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Contents

Preventive Care: A Sustainable approach for Better Oral Health

Dr Sujita Shrestha
Chief Editor

The access to oral health service remains a challenge in Nepal, particularly in rural regions. The most sustainable, impactful, and economical solution to this problem is the prevention of dental diseases for public oral healthcare. Preventive care is crucial due to the country's unique social, economic and healthcare condition. As a result, the country can lessen the burden of dental diseases and improve overall health.

Oral health problems such as dental caries, periodontal disease, oral infections, tooth loss and oral cancer are highly prevalent in Nepal. Oral Health Focal Point, Ministry of Health and Population conducted a national oral health pathfinder survey in 2004. Preventive care such as regular brushing, use of fluoride and early dental check-up can significantly reduce oral health problems. Research has established strong link between poor oral health and systemic disease conditions like heart disease, diabetes and complications during pregnancy. Nepal's National Oral Health Policy (2014), Second Long Term Health Plan (1999-2017), National Oral Health Strategy (2024) emphasize preventive care, oral health education and integration of oral health into the primary healthcare system. The global community has launched a series of initiatives for oral health to overcome those challenges. In 2021, the World Health Assembly (WHA) adopted a resolution urging the integration of oral health into national health policies and universal health coverage. This resolution was followed by the release of the Global Strategy on Oral Health- 2022; which envisions achieving universal health coverage of oral health for all individuals and communities by 2030.

Although oral health policies and strategies were established; limited funds, resources and manpower are the constraints for implementation. Access to quality dental care is a fundamental component of overall health and well-being. In Nepal, government dental services are limited to central, provincial and district hospitals. The government should play an active role for the expansion of dental services nationwide by establishing dental units in local-level hospitals, including 5, 10 and 15-bedded hospitals. Health financing should be extended in dental health sector which will minimize the out-of-pocket expenditures of the people for expensive dental treatments. The health insurance system should encompass various modalities of dental healthcare. Nepal Government has also envisioned central-level tertiary dental hospital in the capital; materializing this plan would raise health access in public dental services, limiting the sole dependence on private hospitals/clinics. The government should eventually establish provincial dental hospitals or dental colleges in due course of time. The Health Services Department should utilize the fresh dental graduates studied on government scholarship for the postings to district and local level hospitals facilitating with proper equipment and auxiliary helping hands.

Government hospitals often lack basic dental units, proper equipment and instruments. The dentist-to-patient ratio in many regions of Nepal, especially in Karnali and Far-west provinces is alarming. The WHO recommended dentist-to-population ratio is 1:7,500. In Nepal, the dentist-to-population ratio is as low as 1:1720 in the Kathmandu valley and 1:14245 outside Kathmandu valley. The ratio can increase in rural regions as dentists working in the rural areas are very less. This shortage makes curative services nearly inaccessible thus, prevention is essential. Different organizations like public hospitals, district hospitals, primary health care centers, dental colleges and private clinics working under the Department of Health Services, Curative Service Division, Eye, ENT and Oral Health Section should extend community outreach programs focusing on preventive care.

Preventive approaches like health education, community fluoridation, advocacy for fluoridated toothpaste, reduced intake of sugary foods, prohibition of tobacco products and routine dental check-up can lower the risk of oral diseases. Integration oral health education into school curriculum, training and deployment of oral health workers in rural areas, national awareness campaign on oral hygiene, and implementation of National Oral Health Strategy with clear targets and goals will promote and strengthen better oral health. Inclusion of preventive, curative and rehabilitative dental services in national health insurance programs will help reduce out-of-pocket expenses of dental treatments. Preventing disease early is less costly than treating advanced dental problems, especially for poor and rural populations.

Preventive oral health care is a simple, effective and affordable strategy for improving health status of Nepali population. Oral health education, evidence-based strategies and stronger policy execution can protect from dental pain, reduce healthcare costs, improve quality of life and helps to make healthier and happier people.

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Assessment of Inter radicular and Cortical Bone Thickness of Anterior Maxilla for Mini-Implant placement: A CBCT Study

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ABSTRACT

Introduction: Anchorage is the most important factor that influences the orthodontic treatment plan. The factors that influence anchorage of the orthodontic miniscrew implants are interradicular areas and cortical bone thickness.

Objectives: To evaluate the cortical bone thickness in the anterior maxilla for the placement of orthodontic mini implant in different age and gender groups using CBCT and determine the studied anatomic measurement vary with age and gender of the individual.

Materials and Method: CBCT images of 82 (41 males and 41 females) individuals were divided into three age groups (15–20, 21–30, and 31–40 years). Measurements were done for each inter radicular space in the anterior maxilla at four different depths, i.e., at a distance from cementoenamel junction (CEJ) up to 3 mm, 5 mm, 7 mm, and 9 mm apical to CEJ. The mesio-distal (MD), bucco-palatal (BP), palato-cortical (PC), bucco-cortical (BC) bone thickness was measured. Descriptive statistics, ANOVA, and post-hoc Tukey test were done to assess the differences among the groups. Independent t test was done to analyze gender differences.

Result: The highest bucco-palatal thickness was found between the right central and lateral incisor at the 9 mm level. Highest mesio-distal distance was found between the central incisor at the 9 mm level while highest bucco-cortical thickness was between the right lateral incisor and canine at the 7 mm level. The greatest palato-cortical thickness was present between distal to right canine at 3 mm level. Males had higher bucco-palatal thickness at the 3 mm, 5 mm, 7 mm and 9 mm level from CEJ.

Conclusion: The optimal site for mini-implant placement between central incisors, central and lateral incisor (right and left side) is present at 9 mm from CEJ. Statistically significant difference is present between male and female at bucco-palatal thickness at 5 mm, 7 mm and 9 mm from CEJ. Statistically significant difference is seen at 5 mm (palato-cortical) at the various age groups.

Keywords: CBCT; cortical bone thickness; inter-radicular distance; mini-implant.

INTRODUCTION

Anchorage control is a critical factor for the successful orthodontic treatment.[1] Mini-implant provided absolute anchorage during various orthodontic tooth movements such as anterior retraction, anterior intrusion, molar intrusion, molar distalization, and molar protraction.[1,2,3,4,5] Mini-implant offers advantage over other skeletal anchorage device such as small size, ease of placement and removal, decreased discomfort, options for placement sites, minimal surgical defects, immediate loading, and moderate cost.[6,7,8,9,10,11]

Cone beam computed tomography (CBCT), a three dimensional imaging modality, permits to visualize thickness and level of labial/buccal, palatal and lingual alveolar bone. Prior to the introduction of CBCT, the visualization of labial, buccal, palatal and lingual cortical bone was not possible due to image superimposition of conventional radiographs and gingival covering.

The volume of bone in the maxillary inter radicular space between the second premolar and the first molar provides the optimal anatomic site for mini-screws in the maxilla have been reported.[12,13] Hence, limited data are available concerning the inter radicular spaces of the anterior maxillary areas despite its use in anterior region. It seems that cortical bone is thinner in females mesial to the maxillary first molar.[13] However, the influence of age and gender in the success of mini implants remains controversial.

Thus, the study will determine the optimal sites for mini-implant placement in the maxillary anterior region and to find the influence of gender on inter radicular and cortical bone thickness of the anterior maxilla for the placement of orthodontic mini implants.

MATERIALS AND METHOD

This is an observational cross-sectional comparative study on CBCT of patients visiting Kantipur Dental College and Hospital. The inclusion criteria were CBCT of patient of age range 15-40 years and the exclusion criteria were scans showing overlapping of crowns or roots of adjacent teeth, missing teeth, periodontal diseases, blurred or unclear images and severe ectopic eruptions. The study period was during March to June 2022. Ethical clearance was obtained from Institutional Review Committee, Kantipur Dental College (IRC Reference Number 4/022). The sampling technique was non-probability convenient sampling. Sample size was calculated in reference to the study done by Brahme et al.[14] using the following formula:

$N = 2\int(\alpha_1\ \beta)\ SD^2/D^2$

(where, $\int\alpha_1\beta = 7.85$, (at 80% power)

$N = 2(7.85) \times (1.32)^2 / 1.015 = 26.95 = 27$

Total sample = 27 X 3= 81

A total of 82 CBCT scans were selected (41 females and 41 males) from the Department of Oral Medicine and Radiology which were further divided into three age groups: 15-20 years, 21-30 years, and 31-40 years. CBCT image was taken via CS9300 Care Stream, USA machine using the standard protocol at 85 kV, 6.3 mA, 11.30 s, voxel size of 300 mm and 17X13 cm field of view. Data collection sheet was developed for data collection. The selected DICOM file was opened in CS imaging suite software and measurements were done. Oblique slicing was selected and image was displayed simultaneously with their coronal, axial and sagittal slices (Figure 1). Sagittal section was selected for determining different cut level. Axial view was selected, and reference points and lines were determined.

The measurements were done for each inter radicular space in the anterior maxilla from distal side of canine to distal side of canine on the other side. The mesio-distal (MD), bucco-palatal (BP) and bucco-cortical (BC) and palato-cortical (PC) thickness was measured in the maxilla at four different site from cementoenamel junction(CEJ) at 3mm, 5mm, 7mm, 9mm (Figure 1).

Mesio-distal distance: The MD thickness was measured at the widest distance between each two adjacent teeth (Figure 1).

Bucco-palatal thickness: The BP thickness was measured from the outermost point on buccal side to the outermost point on palatal side at the middle of distance between each two adjacent teeth (Figure 1).

Cortical bone thickness: Buccal and Palatal Cortical thickness was measured from the outermost point on buccal/palatal side to the inner point of BC/PC side in the middle of inter radicular distance between each two adjacent teeth (Figure 1).

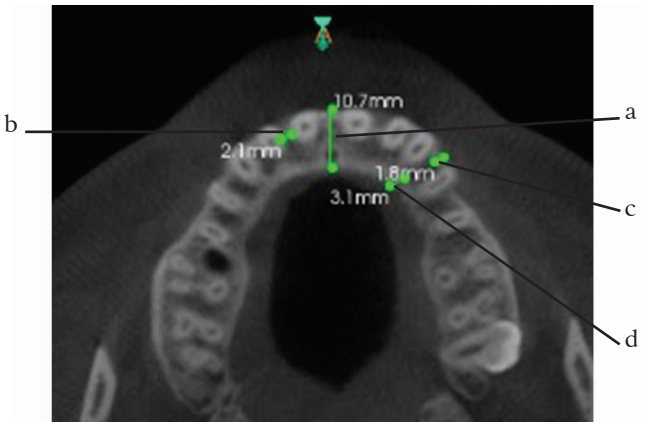

Fig 1: Maxillary anterior region:
a. Measurement of the bucco-palatal thickness=10.7mm
b. Measurement of the mesio-distal thickness=2.1mm
c. Measurement of bucco-cortical thickness=1.8 mm
d. Measurement of the palato-cortical thickness=3.1 mm

Data was entered into Microsoft Excel and then imported into the Statistical Package for Social Sciences (SPSS) version 21.0. Descriptive statistical measures were used to obtain the mean and standard deviation (SD) of all measurements. Statistical analysis was performed using Student's t test and ANOVA test. Further, post-hoc Tukey test was done. $p<0.05$ was considered statistically significant.

RESULT

The descriptive statistics of the measurements of the anterior maxilla i.e. right and left side are shown in Table 1.

Table 1. Descriptive statistics of the measurements of the anterior maxilla (right side)

Cut level (mm)	Site	Bone Thickness (Mean± SD)		
		Distal to 13	13-12	12-11
3mm	BP	9.68±1.40	9.27±1.6	9.62±1.51
	MD	2.49±0.76	2.26±0.81	1.72±0.57
	BC	1.48±0.42	1.47±0.46	1.57±0.44
	PC	9.68±1.4	1.83±0.50	1.77±0.56

5mm	BP	9.84±1.33	9.71±1.71	9.99±1.96
	MD	2.45±0.93	2.64±0.97	1.90±0.63
	BC	1.64±0.48	1.76±0.46	1.76±0.40
	PC	2.101±0.43	1.97±0.41	1.93±0.60
7mm	BP	9.64±1.76	9.41±1.70	9.84±1.81
	MD	2.68±0.88	2.79±1.0	2.05±0.78
	BC	1.49±0.49	1.87±0.49	1.74±0.37
	PC	2.1±0.48	1.98±0.42	1.9±0.57
9mm	BP	9.74±1.73	9.12±1.91	9.89±2.16
	MD	2.89±1.35	3.03±1.02	2.4±0.87
	BC	1.85±0.51	1.84±0.41	1.79±0.48
	PC	1.91±0.4	1.92±0.47	1.91±0.6

[where, Distal to 13 - distal to right canine, 13-12 - between right canine and right lateral incisor, 12-11 - between right lateral incisor and right central incisor]

Table 2. Descriptive statistics of the measurements of the anterior maxilla (left side)

Cut level (mm)	Site	Bone Thickness (Mean± SD)			
		11-21	21-22	22-23	Distal to 23
3mm	BP	9.14±1.92	9.35±1.65	9.15±1.45	9.63±1.29
	MD	2.55±0.82	1.82±0.65	2.03±9074	2.45±0.79
	BC	1.51±0.48	1.513±0.42	1.55±0.43	1.5±0.41
	PC	1.49±0.51	1.92±0.58	1.79±0.47	1.89±0.5
5mm	BP	9.98±2.28	9.473±1.78	9.485±1.75	9.853±.1.5
	MD	3.09±1.15	1.90±0.67	2.38±1.15	2.42±0.77
	BC	1.57±0.45	1.71±0.36	1.72±0.45	1.66±0.39
	PC	1.61±0.59	1.96±0.62	1.95±0.57	2.021±0.41
7mm	BP	10.53±2.51	9.446±1.94	9.3±1.83	9.75±1.59
	MD	3.3±1.0	2.18±0.88	2.63±1.22	2.51±0.92
	BC	1.62±0.44	1.73±0.43	1.78±0.48	1.61±0.38
	PC	1.67±0.59	1.95±0.51	1.85±1.5	2.04±0.42
9mm	BP	11.27±2.58	9.70±2.07	9.14±1.99	9.71±1.87
	MD	3.84±1.24	2.46±1.03	2.96±1.27	2.7±0.98
	BC	1.78±0.45	1.65±0.46	1.79±0.42	1.71±0.41
	PC	1.77±0.63	1.90±0.59	1.93±0.57	1.99±0.43

[where, 11-21 - between central incisors, 21-22 - between left central and lateral incisor, 22-23 - between left lateral incisor and canine, Distal to 23 - distal to left canine] The highest bucco-palatal thickness was found between the right central and lateral incisor at the 9mm level (11.27 ± 2.58). The lowest bucco-palatal thickness was between the right lateral incisor and canine at the 9mm level (9.12±1.91). The highest mesio-distal distance was found between the central incisors at the 9mm level was 3.84 ± 1.24, and the lowest was between the right central and lateral incisor at 3mm level (1.72±0.57). The highest bucco-cortical thickness was between the right lateral incisor and canine at the 7mm level (1.87 ± 0.49), and lowest was between right lateral incisor and canine at 3mm level. The greatest palato-cortical thickness was present distal to right canine at 3mm level (9.68 ± 1.4) and least between central incisor at 3mm level (1.49 ± 0.51).

