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Author Guidelines

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1. Hou WR, Hou YL, Wu GF, Song Y, Su XL, Sun B, et al. cDNA, genomic sequence cloning and overexpression of ribosomal protein gene L9 (rpL9) of the giant panda (Ailuropoda melanoleuca). Genet Mol Res. 2011;10: 1576-1588.
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EDITORIAL

The necessity to prevent irrational use of benzodiazepines

Benzodiazepines are the most frequently prescribed psychotropic medications used by 5%–10% of the community in high-income countries (1, 2). Most of the data suggesting misuse of these drugs comes from high-income countries. In contrast, low-income and middle-income countries have witnessed a rise in mental disorders diagnoses and psychotropic medication use. In 1998, a study using data from the Brazilian health system showed that 19% of chronic diseases were neuropsychiatric disorders (3, 4). Benzodiazepines (BZDs) are commonly prescribed as a treatment for anxiety and insomnia. BZDs are also inappropriately used for pain, somatic illnesses and less specific stress responses. Although there is still debate about the potential for abuse with BZDs, dependence, withdrawal symptoms and side effects, prevalence rates of BZD use are high and vary between 7.5% and 21.3% across countries (5, 6, 7, 8). When Benzodiazepines are used as indicated, i.e. at standard therapeutic doses, during a short period, and only one type of benzodiazepines at a time, treatment is usually without substantial side effects (9). Inappropriate benzodiazepine use is accompanied by adverse side effects, including cognitive impairment, risk of falling, and dependence (10). Further, there is little evidence for the effectiveness of benzodiazepines during chronic use. For that reason, several international guidelines were formed that, although showing some differences, all recommended a conservative prescription practice, including short-term use (11, 12). Benzodiazepines can cause physical dependence and be recognised by the medical profession because a withdrawal syndrome occurred on cessation of regular use. Doctors were advised to reserve them for short-term use in minimal dosage. Nevertheless, definitions of drug dependence changed in the 1990s (13, 14). In the past, dependence had been defined in terms the development of drug tolerance and a withdrawal syndrome on cessation, but in recent classification systems, these two features alone are no longer considered sufficient for the diagnosis. Present criteria for substance dependence include tolerance, escalation of dosage, continued use despite efforts to stop and knowledge of adverse effects, other behavioral features, and a withdrawal syndrome (15, 16). Benzodiazepines meet all these criteria. The risk of dependence among elderly persons increases with age and is more common among patients with medical conditions that require polypharmacy and among patients who have depression and alcohol dependence.

Prevention of benzodiazepine dependence can be achieved by adherence to bureaucrat recommendations to limit prescriptions to short-term use (2–4 weeks), or as intermittent brief courses. Some benzodiazepine prescribing is straightforward, for example, as a brief intervention for acute distress or as-needed use for a phobic anxiety (e.g., airplanes) or transient insomnia. Some prescribing situations are, however, to be avoided if possible, like prescribing to manage persisting distress resulting from a personality disorder or for patients with known current or past substance use disorders. But prescribing is never carefree. An important guideline is to avoid chronic administration for acute problems and to set a goal for those on maintenance therapy

of gradually working to find the lowest effective dose, which over time might become less or none, especially in older patients, in whom increasing sensitivity to the medication, the likely presence of more drugs interacting, memory concerns, and fall risk are important clinical issues to be assessed.

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Characteristics of patients with diabetes and prediabetes admitted for covid-19 treatment in Khulna: Single-centre cross-sectional study

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Abstract

Background: *The coronavirus disease 2019 (COVID-19) outbreak has become a significant threat to global health due to its highly contagious nature and varied mortality. Recent studies have shown that diabetes is an important risk factor contributing to the severity of COVID-19 and resulting mortality. Poor glycemic control is also associated with poor patient outcomes (e.g., hospitalisation and death).* ***Objectives:*** *This study aims to investigate the clinical characteristics of patients with diabetes and prediabetes admitted for COVID-19 treatment in Gazi Medical College Hospital (GMCH), Khulna, Bangladesh.* ***Materials and Methods:*** *This was a cross-sectional observational study on patients with diabetes and prediabetes who were diagnosed with COVID-19 based on laboratory and radiological findings and admitted to Gazi Medical College Hospital, Khulna, Bangladesh, from July 1 to July 31, 2021. In that timeframe, overall, 215 patients with COVID-19 were admitted. Among them, 47 patients having diabetes or prediabetes fulfilled the inclusion criteria for the study. Demographic, clinical, laboratory, and radiological data of those 47 patients were recorded and analysed.* ***Results:*** *Among 47 study subjects, 61.7% were male. The mean age of the patients was 55.5±12.9 years. Hypertension (44.7%) among the study subjects was the most common comorbidity. Regarding laboratory parameters, the mean HbA1c of the patients was 7.9±1.4%. In addition, the mean random blood sugar (RBS) level was 15.3±2.5 mmol/l. Neutrophilia and lymphocytopenia were observed in 93.6% and 95.7% of cases, respectively. The mean D-dimer (4.1 mg/l) and CRP (71.1 mg/l) levels were well above their normal limits. In a high-resolution chest CT scan (HRCT chest), bilateral lung involvement was present in 91.5% of cases. The ground-glass appearance was the most frequent (95.7%) radiologic pattern. Out of the 47 diabetic patients, 2 (4.3%) patients had type 1 diabetes, and 35 (74.5%) patients had type 2 diabetes. Moreover, 10 of 47 (21.2%) patients were prediabetic. Regular insulin was the most prescribed parenteral antidiabetic medication (63.9%). Among oral antidiabetic drugs, DPP-4 inhibitors were the most frequently used ones (21.3%). A total of 15 (31.9%) patients were severely affected by COVID-19 and admitted to the ICU, requiring mechanical ventilation. Six (6) patients (12.8%) died during our study due to multiple organ dysfunction syndrome or cardio-respiratory failure.* ***Conclusion:*** *The study provides critical information to understand better the clinical characteristics of patients with diabetes and prediabetes admitted for COVID-19 treatment, which may help physicians to identify the factors associated with adverse outcomes in this disease.*

Keywords: *Diabetes, Prediabetes, COVID-19, Gazi Medical College*

Introduction

Towards the end of December 2019, pneumonia cases with no identifiable cause began to appear in Wuhan and quickly spread to most of China. The genetic makeup of the virus isolated from these patients revealed that it is one of the members of the Coronaviridae family; as a result, it was given the names "severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)" and "coronavirus disease 2019" (COVID-19) to describe the illness it causes (1). Since the World Health Organization (WHO) designated this sickness a pandemic in early March 2020, it has already spread to several nations worldwide (2). Managing COVID-19 patients is extremely difficult in countries like Bangladesh since the few medical resources are soon exhausted. IEDCR, the nation's epidemiology institute, released information about the first three instances on March 8th, 2020. Since then, the epidemic has progressively spread over the entire country, and the number of victims has risen (3). Bangladesh has experienced a threefold increase in coronavirus incidence during the previous several months. The specialised beds in many other hospitals are likewise filled, as are all COVID-19 hospitals in the capital and other cities (4). As of June 2021, it has been noted that Sylhet has the lowest confirmed cases rate (9.75%) out of all eight divisions in Bangladesh, while Khulna division possesses the highest known cases rate (19.94%) (5).

According to new studies, hyperglycemia is a key risk factor that influences the severity and mortality of COVID-19 (6). As documented in 20% to 30% of these individuals, diabetes is also an essential risk indicator for diagnosing severe pneumonia and the clinical course brought on by COVID-19 (7). It is also known that poor glycemic control, whether brought on by diabetes or stress hyperglycemia, is associated with unfavourable patient outcomes, including hospitalisation and death (8).

In this study, we sought to understand better the clinical characteristics of patients with diabetes and prediabetes who were admitted to Gazi Medical College Hospital in Khulna, Bangladesh, for COVID-19 management.

Materials and Methods

Study design

This was a cross-sectional, observational study of patients with diabetes diagnosed with COVID-19 based on laboratory or radiological findings and admitted to Gazi Medical College Hospital, Khulna, Bangladesh, from July 1 to July 31, 2021. In that timeframe, overall, 215 patients with COVID-19 were admitted. Among them, 56 patients had diabetes or prediabetes. Thus, 26.1% (56/215) of all patients admitted with COVID-19 had coexistent diabetes or prediabetes (9). Among them, 47 patients who fulfilled the inclusion criteria were selected for the study. This study was approved by the Ethical Review Board of the concerned institute (Ethical Clearance No: GMC/IER-B/2021/01).

Inclusion criteria

- Patients of either sex aged ≥18 years
- COVID-19-positive patients who were either diabetic or prediabetic
- Patients who gave consent to be included in the study

Exclusion criteria

- Pregnant women having gestational diabetes
- Patients who had incomplete data regarding clinical and laboratory profile

Case definitions (9)

- A positive reverse transcription-polymerase chain reaction (RT-PCR) test for COVID-19 and consistent imaging results from chest radiography or chest high-resolution computed tomography (HRCT), that is, radiological features of COVID-19 that are pathognomonic (for example, ground-glass opacity), were required to confirm a diagnosis of COVID-19.
- Hemoglobin A1c (HbA1c) levels ≥ 6.5% upon admission or a prior diagnosis of diabetes served as confirmation.
- HbA1c 5.7%–6.4% upon admission and prior diagnosis both supported the presence of prediabetes.
- Laboratory tests ordered within 24 hours after hospital admission were referred to as initial tests.
- When patients were clinically healthy and were negative on two consecutive nasopharyngeal swab tests (laboratory tests) for COVID-19 RT-PCR, they were released from the hospital.

Data collection

We reviewed each study participant's medical records, nursing notes, test results, and HRCT chest report. The demographic, clinical, biochemical, and radiological characteristics, treatments, and outcomes information was collected and then put into standardised data-collecting forms from patients' case files and electronic medical records. Up to July 31, 2021, clinical effects (such as discharges, death, and readmission) were monitored.

Data analysis

For descriptive explanations, the clinical and demographic parameters of the patients were collated. According to the situation, continuous variables were reported as means ± standard deviations (SDs) or medians (with interquartile ranges, IQR). We computed the frequencies and proportions of patients in each group for categorical variables. Microsoft Excel and SPSS Version 21.0 for Windows (SPSS Inc., Chicago, IL, USA) were used for all analyses.

Results

The demographic characteristics, laboratory findings, information about comorbidities, and HRCT chest reports of the 47 study subjects are described below.

Demographic characteristics:

We included 47 patients in this study, with 29 (61.7%) male and 18 (38.3%) female (Table-1). The age of the patients ranged from 21 to 79 years; the mean age was 55.5±12.9 years. Among the study subjects, 30 (63.8%) came from urban a,reas and 17 (36.2%) came from rural areas.

Laboratory findings

The first results of the laboratory tests after admission were analysed. The mean HbA1c of the patients was 7.9±1.4% **(Table 2)**. In addition, the mean random blood sugar (RBS) level was 15.3±2.5 mmol/l. The routine blood tests showed that the mean Hb concentration of the study subjects was 12.1±1.9 g/dl. The blood counts of 44 patients out of 47 (93.6%) showed neutrophilia (neutrophil count >70%), and 45 patients (95.7%) showed lymphocytopenia (lymphocyte count <20%). Also, 3 (6.4%) patients had thrombocytopenia (platelet count <1,50,000/cm). The mean D-dimer level of the study subjects was 4.1±3.7 mg/l. In addition, the mean plasma CRP and serum creatinine levels were

71.1±20.7 mg/l and 1.5±1.2 mg/dl, respectively. The median oxygen saturation level (SpO2) was 84 (IQR, 62 to 96) **(Table 2).**

Comorbidities

Among the study subjects, 32 patients had either one or more comorbidities. The most common comorbid condition was hypertension (HTN) [21 (44.7%)], followed by ischemic heart disease [6 (12.8%)], and bronchial asthma [4 (8.5%)]. Coexisting cerebrovascular disease, chronic kidney disease and chronic liver disease were found in 1 (2.1%) patient each **(Table 3).**

HRCT of chest

All 47 patients had abnormal findings on HRCT; bilateral lung field involvement was observed in 43 (91.5%), and unilateral lung field involvement was observed in 4 (8.5%) patients (Figure 1). Ground-glass opacity, the predominant CT imaging pattern, was observed in 45 (95.7%) patients, followed by patchy consolidation shadow in 22 (46.8%) patients. Interstitial abnormalities, including reticular appearance and interlobular septal thickening, were found in 9 (19.2%) patients (Figure 2).

