Evaluation of Patients Pharmaceutical Care Needs Unmet and Its Contributing Factors in Medical Ward of Bedelle General Hospital, South Western, Ethiopia: A Prospective Observational Study

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Abstract

Background: Pharmaceutical care is the responsible provision of drug therapy for the purpose of achieving definite outcome that improve a patient's quality of life. Drug related problems are relatively common in hospitalized patients and can result in patient morbidity and mortality, and increased costs besides their alarming rise among patients who are in medical ward chronic disease.

Objective: To determine evaluation of patient pharmaceutical care needs not meet and its contributing factors in medical ward of Bedelle General Hospital.

Methods: A hospital based prospective observational study design was carried out from April 12/2021 to June 19/2021.Relevant social-demographic information, clinical characteristics were recorded in face-to-face interviews by using semi-structured questioner, and then the collected data was coded and analyzed by statistical packages for social sciences 25.0 version statistical software. Logistic regression was used to look for significant associations, and P value <0.05 was used to declare association.

Results: The overall prevalence of drug therapy problems among medical ward was 81(52.6%).A total of 154 patients were included. Of which, 47(61.8 %) of them were age <50 years. From 312 disease type identified the majority of participants had cardiovascular disorders 76(24.5%), and renal disorders 64(20.5%). From the 1146 drugs identified ceftriaxone 203(17.7%) was the most commonly encountered in the medical wards followed by enal april 117(11.3%).Ineffective drug therapy 20(24.7%) was highly occurred type of drug therapy problems followed need for additional treatment 15(18.5%). Poly pharmacy ≥ 5 medications, ≥5 days, length of hospital stay, comorbidities, and drug interaction were variables which significantly associated with presence of drug therapy problem.

Conclusion and Recommendation: The overall prevalence of drug therapy problems among medical ward was high. Hospital and ministry of Health should have established drug therapy guideline to minimize the occurrence of drug therapy problems and to establish pharmaceutical care services for better patient care.

Keywords: Drug related problems; Risk factors; Medical ward; Mettu karl referral hospital, Ethiopia

Abbreviations: ADR: Adverse Drug Reaction; DRPs: Drug Related Problems; DTPs: Drug Therapy Problems; JUSH: Jimma University Specialized Hospital; BGH: Bedelle General Hospital; PCNE: Pharmaceutical Care Network Europe; TRPs: Treatment Related Problems

Introduction

According to Pharmaceutical Care Network Europe (PCNE) classification volume 6.2, a drug related problem is 'an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes. The event could prevent or delay the achievement of desired therapeutic goals in patients. While an actual DTP occurs when an event has already occurred in a patient, a potential DTP is an event that may likely develop if appropriate interventions are not promptly provided [1]. According to Robert J.Cipolle text book of pharmaceutical care practice (3rd edition), DRPs are classified into seven classes, based on problem associated with medication such as indication (unnecessary treatment & need for additional treatment), effectiveness (ineffective drug & dosage too low), safety (adverse drug reactions & dosage too high) and non-adherence). DTPs can occurs at different stages starting from prescribers to patients and often deleterious and costly [2]. In Ethiopia the prevalence of DTP ranged from 73.5-80.7% [3]. The most frequently identified cause for drug therapy problems are drug choice problems, dosing problems and/or drug interactions. On the other hand, patients usually had drug use problems caused by "drug use process, lack of information, and physiological or patient factor [4]. Drug related problems are relatively common in hospitalized patients and also a major concern in health care because of increased cost, morbidity and mortality. The cost of drug related morbidity and mortality exceeded $177.4 billion in 2000 of total costs, followed by long-term-care admissions, which accounted for 18% ($32.8 billion) [5]. DRP is associated with prolonged length of stay, increased economic burden, and an almost 2-fold increased risk of death, and also the major reasons for admission ranging from the emergency ward up to the intensive care unit, despite their preventability [6]. Different factors contribute for occurrence of DTPs. These includes: missing information, poor patient's knowledge of the drug use, poly-pharmacy, administration of drugs with a narrow therapeutic range poly- morbidity, hepatic and renal impairment [7]. It has been estimated that approximately 5 to 10% of all hospital admissions are drug related, and about 22% of patients are discharged with DTPs. As many as 28% of all emergency department visits are drug related [8]. DTPs pose significant challenges to health care providers and patients alike, contributing to morbidity or mortality, prolonged hospitalization, and increased health care expenditure if left unresolved. However, DTPs are preventable in most cases [9].