Table 3. Comparison between measurements of male and female in the anterior maxillary region using Student's t-test

Cut level	Site	Gender, mean±SD		p-value
		Male	Female	
3mm	BP	8.22±0.90	7.83±1.32	0.13
	MD	2.15±0.42	20.22±0.45	0.49
	BC	1.49±0.26	1.54±0.31	0.45
	PC	1.80±0.51	1.74±0.27	0.50
5mm	BP	10.16±1.09	9.38±1.67	0.01*
	MD	2.54±0.42	2.64±0.49	0.30
	BC	1.71±0.25	1.67±0.28	0.55
	PC	1.97±0.37	1.90±0.25	0.29
7mm	BP	10.24±1.36	9.37±1.86	0.02*
	MD	2.54±0.42	2.64±0.49	0.30
	BC	1.68±0.35	1.71±0.26	0.63
	PC	2.00±0.37	1.89±0.27	0.16
9mm	BP	10.24±1.36	9.37±1.86	0.01*
	MD	2.89±0.50	2.90±0.55	0.93
	BC	1.80±0.32	1.74±0.24	0.37
	PC	1.94±0.43	1.87±0.25	0.32

*statistically significant

Males had higher bucco-palatal thickness at the 3mm, 5mm, 7mm and 9mm level from the CEJ. Males also had higher bucco-cortical thickness at 5mm and palato-cortical thickness at the 3mm, 5mm, 7mm and 9mm level from the CEJ. Females had higher mesio-distal thickness at 3mm, 5mm 7mm and 9mm respectively and bucco-cortical thickness at the 3mm and 7mm level from the CEJ. There was statistically significant difference between male and female at bucco-palatal thickness at 5mm, 7mm and 9mm cut level.

Table 4. Comparison between measurements of three age group in the anterior maxillary region using ANOVA

Cut level	Site	Age group(years), mean ±SD			p-value
		15-20	21-30	31-40	
3mm	BP	7.96±0.97	8.12±1.03	7.85±1.53	0.69
	MD	2.2664±0.49	2.16±0.41	2.18±0.47	0.73
	BC	1.43±0.25	1.57±0.33	1.46±0.19	0.17
	PC	1.68±0.21	1.83±0.48	1.70±0.32	0.34
5mm	BP	9.62±1.24	9.81±1.29	9.76±2.00	0.89
	MD	2.73±0.54	2.53±0.43	2.60±0.44	0.30
	BC	1.66±0.22	1.73±0.27	1.61±0.28	0.27
	PC	1.76±0.28	2.04±0.31	1.85±0.29	0.004*
7mm	BP	9.55±1.34	9.77±1.37	9.68±2.05	0.88
	MD	2.73±0.54	2.53±0.43	2.60±0.44	0.30
	BC	1.64±0.19	1.72±0.37	1.69±0.24	0.71
	PC	1.82±0.25	1.99±0.34	1.95±0.33	0.19

9mm	BP	9.51±1.38	9.93±1.65	9.74±2.02	0.69
	MD	2.93±0.52	2.90±0.56	2.83±0.46	0.75
	BC	1.68±0.23	1.81±0.31	1.76±0.26	0.28
	PC	1.79±0.31	1.96±0.40	1.87±0.22	0.20

*statistically significant

The group aged 15–20 years had a thicker mesio-distal cortex at the 3mm, 5mm, 7mm and 9mm level from the CEJ.The group aged 21-30 years had a higher bucco-palatal, bucco-cortical and palato-cortical thickness at the 3mm, 5mm, 7mm and 9mm from the CEJ. The result obtained from One-way ANOVA test was statistically significant at 5mm (palato-cortical) which was followed by Post-hoc Tukey test. The result from the test is presented in Table 4 and Table 5.

Table 5: Post-hoc Tukey test for palato-cortical thickness at 5 mm among the age groups

	Age group		p-value
Palato-cortical thickness (5 mm)	21-30	15-20	0.006*
		31-40	0.064
	31-40	15-20	0.690

*statistically significant

DISCUSSION

The stability of orthodontic mini-implant is influenced by several factors which may be related with the implant (type, diameter, and length), patient (sex, age, physical status), placement technique (direction of mini-implant and placement torque), orthodontic force (magnitude and timing of force), location (peri-implant bone quantity, cortical bone thickness, keratinized versus oral mucosa), and oral hygiene maintenence.[15]

It is well-documented that mini-implant is stable if the insertion depth is greater than 5mm. The success of mini-implant is affected by two factors such as the thickness of the cortical bone and root proximity.[16,17] CEJ was selected as the starting point for the measurements, unlike other studies that used the alveolar crest, which could be affected by different periodontal problems.[18,19] The safety and stability of micro-implant is influenced significantly by interradicular distance. Kuroda et al[20] and Asscherickx et al[21] advocated that the root proximity is a key factor for screw failure, suggesting that sufficient inter-radicular space is crucial for both safety and late stability. Schnelle et al[22] considered 3-4 mm of inter-radicular distance as the minimum amount for a mini-implant placement.

The safe site for mini-implant placement between central incisor is present at 9mm from CEJ whereas between central and lateral incisor (right and left site) is also present at 9mm from CEJ. The safe site for mini-implant placement between lateral incisor and canine (right site) is present at 5mm from CEJ (BP=9.71±1.71) MD=2.64±0.97) however at 9mm is BP=9.12±1.91, MD=3.03±1.02). This result is also in coincidence with the left side (between lateral incisor and canine). The optimum site distal to canine (right and left side) is also 5mm from CEJ.

Dharamdeep et al[23] concluded that 10mm from CEJ in the maxilla as the safe site for mini-screw implant placement between central incisors and central & lateral incisor.The optimal site for mini-implant placement in the anterior region is between the central and lateral incisor in the maxilla and between the lateral incisor and the canine in the mandible at the 6mm level from the CEJ.[24]

Sex and age factors play an important role in the development of bone thickness. However, the success of mini-implants in the gender and age group seems controversial. There was statistically significant difference between male and female at bucco-palatal thickness at 5mm, 7mm and 9mm cut level. This result was in accordance with Fayed et al, Abbas et al[25], Ono et al,[26] Rai et al[27] but contrary to those of Deguchi et al[28], Kim et al[29], Alsaffar et al[30].

The group aged 15–20 years had a thicker mesio-distal cortex at the 3mm, 5mm, 7mm and 9mm level from the CEJ. The group aged 21-30 years had a higher bucco-palatal, bucco-cortical and palato-cortical thickness at the 3mm, 5mm, 7mm and 9mm from the CEJ. The result obtained from One-way ANOVA test was statistically significant at 5mm (palato-cortical) which was followed by Post-hoc Tukey test which was in accordance with Kim HJ et al,[31] Zohu Z et al,[32] Fayad et al[24].

The selected points in a standardized practice setting can be both valid and reliable for determining the optimal site for mini-implant placement. The study is limited to Kantipur dental college and Hospital. Hence, more extensive study is needed to generalize the result.

CONCLUSION

The optimal site for mini-implant placement between central incisor is present at 9mm from CEJ whereas between central and lateral incisor (right and left site) is also present at 9mm from CEJ. The optimum site distal

to canine (right and left side) is also present at 5mm from CEJ. Statistically significant difference is present between male and female at bucco-palatal thickness at 5mm, 7mm and 9mm cut level. Statistically significant difference is seen at 5mm (palato-cortical) at the different age groups.

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Prevalence of Extended Spectrum Beta Lactamase Producing Enterobacteriaceae among Patients Attending Tertiary Care Hospital

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ABSTRACT

Introduction: Extended spectrum beta lactamase (ESBL) producing Enterobacteriaceae have emerged as significant pathogens and increasingly reported as a major cause for nosocomial as well as community-acquired infections over the past few years. These organisms represent a major threat among Multi-Drug Resistant (MDR) bacterial isolates and has been a great challenge to the clinicians for choosing appropriate antimicrobial therapy for the infections caused by ESBL producing isolates.

Objectives: To determine bacteriological profile, their antibiotic susceptibility patterns and ESBL production among Enterobacteriaceae in patients attending tertiary care hospital.

Materials and Method: A cross-sectional study was conducted from patients' sample attending Kantipur Dental College and Teaching Hospital at clinical microbiology laboratory. Prior conducting the study, permission was obtained from Institutional Review Committee of Kantipur Dental College. Data was collected from the laboratory record file. Phenotypic screening of ESBL of the isolated organism was done on Muller-Hinton agar (MHA) placing ceftazidime (30μg) and cefotaxime (30μg) disc along with other panel of antibiotics and incubated for 24 hours. Those isolates which show positive screening test were further confirmed as ESBL producing strains, as per Clinical Laboratory Standard Institute (CLSI) guideline. The collected data was analyzed using statistical package for social sciences (SPSS) version 20.

Result: A total of 98 Enterobacteriaceae isolates were collected from patients suspected with various infections. 31 (31.6%) isolates were from male and 67 (68.4%) were from female patients. Majority of the isolates were from out-patients 84 (85.7%) and 14 (14.3%) from in-patients department. Highest number of isolates were from urine (n= 72) followed by sputum. E. coli (n=72) was the most common organism isolated followed by K. pneumoniae (n=17). Among the 45 potential ESBL producers isolates, 19 (42.2%) were found as confirmed ESBL producer. ESBL production was highest in E. coli 12 (63.15%) followed by K. pneumoniae 6 (31.57%). Imipenem showed total susceptibility in all whereas ampicillin showed the highest resistance rate. Among the total confirmed ESBL producers, 14 (73.68%) were found to be Multi-Drug Resistant (MDR).

Conclusion: A high prevalence of Extended spectrum beta lactamase (ESBL) strains was detected in our study. Most of the ESBL producers are found to be Multi-Drug Resistant (MDR) strains. Increased rate of resistance to first line antibiotics like cephalosporins and quinolones explores the urgent need for alternatives to these groups of antibiotics.

Keywords: Antimicrobial resistance; Beta-lactam (β-lactam); Extended-spectrum beta lactamase (ESBL); Multi-drug resistant (MDR)

INTRODUCTION

The emergence of resistance to antibiotics is a public health burden and has become one of the great challenges in patient care worldwide.[1] Nepal is not an exception, where there has been a rise in anti-microbial resistance (AMR) in recent years.[1] The irrational use of antibiotics has contributed to greater emergence of drug resistant-pathogens in developing countries.[1,2] Beta-lactam (β-lactam) antibiotics used to treat infections caused by Gram-negative organisms exhibit their bactericidal effects by inhibiting enzymes involved in cell wall synthesis.[3] Extended spectrum beta lactamases (ESBLs) are one group of β-lactamases that have ability to hydrolyse β-lactam ring and cause resistance to various types of newer β-lactam antibiotics such as penicillins, third-generation cephalosporins and monobactams, but not the cephamycins and carbapenems.[4] The genes coding

for ESBLs are located on plasmids and thus transferred within the same species and between different bacterial species resulting in increased resistance to non-β-lactam antibiotics including fluoroquinolones, aminoglycosides, sulfonamides and tetracyclines.[3-5]

The emergence of multi drug resistance (MDR) has been a great challenge to the clinicians for choosing appropriate antimicrobial therapy for the infections caused by ESBL producing isolates.[4,5] Therefore, this study aims to determine the bacteriological profile, their antibiotic susceptibility patterns and ESBL production among various clinical samples obtained from the patients, helping the clinicians to select the suitable antimicrobial therapy.

MATERIALS AND METHOD

A cross-sectional study was conducted from 15th April 2023 to 15th March 2024 at Department of Microbiology, Kantipur Dental College and Teaching Hospital, Basundhara, Kathmandu. Ethical clearance was obtained from Institutional Review Committee of Kantipur Dental College. Data was collected from the laboratory record file. Different clinical samples taken from patients admitted in the hospital and from visiting outpatient departments of the hospital were included. Improperly collected samples or those lacking proper labeling and the bacterial isolates other than Enterobacteriaceae were excluded from the study.