Table 1: Demographic characteristics of the study subjects

Demographic characteristics	Patients (N = 47)
Sex	
Male	29 (61.7%)
Female	18 (38.3%)
Locality	
Urban	30 (63.8%)
Rural	17 (36.2%)

Table 2: Laboratory findings of the study subjects

Laboratory findings	Frequency (percentage)
HbA1c (%)	7.9±1.4*
RBS (mmol/l)	15.3±2.5*
Hb concentration (g/dl)	11.2±1.9*
Neutrophilia (neutrophil count >70%)	44 (93.6)
Lymphopenia (lymphocyte count <20%)	45 (95.7)
Thrombocytopenia (platelet count <1,50,000/cm)	3 (6.4)
D-dimer (mg/l)	4.1±3.7*
Plasma CRP (mg/l)	71.1±20.7*
Serum creatinine (mg/dl)	1.5±1.2*
Finger oxygen saturation level (SpO2)	84 (62 to 96) **

Table 3: Comorbidities of the study subjects

Comorbidities*	Frequency (percentage) n = 32
Hypertension	21 (44.7)
Ischemic heart disease	6 (12.8)
Bronchial asthma	4 (8.5)
Cerebrovascular disease	1 (2.1)
Chronic kidney disease	1 (2.1)
Chronic liver disease	1 (2.1)

***More than one comorbidity was reported in some patients**

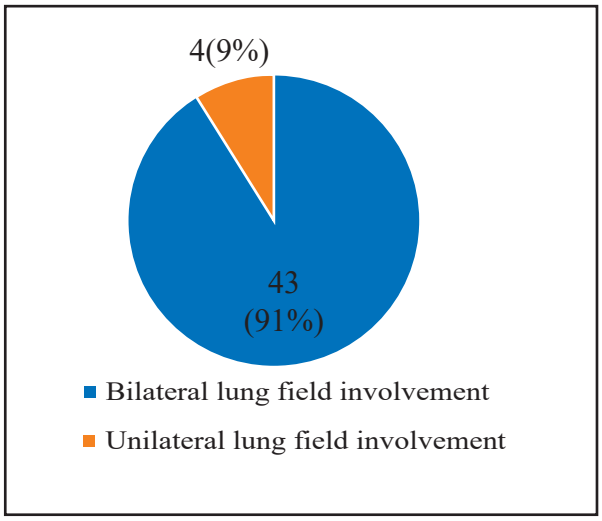

Fig 1. Lung field involvement of the study subjects reported by HRCT of chest

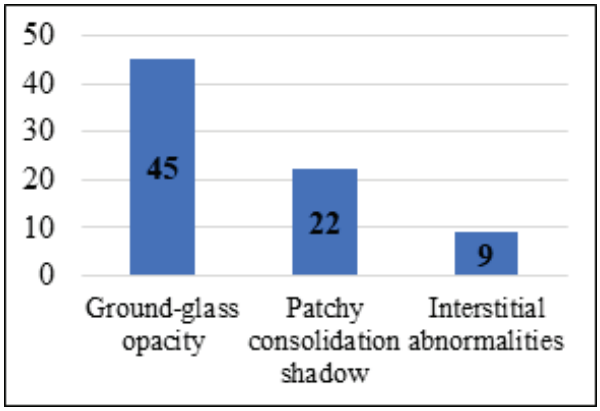

Fig 2. Imaging pattern found in HRCT of chest

The diabetes status of study subjects, information regarding antidiabetic drug use and clinical outcome are described below.

Status of diabetes

Out of the 47 diabetic patients, 2 (4.3%) patients had type 1 diabetes and 35 (74.5%) patients had type 2 diabetes. Moreover, 10 of 47 (21.2%) patients were prediabetic **(Table 4).**

The pattern of antidiabetic drugs used

A survey of the treatment regimen of the patients showed that, among parenteral drugs, regular insulin was the most prescribed medication [30 (63.9%], followed by long-acting insulin [8 (17.1%]. The premixed drug in the form of (regular+intermediate-acting) insulin was administered in 2 (4.3%) patients, and (rapid+intermediate-acting) insulin was given to 1 (2.1%) patient.
Among oral antidiabetic drugs, DPP-4 inhibitors were the most frequently used ones [10 (21.3%], followed by metformin in 6 (12.8%), sulfonylureas in 3 (6.4%) and SGLT-2 inhibitors in 2 (4.3%) patients **(Table 5).**

Table 4: Diabetes status of the study subjects

Type of diabetes	Frequency (percentage)
Type 1	2 (4.3%)
Type 2	35 (74.5%)
Prediabetes	10 (21.2%)

Table 5: Pattern of antidiabetic drug use among study subjects

Antidiabetic drugs*	Frequency (percentage)
Regular insulin	30 (63.9)
Long-acting insulin	8 (17.1)
(Regular+intermediate) insulin	2 (4.3)
(Rapid+intermediate) insulin	1 (2.1)
DPP-4 inhibitors**	10 (21.3)
Metformin	6 (12.8)
Sulfonylureas	3 (6.4)
SGLT-2 inhibitors***	2 (4.3)

* **The same patient could have received more than one drug**
** **DDP-4 inhibitors: dipeptidyl peptidase-4 inhibitors**
*** **SGLT-2 inhibitors: sodium-glucose co-transporter-2 inhibitors**

Clinical outcome

Among the study subjects, 15 (31.9%) patients were severely affected by COVID-19 and admitted to the ICU due to moderate or severe ARDS, requiring noninvasive mechanical ventilation therapy. The median PaO2 level of ICU-admitted patients was 72 mmHg (54 to 86). During the study period, six patients (12.8%) died either due to multiple organ dysfunction syndrome or cardio-respiratory failure-all of whom were in the ICU **(Table 6)**.

Table 6: Clinical outcome of the study subjects

Clinical outcome	Frequency (percentage)
ICU admission	15 (31.9)
PaO2 level (mmHg)	72 (54 to 86) *
Mortality	6 (12.8)

***Median (IQR)**

Discussion

This single-centre study was conducted at Gazi Medical College Hospital, Khulna, Bangladesh, on patients with COVID-19 with diabetes mellitus (DM) or prediabetes. In our study, 26.1% of the patients had DM or prediabetes. A previous study shows that the overall prevalence of DM and prediabetes in Bangladesh is 9.2% and 13.3%, respectively (10). The severe acute respiratory syndrome coronavirus type 2 (SARS-CoV-2) is widely recognised for attacking the pancreas, damaging both exocrine and endocrine cells. It is a member of the SARS coronavirus family (11). According to earlier research, diabetes was linked to worse patient outcomes during the SARS-CoV and Middle East Respiratory Syndrome (MERS) coronavirus epidemics (12, 13). So, the hypothesis put out was that diabetes contributes to an immunological response that is dysfunctional, which results in a damaging state of the lungs (14, 15).

Patients in our study were predominantly male (61.7%) compared to female (38.3%). This data is consistent with recent research showing that males with COVID-19 are more likely than women to experience catastrophic effects, including death (6, 16, 17).

Additionally, a substantial number of the people in our group who had COVID-19 and diabetes or prediabetes also had other severe comorbidities (32/47, 68.1%), which is consistent with another study's results (76/103, 73.8%) (9). This result reflects that the metabolic syndrome's main contributors are cardiovascular disease and diabetes (18). Proinflammatory and prothrombotic states are also linked to metabolic syndrome, which may have significant repercussions for COVID-19 patients, where these consequences are more prevalent and problematic (19).

In our study, 63.9% of patients received regular insulin, and 17.1% received long-acting insulin. Also, DPP-4 inhibitors were the most used oral antidiabetic medication (21.3%). These findings differ from the study conducted by Bhatti et al. (9). 7.8% of patients received long-acting insulin, 5.8% of patients received a basal-bolus insulin regimen, and metformin was the most used oral medication for diabetes (62.1%).

In this study, patients with DM and COVID had increased HbA1c, RBS, D-dimer and CRP levels. These findings align with the results of another study and indicate the increased cytokine response that occurs in COVID-19 cases (20).

Moreover, 31.9% of patients (15/47) needed ICU support due to a marked decrease in O2 saturation. This finding is consistent with a previous study, where 28.2% of patients (29/103) required ICU admission (9). Acute hyperglycemia causes the ACE2 gene to be upregulated, which makes it easier for the SARS-CoV-2 virus to enter cells. Long-term hyperglycemia reduces the expression of ACE2, leaving cells more susceptible to the inflammatory properties of the SARS-CoV-2 virus (21). Therefore, doing biochemical investigations at the time of admission to the hospital may help estimate disease severity and assess the required degree of patient care.

Limitations and conclusion

It is essential to consider the present study's limitations. First, our sample size was small because we conducted the study at just one centre. Therefore, the current study does not accurately reflect the COVID-19 burden in the Khulna area. Our study's lack of a control group of individuals without diabetes to compare the outcomes to is another drawback. Additionally, most of our patients lacked information on how accurately they might be classified as overweight or obese, even though obesity is associated with more severe disease and higher death risk. This is because, during a short period, a rising number of new patients presented to our healthcare institution with COVID-19 symptoms.

Despite these drawbacks, our study offers essential insights into the characteristics of diabetic and prediabetic patients hospitalised for COVID-19 management. This study may aid medical professionals in determining the causes of unfavourable outcomes in diabetic individuals hospitalised with COVID-19 by using clinical and laboratory data.

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ORIGINAL ARTICLE

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Antibacterial Effect of Ginger *(Zingiber officinale)* against *Pseudomonas aeruginosa*

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Abstract

Background: *Historically, medicinal plants have been a source of novel drug compounds. Plants derived products have made large contributions to human health and wellbeing. Green pharmacy may become the base for the development of medicines by providing a pharmacophore which could be used for the development of new drug with novel mechanisms of action. Many scientists across the globe have reported antimicrobial properties of several medicinal plants but still a very few portion of this tremendous potential drug-repertoire has been scientifically screened. Because of the increasing resistance of some bacteria to antibiotics, herbal products are looking for new leads to develop better antibiotics.* ***Objectives:*** *In this regard one of the herbal spice Zingiber officinale (Ginger) was undertaken to investigate the antibacterial effect against the commonly encountered pathogens (Pseudomonas aeruginosa, Staphylococcus aureus, Escherichia coli and Salmonella typhi) causing various type of infections forits low cost, availability throughout the year and less adverse effects.* ***Materials and Methods:*** *The study was conducted from July 2016 to June 2017 in the Department of Pharmacology and Therapeutics with the collaboration of the Department of Microbiology, Mymensingh Medical College, Mymensingh, to determine the profile of the antibacterial effect of Crude Ginger Extract (CGE), Ethanolic Ginger Extract (EGE) and standard antibiotic Amikacin against standard strains of Pseudomonas aeruginosa. It was an experimental study. Five separate experiments were done e.g.* ***Experiment-I****, Determination of inhibitory effects of crude ginger extract by incorporation into Nutrient agar media against Pseudomonas aeruginosa.* ***Experiment-II****, Antibacterial sensitivity testing of ethanolic ginger extract againstPseudomonas aeruginosaby using disc diffusion method.* ***Experiment-III****, Determination of minimum inhibitory concentration (MIC) of ethanolic ginger extract against the test organism by broth dilution technique.* ***Experiment-IV****, Determination of minimum inhibitory concentration (MIC) of antibiotic Amikacin against test organism by broth dilution technique and* ***Experiment-V****, Subculture studies of materials from effective CGE, EGE and Amikacin preparations for confirmation of respective results of Experiments I, III and IV.* ***Results:*** *The growth of Pseudomonas aeruginosastarted to be inhibited from 90% CGE incorporated media and complete inhibition of growth occurred at 100%. In case of Ethanolic Extract in disc diffusion method sensitivity was seen against Pseudomonas aeruginosa zone of inhibition was 14 mm at 25 µg/10 µl, 16 mm at 50 µg/10 µl and, 18 mm at 100 µg/10 µl concentrations respectively. The broth dilution technique was performed to determine the MICs of EGE and Amikacin. The MIC of EGE was 600 µg/ml against Pseudomonas aeruginosa and the MIC of Amikacin 1.5 µg/ml against Pseudomonas aeruginosa. The subculture study showed the same results with that of previous experiments.* ***Conclusion:*** *From the study it is clearly observed that there is definite antibacterial effect of ethanolic ginger extract (EGE) against Pseudomonas aeruginosa. The crude ginger extract (CGE) also has its definite inhibitory effects against the organism studied. Further studies are required to detect and isolate the active ingredients present in the Ginger extract responsible for antibacterial effect.*

