

ISSN: 1991-7449/ eISSN: 2382-5162  
Volume 25 | Number 1 | Jan-Mar 2025

# PMJN

Postgraduate Medical Journal of NAMS

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PMJN is an official publication of the National Academy of Medical Sciences and is published quarterly.

# PMJN

Postgraduate Medical Journal of NAMS

Is published and distributed by

**National Academy of Medical Sciences**

Bir Hospital, Kathmandu, Nepal

P.O.Box: 13606

Tel. +977-1- 5970750

email: pmjn@nams.org.np

Website: pmjn.org.np

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# Benign Prostatic Hyperplasia among Patients with Inguinal Hernia: A Descriptive Cross-sectional Study

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## ABSTRACT

**Introduction:** Benign prostatic hyperplasia refers to the non-cancerous enlargement of the smooth muscle and epithelial cells within the prostatic gland transition zone in aging males, leading to the enlargement of the gland. Benign prostatic hyperplasia is common in the aging male population. The coexistence of inguinal hernia and lower urinary tract symptoms due to benign prostatic hyperplasia is common. The objective of this study was to find out the prevalence of benign prostatic hyperplasia among patients with inguinal hernia in a tertiary care centre.

**Methods:** A descriptive cross-sectional study was done among patients with inguinal hernia between 14 April 2023 to 13 April 2024 in a tertiary care centre after obtaining ethical approval from the Institutional Review Board. Male patients aged >50 years with a clinical diagnosis of inguinal hernia were included in the study. Patients who had any form of surgery for benign prostatic hyperplasia in the past, diagnosed cases of bladder outlet obstruction due to causes other than benign prostatic hyperplasia, diagnosed cases of prostate carcinoma, patients with femoral or other abdominal wall hernia, and recurrent hernia were excluded from the study. Convenience sampling technique was used. Point estimate and 95% confidence interval were calculated for binary data.

**Results:** Among 185 patients with inguinal hernia, 61 (32.97%) (26.20-39.75, 95% Confidence Interval) had benign prostatic hyperplasia. Among total inguinal hernia patients, 8 (4.32%) patients were asymptomatic, 116 (62.70%) were mildly symptomatic, 42 (22.70%) were moderately symptomatic, and 19 (10.3%) were severely symptomatic. In this study, 99 (53.5%) had a prostate volume of more than 20 cm<sup>3</sup> and 86 (46.5%) had a prostate volume of less than 20 cm<sup>3</sup>.

**Conclusions:** The study concluded a similar prevalence of benign prostatic hyperplasia as per the International Prostate Symptom Score questionnaire among patients with inguinal hernia, as in other studies, and higher if defined as per radiological volume measurement.

**Keywords:** *hernia, inguinal, lower urinary tract symptoms, prostatic hyperplasia.*

## INTRODUCTION

Inguinal hernias (IH) are common surgical issues, with a lifetime risk of 25% in men and 5% in women.<sup>1</sup> They are more frequent in men, and the risk increases with age.

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The cumulative prevalence in men grows from 5% in those aged 25-34 years to 45% in men over 75.<sup>2</sup> Risk factors for IH include male sex, older age, chronic cough, low BMI, smoking, and occupational exposure.<sup>3</sup>

Benign prostatic hyperplasia (BPH), a non-cancerous prostate enlargement, is common in aging men and leads to lower urinary tract symptoms (LUTS).<sup>4</sup> BPH can contribute to bladder outlet obstruction, increasing the risk of inguinal hernia due to chronic straining.<sup>5</sup> The coexistence of IH and BPH is frequent, especially in elderly men, and may be related to age.<sup>6</sup>

# Benign Prostatic Hyperplasia among Patients with Inguinal Hernia: A Descriptive Cross-sectional Study

This study aimed to find out the prevalence of benign enlargement of the prostate among patients with inguinal hernia in a tertiary care centre.

## METHODS

This is a descriptive cross-sectional study done from 14 April 2023 to 13 April 2024 in the Department of General Surgery, National Academy of Health Sciences (NAMS), Bir Hospital, Mahabouddha, Kathmandu, Nepal after obtaining ethical approval from the Institutional Review Board (IRB) (Reference number: 873/2079/80) of NAMS, Bir Hospital on 13 April 2023. Male patients aged >50 years of age and with a clinical diagnosis of inguinal hernia were included in the study. Patients who had any form of surgery for BPH in the past, were diagnosed with bladder outlet obstruction (BOO) due to any causes other than BPH, diagnosed with prostate carcinoma, patients with femoral and other abdominal wall hernia, and having recurrent hernia were excluded from the study. Convenience sampling method was used for data collection. The sample size was calculated as follows:

Sample size calculation:

$$n = Z^2 \times p \times q / e^2$$

$$n = 1.96^2 \times 0.139 \times 0.861 / (0.05)^2$$

$$= 184$$

Where,

n= minimum required sample size

Z= 1.96 at 95% Confidence Interval (CI)

p= prevalence of 13.9%, taken from a similar study in the past<sup>3</sup>

q= 1-p

e= margin of error, 5%

Thus, the sample size was calculated to be 184. However, the final sample size taken was 185.

A predesigned proforma was used to collect samples. International Prostate Symptom Score (IPSS) was used to determine the severity of BPH.<sup>7</sup> Radiological prostate volume is also used to assess the BPH among Patients.<sup>8</sup> Data obtained was entered in Microsoft Excel 2016 and analyzed using IBM SPSS Statistics version 26.0. Point estimate and 95% Confidence Interval were calculated.

## RESULTS

Among 185 patients with inguinal hernia, 61 (32.97%) (26.20-39.75, 95% CI) had benign prostatic hyperplasia. Among total inguinal hernia patients, 8 (4.32%) patients were asymptomatic, 116 (62.70%) were mildly symptomatic, 42 (22.70%) were moderately symptomatic, and 19 (10.3%) were severely symptomatic (Table 1).

**Table 1. Severity of benign prostatic hyperplasia (n= 185).**

IPSS severity	n (%)
Asymptomatic	8 (4.32)
Mild	116 (62.70)
Moderate	42 (22.70)
Severe	19 (10.27)

For this study, a prostate volume of  $\leq 20$  cm<sup>3</sup> is considered normal, and a volume of  $>20$  cm<sup>3</sup> is taken as having radiological prostatomegaly (and as BPH). So, according to the prostate volume category, 99 (53.51%) patients had BPH while 86 (46.49%) patients did not have BPH.

**Table 2. BPH as per radiological prostate volume (n= 99).**

Age group (years)	n (%)
50-59	49 (49.49)
60-69	28 (28.28)
70-79	13 (13.13)
80-89	7 (7.07)
90 and above	2 (2.02)

## DISCUSSION

Overall, 32.39% of inguinal hernia patients have BPH, and radiologically, 53.51% had prostate volumes over 20 cm<sup>3</sup>. Patients in this study were categorized by IPSS score, with 4.32% of patients being asymptomatic, 62.70% being mildly symptomatic, 22.70% being moderately symptomatic, and 10.3% being severely symptomatic.

Comparisons with other studies revealed variations. Reis et al. reported a higher prevalence of BPH (87.5%) in patients with inguinal hernia,<sup>9</sup> while Parthiban SS et al. found similar clinical BPH prevalence (34%) but lower radiological BPH (31%).<sup>10</sup> A Turkish study by Senturk et al. showed no significant relationship between BPH and inguinal hernia subtypes, with higher IPSS scores and prostate volumes than in this study.<sup>6</sup> Differences may stem from varying criteria and study designs. When comparing this study with population-based studies on BPH prevalence, the Baltimore Longitudinal Study reported a median age of 58 years and a median prostate size of 28 cc, while this study found a median age of 60 years and a median prostate size of 21 cc, with a mean of 28.1 cc.<sup>11</sup> Garraway et al. identified a BPH prevalence of 25.3% in men aged 40-79 years in Scotland, using transrectal ultrasonography.<sup>12</sup> In another study by Mor et al., the incidence of prostatomegaly was 41% in men over 50, with clinical BPH prevalence based on IPSS severity at 66%, comprising 34% asymptomatic, 32% moderate, and 34% severe cases.<sup>13</sup>

## Benign Prostatic Hyperplasia among Patients with Inguinal Hernia: A Descriptive Cross-sectional Study

A 2020 study by Wu Y-H et al. in Taiwan followed 22,310 men with LUTS-BPH and 22,310 without, finding that men with LUTS-BPH had a two-fold increased risk of developing inguinal hernia (IH) over 10 years (HR: 2.25).<sup>14</sup> Sanchez-Ortiz et al. (2016) analyzed 693 patients undergoing radical prostatectomy, noting that men with an IPSS  $\geq 15$  had a fivefold increased risk of hernia, with 22.4% requiring repair.<sup>15</sup> A 2014 Chinese meta-analysis found a BPH prevalence of 36.6% in men aged 40+, while this study found a 33% overall prevalence, showing similar trends, but with no clear increase with age, likely due to a smaller sample size.<sup>16</sup> Iranian studies also report varying prevalence rates.<sup>17</sup> One explanation for the large variation in the reported prevalence is the lack of consensus on the definition and diagnostic criteria of clinical BPH in different studies.

This study is a single-centre based study, the patients were not randomly selected, instead, convenience sampling was done. The clinical criteria used to diagnose BPH (e.g., IPSS scores) may not capture all cases accurately, and moreover response bias on the side of the participant could affect the validity of prevalence estimates. Due to

resource limitations and ethical issues, transabdominal USG as a measure of prostate volume was used, which is not the standard of care. The study is cross sectional in nature, a longitudinal study would help find BPH incidence over time or provide information about the progression of the condition. Various confounding variables, such as family history or lifestyle factors, may have influenced the observed prevalence. Future studies should explore the progression of BPH in hernia patients and identify risk factors for its co-occurrence.

### CONCLUSIONS

The study concluded a similar prevalence of benign prostatic hyperplasia among patients with inguinal hernia, as in other studies. Clinical screening with the IPSS questionnaire aids in the early detection of BPH, preventing complications like postoperative urinary retention in inguinal hernia patients. The coexistence of BPH and inguinal hernia may influence treatment decisions, and addressing both in the same surgery can reduce costs.

**Conflict of Interest: None.**

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# Bacterial Vaginosis among Infertile Women: A Descriptive Cross-Sectional Study

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## ABSTRACT

**Introduction:** Bacterial vaginosis is the commonest vaginal infection. Evidence has shown a relationship between bacterial vaginosis and infertility. The objective of this study was to determine the prevalence of bacterial vaginosis among infertile women attending the infertility clinic.

**Methods:** This was a descriptive cross-sectional study conducted from 20 May 2018 to 19 May 2019 in a tertiary care centre after obtaining ethical approval from the Institutional Review Committee. Patients who had used antibiotics, vaginal creams/ pessaries in the last two weeks, women with genitourinary malignancy, menstruating at the time of sample collection, women with vaginal agenesis/atresia, and history of sexual intercourse 24 hours before the test were excluded from the study. Convenience sampling method was used. Point estimate and 95% Confidence Interval were calculated.

**Results:** Among 240 patients, bacterial vaginosis was found in 98 (40.83%) (34.61-47.05, 95% Confidence Interval) patients. Symptomatic bacterial vaginosis positive cases were 42 (42.86%), whereas asymptomatic cases were 56 (57.14%). Clue cells were present in 68 (69.39%) and absent in 30 (30.61%) in bacterial vaginosis positive cases.

**Conclusions:** Bacterial vaginosis was more prevalent in the women presenting to the infertility clinic and higher prevalence was noted in women of low socio-economic status.

**Keywords:** *bacterial vaginosis, hysterosalpingography, infertility, literacy.*

## INTRODUCTION

Infertility is a disorder of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more despite regular unprotected sexual intercourse.<sup>1</sup> Bacterial Vaginosis (BV) may lead to tubal factor infertility.<sup>2,3</sup>

The prevalence of bacterial vaginosis in some tertiary care centers in the general Nepalese female population

was found to be around 22-25%.<sup>4,5</sup> Studies done around the world have stated that the prevalence of bacterial vaginosis is higher in the infertile female population (28-75%).<sup>3</sup>

This study aims to identify the prevalence of bacterial vaginosis among infertile women attending an infertility clinic in the tertiary care center.