A prospective bedside clinical assessment from internal medicine ward in Jordan found that of the total patients, 98.3% had TRPs and on average 9.35 TRPs occurred per patient Previous studies reported that majority of hospitalized patients have some kind of DRPs [10]. For instance, studies conducted in Norway reported that, 2.6 DRPs occurred per patient in medical ward. In addition to this Viktil et al. found that the occurrence of DRPs per patient increased linearly with the number of drugs used, with one unit increase in number of drugs yielded 8.6% increase in the number of DRPs. Furthermore, a prospective study done in Jordan from medical ward reported that from the total patients, 98.3% had treatment related problems (TRPs) and on average 9.35 TRPs occurred per patient [11]. It is estimated that approximately 5 to 10% of all hospital admissions are drug related, and about 22% of patients are discharged with DTPs. As many as 28% of all emergency department visits are drug related. Common drug therapy problems resulting in emergency department visits are adverse drug reactions, noncompliance, and inappropriate prescribing. Pharmaceutical who die in hospital [12]. It has been estimated that 3 to 14% of total hospital admissions to medical wards are related to ADR which is one of the DTPs. ADR is one of the major challenges in the healthcare system due to increased patient morbidity, mortality, and healthcare costs [13]. Drug related problems may lead to increased morbidity, mortality, health care costs, and recurrent hospital admissions and prolonged hospitalization. Cost of drug-related problem related morbidity and mortality exceeds the cost of the medications themselves [14].

The study was aimed to close the gap by providing recent information on drug therapy problems in patients with chronic disease in Bedelle General Hospital. The findings generated from this study will be made available to Bedelle General Hospital pharmacists and other Health care providers, top management staffs and researchers, and we hope that this will lead to better provision of pharmaceutical care in the hospital so that patients will be benefited from this study.

Methods and Materials

Study Design and Study Setting

A Hospital based cross-sectional study design was conducted from April 12/2021 to June 19/2021.The study was conducted at BGH hospitals in Southwest Ethiopia, found at 495 km from Addis Ababa.

Study Population and Eligibility Criteria

All patients who attending medical ward of BGH during the data collection period was study population. Patients who were greater than 18 years age and who had complete registration charts, patients whose hospital stays were greater than 2 days (48hrs), patient who were on drug therapy or who needs drug therapy during study period were included in the study, patients discharged before cross checking the collected data were excluded. Patients whose back ground information were incomplete or no drug orders on their charts, patients who were admitted to intensive care unit were excluded.

Sample Size Determination and Sampling Procedure

The sample size was determined by using the Single Population proportion Formula: The sample size was determined based on "P" value which was taken from JUSH, P=0.735, or 73.5%. $n = \frac{(Za/2)2 \ P(1-P)}{d2}$, n=sample size, P= prevalence of drug therapy problem, d=margin of sampling error tolerated, z=the standard normal value at confidence interval of 95%.

$n = \frac{(1.96)^2(1-0.735) \ x \ (0.735)}{(0.05)^2} = 299$. Since the total number of medical ward patients was less than 10,000, reduction formula (correction formula) was applied as follow; $n_f = n/(1+(n/N))$, $n_f = 299/(1+(299/263)) = 140$. When 10% contingency is added to minimize non response rate, then final sample size was found to be 154. Convenience sampling technique was simple use available participants at the moment of study until the desired sample size was obtained.

