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ADVERSE EVENTS AND THEIR RELATIONSHIP WITH THE DEMOGRAPHIC CHARACTERISTICS OF PATIENTS AT WA, THE UPPER WEST REGIONAL HOSPITAL OF GHANA

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There no conflict of interest situation.

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Abstract

Background: Being discharged from the hospital is sometimes associated with complications which may be dangerous to the patient. Adverse events are unintended injuries or complications which may result in death, disability and prolonged hospital stay after discharge or related to the hospital visit. This paper aims at giving an insight into the relationship between patient demographic factors and the incidence, types and severity of adverse events after hospitalization in a secondary hospital in Northern Ghana.

Method: A prospective cohort study into the relationship between adverse events and patient demographic factors. This was carried out with patients admitted and discharged from Wa Hospital. A total of 206 patients were recruited from the medical, surgical and emergency wards of the hospital.

Findings: Adverse events were found to increase with age. The adverse events at age of less than 20 years was 2.4%, between 31 to 40 was 3.3% , 41 to 50 was 3.8%, 51 to 60 was 7.2% and 61 and above was 7.2%. However, 21 to 30 years age group had 9.2% of adverse events. There were no differences in occurrence of adverse events among sexes and other demographic characteristics of the patient with exception of age groups ($p<0.050$) which had influence on the type of adverse events. The level of literacy and education did not also influence the occurrences of adverse events.

Conclusion: Demographic characteristics of patients might not contribute to the development of adverse events after they are discharged from the hospital. However, the age of patients may influence adverse events development probably because of their weaknesses in old age. Improvement in patients social life will help to reduce the occurrence of adverse events after patients had been discharged from the hospital.

Introduction

Adverse events are unintended injuries or complications sustained experienced patients which may result in death, disability and prolonged hospital stay (Hanskamp-Sebregts et al., 2016). There may also be harm that arises from health care management. Patients' contributory factors are sometimes referred to as non-modifiable factors and included patients' age, sex, educational status, religious denomination, marital status, occupation, income and religion. These factors continuously interact with the service delivered to these patients and may produce a relationship that can be exploited and improved in reducing the occurrences and severity of adverse events.

A number of studies have revealed that elderly patients experienced adverse events more than patients of younger age group (Baker et al., 2004; Forster et al., 2004; Mendes, Monica, Sueley,

& Travassos, 2009). It was also observed that 59.2% of patients who experienced an adverse event were 65 years old or older (Sousa, Uva, Serranheira, Nunes, & Leite, 2014). This means that the older the patient the more likelihood of him/her developing adverse events. Other studies indicated that patients were significantly more likely to experience an adverse event if they were female, older, and had conditions such type 2 diabetes mellitus, atrial fibrillation, pneumonia, acute renal failure or an acute exacerbation of congestive heart failure or stayed longer in hospital (Forster et al., 2004). Self-care treatment was noted to be twice as likely to result an adverse event(Miller, 2012). These observations were supported by various studies who reported that factors significantly associated with adverse events amongst home care clients included age 65 years or more and living with others (Baker et al., 2004; Forster et al., 2004; Mendes et al., 2009; Sears, Wickizer, Franklin, Cheadle, & Berkowitz, 2008). However, others found no relationship between sex and the experience of an adverse event indicating that sex did not predict adverse events(Forster et al., 2004; Mendes et al., 2009; Miller, 2012; Van Walraven, Mamdani, Fang, & Austin, 2004). Again, diagnosis of any infection was not related to adverse events (Mendes et al., 2009; Miller, 2012; Van Walraven et al., 2004).