## METHODS

This is a descriptive cross-sectional study done among women attending the Infertility Clinic of the Department of Obstetrics and Gynecology, Tribhuvan University Teaching Hospital (TUTH), Maharajgunj, Kathmandu, Nepal from 20 May 2018 to 19 May 2019. The study was carried out after obtaining Institutional Review Committee (IRC) approval of TUTH (Reference number: 377(6-11-E)2/ 074/075 on 18 May 2018). All infertile women attending the infertility

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clinic of TUTH during the study period were included in the study. Exclusion criteria were patients who had used antibiotics in the last two weeks, used vaginal creams/ pessaries in the last two weeks, woman with genitourinary malignancy, menstruating at the time of sample collection, woman with vaginal agenesis/atresia, and history of sexual intercourse 24 hours before the test. The convenience sampling method was used. Sample size calculation was done using the following formula:

$$n = Z^2 \times p \times q / e^2$$

$$n = 1.96 \times 1.96 \times 0.5 \times 0.5 / (0.07)^2$$

$$= 196$$

Where,

n = minimum required sample size

Z = 1.96 at 95% Confidence Interval (CI)

p = prevalence taken as 50% for maximum sample size calculation

q=1-p

e= margin of error, 7 %

The calculated sample size was 196. However, we have taken 240 patients for the study.

Informed consent was obtained from women meeting the inclusion criteria after explaining the test. A detailed history was taken. The demographic and clinical details, diagnosis, and investigation results were filled on a proforma by an independent student working in the department. Non-lubricated sterile Cusco's bi-valved speculum was inserted into vagina of the woman after keeping her in dorsal position. Presence or absence of vaginal discharge and type of discharge was noted. Three high vaginal swabs were taken from lateral and posterior fornix simultaneously. The first swab was smeared directly on the litmus paper kept on the glass slide, and the color change was assessed, which was then compared with the indicator given in the pack, and thus, pH was noted. With the second swab, a smear was made on a glass slide, and a drop of 10% KOH was added to it (Whiff test). The fishy odor was noted. A third swab was rotated in the posterior and lateral fornices and then was sent to the microbiology lab on the same day after the sample was smeared on the slide, air dried, and fixed in 95% ethyl alcohol for detection of clue cells. Amsel's criteria was used for the diagnosis of bacterial vaginosis.<sup>6</sup> Positive cases were correlated with tubal factor findings of HSG done on a regular basis in all infertile women between days 6-10 of the cycle.

Data was entered into Microsoft Excel and statistically analyzed

using IBM SPSS Statistics version 22.0. Point estimate and Confidence interval were calculated for binary data.

## RESULTS

Among 240 cases, 98 (40.83%) (34.61-47.05, 95% Confidence Interval) cases were diagnosed to have bacterial vaginosis. A total of 30 (30.61%) patients with BV were above the age of 30 years. (Table 1).

**Table 1. The demographics of the patients with bacterial vaginosis (n= 98).**

Variables		n (%)
Age group (years)	20-24	20 (20.41)
	25-29	18 (18.37)
	30-34	30 (30.61)
	>35	30 (30.61)
Education	Literate	56 (57.14)
	Illiterate	42 (42.86)
Social status	Upper	14 (14.29)
	Middle	74 (75.51)
	Lower	10 (10.20)
Marital status	Married	98 (40.83)

All the patients in our study were married. Out of the 142 literate patients in our study, 56 (57.14%) patients had BV, while out of the 98 illiterate patients, 42 (42.86%) patients had BV. Out of the 12 patients from a lower socioeconomic class, 10 (83.33%) patients had bacterial vaginosis. There was normal HSG in 88 (89.80%) cases with BV present. Cases with BV accounted for 98 (40.83%) cases of infertility both primary and secondary (Table 2).

**Table 2. Various clinical factors of patients with bacterial vaginosis (n= 98).**

Variables		n (%)
Types of infertility	Primary	74 (75.51)
	Secondary	24 (24.49)
pH	Normal	88 (89.80)
	Abnormal	10 (10.20)
	Acidic	88 (89.80)
	Basic	10 (10.20)

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<b>Symptoms like itching, discharge, fishy vaginal odour</b>	Yes	42 (42.86)
	No	56 (57.14)
<b>Whiff test</b>	Positive	90 (91.84)
	Negative	8 (8.16)
<b>Clue cells</b>	Yes	68 (69.39)
	No	30 (30.61)

### DISCUSSION

In this study, 40.83% cases were diagnosed to have bacterial vaginosis. In previous studies in Nepal, the prevalence of BV was 22-25%.<sup>4,5</sup> In this study, the prevalence of BV among infertile women was 40.83%, which was nearly double that of the previously reported studies.<sup>7</sup> The advancement of Artificial Reproductive Technology (ART) in the present day has led many infertile women to seek medical attention. The routine examination of the vaginal flora is a part of the investigations done for infertility. This might have led to the diagnosis of asymptomatic BV cases in infertile women.

A study suggests that the worldwide prevalence of BV ranges from 4.2%- 70.34%.<sup>8</sup> Our prevalence is between these two extremes, and we believe that this variation in the prevalence may be due to socioeconomic and cultural differences.

In this study, the prevalence of BV was greater in women > 30 years of age, 44.12% in the 30-35 years and 51.72% in the > 35 years age group. In the study by Durugho et al., 88% of the infertile women with BV were above 25 years of age.<sup>9</sup> The higher prevalence in the older age group can be attributed to the high recurrence rate of BV of up to 76% as noted in the literature. The recurrence can occur within six months of treatment due to antibiotic resistance against pathogenic bacteria and their biofilms, increasing the prevalence of the disease.<sup>7</sup>

BV was diagnosed in 75.51% of primary infertile and 24.49% of secondary infertile women. Though the percentage of patients with primary infertility was higher in the study population, the prevalence of BV was similar in both groups (40.22% and 42.89%, respectively, among patients with primary and secondary infertility). The equal prevalence of BV in primary and secondary infertility indicates that BV might be a significant risk factor for infertility. In contrast to our finding, a study by Dhont et al showed that women with secondary infertility were more likely to have a diagnosis of BV than women in primary

sub-fertility, attributing the cause to the interventions under unhygienic conditions, particularly during delivery or induced abortions, which predisposes patients prone to infection.<sup>10,11</sup>

The percent of patient showing a higher pH in vaginal swab, a positive Whiff test and clue cells in the swab was significantly higher in patient who had BV. This result also supports the role of Amsel's criteria in diagnosing BV in women. The efficacy of diagnosing BV using Amsel's criteria has also been validated by many studies. The result of this study also helps to validate the authenticity of Amsel's criteria.<sup>6</sup>

In this study, the prevalence of BV in the lower socioeconomic group was 83.33%. The finding is similar to the study done by Durugbo I. et al. (2015) done in Nigeria which stated that lower socioeconomic class had an increased risk of BV.<sup>9</sup> In studies from the USA, a lower socioeconomic class was found to be associated with poor health-seeking behavior and higher risk of STIs, which in turn increase risk for infertility, especially of tubal cause.<sup>11</sup> In another study conducted in India, the highest prevalence of BV was seen in urban slum (38.6%), followed by rural community (28.8%) and urban middle class (25.4%).<sup>12</sup> This shows that the prevalence of bacterial vaginosis varies widely among different areas and communities within the country. The contrasting prevalence figures may be because of various reasons, such as differences in economic status and educational background.

The prevalence of abnormal HSG in infertile patients with bacterial vaginosis was 83.33%. In many instances, BV goes untreated, hence creating the necessary milieu for ascending organisms to cause tubal damage.<sup>10</sup> Similarly, other possible reasons that have been put forward for BV being a cause of tubal infertility are due to the association of BV with sub-clinical PID, tubal motility disorders, and autoimmune infertility. The higher prevalence of BV in patients with abnormal HSG in other studies also helps to validate our findings.<sup>9,13,14</sup> Many possible reasons have been put forward in mechanisms of BV leading to infertility, like plasma cell endometritis (sub-clinical PID), tubal motility disorders, and autoimmune infertility, thus most pointing toward ascending infection.<sup>3</sup> All these studies support our study that tubal cause can be the result of BV infection.

This study had a large sample of cases, so the data generalizability may be appropriate. The data were taken by a student blinded to the study, hence minimizing the bias. Standard diagnosing criteria have been used in the study. A single-center study and convenience sampling method

might affect the generalizability of the results. Cases on antibiotics, menstruation, and recent sexual intercourse could alter the investigation results and were excluded. But, following up on the patient and taking data after 2 weeks could have increased the sample size and validity of the data.

## CONCLUSIONS

Bacterial vaginosis was more prevalent in the women presenting to the infertility clinic and higher prevalence was noted in women of low socio-economic status.

**Conflict of interest: None.**

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# Medication Adherence in Patient Suffering from Epilepsy: A Descriptive Cross-sectional Study

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## ABSTRACT

**Introduction:** Medication adherence is crucial in epilepsy management, as poor adherence increases seizure frequency and treatment failure. Identifying factors influencing adherence is essential for improving patient outcomes. This study aimed to evaluate the medication adherence in epilepsy patients at a tertiary care teaching hospital.

**Methods:** A descriptive cross-sectional study was conducted at tertiary care center from 23 July 2024 to 22 January 2025 after obtaining ethical approval from the Institutional Review Committee. Epileptic patients aged 21–70 years attending the outpatient Department of Medicine, without chronic comorbidities and taking antiepileptic drugs for at least 3 months and excluding those with absence seizures, vagus nerve stimulation treatment, cognitive impairments or mental health disorders, or pregnancy/lactation. Medication adherence was assessed using the Medication Adherence Report Scale-5. Convenience sampling method was used.

**Results:** Among 108 patients, high adherence was observed in 40 (37.1%) patients, moderate in 48 (44.4%) patients, and low in 20 (18.5%) patients. Adherence was highest in the 31–40 years age group, with 26 (86.67%) adhering, and lowest in the 61–70 years group, with 6 (66.77%) adhering. Patients on monotherapy 37 (92.5%) and those with education above Class 12, 22 (91.67) showed better adherence. Key barriers included forgetfulness 30 (27.8%), financial constraints 23 (21.3%), and side effects 17 (15.7%).

**Conclusions:** Younger age, higher education, and simpler treatment regimens have better adherence. Interventions such as education programs, cost-effective drug options, and reminder strategies (e.g., alarm clocks) can enhance adherence among epileptic patients.

**Keywords:** anticonvulsant drug, barriers to adherence, education of patients, health services accessibility, seizure disorder.

## INTRODUCTION

An epilepsy is a neurological disorder causing recurrent seizures, affecting about 70 million people globally, making it the second most common neurological condition.<sup>1</sup> Despite advancements, antiepileptic drugs (AEDs) remain the primary treatment.<sup>2</sup> Common AEDs include carbamazepine, lamotrigine, levetiracetam for focal seizures; phenytoin, valproate, topiramate for generalized seizures; and ethosuximide, valproate, lamotrigine for absence seizures.<sup>3</sup>

Poor medication adherence increases seizure frequency, medical costs, and the risk of accidental death.<sup>4</sup> Adherence refers to how well patients follow prescribed schedules.<sup>1</sup> WHO estimates nearly half of patients fail to take medications correctly.<sup>5</sup> Various methods assess adherence, including self-reporting, pill counting, and drug level monitoring.<sup>6</sup> Self-reports and interviews are the most commonly used due to their simplicity.<sup>7</sup>

This study aimed to evaluate the medication adherence in epilepsy patients at a tertiary care teaching hospital.

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## METHODS

A descriptive cross-sectional study was conducted from 23 July 2024 to 22 January 2025 at the Outpatient

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Department of Medicine, Nepalgunj Medical College and Teaching Hospital (NMCTH), Nepalgunj, Banke, Nepal with ethical approval from the Institutional Review Committee (Reference number: 12/081/082). Patients with confirmed epilepsy diagnosis without chronic comorbidities, treated with at least one antiepileptic drug for a minimum of 3 months, and aged 21–70 years of both genders were included. Patients with clinical features of absence seizures, cognitive impairments, and mental health disorders as well as patients undergoing vagus nerve stimulation treatment and patients during their pregnancy/lactation period were excluded. Convenience sampling method was employed for data collection.

Sample size calculation:

$$n = Z^2 \times p \times q / e^2$$

$$= 1.96^2 \times 0.5 \times 0.5 / 0.1^2$$

$$= 96.04 = 96$$

where,

n = minimum required sample size

z = 1.96 at 95% of Confidence Interval (CI)

p = prevalence is taken as 50% for maximum sample size calculation

q = 1-p

d = margin of error, 10%

The calculated sample size was 96. However, a total sample of 108 was taken.