Keywords: *CGE, EGE, MIC, pseudomonas aeruginosa.*

Introduction

Historically, medicinal plants have been a source of novel drug compounds. Plants derived products have made large contributions to human health and well-being. Green pharmacy may become the base for the development of medicines by providing a pharmacophore which could be used for the development of new drug with novel mechanisms of action. Many scientists across the globe have reported antimicrobial properties of several medicinal plants but still a very few portion of this tremendous potential drug repertoire has been scientifically screened (1). A number of medicinal plants have been screened for antimicrobial activity in recent years (2) and efforts have been done to identify their active constituents (3). The plants extracts possessing bioactivity are essentially evaluated for toxicity and the extracts are usually tested for short or long term toxicity in animal models (4, 5). Nontoxic extracts possessing good bioactive principles may provide potential antimicrobial leads.

Ginger (Zingiber officinale) belongs to Zingiberaceae family (6). The Zingiberaceae plants are characterized by their tuberous or non-tuberous rhizomes, which have strong aromatic and medicinal properties (7). The active ingredients of ginger are, phenolic compounds: shogaols and gingerols; Sesquiterpenes: bisapolene, zingiberene, sesquiphellandrene, curcurmene; others: 6-dehydrogingerdione, galanolactone, gingesulfonic acid, zingerone, geraniol, ginger glycolipids (8).The active ingredients in ginger are thought to reside in its volatile oils, which comprise approximately 1-3% of its weight (9). Ginger's active ingredients have a variety of physiologic effects. For example, the gingerols have antioxidant, anti-inflammatory, anti-tumor, analgesic, sedative, antipyretic and antibacterial effects in vitro and in animals (10, 11). Active constituents of ginger inhibit multiplication of bacteria by membrane disruption (12). Ginger is a strong antibacterial agent against Pseudomonas aeruginosa(10). Because of the increasing resistance of bacteria to antibiotics, herbal products are looking for new leads to develop better antibiotics (13). Therefore, the aims of this study are to investigate the antibacterial effectiveness of crude paste and ethanolic ginger extract.

Materials and Methods

This experimental study was carried out in the Department of Pharmacology and Therapeutics in collaboration with the Department of Microbiology, Mymensingh Medical College, Mymensingh, during the period from July 2016 to June 2017. Ginger was used as a material for experiment which was collected from local market of Mymensingh, Bangladesh. Another important material Aminoglycoside antibiotic (Injectable form) was bought from local market. Standard reference strains of Pseudomonas aeruginosa ATCC 27853 was use for testing and collected from Microbiology Department of Mymensingh Medical College. Five experiments were conducted during this time period, they are as follows

Experiment-I:

Pregnant women having gestational diabetes Patients who had incomplete data regarding clinical and laboratory profile

Experiment-II:

Antibacterial sensitivity testing of Ethanolic Ginger Extract (EGE) againstPseudomonas aeruginosaby using disc diffusion method.

Experiment-III:

Determination of Minimum Inhibitory Concentration (MIC) of Ethanolic Ginger Extract (EGE) against test organism by broth dilution technique.

Experiment-IV:

Determination of MIC of Amikacin against test organism by Broth Dilution Technique.

Experiment-V:

Subculture studies of materials from effective CGE, EGE and Amikacin preparations for confirmation of respective results of Experiments I, III and IV.

Procedure of Experiment-I:

Inhibitory effects of CGE against Pseudomonas aeruginosainto Nutrient Agar (NA) media. Ginger (1000gm) was washed initially by distilled water and then by 95% ethanol and homogenized by using sterile mortar and pestle. Then sieved through double layer of sterile fine mesh cloth to make crude extract. This CGE was considered as 100% crude ginger extract **(Table 1).**

* One loopful =20 µl

Bacterial (Pseudomonas aeruginosa) Suspension was prepared by 3-5 similar colonies from 18-24 hours old agar plates and mixed with normal saline. The turbidity of the suspension was adjusted with 0.5 McFarland standards (1.5 ×108 organisms/ml). A cotton swab was dipped in the bacterial suspension and inoculated into CGE containing NA media as well as control plates. Then all the plates were placed in the incubator at 37 0C for 24 hours.

Table 1: Composition of different concentration of CGE incorporated into NA media

Set No	CGE (ml)	Distil water in NA media to make 100ml	Percentage of CGE incorporated into NA media	Test organism
Set-I	5	95	5	One loopful*
Set-II	10	90	10	One loopful
Set-III	15	85	15	One loopful
Set-IV	20	80	20	One loopful
Set-V	30	70	30	One loopful
Set-VI	40	60	40	One loopful
Set-VII	50	50	50	One loopful
Set-VIII	60	40	60	One loopful
Set-IX	70	30	70	One loopful
Set- X	80	20	80	One loopful
Set-XI	90	10	90	One loopful
Set-XII	100	00	100	One loopful
Control				
Set XIII	-	100	-	One loopful

Fig 1. Petri dish contains prepared different concentration of CGE

Procedure of Experiment- II:

Antibacterial sensitivity testing of Ethanolic Ginger Extract (EGE) againstPseudomonas aeruginosaby disc diffusion method and all materials were Sterilized accordingly (same

as procedure I). Ethanolic Ginger Extract was prepared by using 10 grams of the grounded ginger mixed with 200 ml of 95% ethanol and left in room temperature for 24 hours. After that it was filtered by using gauze pad to remove the large particle then centrifuged at 3000 rpm for 10 minutes. Secondarily by filter paper to obtain a clear solution which was dried at 40°C in hot water bath and stored in the refrigerator until use. For preparation of parent solution, 1gm powder extract mixed with 10 ml ethanol. Then filtered by gauze pad and centrifuged at 3000rmp for 10 min then filtered by filter paper. This solution was the source of preparing different concentrations with adding ethanol. The extract was stored at 4°C in refrigerator.

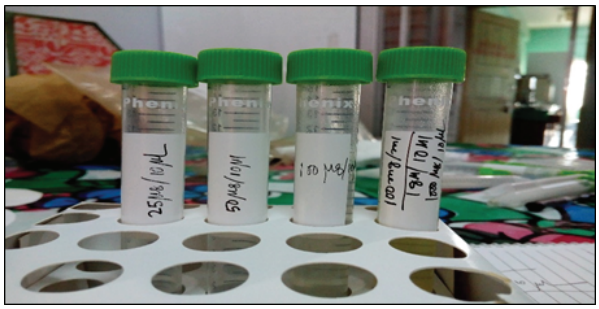

Fig 2. Prepared Ethanolic Ginger Extract

Calculation of concentration of different EGE Disc Diffusion solutions:

Powdered ginger extract 1gm in 10 ml ethanol. This solution was marked as Parent solution. 10 ml ethanol contains 1gm = 1000 mg ethanolic ginger extract. So, 1 ml Solution contains 100 mg EGE, This, solution was marked as Stock EGE DD (Disc Diffusion) Solution-I. Then 1:10 dilution was done of stock EGE DD solution-I by adding 9 ml of ethanol.

So, 10 ml solution contains 100 mg of EGE. So, 1 ml=1000 µl solution contains 10 mg=10×1000 µg of EGE=10000 µg. Thus, 10 µl solution contained 100 µg of EGE; this solution was used in Disc Diffusion Method and different lower concentration solutions (25 µg and 50 µg per 10 µl) were made from this by adding ethanol. In case of making higher concentration of disc Diffusion solution same procedure was applied but the difference was done in making Parent solution. Instead of 1gm of powdered ginger extract in higher concentration Disc Diffusion Solution 2 gm, 4 gm, and 8 gm powdered ginger extract was mixed with 10 ml ethanol. So, the concentrations were 200 µg, 400 µg and 800 µg per 10 µl respectively.

A sterile cotton swab was dipped into bacterial suspension (Prepared as per procedure I) and inoculated into NA plates then left 5-10 minutes on room temperature. By using a sterile forceps the blank discs were placed on the surface of the plates and with the help of micropipette different concentrations of EGE were put over the blank discs and left for five minutes. Then the plates were incubated at 37°C for 24 hours then the zone of inhibition were measured in mm by using ruler.

Procedure of Experiment- III:

Determination of Minimum Inhibitory Concentration (MIC) of Ethanolic Ginger Extract (EGE) against Pseudomonas aeruginosaby broth dilution technique where instruments were sterilizedand medium was prepared accordingly (as per procedure- I)

Stock EGE was prepared by mixing 1 gm of powdered ginger extract in 10 ml ethanol. (Parent Solution) So, 1 ml Solution contains 100 mg EGE. This solution was marked as Stock EGE Solution-I. To prepare more diluted working solution, 1:100 dilution was done of the stock EGE solution -I by adding 99 ml of Ethanol.

So, 100 ml of working solution contains 100 mg of EGE.

So, 1 ml of working solution contains 1 mg of EGE, This, solution was marked as EGE Solution-II. This solution (EGE Solution-II) was used for determination of MIC of EGE by making different working solution of different concentrations **(Table 2).**

Table 2: Composition and different concentrations of working EGE solutions with controls

No of Sets	EGE solution-II (ml)	Nutrient broth medium (ml)	Total (ml)	Concentration o EGE(µg/ml)	Test organism (µl)
Set- I	9	1	10	900	20
Set- II	8	2	10	800	20
Set- III	7	3	10	700	20
Set- IV	6	4	10	600	20
Set- V	5	5	10	500	20
Set- VI	4	6	10	400	20
Set- VII	3	7	10	300	20
Set-VIII	2	8	10	200	20
Set-IX	1	9	10	100	20
Set- X C-1	10	0	10	1000	20
Set- XI C-2	-	10	10	-	20
Set-XII C-3	-	10	10	-	-

With each 10 ml preparation except control-2 (set VIII) 20 µl bacterial suspensions were added after matching its opacity with that of 0.5 McFarland Standard. After 18 to 24 hours of incubation at 37°C, the growth of Pseudomonas aeruginosain each preparations of Amikacin were examined and compared against that of controls by matching their turbidity. The clear preparations were considered as no growth of bacteria and turbid ones, as growth of bacteria. The MIC was reported as lowest concentration of Amikacin required to prevent the visible growth of test organism.

Procedure of Experiment- IV:

Determination of MIC of Amikacin against Pseudomonas aeruginosa Broth dilution. All the materials were sterilized by hot air oven and autoclaving.

Nutrient broth medium was prepared accordingly and **stock solution of Amikacin** was prepared by mixing Five hundred (500) mg of Amikacin injection with 500 ml of sterile DW. So, 1 ml solution contains 1 mg Amikacin. **(Stock Amikacin solution-I)** Then 1 ml of stock Amikacin solution-I was mixed with 99 ml of sterile D/W. This 1:100 dilution of stock Amikacin solution-I had the concentration of 10 µg/ml. This solution was marked as **Stock Amikacin Solution-II** which was used as stock solution for the determination of MIC of Amikacin **(Table 3).**

Table 3: Composition and different concentrations of working Amikacin solutions and the controls.