Other patient factors that may have effect on development of adverse events and generated interesting data and information were levels of literacy, adherence rates to treatments and follow-up (Greenwald, Denham, & Jack, 2007). Patient's level of literacy may contribute to the risk of hospitalization, with resultant gaps and fragmentation during discharge from the hospital. It was found that patients with adequate literacy skills had lesser adverse events. Additionally, patients who are unable to remember a discussion with their care provider are three times more likely to have adverse event (Greenwald et al., 2007). This occurs as a result of not being able to recall discharge instructions and have greater risk of experiencing an adverse event than patients who recall their discharge instructions. The study was therefore to examine the non-modifiable patient factors that could contribute to adverse events.

Methods and Materials

Research Design

The study design employed a prospective cohort using a sequential method of data collection(Euser, Zoccali, Jager, & Dekker, 2009; Polit & Beck, 2010).

Research Settings

The study setting was the Regional Hospital, Wa which is a multisite secondary referral facility in the Upper West Region of Ghana. The Upper West Region has a total of eleven (11) administrative districts. The projected population for 2015 based on the 2010 Population and Housing Census growth rate of 1.9% was 771,394 (Ofosu, 2016). The Hospital has 22 specialized units with nine (9) of these units admitting patients. The study was on adult health and therefore focused on seven (7) main units. These were female medical ward, female surgical ward, male medical ward, male surgical ward, fevers unit, infectious disease holding centre and emergency ward.

Population

The target population of the study was patients discharged from the Regional Hospital, Wa. The patients recruited were 206 who were admitted and discharged from the medical, surgical and emergency wards during the data collection period.

Sampling Technique

Selection of the study participants` were done by census (Mustafa, 2015). The participants were recruited at the point when the discharge decisions were made and also met the inclusion criteria.

They were informed about the study and its importance and those who consented to the study were then recruited.

Research Instruments

Two (2) instruments were used sequentially, these were records review guide and semi-structured interview guide. The records review guide was used to record the patient demographic data which included the patient age, marital status, sex, occupation, educational status, addresses, ward, date of admission, date of discharge, diagnosis, oral medications, injectable medications, other procedures, referral to public health services, follow up information and telephone number. With the semi-structured interviews there were lists of broad questions/topic guide to be addressed in the interview as adapted from Polit and Beck (2010).

Data Collection Procedure

Permission was further obtained from the Upper West Regional Directorate of Health Services, the Regional Hospital, Wa and the patients, after an ethical clearance was obtained from the ethical review board of the University of Cape Coast.

Patients who consented to the study had their medical charts reviewed to record demographic data and hospital services provided. They were then followed for over 21 days after discharged from the hospital either through visitation or telephone calls by a registered nurse who documented the patient records and administered the semi-structured telephone interview.

Data Analysis

Patients were considered to have adverse outcome after discharged, when they had new or worsening symptoms, a physician or health-facility visit that was unscheduled. Other parameters considered for adverse events are an emergency ward detention or re-admission to hospital, or if they died. For such patients, information from the chart review, interviews and records of any post-discharge emergency detention or re-hospitalization were systematically summarized. The outcome summary included a detailed description of all outcomes, including time of onset, severity, health services used and resolution. Descriptive analysis, cross tabulation and multiple logistic regressions were used to measure the independent association of patient characteristics with the occurrence of adverse events using SPSS version 21.

Ethical Consideration

Ethical consideration was sought at UCC ethical review board and ethical clearance number issued is UCCIRB/CHAS/2016/12. Participants were given information sheets that introduced the study, the likely benefits of the findings that would be generated, the responsibility of the participants, and the ability to withdraw from the study. The ethical considerations were read and translated to neither participants who could not read nor write.

Results

This paper is to provide insight into determining the relationships between patients' background characteristics and the possible factors that might have contributed to the development of adverse effects days after discharge from the hospital.

Table 1 shows a cross tabulation of reported adverse events and patient contributory factors. For the participants 30 years or below, 21 (10.2%) reported an adverse event, 14 (6.8%) between the ages of 31 and 50 years also reported with adverse events. Whereas 13 (6.3%) participants with adverse events were between the ages of 51 and 60 years and 17 (8.3%) were 61 years and above.

