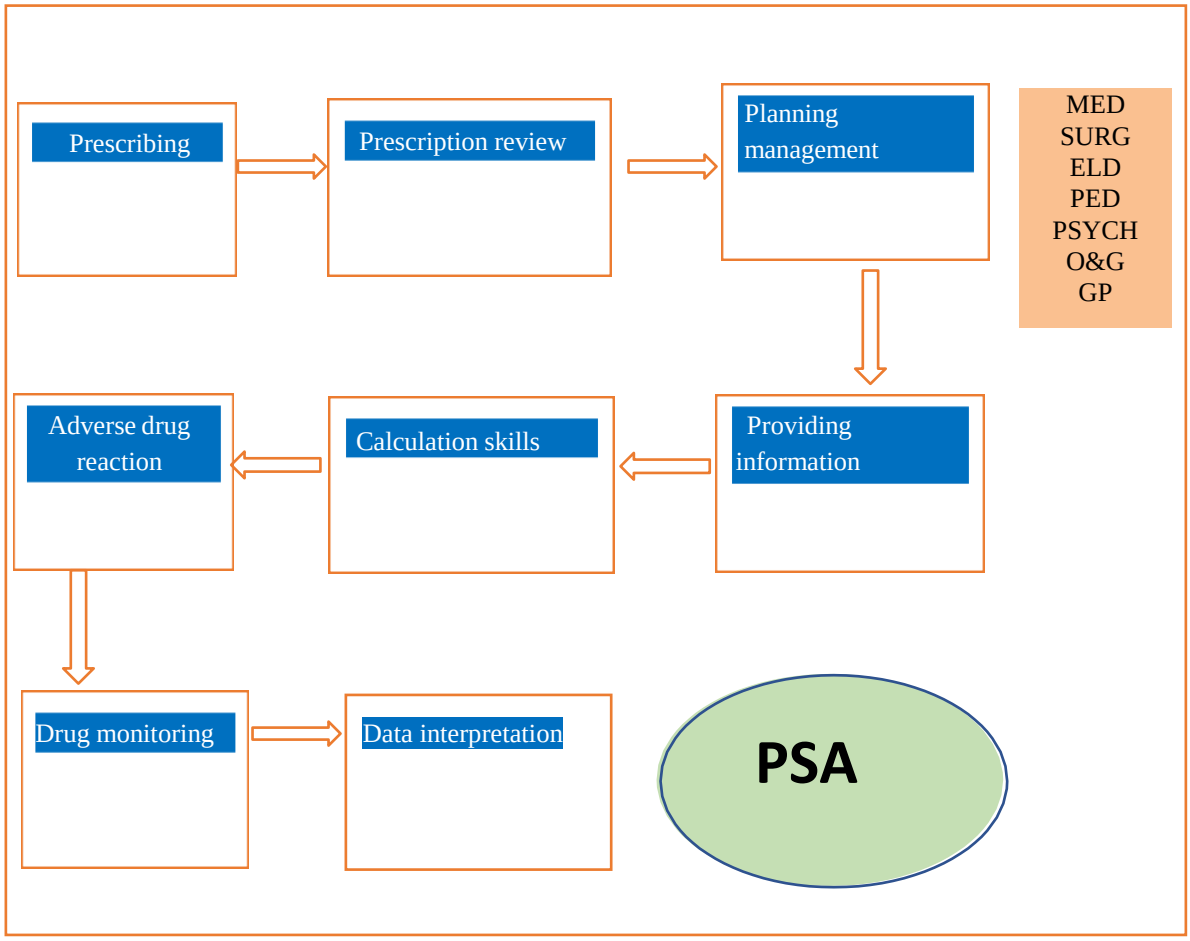

Figure 1: Process of prescribing safety assessment group A (PSA)