No. of Sets	Stock Amikacin solution-II (ml)	NB media (ml)	Total (ml)	Concentration of Amikacin (µg/ ml)	Test organism (µl)
I	0.25	9.75	10	0.25	20
II	0.5	9.50	10	0.5	20
III	0.75	9.25	10	0.75	20
IV	1	9	10	1	20
V	1.5	8.5	10	1.5	20
VI	2	8	2	2	20
VII	Control-1	10	10	-	20
VIII	Control-2	10	10	-	-

With each 10 ml preparation except control-2 (set VIII) 20 µl bacterial suspensions were added after matching its opacity with that of 0.5 McFarland Standard. After 18 to 24 hours of incubation at 37°C, the growth of Pseudomonas aeruginosain each preparations of Amikacin were examined and compared against that of controls by matching their turbidity. The clear preparations were considered as no growth of bacteria and turbid ones, as growth of bacteria. The MIC was reported as lowest concentration of Amikacin required to prevent the visible growth of testorganism.

Procedure of Experiment- V:

Subculture studies of materials from effective CGE, EGE and Amikacin preparations for confirmation of respective results of Experiments I, III and IV

The materials from last two sets of growth and all sets of no growth of CGE incorporated into NA media were subculture in the pure NA (solid) media plates (without any incorporation of CGE). After 18 to 24 hours of incubation at 37°C, the growth of test organism was examined.

The materials from last two sets of growth and all sets of no growth ofPseudomonas aeruginosafrom dilutions of EGE and Amikacin preparations were sub cultured in the pure NA (solid) media plates (without any EGE and antibiotic mixed with the media). After 18 to 24 hours of incubation at 37°C, the growth of test organism was examined.

Results

Results of the experiment- I:

It was observed that the growth of Pseudomonas aeruginosa was started to be inhibited from 90% Crude Ginger (Zingiber officinale) Extract (CGE) incorporated media and complete inhibition of growth occurred at 100% **(Figure 3).**

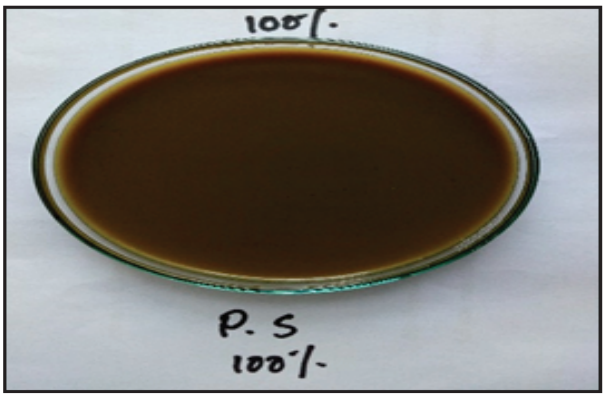

Figure 3: Inhibitory effect of CGE at 100% concentration

The inhibitory effect of Crude Ginger (Zingiber officinale) Extract (CGE) incorporated into nutrient agar media against the growth of Pseudomonas aeruginosa is shown in **Table 4.**

Table 4: Inhibitory effect of CGE incorporated into Nutrient Agar (NA) medium against the growth of Pseudomonas aeruginosa

No of Sets	Percentage of CGE in NA media	*Pseudomonas aeruginosa*
Set-I	5	Growth not inhibited
Set- II	10	Growth not inhibited
Set-III	15	Growth not inhibited
Set-IV	20	Growth not inhibited
Set-V	30	Growth not inhibited
Set- VI	40	Growth not inhibited
Set-VII	50	Growth not inhibited
Set-VIII	60	Growth not inhibited
Set-IX	70	Growth not inhibited
Set-X	80	Growth not inhibited
Set- XI	90	Medium growth
Set-XII	100	Growth completely inhibited
Set-XIII (Control)	Without CGE	Huge Growth

Results of the experiment- II:

In case of Ethanolic extract, in disc diffusion method, sensitivity was seen against Pseudomonas aeruginosa with a maximum zone of inhibition of 18 mm at 100 µg/10 µl concentration (Figure 3). According to the Zone of diameter interpretation chart, it was clearly observed that there is an antibacterial effect of ethanolic ginger extract (EGE) against Pseudomonas aeruginosa as zone of inhibition was 18 mm at 100 µg/10 µl concentration.

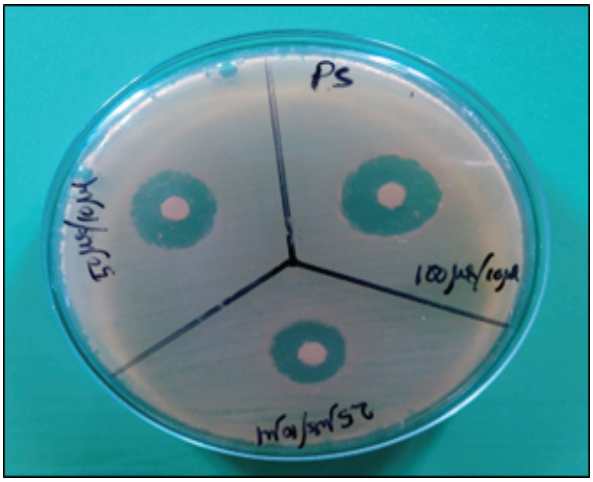

Figure 4: Disc Diffusion showing the sensitivity of Pseudomonas aeruginosa to EGE.

Results of the experiment- III:

Visible growth of Pseudomonas aeruginosa was observed in set-IX to Set-V (Table 5). Their growth was not visible in Set-IV to Set-I. So, the MIC of EGE against Pseudomonas aeruginosa was 600 µg/ml (Set-IV). The inhibitory effect of ethanolic ginger extract (EGE) against the growth of Pseudomonas aeruginosa is shown in **Table 5.**

Table 5: IInhibitory effect of EGE *against Pseudomonas aeruginosa*

No. of Sets	Concentration of EGE (µg/ml)	*Pseudomonas aeruginosa*
Set-I	900	No Growth
Set-II	800	No Growth
Set-III	700	No Growth
Set-IV	600	No Growth
Set-V	500	Growth
Set-VI	400	Growth
Set-VII	300	Growth
Set-VIII	200	Growth
Set-IX	100	Growth
Set-X Control-1	1000 (Pure stock EGE+Bacteria)	No Growth
Set-XI Control-2	N/A Media + Bacteria	Huge Growth
Set-XII Control-3	N/A media + No Bacteria	No Growth

Results of the experiment- IV:

Visible growth of Pseudomonas aeruginosa was observed at Set-I to Set-IV but the organisms failed to grow at Set-V to Set-VIII (Figure 5). So, the MIC of Amikacin against Pseudomonas aeruginosa was 1.5µg/ml (Set V). The inhibitory effect of Amikacin against the growth of Pseudomonas aeruginosa is shown in **Table 6.**

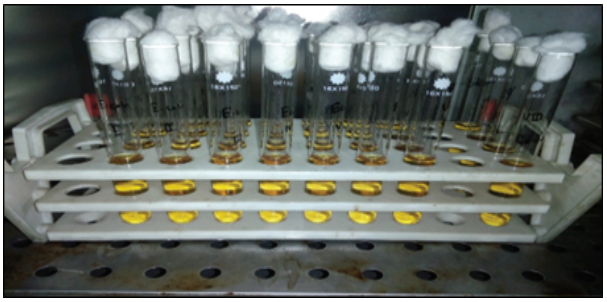

Figure 5: Determination of MIC of amikacin by broth dilution technique

Table 6: MIC of Amikacin against *Pseudomonas aeruginosa*

No of Sets	Concentration of Amikacin (µg/ ml)	*Pseudomonas aeruginosa*
Set-I	0 .25	Growth
Set-II	0.5	Growth
Set-III	0.75	Growth
Set-IV	1	Growth
Set-V	**1.5**	**No Growth**
Set-VI	2	No Growth
	Control	
Set-VII	Control-1 (NB medium + No bacteria inoculation)	No Growth
Set-VIII	Control-2 (NB media + Bacterial inoculation)	Growth

Results of the experiment- V:

It was observed that the concentration of CGE in subculture plates showing complete inhibition of growth of Pseudomonas aeruginosa was 100 ml/100 ml which coincides with the findings of the experiment- I (Table 7). The MICs of EGE and Amikacin found in the subculture plates were 600 µg/ml and 1.5 µg/ml respectively were also coinciding with results of experiment- III and IV **(Table 7)**.

Table 7: Subculture study of materials from effective CGE, EGE and Amikacin in NA medium for Confirmation of respective result of previous experiment.

Material	Minimum inhibitory Concentration (MIC)	Observed effect in subculture plate
CGE (Crude Ginger Extract)	100 ml/100 ml	Complete inhibition
EGE (Ethanolic Ginger Extract)	600 µg/ml	No growth
Amikacin	1.5 µg/ml	No growth

Discussion

In this study it is found that 100% CGE has complete inhibitory effect against Pseudomonas aeruginosa.Shah P. 2012 (14) also found that crude ginger extract has antibacterial activity against Pseudomonas aeruginosawhich is almost similar to this study.

Karuppiah P. 2012 (15), determined the antibacterial effect of Allium sativum cloves and Zingiber officinale rhizomes against multi-drug resistant clinical pathogens with the help of disc diffusion method. In that study the zone of inhibition against Pseudomonas aeruginosawas 10.4 mm at 25µg/ml, 13.5 mm at 50 µg/ml and 14.1 mm at 100µg/ml. In this study it was 14 mm at 25µg/ml, 16 mm at 50µg/ml and 18 mm at 100µg/ml, which is almost similar with this study.
M. Yusha. U et al. 2008 (16), determined the inhibitory effect of garlic and ginger extracts on some respiratory tract isolates of gram negative organisms. In that study the zone of inhibition against Pseudomonas aeruginosawas 21 mm at 25µg/ml, 23 mm at 50 µg/ml and 25 mm at 100µg/ml. In this study it was 14 mm at 25µg/ml, 16 mm at 50µg/ml and 18 mm at 100µg/ml. This is bit different with this study. This is may be due to the species difference or the ginger difference in different biologic condition.

H.Z. Neihaya 2015 (17), determine the antibacterial effect of ginger and black pepper extracts (alone and combination) with sesame oil on some pathogenic bacteria at different concentration. In that study zone of inhibition was 00 mm, against Pseudomonas aeruginosaat 10% concentration. But in this study zone of inhibition was 14 mm at 25µg/ml. This is bit different with this study.

Karuppiah P. 2012 (15), determined the MIC of ethanolic ginger extract againstPseudomonas aeruginosawas 75 µg/ml. But in this study the MIC of EGE was against Staphylococcus aureus600 µg/ml. This is bit different with this study. This is may be due to the species difference or the ginger difference in different biologic condition.

Conclusionon

From this study it is clearly observed that there is definite antibacterial effects of ethanolic Ginger extract (EGE) against Pseudomonas aeruginosa. The crude Ginger extract (CGE) also has its definite inhibitory effects against Pseudomonas aeruginosa. Further studies are required to detect and isolate the active ingredients present in the Ginger extract responsible for antibacterial effect. Then their effects against the studied organism should be studied in vivo separately and their toxicity profiles should also be taken into account. Only then the Ginger extracts will fulfill the criteria for its therapeutic use. Until then ginger may be used in gastrointestinal tract infection, respiratory tract infection, skin infection and urinary tract infection along with the conventional antibiotics which are used in those conditions.