The patients participating in the study were explained the reason and nature of the study in the local language easily understood by them and their written consent was taken. Patients were interviewed to gather qualitative data on the patient's experiences, perceptions, barriers to medication adherence, Knowledge and understanding of epilepsy and its treatment. In addition, a structured questionnaire was utilized to collect demographic details (e.g., age, gender, educational level) and clinical history (types of seizures, current antiepileptic drugs). Medication Adherence Reporting Scale, Version 5 (MARS-5)<sup>8</sup> was used as the primary tool for assessing medication adherence in epilepsy patients. Interpretation of the MARS-5 scale is as follows:

a) 0-15: Poor adherence – The patient very often does not follow the prescribed medication regimen (non-adherent)

b) 16-20: Moderate adherence – The patient has some degree of adherence, but there is significant room for improvement (non-adherent)

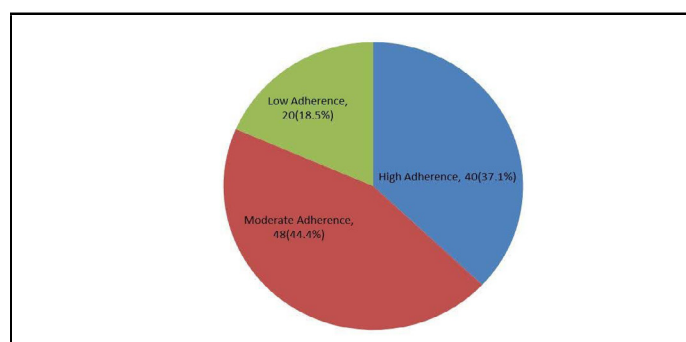
c) 21-24: High adherence – The patient is following the prescribed medication regimen to a high degree but still requires improvement (non-adherent)

d) Score of 25:- Adherent

Data was entered into Microsoft Excel and statistically analyzed using IBM SPSS Statistics version 26.0.

## RESULTS

Among 108 patients, it was found that 20 (18.5%) showed poor adherence, 48 (44.4%) showed moderate adherence and 40 (37.1%) showed high adherence (Figure 1).



**Figure 1. Distribution of patients as per the adherence on the basis of the MARS-5 adherence scale (n=108).**

A total of 108 patients participated, among which male patients were a bit higher 62 (57.41%) and 46 (42.59%) females participated in the study. Patients between the age group 31-40 years showed the maximum 26 (86.67) adherence to antiepileptic drugs followed by the 21-30 age group 20 (83.3) whereas patients of the age group 61-70 years demonstrated the least adherence 6 (66.67) (Table 1).

**Table 1. Distribution of patients showing adherence as per the age group (n=108).**

Age group (years)	n (%)
21-30 (n=24)	20 (83.3)
31-40 (n=30)	26 (86.67)
41-50 (n=27)	22 (81.48)
51-60 (n=18)	14 (77.78)
61-70 (n=9)	6 (66.67)

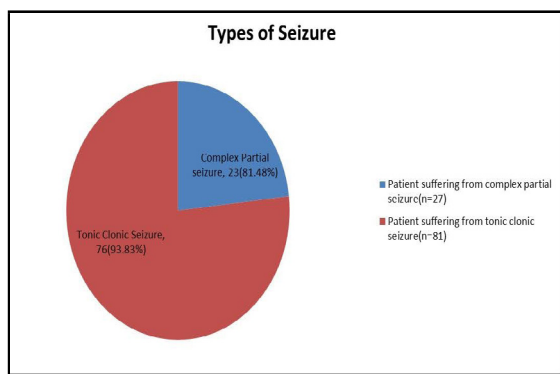
Patients were divided as per the number of anti-epileptic drugs they were receiving and it was observed that as the number of drugs increases, adherence to drugs decreases (Table 2).

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**Table 2. Distribution of patients as per adherence to no of drugs used (n= 108).**

Type of therapy	n (%)
Monotherapy (40)	37 (92.5%)
Two drug therapy (57)	50 (87.72%)
Three drug therapy (11)	8 (72.27%)

Among 81 patients who were taking an anti-epileptic drug for tonic-clonic seizure, 76 (93.83%) patients took the drug exactly as directed while among 27 patients adherence was comparatively low 23 (81.48 %) in patients taking anti-epileptic drugs for complex partial seizure (Figure 2).



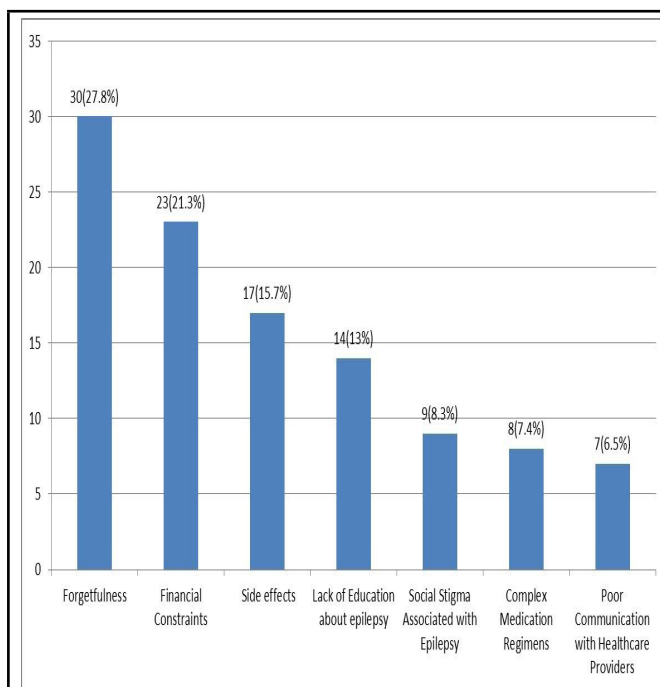
**Figure 2. Adherence of patient as per the type of seizure (n=108).**

Our study analyzed the study participants as per their formal/academic education status to understand the impact of education on adherence to anti-epileptic drugs. It was found that adherence to anti-epileptic drugs is directly proportional to education status (Table 3).

**Table 3. Distribution of patients adhering to AED as per the education level (n=108).**

Education status	n (%)
No formal education (n=24)	17 (70.83 )
Primary (n=26)	21 (80.77 )
Secondary (n=34)	30 (88.24)
Above class 12 (n=24)	22 (91.67)

This study examined barriers like as forgetfulness 30 (27.8%), financial constraints 23 (21.3%), side effects 17 (15.7%), lack of education about epilepsy 14 (13%), social stigma associated with epilepsy 9 (8.3%), complex medication regimens 8 (7.4%), poor communication with healthcare providers 7 (6.5%), faced by the patients that prevent or decrease their adherence to anti-epileptic drugs (Figure 3).



**Figure 3. Barriers or challenges faced by the study participants for drug-adherence (n=108).**

## DISCUSSION

In this study, it was revealed that as per the MARS – 5 scale, 44.4% of patients demonstrated moderate adherence to AED therapy, while 37.1% exhibited high adherence and 18.5% showed low adherence. The 37.1% high adherence rate suggests that nearly one-third of patients are fully committed to their prescribed therapy, and taking their medications regularly, which is associated with better clinical outcomes such as seizure control and reduced hospitalizations, however, still a significant proportion of patients do not comply with the drug treatment. The findings of our study are strongly supported by Paschal A. et al. They found that 25.6% of patients had high adherence, 44.5% had moderate adherence, and 29.9% had low adherence.<sup>9</sup>

Medication adherence among epilepsy patients across five different age groups revealed the highest adherence with the 31-40 years group (86.67%), followed by the 21-30 age group (83.33%) and the 61-70 years group (66.67 %) the lowest. The highest adherence rate in the 31-40 years group can be attributed to factors such as stable health, established routines, and heightened responsibility for both personal and family well-being whereas the most likely explanation of the 21-30 years group showed better adherence due to strong health awareness, fewer chronic conditions. In contrast, elderly patients aged 61-70 showing the least adherence are most

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largely due to age-related challenges such as cognitive decline, complex health conditions requiring multiple medications, and social isolation & lack of caregiver which can further hinder consistent medication use. The result of our study resonates with a study by Zeber J et al. in 2010 that analyzed adherence to 9 different AEDs in a national clinical sample of elderly patients with new-onset epilepsy. They found that nearly half of the older patients were non-adherent, with rates ranging from 42% to 63% across anti-epileptic drugs.<sup>10</sup>

Our study also observed medication adherence among epilepsy patients on monotherapy, dual therapy, and polytherapy. Our findings indicate that adherence rates decrease as the number of prescribed AED increases. Specifically, 91.30 % of monotherapy patients adhered to their medication regimen, compared to 86.49 % on dual therapy and 72 % on 3 drugs. The findings of our study are in agreement with those of a study carried out by Joshi et al., which examined the impact of monotherapy and polytherapy on medication adherence among epilepsy patients where they found the same trend.<sup>11</sup> It is concluded that as the number of prescribed antiepileptic drugs increases, adherence rates tend to decrease. Both the studies highlighted that the physician should provide fewer drugs to increase patient adherence.

The present study identified several key barriers to medication adherence in patients with epilepsy, with forgetfulness (27.8%) being the most common. Forgetfulness is particularly critical in epilepsy due to the necessity of maintaining stable therapeutic drug levels to prevent seizure recurrence. This finding is consistent with a study by Faught et al. that also highlighted forgetfulness as a prominent factor contributing to non-adherence in adult epilepsy patients, accounting for nearly 25% of cases.<sup>12</sup> Financial constraints were the next most reported barriers to adherence by 21.3% of patients in this study, underscoring the economic burden of epilepsy treatment. Another study by Cutler et al. also reported that patients with higher out-of-pocket costs for AEDs were less likely to remain adherent to their medication regimen. The nonadherence rate was approximately 25-30% higher among patients facing high costs.<sup>13</sup> Side effects were reported by 15.7% of patients in this study, reflecting concerns about medication safety and tolerability. A study by Schmidt D et al also reported in 2013 that 20% of epilepsy patients discontinued medications due to side effects.<sup>14</sup>

In this study, 13% of patients cited a lack of education about epilepsy as a barrier to adherence. This finding is supported by Munaf A et al. in which patients received

4 sessions of the structured educational program and found that the post-test Morisky Medication Adherence Scale reached 7.53 compared to a pretest score of 6.58 highlighting the need of health education to increase adherence.<sup>15</sup> Complex medication regimens were a barrier for 7.4% of participants in this study. A study by Sabaté et al. found that patients with complicated dosing schedules were significantly less likely to adhere to their treatment plans, with non-adherence rates reaching a maximum of 35%.<sup>16</sup>

Social stigma was also identified as a barrier of which 8.3% of participants reported that they didn't take their medication. A similar finding was reported by Zolnierek B et al., where 10% of patients avoided taking medications in public due to fear of discrimination or stigma.<sup>17</sup> Poor communication with healthcare providers accounted for 5.6% of barriers in the present study indicating the importance of healthy communication between a patient and physician. This aligns with findings by Jacoby A et al., where they advocated that there is a 19% higher risk of nonadherence among patients whose physician communicates poorly than among patients whose physician communicates well.<sup>18</sup>

The study is limited by its reliance on the reported data by the participants which can lead to recall bias, its single-center design that may not represent the wider population and its relatively small sample size.

## CONCLUSIONS

The study revealed that adherence to antiepileptic drugs (AEDs) varied across different age groups, with patients between 21-40 years exhibiting the highest adherence. Patients on monotherapy demonstrated the best adherence rates, which kept on decreasing as no of drugs increased. The study also highlighted key barriers to medication adherence, with forgetfulness, financial constraints, and side effects being the most common reasons for non-adherence.

The study emphasizes the need for targeted interventions to improve medication adherence, such as simplifying treatment regimens, enhancing patient education, and addressing financial constraints thus ensuring cost minimization, fostering better communication by clinicians or reminders by family members or caregivers.

**Conflict of Interest: None.**

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# Health-promoting Lifestyle among Students Studying in Secondary Level of a Government School

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## ABSTRACT

**Introduction:** Health promotion during adolescence is the basic indicator of positive development. Adopting the healthy lifestyle in this period promotes health, prevents chronic diseases, and reduces the cost of treating diseases. This study was conducted to find the health promoting lifestyle of students studying in secondary level of a government school.

