Original Article

Evaluation of Impact on Antimicrobial Prescribing in Ashiyan Medical College Hospital before and after Intervention and Survey on Completion of Duration of Antimicrobial Therapy

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Abstract

Introduction: *Antimicrobial resistance is a global problem with a strong impact on morbidity and mortality. This resistance found to have link with the using pattern of antimicrobials. Not completion the duration of prescribing antimicrobial by the patient is considered irrational use for this drug.*

Objective: *This study was attempted in Ashiyan Medical College Hospital to see the doctor's prescribing pattern and patient's compliance about the completion of duration of antimicrobial therapy.*

Materials and Methods: *This was a 'Prospective Cohort Study' conducted as a before-after in Ashiyan Medical college Hospital from February 2019 to July 2019. For doctor's prescribing pattern was evaluated by prescription audit and patient awareness was observed by compliance. Some intervention was implicated and its Impact was evaluated by measuring change in proportion of prescribed antimicrobials before and after intervention.*

Results: *Overall, 74.0% of the admitted and 69.5% of outdoor patients received antimicrobial in this hospital. After intervention, proportion of patient received antimicrobial significantly reduced. Among the prescription of four departments 59% antimicrobials were prescribed with duration in indoor and outdoor but 51% patient's adherence were observed about the completion of duration of antimicrobial therapy.*

Keywords: *Antimicrobial, Duration of antimicrobial, Rational use, Adherence to the Guideline, Prescriber, Consumer, Antimicrobial stewardship program (ASP)*

Introduction

Bangladesh is going through a transition in health (WHO, 2003)[1], however the major causes of morbidity and mortality are still infective disease and therefore antimicrobials are the most widely used medicine[2,3]. Inappropriate use of antimicrobials led to emergence of resistance that finally results into loss of their effectiveness[4,5]. Studies conducted in Bangladesh during last decades revealed that prescribing of antimicrobials are generally irrational[6,7,8,9,10,11]. Moreover, consumption of antimicrobials with short time than the prescribing time perhaps worsened the situation[12]. Few educational and managerial interventions were found successful in Bangladesh[9,10,11,12].

Antimicrobial stewardship program (ASP) is considered as the most effective approach to improve antimicrobial prescribing[13,14,15,16,17]. ASP encourage clinician to improve quality of care through better infection cure rate[18,19]. On this background, intervention was designed in this study to support the implementation of rational antimicrobial prescribing. The experience and evaluation of the patient's compliance would provide important information about the knowledge, attitude and perception of patients towards the completion of antimicrobial therapy.

Materials and Methods

The Research was conducted as a before-after intervention in Ashiyan Medical College Hospital from February 2019 to July 2019, and the impact was evaluated in the selected department, e.g., Department of Internal Medicine, Surgery, Obstetrics & Gynecology and Pediatrics. Before initiating the actual study, ethical clearance was obtained from the Institutional Review Board of AMC.

For this study, 100 antimicrobial containing prescriptions from each department, total 400 were analyzed. This 100 included, 50 indoor and 500 outdoor prescriptions in which antimicrobials were prescribed by the doctor. A data collection form was used to collect the information from the prescription. Data collection was performed just before and after of giving intervention. In the prescription it was observed that weather doctor mentioned the duration of antimicrobial therapy or not and antimicrobial drug completion date for individual patient was collected. In addition, a face-to-face interview was done to the patient; to asses that they were well informed about the importance of completion of antimicrobial therapy by the doctor. Their contact number was also collected through this interview which was used to further telephone interview. At the particular date when the individual antimicrobial therapy date mentioned in the prescription was completed this telephone interview was performed to know the patient's compliance regarding completion of duration. If he or she not completed the full duration, the reason behind it was evaluated through this interview.

Description of the Intervention

Awareness about Antimicrobial Guideline: Stewardship was executed by the active participation of the key prescribers about the use of existing WHO, National and online antimicrobial guideline. As well as the formal commitment, endorsement and persuasion from of the top-level management of this hospital.

Reminders: Repeated reminders were sent to the prescribers through SMS.

Academic detailing: Face-to-face educational visit conducted by the provision of scientific evidences to the prescribers.

Post-intervention Data Collection

Post interventional data was collected on May, June 2019 as same as pre interventional data collection procedure to evaluate the impact of intervention.

Procedure of the Study:

Pre interventional data collection for situation analysis
↓
Compilation of the results of situation analysis
↓
Intervention
↓
Post interventional data collection
↓
Assessment of the impact of intervention immediately after data collection

Statistical analysis:

Data was compiled, presented and appropriate statistical test (paired proportion test and unpaired t-test) was applied to draw the expected conclusion. Microsoft Excel 2007 was used for the statistical

analysis. P value was calculated by test statistic (t value) using online calculator against corresponding degree of freedom (df).