The specimens were cultured on brain heart infusion (BHI) broth (only for blood samples), MacConkey agar, blood agar, chocolate agar and Cystine lactose electrolyte deficient (CLED) agar. The isolates were identified based on colony morphology, Gram's stain result, and conventional biochemical methods. Antimicrobial susceptibility testing (AST) was done by the Kirby-Bauer disk diffusion technique using Muller Hinton agar (MHA). A panel of antibiotic disks: amikacin (30μg), ciprofloxacin (5μg), ofloxacin (5μg), imipenem (10μg), tetracycline (30μg), piperacillin-tazobactam (100/10μg), trimethoprim-sulfamethoxazole (23.75/1.25μg), nitrofurantoin (300μg), ampicillin (10μg) along with ceftazidime (30μg) and cefotaxime (30μg) were placed and incubated overnight at 37°C for the phenotypic screening of ESBL. Those isolates which showed positive screening test were further processed for the combined discs method used for confirmatory phenotypic detection of ESBL-producing strains, as per CLSI guideline, 2023.[6] The collected data were analyzed using statistical package for social sciences (SPSS) version 20.

RESULT

During the study period, total of 98 Enterobacteriaceae isolates were recovered from patients suspected with various infections. 31 (31.6%) isolates were from male and 67 (68.4%) were from female patients. Majority of the isolates were from out-patients 84 (85.7%) and 14 (14.3%) from in-patients department. Highest number of isolates were from urine (n= 72) followed by sputum (n=13), pus (n=11) and blood (n=2).

Table 1. Distribution of micro-organisms in different samples

Organism	Urine	Sputum	Pus	Blood	Total
E. coli	55 (76.4%)	9 (12.5%)	6 (8.3%)	2 (2.8%)	72 (100%)
K. pneumoniae	10 (58.8%)	3 (17.6%)	4 (23.5%)	0 (0%)	17 (100%)
Proteus	6 (100%)	0 (0%)	0 (0%)	0 (0%)	6 (100%)
Citrobacter	1 (33.3 %)	1 (33.3%)	1 (33.4%)	0 (0 %)	3 (100%)

E. coli (n=72) was the most common organism isolated followed by K. pneumoniae (n=17). Among the 45 potential ESBL producers isolates, 19 (42.2%) were found as confirmed ESBL producer. ESBL production was highest in E. coli 63.15% (n= 12) followed by K. pneumoniae 31.57% (n=6) (Table 1).

Table 2. Antibiotic susceptibility pattern of ESBL producers

Isolated organism	CIP	OF	AK	NIT	COT	PIT	TE	AMP
E. coli (N=72)	63.9%	56.9%	38.9%	59.0%	66.7%	19.4%	54.2%	70.8%
K. pneumoniae (N =17)	47.1%	47.1%	47.1%	66.7%	58.8%	23.5%	47.1%	100%
Citrobacter (N=3)	66.7%	33.3%	66.7%	0.0%	66.7%	0.0%	66.7%	100%
Proteus (N=6)	33.3%	16.7%	0.0%	16.7%	16.7%	0.0%	16.7%	33.3%

[CIP=Ciprofloxacin, OF= Ofloxacin, AK=Amikacin, NIT=Nitrofurantoin, COT= Co-trimoxazole, PIT= Piperacillin-tazobactam, TE= Tetracycline, AMP=Ampicillin]

A total of antibiotic disks were tested against the isolated organism among which imipenem shows the total susceptibility in all whereas ampicillin showed the highest resistance rate. Among the total confirmed ESBL producers, 14 (73.68%) were found to be MDR.

DISCUSSION

ESBL producing Enterobacteriaceae have emerged as significant pathogens and are increasingly reported as a major cause for nosocomial as well as community-acquired infections over the past few years.[3] These organisms represent a major threat among MDR isolates which leads a great health challenge in the patient care worldwide.[3,5] In this study, ESBL production among Enterobacteriaceae clinical isolates was found to be 42.2% which is similar in the study done in Manmohan hospital reporting the ESBL production rate to be 40.6%.[7] Studies from different hospitals in Nepal reported the prevalence of ESBL production ranging from 13.5% to 34.5%.[8-12] Studies in India reported prevalence of ESBL of 38.2% by Segar et al[13], 32.1% by Basavaraj M C et al.[14] from various clinical samples. All these findings were lower than ours as several studies on ESBL prevalence across the world showed that ESBL prevalence varies significantly across continents, countries and hospitals.[3] On contrary to the above findings, higher prevalence had been reported by Yadav and Prakash[15] from Terai region of Nepal (62.31%), from Uganda[16] (62.0%), from Tanzania[17] (45.2 %). This higher prevalence is probably due to differences in types of samples analysed, variation in geographical regions, different detection methods and time.

The major proportion of sample in our study was urine sample which might be because UTIs are the most common infections and hence highest number of growths were observed in urine sample. Similar findings were observed in Shilpakar et al.[8] and Gurung et al.[18] E. coli (n=72) was the predominant organism found in overall samples. This finding is similar with the studies done by Binod et al[19] and Aryal et al[20]. Higher culture positivity in urine samples from females might be attributed to the long urethra and close anal proximity of urethral opening in females, increasing the chance of UTI in females. In our study, 63.15% of E. coli showed confirmed ESBL positivity followed by K. pneumoniae (31.57%) and Citrobacter species (5.2%). As E. coli and K. pneumoniae are the most commonly isolated organisms among the Enterobacteriaceae, similar pattern is seen in this study. These findings were similar to that reported by Parajuli et al.[7] and Ghimire et al.[21] The change in ESBL production pattern in bacteria seemed common as ESBLs were most often encoded on plasmids, which could easily be transferred between isolates.[2-4] In the present study, none of the isolates were resistant to imipenem. This study found higher rate of resistance in E. coli against ampicillin (70.8%) followed by ciprofloxacin (63.9%). Similar finding was seen in study by Ansari et al. and Baral et al. In contrary to this, piperacillin tazobactam showed low level of resistance in our study which is similar to the findings by Shilpakar et al.8 and Kayastha et al.[22]

It is well known that ESBL producing isolates often have high rates of co-resistance to commonly used antimicrobials. In our study, among the total confirmed ESBL producers, 14 (73.68%) were found to be MDR. A high prevalence of MDR strains have been reported in past studies within the country.[8,11-13,22] Higher rates of MDR were reported from India[14] (80.1%), Tanzania[17] (65.2%), Uganda[16] (70.3%) and Ethiopia[23] (79.2%). These varied range of MDR strains might be due to the variation in choice of antibiotics in various regions and countries. The irrational and injudicious use of high doses of antibiotics for therapy, self-medication, failing to follow a full-course of treatment, easy access of antibiotics from pharmacies without prescriptions and lack of poor implementation of legislation are the leading causes of anti-microbial resistance (AMR) in Nepal.[1,3]

CONCLUSION

A high prevalence of ESBL strains was detected in our study. Most of the ESBL producers are found to be MDR strains. Increased rate of resistance to first line antibiotics like cephalosporins and quinolones explores the urgent need for alternatives to these groups of antibiotics. MDR and ESBL among E. coli and K. pneumoniae are presenting serious problem in Nepal; regular monitoring and proper implementation of legislation on use of antibiotics is necessary.

LIMITATIONS

The data taken in our study was purely from only one hospital, which might not represent total population. Only phenotypic detection of ESBL was done, molecular level studies was recommended to strengthened the findings.

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Assessment of Knowledge, Attitude and Practice of Probiotics among General Dentists and Dental Residents: A Questionnaire study

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ABSTRACT

Introduction: Probiotics are defined as, 'living microorganisms, principally bacteria, that are safe for human consumption and when ingested in sufficient quantities, have a beneficial effect on human health beyond basic nutrition' which has been approved by the United Nations, Food and Agriculture Organization and World Health Organization. The World Health Organization has defined probiotics as, "Live microorganisms which when administered in adequate amounts confer a health benefit on the host."

Objectives: To assess knowledge, attitude and practice of probiotics among general dentists and dental residents.

Materials and Method: A descriptive cross-sectional study was conducted among the general dentists and dental residents of Kathmandu Valley of Nepal. Ethical clearance was taken from the Institutional Review Committee of Kantipur Dental College before conducting the study. Prior consent was taken from each participant before the study. A convenience sampling technique was used. A pre-designed self-administered questionnaire was used among 254 participants to collect the data. The data was entered in Microsoft Excel and analyzed using SPSS version 20 software. Descriptive statistics were presented using frequency and percentage. Chi square test was used to test the statistically significant differences and p value<0.05 was considered statistically significant.

Result: Altogether 254 general dentists and dental residents participated in the study out of which 22.5% were male and 77.5% were female. Majority of the participants had good knowledge regarding probiotics but most of them were not sure in the attitude and practice related domains. Comparison was done among the general dentists and dental residents in all the domains but knowledge on Probiotics, presence of adverse effects and probiotics can be recommended to the patients showed statistically significant association.

Conclusion: The present study showed that general practitioners and dental residents have sufficient awareness regarding probiotics. However, dental residents were found to have better knowledge, attitude and practice levels compared to general practitioners.

Keywords: attitude, knowledge, practice, probiotics.

INTRODUCTION

A symbiotic relationship with the host is shown by multiple bacteria which are present in the oral cavity and gastrointestinal tract. These bacteria perform important functions like immunity, harvesting energy, and lipid metabolism. To modify gut bacteria which was found to be beneficial for the health of the host, commercial products like probiotics and prebiotics have been developed.[1] Probiotics can be defined as living microbes, or as food ingredients containing living microbes, that beneficially influence the health of the host when used in adequate numbers.[2] Probiotics are available in the form of drugs, creams as well as dietary supplements such as cheese, yoghurt, etc. Probiotics not only help in the improvement but also in the treatment of oral infections such as dental caries, periodontitis, halitosis as per several studies.[3]

The first study which enlightens the beneficial use of microorganisms in the dentistry was done by Miller et al.[4] However nowadays multiple studies focusing on the effectiveness of probiotics on oral health have been carried out. Probiotics affect oral health in various ways such as decrease in plaque formation rate, changes in the secretary immunoglobulin levels in saliva,[5] release of antimicrobial substances, changes in the salivary secretion rate.[6] Microorganisms that are considered to be probiotics mainly belong to the genera Lactobacillus and Bifidobacterium. Lactobacilli and bifidobacteria are

"friendly" bacteria, which means that they normally occur in the human gastrointestinal and genitourinary tracts and thus play important role in promoting overall health.

Despite the numerous benefits of probiotics on oral health, the use of probiotics in dentistry is still limited. The main problem is lack of information about probiotics among the health care professionals.[7] The aim of this study is to evaluate the level of awareness of probiotics among the dental practitioners and dental residents of Kathmandu Valley of Nepal.

MATERIALS AND METHOD

A descriptive cross-sectional study was conducted among the general dentists and dental residents of Kathmandu Valley of Nepal for a period of four months (January 2024 – April 2024.). Ethical clearance was taken from the Institutional Review Committee of Kantipur Dental College before conducting the study. Prior consent was taken from each participant before the study. A convenience sampling technique was used and sample size was calculated by using; $N=z^2pq/e^2$ [where, p = 20.8%, q=1-p, z=1.96, e=5%. $N=1.96X1.96X0.208X0.792/(0.05)^2 = 254$]

A total of 254 participants; general dentists working in Kathmandu Valley and dental residents studying in different colleges of Kathmandu Valley of Nepal were included in the study.

A pre-designed self-administered questionnaire was adopted among 254 participants.[8] The questionnaire consisted of 15 questions; five questions related to knowledge, five questions related to attitude and remaining five questions were related to practice. The responses for each question was measured on three scales i.e. Yes, No, Not sure.

All the participants who have been working as general dentists and have been pursuing post-graduation in Kathmandu Valley and were willing to participate in the study were included. General dentists and dental residents of other cities of Nepal apart from Kathmandu valley were excluded in the study. The data was entered in Microsoft Excel and analyzed using SPSS version 20 software. Descriptive statistics were presented using frequency and percentage. Chi square test was used to test the statistically significant differences and p value<0.05 was considered statistically significant.

RESULT

A total of two hundred fifty-four subjects participated in the study, among which 153 (60.2%) were general dentists and 101(39.8%) were dental residents. Majority of the participants were female 197 (77.5%) and 57 (22.5%) were male.

Majority of the participants had good knowledge regarding probiotics but most of them were not sure in the attitude and practice related domains (Table no.1).