Data Collection Tools and Procedures

A well-structured standard checklist and questionnaire was used to collect relevant information from patients and patient charts. The relevant information about each patient social-demographic information such as (age, sex, marital status, educational background), and clinical characteristics such as (duration of treatment, number of drugs, poly pharmacy, length of hospital stay, social abuse, presence of co morbidity, presence of ADR)

were collected. Drug related problems were identified by evaluating the appropriateness of prescriptions in terms of indication, dosage, safety and efficacy. Finally the existence of DTPs was identified using Ethiopian guide line, the Pharmaceutical Care Network Europe (PCNE) classification of drugs related problems (DRPs) version 5.01 (PCNE, 2006).

Data Processing and Analysis

The gathered quantitative data was coded, and then analyzed through employing SPSS version 25.0 statistical Software. Categorical variables were expressed by percentage and frequency, whereas continuous variables were present by mean and standard deviation. Both bivariate and multivariate binary logistic regressions were conducted to identify the associated factors with the outcome variables. Variables with a p value of less than 0.25 during bivariate analysis were exported to multivariate analysis to adjust the effect. During multivariable analysis, variables with a P value ≤0.05 and odds ratio with their 95% confidence interval were considered as significantly associated factors with the outcome variables.

Ethical Clearance

An ethical clearance was obtained from SWAN diagnostic pharmaceutical importer. Privacy and behind the scenes were ensured during data collection process. The instruments and procedure did not cause any harm to the study subject. Thus, name and address of the patient were not recorded in data collection checklist.

Operational Definitions

Drug Therapy Problem: is an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes.

Poly Pharmacy: Consumption of five or more medications.

Adverse Drug Reaction: Any response to a drug which is noxious and unintended and that occurs at normal therapeutic dose.

Dosage Regimen: Dose of the medication, frequency of administration, and duration of treatment.

Co Morbidity: The presence of additional diseases in relation to an index disease.

Results

Socio-Demographic Variables of the Participants

A total of 154 patients were included. Of which, 47(61.8 %) of them were age <50 years while 85(55.2%) and 82(53.2%) of the patients were male and lived in rural area respectively. A majority 114 (74.0%) 0f patients were earn less than ≤ 500 ETB monthly whereas 57(%) of participants were married. Above half 97(63.0%) of patients were uneducated and only 46(29.9%) patients had social habit. The prevalence of DRPs among medical ward patients was 81(52.6%) (Table 1).

Table 1. Socio-demographic characteristics of the patients in the medical ward of BGH, March 02/2021 to June 19/2021 (n= 154)

Variables	Category	Frequency	Percent
Age	<50 years	66	42.8
	50-64 years	50	32.5
	> 64 years	38	24.7
Sex	Male	85	55.2
	Female	69	44.8
Residency	Urban	72	46.8
	Rural	82	53.2
Monthly income	≤ 500ETB	114	74.0
	>500ETB	40	26.0
Marital status	Single	41	26.6
	Married	57	37.0
	Divorced	38	24.7
	Widowed	18	11.7
Educational status	Uneducated	97	63.0
	Educated	57	37.0
Social habit	Yes	46	29.9
	No	108	70.1
Prevalence of DRPs	Yes	81	52.6
	No	73	47.4

Table 2. Clinical characteristics of patients in the medical ward of BGH, March 02/2021 to June 19/2021 (n= 154)

Variables	Category	Frequency	Percent
MMAPS-8	Low	76	49.4
	Moderate	38	24.7
	High	40	26.0
Drug interaction	Yes	47	30.5
	No	107	69.5
Laboratory values	Yes	62	40.3
	No	92	59.7
Polypharmacy	Yes	78	50.6
	No	76	49.4
Length hospital stay	<5 days	82	53.2
	≥5 days	72	46.8
Comorbidity	Yes	83	53..9
	No	71	46.1
Past medical history	Yes	65	42.2
	No	89	57.8
Past medication history	Yes	62	40.3
	No	92	59.7
Naranjo adverse effects	Doubtful	32	20.8
	Possible	30	19.5
	Probable	53	34.4
	Definite	39	25.3

Table 3. Disease type and drug category of patients in the medical ward of BGH, March 02/2021 to June 19/2021 (n= 154)

