

Nurses Opinion on the Attributes of Polypharmacy in Patient Safety

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Abstract- Nurses play a functional role in preventing drug related problems. They need to be aware of the dangers of polypharmacy while reviewing patient medications. We studied the nurses' opinion on the diverse effects of polypharmacy in the hospital setting. Nurses working in a tertiary care teaching hospital participated in this cross-sectional study, conducted over 3 months, by responding to a self-administered questionnaire. Chi-square test was used to analyze association between socio-demographic characteristics and items in the study. A value of $P < 0.05$ was considered statistically significant. Increased drug interactions scored the highest (98.1%), followed by increased adverse drug effects (81.9%), and increase in financial burden (69.5%) among the negative effects of polypharmacy. 61% of the respondents felt that polypharmacy increased therapeutic effect in polypharmacy. No difference was observed in the opinion between male and female nurses or among varying nursing experience. Nurses with 5-10 years of experience opined increase in non-compliance to prescribed medication regimen and increase in financial burden also as negative attributes. Nurses pointed out both positive and negative implications of polypharmacy. Training programs such as continuing nursing education and workshops can be planned to translate this knowledge into practice in their routine nursing practice.

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Introduction

Polypharmacy is a ubiquitous problem rapidly invading into the healthcare system. Polypharmacy can be defined as use of more number of drugs than that is clinically indicated in a patient or the use of five or more drugs in a patient (1) and excessive polypharmacy is defined as the use of ten or more drugs in a patient (2). The prevalence of polypharmacy is well studied among the elderly population and varies from 4% to 34% (3,4). Polypharmacy is much more complex than just the number of medications. It constitutes a serious problem in the health care system, and is one of the contributing factors to the escalating health care costs and financial burden on the patient community (5).

Polypharmacy is considered rational when appropriate medications are prescribed to reduce symptoms, drug resistance or for synergistic effect and

which in turn decreases the associated morbidity and mortality. However, irrational use of multiple medications occurs too frequently which could result in several drug related problems such as increase in adverse drug reactions, drug interactions, and medication errors. Koh *et al.* reported that among the patients on polypharmacy, nearly 63% developed at least one drug related problem such as drug interactions (34.8% experienced drug toxicity), adverse drug reactions (10%), unnecessary drug therapy, inappropriate choice of drugs (15.3%), and untreated conditions (6). Notably elevated mortality rates and drug-related hospitalization are directly related to the number of medications a patient is taking (7). Polypharmacy also affects the medication adherence; as the number of drugs in the prescription increases the patient's adherence to the prescribed regimen increases accordingly. In spite of these adverse consequences

associated with the use of multiple medications, there is insufficient awareness of the problem among the health care professionals, and also attempts to combat this issue.

Health care professionals have a major responsibility in preventing potential problems arising from pharmacotherapy. Nurses as an interdisciplinary member of the health care system can play a key role in preventing drug related problems. They ought to be aware of the effects of polypharmacy during review and administration of medications. Due to their propinquity with patients in the hospital setting they can review the prescriptions and identify patients receiving multiple medications. It is imperative to identify the nurses' views on the various effects of polypharmacy to serve as a guide to initiate appropriate measures to encourage more rational use of medications. The present study aimed to obtain the opinion of the nurses regarding the diverse effects of polypharmacy.

Materials and Methods

Study design and participants

A cross sectional, population based study was carried out among nurses of Gulf Medical College Hospital and Research Centre (GMCHRC), Ajman, UAE from March 2011- May 2011 (three months) to explore the opinion of nurses on the diverse effects of polypharmacy. GMCHRC offers twenty four hours a day inpatient and outpatient care and diagnostic services provided by its physicians and nurses. A paper based questionnaire with structured close-ended items was developed by the research team as the study instrument. The questionnaire comprised items that assessed socio-demographic characteristics, and opinions regarding the effects of polypharmacy. Nurses who participated in this cross-sectional study responded to a self-administered anonymous questionnaire focusing on the effects of polypharmacy.

Data collection

The approval of institutional ethics committee was obtained before the start of the study. Informed consent was obtained from the participants before distributing the questionnaire. Self administered questionnaire were handed out to the nurses in all the hospital wards and outpatient departments who were willing to participate in the study during their duty hours in the hospital. Enough time will be given to fill in the questionnaire. The filled in questionnaire were collected back from the

nurses on the same day. Anonymity was maintained throughout the study.