Table 1. Frequency distribution according to knowledge, attitude and practice

S.N	Questions	Yes	No	Not sure
	Knowledge			
1.	Are you aware of the term Probiotics?	230(90.6%)	-	24(9.4%)
2.	Do you have knowledge on the advantages of Probiotics?	197(77.6%)	34(13.4%)	23(9.1%)
3.	Do you know Streptococcus strains when used as probiotics are beneficial to oral health?	123(48.4%)	62(24.4%)	69(27.2%)
4.	Have you come across any food supplements that are sources of probiotics?	172(67.7%)	56(22%)	26(10.2%)
5.	Are you aware of any commercially available probiotics?	149(58.7%)	75(29.5%)	30(11.8%)
	Attitude			
1.	Do you think probiotics is helpful in providing quality oral care to the patients?	163(64.2%)	19(7.5%)	72(28.3%)
2.	Do you think probiotics helps in prevention of halitosis?	98(38.6%)	30(11.8%)	126(49.6%)
3.	Do you think probiotics can replace antibiotics?	43(16.9%)	95(37.4%)	116(45.7%)
4.	Do you think probiotics causes any adverse effects?	48(18.9%)	75(29.5%)	131(51.6%)
5.	Do you think the outcome of treatment with probiotics will be better than the conventional one?	84(33.1%)	47(18.5%)	123(48.4%)
	Practice			
1.	Would you consider probiotics as an adjunct to conventional periodontal therapy?	105(41.3%)	46(18.1%)	103(40.6%)
2.	Will there be any changes in the treatment protocol for patients with probiotics?	88(34.6%)	48(18.9%)	118(46.5%)
3.	Have you recommended probiotics to your patients?	56(22%)	178(70.1%)	20(7.9%)
4.	Do you think probiotics should be given to both healthy and periodontitis patients?	136(53.5%)	17(6.7%)	101(39.8%)
5.	Would you try a probiotic if recommended?	212(83.5%)	7(2.8%)	35(13.8%)

Table 2. Comparison of Knowledge among general dentists and dental residents

S.N	Knowledge	Response	General Dentist	Dental Resident	p value
1.	Are you aware of the term Probiotics?	Yes	132(86.3%)	99(98%)	<0.001*
		No	-	-	
		Not sure	21(13.7%)	2(2%)	
2.	Do you have knowledge on the advantages of Probiotics?	Yes	112(73.2%)	85(84.2%)	0.046*
		No	27(17.6%)	7(6.9%)	
		Not sure	14(9.2%)	9(8.9%)	
3.	Do you know Streptococcus strains when used as probiotics are beneficial to oral health?	Yes	68(44.4%)	55(54.4%)	0.284
		No	41(26.8%)	21(20.8%)	
		Not sure	44(28.8%)	25(24.8)	
4.	Have you come across any food supplements that are sources of probiotics?	Yes	97(63.4%)	75(74.3%)	0.135
		No	40(26.2%)	16(15.8%)	
		Not sure	16(10.4%)	10(9.9%)	
5.	Are you aware of any commercially available probiotics?	Yes	84(54.9%)	65(64.4%)	0.323
		No	49(32%)	26(25.7%)	
		Not sure	20(13.1%)	10(9.9%)	

*Statistically significant

Table 3. Comparison of Attitude among general dentists and dental residents

S.N	Attitude	Response	General Dentist	Dental Resident	p value
1.	Do you think probiotics is helpful in providing quality oral care to the patients?	Yes	99(64.7%)	64(63.4%)	0.348
		No	14(9.2%)	5(4.9%)	
		Not sure	40(26.1%)	32(31.7%)	
2.	Do you think probiotics helps in prevention of halitosis?	Yes	56((36.6%)	42(41.6%)	0.143
		No	23(15%)	7(6.9%)	
		Not sure	74(48.4%)	52(51.5%)	
3.	Do you think probiotics can replace antibiotics?	Yes	34(22.2%)	9(8.9%)	0.013*
		No	50(32.7%)	45(44.6%)	
		Not sure	69(45.1%)	47(46.5%)	
4.	Do you think probiotics causes any adverse effects?	Yes	24((15.7%)	24(23.8%)	0.003*
		No	57(37.2%)	18(17.8%)	
		Not sure	72(47.1%)	59(58.4%)	
5.	Do you think the outcome of treatment with probiotics will be better than the conventional one?	Yes	47(30.7%)	37(36.6%)	0.396
		No	32(20.9%)	15(14.9%)	
		Not sure	74(48.4%)	49(48.5%)	

*Statistically significant

Table 4. Comparison of Practice among general dentists and dental residents

S.N	Practice	Response	General Dentist	Dental Resident	p value
1.	Would you consider probiotics as an adjunct to conventional periodontal therapy?	Yes	56(36.6%)	49(48.5%)	0.169
		No	30(19.6%)	16(15.8%)	
		Not sure	67(43.8%)	36(35.7%)	
2.	Will there be any changes in the treatment protocol for patients with probiotics?	Yes	59(38.6%)	29(28.7%)	0.222
		No	29(18.9%)	19(18.8%)	
		Not sure	65(42.5%)	53(52.5%)	
3.	Have you recommended probiotics to your patients?	Yes	36(23.5%)	20(19.8%)	0.015*
		No	111(72.6%)	67(66.3%)	
		Not sure	6(3.9%)	14(13.9%)	
4.	Do you think probiotics should be given to both healthy and periodontitis patients?	Yes	85(55.6%)	51(50.5%)	0.460
		No	8(5.2%)	9(8.9%)	
		Not sure	60(39.2%)	41(40.6%)	
5.	Would you try a probiotic if recommended?	Yes	131(85.6%)	81(80.2%)	0.075
		No	6(3.9%)	1(1%)	
		Not sure	16(10.5%)	19(18.8%)	

*Statistically significant

DISCUSSION

The present study assessed the knowledge, attitude and practice of probiotics among the general dentists and dental residents of Kathmandu Valley of Nepal. In the present study, 90.6% of participants were aware of the term probiotics, which could be because of the academic curriculum, which was similar with the study conducted by Cheppalli N P et al[8] which reported 86.5% of participants were aware about probiotics. This indicated that the participants have basic knowledge of probiotics. In current study, 44.7% of the dental residents were aware of the beneficial effects of Streptococcus strains as probiotics to oral health. However, in the study conducted by Patait et al[9], 94.1% of dental postgraduates were aware of beneficial effects of Streptococcus strains as probiotics.

In the present study, around 83.5% of participants reported that they are willing to use probiotics if recommended, which is similar to the findings of the study conducted by Sunayana et al.[10], where 84% of the participants were ready to use probiotics. Similar results were seen in a study conducted by Krishnan et al.[11], where 44.8% of the participants were willing to use probiotics.

In the present study, 67.7% of the participants had knowledge regarding food supplements being the source of probiotics, which is similar to the study conducted by Patait et al[9], where 67.6% of the postgraduates were aware that food supplements can be the source for probiotics.

Krishnan et al[11] reported that 66.5% of the participants had knowledge regarding the advantages of probiotics and similar results have been observed in the present study with 77.6% participants being aware of the advantages of probiotics.

In a study conducted by Prasad et al[12], 4% of the general practitioners opined that probiotic could cause adverse effects while in present study, 15.6% of general practitioners thought probiotics had some side effects.

In our study, 22% of the participants had recommended probiotics, while in a study conducted by Prasad et al, 66% of the participants had prescribed probiotics.[12]

In our study, 22.2% of general practitioners expressed their opinion that probiotics can replace antibiotics, while in a study conducted by Prasad et al, 79% of the general practitioners opined that probiotic could overcome the side effects of antibiotics.[12] About 64.2% of participants accepted that probiotics are helpful in providing quality oral care to the patients in the present study, similar results were reported by Krishnan et al.[11]

Further studies need to be carried out regarding the barriers of usage of probiotics in daily practice and in large population.

CONCLUSION

The present study showed that general practitioners and dental residents have sufficient awareness regarding probiotics. However, dental residents were found to have better knowledge, attitude and practice levels compared to general practitioners. Most of them were aware of the beneficial effects of probiotics on the human body and most of them are willing to use and prescribe probiotics if recommended.

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Comparative evaluation of shear bond strength of total etch adhesives with self etch adhesives to dentin: An in vitro study

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ABSTRACT

Introduction: Adhesive dentistry has revolutionized restorative dental practice. Recent advances in resin adhesives, as well as an increased demand for esthetics have stimulated a great increase in the use of resin-based composites. Currently, there are several self-etching systems available but little is known about their capacity to adhere to dental hard tissues. Bond strength testing is used as a screening tool to help understand and predict the clinical behaviors of adhesives.

Objectives: To compare and evaluate the shear bond strength of total etch adhesives with self etch adhesives to dentin.

Materials and Method: A total of 60 samples were evaluated. The roots of teeth were embedded on acrylic resin blocks. The occlusal surface of each tooth was reduced to expose flat surface of superficial dentine. Surface area to be bonded was standardized using vernier caliper. The samples were randomly divided into four groups. After conditioning and application of the bonding adhesives, composite resin (Prime Dent) was placed. Specimens were transferred to the universal testing machine and subjected to shear load of 1.0 mm/minute. Force was applied till the bond failure occurred. Independent-t test and Analysis Of Variances (ANOVA) were used to compare mean bond strengths between various dentin bonding systems.

Result: The comparison of mean bond strengths of total etch with self etch adhesive system showed total etch has higher bond strength which has reached statistical inference with p value of 0.021. This indicated that in terms of mean bond strengths the total etch group is superior to self - etch group. The highest bond strength is shown by Gluma 2 Bond (Total etch) which is 14.72 MPa and lowest by U - Bond (Self etch) which is 10.44 MPa.

Conclusion: The mean bond strength of total etch system is higher than self etch system with statistical significance.

Keywords: Total etch, Self etch, Bonding Adhesives, Universal Testing Machine, Shear Bond Strength.

INTRODUCTION

Adhesive dentistry is a rapidly evolving discipline. It has revolutionized restorative dental practice over time. Advancement in resin adhesives and restorative materials and increased demand for esthetics, have stimulated an increase in the use of resin-based composites in anterior and posterior teeth. Improved adhesive materials have made resin based composite restorations more reliable and long lasting.[1,2,3]

Diverse types of adhesives exist which are classified according to their bonding mechanism and clinical application approach into total etch and self-etch adhesives.[4] Bonding to enamel is predictable and can be achieved using the acid-etching technique, while bonding to dentin is more difficult due to high organic composition, continuous moist condition, permeability properties and presence of smear layer after cavity preparation.[5] Adhesive systems have evolved with changes in chemistry, mechanisms, application techniques and clinical effectiveness.[6] Dentin adhesives are available as three, two & single step systems, depending on the three cardinal steps of etching, priming and bonding to tooth substrate are accomplished.[7,8]

Total etching is the classic technique of utilizing 35% to 37% phosphoric acid gel to prepare both the enamel and the dentin for adhesive procedures. Most present-day total etch adhesives produce shear bond strength of composite resin to enamel of around 20-25 Mpa.[9] Bond strengths in this range provide routinely successful retention and sealing of resins for a variety of clinical applications. One of the advantages of this technique is its ability to remove the smear layer and demineralize the most superficial hydroxyapatite crystals which prepares dentin for bonding

resulting in high bond strengths. On the other side are the disadvantages, over-etching the dentin results in postoperative sensitivity. Also, total etch is "technique sensitive", in regard to how much moist should the dentin be before placing the dentin adhesive, it appears that the degree of surface wetness that is optimal for ideal dentin bonding varies widely among marketed products.[10,11,12,13]

Newer concepts of self etching system are introduced to overcome the disadvantages of total etch technique. In regards to user-friendliness and technique sensitivity, self-etch technique has been promising. It no longer needs an "etch & rinse" phase as they condition and prime dentin simultaneously by infiltrating and partially dissolving the smear layer, which not only lessens clinical application time, but also significantly reduces technique-sensitivity or the risk of making errors during application and manipulation.[13,14] Another advantage of these systems is the near absence of postoperative sensitivity. The absence of postoperative sensitivity comes from not over-etching or over-drying the dentin.[15]

Currently, there are several self-etching systems available but little is known about their capacity to adhere to dental hard tissues. Since bond strength testing is used as a screening tool to help understand and predict the clinical behaviors of adhesives, this in vitro study is aimed to evaluate and compare the shear bond strength (SBS) to dentin achieved with different total etching and self-etching systems.

MATERIALS AND METHOD

This study was performed in the Department of Conservative dentistry and Endodontics, Peoples Dental College and Hospital and in Bureau of Standards and Metrology, Kathmandu. Sixty extracted maxillary and mandibular premolars were collected from Department of Oral and Maxillofacial Surgery, Peoples Dental College and Hospital and other private clinics. Intact teeth; free of caries, non-root canal treated, without restorations, extracted for orthodontic treatment purposes were selected for the study. All the selected teeth were thoroughly cleaned with an ultrasonic scaler, debrided of blood and saliva and stored in distilled water until use. The specimen teeth were utilized within three months of extraction. The specimen teeth were mounted on blocks using cold cure acrylic resin to embed the root portion. The occlusal surface of each tooth were reduced with a high speed hand-piece using diamond bur under constant water spray in order to expose flat surface of superficial dentine. To standardize bonded surface area, enamel and dentin was also grounded to expose dentin in dimension of 4×4 mm^2; measurements were checked using vernier caliper.

In present study, shear bond strength test was performed for evaluating the bond strength. The high preference for shear bond strength test is attributed due to minimal equipment required for specimen preparation and convenience to conduct, requiring minimal equipment and specimen preparation.[9,11] To maintain the morphological heterogeneity and composition uniform, intact, caries-free premolars extracted for orthodontic reasons were selected. Studies have shown that sclerotic dentin lead to decreased resin infiltration into dentinal tubules.[9] Also, carious dentin loses more of its mineral phase resulting in lower bond strength. Teeth extracted for longer than six months could have degenerative changes in dentinal protein affecting the bond strength. Hence, teeth samples extracted within 3 months were used. Distilled water was used for storage of specimen samples in order to maintain the hydration and to prevent the collapse of collagen fibrils.[11]

The prepared samples were randomly divided into four groups with 15 specimens in each group. For identification purpose, each acrylic blocks were assigned different numbers belonging to different groups. Total etch adhesives; Gluma 2 Bond (Heraeus) (Group IA) and Meta P& Bond (Meta Biomed) (Group IB) were used. Gluma 2 Bond (Heraeus) contains glutaraldehyde as desensitizing agent. Similarly, single step self etch adhesives; U-Bond (Vericom) (Group IIA) and Bond Plus SE (Medicept) (Group IIB) were used.