Variables	Category	Frequency	Percent
Disease Type	Cardiovascular disorders	76	24.5
	Hematologic disorder	35	11.1
	Endocrinologic disorders	22	7.1
	Renal disorders	64	20.5
	Parasitic diseases	24	7.6
	Opportunistic infections	17	5.4
	GI disorders	58	18.6
	Others	16	5.2
Drug Category	NSAIDs	21	13.6
	Antacids and antiulcer	16	10.4
	Oral hypoglycemic drugs	11	7.2
	Corticosteroids	13	8.5
	Antibiotics	32	20.8
	calcium channel blockers	12	7.9
	Beta blockers	15	9.7
	Diuretics	17	11.0
	Antifungal	7	4.5
	Antihyperlipidemics	5	3.2
	Direct vasodilators	2	1.3
	Others	3	1.9

Table 4. Commonly used drugs of patients in the medical ward of BGH, March 02/2021 to June 19/2021 (n= 154)

Variables	Category	Frequency	Percent
Drug type	Furosemide	116	10.2
	Enalapril	117	11.3
	Amilodipnie	59	5.1
	ASA	71	6.2
	Ceftriaxone	203	17.7
	Gentamycin	67	5.9
	Ampicillin	73	6.1
	Omeprazole	104	9.1
	Atorvastatins	79	6.9
	Artesunate	107	9.3
	Atenolol	71	6.2
	Amphotericin	23	2.0
	Others	56	4.9

Table 5. Types of DTPs of patients in the medical ward of BGH, March 02/2021 to June 19/2021 (n= 154)

Variables	Category	Frequency	Percent
Type of DTPs	Unnecessary treatment	13	16.0
	Need for additional treatment	15	18.5
	Ineffective drug	20	24.7
	Dosage too low	7	8.7
	Adverse drug reactions	3	3.8
	Dosage too high	9	11.0
	Non-adherence	14	17.3

Table 6. Predictors of drug related problems in the medical ward of BGH, March 02/2021 to June 19/2021 (n= 154)

Variables	Category	n(%)	AOR (95% C.I)	P-value
Age	<50 years	66(42.8)	1.26(1.185-1.947)	0.042
	50-64 years	50(32.5)	0.91(1.028-1.652)	0.01
	> 64 years	38(24.7)	1	
Sex	Male	85(55.2)	1.17(1.204-1.702)	0.460
	Female	69(44.8)	1	
Polypharmacy	≥ drugs	78(50.6)	3.06(2.913-7.610)	0.018
	< 5 drugs	76(49.4)	1	
Length of hospital stay	≥5 days	82(53.2)	2.75(2.907-5.541)	0.001
	<5 days	72(46.8)	1	
Comorbidity	Yes	83(53.9)	3.67(4.590-9.018)	0.046
	No	71(46.1)	1	
Drug interaction	Yes	47(30.5)	2.14(2.243-6.197)	0.005
	No	107(69.5)	1	
Past medical history	Yes	65(42.2)	0.45(0.026-1.166)	0.759
	No	89(57.8)	1	
Past medication history	Yes	62(40.3)	1.24(1.476-1.857)	0.047
	No	92(59.7)	1	

Clinical Characteristics of Patients in Medical Ward

Slightly less than one third 47(30.5%) of the patients had drug interaction and 67 (40.3%) of the respondents were have laboratory values. Regarding MMAPS-8 46(49.4%), 26(26.0%), and 38(24.7%) were low, high and moderate respectively. Slightly above half 78(50.6%), 82(53.2%), and 83(53.9%) of the participants were poly pharmacy, length hospital stay <5 days and comorbidity respectively. Less than half 65 (42.2%) of patients had past medical history and 62(40.3%) had past medication history. According to naranjo adverse effects 32(20.8%), 30(19.5%), 53 (34.4%), and 25.3(25.3%) of participants were have doubtful, possible, probable, and definite respectively (Table 2).