Inclusion and exclusion criteria

All nurses working at GMCHRC during the study period and willing to participate in the study were included. Nurses who were not willing to participate in the study and those who were on leave during the study period were excluded.

Sample size calculation

A population based survey was planned and conducted and thus, all the nurses working in the hospital during the study period were included as the study sample. A total 109 nurses were working in the hospital and all of them were included in the study.

Data management and statistical analysis

The collected data from the returned questionnaire were entered into the Microsoft Excel spread sheet. The nurses were divided into three groups based on their years of nursing experience: those with <5 years, 5-10 years and with >10 years of experience. Predictive Analytic Software 18 version was used to analyze the data. Association between socio-demographic characteristics such as gender, duration of nursing experience and items in the study were analyzed using Chi-square test and a *P*-value less than 0.05 was considered statistically significant.

Results

The results of the study highlight the opinion of nurses regarding the diverse effects of polypharmacy among the patient population in the hospital. A total of 105 nurses participated in the survey of the total 109 nurses working in the hospital. Thus, a high response rate of 98% was obtained. A total of 92 female and 13 male nurses participated in the survey. The number of nurses below 25 years of age was 24 (22.9%); 26-30 years was 47 (44.8%) and above 30 years of age was 34 (32.4%). On the basis of the duration of nursing experience 42 nurses (40%) had nursing experience of less than five years; 47 (44.8%) were between five and 10 years and 16 (15.2%) had more than 10 years of experience. Based on their qualification, 86 (81.9%) nurses were Diploma in Nursing while 19 (8.1%) nurses were Graduates (BSc in Nursing).

Overall, the negative attributes of polypharmacy identified by the nurses were; increased drug interaction

Nurses opinion on the attributes of polypharmacy in patient safety

Table 1. Nurses' opinion on the effects of polypharmacy.

Effects of Polypharmacy	Number	Percentage
Increases drug interactions	103	98.1
Increases adverse drug effects	86	81.9
Increases financial burden on patients	73	69.5
Increases non-compliance	72	68.6
Increases therapeutic effect	64	61.0
Leads to unnecessary/inappropriate prescribing	59	56.2
Results in medication errors	45	42.9
Results in strictly following guidelines	44	41.9
Prolongs patient's survival	38	36.2
Improves quality of life	37	35.2
Shortens the duration of treatment	36	34.3

Increase in adverse drug interactions and adverse drug reaction were the common effects of polypharmacy noted by the nurses

103 (98.1%) followed by increased occurrence of adverse drug effects, increase in financial burden and increase in non-compliance to prescribed medication regimen. Increase in the therapeutic effect (61%) was the most commonly identified positive effect of polypharmacy. The least scored effects of polypharmacy were prolongs patients survival, improves quality of life and shortens duration of treatment. The details of nurses' opinion regarding the varied effects of polypharmacy are given in Table 1.

About 89% of the nurses identified elderly as the commonest age group in whom the negative effects of polypharmacy are observed. Based on the duration of

illness, 77% of the nurses opined that polypharmacy produces adverse consequences in patients chronic conditions. Considering acute conditions, 89% of the nurses believed that polypharmacy produces beneficial effects. Based on the severity of the clinical conditions, 69% of the nurses felt that the use of multiple drugs in severe conditions produces beneficial effects, while 25% opined that polypharmacy produces adverse consequences in severe conditions, and 6% were unsure of the effects.

There were no major differences in the opinion regarding the effects of polypharmacy between the male and female nurses as depicted in Figure 1.

