ISSN : 2822-1788 (Online)
ISSN : 2717-5073 (Print)

Year 3 Volume 1 Issue 4 Jan 2023

वर्ष ३ अङ्क १ सङ्ख्या ४ माघ २०७९

JMEC

Journal of Medical Education Commission

A Peer Reviewed Journal

चिकित्सा शिक्षा जर्नल

Government of Nepal

Medical Education Commission

Sanothimi, Bhaktapur

Nepal

Published by:

Government of Nepal

Medical Education Commission

National Board of Medical Specialties (NBMS)

Sanothimi, Bhaktapur

Nepal

January 2023

Web site : www.mec.gov.np

Email : jmec@mec.gov.np

Phone Number : 01-6639413, 6639414, 6639415, 6639416

Online Submission : jmec@mec.gov.np

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Competency Based Medical Education (CBME) : Paradigm Shift With Challenges In Implementation

Aarati Khanal Shah, MD

Chief Editor, JMEC

Competency-Based Medical Education (CBME) is a revolutionary approach in Medical Education which has gained a significant importance in recent years., CBME focusses on learners' abilities to demonstrate specific competencies and skills unlike traditional methods, which rely heavily on time-based training and knowledge acquisition. This paradigm shift from an input-based to an outcome-oriented training has the potential to transform medical education, ensuring healthcare professionals are skilled and competent to provide service to the patients.[1]

The growing recognition that time served in medical school and residency programs did not necessarily correlate with a trainee's ability to practice independently led to a paradigm shift for introducing CBME, which has the basic principles of individualization, flexibility, learner-centeredness, continuous assessment, and outcomes-based evaluation.

CBME is characterized by a set of essential components that distinguish it from traditional education approaches. These components include defining competencies clearly in the curriculum, implementation of robust assessment methods, providing timely feedback, encouraging self-directed learning, and utilizing technology to support the educational process so that Learners benefit from a more structured and transparent well defined competencies,to be learnt and enabling them to take ownership of their learning and focus on areas that require improvement. The focus on interpersonal skills, communication, and professionalism fosters empathy and compassion, further leading to a more patient-centric healthcare system.

Equally in this model of CBME, the Medical Educators gain valuable insights into learners' progress through continuous assessment, enabling timely interventions and tailored support.

Despite its tremendous potential, transition to CBME is not without challenges. Implementing CBME demands significant changes in educational philosophy, curriculum design, assessment methodologies, and faculty development. Additionally, the need for robust data collection and analysis to ensure the validity and reliability of assessments poses logistical huge task. Addressing these challenges requires collaboration, commitment, and ongoing refinement to realize the full potential of CBME[2].

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Original Article

Validation Of Modified Method Of Protein Estimation By Two-Point Kinetic Approach

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ABSTRACT

Background: In the clinical laboratory, protein is the most frequently analyzed test in blood for the diagnosis and monitoring of hepatic function, inflammation, and metabolic status. The biuret method is the most common endpoint reaction method for total protein estimation in serum with significant time consumption. The aim of our study is to modify the existing biuret method of protein estimation with a two-point kinetic mode, which may help to reduce the time for the high throughput analysis of serum protein.

Methods: Photometric linearity of the two-point kinetic method was compared with that of existing end-point reaction methods. For the validation of the modified two-point kinetic method, serum was obtained from patients (n=50) visiting Manmohan Memorial Teaching Hospital, Kathmandu, and the results were compared with wet and dry chemistry using the biuret method. The comparison was done using Kruskal-Wallis Test. The correlation between endpoint and kinetic method was studied using Pearson and Spearman correlation.

Results: Our study showed no significant difference in protein values obtained from existing endpoint method and our modified kinetic method in normal individuals ($p=0.422$), hypoproteinemic patients ($p = 0.899$), and hyperproteinemic patients ($p = 0.410$). A significant correlation was found between the endpoint and the two-point kinetic method ($r = 0.968$).

Conclusion: The significant positive correlation of our two-point kinetic method with the endpoint reaction method shows an alternative approach useful for high throughput and rapid analysis of serum protein using semi-automated and automated chemistry analyzers.

Keywords: *Protein estimation, Biuret method, Two-point kinetic method.*

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INTRODUCTION

Estimation of total protein in serum is common in routine clinical diagnosis and research[1]. Proteins have an important role in the growth, metabolism and maintenance of body homeostasis. It also possesses a wide range of functions in the body such as an enzyme, transport of nutrients and other biochemical compounds across cellular membranes[2]. The total protein test measures the total amount of protein including albumin and globulin fractions in the serum which is a major extracellular fluid of the body. To study the state of health and disease, quantitative estimation of total protein in a given sample plays a crucial role[1]. Clinically, the reference range serum protein level of 60–80 g/L and urine protein level of <0.2 g/L are considered as normal[3]. The level of protein outside the reference ranges is often associated with inflammation, kidney disorder, dehydration, liver disorder and defective nutritional status. In the present time, alcoholism leading to liver disease as well as diabetes affecting the kidney is also increasing significance of protein measurement[4,5]. Thus, estimation of protein carries significant importance for the prediction and timely treatment of various abnormalities[6].

There are six "common" methods for the determination of total protein concentration, including the Kjeldahl method, biuret method, Lowry assay, and bicinchoninic acid (BCA) assay. The Kjeldahl method measures total organic nitrogen and is not as sensitive as other methods. It requires UV-visible spectrophotometry and the extinction coefficient of protein. Likewise, a limitation of the Bradford method for protein estimation is its sensitivity to the composition of the protein sample, potentially leading to inaccurate results when certain types of proteins or contaminants are present. In comparison to these methods, biuret method is taken as better approach, where result is accurate and does not depend on composition of protein sample[7].

Biuret method involves a single incubation period and comparatively short time[8]. However, the incubation time can further be reduced if we modify the method of protein estimation by two-point kinetic approach. Thus, our study is to modify the method of protein estimation by two-point kinetic approach being completely based on a biuret reaction. In the reaction, cupric ions react with peptide bonds forming a complex with tartrate, and the change in absorbance per unit time measured at 540nm is directly proportional to the concentration of protein in the given sample.