On marital status, 51(24.8%) participants who were married reported with adverse events, whereas 6(2.9%) participants who were single reported with adverse events. Eight (3.9%) participants who were widows also reported adverse events.

The results for sex of participants, occupation and educational level also indicated more females 42 (20.4%) than males 23 (11.2%) reported with adverse events. For occupation, many of the participants who reported adverse events were farmers 17(8.3%). These were followed by traders, 14(6.8%), aged, 11(5.3%), employees, 8(3.9%), students 7(3.4%), artisans, 3(1.5%), others, 3 (1.5%) and house wives 2 (0.9%). Lastly for educational levels, majority of the participants who reported adverse events did not have any formal education, 39(18.9%). These were followed by those with tertiary education 11(5.3%), then junior high school 8(3.9%), primary school 6(2.9%) and then senior high school 1(0.5%).

We wanted to know if the demographics mentioned in Table 1 had any effect on incidence of adverse events. The following result in terms of Age in years ($r = -0.146$, $p=0.62$), Marital status ($r=-0.010$, $p=0.889$), Sex ($r=0.032$, $p=0.648$), Occupation of participants ($r=0.142$, $p=0.073$), Educational level of participants ($r= 0.020$, $p=0.810$) show that there are no significant influences of demographic factors on reported adverse events (Table 2). It is therefore likely that demographic factors determined in our case not influence the incidence of adverse events.

Also to determine whether demographic factors influence the severity of adverse events. From Table 3, Age in years ($r =-0.085$, $p=0.284$), Marital status ($r=0.030$, $p=0.680$), Sex ($r=0.075$, $p=0.291$), Occupation of participants ($r=0.056$, $p=0.481$), Educational level of participants ($r=-0.022$, $p=0.787$) show no significant influence of demographic factors on severity of adverse events implying demographic factors might also not have any influence on severity of adverse events.

From Table 4, it was also noted that Marital status (r=-0.097, p=180), Sex (r=0.036, p=0.605), Occupation of participants (r=0.096, *p*=0.221), Educational level of participants (r=-0.044, *p*=0.586) did not significantly influenced the types of adverse event. It is therefore, worth noting that types of adverse event might not depend on demographic factors. However, Age in years (r=-0.153, *p*=0.049) influenced the type of adverse effect as seen in table 6.

We also wanted to find out the trend of the severity in the development of adverse events with age (Table 5). A cross tabulation showing participants age groups in years and severity of adverse events generally showed increase in adverse events with age after 30 years. Participants with age group of less than 20 years old reported the least adverse severity events rate of 4 (2.0%), all of whom had several days of symptoms. The 21 to 30 year age group reported the highest adverse events rate of 17(8.3%). Out of whom 10 (4.9%) had several days of symptoms, 6 (2.9%) with non-permanent disability and 1(0.5%) death. The 31 to 40 year age group reported with adverse events rate of 7(3.4%) with 3 (1.5%) having several days of symptoms and 4 (1.9%) with non-permanent disability. The next age group also with severity rate of 7(3.9%) was the age group between 41 to 50 years with 3(1.5%) participant having several days of symptoms, 1(0.5%) having no permanent disability and 3 (1.5%) participants death. The next age group with adverse events rate of 13 (6.3%) was the 51 to 60 year age group. One (0.5%) died, 4 (2.0%) had non-permanent disability, 7 (3.4%) with several days of symptoms and 1(0.05%) participant with one day of symptoms. The last group was 61 and above year age group with 17 (8.3%) incidence rates of adverse events. With this, there were 3(1.5%) deaths and 5(2.4%) non-permanent disabilities. They also recorded 7 (3.4%) with several days of symptoms of adverse events and 2 (1.0%) with one day of symptoms of adverse events.