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ORIGINAL ARTICLE

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Efficacy and safety of escitalopram: an observational study on major depressive disorder in Bangladesh

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Abstract

Background: *Major Depressive Disorder (MDD) is a mood disorder characterised by the occurrences of one or more major depressive episodes. Escitalopram is a selective serotonin reuptake inhibitor (SSRI) often used to treat it.* ***Objectives:*** *To find out the efficacy and safety of escitalopram in patients with MDD.* ***Materials and Methods:*** *This was a prospective, observational, 12 weeks follow-up study of patients with Major Depressive Disorder (MDD) conducted in the Department of Psychiatry, Rajshahi Medical College, for six months beginning in January 2022 and ending in June 2022. A sample of 84 participants (≥ 18 years of age) with MDD were recruited through systematic random sampling. Data were collected through face to face using a semi-structured questionnaire. The DSM-5 diagnostic criteria for MDD were used to identify depression. To determine the severity of depression, the Montgomery-Asberg Depression Rating Scale (MADRS) was employed.* ***Results:*** *The mean (±SD) MADRS total score at baseline was 21.74 (±6.15); which was decreased in subsequent follow-up, and at 12-week score was 9.71 (±5.22). A paired sample t-test was done to measure the level of significance. In terms of statistics, the difference was quite significant (p 0.001). In this study, 49 (58.3%) respondents experienced remission. The common adverse effects were dizziness 55(65.50%), headache 49 (58.30%), and nausea 25(29.80%).* ***Conclusion:*** *Escitalopram was efficacious as it reduced more than 50% of the baseline score, and the remission rate was 58.3% after 12 weeks of treatment. The remission rate was 58.3% after 12 weeks of treatment. Escitalopram also had high tolerability because adverse events related to escitalopram therapy were generally less. So, this study concluded that escitalopram could be used as an effective and well-tolerant antidepressant drug for treating major depressive disorder.*

Keywords: *Major depressive disorder, escitalopram, Bangladesh*

Introduction

Major Depressive Disorder (MDD) is a mood disorder characterised by the occurrences of one or more major depressive episodes and the absence of any history of manic, hypomanic, or mixed episodes. There are often feelings of low self-esteem, guilt, self-reproach, withdrawal from interpersonal contact, and somatic symptoms such as eating and sleep disturbances. Major depressive disorder has a prevalence of 10-15% worldwide (1). According to the National Mental Health Survey Bangladesh 2018-1019, the overall prevalence of depressive disorders in Bangladesh is 6.7% (5.8-7.6), and women (7.9%) suffer more from MDD than men (5.4%). The most often prescribed class of antidepressants is selective serotonin reuptake inhibitors (SSRIs). Among the SSRIs, escitalopram had a superior tolerability profile, with significantly fewer discontinuations of patients than other antidepressants. It has also been suggested that escitalopram has a better efficacy and safety profile than other SSRIs used in the treatment of MDD (2). The data regarding the efficacy and adverse effects of escitalopram was scarce in our Bangladeshi population. Therefore, the present study evaluated the efficacy of escitalopram by assessing clinical improvement. The adverse effects were also assessed during the treatment of MDD. So, the study might give an idea about the efficacy and adverse effects of escitalopram and might help psychiatrists and specialised physicians to select the proper drug for treating Major Depressive Disorder (MDD).

Materials and Methods

This was a prospective, observational, 12 weeks follow-up study of patients with Major Depressive Disorder (MDD) conducted in the Department of Psychiatry, Rajshahi Medical College, for six months from January 2022 to June 2022. The study had the following inclusion criteria: both genders aged ≥18 years, have sustained moderate-severe depression symptoms, meet DSM-5 criteria for a diagnosis of major depressive disorder, and Montgomery-Asberg Depression Rating Scale (MADRS) score: 7 or more. Patients with suicide risk, episodes of mania or hypomania, schizophrenia, bipolar disorder, substance abuse or dependence, cogitative impairment, hepatic impairment, pregnancy, taking anti-depressant drugs and lipid-lowering agents, and refusal to consent were excluded.

The sample size was calculated using the formula below:

$$n = \frac{[P\ (100-P\ ) + P\ (100-P\ )] \times (Z\ + Z_{\beta}\ ^{2}}{(P\ -P\ )^{2}}$$

The sample size was determined by using hypothesis testing for the difference between two proportions and it was calculated from the findings of a previous study (13). Firstly, in the department of Psychiatry, all the attending patients with MDD were listed then, a sample of 84 participants (≥ 18 years of age) with MDD were recruited. Every 3rd patient was selected by systematic random sampling technique Data was collected through face to face using a semi-structured questionnaire. Escitalopram 10 mg once daily was started in patients with MDD. Clinical improvement and tolerability of escitalopram were evaluated at 6 weeks and 12 weeks. Participants were told of the study's objectives, and their written informed permission was obtained. The Rajshahi Medical College's (RMC) Ethical Review Committee (ERC) gave its approval (IRB no. RMC/IRB/2022/37) to the study. Collected data were subjected to appropriate descriptive statistics of different variables using frequency and

percentage, mean, and standard deviation. Paired samples t-test was used for quantitative data and a p-value of <0.05 was considered statistically significant. Statistical Package for the Social Sciences (SPSS) version 24 was applied to analyze the data.

Results

The highest number of respondents were in the age group 30 years, which occupied 42 (50.00%), and the lowest number of respondents were in the age group 30-40 years, which occupied 18 (21.43%). Females were 48 (57.1%) and males were 36 (42.9%). In this study, 42 (50.0 %) were married, and only 6 (7.1%) were divorced. Regarding educational status, 37 (44.0%) were graduates & above, 24 (28.6%) were HSC, 22 (26.4%) were SSC & 1 (1.2%) were educated through primary education (Table 1). 29 (34.5%) respondents had a positive smoking history (Figure 1). The study revealed a considerable number of respondents (29.00%) had a previous history of depression (Figure 2). However, in only 2.40% of cases had positive family history among them (Figure 3).

The mean MADRS baseline score was 21.74 (±6.15). At the first follow-up (at 6 weeks), the score was 17.57 (±5.72) and at the second follow-up (at 12 weeks), the score was 9.71 (±5.22). (Table 2). The significant t-test results found in the baseline score and 2nd follow-up score ($p < 0.001$) imply that the treatment with this drug is to be effective. It was observed that 49 (58.3%) respondents experienced remission (Table 3). The predominant adverse effect following treatment was dizziness 55(65.50%) followed by headache 49 (58.30%). Other adverse effect shows in Table 4.

Table 1: Socio-demographic characteristics of the study participants (n=84)

Variable	Frequency	Percent (%)
Age in years		
< 30 years	42	50.00
30-40 years	18	21.43
≥ 40 years	24	28.67
Mean ± SD	30.90 ±10.34	
Gender		
Male	36	42.90
Female	48	57.10
Marital status		
Married	42	50.00
Unmarried	36	42.90
Divorce	6	7.10
Occupational status		
Student	40	47.60
Housewife	23	27.40
Business	11	13.10
Service holder	4	4.80
Others	6	7.10
Educational status		
Graduate and	37	44.00

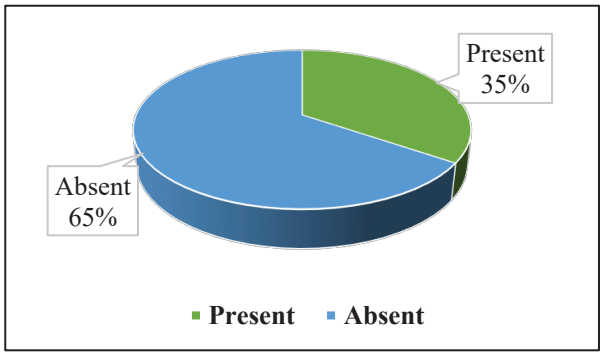

Fig 1. Pie chart showing the smoking history of the respondents

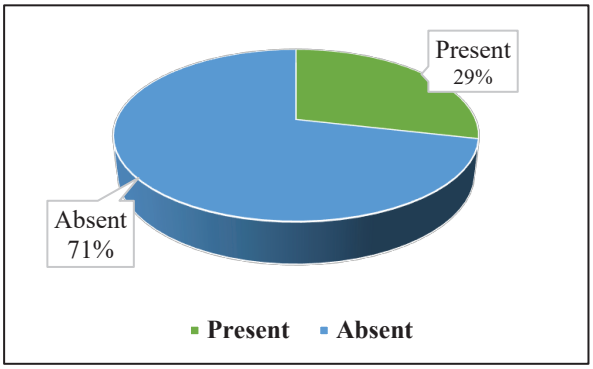

Fig 2. Pie chart showing the previous history of depression

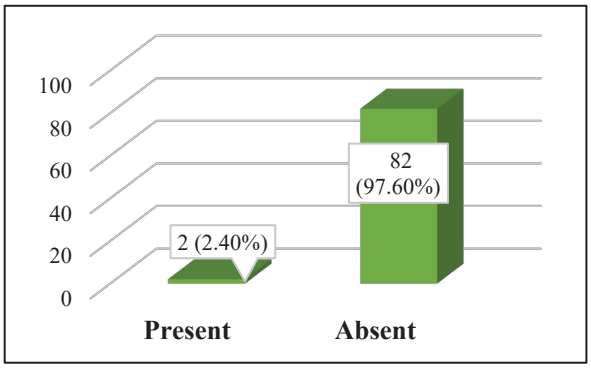

Fig 3. Bar diagram showing the family history of depression

Table 2: Montgomery Asberg Depression Rating Scale score at baseline, first follow-up (at 6 weeks), and second follow-up (at 12 weeks)

Montgomery Asberg Depression Rating Scale score	**Mean ± SD**	**P value**
Baseline score	21.74 ± 6.15	t =25.26
First follow up	17.57 ± 5.72	p <0.001
Second follow up	9.71± 5.22	

Table 3: Distribution of respondents by remission after 12 weeks of treatment (n=84)

Remission after 12 weeks of treatment	**Frequency**	**Percent (%)**
Remission occurred	49	58.30
Remission don't occurred	35	41.47
Total	84	100.00

Table 4: Adverse effects following treatment of the respondents (n=84)

Adverse effects	Present (%)	Absent (%)
Headache	49 (58.3%)	35 (41.7%)
Dizziness	55(65.5%)	29(34.5%)
Nausea	25(29.8%)	59(70.2%)
Weight gain	7(8.3%)	77(91.7%)
Sexual dysfunction	7(8.3%)	77(91.7%)
Diarrhea	1(1.2%)	83(98.8%)
Weakness	1(1.2%)	83(98.8%)
Restlessness	3(3. %)	81(96.4%)
Insomnia	9(10.7%)	75(89.3%)

Discussion

In this study, the majority of the patients were below 30 years of age. The mean age of the escitalopram-treated group was 30.90 (±10.34) with a range of 18-52 years. In a study in China reported that the mean age was 37.1 (±14.1) for the escitalopram-treated group & the minimum & maximum ages were 18 and 65 years respectively which was quite similar to the present study findings (3). In this study, more than half (57.1%) of the respondents were female. A study done by Huang (4) in 12 different countries found that females were 54.3% of escitalopram-treated group respondents, which was similar to our findings. This present study revealed that half (50%) of the respondents were married, just above two fifth (42.9%) were unmarried & some (7.1%) of them were divorced. In a study in Canada, exposure to depression doubled the proportion of transitions from married to separated or divorced status (5). In a study in Egypt found that 36.9% of married women had mild depression symptoms, and 1.9% had severe depression symptoms. The findings of these above-mentioned studies were not similar to our study findings (6).

In this study, among the respondents, nearly half (47.6%) were students, nearly 1/4th (27.4%) were housewives & only 13.1%, 4.8% & 7.1% were involved in business, services & other occupations respectively. A study in India revealed that the majority (41.2%) of college students were found to be suffering from moderate followed by mild (26.6%) depression. The findings were similar to this study (7). In this study among the participants, more than 2/5th (44 %) were graduates & above. An almost similar proportion was up to HSC (28.6%) & SSC (26.4%) & one (1.2%) had PSC level education. A study in Sweden reported that there was a significant change in the level of depressive symptoms over time: an increase from the first to later years in education and a decrease to levels similar to baseline after graduation and a year in the profession (8). The study findings were quite similar to our findings.

This present study revealed that among the participants more than 1/4th (28.6%) of respondents had a previous history of depression and only two (2.4%) of the respondents had a family history of depression. In a study in England reported that family history had a significantly earlier age of onset with the largest estimate for MDD onset before age 20 years (HR=2.2), whereas family history is not associated with MDD for onset after age 50 years (9).

