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Pamphlet as a tool for continuing medical education: performance assessment in a randomized controlled interventional study

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Abstract

Background: Pamphlet is a tool used for distance continuous professional development programs. In this study, we assessed the impact of an educational pamphlet on improving prescription writing errors in general physicians' performance.

Methods: In this randomized controlled interventional study, we prepared a training pamphlet according to the most prevalent prescription writing problems. We randomized 200 participants among general physicians affiliated with Tehran Social Security Insurance Organization, and randomly divided them into intervention and control groups. Participants' prescriptions (N= 34888) were investigated over a month, and then the prepared pamphlet was sent out to the participants in the intervention group. After three months we examined their one-month prescriptions again (N= 30296) and investigated the changes in prescription errors.

Results: There was no significant difference in the mean number of prescriptions in two groups before and after intervention (p= 0.076). Mean number of medicinal items reduced significantly in intervention group. Also mean number of prescriptions including injection drugs (p= 0.024), Corticosteroids (p= 0.036), Cephalosporin (p= 0.017) and non-steroidal anti-inflammatory drugs (p=0.005) reduced significantly. No significant differences were found for other errors.

Conclusion: This study showed that use of an appropriate pamphlet has a considerable impact on improving general physicians' performance and could be applied for continuous professional development.

Keywords: Educational media, Pamphlet, Continuous medical education, General practitioners.

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Introduction

Physicians are supposed to be up to date and this is met through Continuous Medical Education (CME) and Continuous Professional Development (CPD) activities (1). Continuous development is an ethical and professional responsibility of every healthcare member all through their professional career (2). CME concept and CPD development strategies have recently changed greatly with more focus on patient safety, improved care, and evidence based practice (3,4). For instance CPD activities are more learner-centered and self-directed compared to CME programs with more teacher-centered approaches (5). However, it is recommended to integrate core competencies of practice based learning in CME and CPD activities and use new instructional strategies (6). In fact CME and CPD

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are lifelong collaborative and continuous learning approaches (7).

In different countries, numerous CME programs are offered and the certificate of attendance is required for extending the medical license (8,9). Face-to-face continuing education may include seminars, conferences, congresses, short-term professional training courses, and formal education programs, and distance education includes on-line education or sending periodicals, books, educational CD/DVDs, brochures, and pamphlets (10).

A pamphlet is a compact educational medium used as a tool to reinforce learning process. It takes a short time to read a pamphlet and it acts as a reminder of important points. It aims to change knowledge and attitude, or to teach a behavioral skill. Pamphlets are used in different studies for educating communities and patients (11-13).

Rational prescription of medicine by physicians, monitoring drug usage and distribution, and promotion of public culture to achieve more effective medical treatment, shape principles of healthcare in developed countries (14).

In 1985, the World Health Organization (WHO) held a conference in Nairobi, Kenya on rational use of drugs. Since then, efforts to improve the use of drugs in developing countries have increased with the aim of changing the public attitude and the culture of drug prescription by physicians (15). This study assessed the impact of administering a scientifically prepared pamphlet on improving General Practitioners' (GPs) performance, and to evaluate its possible role in CPD programs.

Methods

Preparing the educational pamphlet

For designing the educational pamphlet, we firstly had to identify GPs' prescription writing errors. Thus, from the GPs' prescriptions returned to the Social Security Organization (SSO) between January 20th and February 18th, 2010. We randomly selected 600 ones. Two separate SSO's prescription evaluator personnel identified the frequency of each error in selected prescriptions based on common prescription errors (16), including content and writing errors. Writing errors included: illegibility of prescription, insertion of "as per order", not mentioning diagnosis, and excessive medicinal items. Content errors consisted of drugs misprescriptions and interactions. A pharmacologist and a clinical pharmacologist identified most frequent or critical errors. Then the educational pamphlet was prepared according to identified errors under the supervision of above mentioned experts.

Also, we designed a checklist on the basis of identified errors to assess prescriptions. To check interpersonal reliability of the checklist (between raters), 50 assessed prescriptions were reviewed simultaneously by two experts, and for individual reliability (within rater), 50 prescriptions were assessed in two rounds with one-week interval.

Intervention

In this study, 2277 GPs affiliated with Tehran SSO were chosen as the study population. The duration of the study was six months between February and August 2010. Of 2277 GPs, 1813 were male (80%) and 464 were female (20%). Using a simple random sampling, 200 GPs including 160 males (80 in intervention and 80 in control groups), and 40 females (20 in the intervention and 20 in control groups) were randomly selected (Fig. 1).