METHODS

This study is laboratory-based cross sectional study conducted in the Department of Laboratory Medicine at Manmohan Memorial Institute of Health Science (MMIHS).

Chemicals and equipment:

The biuret reagent and standard solution for wet chemistry based protein estimation were obtained from Accurex, India. Total protein concentration was estimated according to manufacturer's guideline.

Photometric measurement:

The quantification of total protein was carried out using a known protein standard solution of 6g/dl. Serial dilutions were performed to calibrate the visible kinetic method, which was then compared with the existing endpoint reaction technique. All analyses were conducted using a semi-automatic analyzer (Bioanalyzer 100, China).

For the determination of total protein in both serum and standard solutions, the biuret reaction method, as outlined by the manufacturer, was employed. In this procedure, a sample (20µl) was mixed with a reagent (1000µl) containing cupric ions derived from copper tartrate. Under alkaline conditions, the peptide bond from the protein in the serum interacts with the cupric ions, resulting in the displacement of hydrogen from the peptide bond and the formation of a violet-colored complex. The intensity of this color was measured at a wavelength of 540nm and

the measured absorbance was directly proportional to the concentration of total protein in the serum.

The incubation time for the end point reaction method recommended by manufacturer was 10 minutes at room temperature. For the kinetic assay, we performed time course experiment to determine the assay time. Standard solution of protein with known concentration of 6g/dl was measured thrice using increasing time intervals and mean protein concentration with standard error of mean and coefficient of variance was used to determine correct assay time interval in two-point kinetic mode. For the determination of linearity of the methods, primary protein standard solution of 22g/dl was prepared and serial dilutions were made for the analysis of mean Δ absorbance for end point as well as kinetic method, respectively. The average response (X) and standard deviation (SD) was calculated and limit of detection (LOD) or sensitivity was obtained by the formula: LOD= X + (3 × SD)

Specimen collection:

Patients' sample were used to correlate protein levels by two-point kinetic method and end point method. Performa was used as sample collection tool. Random blood sample was collected in yellow topped gel vials using Standard Operating Procedure (SOP) from the normal, hypoproteinemic and hyperproteinemic with total of 50 (n=50) patients visiting Manmohan Memorial Teaching Hospital, Kathmandu. Serum was separated by centrifugation at 3000 rpm for 5 minutes and samples were analyzed for total protein by semi-automated method using manufacturer's guidelines. Internal and external quality control was maintained in the laboratory.

Data analysis:

The laboratory work was performed following standard operating procedures under manufacturer guideline and SOP was approved by Institutional Review Committee (NEHCO-IRC) of MMIHS. Entry of data was manually recorded and entered into SPSS and Microsoft excel for the analysis. Ethical approval was taken from NEHCO-IRC of Manmohan Memorial Institute of Health Sciences. The informed consent was taken from the patients.

RESULTS

Photometric measurement of protein using serial dilutions of known concentration of standard solutions defined three minutes as the calibrated assay time **(Table 1).** The linearity of endpoint method was found to be 18g/dl while our modified method of two-point kinetic approach estimated its linearity as 14 g/dl **(Figure 1 and 2).** The precision study for the validation by both between run and within run methods revealed two-point kinetic method as more precise one than the endpoint method. Conducting the between-run method involved analyzing two samples over a period of 10 days, with each sample being tested three times. The observed imprecision for the endpoint method ranged from 0.38% to 0.56%, while the two-point kinetic method exhibited a narrower imprecision range of 0.20% to 0.34%. as shown in **Table 2 and 3**. Conducting within-run method involved analyzing 20 samples including both normal and high controls. The results indicated an endpoint fluctuation of 0.38-0.56%, while the two-point kinetic approach demonstrated a narrower range of 0.20-0.34% **(Table 4 and 5)**. As a result, the two-point kinetic approach was determined to be the more precise method. The limit of detection of our modified two-point kinetic method was found to be 0.30 g/dl and limit of quantification was estimated to be 1.852 g/dl.

Our study included 50 individuals: 27 were male and 23 were female. Among them, 35 (70%) had total protein within the normal range, 10 (20%) had total protein below the normal range (hypoproteinemia) and 5 (10%) had total protein values above the normal range (hyperproteinemia). Total protein estimated by two-point kinetic method, endpoint method and dry chemistry method of normal, hypoproteinemic and hyperproteinemic patients

were compared and the result analyzed using Kruskal Wallis Test showed no significant difference among these methods i.e. p-value>0.05. The p-value in normal sample was found to be 0.422, for hypoproteinemic was 0.899 and for hyperproteinemic was 0.410 **(Table 6)**. Also, no significant difference was seen in the analysis of protein values of standard solutions. The p-value was obtained to be 0.657 as shown in **Table 7**.

The correlation coefficient was determined to confirm the correlation between existing end-point method and two-point kinetic method. It was found to be 0.998 in samples and 0.968 in while running standard solutions **(Table 8 and 9)** indicating strong correlations between the methods. Also, the correlation of end-point method by wet and dry methods was found to be 0.966 indicating strong correlation **(Table 10)**.

Calibration of two-point kinetic assay:

Assay time for the kinetic method was determined using mean of triplicate test results of 6g/dl protein standard measured immediately and reading time started from 1 to 5 minutes. In end point method, mean and CV% was **6.08 ± 0.2** and **3.30%** respectively in 5 minutes. The least CV % **(4.46%)** was found in the shortest time 180 seconds (3 minutes) indicating the suitable reading time for the kinetic assay.

Table 1: Calibration of assay time for the kinetic method:

Method	Time in minute	Mean ± SD	CV%
Endpoint method	**5**	**6.08 ± 0.2**	**3.30%**
Two-point Kinetic method	1	6.95 ± 0.43	6.18%
	2	5.49 ± 0.36	6.5%
	3	**6.27 ± 0.28**	**4.46%**
	4	6.85 ± 0.53	7.7%
	5	6.91 ± 0.63	9.1%

Measurement of linearity of the kinetic method in comparison to endpoint assay:

Determination of linearity:

For the measurement of linearity of the test method, we used known concentration of protein standard solution 22 mg/dl and serial dilutions were made. Total protein was estimated by both methods three times for the calibration curve of the visible kinetic method and compared same with the existing end point reaction method. Graph of the protein concentration versus absorbance of endpoint reaction method shows the straight line up to 18g/dl, which indicates the linearity of this method up to 18g/dl. (Figure 1). When we measured the rate of reaction in two-point kinetic mode, the protein concentration versus average change in absorbance per unit time (Δ absorbance/min) of kinetic method graph shows a straight line up to 14g/dl which indicates the linearity of method is 14g/dl., (Figure 2). Although, similar study performed the comparison of two-point assay of protein estimation, we standardized and verified more clearly the time linear rate of reaction with limit of detection of the kinetic assay.