Group IA - Gluma 2 Bond (Heraeus): Prepared specimens were first treated with 37% phosphoric acid gel for 15 seconds. The gel was rinsed off with water and blot dried with cotton pellet, with an applicator tip adhesive was applied to the prepared surface. The adhesive was left to set for 15 seconds. To evaporate the solvent and residual moisture, gentle air stream was applied until no movement of liquid was detected. The prepared dentin surface was checked for shiny appearance, to confirm proper coating by the adhesive. The bonding adhesive was then cured for 20 seconds with LED (Youhong electronics, China) curing unit.

Group IB - Meta P& Bond (Meta Biomed): Prepared specimens were treated with 37% phosphoric acid gel for 15 seconds. The acid gel was rinsed for 20 seconds with water and blot dried with moist cotton pellet. After blot drying, double coat of the adhesive was applied with the applicator tip, and gently air dried for 5 seconds and cured for 10 seconds with LED curing unit.

Group IIA - U-Bond (Vericom): After cleaning the prepared specimen, with the help of applicator tip one coat of adhesive was applied by scrubbing the surface for 20 seconds. To spread the adhesive, air was applied for 5 seconds till the surface appeared glossy, then cured for 10 seconds using LED curing unit.

Group IIB – Bond Plus SE (Medicept): The prepared

specimen were thoroughly washed with water spray and air dried, using an applicator tip the adhesive was applied in brushing motion for 20 seconds, again second application of the adhesive was made in brushing motion for 20 seconds.

The surface was then gently air dried for at least 5 seconds and cured for 10 seconds using LED curing unit.

After applying the bonding adhesives, composite resin (Prime Dent) was placed in a 2-layer increment using plastic mould and light-cured for 40 seconds for each specimen. All the specimens were stored in distilled water for 24 hours prior to shear bond strength testing. All specimens were transferred to the universal testing machine (Shimadzu corporation, Japan) (Fig. 1) and subjected to shear load at crosshead speed of 1.0 mm/minute. The force was applied till the bond failure occurred. The maximum load to debond the specimen was recorded in Newton. Shear bond strength was calculated in megapascal units (MPa) by the ratio of maximum load in Newton to the cross-sectional area of the bonded interface in millimeters.

The data collected were entered and coded in Microsoft excel. The data was then transferred to Statistical Package for Social Sciences (SPSS) version 17.0 for statistical analysis.

Fig1: Specimen mounted in Universal Testing Machine.

The mean bond strength between various dentin bonding systems were compared using independent-t test and Analysis of Variances (ANOVA). Further, post-hoc comparisons were made between all the dentin bonding systems. The level of significance was set at 5%.

RESULT

The total etch showed high mean bond strength compare to self etch which indicates mean bond strength of total etch group is superior to self-etch group and statistically significant (p=0.021) (Table1).

Table 1. Comparison of mean bond strengths of total etch with self etch dentin bonding systems

Bonding systems	Mean (±SD) MPa	Mean Diff	Std Error of Difference	95% CI of the difference		p value
				Lower	Upper	
Total etch	13.35 (±1.90)	1.22	0.51	0.187	2.246	0.021*
Self etch	12.13 (±2.07)					

*Statistically significant

Table 2. Descriptive statistics for bond strength of various dentin bonding systems

Bonding systems	Types	Mean	Std Dev.	Std Error	Range (Min - Max)
Total etch	Gluma 2 Bond	14.72	1.13	0.29	12.50 - 16.44
	M eta P Bond	11.97	1.47	0.38	10.19 - 15.25
Self etch	U Bond	10.44	1.45	0.37	06.56 - 12.50
	Bond Plus SE	13.82	0.83	0.21	12.19 - 15.69

Gluma 2 Bond adhesive system showed highest mean bond strength range of 16.44 MPa and lowest value of 12.5 MPa. The lowest strength has been reported by U-bond; self-etching adhesive system with minimum value of 6.56 MPa and maximum value of 12.50MPa (Table 2).

Table 3. Comparison of mean bond strengths of four dentin bonding systems

Comparison of means	Sum of squares	Mean square	F statistic	p value
Between Groups	164.47	54.82	34.94	<0.001*
Within Groups	87.86	01.56		

*Statistically significant

Results from analysis of variances showed that there is statistical significant difference ($p < 0.001$) in mean values among four dentin bonding adhesive systems (Table 3) but Gluma 2 Bond and Bond Plus SE was not statistically significant (Table 4).

Table 4. Post-hoc comparisons of mean bond strengths of four dentin bonding systems

Principal Group	Comparison Group	Mean Difference	Std. Error	95% Confidence Interval		p value
				Lower	Upper	
Gluma 2 Bond	Meta P & Bond	2.746	0.457	1.534	3.957	< 0.001*
	U- bond	4.280	0.457	3.068	5.491	<0.001*
	Bond Plus SE	0.899	0.457	- 0.311	2.110	0.213
Meta P & Bond	Gluma 2 Bond	- 2.746	0.457	-3.957	-1.534	<0.001*
	U- bond	1.534	0.457	0.322	2.745	0.008*
	Bond Plus SE	- 1.846	0.457	- 3.057	- 0.635	0.001*
U- Bond	Gluma 2 Bond	- 4.280	0.457	- 5.491	- 3.068	<0.001*
	Meta P & Bond	- 1.534	0.457	- 2.745	- 0.322	0.008
	Bond Plus SE	- 3.380	0.457	- 4.591	- 2.169	<0.001*

*Statistically significant

DISCUSSION

In present study, the mean shear bond strength obtained for total etch adhesive and self etch adhesive were 13.35 MPa and 12.13 MPa respectively. Results showed that total etch adhesives had higher mean of shear bond strength compared to self etch adhesives. The findings of present study is consistent with those of Soderholm et al, Raposa et al, Hegde et al,[12,14,17] who found that total etch adhesive performed better than self-etching adhesives. In total etch adhesives, application of phosphoric acid before applying the adhesive acts by removing the smear layer, demineralizing the superficial dentin structure and exposing the collagen fibrils.[18] The exposed collagen provides reactive groups that chemically interact with bonding adhesives, creating a framework of resin-demineralized dentin hybrid layer which results in strong micromechanical interlocking. The solvent used in total etch adhesives are ethanol; it replaces moisture in dentinal tubules due to high vapor pressure, promoting infiltration of monomers through the spaces of exposed collagen network, increasing the thickness of hybrid layer.[13,19,20]

On the other hand, self etch adhesives depends on weak acidic monomers for simultaneous demineralization of superficial dentin and penetration of adhesive resin, resulting in formation of thinner and shorter resin tags compared to those produced by phosphoric acid etching.[21] Another reason for lesser bond strength of self etch adhesives could be its greater hydrophilic nature. The higher water content of adhesive dilutes the primer leading to incomplete polymerization of the monomer resulting in decreased bond strength.[22,23]

Among the two total etch adhesives used, Gluma 2 Bond (Heraeus) gave higher mean bond strength of 14.72 Mpa compared to 11.97 Mpa of Meta P& Bond (Meta Biomed). Our result is in agreement with previous studies by Ravikumar et al, Ritter et al[17,24] Better bond strength could be due to the presence of glutaraldehyde in Gluma 2 Bond's composition. The aldehyde group of glutaraldehyde cross-linking primarily with the e-amino groups of lysine and hydroxylysine residues in dentin collagen resulting in protein fixation demonstrates that glutaraldehyde bonds to dentin collagen fibrils, possibly, stabilizing the collagen layer and thus contributing to improved bond strengths.[17,24]

In the present study, Bond Plus SE (Medicept), a self etch adhesive produced statistically comparable mean bond strength to that of Gluma 2 Bond (Heraeus) and higher than Meta P & Bond (Meta Biomed), both are total etch adhesives. Bond Plus SE has 15% fillers content in its composition. Miyazaki et al. study found that 10 – 20% of filler content in adhesives was adequate to increase the bond strength. The presence of fillers produces sufficiently thick resin film that stabilizes hybrid layer and provides elastic buffer zone that compensates for shrinkage stress during polymerization.[22] The study also showed bonding agents with over 30% filler content had lower bond strength due to increased viscosity reducing penetration of adhesive monomers into the dentinal tubules creating internal voids. The functional monomers of self etch adhesives interact with Ca^2 to form apatite crystallites within the partially demineralized hybrid layer to form an insoluble calcium salt. This chemical interaction between the hydroxyapatite or collagen and functional monomers in the adhesive contributes to bond effectiveness of self-etch adhesives.[25]

Among the four bonding agents, U-Bond (Vericom) gave the least mean bond strength of 10.44 Mpa. U-Bond is the only bonding agent having acetone based solvent in present study. Previous studies have shown that single step adhesives containing acetone based solvent has affected their bond strength. As, acetone has a lower boiling temperature (56.5°C) and higher vapor pressure (200 mmHg) compared to ethanol (78.3°C/43.9 mmHg) and water (100°C/17.5 mmHg), it is likely that, due to early evaporation of solvent, the adhesive layer can be thinner than that formed by the ethanol/water based material.[26] The thinner the adhesive layer, the more susceptible it is

to polymerization inhibition (inhibit polymerization) by oxygen resulting in weaker bond strength.[27]

CONCLUSION

The total etch adhesive showed higher shear bond strength. The total etch technique is found to be effective approach for achieving stable bonding. Clinical application procedure for self etch is easier compare to total etch. The self etch adhesive provide lower bond strength than total etch adhesive because of their semi permeability, incorporation of smear layer, shorter resin tag formation, residual acidity and hydrolytic instability.

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A Comparative study of block characteristics with and without addition of pethidine or fentanyl to hyperbaric bupivacaine in subarachnoid blocks

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ABSTRACT

Introduction: Subarachnoid block (SAB) is a very popular mode of anaesthesia for lower abdominal and lower limb surgeries. Several studies have shown that spinal opioids provide profound post-operative analgesia with fewer side effects compared to their intravenous administration.

Objectives: This study compared hyperbaric bupivacaine alone to hyperbaric bupivacaine combined with pethidine or fentanyl for SAB.

Materials and Method: This prospective, double blind, three-group comparative study involve 90 patients requiring elective lower abdominal and lower limb surgeries. They were allocated to three different groups: hyperbaric bupivacaine alone (HB, n=30), hyperbaric bupivacaine with pethidine (1 mg/kg) (HBP, n=30), hyperbaric bupivacaine with fentanyl 25 mcg (HBF, n=30), which was totaled to a volume of 4 ml. The onset of sensory block to T10, complete motor block as per Modified Bromage Scale and duration of analgesia were studied.

Result: The onset of sensory block in minutes was 5.38±2.64, 4.52±2.43 and 5.74±5.18 in HB, HBP and HBF groups respectively. The onset of motor block was 7.59±5.32 minutes, 7.93±3.36 minutes and 9.18±4.33 minutes in HB, HBP and HBF groups respectively. The onset of sensory and motor blocks was statistically not significant *(p value> 0.05)*. Duration of analgesia was 424.53±312.99 minutes for HB group, 428.33±285.12 min in HBP group and 400.45±205.32 minutes in HBF group, which was also statistically not significant. Mean Ramsay Sedation Scale was found to be 3.12 in HBP which is higher than in HB and HBF groups. The increased incidence of hypotension (20%), bradycardia (6.7%), post-operative nausea and vomiting (13.3%) were encountered in HBP group. Pruritus was higher with fentanyl (23.3%) whereas shivering was more common in HB group (26.7%).

Conclusion: Addition of fentanyl or pethidine to hyperbaric bupivacaine for SAB did not expedite block onset of hyperbaric bupivacaine or prolong the duration of analgesia. Pethidine increased the incidence of hypotension, while fentanyl increased pruritus.

Keywords: Bupivacaine, fentanyl, motor block, pethidine, sensory block, subarachnoid block

INTRODUCTION

Neuraxial opioids and local anaesthetics act synergistically to prolong analgesia with reduced side effects.[1] Pethidine differs from the other opioids as it has local anaesthetic properties and can be used as a sole agent in regional anaesthesia.[2] Doses of 1 mg/kg of intrathecal pethidine has been reported to induce surgical anaesthesia in subarachnoid block for caesarean sections and urological surgeries.[3,4,5] However, side effects like pruritus, nausea, vomiting and respiratory depression may limit its routine use.[6] Fentanyl also has a weak local anaesthetic effect.[7] Several studies have used 25 μg or lower intrathecal fentanyl as an adjunct to a local anaesthetic with good results with regards to the onset of sensory and motor block.[8,9,10,11] Longer the duration of sensory block, better is the post operative analgesia, leading to decreased post operative analgesic requirement and cost to the patient. Hence, this study was conducted to evaluate the effects of pethidine or fentanyl to bupivacaine in subarachnoid blocks at Kathmandu Medical College Teaching Hospital.