Table 6 also shows a cross tabulation of types of adverse events and the various age groups in years. The type of adverse events generally increased with age groups with the highest adverse events of 20(9.7%) between 21 to 30 years age group. Also drug related adverse events were the highest 22(10.7%). For less than 20 years age group, wounds 2(1.0%), drug related adverse events 1(0.5%) and others 2(1.0%) were noted. For 21 t0 30 year age group, the adverse events drug related (5(2.4%), procedural related 1(0.5%), nosocomial 2(1.0%) re-admission 3(1.5%), death 1(0.5%) and others 8(3.9%). For 31 to 40 year age group the adverse events were drug related 2(1.0%), nosocomial 2(1.0%) wounds, re-admission and others, all with 1(0.5%). For 41 t0 50 year age group, the adverse events were drug related 3(1.5%), re-admission 2(1.0%) and death 3(1.5%). Also 51 to 60 year group showed adverse events of drug relation 4(1.9%), procedural relation 2(1.0%), re-admission1 (0.5%), death1 (0.5%) and others 5(2.4%). For 61 year and above, the events were drug related 7(3.4%), procedural related 1(0.5%), nosocomial related 3(1.5%), wounds 2(1.0%), re-admission, 1(0.5%), death 3(1.5%) and others 1(0.5%).

Discussions

Adverse events vary widely in prevalence among different age groups. In this study adverse events were found to generally increase with age (21-30) with the highest (8.7%) in age group 21 to 30 years. A review of multiple studies, looking at different age brackets, found that the median prevalence rates adverse events ranged from 2.45% for children (less than 19years of age), to 5.27% for adults (20 years and above) (Forster et al., 2004; Mendes et al., 2009; Sousa et al., 2014). The elderly population (60 years and above) however had up to 16.1% adverse events which were higher than what were noticed in this study. Additionally, the trend in this study shows that as a patient becomes older they seem to be more susceptible to adverse events as seen in many studies (Baker et al., 2004; Miller, 2012; Sousa et al., 2014). It is therefore important to inform the health care services providers to carefully administer drugs and monitor their elderly patients after discharge from the hospital in order to prevent the development of higher adverse events rates among them.

Although Patient demographics in this study did not reveal such dramatic statistical variances with respect to adverse events rates, there were some studies which reported significantly the effect of patients' demographics on the development of adverse events (Ashbrook, Mourad, & Sehgal, 2013; Wilkerson & Blacketer, 2012). Generally, females tend to present with more adverse events in comparison to males which may followed a similar trend in the findings of this study (Ashbrook et al., 2013; Wilkerson & Blacketer, 2012). One specific study focusing on adverse events leading to emergency room visits showed that 60% of all adverse drugs events were from the female population (Ashbrook et al., 2013). It has also become clear in some settings that being females having type 2diabetes or pneumonia may independently predict adverse outcomes (Forster, 2003). Even though these studies established a relationship between adverse events and gender the findings of current study did not confirm the relationship indicating other factors may also contribute to the development adverse events.

Interestingly, the findings of this study support other studies which found that sex was not significant factor contributing to the development of adverse events in patients (Forster et al., 2004; Miller, 2012; Tsilimingras, 2014). Health literacy is not often a topic associated with reducing adverse events, but many health safety experts believe it could have effect on the development adverse events and conversely this study also confirmed that literacy do not influence the occurrence of adverse events (Wilkerson & Blacketer, 2012). More importantly about half of the participants of this study could not read nor could write the labels and instructions on medications. These patients together with those with higher educational levels reported adverse events. It is therefore reasonable to assume that many drugs related adverse events could not be prevented if patients simply understood what their medications were for and exactly how and when they were supposed to use them (Tsilimingras, 2014). It is therefore important that patients be reminded and monitored in taking their drugs by healthcare provider or any close reliable relative after discharge from the hospital. Understanding the health literacy gap between healthcare providers and patients, and taking steps to ensure patients are well informed about their regimens may result in reductions in adverse events.