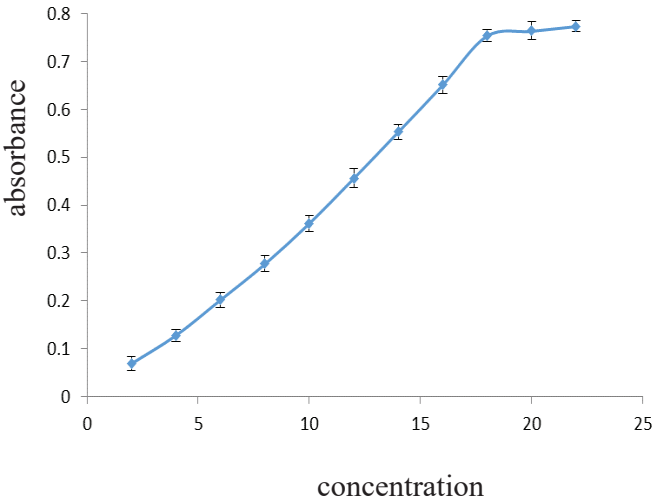

Figure 1: Absorbance versus concentration of total protein in g/dl by endpoint method

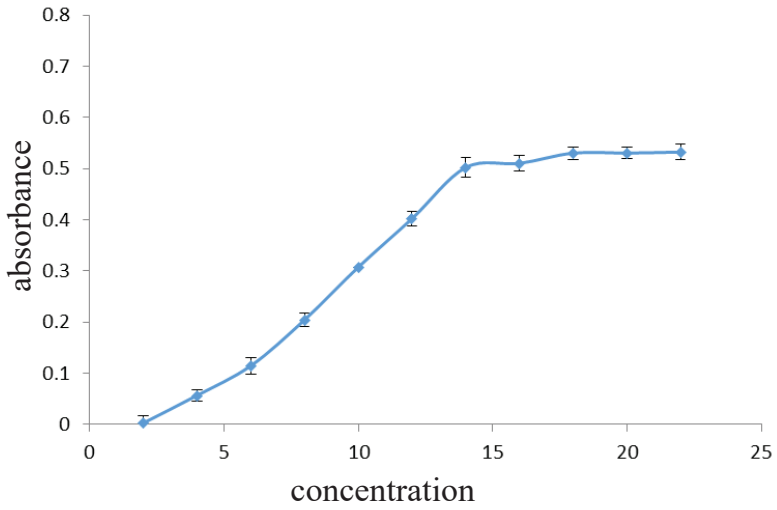

Figure 2: Absorbance versus concentration of total protein in g/dl by the two-point kinetic method.

PRECISION:

For precision, two quality control sera were tested twice a day for 10 days by both endpoint and two-point kinetic method. Details of the precision study are shown in Table 2 and 3.

Table 2: Precision study of endpoint method

Quality Control Sera	Mean	Standard deviation	CV%
NC1	4.246	0.0239	0.5607
NC2	4.257	0.0262	0.6154
HC1	5.941	0.0228	0.3837
HC2	5.956	0.0227	0.3811

**NC1: Normal Control Sera (3.35-4.45) tested first time*
**NC2: Normal Control Sera tested second time*
**HC1: High Control Sera (5.77-6.77) tested first time*
**HC2: High Control Sera tested second time*

Table 3: Precision study of two-point kinetic method

Quality Control Sera	Mean	Standard deviation	CV%
NC1	4.250	0.01247	0.29
NC2	4.249	0.01449	0.34
HC1	5.349	0.01101	0.20
HC2	5.345	0.01080	0.20

The table **(Table 3)** show that imprecision for the endpoint method was 0.38% - 0.56% and for two-point kinetic method was 0.20% - 0.34%. The CV% of quality control sera tested for 10 days by the two-point kinetic method is comparatively less than those measured by the endpoint kinetic method which explain the precision of our two-point kinetic method.

Also, for the precision study, within-run (n=20) was done with both normal and high control and the result were obtained as shown in Table 4 and 5.

Table 4: Values obtained by running 20 samples in a day (within-run) for precision check by end-point method

Quality Control Sera	Mean	Standard deviation	CV%
Normal Control	4.24	0.023	0.56
High Control	5.94	0.022	0.38

Table 5: Values obtained by running 20 samples in a day (within-run) for precision check by two-point kinetic approach.

Quality Control Sera	Mean	Standard deviation	CV%
Normal Control	4.24	0.014	0.34
High Control	5.34	0.011	0.20

Within-run imprecision of total protein values using

the two-point kinetic method is lower than the imprecision obtained using the endpoint method.

Limit of Detection (LOD) :

The lowest calibration standard which produced a peak response corresponding to the analyte was measured 8 times. The average response (X) and standard deviation (SD) was calculated and LOD was obtained by the formula:

$$LOD = X + (3 \times SD)$$
$$= 0.277 + (3 \times 0.0088)$$
$$= 0.30 \text{ g/dl}$$

Limit of Quantitation (LOQ) :

For the study, the standard solution at estimated LOQ concentration based on the preliminary study was run 8 times. The average response (X) and standard deviation (SD) were calculated and LOQ was obtained by the formula:

$$LOQ = X + (10 \times SD)$$
$$LOQ = 1.16 + (10 \times 0.0692)$$
$$= 1.852 \text{ g/dl}$$

Correlation and validation of kinetic method with end point reaction method:

Total protein estimated by two-point kinetic method, endpoint method and dry chemistry method of normal, hypoproteinemic and hyperproteinemic patients were compared and the result was analyzed using Kruskal Wallis Test for our data that was not normally distributed.