Disease Type and Drug Category of Patients in Medical Ward

From 312 disease type identified the majority of participants had cardiovascular disorders 76(24.5%) and renal disorders 64(20.5%) followed by GI disorders 58(18.6%) and Hematologic disorder 35(11.1%). Opportunistic infections 17(5.4%) was the least disease type identified. From the class of drug antibiotics 32(20.8%) were the most commonly commonly prescribed drugs in medical ward followed by NSAIDs 21(13.6%) and direct vasodilators 2(1.3%) was the least prescribed classes of drugs (Table 3).

Commonly Used Drugs in Medical Ward

From the 1146 drugs identified ceftriaxone 203(17.7%) was the most commonly encountered in the medical wards followed by enalapril 117(11.3%).From those 59(5.1%), and 23(2.0%) amilodipnie and amphotericin respectively (Table 4).

Type of Drug Related Problems of Patients in Medical Ward

From seven type of drug therapy problem ineffective drug therapy 20(24.7%) was highly occurred type of DTPs followed need for additional treatment 15(18.5%) and 14(17.3%) non-adherence. Adverse drug reactions 3(3.8%) was less occurred type of DTPs followed by dose too low 7(8.7%) (Table 5).

Predictors of Drug Related Problems of Patients in Medical Ward

Bivariable logistic regression was conducted to comprehend variables which associated with presence of drug therapy problem among medical ward patients in BGH. Polypharmacy ≥ 5 medication were 3 time more likely cause DTPs (AOR=3.06, 95% CI=2.913-7.610, p=0.018) than who taken < 5 medication. ≥5 days length of hospital stay were 2.75 times more likely cause DTPs (AOR=2.75, 95% CI= 2.907- 5.541, p=0.001) than who stayed < 5 days. Patients who had at least one comorbidities were 3.67 times more likely cause DTPs (AOR=3.67, 95% CI= 4.590-9.018, p=0.046) than who hadn't comorbidities, and patients who had drug interaction were 2 times more likely cause DTPs (AOR=2.14,95% CI=2.243-6.197, p=0.00 5) than who hadn't drug interaction (Table 6).

Discussion

Pharmaceutical drugs are associated with fatal adverse drug reactions in 3.1% of the total hospital admission and in 6.4% of those who die in hospital [20]. It has been estimated that 3 to 14% of total hospital admissions to medical wards are related to ADR which is one of the DTPs. ADR is one of the major challenges in the healthcare system due to increased patient morbidity, mortality, and healthcare costs [21].

Our study revealed that 52.6% of the participants had at least one drug related problem which were lower the survey conducted in Norway 81%, Jordan 98.3%, Adama Hospital Medical College 80.7% [22-24]. The difference was due to only few drug-interaction avail in our study than those study which highly cause DTPs. The present study were in line with the study conducted in the Kingdom of Saudi Arabia 45.2%, in University of Gondar teaching hospital 54.7% [25,26]. Our study were higher than the study conducted in Hong Kong 21%, Ethiopia 31.57%, JUSH 37.7%, Nabulus district in North Palestine 40% [27-30]. Because in our study the physician were not prescribed the effective drug and the patients not willing to take the medication accordingly.

The current study displayed ineffective drug 24.7% was different from the survey conducted in Dessie referral Hospital [31] which showed that needs additional drug therapy (35.85%) was the most common drug therapy problem; followed by unnecessary drug therapy, 30.19%; and dosage too low, 13.2%.Because in our survey the patients had copious disease which seek two/three medication accordingly but the physician prescribed ineffective drug. Our study showed efficacy 33.4% type of DTPs were higher which is consistent with the study conducted in China [27] efficacy and safety DTP types were the common; such difference can be explained with higher number of drug use in China.

In our study adverse drug reactions was the least type of DTPs which is inconsistent with the study conducted in Adama Hospital Medical College [28] which revealed that the adverse drug interactions were occur in 42.7% of total samples. The difference was in our not skilled person identified adverse drug reaction and also to identify the adverse drug reaction naranjo adverse drug reaction where not applied properly in our study.