Finally, the findings on the influences of age on adverse events were similar to the findings of several other studies except among age group 21-30, who found that the rate of adverse events increase with age, suggesting that elderly people are at higher risk of adverse events (Ashbrook et al., 2013; Baker et al., 2004; Forster, 2003; Wilkerson & Blacketer, 2012). The 21-30 years age group probably had higher adverse events because many of the unmarried participants were in that age brackets, hence lack of support from partners could results in that. This may reflect in part the fact that older people are likely to have more complicated illnesses and often require more complicated interventions. Also majority of the patients suffered from drug related adverse events which did not result into permanent disability. This observation is very important implying patients should carefully be guided in taking their medications and monitored by healthcare providers. These measures will drastically reduce the development of adverse events especially in aged patients after being discharge from the hospital.

Conclusion

In conclusion some background characteristics like some age groups may influence adverse events rates, severity and types. Therefore, the findings of this could be used for improvement of patient safety, by assisting in targeting the areas of most opportunity for service improvement as well as use to reengineered discharge process and follow-up in health service delivery.

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List of Tables

Table 1: Adverse Events and Demographic Factors

	Reported Adverse Events		
Age in years	Yes	No	Total
less than 20 years	4(1.9%)	26(12.6%)	30(14.6%)
21 to 30	17(8.3%)	38(18.4%)	55(26.7%)
31 to 40	7(3.4%)	19(9.2%)	26(12.6%)
41 to 50	7(3.4%)	16(7.8%)	23(11.2%)
51 to 60	13(6.3%)	20(9.7%)	33(16.0%)
61 and above	17(8.3%)	22(10.7%)	39(18.9%)
Total	65(31.6%)	141(68.4%)	206(100%)
Marital status			
Married	51(24.8%)	92(44.7%)	143(69.4%)
Single	6(2.9%)	41(19.9%)	47(22.8%)
Widow (er)	8(3.9%)	8(3.9%)	16(7.8%)
Total	65(31.6%)	141(68.4%)	206(100%)
Sex			
Male	23(11.2%)	45(21.8%)	68(33.0%)
Female	42(20.4%)	96(46.6%)	138(66.9)
Total	65(20.4%)	141(68.4%)	206(100%)
Occupation of participants			
Farmer	17(8.3%)	27(13.1%)	44(21.4)
House wife	2(0.9%)	6(2.9%)	8(3.9%)

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Aged	11(5.3%)	5(2.4%)	16(7.8%)
Student	7(3.4%)	18(8.7%)	25(12.1%)
Trader	14(6.8%)	26(12.6%)	40(19.4%)
Artisans	3(1.5%)	18(8.7%)	21(10.2%)
Employees	8(3.9%)	22(10.7%)	30(14.6%)
Others	3(1.5%)	19(9.2%)	22(10.8%)
Total	65(31.6%)	141(68.4%)	206(100%)
Educational level of participants			
Primary	6(2.9%)	21(10.2%)	27(13.1%)
JHS	8(3.9%)	11(5.3%)	19(9.2%)
SHS	1(0.5%)	18(8.7%)	19(9.2%)
Tertiary	11(5.3%)	25(12.1%)	36(17.5%)
None	39(18.9%)	66(32.0%)	105(50.9%)
Total	65(31.6%)	141(68.4%)	206(100%)

Table 2: Effect of Demographic Factors on Adverse Events

Model	Unstandardized Coefficients		Standardized Coefficients	T	P-value
	B	Std. Error	Beta		
(Constant)	1.626	0.187		8.685	
Age in years	-0.039	0.021	-0.146	-1.875	0.062
Marital status	-0.008	0.054	-0.010	-0.139	0.889
Sex	0.032	0.069	0.032	0.458	0.648
Occupation	0.028	0.016	0.142	1.800	0.073
Educational level	0.006	0.026	0.020	0.241	0.810

Dependent variable: Reported Adverse Events

(Significant level= 0.05)