Table 6: Comparison between two-point kinetic method, endpoint method and dry chemistry method of normal, hypoproteinemic and hyperproteinemic patients.

Patient	End-point method Median (IQR)	Two-point kinetic method Median (IQR)	Dry Chemistry method Median (IQR)	p-value (<0.05)
Normal	7.5 (7.6-7.9)	7.8 (7.4-8.1)	7.6 (7.1-8.0)	0.422
Hypoproteinemic	5.8 (5.3-6.2)	5.7 (5.4-6.1)	5.8 (5.4-6.2)	0.899
Hyperproteinemic	8.8 (7.4-10.3)	9.1 (7.7-10.6)	8.9 (7.5-10.1)	0.410

Table 7: Mean Comparison between the two-point kinetic method and endpoint method of standard solutions.

	End-point method (Mean ± SD)	Two-point kinetic method (Mean ± SD)	p-value (<0.05)
Standard Solutions	11.64 ± 5.75	11.94 ± 6.07	0.657

A correlation study was performed to observe the relation between endpoint and two-point kinetic method of total protein estimation in standard solutions and the patient samples.

Table 8: Correlation between end-point and two-point kinetic method of total protein estimation of standard solutions.

Method	Endpoint method	p-value
Two-point kinetic method	0.998**	<0.001

Table 9: Spearman correlation between two-point kinetic method with endpoint and dry chemistry of total protein estimation of patient samples.

Method	End-point method	Dry Chemistry method	p- value
Two-point kinetic method	0.968**	0.961**	<0.001

Table 10: Pearson correlation between endpoint method and dry chemistry for total protein estimation of patient samples.

Method	Dry chemistry	p-value
End point method	0.966**	<0.001

In our study for the validation of the study method, we ran the quality control sera of Ortho Clinical Diagnostics. Lot: Q7692 and P7690.

Table 11: Processing of quality control sera

S. No.	Quality control sera		Methods		Normal Range
		Endpoint	Two-point kinetic	Dry Chemistry	
1	Normal Control	4.23	4.25	4.01	3.35-4.35
2	High Control	5.83	5.96	6.43	5.77-6.77

DISCUSSION:

Examining the dynamic and static roles of proteins is essential for comprehending both health and illness states. Deviations of protein levels from normal ranges are frequently linked to a range of conditions like inflammation, kidney disorders, liver and muscle problems, as well as nutritional status3,4. Consequently, an accurate quantitative protein estimation technique must possess high sensitivity and specificity to facilitate efficient large-scale analysis in clinical and research settings 2.

Six methods commonly employed for quantifying total protein content have been identified. These encompass the Kjeldahl method, biuret method, UV-VIS spectrophotometry, CBB G-250 dye binding (Bradford assay), Lowry assay, and bicinchoninic acid (BCA) assay7. When contrasted with these techniques, the biuret method is regarded as superior in terms of its precision; however, it does require a slightly extended incubation period. Hence, we examined a swift approach utilizing the biuret reagent, which employs a reaction rate-based method and was verified against the established endpoint technique, aiming to achieve precise outcomes within a shorter duration. Our examination of the two-point kinetic method found a linearity up to 14g/dl, whereas the endpoint technique demonstrates linearity up to 18g/dl. Normally, in a routine laboratory maximum number of patients' value fall within this range. In the similar kind of study done for glucose, Bhatt et al has found the linearity of glucose assay by kinetic method is up to 400mg/dl while by end point method is up to 500mg/dl, however, Basak et al. have found linearity up to 340mg/dl in kinetic approach9.

We showed significant positive correlation between the two-point kinetic method and endpoint method measured by dry chemistry in Quality control sera and patient samples. The target value of Quality control sera was met by our modified method. This helps to validate the two-point kinetic method as per the international guidelines. The two-point kinetic method consumes less time than the endpoint method. So, this method can be used in case of emergency in high throughput laboratory.

CONCLUSION:

In this study, we revealed the novel approach of the two-point kinetic method to measure serum protein by biuret method, which is found sensitive, specific and consistent with existing end-point reaction method using wet and dry chemistry analyzers. Moreover, this modified method is more convenient in high throughput analysis of protein in diagnostic as well as in research set up. Our two-point kinetic method helps to estimate total protein in 3 minutes as compared to the endpoint method may take 5 to 10 minutes of incubation. Thus, the the two-point kinetic method may be the choice of method in high throughput estimation of serum protein.

CONFLICT OF INTEREST:

No conflict of interest declared.

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Factors Contributing Delay During Management Of Lung Cancer: A Study From Tertiary Referral Center In Nepal.

Acharya Sandhya Chapagain[1]

Abstract

Background: Lung cancer is the leading cause of cancer related morbidity and mortality in both the sexes in Nepal and worldwide. It is the most common cancer in men (18% of new cases diagnosed) and third most common cancer in women (7.7%) in Nepal. Diagnostic delays continue to remain a common problem, patient and systematic factors within primary and secondary care contribute to this delay.

Methods: This cross-sectional descriptive study was conducted at Department of Clinical Oncology, Bir Hospital, National Academy of Medical Sciences (NAMS), Nepal. After enrollment detailed history taking and physical examination was done during the first visit at outpatient oncology department with diagnosis of histologically proven lung cancer. Patient recruited over period of four months. Written informed consent was taken along with ethical approval from the Institutional Review board of NAMS.

Result: A total of 123 patient's with lung cancer were evaluated. Sixty percent of them were males. The mean age was 63.93 years with the youngest being 31 and the eldest was 83 years. Frequent stage was stage III (59%) followed by stage IV (33%). Eighty nine percentage of the patients were smokers. A total of 17% (21) of patient were on empirical Anti-tubercular treatment (ATT) since the onset of current symptoms. While analyzing delay with independent T test showed mean delay of 25.01 days (-/+ SD 6.17) in patient without ATT and with ATT delay was 57.09 days (-/+ SD 8.05) (p=<0.01). Thirty five (43) percentage of patient received treatment within 1 month from the first hospital visit, 28% (34) within two months and 37% (46) within 3-4 months of the first hospital visit. The delay in specialist visit was shorter in advanced cancer and small cell cancer because of the acute symptoms.