Initially, we identified prescription errors of all participants during one month period (February 2010) according to the above-mentioned checklist. Then, the prepared educational pamphlet was sent to the GPs' in the intervention group. Five physicians (5%) were excluded due to unknown address. Then we examined the prescriptions of both groups with the same checklist, in July 2010. Before the intervention 34888 prescriptions were reviewed (19405 and 15483 from the intervention and the control groups, respectively). After the interven-

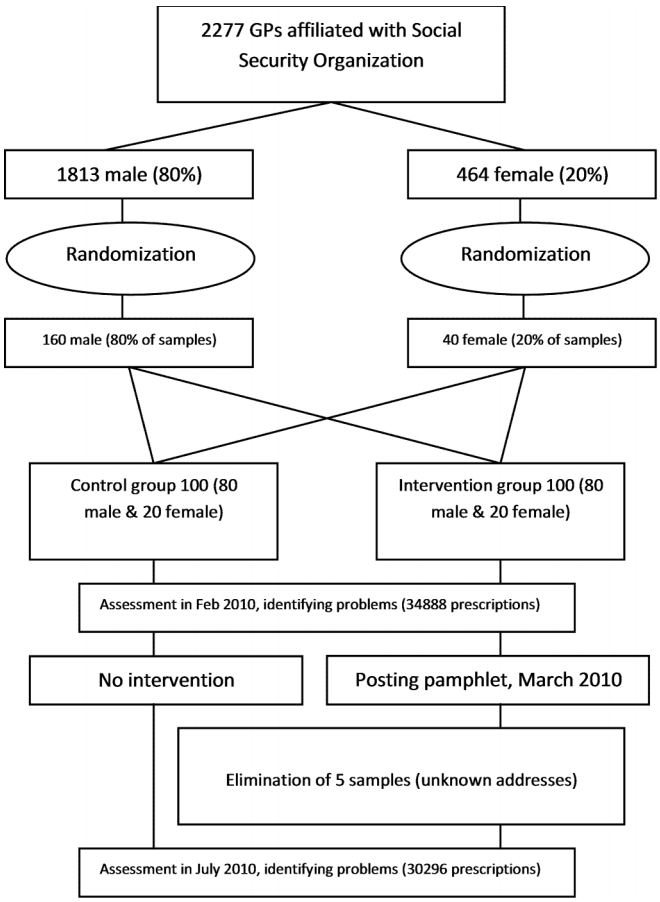

Fig. 1. Schematic study design and randomized groups

tion, 30296 prescriptions were studied (15661 and 14635 from the intervention and the control group, respectively).

Statistical Analysis

We determined the mean number of prescriptions with errors in the intervention and control groups before and after intervention and used t-test to compare the differences. Also, we performed repeated measures analysis of variances (ANOVA) to assess the effect of the pamphlet. Normal distribution and homogeneity of variances were confirmed prior to analysis. P value less than 0.05 was considered as significant. In August 2010, we posted the pamphlet to the control group for ethical issues.

Results

Table 1 presents the errors and their frequency. The between and within rater's errors of the devised assessment checklist were 2% and 1%, respectively, which were acceptable.

In total, prescriptions written by 195 GPs were examined; 95 (49%) of them were in the intervention group and 100 (51%) in the control group. There was no significant difference for the years of experience between intervention (8.1% ± 3.52) and control (8.2 ± 3.00) groups (p= 0.874). Also, there was no significant difference between two groups in gender (p= 0.463).

There was no significant difference in the mean number of prescriptions in the intervention and the control groups before and after intervention (p= 0.076). Mean number of medicinal items reduced significantly in intervention group. Also mean number of prescriptions including injection drugs, Corticosteroids, or 3rd generation injection cephalosporin and non-steroidal anti-inflammatory drugs (NSAIDs) reduced significantly. However, no significant differences were found for the mean number of prescriptions including Penicillin injection,

Table 1. Types and percentages of errors among total errors in participants' prescriptions

Type of error	Errors N*(%)
Injection drugs	36 (25)
Corticosteroid prescriptions	9 (6)
Injection solutions	4 (2.5)
3rd generation injection cephalosporin	2 (1.5)
Penicillin injection	17 (12)
Simultaneous prescription of gentamicin and ceftriaxone	3 (2)
Aminoglycosides	17 (12)
NSAIDs	25 (17)
Cost of prescription	32 (22)

*Total number of prescriptions: 600, Total number of prescription with errors: 84, Total number of errors: 145

Table 2. Results and comparison of participants' prescription errors before and after intervention.

