

PREVALENCE OF ANTIBIOTIC-ASSOCIATED DIARRHEA

Rahmat Ali,¹ Gohar Ali Khan¹, Muhammad Sohrab Khan¹, Saba Shams¹, Umair Amir Khan¹, Hamza Mukhtar¹

1. Department of Medicine, Bacha Khan Medical College, Mardan, Khyber Pakhtunkhwa, Pakistan.

ABSTRACT

Antibiotic Associated Diarrhea is a common complication of antibiotics treatment. The aim of this study was to find the prevalence of Antibiotic Associated Diarrhea.

During the study of 90 days duration, 134 patients admitted in Medical Ward BKMC(Bacha Khan Medical Complex Swabi) were randomly selected for the study. 102 (76.1%) were males and 32 (23.9%) were females. The mean age of the patients was 42.46 years and SD was 13.37. A prevalence of 29.1% of AAD was found in the patients on the basis of clinical and laboratory findings. Majority of the patients belonged to the age group of 45 years to 75 years. AAD is more prevalent in 45 to 75 years age group. AAD is statistically significant with age ($p=0.0001$) and not statistically significant with gender ($p=0.139$).

Preventive policies must be put in place in all hospitals and healthcare units to prevent the development of AAD in patients receiving antibiotics.

INTRODUCTION

An antibiotic is a substance which has an origin of semisynthetic or synthetic nature, often prescribed by health professionals to stop the growth of bacterial infections. Diarrhea, is characterized by passage of watery or loose stools three or more times within a 24-hour period, represents an adverse effect associated with antibacterial medication usage. Typically, this gastrointestinal disturbance arises from direct mucosal irritation or perturbations in the balance of commensal and pathogenic bacteria within the gastrointestinal tract induced by antibacterial agents.

The role of antibiotics against infections can never be neglected in the modern world, but it has some clinical side effects as well. One of the common and -known intestinal complications in which the use of antibiotics disturbs the intestinal environs of friendly residing microorganisms leading to (AAD). Antibiotics Associated Diarrhea (AAD) is diarrhea concerning antibiotic management with no other explanation that could last from 2 hours to 2 months²⁻³.

The use of antibiotics creates trouble in the segments of the alimentary canal, specifically the intestines and stomach, and affect microorganisms present in there and make patient inclined towards bacterial colonization⁴⁻⁵. Symptoms of AAD have often ranged from mild to severe and are not supposed to be life threatening⁶. Diarrhea needs more attention and can be fatal if it is associated with Clostridium difficile infection, it's a serious medical condition and symptoms may include deadly colitis, relapsing etc⁷. Moreover, serious cases regarding AAD might include a prolonged stay in the hospital, require more tests for diagnosis and medical attention⁸⁻⁹. AAD affects people of all ages in combination patient had a previous illness/surgery and the drug which affects the function of the alimentary canal could increase the risk for catching AAD¹⁰. A study conducted in Belgium revealed the prevalence of 10 to 20% for Clostridium difficile infection among all AAD associated cases¹¹. In a study conducted in the U.S to find the prevalence of AAD among 650 children, AAD was found among 71 out of 650 children with a frequency of 11%, similarly, another study conducted in Thailand showed a prevalence of 6.2% in children by using cloxacillin and amoxicillin

in combination¹². Lincomycin and clindamycin are less commonly prescribed antibiotics but their association causing diarrhea is astonishing, reportedly 2% of children were found to be affected by using these antibiotics¹⁶. One of the published meta-analysis showed the prevalence of 14% of AAD. Another study showed the incidence of AAD in adult's 5-25%¹⁴. Another study conducted in Sweden regarding AAD observed the incidence of 4.9%¹⁷. Frequent diarrhea (AAD/CDAD- Clostridioides difficile-associated disease) can create the worst scenario for the patients already suffering from an ulcer, losing of important minerals like magnesium, zinc, and potassium, etc., from the body, can slow down the process of healing.

The clinical examination could be initiated by assessing the history taken from the

patient recently used antibiotics, a physical examination may include examining the abdomen, hydration level, pulse rate, body temperature, etc. If something more sinister like CDI (watery could be bloody diarrhea, abdominal cramps, weight loss, high grade fever)s surmised, health care professionals may order polymerase chain reaction for the testing of toxin A and toxin B (C. difficile). A stool culture test can be done for the bacterium if C. difficile infection is suspected.

Treatment of AAD depends upon the seriousness of signs and symptoms, if a patient has mild diarrhea, then the symptoms will vanish within a few days after the completion of the antibiotic medication course. In some cases, the doctor may advise to stop the ongoing antibiotic treatment till symptoms become less active or disappear. After the diagnosis of C.difficile infection, doctor may order to stop the current antibiotic treatment, and change the treatment particularly in order to target specifically C. difficile bacteria causing AAD

Material and Methodolgy:

This cross-sectional study was conducted in Medical Ward at BKMC Swabi hospital. A written approval was obtained from hospital's ethical committee for conducting the study. A total of 134 patients receiving antibiotics admitted in medical ward, were studied in the duration of three months. These patients were admitted for the treatment of infectious diseases.

AAD was considered to be developed if a patient had three or more loose or watery stools per day for more than 2 days. Those who were having diarrhea for reasons other than taking antibiotics for treatment were excluded from the study. In order to differentiate between AAD and other causes of diarrhea, the clinical and laboratory investigation were used.

Sample size was selected using WHO Sample Size Calculator by taking the prevalence of AAD 9.6%¹⁸. Frequencies and percentages were used for categorical variables like gender, presence of AAD and presence of CDI. Mean and standard deviation were calculated for age. Chi Square Test were applied. p value of 0.05 was considered statistically significant.