**Methods:** A descriptive cross-sectional study was conducted among students studying in grade 9 and 10 of a government school from 14 August 2022 to 10 September 2022. Convenience sampling technique was used to select the sample from the school. The validated tool “Health-promoting Lifestyle Profile II”, developed by walker et al., was used to collect the information related to the health-promoting lifestyle of respondents. Data was collected by self-administered questionnaire. Data were entered and analyzed in IBM SPSS Statistics version 27.0. Point estimate and 95% confidence intervals were calculated.

**Results:** Among 123 participants, 93 (75.60%) (68.02–83.20, 95% Confidence Interval) participants’ overall health-promoting lifestyle was good. Interpersonal relation was good in 112 (91.05%) participants.

**Conclusions:** The overall health-promoting lifestyle of adolescents was similar to studies done in similar settings in the past.

**Keywords:** *adolescents, healthy lifestyle, health promotion, high school, students.*

## INTRODUCTION

Adolescence is the phase of life between childhood and adulthood, and it is an important time for laying the foundations of good health. Despite being thought of as a healthy stage of life, there is significant death, illness and injury in the adolescent years. Globally, over 1.5 million adolescents and young adults aged 10–24 years died in 2021, the leading causes of death are injuries, violence, self-harm, and maternal conditions among these causes many causes are related to the health risk behavior of adolescents.<sup>1</sup>

Health promotion during adolescence is the basic indicator of positive development as it ensures optimal well-being and helps to find the beneficial pathways that lead to achieving a positive change in the transition to adulthood.<sup>2</sup> Adopting a health-promoting lifestyle plays an important role in the prevention of non-communicable diseases, and reduces the cost of treating the disease and minimizing its burden.<sup>3</sup>

Therefore, this study aims to find out the health-promoting lifestyle among students studying in selected grades of a government school.

## METHODS

A descriptive cross-sectional study was conducted in Koteswori Saraswati Secondary School from 14 August 2022 to 10 September 2022. Ethical approval was taken from the Institutional Review Committee of Tribhuvan University, Institute of Medicine, Maharajgunj (Reference

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number: 30(6-11)E2 79/80). Convenience sampling technique was used. Students studying in grade 9 and 10 were selected for the study. Students with incomplete information in the proforma were excluded.

The sample size was calculated using the following formula:

$$n = Z^2 \times \sigma^2 / e^2$$

$$= 1.96^2 \times (0.27)^2 / (0.05)^2$$

$$= 3.84 \times 0.0729 / 0.0025$$

$$= 0.279936 / 0.0025$$

$$= 112$$

Where,

n= minimum required sample size

Z= 1.96 at 95% of Confidence Interval (CI)

$\sigma$  = standard deviation of overall health promoting lifestyle from previous study, 0.27<sup>5</sup>

e= margin of error, 5%

Non-response rate 10% was added. Hence, the final sample size is 123.

The study was conducted among the students studying in grade 9 and 10. The self-administered questionnaire was used to collect the data. Health Promoting Profile II was used to collect the information related to health promoting lifestyle of adolescents.<sup>4</sup> The instrument has measured health-promoting lifestyle profile in six domains (physical activity, Nutrition, health responsibility, interpersonal relation, spiritual growth, and stress management) that consist of 52 items which was measured with a 4-point response scale consisting of "Never"=1, "Sometimes"=2, "Often"=3 and "Routinely"=4. The score of all items were added and divided by the total numbers of items to obtain the overall health promoting lifestyle score. The lowest possible overall score was 1, and the highest possible overall score was 4 out of score 4. Participants those with obtained mean score <2.5 was considered poor health promoting lifestyle, and respondents those with obtained mean score  $\geq 2.5$  was considered good health promoting lifestyle based on the previous study.<sup>5,6</sup> The original version scale was translated into Nepali language and back translation was done to make it suitable for the Nepalese context.

Among the secondary-level government schools of Kathmandu metropolitan city, one school (Koteshwor Saraswati Secondary School ) was selected for the study. There were 312 students studying grades 9 and 10.

Data were entered and analysed using IBM SPSS Statistics version 27.0. Point estimate and 95% CI were calculated for binary data.

## RESULTS

Among the 123 participants, 93 (75.60%) (68.02-83.20, 95% CI) participants' overall health-promoting lifestyle was good. Interpersonal relation was good in 112 (91.05%) participants. The mean score of the overall health-promoting lifestyle profile was 2.74 $\pm$ 0.38. Regarding the subscales of a health-promoting lifestyle, the highest was in interpersonal relations (3.20 $\pm$ 0.61) and lowest was in physical activity (2.18 $\pm$ 0.53) (Table 1).

**Table 1. Overall health-promoting lifestyle of study participants (n= 123).**

Variables	Good n (%)	Poor n (%)	Mean $\pm$ SD
Interpersonal relation	112 (91.05)	11 (8.94)	3.20 $\pm$ 0.61
Spiritual growth	107 (87.00)	16 (13.00)	3.04 $\pm$ 0.54
Nutrition	99 (80.48)	24 (19.51)	2.83 $\pm$ 0.45
Stress management	81 (65.85)	42 (34.14)	2.6 $\pm$ 0.53
Health responsibility	60 (48.78)	63 (51.21)	2.45 $\pm$ 0.70
Physical activity	37 (30.08)	86 (69.91)	2.18 $\pm$ 0.53
Overall health-promoting lifestyle	93 (75.60)	30 (24.40)	2.74 $\pm$ 0.38

Among 123 participants, 49 (71%) male had a good health-promoting lifestyle and 44 (81.50%) female had a good health-promoting lifestyle (Table 2).

**Table 2. Health-promoting lifestyle with different variables (n= 123).**

Variables	Good n (%)	Poor n (%)
<b>Sex</b>		
Male	49 (71.00)	20 (29.00)
Female	44 (81.50)	10 (18.50)
<b>Grades</b>		
Nine	54 (79.40)	14 (20.60)
Ten	39 (70.90)	16 (29.10)
<b>Living arrangement</b>		
Living with parents	85 (78.00)	24 (22.00)
Living with others	8 (57.10)	6 (42.90)
<b>Smoking habit</b>		
Yes	4 (78.40)	3 (21.60)
No	89 (76.34)	27 (23.36)
<b>Pocket money per day for snacks</b>		

Yes	60 (73.17)	22 (26.8)
No	33 (80.48)	8 (19.52)
<b>Having parents</b>		
Both	87 (78.40)	24 (21.60)
Single parent	6 (50.00)	6 (50.00)
<b>Father's education</b>		
Up to basic level	48 (73.80)	17 (26.20)
Above basic level	41 (83.70)	8 (16.30)

The mean age of study participants was 15.44±1.09 years. Most of the respondents 97 (78.86%) lived in rent with their parents. Regarding the participants' habit of smoking and alcohol consumption, almost all 116 (94.30%) of them never consumed tobacco products (Table 3).

**Table 3. Socio-demographic characteristics of study participants (n= 123).**

Variables	n (%)
<b>Age in years</b>	
<15	62 (50.40)
≥15	61 (49.60)
<b>Sex</b>	
Male	69 (56.10)
Female	54 (43.90)
<b>Religion</b>	
Hindu	109 (88.61)
Kirat	8 (6.50)
Christian	5 (4.06)
Buddhist	1 (0.81)
<b>Grades</b>	
Nine	68 (55.28)
Ten	55 (44.71)
<b>Pocket money per day (Nrs) for snacks</b>	
<50	60 (48.78)
50-100	18 (14.63)
>100	4 (3.25)
Eats homemade snacks	41 (33.33)
<b>Living arrangement</b>	
With parents in own home	12 (9.75)
With parents in rent	97 (78.86)
In hostel	2 (1.62)
Serving and living in other's home	12 (9.75)

<b>Smoking habit</b>	
Never	116 (94.30)
Sometimes	6 (4.87)
Usually	1 (0.81)

Among the 123 respondents, 111 (90.24%) respondents had both parents. Regarding parental education status, 46 (40.35%) respondents' fathers had a basic level and 48 (40.00%) respondents' mothers had a basic level of education. Similarly, 35 (30.70%) respondents' fathers were involved in a job, and 53 (44.16%) respondents' mothers were homemakers (Table 4).

**Table 4. Parental status of study participants (n= 123).**

Variables	n (%)
<b>Having parents</b>	
Both	111 (90.24)
Father only	3 (2.43)
Mother only	9 (7.31)
<b>Educational status of father (n= 114)</b>	
Illiterate	10 (8.77)
Informal education	9 (7.89)
Basic level	46 (40.35)
Secondary level	35 (30.70)
University level	14 (12.28)
<b>Educational status of mother (n= 120)</b>	
Illiterate	32 (26.66)
Informal education	19 (15.83)
Basic level	48 (40.00)
Secondary level	17 (14.16)
University level	4 (3.33)
<b>Occupation of father (n= 114)</b>	
Job	35 (30.70)
Agriculture	33 (28.94)
Business	32 (28.07)
Labor	9 (7.89)
Foreign employment	5 (4.38)
<b>Occupation of mother (n= 120)</b>	
Homemakers	53 (44.16)
Job	25 (20.83)
Agriculture	20 (16.663)
Business	19 (15.8)
Labor	3 (2.50)

## DISCUSSION

The overall health-promoting lifestyle of respondents was  $2.74 \pm 0.38$  out of the score of 4 which is similar to a previous study conducted in Nepal.<sup>7</sup> This study found a good health promoting lifestyle, as the health promoting lifestyle profile score equal to and greater than 2.5 is considered as good, and a score less than 2.5 is considered poor which is consistent with the finding of the study conducted among the government school student in Nepal.<sup>5</sup>

Regarding the subscales of the health-promoting lifestyle profile, respondents scored highest on interpersonal relations which is consistent with the study findings conducted among adolescents in Turkey.<sup>8</sup> This study results showed that the lowest mean score was for physical activity ( $2.18 \pm 0.53$ ) and health responsibility ( $2.45 \pm 0.73$ ) domain which is consistent with the study of Egypt and Nepal.<sup>9,5</sup> Spending more time on viewing TV, playing video games, computer and internet were one of the factor of low physical activity in adolescents.<sup>10</sup> Unavailability of Play Park and playground around the home are related to low physical activity among the adolescents in Nepal.<sup>11</sup> Lowest score in physical activity in current study also might be due the more involvement of adolescents in indoor game and time spent on social media, the lack of playing park and playground, lack of assigned in physical activities in school.

This study result found a good health promoting lifestyle in most (78.00%) of the adolescents those who were living with their parents than those who were living with others. This result is similar to the study findings conducted in Iran.<sup>12</sup> In this study, students whose parents' educational status was above the basic level had a good health-promoting lifestyle compared to others. This finding is supported by a similar study conducted in Nepal.<sup>5</sup> Family processes such as parenting and parent-child relationship play an important role in developing positive interpersonal relations in their child.<sup>13</sup> Similarly, involvement in religious education activities enables and supports the parents in developing their children's spirituality.<sup>14</sup>

This is the cross sectional study at one government school, the result may not be generalized to wider context. A study could be done to find out the factors of poor physical activity and health responsibility among adolescents.

## CONCLUSIONS

The overall health-promoting lifestyle of adolescents was similar to studies done in similar settings in the past. Since adolescents' physical activity and health responsibility are poor, they should be encouraged to participate actively in physical activity and make them responsible for their health.

**Conflict of Interest: None.**

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# Teaching Learning Method Preferences among Medical Students of a Medical College: A Descriptive Cross-Sectional Study

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## ABSTRACT

**Introduction:** The most common method of traditional teaching and learning practice is didactic lectures, which have been considered the gold standard. Modern techniques of teaching and learning methodologies include case-based learning, evidence-based medicine, problem-based learning, simulation-based learning, e-learning, peer-assisted learning, and observational learning. The aim of the study is to assess specific teaching and learning methods preferred by selected medical students of a medical college.

**Methods:** A descriptive cross-sectional study was conducted among selected medical students from 01 March 2024 to 01 December 2024 after obtaining ethical approval from the Institutional Review Committee. Students who were not willing or did not give consent to participate in the study were excluded. The students were enrolled in the study after written informed consent. Convenience sampling method was used. Point estimate and 95% confidence interval were calculated.