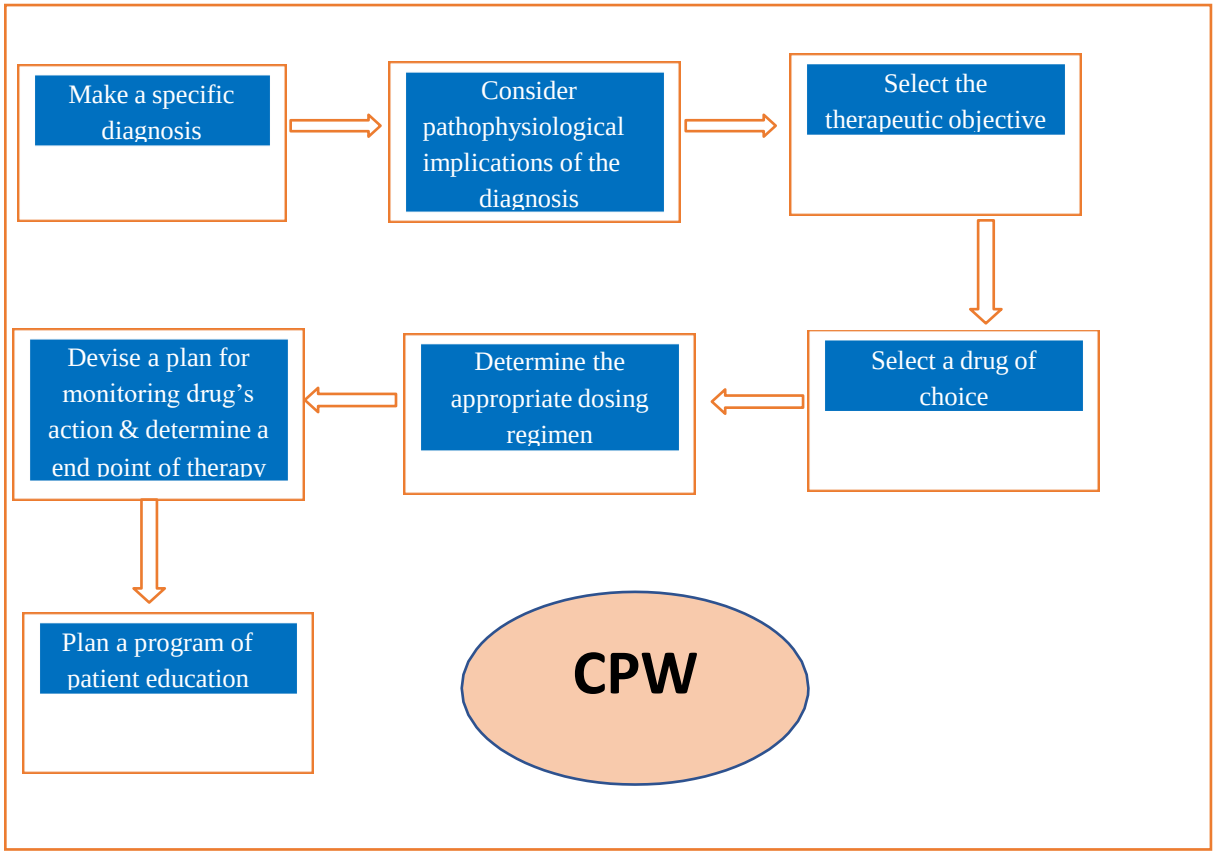

Figure 2: Process of conventional prescription writing group B (CPW)

Results

All participants who gave consent participated in pre-posttests from both cohorts (PSA and CPW).

Table 1: Demographic distribution of the participants

Serial No.	*Categories*	*Sub-categories*	*N*	*Percentages (%)*
1.	Level of education	Graduates	35	80
		Postgraduates	9	20
2.	Gender	Males	9	20
		Females	35	80
3.	Discipline	Basic	30	68
		Clinical	14	32

Table 2: Groups demographics after randomization

		Group A (PSA)	*Group B (CPW)*
Disciplines	Basic Sciences	15	15
	Clinical Sciences	7	7
Gender	Female	18	17
	Male	4	5
Level of education	Graduates	18	17
	Postgraduates	4	5
Scores	Pretest score (mean)	28.18	27.64
	Pretest score (median)	30.0	28.0
	Pretest score (SD)	11.50	11.86

Table 3: Scores of pre-posttests and their distribution within different striata

Group			*Skewness*	*Kurtosis*	*Shapiro-Wilk test*
Pre-test	Total		0.357	0.702	0.001
	Education	Graduates	0.60	2.121	0.001
		Post-graduates	0.271	2.571	0.001
	Gender	Males	3.162	10.0	0.001
		Females	0.507	1.856	0.001
	Discipline	Basic sciences	0.430	1.950	0.001
		Clinical sciences	1.607	1.034	0.001
Post-test	Total		0.357	0.702	0.957
	Education	Graduates	0.60	2.121	0.001
		Post-graduates	0.271	2.571	0.001
	Gender	Males	3.162	10.0	0.001
		Females	0.507	1.856	0.001
	Discipline	Basic sciences	0.430	1.950	0.001
		Clinical sciences	1.607	1.034	0.001

The comparison of pre-posttest scores between the two groups along with P-value calculated by t- test is given below in table.