Errors	Occasion	Intervention group Mean* (SD)	Control group Mean* (SD)	p
Number of prescriptions for each GP	Before	229.24 (222.52)	164.57 (131.64)	0.076
	After	185.65 (171.80)	157.73 (149.80)	
Number of items	Before	3.61 (0.87)	3.22 (0.59)	0.014**
	After	3.50 (0.95)	3.32 (0.63)	
Injections	Before	149.64 (158.26)	88.68 (90.41)	0.024**
	After	85.88 (88.50)	78.48 (83.41)	
Corticosteroids	Before	61.19 (66.34)	38.72 (42.37)	0.036**
	After	34.90 (35.39)	31.11 (32.50)	
Penicillin injections	Before	36.89 (44.80)	24.27 (32.07)	0.165
	After	12.77 (18.55)	13.83 (23.00)	
Cephalosporins	Before	18.75 (29.31)	9.16 (15.71)	0.017**
	After	10.52 (16.06)	7.19 (11.56)	
Aminoglycosides	Before	1.82 (2.91)	1.49 (2.36)	0.438
	After	1.60 (4.55)	1.19 (2.77)	
NSAIDs	Before	31.14 (37.28)	16.75 (16.64)	0.005**
	After	20.01 (26.67)	13.92 (15.96)	
Injection solutions	Before	22.45 (34.97)	12.39 (20.09)	0.052
	After	18.32 (22.89)	14.71 (19.08)	
IV Gentamicin + Ceftriaxone	Before	1.57 (2.77)	1.01 (1.98)	0.617
	After	0.73 (1.70)	0.96 (2.52)	
Cost of prescription	Before	32016 (11255)	36312 (22597)	0.088
	After	33799(9777)	35261 (9780)	

* Mean number of errors for each participant, ** Significant ($p < 0.05$)

Aminoglycosides, injection solutionsimultaneous prescription of Gentamicin and Ceftriaxone or mean medicinal cost. Table 2 compares the mean (SD) errors in two groups before and after the intervention.

Discussion

The effect of education on reducing prescription writing errors has been examined in various studies (17-19). Also, studies in different countries have shown the need for distance training of GPs and identified self-training as a suitable method for CME; physicians showed a positive attitude toward it (20). In a study active learning strategies enhanced physicians' knowledge of drug interaction and reduced related errors frequency from 1.6% to 0.24% (21). Also instructional interventions relatively improved proper drug prescription (22). One study in Iran reported a decrease in mean number of medicinal items from 3.9% in 1999 to 3.49% in 2001, following a CME intervention (23).

In this study, we examined the effectiveness of a pamphlet in a real environment. We assessed the prescriptions before intervention in winter and after intervention in summer. So there may be the effect of diseases prevalence in different seasons on prescriptions. We considered this point in analysis and the effect was adjusted using repeated measures of variances.

We found that the mean number of items in prescriptions reduced significantly. Also mean number of injection drugs reduced

significantly, too. This finding is in accordance to the study performed in Shiraz (22); but unlikely, we found no significant decrease in mean Penicillin injections. In our study, participants in intervention group significantly prescribed less Cephalosporin and NSAIDs; the same is found in another study (22). In our study, except for some injection drugs and Corticosteroids, the mean number of prescribing Penicillin injection, Aminoglycosides, injection solutions simultaneous prescription of Gentamicin and Ceftriaxone or mean medicinal cost were not reduced significantly. Other studies had reached the same findings about simultaneous prescription of Gentamicin and Ceftriaxone after education (21,24). It seems that correction of some of the prescription errors require more educational, or maybe non-educational, interventions which needs further studies.

The results could be affected if the postal package was failed to be delivered or if it was not read due to huge load of commercial packages mailed to doctors. On the other hand, it should be noted that the signature of Tehran University of Medical Sciences, as a famous university in Iran, may have motivated GPs to study the pamphlet. Nonetheless, pamphlet impact on GPs' prescription writing was positive.

Conclusion

The results of this study showed that a well-designed pamphlet is an appropriate tool for CME and could change GPs performance regarding proper prescription writing. Using pamphlets as an educational medium could reinforce learning in continuing education.

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Conflict of interests

The authors declare no competing interests.

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