This present study showed that among the

respondents, just above 1/3rd (34.5%) had a smoking history. In a study in Malaysia revealed that depression and anxiety were significantly associated with smoking (OR = 1.347) which is different from our study findings (10). This present study showed the mean (±SD) MADRS baseline score was (21.74±6.15), the 1st follow-up (after 6 weeks) visit revealed that the mean MADRS score (17.57 ± 5.72) and the second follow-up (after 12 weeks) visit was (9.71 ± 5.22). In India found that the mean MADRS score for escitalopram decreased on subsequent follow-up from the baseline of 32.08 and, was 24.11 after 1st week, 20.22 after 2nd week, 16.92 after the 4th week, 13.86 after 6th week & 11.24 at the end of 8th week which were quite similar with the present study findings (11).

A study in China revealed that the mean MADRS baseline score was (30.1±5.4) and the 2nd follow-up (after 8 weeks from baseline) score was (9.2±7.4) for those treated with escitalopram (3). The findings were quite similar to our study findings. The present study revealed that remission after 12 weeks of treatment occurred more frequently among the respondents (58.3%). In a study in China (3) reported that at the end of 8 weeks of treatment, the remission rate was 82% for the escitalopram-treated group which was quite different from the present study findings. Another study done by Patel et al revealed that at the end of 8 weeks of treatment, the remission rate for the escitalopram-treated group was 64.9%, which was quite similar to the present study findings (11).

Another study in North America reported that clinical remission, no remission, and loss of follow-up among the escitalopram respondents were 54.9%, 15.8%, and 29.3% respectively(4). The remission rate was almost similar to the present study findings, In Chinese study found that the remission rate for escitalopram monotherapy was 46.4%, after 7 weeks of treatment, which was quite similar to the present study findings (12).

In our study, dizziness, headache, nausea, weakness, weight gain, and insomnia were the most common side effects. Escitalopram side effects were reported in a study to be modest, and manageable, and no one has experienced any serious negative effects. Constipation and nausea were the most frequent adverse effects, followed by dry mouth, yawning, headaches, and palpitations12. These findings were consistent with the multicenter study of escitalopram in patients with depression in China as well as the present study findings. Mao found that most adverse events were mild to moderate in severity and transient. Nausea, dizziness, drowsiness, dry mouth, and headache were the adverse events with an incidence greater than 5% and which were not similar to the present study findings.

Therefore, this study showed advantages in efficacy and tolerability profiles. So, the present study might postulate that escitalopram could help to reduce the depressive symptoms of patients with Major Depressive Disorder (MDD) more effectively.

Conclusion

Major Depressive Disorder (MDD) is a disabling disorder associated with considerable comorbidities, risk of suicide & societal consequences. The study provided an overview of escitalopram, focusing on their efficacy & adverse effects in the management of MDD. In terms of efficacy, escitalopram was efficacious as it reduced more than 50% of the baseline score after 12 weeks of treatment. The remission rate was 58.3% after 12 weeks of treatment. Escitalopram also had high tolerability because adverse events related to escitalopram therapy were generally less. So, this study concluded that escitalopram could be used as an effective

and well-tolerant antidepressant drug for the treatment of major depressive disorder.

Source(s) of Support: Nil

Conflict of Interest: Nil

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ORIGINAL ARTICLE

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An empirical analysis of rape incidents in rural Bangladesh

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Abstract

Background: *A consistent body of evidence indicates that in the rural areas of Bangladesh, rape and sexual assaults are highly prevalent. Despite the severity of the problem, there has not been sufficient research focusing on the issue.* ***Objectives:*** *This study intended to examine the characteristics of rape incidents in rural Bangladesh and provides a statistical analysis based on some key demographics and associated factors, including age, marital status, types of rape, familiarity with the perpetrator, and delay in taking legal action.* ***Materials and Methods:*** *This cross-sectional study has been carried out using a quantitative research method. Data have been collected from 74 police reports filed during 2021 using a Simple Random Sampling method. Data analysis has been performed using MS Excel and SPSS.* ***Results:*** *The study showed that the more significant portion of the rape victims were aged between 10 and 19 years, while another 12% were between 1 and 9 years old. The female population aged below 20 are the most vulnerable group in terms of being subjected to rape, according to the finding of this study. Furthermore, most of the perpetrators of rape incidents in Bangladesh were known to the victims. Sexual assault was found to be the most common cause of rape incidents, followed by extra-marital rape and affair. The study also found that 73% of the rape incidents were single rape, while 27% were gang rape.* ***Conclusion:*** *The results shed light on the incidence and nature of rape occurrences in rural Bangladesh. However, the study has some limitations that should be considered when interpreting the findings. Despite these limitations, the study highlights the urgent need for preventive measures and legal actions against sexual violence. Preventing sexual assault and supporting its survivors requires concerted attempts at promoting gender parity and respect for women's rights.*

Keywords: *Rape, sexual violence, rural Bangladesh, victims, case filed, extra-marital rape*

Introduction

Rape is a form of sexual violence that violates a person's basic human rights, causes physical and psychological harm, and leads to long-term trauma (1). Bangladesh, like many other countries, faces a serious challenge in addressing this issue. Rape cases in Bangladesh have been increasing at an alarming rate, with many incidents occurring in rural areas. Bangladesh has made significant progress in many areas, such as health and education, but remains challenged in addressing gender-based violence, including rape (2). According to a 2020 report by Ain o Salish Kendra, a human rights organization, there were 975 reported rape cases in Bangladesh in the first nine months of 2020, an increase from the previous year (1). The actual number of rape cases is believed to be much higher, as many incidents go unreported due to social stigma, fear of retaliation, and lack of trust in the justice system (3). Despite the severity of the problem, there has been limited research conducted on the issue, particularly in rural Bangladesh, and considering this research gap the current study has been undertaken for being able to shed light on some critical elements associated with rape and sexual assault in the rural areas to gain a better understanding and open doors to more research regarding the issue and factors related to it.

While rape occurs in both cities and rural areas in Bangladesh, the problem is particularly acute in rural areas, where socio-economic conditions are often worse than in city and town areas (4). Women in rural areas are more likely to be victims of rape due to factors such as poverty, lack of education, and limited access to justice (3). Additionally, the patriarchal social structure prevalent in rural areas often normalizes violence against women and girls, contributing to a culture of impunity (5).

This study aims to provide a comprehensive empirical analysis of rape incidents in rural Bangladesh. The study will examine the occurrences of rape, including the nature of perpetrators, the difference between rape occurrence and filed cases, the use of drugs, and the type of rape. The findings of the study will contribute to the understanding of the problem of rape in rural areas and help inform policies and programs aimed at preventing and addressing this issue.

Materials and Methods

This cross-sectional research study has applied a quantitative data analysis approach to examine the characteristics of rape incidents in rural Bangladesh. The data was collected from 74 police reports in rural Bangladesh. These reports were collected from multiple police stations across rural areas in Bangladesh. The data was collected for a period of 1 year, during the year 2021. This study employed descriptive analysis to examine the characteristics of rape incidents. The data were analyzed using statistical software SPSS and MS Excel to generate frequency distributions, percentages, and other summary statistics. The variables used in this study include the victim's age, marital status, perpetrator's relationship with the victim, cause of rape, occurrence of rape, and case filed difference.

The study has been carried out using a Simple Random Sampling technique and police stations and profiles of victims have been chosen randomly.

Ethical clearance was obtained from the Forensic Medicine Department of Khulna Medical College (Ref. no. 7/23).

Results

The study indicates that the majority of the rape

victims (53%) were 10 to 19 years old while another 12% were 1 to 9 years old (Figure 1). This implies that females below 20 years of age are the most vulnerable groups in terms of being subjected to rape.

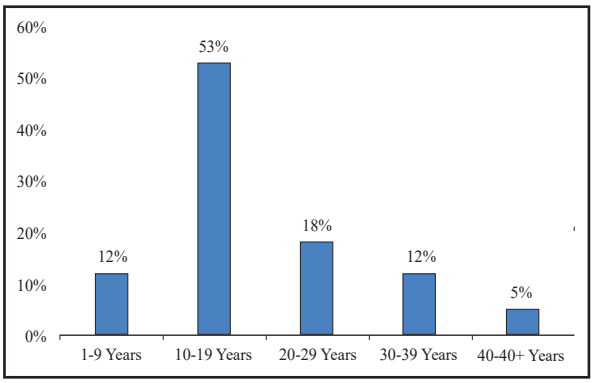


Fig 1. The age group of victims

The study shows that 62% of the rape victims were unmarried and 28% of them were married **(Figure 2).** The prior age group analysis suggests that most of the unmarried victims were children and teenage girls.

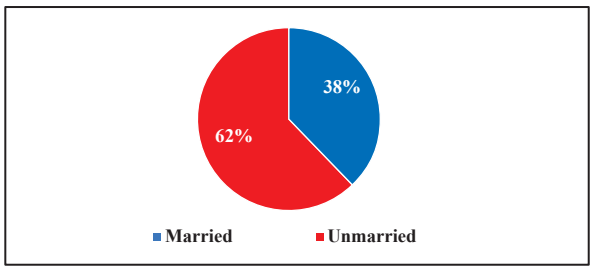


Fig 2. Marital status of the victims

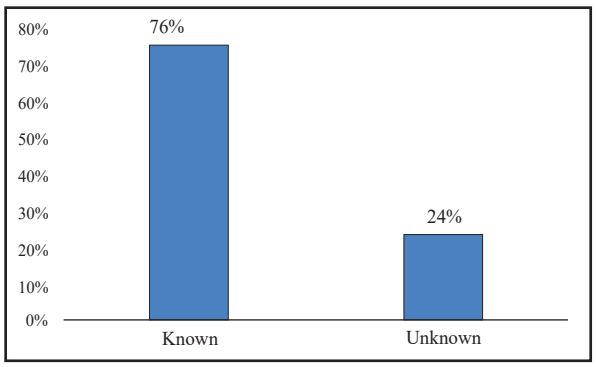


Fig 3. Familiarity with the perpetrator

According to the study the use of drugs in rape incidents in rural Bangladesh is limited. It shows that drug was used in only 16% of the cases while 84% of the incidents did not involve drug use **(Figure 4)**.

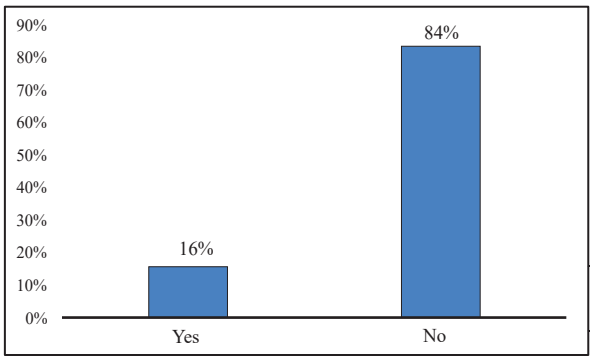


Fig 4. Use of drugs in rape incidents

The study shows that majority of the rape (66%) is caused by sexual assault followed by extramarital rape (18%) and affair (16%) **[Figure 5]**. This implies that sexual assault is the most common cause of rape in rural Bangladesh

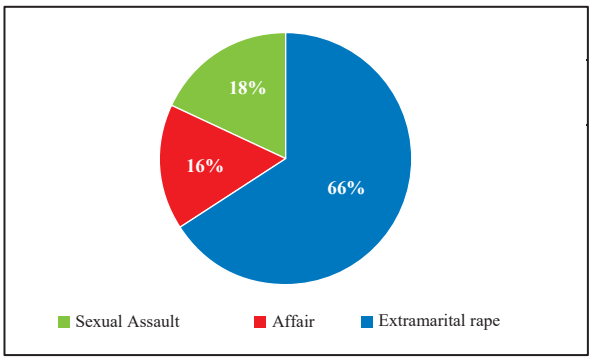


Fig 5. Causes of Rape

The study shows that most rape cases are filed on the same day the rape incident occurs. It shows that 92% of the cases are filed on the same day while the remaining 8% are filed in 1 to 7 days **(Figure 6).**