**Results:** Among 400 students, 399 (99.75%) (99.43-100, 95% confidence interval) medical students preferred specific teaching learning methods and 1 (0.25%) medical student preferred blended teaching learning method. Evidence-based medicine was recognised as a method for teaching and learning by 350 (87.50%), problem-based learning by 393 (98.25%) and case based learning by 396 (99%). However, 202 (50.50%) preferred problem-based learning for theory teaching as 233 (58.25%) believed problem-based learning helps in better clinical correlation and 153 (38.25%) believed it allows better students interaction followed by 240 (60%) student-teacher interaction.

**Conclusions:** Majority students preferred specific teaching learning methods also were aware of different teaching learning methods and most preferred methods were problem-based learning, followed by socratic lectures. However, most practiced in their institution were didactic lectures while the preferred aids by students were powerpoint presentations.

**Keywords:** *learning, medical students, problem-based learning.*

## INTRODUCTION

Learning is a never-ending process. For a teacher, learning is a cardinal factor one must consider while teaching students. A transformation process of knowledge from teachers to students is a teaching and learning process.<sup>1</sup> And most common method of traditional teaching and learning practice is didactic lectures (DL), which have been considered the gold standard.<sup>2</sup>

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There are different modern techniques of teaching and learning methodologies such as case-based learning, evidence-based medicine, problem-based learning, simulation-based learning, e-learning, peer-assisted learning, observational learning, flipped classroom and team based learning, however most preferred teaching method was problem based learning (71.4%) and among clinical medical students bedside teaching was most preferred 76.4% followed by lectures 14.6%, tutorials 7.9%.<sup>3,4,5</sup>

This study aimed to assess specific teaching and learning methods preferred by medical students, their general knowledge, perception, practice and attitudes towards the preferred methods.

## METHODS

This descriptive cross-sectional study was conducted among 400 medical students from first year to the final year of Nepalgunj Medical College Teaching Hospital (NGMCTH), Banke, Nepal, from 01 Mar 2024 till 01 Dec 2024 after getting ethical approval from the Institutional Review Committee of NGMCTH (Reference Number: 41/080-081). The students who were not willing or did not give consent to participate in the study were excluded. All the students willing were enrolled in the study after written informed consent and details about the research were explained. The convenience sampling method was used. The sample size was calculated using the following formula:

$$n = Z^2 \times p \times q / e^2$$

$$= 384$$

Where,

n= minimum required sample size

p= prevalence taken as 50% for maximum sample size calculation

q= 1-p

e= Margin of error, 5%

Z= 1.96 at 95% Confidence Interval

The final sample size calculated was 384. However, a total sample of 400 was taken.

Semi-structured questionnaires were used to collect data which has been made after multiple literature reviews.<sup>2,5,6</sup> It consists of demographic details of the participants followed by main questionnaires that consist of semi-structured questionnaires designed to assess the knowledge, perception, attitude, and practice, preference regarding different teaching learning methods. After obtaining ethical approval, a permit and permission from the principal of the medical college were taken. The data collection was started after questionnaire revision after pretest at another college. The study objectives were explained to the participants and informed consent was taken. Participants who provided informed consent were distributed with the semi structured questionnaires and asked to fill out those questionnaires. The principal investigator was

responsible for data collection. The students selecting any one method among the nine methods were considered as medical students with specific teaching learning method and students who chose the blended teaching method were considered in the blended teaching learning method.

Data collected were entered in Microsoft Excel and analyzed by Statistical Package For Social Sciences (SPSS) version 22.0. Point estimate and 95% confidence interval were calculated.

## RESULTS

Among the 400 medical students, 399 (99.75%) medical students preferred specific learning methods and only 1 (0.25%) medical student preferred blended teaching learning method. Majority of them, 231 (57.75%) preferred the problem based learning method (Table 1).

**Table 1. Teaching learning methods preferred by students (n=400)**

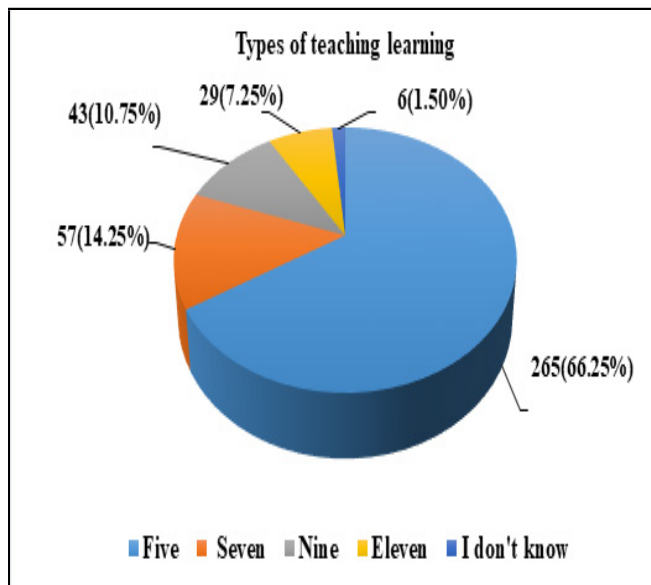
Variables	n (%)
Problem based learning	231 (57.75)
Audio visual learning	66 (16.50)
Lecturer based learning	48 (12)
Cooperative learning	17 (4.25)
Peer-assisted learning	12 (3)
Inquiry based learning	10 (2.50)
Experimental learning	7 (1.75)
Flipped classroom	4 (1)
Project based learning	4 (1)
Blended learning	1 (0.25)

The sociodemographic details of students enrolled in this study, among them 243 (60.75%) were male and 157 (39.25%) were female. The majority 226 (56.50%) of participants were in the age group 21-23 years followed by 86 (21.50%) in age group 18-20 years, 83 (20.75%) in 24-26 years and 27 years and above 5 (1.25%), with mean age and standard deviation (S.D) 22.13±1.82. The median age was 22 years with an interquartile range ±2, minimum age 18, and maximum age 27 years. Similarly, the majority of participants, 304 (76%), were Hindu by religion, followed by 78 (19.50%) were Islam, 8 (2%) were Christian, and 10 (2.50%) were Buddhist. Likewise, 312 (78%) medical students were of Nepalese origin and 88 (22%) were of Indian origin. However, according to their semester equal number of students were in each semester, 100 (25%). While in 2019, higher number 95 (23.75%) of students were enrolled in MBBS, followed by 92 (23%) in 2022 (Table 2).

**Table 2. Students' enrollment and years of experience of teaching and learning (n=400).**

Years of enrollment	n (%)
2016	5 (1.25)
2017	3 (0.75)
2018	6 (1.50)
2019	95(23.75)
2021	54 (13.50)
2022	92 (23)
2023	83 (20.75)
2024	62 (15.50)

Medical students were aware about teaching learning methods as according to them there are five types of teaching learning as majority, 265 (66.25%) of them, replied it, followed by seven types, 57 (14.25%), (Figure 1).



**Figure 1. Types of teaching learning method (n=400).**

Students recognised evidence-based medicine 350 (87.50%), problem-based learning 393 (98.25%) and case based learning 396 (99%) as methods for theory teaching.

**Table 3. Methods recognised by medical students as one of methods of teaching and learning (n=400).**

**Table 3. Methods recognised by medical students as one of methods of teaching and learning (n=400).**

Variables	n (%)
Evidence-based Medicine (EBM)	350 (87.50%)
Problem-based learning(PBL)	393 (98.25)
Case-based learning (CBL)	396 (99)

Medical students preferred methods for theory teaching and reason listed below in (Table 4).

**Table 4. Preference and reason for preference for theory teaching (n=400).**

Variables	n (%)	Reason for preference n (%)*
Problem-based learning method	202 (50.50)	233 (58.25) believed that PBL helps in better clinical correlation
		153 (38.25) believed it allows better student interactions
		240 (60) believed it allows better student-teacher interaction
Socratic lecture (two way)	106 (26.25)	184 (46) believed that it allow freedom to voice opinion
		166 (41.50) believed that it broadens thinking
		72 (18) believed that it creates positive competitive spirit

Jigsaw method (type of group study)	72 (18)	346 (86.50) believed that it helps effective and proper utilization of time for better understanding of the subject
Didactic lecturer (one way)	21 (5.25)	247 (61.75) believed that its monotonous and boring
		153 (38.25) believed that it lacked student teacher interactions

However, the methods practiced in their institute and their preference were different as the most practiced 279 (69.75%) were didactic learning and most preferred methods for their clinical teaching were bedside teaching as 185(46.25%) (Table 5).

Stimulated based learning	36 (9)	Helps in critical thinking
Peer assisted learning	26 (6.50)	Creates co-operative surrounding
Role play	24 (6)	Creates interest to learn
Flipped class-room	24 (6)	Helps in learning numerical problem
Variables	Most practiced	Reason for practiced at their institute
Didactic learning method	279 (69.75)	Traditional method
Problem based learning	80 (20)	Availability of facilities
Case based learning	30 (7.50)	Depends on teacher teaching style
Flipped class-room	18 (4.50)	Helps them to understand unsolved query
Peer assisted learning	12 (3)	Creates healthy support
Stimulated based learning	10 (2.50)	Helps them in thinking more

**Table 5. Preference for clinical teaching and reason (n=400)**

Variables	n (%)	Reason for preference
Bedside teaching	185 (46.25)	It helps to develop clinical knowledge as well as communication skills for clinical teaching
Social media and video lecturer or e-learning	158 (39.50)	Easily accessible from anywhere
Mannequins(dummy or model of human body)	124 (31)	Helps in clinical teaching as they practice skills and gain more practical experience
Observational learning and Team based learning	78 (19.50)	Teaches patience and equal contribution
Video lectures	67 (16.75)	Clear and audible

The major reason/factors for distraction in half 200 (50%) of medical students was due to social media, followed by lack of communication between teacher and students 120 (30%) and lack of guidance by teachers causing lack of concentration 80 (20%).

The teaching aids preferred for theory classes by students were powerpoint 186 (46.50%), followed by video lecture 142 (35.50%), also black as well as smart board 72 (18%).

**Table 6. Attitude of medical students towards different preferred teaching and learning methods (n=400).**

Statement	n (%)				
	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
<b>Is Problem based learning(PBL) one of most effective methods of teaching and learning?</b>					
	76 (19)	12 (3)	23 (5.75)	161 (40.25)	161 (32)
<b>Case based learning(CBL) as one of most liked and preferred methods of teaching and learning by students</b>					
	1 (0.25)	4 (1)	27 (6.75)	192 (48)	176 (44)
<b>Video lectures are useful when patients is not available for teaching</b>					
	11 (2.75)	15 (3.75)	63 (15.75)	308 (77)	3 (0.75)
<b>Community diagnosis program (CDP) is one of means for teaching and learning</b>					
	3 (0.75)	4 (1)	15 (3.75)	262 (65.50)	116 (29)
<b>Research should be part of MBBS curriculum</b>					
	1 (0.25)	5 (1.25)	21 (5.25)	167 (41.75)	206 (51.50)

The major reason/factors for distraction in half 200 (50%) of medical students was due to social media, followed by lack of communication between teacher and students 120(30%) and lack of guidance by teachers causing lack of concentration 80 (20%).

## DISCUSSION

Present study participants also recognised these techniques as they mentioned there are mainly five types of teaching learning methods such problem based learning (PBL), lecturer based learning, case based learning, evidence based medicine, audio video lecturer or e-learning, observational learning, team based learning, stimulated based learning, peer assisted learning and flipped classroom etc.<sup>2,6</sup>

A total of 233 (58.25%) students thought PBL helps them in better clinical correlation, 153 (38.25%) thought it allows them for better student interactions and 240 (60%) believed it allows them for better student teacher interaction. This finding were similar with other studies as they reported 40.2% felt that it helps in better clinical correlation and better student interactions (17.1%) and better student teacher interaction (14.3%).<sup>5</sup> However, in the present study more male students 243 (60.75%) were involved and only 157(39.25%) female students. Majority 226 (56.50%) of them lie in the age group 21-23 years old.