Conclusion: Various factors contributing for the delays are lag time from symptom onset to first visit with primary physician, delay due to investigation and symptomatic treatment under primary care physician, delay aggravated by empirical but inappropriate ATT, further delay due to diagnostic procedure to establish the cancer diagnosis. Thus proper and timely referral to the specialist (tertiary center) from primary physician will reduce these delays and help to avoid situation where curable disease become incurable and significantly alters the prognosis.

Key Words: *Lung Cancer, Treatment delay, Factors Diagnostic delay, ATT*

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Introduction

Lung cancer is the most common cancer in men with 18% of new cases diagnosed each year and third most common cancer in women (7.7%) in Nepal. Lung cancer remains the leading cause of all cancer death, with an estimated 1.8 million deaths (18%)

in 2020[1].Survival is poorer even in many western countries and is thought to relate to more advanced disease at presentation. Delays in both presentation and in diagnostic workup are thought to contribute to increase in the proportion of advanced stages in cancer patients and has an impact on poor prognosis and quality of life[2].

Different types of delay can occur in total duration from onsets of symptoms to start of cancer treatment and has classically been defined as primary (duration between onset of symptoms to first presentation to clinician) and secondary (from first presentation to clinician until start of treatment) [3]. Primary delay (PD) is also referred to as patient delay owing to the various factors responsible on the patient's end that may include lack of information, poor socio-economic support, financial constraints, geographical difficulty etc. while secondary or clinician delay (SD) takes into account the patient's characteristics and is also associated with doctor and system related factors [4, 5].

It has been accepted that survival rates in lung cancer depend on early diagnosis and treatment, which is more significant in a high-risk population. It is easy to presume that delays result in a reduction of survival time. Diagnostic and treatment delays continue to remain a very common problem among patients with lung cancer. Reducing delays may increase the proportion of early stage cancers, reduce morbidity and improve survival[6].

Common symptoms at the time of presentation of lung cancer include cough, dyspnea, chest pain, fatigue, chest infection, hemoptysis and weight loss. Significant overlap occurs between these symptoms and symptoms of other chronic respiratory conditions such as tuberculosis and chronic obstructive pulmonary disease (COPD). Such overlap in symptoms might lead to delay in recognition of a lung cancer diagnosis. In such instances missed opportunities to establish lung cancer might be a contributing factor owing to the use of Anti-tubercular treatment, antibiotics and waiting for the symptom to resolve. This group of patient have substantially longer time to diagnosis than patient without missed opportunities.

Methods

A cross-sectional prospective descriptive study was designed to enroll histologically confirmed Lung cancer patient attending the Department of Clinical oncology at Bir hospital. Total of one hundred and twenty three patient fulfilling the inclusion criteria were enrolled consecutively over a period of four months duration. Detail history was taken and recorded in the predesigned Performa along with questionnaire were administered and data were recorded during the first outpatient visit. Written informed consent was taken from the patient or the patient caregiver, IRB approval taken before the start of enrollment of the patient. The sample size was based on the number of patients seen during the time period rather than a prior calculations. The data analysis was primarily descriptive. The primary outcome of the study was the time taken from initial onset of patients' symptoms to commencement of treatment by an oncologist.

Results

Total of 123 patient's diagnosed as Lung cancer were enrolled in the study. Sixty percentage of them were males. The mean age was 63.93 years with the youngest being 31 and the eldest was 83 years. Fifty nine percentage of patient was in stage III (59%) and thirty three percentage in stage IV (33%). Eighty nine (89%) percentage of patient gives history of some form of smoking. Non-small cell lung cancer (NSCLC) accounted 83%, squamous Call Carcinoma (50%) and adenocarcinoma (20%) and small cell lung cancer was (SCLC) 17% as shown in Fig 1.

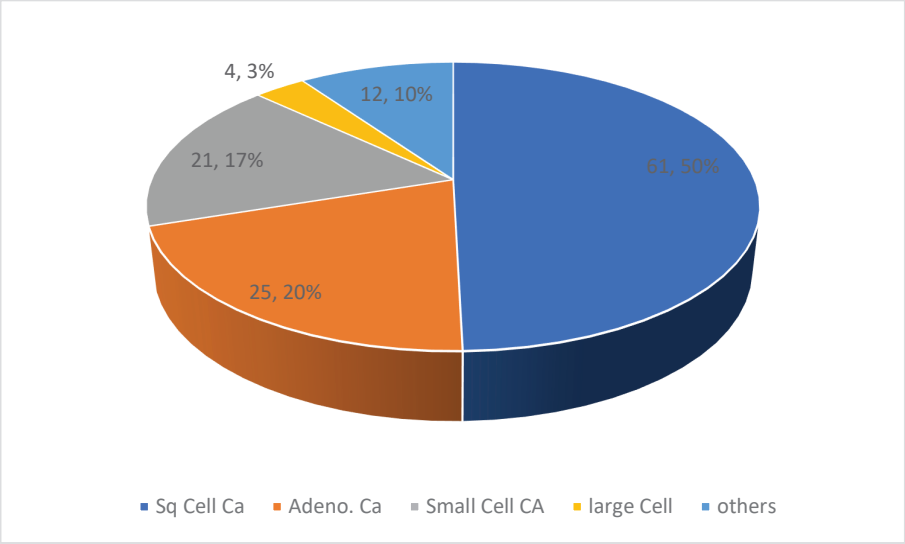

Figure 1. Histopathology

Index symptom was analyzed, forty seven (47%) percentage of the patient presented with cough, about 70% of the patient have overlapping of the symptom at presentation, and hemoptysis was the frequent symptom accompanying the index symptom. Second common presenting symptom was chest pain (19%), followed by dyspnea (15%), hemoptysis (11%), shoulder pain (6%) and hoarseness of voice (Fig.2).