Table 3: Effect of Demographic Factors on Severity of Adverse Events

Model	Unstandardized Coefficients		Standardized Coefficients	T	P-value
	B	Std. Error	Beta		
(Constant)	2.217	0.371		5.984	
Age in years	-0.044	0.041	-0.085	-1.075	0.284
Marital status	0.044	0.107	0.030	0.413	0.680
Sex	0.145	0.137	0.075	1.059	0.291
Occupation	0.022	0.031	0.056	0.705	0.481
Educational level	-0.014	0.051	-0.022	-0.271	0.787

Dependent variable: Severity of Adverse Events

(Significant level= 0.05)

Table 4: The influences of Demographic Factors on of the Types of Adverse Event

Model	Unstandardized Coefficients		Standardized Coefficients	T	P-value
	B	Std. Error	Beta		
(Constant)	7.361	0.967		7.614	
Age in years	-0.209	0.106	-0.153	-1.963	0.049
Marital status	-0.374	0.278	-0.097	-1.344	0.180
Sex	0.185	0.357	0.036	0.518	0.605
Occupation	0.098	0.080	0.096	1.227	0.221
Educational level	-0.073	0.134	-0.044	-0.546	0.586

(Significant level= 0.05)

Dependent variable: Types of Adverse Event

Table 5: A Cross tabulation of Age and Severity of Adverse Events

	Severity of Adverse Events					
Age in Years	One Day of Symptoms	Several Days of Symptoms	Non-permanent Disability	Death	No Adverse event Reported	Total
≤20 years	0(0.0%)	4(1.9%)	0(0.0%)	0(0.0%)	26(12.1%)	30(14.6%)
21 to 30	0(0.0%)	10(5.3%)	6(3.4%)	1(0.5%)	36(17.5%)	53(25.7%)
31 to 40	0(0.0%)	3(1.5%)	4(1.9%)	0(0.0%)	19(9.2%)	26(12.6%)
41 to 50	0(0.0%)	3(1.9%)	1(0.5%)	3(1.5%)	15(7.3%)	22(10.7%)
51 to 60	1(0.5%)	7(3.4%)	4(1.9%)	1(0.5%)	20(9.7%)	33(16.0%)
61 and above	2(0.9%)	7(3.4%)	5(2.4%)	3(1.5%)	21(10.2%)	38(18.4%)
Total	3(1.45%)	34(16.5%)	20(9.7%)	8(3.9%)	137(66.5%)	206(100%)

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Table 6: Types of adverse events and age in years Cross tabulation

	Age in years						
Types Of Adverse Events	less than 20 years	21 to 30	31 to 40	41 to 50	51 to 60	61 and above	Total
Adverse Drugs Events	1(0.5%)	5(2.4%)	2(1.0%)	3(1.5%)	4(1.9%)	7(3.4%)	22(10.7%)
Procedural Related Events	0(0.0%)	1(0.0%)	0(0.0%)	0(0.0%)	2(1.0%)	1(0.5%)	4(1.9%)
Nosocomial Infections	0(0.0%)	2(1.0%)	2(1.0%)	0(0.0%)	0(0.0%)	3(1.5%)	7(3.4%)
Wounds	2(1.0%)	0(0.0%)	1(0.5%)	0(0.0%)	0(0.0%)	2(1.0%)	5(2.4%)
Re-Admissions	0(0.0%)	3(1.5%)	1(0.5%)	2(1.0%)	1(0.5%)	1(0.5%)	8(3.9%)
Deaths	0(0.0%)	1(0.5%)	0(0.0%)	3(1.5%)	1(0.5%)	3(1.5%)	8(3.9%)
Others	2(1.0%)	8(3.9%)	1(0.5%)	0(0.0%)	5(2.4%)	1(0.5%)	17(8.3%)
Total	**5(2.4%)**	**20(9.7%)**	**7(4.4%)**	**8(3.9%)**	**13(6.3%)**	**18(8.7)**	