Table 4: Independent T-test for pre-posttest scores

Scores	*Intervention*	*N*	*Mean*	*SD*	*SEM*	*P-value*
Pre-test	PSA	22	28.18	11.750	2.505	0.940
	CPW	22	27.64	11.867	2.530	
Post-test	PSA	22	35.59	14.764	3.148	0.001
	CPW	22	35.73	4.579	0.976	

Pretest was insignificant P value 0.940 depicting that the level of prior knowledge in randomized cohorts was equal. On the other hand, posttest significant P value < 0.001 showing PSA is a superior intervention as compared to CPW.

Mann Whitney U test:

Table 5: Statistical significance between non-normally distributed pre-posttest scores in various striata

Sr. No.	*Striata*	*Scores*	*P-value*
1.	**Age**	Pre-test score	0.598
		Post-test score	0.678
2.	**Gender**	Pre-test score	0.003*
		Post-test score	0.016*
3.	**Qualification**	Pre-test score	0.954
		Post-test score	0.977
4.	**Discipline**	Pre-test score	0.043*
		Post-test score	0.177

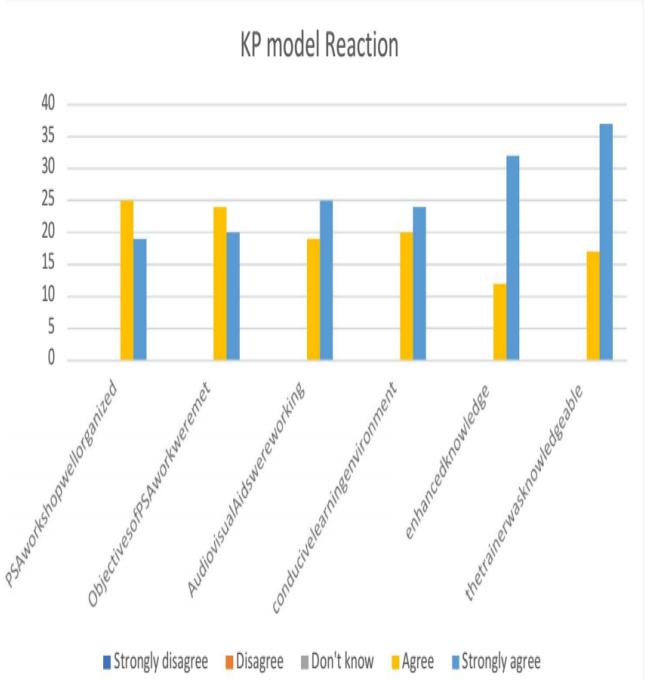

Figure 3: Kirkpatrick reaction of the participants (questionnaire 1-6)

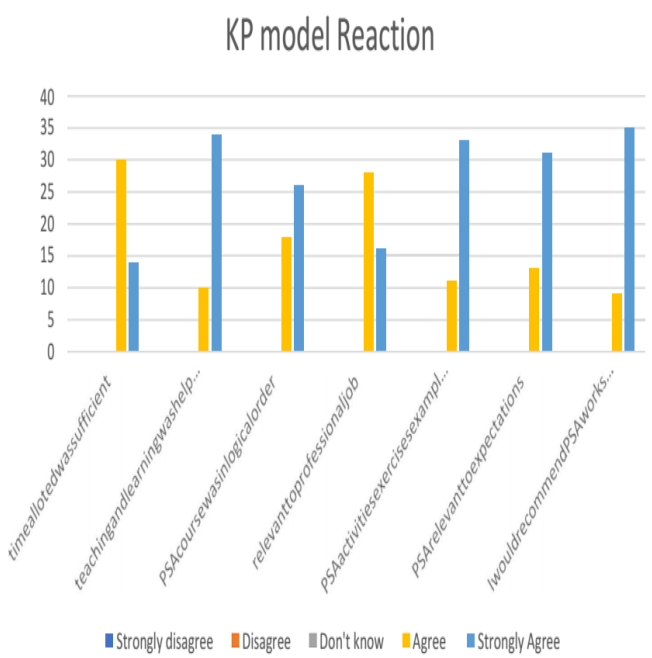

Figure 4: Kirkpatrick reaction of the participants (questionnaire 7-13)

While measuring KP level-1, participants reaction, indicated excellent level of satisfaction at the end of PSA workshop. On 5 points Likert scale from strongly disagree (1) to strongly agree (5), the mean score of all the 13 variables was in a narrow range from 4.32 to 4.84.

The respective means score were, PSA workshop well organized mean score 4.43, objectives of PSA workshop were met 4.45, Audiovisual Aids were working 4.57, conducive learning environment 4.55, enhanced knowledge relevant to expectations 4.73, relevant to professional job 4.36, relevant to expectations, time allotted was sufficient 4.32, the trainer was knowledgeable 4.84, teaching and learning was helpful 4.77, PSA course was in logical order 4.59, PSA activities exercises examples engaged you 4.75, I would recommend PSA workshop to others 4.80.