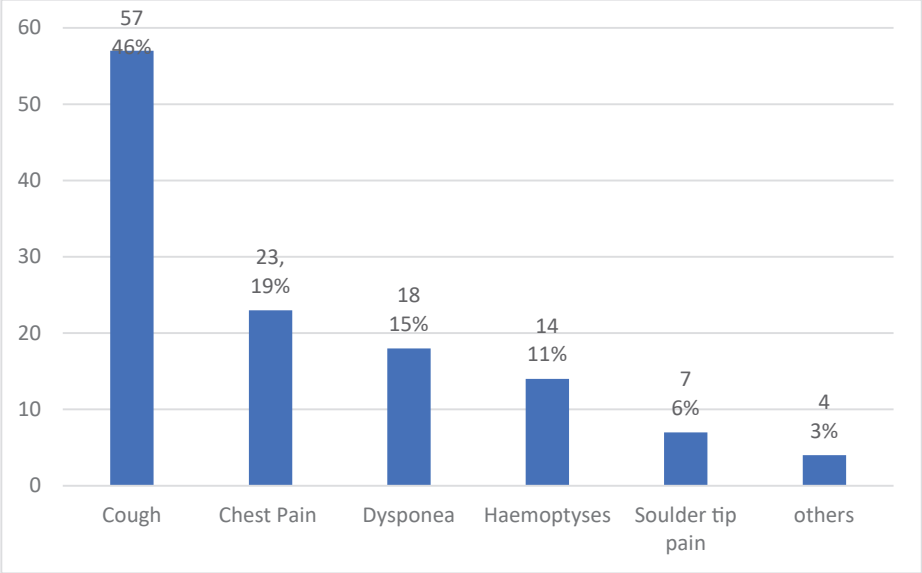

Figure 2. Index symptoms

We found there is role of index symptom to cause delay in seeking healthcare support. Patient having cough, mild shortness of breath and other symptom reach the hospital later than the patient with hemoptysis and chest pain. Physician tend to treat cough, shortness of breath with provisional diagnosis of chest infection and pneumonia which adds on referral delay. This was more common with the patient visiting to Bir hospital from outside Kathmandu valley. Most of the patient referred to us had at least once visited to local hospital or clinic and has received treatment with diagnosis of chest infection, pneumonia, acute exacerbation of COPD or Tuberculosis (Table 1). So about ninety one percent (91%) of patient have received antibiotics for one or the other diagnosis and was followed for

a week before referring, which adds on to referral delay and then diagnosis delay.

Table 1. Initial diagnosis before reaching tertiary center

Initial Diagnosis	(N) Percentage %
Acute COPD	24 (20%)
Chest infection	33 (27%)
Lung Cancer	8 (7%)
*LRTI	15 (12%)
Pleural effusion	3 (2%)
Pneumonia	19 (15%)
**TB	21 (17%)

**lower respiratory tract infection **Tuberculosis*

Lung cancer have significant overlapping symptoms with other disease condition, patient those who visited healthcare facility with these symptom have received empirical antibiotics in first visit even with out undergoing simple chest x-ray in fifty percent (59) of the cases.

Similarly, total of 17% (21) of patient were on empirical Anti-tubercular treatment (ATT) since the onset of current symptoms. While analyzing delay with independent T test showed mean delay of 25.01 days (-/+ SD 6.17) in patient without ATT and with ATT delay was 57.09 days (-/+ SD 8.05) (p=<0.01). This may be partly due to less awareness about lung cancer among healthcare providers which needs to be addressed strongly by education and training.

Our result showed, 35% (43) of patient received treatment within 1 month from the first hospital visit, 28% (34) within two months and 37% (46) within 3-4 months of the first hospital visit. The delay was shorter in advanced cancer and small cell cancer because of the acute symptoms.

Discussion

It is apparent from our survey that patients with suspected lung cancer take a considerable amount of time to present to a doctor, undergo investigations and then commence treatment. Patient, practitioner and hospital/health system factors contribute to this, along with disparities in accessing and transitioning through primary and secondary health services. Consistent with other research, in[7-9] this study, patient health literacy, beliefs and expectations about cancer and health in general appeared to contribute to patients' delay in initial presentation to primary care. We found forty six patient (37%) took about three to four months to start the treatment even after reaching the tertiary care facility, this is due to various reasons like, travel away from home, financial issues, time taken for the referral to specialist, lack of biopsy and the required scan and tests even they reached to the specialist, scattered service in the tertiary center is another reason which add on to diagnostic delay as patient have to visit multiple centers to receive these service and treatment. In our study median time appears three months from the first hospital visit which is excessive in comparison to recommendations given by professional organizations. The Canadian Strategy for Cancer Control recommends that the maximum time to diagnose most cancers should not exceed four weeks.[10] In the UK, standards implemented by the National Health Service (NHS) state that all patients with a suspected cancer diagnosis should be seen within two weeks.[11, 12]

In our study, among the delay group, the most common symptom was a cough wherein no delay group, it was chest pain and hemoptysis, and this association showed statistical significance. Most important patient-related delay is procrastination and appears to reflect in global literature. These patients may be asymptomatic at first; later, may ascribe respiratory symptoms to smoking,, acute respiratory disease, or even to the lack of rest or aging. This corresponds to the fact that a cough was neglected by most of the patients in delay group in our study where chest pain and hemoptysis leads to early consultation to doctor.

In contrast to international literature one important factor causing significant delay in our context is empirical anti-tubercular treatment, which is prevalent in our part of the world where tuberculosis

is public health problem. We noticed mean referral delay in these patient with ATT was 57.09 days where as without ATT is 25 days. Chest infection was another provisional diagnosis which cause delay in referral. About 91% of patient were on empirical antibiotic for the chest symptom without proper work up. We found there has been under use of X-ray in this context where fifty percent of our patient was on antibiotic without x-ray on first visit and those who have x-ray 17% of them receive ATT with suspicion of Tuberculosis and rest receive antibiotic with the provisional diagnosis of chest infection. In both the instances there was referral delay hence causing diagnosis delay. Here low index of suspicion for cancer was the most common cause for the referral delay. [13, 14]

Early referral and assessment at tertiary care center was one of the important predictor in no delay group as patient are evaluated with high index of suspicion for cancer diagnosis with availability of specialized, highly-skilled services in these centers which is estimated to take 7-10 days in various available literature.[15] Mean duration of diagnosis in our study is noted around two weeks in our center where most of the delay is mainly due to obtaining histopathology report of the invasive procedures. Emery and colleagues found a shorter delay where patients were referred to private specialists,16 but private health services are largely not accessed by patients of lower socioeconomic background due to high 'out-of-pocket' cost. Ideally, services need to be brought closer to where people live and access them.