Results:

A total number of 134 patients were examined. There were 102 (76.1%) males and 32 (23.9%) females (Table 1). The means age of the patients was 42.46 and the Standard Deviation was 13.37, The minimum age was 22 and the maximum age was 75 (Table 2).

The prevalence of Antibiotic Associated Diarrhea (AAD) was 29.1 % and 70.9% patients did not have AAD (Table 3). (What criteria did you use to diagnose AAD?) Clostridium difficile Infection (CDI) was found in 5.2% patients (Table 4).

We stratified AAD with different age groups and found out that they are statistically significant using Chi Square test, keeping $p<0.05$ (Table 5). Majority of the patients having AAD belonged to the age group of 45 to 75 which were 50.9% (Table 5). There was no gender base difference in the prevalence of AAD (Table 6)

Table 1 Gender Distribution

| Gender | Frequency | Percent |
|--------|-----------|---------|
| Female | 32 | 23.9 |
| Male | 102 | 76.1 |
| Total | 134 | 100.0 |

Table 2 Mean and SD of Age in years

| Total Patients | Minimum | Macimum | Mean | Std. Deviation |
|----------------|---------|---------|-------|----------------|
| 134 | 22 | 75 | 42.46 | 13.379 |

Table 3 Prevalence of AAD

| AAD Presence | Frequency | Percent |
|--------------|-----------|---------|
| AAD | 39 | 29.1 |
| Non-AAD | 95 | 70.9 |
| Total | 134 | 100.0 |

Table 4 Percentage of CDI

| CDI Presence | Frequency | Percent |
|--------------|-----------|---------|
| Yes | 7 | 5.2 |
| No | 127 | 94.8 |
| Total | 134 | 100.0 |

Table 5 Age wise Stratification keeping $p < 0.05$

| Age Groups | AAD Presence | | Total | P=0.0001 |
|------------|--------------|-------------|-------|-----------------|
| | AAD | Non AAD | | |
| <45 | 11 13.9% | 68 86.1% | 79 | |
| 45 to 75 | 28 50.9% | 27 49.1% | 55 | |
| Total | 39 | 95 | 134 | |

Table 6 Gender wise Stratification

| | AAD Presence | | Total | P=0.139 |
|--------|--------------|--------------|-------|----------------|
| | AAD | Non AAD | | |
| Female | 6 18.75% | 26 81.25% | 32 | |
| Male | 33 32.35% | 69 67.64% | 102 | |
| Total | 39 | 95 | 134 | |

Discussion and Conclusion:

Antibiotics are prescribed by surgeons and medical specialists for the treatment of various wound infections and bacterial diseases. Antibiotics are perfect drug of choice for stopping the growth of bacteria. The side effects of antibiotics cannot be ignored specially when they can lead to serious complications. Antibiotic Associated Diarrhea (AAD) is one of the most common complications associated with the use of antibiotics.

In our study the prevalence of AAD was 29.1% which is similar to an epidemiological study conducted in US which showed a prevalence of 5 to 35% of AAD⁶. Another study conducted in UK showed a prevalence of 21.8%¹⁹ which is similar to our study. We found that 5.2% patients had developed CDI which is higher than the prevalence found in the UK study¹⁹.

Our study had 76% males and 23.9% females⁶ out of 32 (18.75) females had developed AAD and 33 out 102 (32.35%) males had developed AAD. We did not find significant gender difference in the prevalence of AAD ($p=0.139$). Our study showed that the 50.9% out 55 patients having AAD belonged to the age group of 45 to 75, comparing to our result similar findings were recorded in a UK based study¹⁹ which showed 70.6% patients having AAD in the age group >65 years. These results infer that age is an important factor associated with AAD. Patients on antibiotics between 45 to 75 years are more at risk of developing AAD. We found the difference in prevalence of AAD on the basis of age ($p=0.0001$).

On the whole, every antibiotic has the potential to cause mild to severe side effects i.e. diarrhea, usually by disturbing the gastrointestinal tract's ecosystem. The problem seems to be more prevalent in adults and some studies show that children are at higher risk too⁶. Antibiotic Associated Diarrhea can be fatal if it leads to Clostridium difficile infection, it's a serious medical condition and symptoms may include deadly colitis, relapsing etc⁷.

The actions for prevention of AAD and its fatal complications must be considered seriously and performed regularly by health professionals. The most basic treatment for prevention of AAD is discontinuation of antibiotics responsible. Strict rules must be defined in hospitals and health care units regarding the prescription of antibiotics, rational approach must be followed. Prompt diagnosis of AAD can be very helpful in treating AAD. Hospital wards must be disinfected time to time and healthcare professionals must make sure of it.

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Address for Correspondence:

✉ Assistant Professor Department of Medicine, Bannu Medical College, Bannu, Khyber Pakhtunkhwa, Pakistan.
 @ goharalikhan715@yahoo.com
 ☎ 0332-9884081

1. Department of Medicine, Bacha Khan Medical College, Mardan, Khyber Pakhtunkhwa, Pakistan.

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| Contribution of Authors: | |
|---------------------------------------|---------------------|
| CONTRIBUTION | AUTHOR ABBREVIATION |
| Conception & Planning of the Research | RA, GAK, UAK |
| Active Participation in Methodology | GAK, MSK |
| Interpretation Analysis & Discussion | RA, SS, HM |

CONFLICT OF INTEREST

None Declared

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Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.