Whereas, a similar study by VM Holambe et. al. reported (58.7%) females and (41.3%) males which is in contest to the findings in our study. The mean age of the students was 19.38±SD 0.69 years in their study compared to 22.13±1.82 in our study.<sup>7</sup> So the result vary from their studies as in their finding, more female students are enrolled . It could be because of the higher number of female student enrollment in that University in certain years. Similar socratic lecturers allow freedom to voice opinions according to 184 (46%) of students, while Papanna KM et al. reported only 29 % students felt so. The reason for this difference could be the small sample size, rules and regulation of their Institute and availability of facilities. However, 166 (41.50%) thought it broadens thinking and 72 (18%) thought it creates positive competitive spirit which was found to be similar to the findings reported from India, (41.2%) and (11.9%) respectively.<sup>5</sup> Similarly, the Jigsaw method helps them in effective and proper utilization of time for better understand-

ing of subjects in 346 (86.50%), while according to Papanna KM et al. it was considered to give better understanding of the subject in 25.2% and an opportunity for active learning 21.7%. The finding of present study is higher. The reason could be due to individual perception of students and the method teaching and learning conducted in their institute.<sup>5</sup>

The most common methods for theory teaching by students were PBL 202 (50.50%), socratic lecturer 106 (26.25%), jigsaw 72 (18%) and 21 (5.25%) didactic lecturer. This is in contrast to the finding reported by Papanna KM et al. as it was found that (71.4%) chose PBL as the most preferred method for theory teaching, followed by Socratic lectures (56%), Jigsaw method (43.4%) and didactic lectures (32.8%) as the least preferred.<sup>5</sup> However, the method preferred by students for clinical teaching were bedside teaching 185 (46.25%) followed by 124 (31%) mannequins, video lectures 67 (16.75%), role play 24 (6%), which are found to be similar with other studies reported from Mangalore India and V. Holamble (81.5%), (61.6%) students preferred bedside teaching followed by mannequins (75.9%), (45.6%) video lecturers (67.9%) and least preferred was role play (36.1%), (34.8%) respectively.<sup>5,7</sup> However, V. Holamble et al. also reported demonstration method (41.3%) students preferred but as he used multiple options and did not include video lecture, although there is difference in percentage, in both these studies the finding and methods are similar. However, Pathak P et al. reported self-study as most preferred as 29.5% responded, followed by interactive learning 25% and small group discussion, 13.5% their finding were not consistent with the present study.<sup>8</sup>

Bedside teaching helps to develop clinical knowledge as well as communication skills for clinical teaching, that is the reason it is more emphasize in their college as majority responded (60.50%) this method was practiced, however bedside teaching was the best method to develop clinical skills (52%) and communication skills (49.6%) the finding is nearly same.<sup>5</sup>

Mannequins helps in clinical teaching as they help to practice skills and gain more experience of practical and are more often practiced in their college (72.25%) almost similar with finding from Papanna KM et al. as according to them mannequins help them in practicing skills (57.7%) and gain more practical experience (32%).<sup>5</sup> The teaching aids preferred for theory classes by students were powerpoint presentation 186 (46.50%), followed by video lecture 142 (35.50%), also black as well as smart board 72 (18%). The finding is not in alignment with Papanna KM et al. Black-

board (51.4%), powerpoint presentation (PPT) (40.9%).<sup>5</sup> The reason to preferred PPT was students can take reference and study from it anytime they wish in near future.<sup>5</sup> In another study from Chitwan, Nepal also reported that blackboard (51%) was reported as more preferred method of teaching and (65.6%) students had never experienced powerpoint teaching. The finding is not similar to present study, reason could be due to the availability of teaching aids and the clarity of language used.<sup>9</sup>

The case based learning were one of most liked and preferred methods of teaching and learning by students as (48%) agreed to it and video lectures are useful when patients are not available for teaching as (77%) agreed to it in other similar study it was reported 36.4% from Mangalore India, the reason could be the study which has been compared was done when social media was not so popular.<sup>5</sup> Similarly, according to medical student research should be part of MBBS curriculum as (65.50%) strongly agreed, similar finding was reported by Pathak P et al. as 60% strongly agreed to include research in undergraduate curriculum.<sup>8</sup>

However, there are certain limitations of this study as it was conducted in only one medical college of Nepal, thus the result cannot be generalized in the context of the whole country.

## CONCLUSIONS

This study concludes that the majority of students preferred specific teaching learning methods and also were aware of different teaching and learning methods, while the most preferred methods were problem based learning followed by socratic lectures. However, most practiced in their institution were didactic lectures. While the preferred aids by students were PowerPoint presentations.

From this study, we concluded that the most preferred methods should be practiced as they would help the educators to modify the curriculum according to the needs and preferences of medical students for better medical student outcomes and also improvement of the quality of medical education. The medical students are burdened with a vast medical curriculum, and most students are under high pressure of learning; however, if their preferences are being taken care of, their mental health will be better. So, it will definitely bring a better outcome in the future, after all, they are the future doctors who will be dealing with the lives of many.

**Conflict of Interest: None.**

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# Outcome of Proximal Tibial Fracture among Patients Treated with Intramedullary Nail Supplemented with Poller Screw: A Descriptive Cross-sectional Study

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## ABSTRACT

**Introduction:** It is difficult to achieve and maintain reduction during intramedullary nailing of meta-diaphyseal tibia fractures with short proximal fragments. The use of a poller screw helps to achieve and maintain reduction as it acts as the third point of fixation. This study aimed to evaluate the outcome of proximal tibial fracture among patients treated with intramedullary nail supplemented with poller screw.

**Methods:** This descriptive cross-sectional study was done in a tertiary care centre among patients treated with intramedullary nail supplemented with poller screw from 01 November 2021 to 30 December 2022 after receiving ethical approval from the Institutional Review Board. Patients with acute fractures, delayed union, or nonunion of the proximal tibia at the meta-diaphyseal region were included in the study. Convenience sampling technique was used. Radiological outcome was measured by varus/valgus angulation and antero-posterior angulation, while functional outcome was measured by Rasmussen's knee scoring.

**Results:** Among 41 patients, 30 (73.17%) had acute fractures, 6 (14.63%) had delayed union, and 5 (12.20%) had non-union. One poller screw was used in 28 (68.29%) cases and two poller screws were used in 13 (31.71%) cases. At final follow-up, there were 5 (12.20%) cases of malunion. A majority, 37 (90.24%) patients, had excellent final Rasmussen's knee grading.

**Conclusions:** The use of poller screw in fractures of meta-diaphyseal region of proximal tibia had similar outcome when compared with previous studies.

**Keywords:** *meta-diaphyseal tibia fractures, poller screws, proximal tibia fracture, rasmussen's knee function grading.*

## INTRODUCTION

Extra-articular meta-diaphyseal proximal tibia fractures account for 5-11% of all tibia fractures.<sup>1-3</sup> The goal of treatment is to maintain the length of the initial fracture while achieving union and correcting coronal, sagittal, and rotational alignment, thus allowing early range of motion and weight bearing. Above mentioned goals are best achieved by intramedullary nailing, which remains the

treatment of choice among all the operative treatment modalities. Intramedullary nailing for meta-diaphyseal fractures of the tibia with short proximal fragment possesses an increased risk of valgus or apex anterior angulation.<sup>3,4</sup> In such a case, there is an increased risk of malalignment. To prevent deformities after intramedullary nailing in proximal fractures of tibia various techniques have been suggested, including using proximal entry starting point for nail entry, lateral starting point for nail entry, femoral distractor, a neutral insertion angle in coronal and sagittal planes, nailing with the knee in semi extended position and the use of blocking or poller screw.<sup>5</sup>

Poller screw help to achieve three-point fixation, thereby promoting a stable mechanical environment and thus preventing translation of nail within the medullary cavity and thereby reduce the occurrence of malalignment.<sup>6,7</sup>

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Thus poller screw helps to heal acute fractures, delayed union and non-union.<sup>8</sup> There has been paucity of literature in our settings about the outcomes of nailing in fracture of tibia supplemented with poller screws.

This study aimed to evaluate the outcome of proximal tibial fracture among patients treated with intramedullary nail supplemented with poller screw in a tertiary care centre.

### METHODS

This descriptive cross-sectional study was done among patients presenting Department of Orthopedics in National Academy of Medical Sciences, Bir Hospital, Mahaboudhha, Kathmandu, Nepal from 01 November 2021 to 30 December 2022 after receiving ethical approval from the Institutional Review Board (Reference number: 1521/2080/81). Patients aged more than 18 years presenting with acute GA (Gustilo Anderson Grading) type I, II, IIIA open extra-articular meta-diaphyseal fractures of the tibia, closed acute fractures, delayed union and nonunion of closed diaphyseal fractures of proximal tibia were included in the study while those with pathological fractures, intra-articular fractures, diaphyseal tibia fractures and infected fractures were excluded from the study.

Whole sampling method was used.

Surgery was done under spinal or epidural anaesthesia. Stainless steel hollow nails of appropriate diameter and length were used for fixation. The knee was held in a semi-extended position. Under fluoroscopic guidance, a poller screw was placed on the side opposite to the deformity's apex, along the concave border in the anteroposterior view and lateral view. One or two cortical screws of 4.5 mm were used as poller screws to obtain and maintain reduction. True antero-posterior and lateral views were used for precise insertion of poller screw and to correct the malalignment, using intraoperative fluoroscopy.<sup>4,9-12</sup> By using a bone awl, an entry portal was created following mobilization of the patellar tendon. The guide wire was passed and confirmed in both views. Sequential reaming was done, and then a nail of appropriate diameter and length was inserted and locked proximally and distally. The poller screws remained in place. On the second postoperative day, partial weight bearing as tolerated and quadriceps exercises were started. Patients were followed up to 2, 6, and 12 weeks and at 6 and 12 months to assess alignment, fracture healing, and complications. The functional outcome as measured by Rasmussen's knee scoring.<sup>1,13</sup>

The Modified Rasmussen's Knee grading consists of criteria for clinical assessment and radiological assessment. The clinical assessment considers pain, walking capacity, knee extension, total range of motion, stability, and power of quadriceps. The total score is 30. It is graded excellent if the score is 28-30, good if the score is 24-27, fair if the score is 20-23, and poor if the score is <20. Similarly,

the radiological assessment takes into account articular depression, condylar widening, valgus/varus angulation, and osteoarthritis. The total score is 10. It is graded as excellent if the score is 9-10, good if the score is 7-8, fair if the score is 5-6, and poor if the score is <5. Alignment and deformity of the tibia were measured by drawing the anatomic axis of the tibia in the proximal and distal segments of the fracture. Fracture was considered to be healed if there was radiological evidence of callus in at least 3 cortices and the patient was able to do full weight bearing without pain.

The data collected were entered in Microsoft Excel 2016 and analyzed using IBM SPSS Statistics version 22.0. Point estimate was calculated for binary data.

### RESULTS

Among 41 cases, the majority were males 27 (65.85%), whereas 17 (34.15%) were females. Mean age was 36.56±14.83 years (range 18-66 years). There were 30 (73.17%) acute fractures, 6 (14.63%) delayed unions, and 5 (12.20%) cases of nonunion. Among the acute fractures, 21 (51.22%) cases were different Gustilo-Anderson Grades of open fractures, while 9 (21.95%) cases were closed fractures.

Road traffic accidents were the most common cause accounting for 25 (60.97%) patients. A total of 8 (19.51%) had sustained injury by fall from height, 5 (12.19%) sustained injury during sports activities and 3 (7.31%) during household trauma.

The majority of the fractures were oblique 15 (36.59%), whereas the comminuted fractures were the least common type 5 (12.20%) (Table 1).

**Table 1. Fracture geometry of study participants (n= 41).**

Type of fracture geometry	n (%)
Oblique	15 (36.59)
Transverse	12 (29.27)
Spiral	9 (21.95)
Comminuted	5 (12.20)

There were 20 (48.78%) closed fractures and 21 (51.22%) open fractures (Table 2).

**Table 2. Type of fracture of study participants (n= 41).**

Type of fracture	n (%)
Closed	20 (48.78)
Open GA-I	11 (26.83)
Open GA-II	6 (14.63)
Open GA-III	4 (9.76)

The mean length of the proximal fragment was 8.5 cm (range 7-14 cm). One poller screw was used in 28 (68.29%) cases and two screws in 13 (31.71%) cases. The poller screws were used in lateral aspect in the coronal plane and posterior in the sagittal plane. The second of two screws used were in cases where posterior poller screws were used to prevent anterior angulation. The diameter of the screw was 4.5 cm. At final follow-up, there were 5 (12.20%) cases of malunion in the coronal plane. A total of 3 (7.32%) cases had varus angulation of 10° and 2 (4.88%) cases had valgus angulation of less than 7°. A total of 12 (29.27%) had procurvatum, among which 10 (24.39%) cases had less than 5° and 2 (4.88%) cases had procurvatum of 5-10°. The mean Rasmussen radiological score at final follow up was 9.87. There were no cases of nonunion.