MATERIALS AND METHOD

A prospective, double blind, three-group comparative study was conducted in the Department of Anaesthesiology of Kathmandu Medical College and Teaching Hospital with study duration of six months from January to July 2010. Following ethical clearance from Institutional Review Committee of KMCTH (Ref: SNCS:09/September), 90

ASA-PS I and II patients, age 18-65 years, scheduled for elective surgical procedures of lower abdomen and lower limbs, were included and informed consent was obtained. Patients denying consent, having a history of hypersensitivity to pethidine, fentanyl or local anaesthetics or history of abuse to illicit drugs, coagulation disorders, spinal deformities, critical aortic or mitral stenosis, infection at the site of injection, or anticipated surgical duration of >4 hours were excluded. The Numerical Rating Score (NRS) was used to quantify pain in the post-operative period, and the patients were informed about the use NRS during the PAC. NRS is an 11-point scale (0–10) where patients verbally or visually select a number, with 0= "no pain" and 10= "worst pain imaginable".

The patients were kept nil by mouth from midnight. Each patient received Tab. Ranitidine 150 mg, Tab. Metoclopramide 10 mg a night before the surgery.On the day of the surgery, appropriate monitors were attached (electrocardiogram, non invasive blood pressure cuff and pulse oximeter) pre-procedure baseline hemodynamics were recorded. Intra-venous access was secured with an 18 G canula and 8 ml/kg of crystalloid was given as pre-load. Patients were allocated to three parallel groups via computer-generated assignment: only hyperbaric bupivacaine (HB, n=30), hyperbaric bupivacaine with pethidine (1 mg/kg) (HBP, n=30), hyperbaric bupivacaine with fentanyl 25 micrograms (HBF, n=30). The total volume of 0.5% hyperbaric bupivacaine with or without opioids was 4 ml. All interventions were prepared by an anaesthesiologist who was not involved in the patient assessment. SAB was administered in a sitting position with a 27 G Whitacre needle at L3-L4/L4-L5 in case of failure with the former and 4 ml of local anaesthetic was given over 20 seconds.12,13 Autonomic blockade was assessed by ice cubes, while blunt pin prick tests were done for sensory blockade. Motor blockade was assessed using modified Bromage scale, where Grade I=No block with free movement of legs and feet, Grade II=partial block with patient just being able to flex knees with free movement of feet, Garde III=almost complete block with patient being unable to flex knees, but with free movement of feet and Grade IV=complete block with patient being unable to move legs or feet.14 The onset of sensory block was defined as the time from completion of subarachnoid block to the occurrence of sensory block at T10 dermatomal level whereas the onset of motor block was taken as the time taken to achieve complete motor block.

This measurement was done every minute for the first five minutes, then every two minutes till twenty minutes of SAB. Incision was allowed when adequate sensory block with at least grade III motor block was achieved. Heart rate (HR), blood pressure (systolic, diastolic and mean arterial pressure), oxygen saturation (SpO2) and respiratory rate (RR) were measured every 5 minutes.

Any complications during the intra-operative period were recorded and treated if necessary. Hypotension was defined as systolic BP of <90 mm of Hg or fall in blood pressure of > 30 % from the baseline.15 Hypotension was treated with intravenous fluids and Inj. Mephentermine 6 mg till the systolic blood pressure was > 90 mm Hg. Bradycardia was defined as HR < 50/min and treated with atropine (0.02 mg/kg), if required. Respiratory depression was defined as RR<8/min or fall in SpO2 <85%, for which supplemental oxygen was given via nasal prongs at 2 liters/min. If the patient complained of pain in the intraoperative period, intravenous fentanyl 25 microgram was given. Possible sedation due to opioids was assessed using Ramsay Sedation Scale (RSS), where 1=Anxious or restless or both, 2=Cooperative, orientated and tranquil, 3=Responding to commands, 4=Brisk response to stimulus, 5=Sluggish response to stimulus, and 6=No response to stimulus.16 Possible adverse effects of intra-thecal opioid like pruritus, nausea, vomiting, shivering and respiratory depression were recorded and treated if required.

Post-operatively, the patients were monitored for 24 hours. Pain was assessed on the Numerical Rating Scale (NRS). Rescue analgesia was given to the patient on demand (NRS>3) and the time for first analgesic dose was recorded. The total duration of analgesia was taken as the time interval between injection of the spinal drugs and the request for analgesia. Post-operative hemodynamic parameters and complications were recorded.

Data were entered in Microsoft Excel and analysed using Statistical Package for the Social Sciences Version 20 (SPSS Inc; Chicago, IL, USA). Descriptive statistics included percentage, mean, median and standard deviation (SD). Inferential statistics included ANOVA (Analysis of Variance) test and Chi square test. A value of $p < 0.05$ was considered to be statistically significant. Results were expressed as mean ± SD.

RESULT

A total of 100 patients were assessed but 10 participants did not agree to participate therefore, 90 patients were enrolled in the study as shown in Figure 1. Patient demographics and intraoperative parameters were similar across the three groups, minimizing confounding variables (Table 1). There were 38 (42.2%) patients from Orthopaedics, 32 (35.6%) from Surgery, and 20 (22.2%) from the Gynaecology department.

Figure 1: Participants enrollment flowchart according to inclusion criteria

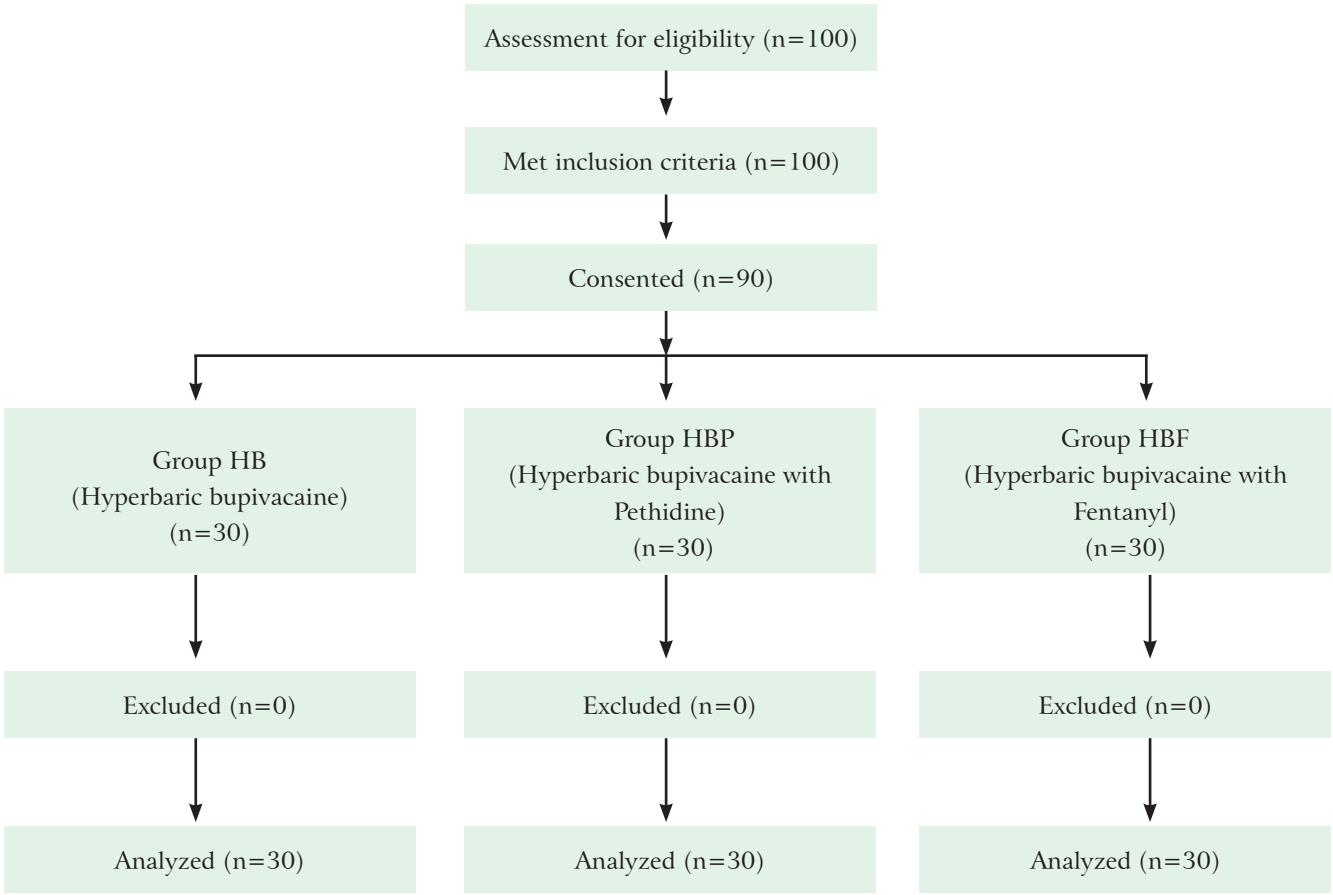

Table 1. Demographic profile and intra-operative parameters

S.No.	Variables	Group HB (n=30)	Group HBP (n=30)	Group HBF (n=30)	*p*-value
1.	Age (years)	40.93±15.17	44.40±13.45	40.30±12.69	0.20
2.	Weight (kilograms)	62.23±9.65	54.40±7.79	59.33±10.71	0.90
3.	Pre-loading (ml)	486.67±50.74	493.33 ±36.51	486.67±50.74	0.85
4.	Intra-operative fluid (milliliters)	1459.33±330.45	1464.33±522.43	1410.33±358.58	0.81
5.	Duration of surgery (minutes)	71.40±25.56	83.97±37.21	68.33±31.11	0.24
6.	ASA** Grading: I	22 (73.33%)	24 (80%)	25 (83.33%)	0.62
	ASA Grading: II	8 (26.67%)	6 (20%)	5 (16.67%)	
7.	Gender				0.10
	Male	14 (46.7)	18 (60)	11 (36.7)	
	Female	16 (53.3)	12 (40)	19 (63.3)	

Notes: Data are presented as mean±SD or number (percentage). *p*-value calculated with ANOVA* test (quantitative variables) and Chi-square test (qualitative variables. **ASA:American Society of Anesthesiologists Grading, HB- Hyperbaric Bupivacaine HBP- Hyperbaric Bupivacaine with Pethidine, HBF Hyperbaric Bupivacaine with Fentanyl

The time taken for the onset of sensory and motor block was not significantly different between the three groups, nor were the duration of analgesia and the time taken for the time to achieve the highest sensory level (Table 2).

Table 2. Block characteristics between the three groups

S.No.	Variables	Group HB	Group HBP	Group HBF	*p*-value
1.	Onset of sensory block (minutes)	5.38±2.64	4.52±2.43	5.74±5.18	0.07
2.	Time taken to achieve the highest level of sensory block (minutes)	22.73±9.35	25.8±10.30	26.57±15.75	0.43
3.	Onset of motor block (minutes)	7.59±5.32	7.93±3.36	9.18±4.33	0.34
4.	Duration of analgesia (minutes)	424.53±312.99	428.33±285.12	400.45±205.32	0.91
5.	Ramsay Sedation Scale	3±1.05	3.12±0.97	2.75±0.78	0.41

Notes: Data are presented as mean±SD. *p*-value calculated with the ANOVA* test

The mean duration of analgesia between the two individual groups was studied using the ANOVA test. The means were not statistically significant. Three patients did not demand for analgesia during the first 24-hour period postoperatively. One patient was under Group HB and had undergone Ureterorenoscopy with Intra-Corporeal Pneumatic Lithotripsy (URS/ICPL) for left-sided distal ureteric calculi. Another patient was in Group HBP, who had undergone mesh repair for right inguinal hernia. Third patient was in Group HBF and was operated for left ureteric calculi with bilateral nephrolithiasis with bilateral hydronephrosis.

The intraoperative complications encountered in the intraoperative period have been tabulated in Table 3. The increased incidence of hypotension (20%), bradycardia (6.7%), and nausea and vomiting (13.3%) were encountered in Group HBP. Pruritus was higher in Group HBF (23.3%) whereas shivering was more common in Group HB(26.7%). Acute retention of urine was observed only in Group HB; four patients (13.33 %) had retention of urine. RSS was higher in Group HBP with 83.3% being sedated in contrast to 33.3% in Group HB and 66.6% in Group HBF.

Table 3. Perioperative complications between the three groups

Groups	Group HB	Group HBP	Group HBF
Parameters	N (%)	N (%)5	N (%)
Hypotension	1(3.33%)	6(20%)	2(6.67%)
Bradycardia	1(3.33%)	2(6.67%)	1(3.33%)
Respiratory depression (SpO2< 85% or RR< 8/min)	6(20%)	10(33.33%)	6(20%)
Shivering	8(26.67%)	2(6.67%)	2(6.67%)
Nausea/vomiting	0 (0%)	4(13.33%)	0(0%)
Pruritus	1(3.33%)	6(20%)	7(23.33%)
Retention of urine	4(13.33%)	0(0%)	0(0%)

In the post-operative period, Numeric Rating Scale (NRS) was used to evaluate pain of the patient. It was seen that NRS scores were equivalent in the immediate post-operative period in all three groups with the *p*-values being more than 0.05 (Table 4).