In our study median symptom to diagnosis delay was 67 days (range 1 -120 days). Globally, the overall length of diagnostic delay (mean) in lung cancer patients has been estimated at 60–90 days17 and this is consistent with our study finding. Our study shows that patient with small cell lung cancer and stage IV cancer reach tertiary center earlier owing to the severity of the symptom burden in these scenarios.

Conclusion

There is significant delay between the patients index symptom and its final diagnosis. This shows there is a pressing need to increase lung cancer knowledge and resource among primary care providers to reduce barriers to early diagnosis. Henceforth, developing strategies for public health education about lung cancer signs and symptoms, educational approaches in primary care to improve early diagnoses of lung cancer and updated guidelines for referral of suspected lung cancers should be enhanced to reduce the various kinds of delays in the management of lung cancer .

Conflict of Interest : None

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A Clinico-Pathological Study Of Nasopharyngeal Carcinoma In Tertiary Level Hospital In Nepal.

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Abstract:

Objectives: To study the clinico-pathological pattern of nasopharyngeal carcinoma in patients presenting in a tertiary level hospital in Nepal. Methods: This is a retrospective study on 86 patients presenting with nasopharyngeal carcinoma from January 2013 to December 2018 in BP Koirala Memorial Cancer Hospital in Nepal. After exclusion of patients with incomplete histological records, details of paients were collected and the data was analysed and presented. Results: There were 59 males and 27 females (ratio 2.2:1) with a mean age of 45.7±17.8 years.The age distribution was such of bimodal presentation with early peak at 15-19 years and late peak at 40-64 years. The commonest presenting symptoms were neck swelling (82.6%) followed by nasal bleeding (34.9%%) and nasal obstruction (32.6%). Histopathologically, non keratinising carcinoma was the commonest (89.5%) followed by keratinizing squamous cell carcinoma (10.5%).This distribution of keratinising and non keratinising histology was similar among male and female patients. Majority of patient at presentation had advanced stage of the disease - 82.5% presenting with stage III to IVB.

Conclusion: Our observation suggests a bimodal age presentation of nasopharyngeal carcinoma in our region which corresponds to low risk geographic area. However, the predominance of non keratinising histology in our patient would suggest elsewise. Majority of patients present ed at advanced stage of the disease, and as such, awareness of nasopharyngeal carcinoma symptoms of growing neck masses could prevent delay in presentation which in turn would lead to early treatment and reduction in morbidity and mortality.

Keywords: *Nasopharyngeal carcinoma, B.P Koirala Memorial Cancer Hospital, Nepal*

Introduction

Nasopharyngeal carcinoma (NPC) is an uncommon malignancy worldwide except in South

East Asia, Southern China and North Africa. The International Agency for Research on Cancer, in 2018, has estimated that there were about 129000 new cases of nasopharyngeal carcinoma, accounting for only 0.7% of all cancers diagnosed in 2018.[1,2] However, it has an extraordinarily skewed distribution geographically with more than 70% of new cases in east and southeast Asia.[1,2] The age distribution of NPC too has a unique distribution in relation to the low risk and high risk group. The age-incidence curves seem to be uniformly bimodal in every low-risk population, irrespective of geographic location and sex.[4] In contrast, in high-risk groups, the incidence peaks around ages 50 to 59 years and declines thereafter.[5] Nasopharyngeal carcinoma (NPC) is endemic in North Africa and Southeast Asia and most notably in South China, where the incidence can be as high as 20–40 per 100,000 persons.[6] In Nepal, inspite

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of higher incidence of other head and neck cancer, the nasopharyngeal carcinoma incidence is lower. According to a pooled data of 7 hospitals in Nepal, the incidence of nasopharyngeal carcinoma as of 2005, in combined male and female was 1.9%.[3] This incidence may however not reflect the true incidence as we lack proper population based cancer registry program to know the incidence, prevalence, morbidity and mortality of cancer in our population. In view of proximity to South China, similar incidence can be thought about in Nepal, but however given the heterogeneity of race with mixed Indo-aryan and Sino-tibetian population, this may not hold true in our scenario. Datas from Northeastern India suggests increase incidence of the disease among Mongoloid race.[7]

The clinical presentation of NPC may be asymptomatic or with subtle signs and symptoms. Patients with NPC commonly present at an advanced stage of the disease thus their prognosis is poor. The main reasons for the late presentation are delay in seeking medical advice and the unusual and confusing nature of the presenting symptoms misleading the clinician. Neck swelling, nasal obstruction,epistaxis and neurological features are the common presenting symptoms. Histologically, in endemic region of the world, non-keratinizing NPC is the most common type comprising over 95%,[9] in contrast the keratinizing histology is predominant in low incidence regions.[10] Nasopharynx being not easily accessible, diagnosis is often delayed and the disease is in advanced stage at the time of presentation. Surgical resection is not possible in view of close proximity to the skull base and thus, radiation therapy has been the mainstay of primary treatment and chemoradiation is the preferred approach for advanced stages.

The purpose of this study was to evaluate the various clinico-pathological patterns in patients presenting with Nasopharyngeal Carcinoma in our region.

Methods

This retrospective review included all patients registered in BPKMCH with diagnosis of Nasopharyngeal carcinoma from January 2013 to December 2018. BPKMCH is a national referral center for cancer care and management in Nepal and by far treats the most number of cancer patients in Nepal. An approval from the Nepal Research Health Council Ethics Committee for Research Involving Human Subjects was obtained before the study was conducted. All the cases with no proper histopathological diagnosis were excluded from evaluation. A total of 126 patients were registered as having Nasopharyngeal carcinoma between the period of January 2013 to December 2018. Among the 126 registered cases only 86 cases were evaluable. All patients had histologically proven squamous cell carcinoma according to the World Health Organisation (WHO) 1991 classification. This classification consisted of Keratinizing squamous cell carcinoma and non-keratinizing carcinoma. Details concerning the patient's age, sex, race, nature of presenting complaint and nature of all other associated complaints were collected. TNM staging was done as per AJCC TNM 2010 staging. The data were analyzed using Statistical package for social science (SPSS) version 16 and results were presented in percentage and simple frequencies.