The present study displayed antibiotics 32(20.8%) were the most commonly prescribed drugs in medical ward followed by NSAIDs 21(13.6%) and diuretics 11.0% were in line with the study done in Felege Hiwot Referral hospital [28] which revealed the Diuretics (76.3%), ACEI (52.6%), antibiotics (27.6%), and, statin and anti-coagulant (19.7%) were the commonly used drugs. Because infectious disease were the most occurred disease so antibiotics were prescribed to them and NSAIDs were used pain management. Our study inconsistent with the study done in in Jordan [29] the most commonly prescribed drugs were anti-hypertensive (21.05%), anticoagulants and anti-platelets drugs (11.13%) and antiulcer (8.84%). Because in Jordan cardiovascular disease commonly occurred than our survey.

In our survey noon-compliance 17.3% was the third leading cause of DTPs which were contrary to the study conducted in Jimma university specialized hospital [30] which showed noncompliance was found to be the least frequent problem among all DRPs in admitted patients in Jimma University Specialized Hospital medical ward. This because majority of our study subjects came from the rural area and they hadn't education they not understand the instructions accordingly, unable to afford expensive medication due to low monthly income, refuse to take the medication.

The present stud revealed ceftriaxone 203(17.7%) were the most commonly encountered in the medical wards followed by enalapril 117(11.3%) were

in line with the study conducted in Dessie referral Hospital [26] in which ceftriaxone (25.81%) was the most frequent specific drug prone to the DTPs followed by spiranolactone (14.52%), enalapril (6.45%) and Furosemide (6.45%).Because ceftriaxone were prescribed empirically in medical ward to cover both gram positive and gram negative bacteria in the patients. Our study contrary to study done in Norway in which the drugs most frequently prone to DTP were Warfarin, digitoxin and prednisolone. This was due to blood disorders were high in Norway despite our study.

From 312 disease type identified the majority of participants had cardiovascular disorders (24.5%) and renal disorders (20.5%) followed by GI disorders (18.6%) and Hematologic disorder (11.1%).Opportunistic infections (5.4%) was the least disease type identified were contrary to the study conducted in in Nigeria [31] anemia (13%), hypertension (5%) and urinary tract infection (3%). Due to blood disorders were low in our survey rather cardiovascular disorders and renal disorders which mostly admitted to medical ward.

In our study bivariable logistic regression was conducted to comprehend variables which associated with presence of drug therapy problem among medical ward patients in BGH. Poly pharmacy ≥ 5 medication were 3 time more likely cause DTPs (AOR=3.06, 95% CI=2.913-7.610, p=0.018) than who taken < 5 medication. ≥5 days length of hospital stay were 2.75 times more likely cause DTPs (AOR = 2.75, 95% CI = 2.907-5.541, p=0.001) than who stayed < 5 days. Patients who had at least one comorbidities were 3.67 times more likely cause DTPs (AOR = 3.67, 95% CI= 4.590-9.018, p=0.046) than who hadn't comorbidities, and patients who had drug interaction were 2 times more likely cause DTPs (AOR=2.14, 95% CI=2.243-6.197,p=0.005) than who hadn't drug interaction were somewhat consistent with the study conducted in Jimma University Specialized Hospital [32] in which female sex, age, taking five or more drugs on average per day (poly pharmacy) and having clinically significant potential drug-drug interaction were found to be independent predictors, which increase the chance of having DRPs. Number of medications used per day was also found to be a risk factor for increasing DRPs by similar studies.

Conclusion and Recommendation

The overall prevalence of drug therapy problems among medical ward was high. Slightly less than one third of the patients had drug interaction. From three hundred twelve disease type identified the majority of participants had cardiovascular disorders and renal disorders followed by GI disorders and Hematologic disorder. From the class of drug antibiotics were the most commonly prescribed drugs in medical ward followed by NSAIDs and direct vasodilators were the least-ly prescribed classes of drugs. Poly pharmacy, length of hospital stay, comorbidity, drug interaction, age were the significantly associated predictors of drug therapy problems in the current study. Hospital and ministry of Health should have established drug therapy guideline to minimize the occurrence of drug therapy problems and to establish pharmaceutical care services for better patient care.

Acknowledgments

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