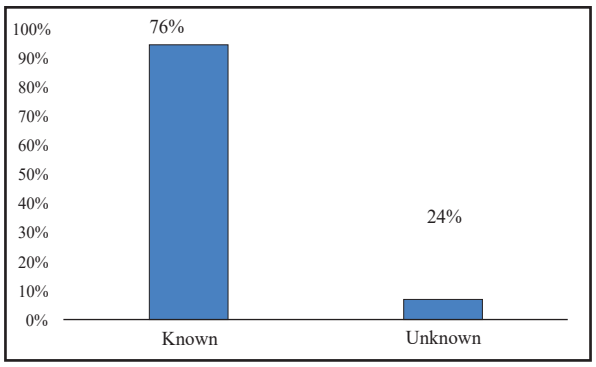
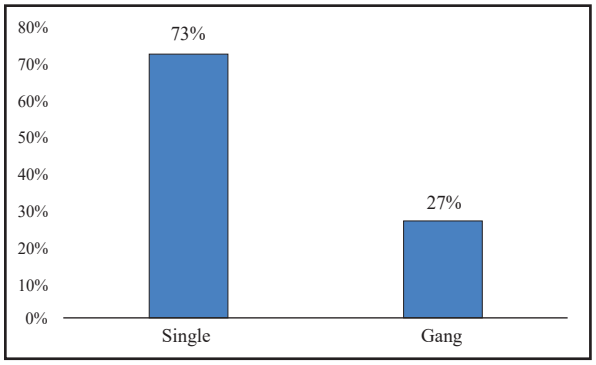


Fig 6. Pie chart showing the smoking history of the respondents

The study shows that the majority of the rape incidents were single rape in rural Bangladesh. According to the finding 73% of the rape incidents were single rape while 27% were gang rape **(Figure 7).**



Discussion

The empirical analysis of rape incidents in rural Bangladesh provides significant insight into the factors contributing to the occurrence of rape. The study finds that rape incidents in rural Bangladesh are often characterized by the victim's age, marital status, and the nature of the perpetrator. This study found that 53% of the rape victims are 10 to 19 years old while another 12% are 1 to 9 years old. One other study found that 67% of rape victims in rural Bangladesh are between the ages of 12 and 30 (6). Also, from this study, it has been found that 62% of the rape victims are unmarried and 28% of them are married. This implies that the female population under the age of 20 is the most vulnerable group in terms of being subjected to rape in rural Bangladesh. Child rape is a severe violation of human rights and can have severe physical and psychological consequences for the victim. This finding is consistent with the existing body of evidence (4, 5, 6). A study found that child abuse is a significant problem in Bangladesh, with girls being at a higher risk than boys. The study also found that a greater portion of child sexual abuse cases occurred in rural areas, where poverty, lack of education, and social norms contribute to the vulnerability of children (4). Another study reported that the majority of rape victims in rural Bangladesh are young girls and women. Moreover, a study found that child marriage, which is prevalent in rural areas in Bangladesh, puts girls at a higher risk of sexual violence, including rape (7). The report notes that child marriage can lead to early sexual activity, unwanted pregnancy, and sexually transmitted infections, increasing the risk of sexual violence. Furthermore, it is also reported that 47% of rape victims in rural Bangladesh are unmarried, and 42% are married (6). This suggests that both married and unmarried women are at risk of being raped in rural Bangladesh, indicating the need for targeted interventions to prevent rape and support survivors (8). The high incidence of child rape in rural Bangladesh highlights the need for greater awareness-raising and education programs targeted at parents, teachers, and caregivers, emphasizing the importance of protecting children from sexual violence.

This study found that the majority of perpetrators (76%) of rape occurrences in rural Bangladesh are known to the victim. A previous study reported that most of the perpetrators are relatives, neighbors, or

acquaintances of the victim (6). Similarly, another study found that perpetrators of sexual violence in Bangladesh are often known to the victim, with family members, neighbors, and employers being the most common perpetrators. The study noted that social norms, such as victim-blaming and the stigmatization of survivors, contribute to the prevalence of sexual violence in Bangladesh (7). This study highlights the need of addressing sexist attitudes and practices that propagate violence against women and girls as a root cause of rape in rural areas.

This study found that drug use is limited (in 16% of cases) in rape occurrences in rural areas of Bangladesh. This is because most of the victims are children and perpetrators use some kind of lure including food, chocolate, or other things to lure the children. However, a study found that drugs such as benzodiazepines and sedatives are commonly used in rape incidents in Bangladesh. The study also found that the use of drugs in rape incidents can lead to severe physical and psychological trauma for the victim, including memory loss, confusion, and disorientation (9). The use of drugs in rape incidents in rural Bangladesh underscores the need for targeted interventions to prevent drug abuse and support survivors of drug-facilitated sexual violence. This includes education and awareness-raising programs targeted at young people to prevent drug abuse, as well as training for law enforcement agencies and health care providers to recognize the signs of drug-facilitated sexual violence and provide appropriate support and services to survivors (5).

This study found that 66% of the rape occurrences in Bangladesh are caused by sexual assault along with affairs and extramarital rape being another two causes. The finding that the majority of rape incidents in rural Bangladesh are caused by sexual assault is consistent with previous research. Rape is the most prevalent type of sexual assault against women in Bangladesh, according to a previous study (6). Another study noted that sexual violence is often used as a tool of power and control over women and that the perpetrators of sexual violence are often known to the victim (9).

The finding of this study that 73% of the rape incidents are single rape while 27% are gang rape is consistent with the findings of these previous studies. A previous study also found that single rape was more prevalent than gang rape, with 70% of the rape incidents being committed by a single perpetrator (10). This suggests that single rape is a more common form of sexual violence in Bangladesh than gang rape.

This study found that most rape cases are filed on the same day the rape incident occurs. It shows that 92% of the cases are filed on the same day while the remaining 8% are filed in 1 to 7 days. However, rape incidents in rural Bangladesh are severely underreported, with many victims not seeking justice due to social stigma and fear of retaliation (11). A study found that only 47% of rape cases are reported to the police, highlighting the need for greater support and services for victims of rape in rural areas (12). Furthermore, another study found that only 26% of reported rape cases in rural Bangladesh result in convictions, indicating a significant gap in the response of law enforcement agencies to rape incidents in rural areas (13).

Conclusion

In conclusion, this research provides a thorough understanding of the types and characteristics of rape incidents in rural Bangladesh. The study shows that females below 20 years of age are the most vulnerable group in terms of being subjected to rape, and in most cases,

the perpetrators are known to the victim. The study also found that sexual assault is the most common cause of rape incidents, followed by extramarital rape and affair.

The study highlights the need for targeted interventions to prevent rape in rural areas and support survivors, including education and awareness-raising programs, community mobilization, and improved access to justice and support services. Furthermore, the study emphasizes the need to address the underlying social and cultural factors that contribute to rape in rural communities, including gender inequality and patriarchal attitudes and norms. By addressing these challenges, Bangladesh can take significant steps towards preventing and addressing rape in rural areas, ensuring the safety and security of its citizens, particularly women, and girls.

These findings underscore the urgent need for comprehensive interventions to address the underlying factors contributing to sexual violence in Bangladesh, including harmful social norms, gender inequality, and impunity for perpetrators. Such interventions should include education and awareness-raising programs targeted at individuals and communities, as well as improving access to justice and support services for survivors of sexual violence.

It is anticipated that the results of this research will help shed light on the prevalence and causes of rape in rural Bangladesh and that this knowledge will be used to create more effective strategies for preventing and responding to this kind of violence. Ultimately, reducing the prevalence of sexual violence in Bangladesh will require sustained efforts from all stakeholders, including the government, civil society organizations, and communities, to promote gender equality and ensure the safety and security of all individuals, particularly women, and girls.

This study has some limitations. Firstly, the data were collected from police reports, which may not accurately reflect the actual prevalence of rape incidents in rural Bangladesh. There may be cases of rape that go unreported to the police. Secondly, the study only focuses on rape incidents in rural areas of Bangladesh, and the findings may not be generalizable to urban areas. Finally, due to the nature of the secondary data analysis, some relevant variables may not have been included in the analysis. Hence, this study recommends further research with primary data to explore the issue in detail.

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Magnesium and Calcium status in Autistic Spectrum Disorders (ASD): A case-control study on Bangladeshi children

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Abstract

Background: *The neurodevelopmental anomaly known as an autism spectrum disorder (ASD) is frequently seen in youngsters and is linked to mineral deficiencies and mitochondrial dysfunction. Iron insufficiency is linked to aberrant behaviour, while Mg2+ and Ca2+ deficiencies are linked to neural excitability. Additionally, it has been shown that ASD has a different lipid profile, which may result from mitochondrial malfunction.* ***Objectives:*** *The study was done to determine serum magnesium and calcium in ASD male children.* ***Materials and Methods:*** *This cross-sectional study was conducted in the Department of Physiology, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka, from March 2014 to January 2015. For this study, 100 male children aged 3-8 years were randomly selected, among which 50 were healthy (control group), and 50 were diagnosed patients with ASD (study group). Independent sample 't-test and proportion (Z) test were used for statistical analysis. P-value <0.05 was accepted as significant.* ***Results:*** *The mean serum magnesium and calcium levels were significantly lower (p<0.001) in cases as compared to controls. Again, the frequency (%) of hypomagnesemia and hypocalcemia were significantly higher in male autistic children.* ***Conclusion:*** *From the results, it may be concluded that there is the presence of hypomagnesemia, hypocalcemia in boys with ASD.*

Keywords: *Autistic spectrum disorder, ASD, hypomagnesemia, hypocalcemia.*

Introduction

According to Manzi et al. (2008) (1), autism is a behaviorally defined syndrome marked by severe social interaction deficits, impairment in verbal and nonverbal communication, and stereotypical patterns of interests and activities. The American Psychiatric Association said behavioral, developmental, neuropathological, and sensory problems are linked to autism (2). Autism is typically diagnosed between the ages of 2 and 10, with the greatest prevalence occurring between the ages of 5 and 8. Autism Spectrum diseases (ASD) are prevalent developmental diseases (3).

Autism is currently a social issue in Bangladesh. About 10.5 million people in Bangladesh may have autism spectrum condition, according to Rahman (2006). Deficits in communication, aberrant social interaction, and limiting or repetitive interests and activities are the three main symptomatic categories of autistic disorders (4).

A strong gender bias exists in autism, with boys diagnosed with the disorder around four times more frequently than girls (5). The increased male-to-female ratio has been noticed, and oxidative stress may play a significant role. Prepubescent girls have an 8-fold higher amount of estrogen than prepubescent boys (6), even though testosterone levels in prepubertal boys and girls are comparable (7). Due to estrogens, super-oxide dismutase (SOD), reduced glutathione, and glutathione peroxidase levels are higher in females. Superoxide dismutase and glutathione peroxidase are two antioxidant enzymes expressing genes more frequently when estrogens are present. Females are less susceptible to oxidative stress than males because their mitochondria produce fewer reactive oxygen species (8).

Environmental and dietary factors significantly impact autism spectrum disorders, which are complex illnesses (9). According to several studies, autistic children had considerably decreased blood levels of certain nutrients such as calcium, magnesium, and iron, which could be caused by dietary deficiencies (9, 10).

Materials and Methods

Type of the study

Case-control study.

Place of the study

Department of Physiology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Shahbag, Dhaka-1000, Bangladesh

Period of the study

From March 2014 to January 2015

Ethical Clearance

Protocol was approved by Institutional Review Board, BSMMU, Shahbag, Dhaka

Sample size

A total of 100 male children aged 3-8 years were enrolled in this study.

Sampling technique

Simple random sampling

Study population

Autistic spectrum disordered children and healthy children were enrolled in this study.

Grouping of the subjects

After selecting the subjects, they were divided into 2 groups:

- Control group (group A): Consist of 50 healthy male children 3-8 years of age.

- Study group (group B): Consist of 50 autistic spectrum disordered male children 3-8 years of age.