Results

74.0% of the admitted and 69.5% of outdoor patients received antimicrobial in Ashiyan Medical College hospital. Table I revealed that in the Department of Obstetrics & Gynecology 78.0% followed by the Departments of Surgery 74.0%, Internal Medicine 62.0% and Pediatrics 58.0%. In outpatients the highest 68.0% antimicrobials were prescribed in the Department of Internal Medicine, followed by Departments of Department of Obstetrics & Gynecology 64.0%, Surgery 60.0% and Pediatrics 54.0%.

Table I: Proportion of Patients of Four Departments of Ashiyan Medical College Hospital Received Antimicrobials

	Dept. of Internal Medicine	Dept. of Surgery	Dept. of Obstetrics & Gynecology	Dept. of Pediatrics
Inpatients	(n= 50)	(n=50)	(n=50)	(n=50)
	62.0% (31/50)	74.0% (37/50)	78.0% (39/50)	58.0% (29/50)
Outpatients	(n= 50)	(n=50)	(n=50)	(n=50)
	68.0% (34/50)	60.0% (30/50)	64.0% (32/50)	54.0% (27/30)

n= Total number of prescriptions reviewed

Percentage = Total number of prescriptions contained antimicrobial/Total number of prescriptions reviewed to get those prescriptions.

After intervention, proportion of patient received antimicrobial significantly reduced. Among the patients admitted in the Departments of Internal Medicine, proportion of patient received antimicrobial reduced from 62.0% to 37.0% and Department of surgery 74.0% to 49.0% respectively, both of which were statistically significant ($p < 0.01$). In the Departments of Obstetrics & Gynecology, no statistically significant change was observed (Table II). Lastly in the department of Pediatrics proportion reduced 58.0% to 40.0% which was statistically significant.

Table II: Comparison between Before and After Intervention in Proportion of Antimicrobial Use in Four Indoor Departments of Ashiyan Medical College Hospital

	Proportion of Patients Received Antimicrobial		
	Before Intervention (n=63)	**After Intervention** (n=135)	**P value**
Dept. of Internal Medicine	62.0%	37.0%	0.01
Dept. of Surgery	74.0%	49.0%	0.01
Dept. of Obstetrics &Gynecology	78.0%	73.0%	0.50
Dept. of Pediatrics	58.0%	40.0%	0.01

Paired proportion test was done; p≤0.05 was considered as statistically significant

Table III shows, comparison between before and after intervention in proportion of patient received antimicrobial in outdoor. In the four departments reduction proportion of patient received antimicrobial reduced significantly (p <0.01).

Table III: Comparison between Before and After Intervention in Proportion of Antimicrobial Use in Four outdoor Departments of Ashiyan Medical College Hospital

	Proportion of Patients Received Antimicrobial		
	Before Intervention (n=63)	**After Intervention** (n=135)	**P value**
Dept. of Internal Medicine	68.0%	35.0%	0.01
Dept. of Surgery	60.0%	31.0%	0.01
Dept. of Obstetrics &Gynecology	64.0% (30/33)	33.0% (30/35)	0.01
Dept. of Pediatrics	54.0%	40.0%	0.01

Paired proportion test was done; p≤0.05 was considered as statistically significant

Among the prescription of four departments 100% antimicrobials were prescribed with duration in indoor and outdoor. This scenario was common in case of before and after intervention. Table IV illustrates this scenario.

Table IV: Percentage of Prescription Containing Antimicrobials with Duration in the Inpatients and Outpatients of Ashiyan Hospital before and after Intervention.

	Dept. of Internal Medicine	**Dept. of Surgery**	**Dept. of & Obstetrics & Gynecology**	**Dept. of Pediatrics**
Inpatient	100%	100%	100%	100%
Outpatient	100%	100%	100%	100%

The result of telephone tracking of the patients was not satisfactory. Among the 400 patients 17 patients were not responding to their contact number. Rest of the patients those were tracked by the phone, 186 (48.5%) of them was failure to continue the antimicrobial up to the date instructed in the prescription which was statistically significant. Among the 186 patients, 123 were stopped to taking the drug for felt better. 34 patients were not get any symptomatic relief so they stopped taking drug. Rest 29 patients had no significant reason to failure to continue the drug. For the understanding of the reason behind incompliance, further investigation was performed through the telephone conversation. Different issues were pointed out and measures for successful implementation were advised (Table V).