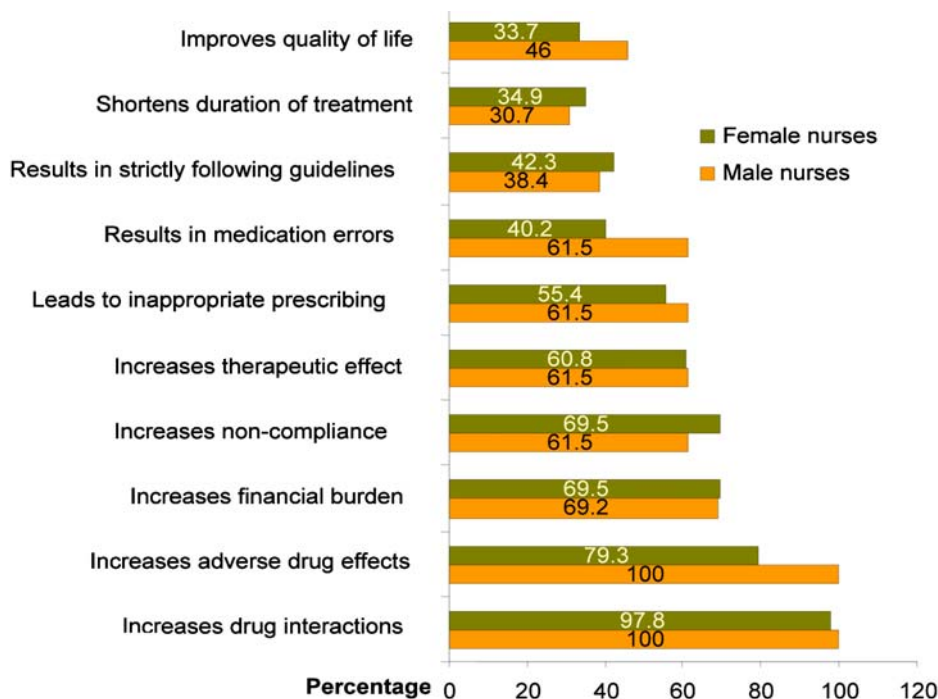


Figure 1. Comparison of the opinion of male and female nurses regarding the effects of polypharmacy.

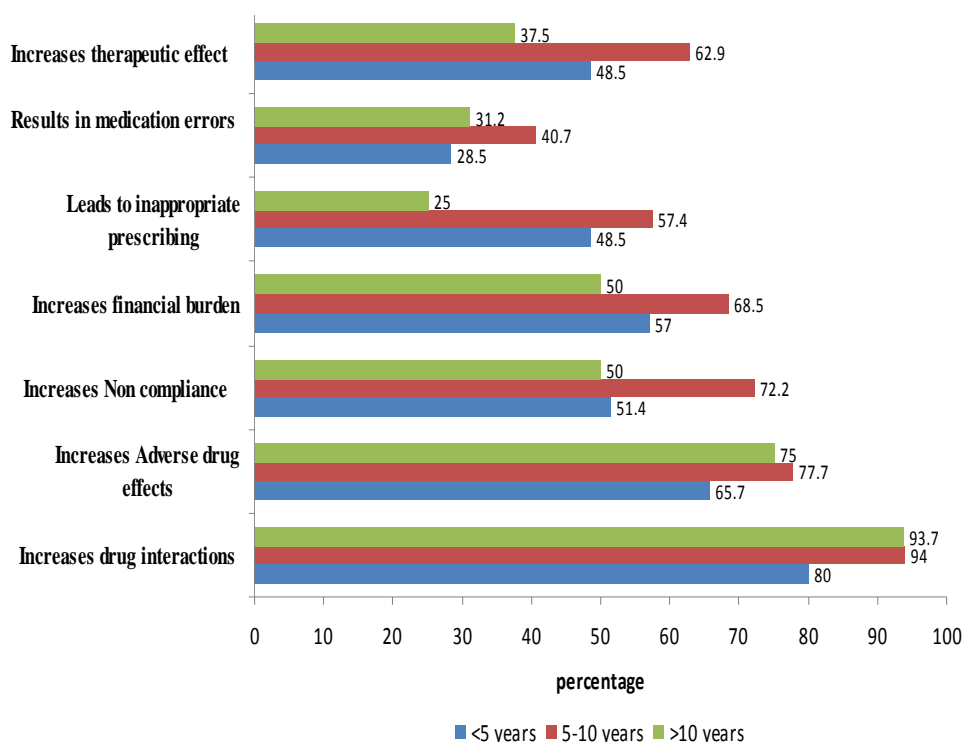


Figure 2. Nursing experience and the opinion on the effects of polypharmacy.

The opinion of the nurses based on their qualification was similar in two groups with no statistical significance. It was also noticed that the more experienced nurses and the less experienced held the same opinion regarding the effects of polypharmacy. The opinion of nurses regarding the effects of polypharmacy based on their nursing experience is presented in Figure 2.