Selection and enrollment of study subjects

Subjects were enrolled for this study according to the following selection criteria.

Inclusion criteria

- Autistic male children aged 3-8 years were selected for this study.
- Diagnosis of autistic spectrum disorder (ASD) was done by a pediatric neurologist.
- healthy subjects who were similar to autistic spectrum disorder (ASD) patients in respect of age, height, weight, BMI, and sex were included as a control.

Exclusion criteria

All subjects were screened (by history taking) for conditions like

- Children with epilepsy
- Children with Turner syndrome
- Children with Down syndrome
- Children who take any medication

Site of sample collection

The study group was selected from the Parents Forum (DOHS, Mohakhali) for autistic children and the control group was selected from some schools for normal children.

Study procedure

After the selection of the subject, thorough information was given to their parents about the objective and study procedure. Their parents were encouraged for the voluntary participation of their children. The parents were also allowed the freedom to withdraw their children from the study even after participation whenever they feel like it. When their parents agreed to participate then informed written consent was obtained from their parents. Then the parents of the subject were requested to attend the Department of Physiology of BSMMU, Dhaka on the day of the examination. Detailed personal, medical, family, socioeconomic, occupational, and dietary histories of the children were recorded in a data schedule from their parents. A thorough physical examination of the subjects was done. Anthropometric measurements including height and weight were taken and documented in a data schedule. Then 5 ml of venous blood was collected from the antecubital vein from each subject of both groups for estimation of the biochemical test.

Collection of blood samples

With all aseptic precautions, 5 ml of venous blood was drawn from the antecubital vein by a disposable plastic syringe and was transferred into a dry, clean test tube with a gentle push after removing the needle, to avoid hemolysis. The test tube was kept in a slanting position till the formation of a clot. After centrifuging the clotted blood (at 3000 rpm for 10 minutes) the serum was separated. Then 3 ml of serum was taken from the test tube into an Eppendorf tube and preserved in the refrigerator at - 4˚c in the laboratory. The serum level of magnesium (Mg^{2+}), and calcium (Ca^{2+}) were measured in the laboratory of the Department of Biochemistry, BSMMU.

Data analysis plan

Data were expressed in mean SE and also in percentage. Statistical analysis was done by using SPSS for Windows version 16. Independent sample ‘t-tests and ‘Z’ proportion tests were used as the tests of significance as applicable. $p\text{-value}<0.05$ was accepted as significant.

Results

General characteristics of the subjects:

Among 100 male children enrolled in this study, the mean (±SE) ages were 6.02±0.21 and 5.93±0.27 in groups A and B respectively (Table 1). The mean (±SE) BMI in group A and group B were 16.90±0.73 and 17.25± 0.14 respectively. The age difference between the two groups was not significant (p=0.94). The difference in BMI between the groups was not significant also (p=0.29).

Table 1: Age and BMI in two groups (n=100)

Group	n	Age (Year)	p-value Age	BMI (kg/m^2)	p-value BMI
A	50	6.02± 0.21* (3-8) **	0.94	16.90±0.73* (14-19) **	0.29
B	50	5.93±0.22* (3-8) **		17.25± 0.14* (16-20) **	

***Data are expressed as Mean ± SE.**
****Figures in parentheses indicate ranges.**

Serum levels of the minerals measured:

The serum level of two minerals was measured in the study population. The data are arranged separately in the following segments.

Mean serum Magnesium (Mg2+) level –

The mean (± SE) serum Mg2+ levels were 2.13±0.02 mg/dl and 1.90±0.03 mg/dl in groups A and B respectively (Table 2). In this study, serum Mg2+ levels were significantly lower in the study group in comparison to the control group (p value<0.001) **(Table 2).**

Mean serum calcium (Ca2+) level –

The mean (± SE) serum Ca2+ levels were 9.32±0.06 mg/dl and 8.86±0.05 mg/dl in groups A and B respectively (Table 2). In this study, serum Ca2+ levels were significantly lower in the study group in comparison to the control group (p value< 0.001) **(Table 2).**

Table 2: Serum magnesium (Mg++), and calcium (Ca++) levels in two groups (n = 100)

Group	n	Mg^{++} (mg/dl)	p-value	Ca^{++} (mg/dl)	p-value
			0.000***		0.000***
A	50	2.13 ± .02 (1.9-2.6)		9.32 ± .06 (8.7-10.40)	
B	50	1.90 ± .03 (1.6-2.4)		8.86 ± .05 (8.2-9.2)	

***Data are expressed as Mean ± SE.**
****Figures in parentheses indicate ranges.**

Discussion

The present study was undertaken to observe some biochemical variables in male children with autistic spectrum disorder to evaluate the nutritional deficiency by estimating serum magnesium (Mg2+), and calcium (Ca2+). All these variables were also studied in apparently healthy age, height, weight, and BMI-matched male children for comparison. In this study, the mean values of all the biochemical variables of normal children were within physiological limits and were almost similar to those reported by different investigators (11, 12, 13, 14, 15).

Both the groups (controls and cases) were comparable, as there were no significant differences in the confounding variables such as age, height, weight, and BMI between the two groups. The mean values of Mg2+ and Ca2+ were below the lower limit of the normal range.

Serum Mg2+:

In this present study, serum Mg2+ was significantly lower in the study group than in the of control group. Almost similar findings were observed by Strambi et al. (16); Bradstreet et al. (17) and Adams et al. (18). In addition, serum Mg2+ level was found abnormally low in 52% of children in the study group and 4% of children in the control, which was statistically significant. Similarly, Kozielec and Hermelin (1997) observed that 33.6% of autistic children had Mg2+ deficiency (16, 17, 18, 19).

Serum Ca2+:

In this present study, serum Ca2+ was significantly lower in the study group than in the control group. Almost similar findings were observed by Yasuda et al., Meguid et al., and Sun et al. (20, 21, 22).

In addition, serum Ca2+ level was found abnormally low in 74% of children in the study group and 6% of children in the control, which was statistically significant. Similarly, Yasuda et al. (20) observed that 5.8% of autistic children had Ca2+ deficiency.

Conclusion

Based on the findings of this study, it is possible to assume that boys with autism spectrum disorder have low levels of magnesium and calcium.

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CASE REPORT

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Luteoma of pregnancy: A rare case report

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Abstract

An uncommon non-neoplastic ovarian tumor is pregnancy luteoma. It develops during pregnancy and is unintentionally found during surgery. To prevent unnecessary surgery, luteoma of pregnancy must be accurately diagnosed because it might mimic other ovarian cancers. Postpartum luteoma spontaneously regresses. We show a 33-year-old woman who is pregnant and had a cesarean section. A sub-serosal fibroid-like tumor was accidentally found during the procedure, removed, and sent for histopathological analysis. A microscopic investigation revealed luteoma during pregnancy characteristics. The prevention of needless oophorectomy, which carries risk for both the mother and the fetus, depends on identifying this entity.

Keywords: *Luteoma, cesarean section, ovary*

Introduction

In 1963, Sternberg published the first description of pregnancy luteoma, a rare hormone-dependent hyperplastic tumor-like lesion of the ovary (1). Luteomas are frequently asymptomatic. During the patient's cesarean section procedure, it is unintentionally discovered. Within a few weeks following delivery, most of these instances are fully resolved (2). A precise diagnosis of luteoma during pregnancy, which mimics ovarian cancer, is crucial to avoiding unnecessary surgery.

Case Report

The present case report concerns a 33-year-old full-term pregnant woman admitted to the obstetrics ward. The patient underwent a cesarean section. A male boy was delivered uneventfully. Intraoperatively, surgeons found the right-sided ovarian mass. The specimen was submitted for histopathological examination in 10% formalin. The macroscopic study showed an ovarian cyst measuring 4x3x1cm. Microscopically, sections from the right ovarian mass revealed a lesion composed of diffuse groups of cells arranged in sheets, nests, and cords (Figure 1). The cells were polygonal in shape and had an abundant amount of finely granular eosinophilic cytoplasm. Nuclei were small, round, and vesicular with prominent nucleoli. Occasional mitotic figures, areas of necrosis, and focal regions of haemorrhage were noted. Based on the clinical and histopathological findings, a diagnosis of pregnancy luteoma was made.

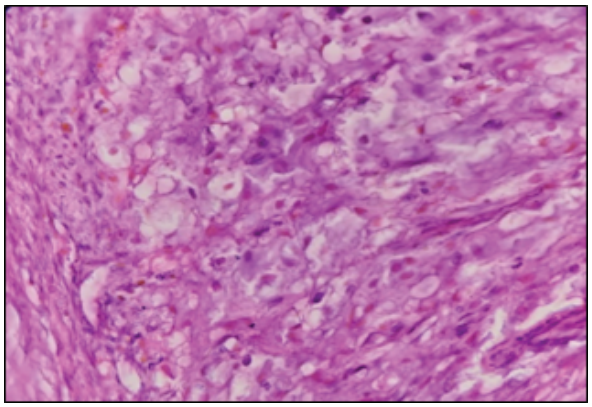

Fig 1. Hematoxylin-eosin 40x view

Discussion

The benign tumors known as pregnant luteomas are made up of lutein-like cells and can range from microscopic to more than 20 cm in circumference (3). Large luteomas can occasionally cause torsion, which causes excruciating abdominal agony. Luteomas have hard, soft, brown, or flesh-coloured surfaces that exhibit hemorrhagic foci when they are sliced open. Under the microscope, luteomas are seen as sharply defined nodules of polygonal cells arranged in sheets, cords, or microscopic clusters. They can also resemble follicles that contain material that resembles colloid. The cytoplasm of eosinophils is extensively dispersed and coarsely granular. The nuclei might have a slight pleomorphic component.

Pregnant luteomas can also be diagnosed as stromal hyperthecosis, granulosa cell tumors, thecomas, Sertoli Leydig cell tumors, pure Leydig (hilar) cell tumors, and hyperreactive luteomas (4). Due to the solid nature of the mass, luteomas cannot be distinguished from other solid ovarian neoplasms like luteinised thecoma, granulosa cell tumor, or Leydig cell tumor purely based on imaging characteristics. Malignant ovarian neoplasms in pregnant

women are uncommon.

Observation of an adnexal lesion compatible with a luteoma in the short-term postpartum period could be considered in the appropriate clinical setting because luteomas spontaneously regress following the reduced chorionic gonadotropin after delivery. At two to three weeks after delivery, ovaries and serum testosterone typically reach their pre-pregnancy sizes and levels. Pregnancy luteoma is an uncommon benign tumor that frequently develops during pregnancy and looks like ovarian cancer (5). About a few weeks after delivery, it resolves spontaneously as blood testosterone levels drop quickly and return to normal about two weeks postpartum (6). The size of the ovarian lesion varies, ranging from microscopic to 20 cm in diameter (5). Torsion caused by large luteomas can also result in symptoms like stomach pain (2). On cut sections, these lesions are well-circumscribed, solid, soft, and yellow to tan in colour, with dark hemorrhagic foci. Pregnancy luteomas are well-defined nodules composed of polygonal cells grouped in sheets, cords, tiny clusters, or follicular patterns containing material that resembles colloid. Individual cells exhibit an abundance of tiny granular cytoplasm that is eosinophilic and slightly pleomorphic.

During the third trimester of pregnancy, maternal circulating testosterone levels increase up to 7 times the normal range, and this physiological condition does not cause virilisation. In the case of pregnancy luteomas, virilisation may be seen, but the patient did not show virilisation in our case. So, hormone studies still need to be done.

Conclusion

During pregnancy, the hormonal environment changes, leading to increased testosterone. Because luteoma typically goes away on its own in the postpartum period, treatment for the condition during pregnancy should be conservative. Surgery is only performed on symptomatic or malignant patients, making it less necessary. Every adnexal lump should get a careful assessment, including tumor markers, ultrasonography, and hormone tests during pregnancy. It is essential to distinguish between a luteoma of pregnancy and a malignancy before deciding. Early luteoma detection is necessary to stop a female fetus from being virilised while the mother is pregnant.

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Conflict of Interest: Nil

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