Anterior knee joint pain was present in 14 (34.15%) cases which was managed with analgesics and physiotherapy. (Table 3).

**Table 3. Frequency of complications (n= 41).**

Complications	n (%)
Knee stiffness	4 (9.76)
Anterior knee pain	14 (34.15)
Superficial infection	3 (7.32)
Varus/valgus angulation	5 (12.20)
Procarvatum deformity	12 (29.27)

All patients achieved >110° range of motion at final follow-up. Rasmussen’s knee function grading was excellent in 37 (90.24%) patients and radiological assessment was excellent in 38 (92.68%) patients (Table 4).

**Table 4. Final Modified Rasmussen criteria for clinical assessment (n= 41).**

Clinical result	n (%)
Excellent	37 (90.24)
Good	4 (9.76)
<b>Rasmussen radiological assessment</b>	
Excellent	38 (92.68)
Good	3 (7.32)
<b>Final Rasmussen grading</b>	
Excellent	37 (90.24)
Good	4 (9.76)

## DISCUSSION

In this study, four cases had knee stiffness at 3 months but improved with physiotherapy and all patients achieved >110° range of motion at final follow-up. Bhangadiya described full range of motion in 45 cases with limited

range of motion in four cases.<sup>1</sup> In our study, at final follow-up, there were 12.20% cases of malunion. A total of 3 (7.32%) cases had varus angulation of 10° and 4.88% cases had valgus angulation of less than 7°. A total of 29.27% had procurvatum, among which 24.39% cases had less than 5° and 4.88% cases had procurvatum of 5-10°. The mean Rasmussen radiological score at final follow up was 9.87. There were no cases of nonunion. Kulkarni et al described four cases of malunion: one case of varus angulation of +7° and three cases of procurvatum deformity upto 10 degrees.<sup>3</sup>

Use of poller screws as blocking screws has excellent functional outcome and has re-established the intramedullary nail as an effective fixation device for proximal third tibial fractures. It is easier to achieve and maintain reduction with poller screws. All fractures in our study united at an average of 18.2±4.3 weeks. This finding was similar to studies by Kulkarni et al and Guo et. al.<sup>2,3</sup> There was no significant loss of reduction after poller screw placement in intraoperative and post-operative radiographs in our study which was similar to the study by Krettek et al.<sup>4</sup>

We had 34.15% cases of anterior knee pain that did not require any treatment. There were 7.32% cases of superficial infection and 9.76% cases of knee stiffness. There were no complications related to poller screws and none of the cases had nonunion. Kulkarni et al described one case of nonunion.<sup>3</sup> Goldzak et. al. described two cases of infection that were managed with exchange nailing and antibiotics therapy but not any poller screws related complications.<sup>14</sup> Krettek et. al. also did not have any complications related to poller screws in his study of 21 cases.<sup>4</sup>

RK Shah<sup>15</sup> retrospectively analyzed 60 patients who underwent intramedullary nailing supplemented by poller screws. According to the Knee Surgery rating scale of the Hospital for Special Surgery, outcome was excellent in 15%, good in 40%, satisfactory in 35% and fair in 10%. In our study, Rasmussen’s functional grading was excellent in 90.24% and good in 9.76% patients.

Abdel-Aal M included 30 patients in his study where blocking screws were used as adjunct to intramedullary nailing in proximal third fractures of tibia.<sup>16</sup> Excellent alignment was obtained in 90% patients. Two patients got superficial infection 2.7%. Final functional score was evaluated using Modified Karlstorm-Olerud Score which was excellent in 66.7%, good in 23.3%, satisfactory in 6.7% cases and poor in 3.3% cases (Knee and ankle joint range of motion were equivalent to the normal side in 82% patients. Our study had 9.76% cases of knee stiffness that needed physiotherapy. We had 7.32% cases of superficial infection that needed debridement and antibiotics.

Rasmussen's knee function grading was excellent in 37 (90.24%) cases and good in 4 (9.76%) cases. Bhangadiya et al described an excellent outcome in 41 cases, good in five cases, fair in two cases and poor outcome in one case.<sup>1</sup>

In this study, 14 (34.15%) patients had anterior knee pain. Solanki et al<sup>18</sup> had five patients who experienced anterior knee pain out of 60 patients. This study had 6 cases of delayed union and 5 cases of nonunion. The 6 cases of delayed union united when the intramedullary nail was supplemented with anterior and posterior poller screws. Among the 5 nonunion cases, 3 needed exchange nailing with larger nail and poller screws, while 2 needed only supplementation of poller screws. None

of the cases of delayed union and non-union needed bone grafting. There were no cases of new fracture through poller screw site or nail breakage.

The limitations of this study is that it is constrained by a small number of cases that were part of research. Nonetheless, it offers a solid foundation for future randomized controlled research.

### CONCLUSIONS

The use of poller screw in fractures of meta-diaphyseal region of proximal tibia had similar outcome when compared with previous studies.

**Conflict of Interest: None.**

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# Serum Electrolyte and Lipid Profile among Patients with Hypothyroidism: A Descriptive Cross-Sectional Study

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## ABSTRACT

**Introduction:** Hypothyroidism is a clinical status resulting from a deficiency of thyroid hormones or, more rarely, from their impaired activity at the tissue level. This study aimed to determine the serum sodium, potassium, and lipid profiles among patients with hypothyroidism in a tertiary care centre.

**Methods:** A descriptive cross-sectional study was conducted in a tertiary care centre from 01 December 2019 to 30 November 2020. The study enrolled patients attending the Medicine Outpatient Department and diagnosed with hypothyroidism. Ethical approval was obtained from the Institutional Review Committee. Convenience sampling method was used.

**Results:** Among 120 patients in the study group, 89 (74.17%) and 31 (25.83%) were further diagnosed with subclinical hypothyroidism and overt hypothyroidism, respectively. Eighty-two (68.33%) had high TG level and a majority of the participants 56 (46.67%) were in the age group of 51-60 years. Five (4.17%) patients had low sodium and 4 (3.33%) had low potassium levels.

**Conclusions:** The findings of this study are similar to the findings published in previous articles done in the past.

**Keywords:** *hypothyroidism, lipid profile, serum electrolytes.*

## INTRODUCTION

About 300 million people worldwide are affected by thyroid dysfunction.<sup>1</sup> The prevalence of thyroid dysfunction in Nepal ranges from 17% to 30.87%.<sup>2-4</sup> About 0.2% of deaths in Nepal are caused by endocrine problems, with iodine deficiency being the primary cause.<sup>5</sup>

Hypothyroidism is a clinical status resulting from a deficiency of thyroid hormones or, more rarely, from impaired activity at the tissue level.<sup>6</sup> Subclinical hypothyroidism (SCH), is more common than Overt Hypothyroidism (OHY).<sup>7</sup> SCH may progress into OHY.<sup>8</sup> Thyroid hormones

regulate various metabolic functions, viz., regulation of lipids, carbohydrates, proteins, electrolytes and minerals metabolism.<sup>9</sup>

There is a paucity of data on establishing the impact of thyroid hormones on serum electrolytes and lipids in central part of Nepal. So, this study was undertaken to study the serum electrolytes and lipid profile among patients with hypothyroidism in a tertiary care centre.

## METHODS

A descriptive cross-sectional study was conducted in the Department of Biochemistry, Nepal Medical College and Teaching Hospital (NMCTH), Jorpati, Kathmandu, Nepal from 01 December 2019 to 30 November 2020. The patients attending the Medicine Outpatient Department of NMCTH and diagnosed with hypothyroidism were enrolled in the study. Ethical approval was obtained from the Institutional Review Committee (IRC) (Reference

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number: 34-076/077). Verbal and written consents were taken from all the participants before enrolling for the study. The participants included were from the age group 18 to 60 years and of both sexes. Patients with hepatic disorders, diabetes mellitus, cardiovascular disorders, pregnant women, and lipid-lowering drugs were excluded from the study. Convenience sampling method was used.

The sample size was calculated using the following formula:

The sample size was calculated using the following formula:

$$n = \frac{Z^2 \times p \times q}{e^2}$$

$$= \frac{1.96^2 \times 0.125 \times 0.875}{(0.06)^2}$$

$$= 117$$

Where,

n= minimum required sample size

Z= 1.96 at 95% of Confidence Interval (CI)

p= prevalence of hypothyroidism taken from previous study, 12.5%<sup>4</sup>

q= 1-p

e= margin of error, 6%

After overnight fasting (8-12 hours), 3 ml of venous blood was drawn in a gel tube and subjected to centrifugation at 3500

revolutions per minute (rpm) for 10 minutes to separate the serum. Serum free triiodothyronine (FT3), free thyroxine (FT4) and Thyroid stimulating hormone (TSH) levels were estimated using the chemiluminescence method, using the fully automated Enhanced chemiluminescent immuno analyzer (ECIQ), by Ortho Diagnostics, Johnson and Johnson, USA, The Serum lipid profile was evaluated by the dry chemistry method using the VITROS 250 fully automated analyzer from Johnson and Johnson, USA, whereas, serum sodium and potassium levels were estimated by the ion selective electrode method by using the EX-DS Jokoh electrolyte analyzer, Japan.

The data was entered in MS Excel 2007 and analyzed using the IBM SPSS Statistics, version 16.0. Binary data were expressed as n (%) and continuous data as Mean±SD.

## RESULTS

Among 120 patients in the study group, 89 (74.17%) and 31 (25.83%) were further diagnosed with subclinical hypothyroidism (SCH) and overt hypothyroidism (OHY), respectively. The mean age of hypothyroid patients was 46.76±11.54 years (Table 1).

**Table 1. Baseline characteristics of the study participants (n= 120).**

Variables	Total hypothyroid patients Mean±SD	SCH Mean±SD	OHY Mean±SD
Thyroid stimulating hormone (TSH) (μIU/ml)	13.78±18.65	8.50±5.89	29.49±30.73
Free triiodothyronine (FT4) (ng/dl)	0.96±0.32	1.09±0.24	0.57±0.16
Free triiodothyronine (FT3) (pg/ml)	3.49±0.71	3.69±0.60	2.91±0.73
Sodium (Na+) (mEq/L)	138.21±2.81	138.52±2.92	137.36±2.27
Potassium (K+) (mEq/L)	4.18±0.41	4.19±0.44	4.12±0.32
Total cholesterol (TC) (mg/dl )	190.24±45.92	181.10±42.28	216.94±46.02
Triglycerides (TG) (mg/dl)	203.38±91.23	190.56±94.84	238.35±70.69
Low-density lipoprotein cholesterol (LDL-c) (mg/dl)	106.94±42.57	101.74±39.62	122.59±46.46
High-density lipoprotein cholesterol (HDL-c) (mg/dl)	36.62±10.27	36.79±11.04	36.00±7.83
Very low-density lipoprotein cholesterol (VLDL-c) (mg/dl)	40.76±18.23	38.22±18.96	47.67±14.13

## Serum Electrolyte and Lipid Profile among Patients with Hypothyroidism: A Descriptive Cross-....

Among 120 patients, a majority of the participants 56 (46.67%) were in the age group of 51-60 years (Table 2).

Among 120 patients, 82 (68.33%) had high TG level (Table 3).