Discussion

Polypharmacy has become a disconcerting issue despite continuing efforts to minimize its occurrence in the healthcare settings. Polypharmacy has been attributed as an important risk factor for drug related problems especially among the hospitalized patients. The nurses are in a unique position to promote safe and effective medication practices. The opinion of nurses on the various effects of polypharmacy has not been studied till now. This research highlights the nurses' opinion on the various effects of polypharmacy. The nurses' mean age was 34 ± 12 years, with an average of 15 years of nursing experience. Female preponderance in the nursing profession was observed. The present study demonstrates that the nurses have a mixed opinion about the effects of polypharmacy.

The negative association linked to polypharmacy is due to increase in drug interactions, adverse drug

reactions, financial burden and increase in hospital admissions (8-11). A past investigation among the elderly showed that they represent the most vulnerable patient group to adverse drug reactions, which are preventable (12), while a recent study reported that the incidence of adverse drug reactions is related to polypharmacy (13).

A large proportion of the nurses identified severity of the clinical condition and chronic diseases as factors leading to polypharmacy and associated with the negative consequences. Similar observation was noted by Rozenfeld *et al.* and Nobili *et al.* among the elderly patients on polypharmacy (14,15).

Majority of our study participants opined that polypharmacy increased both drug interactions and adverse drug reactions. Similar observation was reported by Anthierens *et al.* among general practitioners (16). The greater number of medications the patients take, the higher is the potential for drug-drug interactions and adverse drug effects. In Koh *et al.* about 34.8% of the hospitalized patients on polypharmacy developed drug toxicities due to drug-drug interaction and 10 experienced adverse drug reactions (6). Nurses through their knowledge; can assist patients to understand the adverse consequences of polypharmacy and thus reduce and prevent serious drug related complications.

More than half of the respondents reported that polypharmacy lead to financial burden and also

increased non-compliance to prescribed medications. This finding was in line with the opinion of General practitioners in Anthierens *et al.* study where in medication adherence was identified as the greatest challenge among patients on multiple medications (16).

The male nurses strongly pointed medication errors and inappropriate prescribing as consequences of polypharmacy. Koh *et al.* noted inappropriate dosages of medicines in 15.3% of patients receiving multiple drugs (6). Reports published previously revealed that nearly 40% of the medication errors originated with the prescribing physician/provider and that prescription order transcription errors accounted for about 12% of the medications errors encountered (18). Medication reconciliation is now emerging as an important component of the new healthcare paradigm and can contribute considerably in reducing inappropriate medication use and its consequences such as adverse drug effects and medication errors (18). In a multidisciplinary setting, Varkey *et al.* showed that the number of medication errors decreased after the implementation of a medication reconciliation process (19). Several other reports also have documented that multidisciplinary and multifaceted approaches in the hospital setting can optimize prescribing (20,21).

Polypharmacy carries the above mentioned negative characteristics and with progressing advances in pharmacological therapies and new drug discoveries, it is expected that the number of medications prescribed will continue to increase rather than decrease. Therefore, suitable measures need to be adopted to curb the issue of polypharmacy.

About 64% of the respondents felt that polypharmacy increased therapeutic effect in polypharmacy. Polypharmacy can improve the therapeutic effects if synergistic drugs are utilized but drastic effects on the quality of life and the duration of treatment can be expected secondary to drug-related problems (22,23), Kingsbury *et al.* (7), Oepen *et al.* (24), and Sim *et al.* (25) suggests that polypharmacy may be just as rational as monotherapy in situations when management with multiple medications is necessary. Polypharmacy may be a necessity to effectively manage co-morbidities and associated complications but there is a need to implement an evidence-based medication algorithm to minimize polypharmacy associated adverse consequences.

Only about 40% of the nurses felt that polypharmacy results from strictly following treatment guidelines. This finding was dissimilar from Anthierens *et al.* study in which a majority of the general practitioners identified

following treatment guidelines as a major contributor to prescription of multiple drugs (16). Several other studies have also documented similar observations (26,27).

In conclusion, nurses pointed out that polypharmacy have both positive and negative implications. The three most important adverse consequences identified were drug-drug interactions, adverse drug effects and financial burden and among the positive effects was the increase in the therapeutic effect. Continuing nursing educational programs and workshops dealing with the various effects of multiple medications should be offered to the nursing community. Additionally, the concept of polypharmacy could be incorporated in the nursing curriculum. Future research can be done in this area focusing on effectiveness of various interventions to reduce the practice of polypharmacy in the healthcare settings.

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