Table 4. Numeric Rating Scale in post-operative period

Hours post op	Median value	Group			*p*-value
		HB (n)	HBP (n)	HBF (n)	
1 > 0 <=0	0.00	7 21	7 22	7 23	0.99
2 > 0 <=0	0.00	11 15	16 12	11 18	0.32
3 > 2 <=2	2.00	12 12	12 11	10 15	0.66
4 > 3 <=3	3.00	6 11	8 10	10 11	0.74
5 > 3 <=3	3.00	6 7	5 9	6 7	0.81
6 > 4 <=4	4.00	6 5	3 7	4 6	0.51

Notes: Data presented as number of patients. *p*-value calculated with Kruskal-Wallis* test

DISCUSSION

This study assessed the effects of three different spinal regimens: hyperbaric bupivacaine plain, hyperbaric bupivacaine with pethidine, and hyperbaric bupivacaine with fentanyl in 90 patients undergoing lower abdominal and lower limb surgeries in the general surgery, orthopaedics, and gynaecology departments. The addition of pethidine or fentanyl to hyperbaric bupivacaine in subarachnoid blocks did not speed up the onset of sensory or motor block or prolong the duration of post-operative analgesia in this study. The addition of opioids to local anaesthetics improves the quality of intra-operative block and prolonged post-operative analgesia. The results of this study, however, did not confirm this statement.

The endpoint of onset of sensory block in this study was taken as the time from the administration of the drug intrathecally to the loss of pinprick sensation at T10 dermatomal level bilaterally. The mean time of onset of sensory block at T10 in Group HB was 5.38±2.64 minutes, in Group HBP, it was 4.52±2.43 minutes, and in Group HBF, 5.74±5.18 minutes. The faster onset of sensory block in Group HBP may be due to the addition of pethidine, which possesses local anaesthetic properties. Pethidine has been found to produce not only sensory block but also motor and sympathetic block. This difference was, however, statistically not significant ($p > 0.05$) and showed that the addition of either pethidine or fentanyl did not affect the speed of the onset of sensory block. Naguib M et al found the onset of sensory block in patients undergoing hemorrhoidectomy using 1 mg/kg of undiluted pethidine to be 5.8±2.1 minutes, which is comparable with that of the current study.[17] The faster onset seen in this study may be due to the interaction with hyperbaric bupivacaine and the higher volume of the intrathecal drug. Cheun JK et al have found the onset of sensory block to be 7.3±3.4 minutes when they used 50 mg of pethidine with 0.5 ml of 10% dextrose in 182 patients undergoing lower segment caesarean section.[18] The result obtained in this study is also similar to Acalovschi I et al, where they found the onset of sensory block to be 5.28±1.43 minutes.[19] The results from the study done by Patra et al, however, have different results.[20] They found that the addition of fentanyl to hyperbaric bupivacaine sped up the onset of sensory block from 7.44±2.2 minutes to 5.39±2.21 minutes when 25 μg of fentanyl was added to an even lower dose of hyperbaric bupivacaine for endoscopic urological surgeries.

Bromage score was used to assess the motor blockade characteristics in the present study. The time required for the patient to be unable to move his/her lower limbs after subarachnoid block was taken as the time for the onset of motor block. Though the onset of motor block was actually longer in the fentanyl group, the difference between the means was not statistically significant ($p = 0.34$). The addition of neither pethidine nor fentanyl was found to affect the onset of motor block. The onset of motor block in this study was found to be longest in Group HBF; the reason may be that fentanyl and other opioids have been known to produce just segmental sensory analgesia. It is only pethidine, which has significant local anaesthetic properties, that exhibits all the effects of intrathecal administration of local anaesthetics, i.e., motor, sensory, and sympathetic blockade. The study done by Biswas BN et al also shows similar findings, which concluded that there was no difference in the onset of motor block when 12.5 μg of fentanyl was added to 2 ml of 0.5% hyperbaric bupivacaine in patients undergoing caesarean section.[21] The onset was seen at 5.4±1.1 minutes. The time of onset in the two studies is quite different. The reason for the faster onset of motor block in their study may be because their subjects included pregnant patients, the effects of which led to the faster onset of blockade.[21] Singh H et al also found that intrathecal fentanyl did not augment the onset of sensory or motor block. The onset of complete motor block was at 8.6±4.1 minutes which is in accord with our study.[22] The results of all these studies show that low-dose bupivacaine or fentanyl alone is not enough to produce motor block. A higher dosage of bupivacaine is required, which has been proven by this present study. The probable reason may be that motor fibers are Aα fibers, which have the thickest diameter (12-20 mm) among all the nerve fibers and thicker motor nerves, thus, require more local anaesthetics to be spent for their effective block.

The duration of analgesia in this study was regarded as the time between the administration of the subarachnoid block to the time when the first dose of rescue analgesia was given. When the mean analgesic duration was compared between the three groups, it was not found to be statistically significant ($p = 0.91$). The results of this study showed that the quality of analgesia was comparable in all three groups. The duration of analgesia was longer in this study than the mean duration of analgesia quoted in most of the studies, and it might be due to the higher dose of hyperbaric bupivacaine used. Opioids are added to local anaesthetics as it has been found that opioids improve block characteristics and reduce the need for systemic opioids in post-operative period.[23] Biswas BN et al used 12.5 μg of fentanyl with 10 mg of bupivacaine in caesarean section and found the duration of analgesia to be 4.13 hours, whereas in the control group, the duration was 2.5 hours.[21] In the study by Shrestha BR et al, however, the duration of analgesia with sole 1 mg/kg of pethidine for

lower segment caesarean sections was found to be 8.5 hours while in the sole bupivacaine group, it was 2.65 hours.[24] The difference may be due to the variation in demographic profile, methodology, and the nature of surgery.

Regarding hemodynamics, Group HBP had the higher incidence of hypotension (20%) and bradycardia (6.7%). The statistically significant difference in hypotension between Groups 1 and 2 (p=0.04) suggests that pethidine may exacerbate hemodynamic instability. The most probable reason may be the augmentation of the sympathetic block of bupivacaine by pethidine, as it also possesses a local anaesthetic-like effect. Though it was not statistically significant, Group HBP also had a high incidence of respiratory depression. This may be because of the higher dose of pethidine used in this study. But none of the patients had persistent respiratory depression and required an antidote or supportive ventilation. The same synergistic effect may be why the RSS is higher in the group with pethidine. Nausea and vomiting were also encountered more in the HBP group, possibly because of the increased incidence of hypotension noted in this group. Hypotension irritates the Chemoreceptor Trigger Zone and hence, causes nausea. Intraoperative nausea and vomiting are frequently considered to be side effects of intrathecal opioids. However, Karaman et al say that the same can be protective as well.[25] Cooper et al also showed significant reduction in intraoperative nausea when 25 micrograms of fentanyl was added to local anaesthetic in cesarean section.[26] We also did not experience any nausea with intrathecal fentanyl. Pruritus was seen more in Group HBF, probably due to opioid receptor activation in the dorsal horn and literature says that it is seen more when opioids are given intrathecally compared to the intravenous route.[24] Severity of itching is dose-dependent and can be effectively treated with low doses of naloxone. No treatment for pruritus was required in our study.

Shivering was seen more in Group HB (26.7%), possibly due to the sympathetic block and lack of opioid-mediated thermoregulatory effects. It is not surprising because whenever a patient complains of shivering, opioids, especially pethidine, are given as treatment. Interestingly, post-operative urinary retention was exclusively seen in Group HB (13.3%). Though spinal opioids are frequently blamed for urinary retention, spinal anaesthesia itself can also cause urinary retention. Post-operative urinary retention is multi-factorial in origin, with patient and surgical factors also playing a role in addition to anaesthetic factors.[27] Before voiding occurs, the parasympathetic block caused by spinal anaesthesia has to end.[27] The regression was, maybe faster in our study with opioids. Regression of the spinal block was not assessed, which may be a limitation of this study. Other limitations may be the small sample size, which limits generalizability. The heterogeneity in the surgical procedures may also have influenced pain and the duration of analgesia.

CONCLUSION

Addition of fentanyl or pethidine as adjuncts to hyperbaric bupivacaine for SAB did not expedite the onset of sensory and motor blocks of hyperbaric bupivacaine, nor did it prolong the duration of analgesia. The adjuvants should be chosen based on patient co-morbidities, duration of surgery and the desired balance between analgesia and sedation.

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Associated Factors of Sleep Quality Among Public Health Undergraduate Students in Kathmandu Valley

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ABSTRACT

Introduction: Sleep quality is the measurement of restful and restorative sleep. Sleep quality has significant impacts on academic performance, mental well-being and physical health. Poor sleep quality results in fatigue, irritability, daytime dysfunction, slow responses, increased caffeine and alcohol intake.

Objectives: To assess prevalence and associated factors of sleep quality among public health undergraduate students in Kathmandu valley.

Materials and Method: A descriptive cross-sectional study was carried among 283 public health undergraduate students of different universities of Kathmandu valley. Ethical approval was taken from Institutional Review Committee, Nobel College. Convenient sampling method was employed to selected colleges. Pittsburgh Sleep Quality Index (PSQI) was used as a standard tool to measure sleep quality. Participants' confidentiality was maintained. Data was compared and analyzed using Statistical Package for the Social Sciences (SPSS). Chi-square test was used to analyze association between various variables and p value below 0.05 was considered statistical significance.

Result: According to the study, 59% had good sleep quality. Sleep quality was associated with living condition ($p = 0.018$), feeling of loneliness ($p = 0.000$), sharing problems ($p = 0.015$), satisfaction with teachers' behavior ($p = 0.003$), satisfaction with academic performance ($p = 0.002$), conflict in family ($p = 0.002$). Sleep quality was not associated with family's monthly income ($p = 0.173$), job placement after study ($p = 0.114$), and pressure of assignments ($p = 0.321$).

Conclusion: Majority of participants had good sleep quality. Living condition, feeling of loneliness, sharing problems, satisfaction with teachers' behavior, satisfaction with academic performance and conflict in family were found to be associated with sleep quality whereas familys' monthly income, job placement after study and pressure of assignments were not associated with sleep quality.

Keywords: Pittsburgh Sleep Quality Index,sleep quality, undergraduate students

INTRODUCTION

Sleep quality refers to the extent to which sleep is restful and restorative. It is different from sleep satisfaction, which is a more subjective judgment of how we feel about the sleep we are getting.[1] Sleep quality comprises of four attributes: sleep efficiency, sleep latency, sleep duration, and wake after sleep onset. Good sleep quality consist positive effects such as feeling rested, normal reflexes, and positive relationships. Poor sleep quality results in fatigue, irritability, daytime dysfunction, slowed responses, and increased caffeine and alcohol intake.[2]

Sleep plays an important role for good health and wellbeing throughout our life. During sleep, our body is working to support healthy brain function and maintain physical health.[3] The human body normally requires seven hours of night sleep and eight to nine hours of daily sleep.[4] If proper sleep is not maintained, it automatically leads to sleep disorder.

Sleep disorders are a group of conditions that disturb normal sleep patterns. Inadequate or non-restorative sleep interferes with normal physical, physiological, psychological, mental, social, and emotional functioning.[5] Many college students are at risk for sleep disorders, which can also put them at risk for academic failure.[6]

Numerous studies have identified various factors that can contribute to sleep disorders among students. However given the unique circumstances of public health students, additional variables specific to their field of study, such as field work activities and other academic demands should be considered. The objective of the study was to assess prevalence and associated factors of sleep quality,

investigate impact of different variables, and gain more comprehensive understanding of the issue on sleep quality of undergraduate public health students.

MATERIALS AND METHOD

A descriptive cross-sectional study was conducted in Kathmandu valley from May to October, 2023. Ethical approval was taken from Institutional Review Committee, Nobel College (Ref. no: 080/81/226).Convenient sampling method was used and public health undergraduate students of final year from selected Tribhuwan University (TU), Pokhara University (PoU) and Purwanchal University (PU) affiliated 9 colleges were included i.e. Asian College for Advanced Studies (affiliated to PU), Central Department of Public Health (affiliated to TU), HOPE International College (affiliated to PU), Kathmandu Multiple College (affiliated to PU), Manmohan Memorial Institute of Health Sciences (affiliated to TU), Nepal Institute of Health Sciences (affiliated to PU), Nobel College (affiliated to PoU), National Academy for Medical Sciences (affiliated to PU), and Om Health Campus (affiliated to PU). The name list of the students was written in Excel sheet. Then, each student was assigned an individual number randomly by using a random function table. As per the value of random number, 283 students were selected for the study.

Sample size was calculated using the formula: n =(Z2 *p*q)/ e2; where n = required sample size, z = 1.96 at 95% confidence interval, prevalence (p) = 0.2127, q = 1-p, error (e) = 0.1.Hence, n = 257. After adding 10% non-response rate, N = 283.

Self-administered questionnaire technique was used. PSQI was used as a standard tool for measuring sleep quality.[8] Pre-testing was done among 10% of the total sample size which was not included in the final analysis. Undergraduate public health students who gave consent and full answer were included in the study. All the provided data were kept confidential. Data was entered and analyzed using SPSS. Frequency table was tabulated among different variables and chi-square test was done to measure association between dependent and independent variables and p value below 0.05 was considered statistical significance.

RESULT

A total of 283 undergraduate students participated in the study. Majority 208 (73.5%) were female and 75 (26.5%) were male. Most of the participants 258 (91.2%) were of age less than or equal to 25.

The study found a significant association between living conditions and sleep quality (p = 0.018). Participants living with friends or in hostels had poor sleep quality 16(53.3%) (Table 1).

Table 1. Association between living condition and sleep quality

Living condition	Good sleep quality	Poor sleep quality	p-value
Family	107 (58.5%)	76 (41.5%)	0.018
Friends and Hostel	14 (46.7%)	16 (53.3%)	
Relatives	23 (85.2%)	4 (14.8%)	
Alone	23 (53.5%)	20 (46.5%)	

The study found no significant association between family's monthly income and sleep quality (p = 0.173) (Table 2).