**Table 2. Distribution of study group according to age interval (n= 120)**

Age group (years)	n (%)
18-30	13 (10.83)
31-40	21 (17.50)
41-50	30 (25)
51-60	56 (46.67)
<b>Gender</b>	
Male	36 (30%)
Female	84 (70%)

**Table 3. Serum electrolyte and lipid profile among patients with hypothyroidism (n= 120).**

Biochemical parameters	SCH n (%)	OHY n (%)	Total participants n (%)	
<b>Na<sup>+</sup> (mEq/l)</b>	<134 (Low)	3 (3.37)	2 (6.45)	5 (4.17)
	134-146 (Normal)	86 (96.63)	29 (93.55)	115 (95.83)
<b>K<sup>+</sup> (mEq/l)</b>	<3.6 (Low)	3 (3.37)	1 (3.22)	4 (3.33)
	3.6-5 (Normal)	83 (93.26)	30 (96.77)	113 (94.17)
	>5 (High)	3 (3.37)	0	3 (2.50)
<b>TC (mg/dl)</b>	<200 (Normal)	63 (70.79)	10 (32.25)	73 (60.83)
	≥200 (High)	26 (29.21)	21 (67.74)	47 (39.17)
<b>TG (mg/dl)</b>	<150 (Normal)	33 (37.08)	5 (16.13)	38 (31.67)
	≥150 (High)	56 (62.92)	26 (83.87)	82 (68.33)
<b>LDL-c (mg/dl)</b>	<130 (Normal)	71 (79.77)	21 (67.74)	92 (76.67)
	≥130 (High)	18 (20.22)	10 (32.25)	28 (23.33)
<b>VLDL-c (mg/dl)</b>	<15 (Low)	2 (2.25)	0	2 (1.67)
	15-36 (Normal)	47 (52.81)	6 (19.35)	53 (44.17)
	>36 (High)	40 (44.94)	25 (80.64)	65 (54.17)
<b>HDL-c (mg/dl)</b>	<30 (Low)	32 (35.95)	8 (25.81)	40 (33.33)
	30-70 (Normal)	57 (64.04)	23 (74.19)	80 (66.67)

## DISCUSSION

In the present study, about 70% of the patients who had hypothyroidism were female, with a 2.33:1 female: male ratio, indicating that hypothyroidism was more common in females compared to males, which is in concordance with the study by Regmi et al. (2010).<sup>10</sup> The increased prevalence of hypothyroidism in females might be due to estrogen, which is considered an antagonist of the hormones FT3 and FT4 as it competes with FT3 and FT4 for binding sites on receptor proteins.<sup>11</sup>

Among the study participants (SCH and OHY), the majority of participants belongs to the age group 51-60 years (46.7%), while the minority was noted in the age group 18-32 (10.8%) which was in accordance with the study done by Mahanta et al (2017)<sup>12</sup> but is discordant with the study by Mahato et al (2015)<sup>4</sup> wherein they reported that SCH (23.1%) and OHY (14.7%) were the maximum in the age group of less than 15 years. In our study, the majority of cases were of SCH (89) and a smaller number of OHY (31) cases, which is contradicted

by the study done by Khatri P et al (2021)<sup>13</sup> where they reported a higher number of OHY cases.

In the present study, five and three hypothyroid participants have decreased serum Na<sup>+</sup> and K<sup>+</sup> levels respectively. Our study was in accordance with the study by Murgod et al. (2012)<sup>9</sup> where they reported decreased serum Na<sup>+</sup> and K<sup>+</sup>. However, in contrast to the present study, Bharti et al. (2015)<sup>14</sup> reported a significant increase in serum K<sup>+</sup> in both SCH and OHY. The possible mechanism of hyponatremia in hypothyroidism could be due to enhanced renal water retention mediated by vasopressin<sup>15</sup> as well as suppressed plasma renin and plasma aldosterone activity, which leads to Na<sup>+</sup> excretion, causing hyponatremia.<sup>16</sup>

In the present study, 47 and 28 hypothyroid participants have increased serum TC and LDL-c, Our results were similar to that of Khatri P et al (2021)<sup>13</sup> Murgod et al. (2012)<sup>9</sup> and Regmi et al. (2010).<sup>10</sup> Hypercholesterolemia and increased LDL-c in hypothyroidism could be due to decreased fractional clearance of LDL-c by a reduced number of LDL receptors in the liver.<sup>17</sup>

In the present study 82 hypothyroid participants have increased TG. These results were similar to the study done by Khatri P et al (2021)<sup>13</sup>, Regmi et al. (2010)<sup>10</sup> and Murgod et al. (2012)<sup>9</sup> where they also reported increased serum TG in hypothyroidism. Hypertriglyceridemia in these hypothyroid cases could be due to delayed clearance of

chylomicron remnant and intermediate-density lipoprotein from circulation due to reduced activity of lipoprotein lipase. These lipoprotein remnants are taken up by macrophages in the arterial walls to produce foam cells, which may lead to the development of atherosclerotic coronary artery disease in hypothyroidism.<sup>18-20</sup>

In the present study 40 hypothyroid participants have decreased HDL-c. Our results are similar to the studies done by Khatri P et al. (2021).<sup>13</sup> In contrast, Murgod et al. (2012)<sup>9</sup> reported significantly increased HDL-c in OHY and a positive correlation with TSH. The reduction in HDL levels in hypothyroid individuals is caused by increased activity of hepatic lipase and Cholesteryl ester transport protein.<sup>13</sup> In our study, we measured LDL-C using Friedwald's formula, but it would have been better if direct estimation had been done. The sample size was small. A study on the general population and involving a larger sample size will help elucidate the problem more clearly.

### CONCLUSIONS

The findings of this study are similar to the findings published in previous articles done in the past. Regular evaluation of serum electrolytes and lipid profiles among hypothyroid patients which would be beneficial in managing and treating the disorder and prevent further complications related to lipid and electrolyte disorders.

**Conflict of Interest: None.**

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# Successful In-vitro Fertilisation/Intracytoplasmic Sperm Injection in a Patient with Unicornuate Uterus: A Case Report

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## ABSTRACT

Most often the uterine developmental anomalies are missed until later in life presenting as infertility. This case report is of a couple presented with secondary infertility for four years. The wife had a unicornuate uterus with a left rudimentary horn which was diagnosed only at the time of cesarean section delivery. The husband had teratozoospermia. Two 5AA and 5AA blastocysts were transferred and at 5 weeks two gestational sacs along with a yolk sac and fetal heart pulsations were noted and the patient was under regular antenatal checkup. At 8 weeks of gestation, two gestational sacs were noted. However cardiac activity of only one twin was noted with the missed abortion of the other twin. The patient was under regular antenatal checkup and pregnancy was then continued till 37 weeks.

**Keywords:** *abortion, case reports, pregnancy complications, live birth.*

## INTRODUCTION

A unicornuate uterus is a type of congenital uterine anomaly which results from the fusion defects of müllerian ducts during development.<sup>1</sup> The prevalence of unicornuate uterus accounts for 0.3% in the general population and 5-13% in the population with müllerian anomalies.<sup>2</sup> After undergoing in-vitro fertilisation and intracytoplasmic sperm injection (IVF-ICSI) treatment, women with unicornuate uterus have a lower clinical pregnancy and live birth rate than women with normal uterus.<sup>3</sup> Preterm deliveries, ectopic pregnancies, atypical presentations, and miscarriages are among the obstetric issues that are linked to abnormal uterine blood flow, cervical incompetence, and decreased uterine muscle mass.<sup>1,4</sup>

Here, we report a case of a successful IVF/ICSI in a patient with a unicornuate uterus with poor ovarian reserve and left rudimentary horn who underwent elective cesarean section and uneventful postoperative outcomes.

## CASE REPORT

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We report a case of a 36-year-old female who was married for 8 years. She presented with a history of difficulty in conception for the last 4 years. She had a history of one spontaneous abortion at early pregnancy seven years ago and also one history of IVF pregnancy four years ago followed by spontaneous abortion for which she underwent suction and evacuation which was done in India.

She was not under any prior medications. During the time of evaluation, all infertility panels were sent and her thyroid stimulating hormone (TSH) level was 9.56 mIU/L for which she was kept under Thyronorm 50 mcg PO once a day (OD). Before planning pregnancy, optimization of TSH is necessary and TSH should be below 2.5 prior to planning because of the risk of recurrent abortion. There is no significant surgical history. Her menstrual cycle was regular, and she did not report any history of abnormal uterine bleeding and dysmenorrhea.

All baseline investigation was sent which reported an anti-müllerian hormone (AMH) value of 4.18 ng/mL and TSH of 9.56 mIU/L. Husband semen analysis was performed with a volume of 2 mL, count 22 mil/mL, total motility of 65% with active motility of 20% and 2% morphology. Other investigations were within normal limits. A transvaginal ultrasound was performed with the finding of an anteverted uterus, endometrial thickness of 5.8 mm and antral follicle count >6 in each ovary. Endocrinology consultation was done, and treatment was started with thyronorm 50 mcg and patient was advised to do IVF-ICSI with an indication of secondary infertility with a previous

history of recurrent abortion and male factor (with abnormal sperm morphology i.e 2%) and was advised follow-up on day 2 of the cycle.

From day 2 controlled hyperstimulation was started in our center. We use antagonist protocol using recombinant human follicle-stimulating hormone (rFSH) and human menopausal gonadotropin hormone. Follow up was done for follicle monitoring after triggering was done with an injection of Decapeptyl 0.2 mg which was given on 13<sup>th</sup> day of stimulation. The ovum pickup was done 35 hours after the trigger injection. During the time of pickup, there was difficulty in aspiration from the left ovary since it was highly placed up. Manipulation was done per abdominally and a total of 10 eggs were retrieved. ICSI was performed. On day 5 culture, five blastocysts (5AA, 5AA, 5AA, 2AA, 2AA) were formed and freezing was done. Grading of blastocyst was done by our embryologist using the Gardner grading system. The patient was then planned for Frozen Embryo Transfer (FET) and advised to follow up on day 2.

On second, her endometrial lining was 3 mm. Endometrial preparation started with tablet Estradiol 2 mg thrice a day (6mg/day). Before five days of a transfer, daily Inj Progesterone 50 mg intramuscular (IM) was started and frozen embryo transfer was done on 20<sup>th</sup> day of the cycle. At the time of transfer, the endometrium was tripled, line with a thickness of 8.33 mm. At the time of transfer, the cervix was towards the right, slight resistance was felt, and the transfer was possible with slight manipulation. The patient was advised to do serum beta-human chorionic gonadotropin (beta-hCG) after 13 days which was positive with a value of 1007.2.

The first scan was performed at 5 weeks 6 days of gestation. Two gestational sacs with fetal pole and cardiac activity were noted. Medicine continued and a follow-up scan was suggested at 8 weeks of gestation with the finding of missed abortion of one twin. At a 10-week scan, two gestational sacs were noted with regular cardiac activity in one twin and decreased size of the gestational sac of the second missed aborted twin. Follow-up continued at 12 weeks with nuchal translucency (NT) nasal bone (NB) scan which showed only one fetus with regular cardiac activity and the vanishing of the second missed aborted twin.

Regular ANC along with blood investigation and scan was done which showed normal findings. The pregnancy continued and the patient was planned for elective cesarean section (CS) at 37 weeks 4 days of gestation with an indication for preeclampsia with unfavourable cervix with the outcome of a single live female baby of 2.6 kg with an Apgar score of 8/10 and 9/10 at 1 min and 5 min respectively. Intraoperative findings, there was a unicornuate uterus with a swollen right tube with a normal

ovary and there was the presence of a rudimentary horn on the left side with a normal tube and ovary which was diagnosed only at the time of cesarean section. She had an uneventful postoperative period.

## DISCUSSION

Congenital uterine anomalies result from an abnormal fusion, formation, or reabsorption of Mullerian ducts during fetal life. A unicornuate uterus with presence of rudimentary horn, presents intricate challenges that demand thorough understanding and careful management. This amplifies the risk of diverse obstetric complications including preterm birth, preterm premature rupture of membranes, malpresentations, cesarean section, placenta previa, placental abruption, and intrauterine growth retardation (IUGR).<sup>4</sup> However, in our case the baby was born at 37 weeks of gestation with an indication for preeclampsia with unfavorable cervix with an outcome of a single live female baby with a birth weight of 2.6 kg. The postoperative period was also uneventful.

In our case, during the time of evaluation, all infertility panels were sent and her TSH level was 9.56 mIU/L for which she was kept under Thyronorm 50 mcg PO OD. Before planning pregnancy, optimization of TSH is necessary and TSH should be below 2.5 prior to planning because of the risk of recurrent abortion and miscarriages.<sup>5</sup> However, the pregnancy resulted in the delivery of a normal healthy baby. Patients with unicornuate uterus have increased gynaecological and obstetrics complications. Infertility or recurrent pregnancy loss can be the presenting feature of such disorders. In our case, which brought the patient to hospital for analysis is secondary subfertility with recurrent abortion. Other factors of the couple i.e. male factors might have also contributed to the subfertility in this couple.

Combined hysteroscopy and laparoscopy are proposed as a valuable investigation for the diagnosis of uterine anomalies and treating infertility.<sup>6</sup> Elective single embryo transfer to reduce the incidence of recurrent abortion, malpresentation, premature rupture of membranes (PROM), IUGR.

As compared with normal uterine morphology women, women with unicornuate uterus have also chance of having pregnancy and hopeful live birth rate.

## DECLARATION

The patient has given written consent for the publication in a scientific journal and is informed that the identity will be kept anonymous throughout the article. However, complete anonymity cannot be guaranteed.

**Conflict of Interest: None.**

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