Discussion

In the present study PSA proved to be a better teaching and assessment technique in comparison to CPW. Our results suggest that a part of improving knowledge gain and satisfaction level was considerably high. So, we reject our null hypothesis. All demographics cofounding factors have been ruled out proving that our improved PSA dependent variable posttest score is purely due to our intervention.

Previously, there is little evidence of studies conducted on measuring the impact of PSA workshop on medical doctors using guidelines of KP model.

We found limited literature on the demonstration of the effectiveness of PSA in comparison with CPW intervention in a staff development workshop. Hence the current study may be considered unique in which PSA is compared with CPW.

In an undergraduate study conducted on PSA module, learners filled up an online feedback form concerning prescribing competency and confidence. In this study only one intervention was assessed without comparing with any other approach (10).

In another study conducted in UK, four pharmacy schools were given PSA educational push. Reaction satisfaction level of the participants was taken (11). In our research work apart from intervention in group A PSA, we conducted comparison with CPW in group B.

In South Asian study staff perception about traditional prescribing module. Staff strongly agreed that the contemporary pharmacology training and assessing methods lack proper prescription writing. Comparison of pre-posttest of faculty training workshop was done (12). Randomization whether done or not was not mentioned. Gender-wise there was nonnormally distribution in pre-posttest results. We performed non- parametric Mann-Whitney's test which depicted females did perform better than the male participants. Our finding is not in accordance with a study conducted at Gulf University Bahrain which showed even though female students' attendance was high; there were non-significant gender-linked differences (13). In another study a workshop was conducted on innovative method of teaching and learning related to medicine to measure the effect on staff using KP model. Overall reaction satisfaction of the participants was high and there was significant improvement in pre-posttest scores. There was no demarcation of gender wise performance of the participants (14).

On qualification basis, there was nonnormally distribution found in the pre-posttest results, we performed Mann-Whitney's test, which showed there was no difference in performance based on level of qualification. In another prior study one day workshop was conducted on postgraduates regarding insight of medical education. Evaluation of workshop learning outcomes was performed through a pre- posttest (15). In contrast to this study, we included both the graduates and the postgraduates. The graduates

perform better than the postgraduates because our study consisted of predominately the graduates. The other possible reason for it could be pharmacology as subject is being taught both in the traditional and integrated system and doctors consider themselves quite least well-prepared in terms of prescribing skills (2). In another study a one-day faculty workshop was conducted on the assessment of knowledge and reflective writing skill. Both basic and clinical faculty participated. Pre-posttest was kept the same; department-wise performance was not documented (16).

We also did KP reaction of the participants which depicted high satisfaction level. Our study is in accordance with prior research work in which one-day medical faculty shop was conducted on medical student's reflective writing skills (16).

Our findings are consistent with international studies and can be implicated in PSA module in learning and retention of knowledge at both undergraduate and postgraduate level. PSA facilitates learning knowledge and technical skills but also a lot of other soft skills like clinical reasoning, communication, teamwork, leadership skills, critical thinking and decision making are acquired by the learners.

The other potential benefits of this valuable tool are the enjoyable learning environment which keeps learners motivated and engaged.

PSA is a time demanding and needs expertise to construct case presentations, which requires vigorous teamwork, collaboration of pre-clinical sciences, clinical sciences plus medical educationalist and other context rich brainstorming activities for PSA. With passage of time, more experience with this student-centered teaching strategy, the guides may develop on PSA to facilitate the process. Other technological innovation like, web-based games complementing PSA may help activity planners to design it more efficiently. It may help our students to learn at their own pace with the help of technology.

Limitations

Our study happened to be a single institutional, Consequently the findings of this study, especially its evaluation results cannot be generalized. It was a single blind study. As this study was part of my thesis work and being the only person to carry out the workshops, double blinding was not possible. Therefore, having an inherent bias towards PSA workshop participants cannot be ruled out. We evaluated first two guidelines of KP model due to time limitation. Due to limitation of time all steps of KP model were not carried out.

Conclusion

PSA is objectively superior method of training prescription writing than CPW and workshop was able to achieve the intended outcomes in terms of Kirkpatrick participants' reaction (level- 1), level of satisfaction and gain in knowledge (level-2).

Future implication

PSA module should be a part of undergraduate medical curriculum both in integrated as well as traditional system.

It provides a guideline for basic and clinical sciences faculty to implement this innovative and useful tool for teaching and assessment of learners in an enjoyable manner.

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