Table 2. Association between family's monthly income and sleep quality

Monthly income (NRs)	Good sleep quality	Poor sleep quality	p-value
≤ 30000	29 (72.5%)	11 (27.5%)	0.173
30001-100000	120 (56.9%)	91 (43.1%)	
≥ 100001	18 (56.3%)	14 (43.8%)	

The study revealed significant association between feeling of loneliness and sleep quality (p = 0.000) (Table 3).

Table 3. Association between feeling of being alone at some point of time and sleep quality

Felt lonely	Good sleep quality	Poor sleep quality	p-value
Yes	104 (52.0%)	96 (48.0%)	0.000
No	63 (75.9%)	20 (24.1%)	

There was significant association between sharing of different problems and sleep quality (p = 0.015) (Table 4)

Table 4. Association between sharing of different problems and sleep quality

Sharing	Good sleep quality	Poor sleep quality	p-value
Yes	136 (63.0%)	80 (37.0%)	0.015
No	31 (46.3%)	36 (53.7%)	

Satisfaction with teachers behavior was significantly associated with sleep quality (p = 0.003) (Table 5).

Table 5. Association between satisfaction with teachers behavior and sleep quality

Satisfaction with teachers' behavior	Good sleep quality	Poor sleep quality	p-value
Yes	147 (63.1%)	86 (36.9%)	0.003
No	20 (40.0%)	30 (60.0%)	

The study found a significant association between academic satisfaction and sleep quality (p = 0.002) (Table 6). The research discovered a notable link between job placement after study and quality of sleep (p = 0.114) (Table 7). The study identified a significant connection between conflict in family and sleep quality (p = 0.002) (Table 8).

Table 6. Association between satisfaction with academic performance and sleep quality

Satisfaction with academic performance	Good sleep quality	Poor sleep quality	p-value
Yes	115 (66.1%)	59 (33.9%)	0.002
No	52 (47.7%)	57 (52.3%)	

Table 7. Association between worry of after study job placement and sleep quality

Study outcomes	Good sleep quality	Poor sleep quality	p-value
Yes	130 (56.8%)	99 (43.2%)	0.114
No	37 (68.5%)	17 (31.5%)	

Table 8. Association between conflict in family experienced and sleep quality

Conflict in family	Good sleep quality	Poor sleep quality	p-value
Yes	8 (30.8%)	18 (69.2%)	0.002
No	159 (61.9%)	98 (38.1%)	

The present study revealed no significant association between pressure of assignments and sleep quality($p = 0.321$) (Table 9).

Table 9. Association between experience of pressure while completing assignments and sleep quality

Pressure of assignments	Good sleep quality	Poor sleep quality	p-value
Yes	63 (55.3%)	51 (44.7%)	0.321
No	80 (61.5%)	50 (38.5%)	

DISCUSSION

PSQI tool was used to assess the sleep quality of 283 public health undergraduate students. In current study, 59% had good sleep quality and similar result was reported in Germany and Luxembourg study.[9] Present study had shown association with sleep quality and living condition which is similar to the finding from research done in Egypt[10] as living conditions are directly proportional to the sleeping habit of the students. This study found that students living in hostels or with friends had poor sleep quality whereas students living with their relatives had good sleep quality which may be due to disciplined sleeping habit.

Family's monthly income was found to have no effect on the sleep quality like findings from Gautam et al study.[11] Prevalence of poor sleep quality was observed in students feeling lonely which is similar to the findings of Guo et al study.[12] This might be lonely people are more likely to overthink and use of social media for long time; anxiety and stresses could be a key cause for delay in bedtime. This study found that respondents not sharing their problems with others had poor sleep quality confirming the findings with Gautam et al study.[11] This can be explained with the fact that sharing problem facilitates the peace of mind to the individual and his/her mental health also improves, decreasing the chance of poor quality of sleep. Present study showed significant association between satisfaction with academic performance and sleep quality like in Gaultney study.[6] Students with satisfied academic performance can sleep better because of their confidence as unsatisfied academic performance have to spend nights on doing extra work to improve their grade.

Conflict in family was found to have association with sleep quality of the students similar to the findings of Khor et al study.[13] Having conflict in family affects the sleep quality as it affects every aspect of life. Family conflict is a source of stress and anxiety among people which can affect sleep quality.

Limitations were; only public health undergraduates were included but sleep disorders might be prevalent in other fraternity undergraduates' students. Similarly, some questions are sensitive in nature so there may be social desirability bias.

CONCLUSION

More than half of the participants living with friends and in hostel had poor sleep quality while less than half of the participants living alone had poor sleep quality. Of all the participants living with family, majority had good sleep quality and very few participants living with relatives had poor sleep quality. Good sleep quality was observed highest in the respondents belonging to the family with monthly income less than or equal to NRs.30000 and poor sleep quality was observed highest in the respondents belonging to the family with monthly income greater than or equals to NRs.100001. Likewise, a larger percentage of participants who didn't feel lonely had good sleep quality and more than three fifths of the participants who shared their problems with others had good sleep quality. The greater portion of respondents who were satisfied with their teachers' behavior and majority of the respondents satisfied with their academic performance had good sleep quality. Good sleep quality was found to be in maximum number of respondents who weren't worried about job placement after study. More than two fifths of the respondents who didn't have conflict in family reported to have good sleep quality. Greater portion of respondents who didn't experience any pressure while completing their assignments had good sleep quality. The present study has recommended that colleges should provide trainings to teachers on properly dealing with students and should provide awareness programs on different factors associated to sleep quality.

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Intradermal Nevus with Prominent Lymphohistiocytic Infiltration and Giant Cells – A Rare Histopathological Phenomenon

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ABSTRACT

Nevus results from benign proliferation of melanocytes. Granulomatous inflammation associated with nevus is an unusual presentation. It can be seen as a part of halo phenomena or associated with folliculitis. We present the case of 69-year-old female patient who presented with slowly enlarging mole on the preauricular and nasal bridge over the past two years. Microscopically, it was diagnosed as Intradermal Nevus with prominent lymphohistiocytic infiltration and giant cells. So, this case highlights a rare histopathological presentation of an intradermal nevus.

Keywords: folliculitis; granulomatous; halo; lymphohistiocytic; nevus

INTRODUCTION

Melanocytic nevi are common cutaneous lesions originating from the proliferation of melanocytes, the pigment-producing cells of the skin. These benign growths are broadly classified into junctional, compound, and intradermal subtypes, depending on the anatomical location of nevus cells within the epidermis and dermis. Among these, intradermal nevi are the most prevalent type in adults, frequently appearing as dome-shaped or papillomatous lesions in cosmetically significant areas such as the face, neck, and trunk.[1,2]

Histologically, intradermal nevi are usually stable and unremarkable, but rare inflammatory changes such as granulomatous reactions, lymphohistiocytic infiltration, and giant cell formation can occur. These unusual findings may mimic conditions like halo nevi, infectious granulomas, or even melanoma, making accurate histopathological diagnosis critical.[3,4] This paper reports a unique case of an intradermal nevus exhibiting prominent lymphohistiocytic inflammation and multinucleated giant cells, highlighting its diagnostic challenges and clinical relevance.

CASE PRESENTATION

A 69-year-old female presented to the dermatology outpatient clinic with a slowly enlarging mole on the preauricular and nasal bridge over the past two years. The lesion; initially noted as a small, flat brown macule, increased in size and thickness but remained asymptomatic. Later the lesion was ulcerated and the patient sought medical attention due to fear of skin malignancy. The patient had no history of systemic illness or trauma.

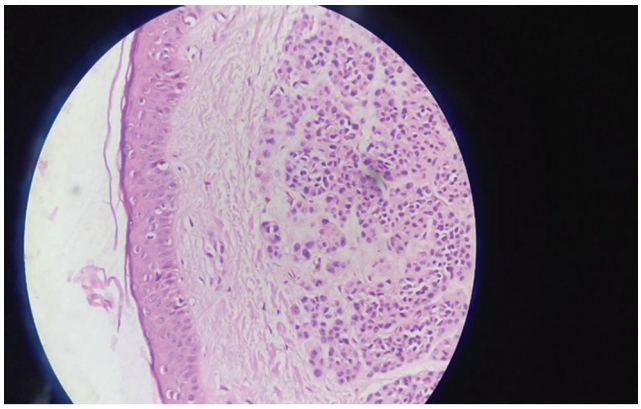
Gross Findings

The excised specimen consisted of two small skin tissue pieces measuring 1.5 × 1.0 × 0.5 cm. The central portion showed pigmented, slightly raised lesion, well-circumscribed with an ulcerated surface.

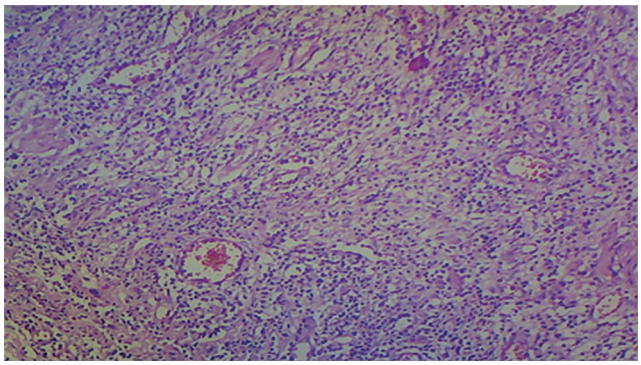
Microscopic Findings

Histopathological examination revealed a benign melanocytic nevus with nests of nevus cells confined to the dermis, consistent with an intradermal nevus. Notably, the deeper dermis exhibited dense inflammatory infiltrates composed predominantly of lymphocytes and histiocytes, interspersed with plasma cells and eosinophils. Multinucleated giant cells of both foreign-body and Langhans types were scattered within the inflammatory milieu.

The overlying epidermis appeared unremarkable, with no evidence of epidermal cyst formation, follicular disruption, or halo phenomenon. The absence of atypia, mitotic figures, or necrosis excluded malignant transformation. Special stains for microorganisms (PAS and Ziehl-Neelsen) yielded negative results.



H and E stained smears show nests of melanocytes in dermis



H and E stained smears showing dense inflammatory infiltrates composed predominantly of lymphocytes and histiocytes, interspersed with plasma cells and eosinophils along with giant cell reaction

DISCUSSION

Granulomatous Reactions in Nevi

Granulomas and giant cells associated with nevi have been described in rare instances, often linked to folliculitis or ruptured pilosebaceous follicles. In these cases, nevus cells may cause physical obstruction or fibrosis of the follicles, leading to rupture and subsequent granulomatous inflammation.[5] Such findings are more common in large or longstanding lesions but were not apparent in this case.

Halo Phenomenon and Regression

The halo phenomenon, characterized by a depigmented ring surrounding a nevus, reflects host immune-mediated regression. Histologically, this involves lymphocytic and histiocytic infiltration of nevus cells.[6] Although no clinical evidence of halo phenomenon was observed in this patient, the histological changes may represent an early or incomplete regression process.[6]

Differential Diagnosis

The differential diagnosis for inflammatory reactions in nevi includes:

1. Halo Nevus: Typically presents with depigmentation and histiocytic infiltration.[6] Absent in this case.
2. Ruptured Follicle or Cyst: Often reveals adjacent granulomas with foreign-body reaction.[5] Not observed here.
3. Malignant Transformation: Excluded by the lack of cytological atypia or mitotic activity.[1]

Pathophysiological Considerations

Granulomatous inflammation may occur in response to trauma, chronic irritation, or unidentified antigens within the nevus. The inflammatory response observed in this case may represent a localized immune reaction against components of the nevus or an inciting external factor.[3,5] The presence of eosinophils suggests a possible hypersensitivity reaction, though no clear trigger was identified.[5]

CONCLUSION

This case highlights a rare histopathological presentation of an intradermal nevus with pronounced lymphohistiocytic infiltration and multinucleated giant cells. While benign, such findings underscore the importance of comprehensive histopathological assessment to distinguish between inflammatory changes, regression phenomena, and malignant transformation. Pathologists should remain vigilant for such atypical presentations to ensure accurate diagnosis and appropriate clinical management.

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Discussion should describe what the present results mean and what is already known about the subject. It should indicate how the results relate to expectations and new scientific knowledge. It also identifies the gaps and ideas for further study.

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Word limit
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Tables
Tables should be simple and legible. It should present only essential data with a title or caption and clearly numbered. Table/s should be cited within the text, e.g. (Table 3).

Units and abbreviations
All measurements should be expressed in Standard International (SI) units. Avoid abbreviations in the title and abstract. All unusual abbreviations should be fully explained at their first occurrence in the text.

Drug names
Generic drug names should be used.

Conflict of Interest Notification
This should be notified (if any).

Ethical consideration
Manuscripts submitted for publication should be attached with ethical clearance letter from the respective institutional ethical committee or review board.

Informed consent
Informed consent of the patients must be taken before they are considered for participation in the study. Patient identifying information such as names, initials, hospital numbers or photographs should not be included in written descriptions. Patient consent should be obtained in written and archived with authors.

Protection of human subject in research
When conducting experiments on human subjects, appropriate approval should be obtained from the Ethical Committee. All the procedures on human experimentation must be performed in accordance with the ethical standards of the responsible ethical committee (both institutional and national) and the Helsinki Declaration of 1964 (as revised in 2008).

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Checklist for authors before submitting the manuscript
- Covering letter
- Completely filled JKDC declaration of authorship
- Ethical committee approval
- Informed consent (if appropriate)
- Abstract
- Manuscript files including tables/figures/ pictures
- References
- Word count (Abstract/Text)

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