Table V: Knowledge, Attitude and Perception of the Patients about Completion of Duration of Antimicrobial

Knowledge, Attitude and Perception
1. Almost half of the patients (210 patients) did not know that which is antibiotic among the prescribed drug.
2. More than half of the patients (318) had not any perception about the importance of completion antimicrobial course.
3. None of them were counseled or instructed verbally to complete the duration of antimicrobial by the prescriber or dispenser.
4. Among the 186 patients who were failure to continue the antimicrobial up to the date instructed in the prescription, 123 were stopped to taking the drug for felt better.
5. 34 patients were did not get any symptomatic relief by taking drug so they stopped.

Discussion

Present study revealed that overall, 74.0% of the admitted and 69.5% of outdoor patients of four selected departments of received antimicrobial. In admitted patients, highest proportion 78.0% in the Department of Obstetrics & Gynecology received antimicrobial, followed by the Departments of Surgery 74.0%, Internal Medicine 62.0% and Pediatrics 58.0%. In outpatients the highest 68.0% antimicrobials were prescribed in the Department of Internal Medicine, followed by Departments of Department of Obstetrics & Gynecology 64.0%, Surgery 60.0% and Pediatrics 54.0%.

This finding corresponds with the result of studies conducted in the BSMMU[20,21]. The higher prescribing rate in the Departments of Surgery and Obstetrics & Gynecology might be prophylaxis or therapeutic purpose. Another study revealed almost same result like as 81.9% of patients admitted in the department of Obstetrics & Gynecology which was followed by Surgery 78.5%, Internal Medicine 47.0% and Pediatrics 46.7%[22]. The pattern of preference is similar to that of Akhloufi et al.[23]. This pattern assumed more antimicrobial used in Departments of and Obstetrics & Genealogy and Surgery to be prophylactic use before surgeries and the major causative microbes in abdominal surgeries are similar[24]. It may be noted that only 11.1% is contribution of medical prophylaxis[25] .

Antimicrobial Guideline, reminder, academic detailing is considered as a common intervention to improve the situation[26,27]. Orientation and motivational programs were supportive measures to improve the situation [28]. But adherence to the intervention is not up to the mark and the possible reasons of noncompliance are inadequate participation of the prescribers, communication gap, lack of regular activities[20,29].

To evaluate the impact of intervention, data was collected after the implication of intervention. A significant reduction ($p<0.01$) in the proportion of antimicrobial prescribing and used in department of Internal Medicine, Surgery and Pediatrics in admitted patients and in all department in outdoor. This might be explained by the improved awareness of the prescriber about antimicrobial usage. A meta-analysis mentioned about the scope of this type of reduction in antimicrobial prescribing[30]. In this study, there was no significant change in antimicrobial prescribing of admitted patients in the departments of Obstetrics & Gynecology probably due surgical cases.

The study attempted to observe the completion of duration of prescribed drug which is an essential part of rational use of antimicrobial. From the prescriber end among the prescription of four departments 100% antimicrobials were prescribed with duration in indoor and outdoor. This scenario was common in case of before and after intervention. But from the consumer end the result was not satisfactory. 48.5% patients were failure to continue the antimicrobial up to the date instructed in the prescription. Among the defaulter more than two third were stopped to taking the drug for better feeling and less than one third was did not get any symptomatic relief so they stopped taking drug. Rest 29 patients had no significant reason to failure to continue

the drug. Probably this dimension of antimicrobial use was never studied before so comparison with other studies was not visible. The present study attempted to establish a new platform, which is innovative one. For the understanding of the reason behind incompliance, telephone interview was performed and different issues were pointed out. Among the issues patient understands level about the importance of completion of antimicrobial duration was mainly focus. Beside this symptomatic relief or persistence of symptom are the other reasons of noncompliance.

Conclusion

Considering the above findings, this study confirmed that proper intervention is mandatory to improve the current situation. Awareness, managerial intervention and some scientific issues can be considered as a model intervention to improve the prescriber end prescribing. Fill the gap of knowledge and perception of the user end is make a bridge for the rational use of antimicrobial which is most effective way to combat antimicrobial resistance. It's clear that a comprehensive approach can bring a positive dimension in antimicrobial utilization.

Acknowledgements: The authors greatly acknowledge the support received from the authority of the Department of Microbiology, Department of Internal Medicine, Department of Surgery, Department of Obstetrics & Gynecology and Departments Pediatrics. Authors also show gratitude towards outdoors doctors of this Hospital and all staff of the Information Technology Cell of the Hospital.

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