Results

There were 59 males and 27 females with male to female ratio of 2.2:1.The age ranges from 13 years to 84 years with mean age of 45.7±17.8 years. The peak incidence in males was in 15-19 age groups and 40-44 years age group and in females at 50-54 years age group.The bimodality of age distribution seems clearer in male although the pattern is still apparent in females too. After the initial peak at age of 15-19 years, there appears to be subsequent decline for the next 10 years, after which the number of patient begins to increase after the age of 30 years and reaches a peak between 40-64 years,and declining thenafter as shown in figure 1. More than half

(69.8%) of the cases occurred in patients between the age of 30 and 64 years. Among the presenting features, neck swelling was the most common complaint in 82.6% of the patients.This is followed by nasal bleeding, nasal blockage, headache, visual disorders and others as listed in Table 1.

Table 1. Presenting complaints and their frequencies

(n=86)

Symptoms	Number (percentage)
Neck Swelling	71 (82.6%)
Nasal Bleeding	30 (34.9%)
Nasal Blockage	28 (32.6%)
Headache	7 (8.1%)
Visual Defects	3 (3.5%)
Others	
Hearing loss	1 (1.2%)
Otalgia	2 (2.3%)
Hoarseness	2 (2.3%)
Ptosis	1 (1.2%)
Seizure	1 (1.2%)

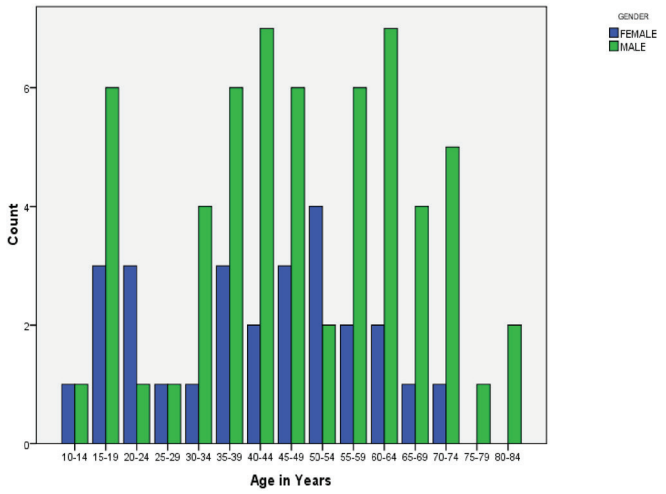

Figure 1 : Age and Sex Distribution of NPC cases

The commonest histopathology that was noted was the non keratinising (89.5%). It was similar in both male (89.8%) and female (88.3%). Staging of the disease was done according to the American Joint Committee on Cancer (AJCC) Tumor, Node, and Metastasis (TNM) staging 2010. The majority of patient presented in advanced stage (82.5%) while early-stage presentation of the disease was in 17.4% as highlighted in figure 2. 2.3% of the patients were upfront metastatic on presentation. The T, N and M category distribution is shown in table 2.

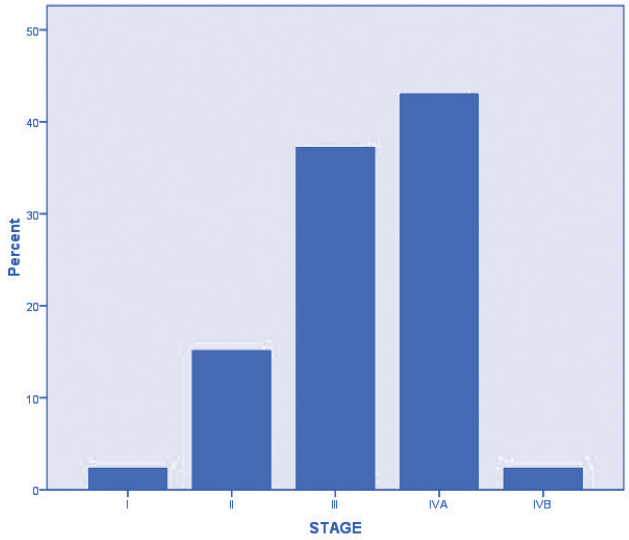

Figure 2 : Stage Distribution of the cases

Table 2. T, N, M Stage and Frequencies (n=86)

Stage	Number (Percentage)
T- stage	
T1	22 (25.6%)
T2	21 (24.4%)
T3	22 (25.6%)
T4	21 (24.4%)
N- stage	
N0	11 (12.8%)
N1	29 (33.7%)
N2	25 (29.1%)
N3	21 (24.4%)
M- stage	
M0	84 (97.7%)
M1	2 (2.3%)

Discussion

Nasopharyngeal carcinoma shows a unique feature in age distribution according to the high and low risk geographic groups. The pattern of bimodality with peaks in 15-24 years and 6574 years has been reported in low risk population.[4] Our study shows a consistent pattern across populations emerging from continual increases in NPC risk. There appears to be a peak in adolescence (15-19 years) followed by

a second peak later in life (age 40-64) and declining thenafter. This observation tends to be similar among both men and female. The second peak is observed to vary between countries and regions, occurring at 65 to 69 years in North American men, but some 10 to 15 years later in Australia and Northern Europe.[4] In our population, the "second peak" in NPC cases appears early at 40-64 years and then starts to decline. This finding is similar to a hospital based series from Mumbai, India (n=535).[11] However, even within India, series from Northeastern states shows no such bimodality.[12]

North African NPC although being in a high endemic region shows an intriguing characteristic.It shows a bimodal age distribution with a secondary peak of incidence in the range of 15-25 years,which is not observed in Asian NPC.[13] Different regions shows varying levels of risk. Even within China, Cantonese regions show higher endemicity than Hokkien, though incidence in the latter is higher than the general worldwide incidence.[14] In the Sarawak region, the NPC incidence of Bidayuh is higher than the total Malaysian incidence in general.15 In such scenario, it would be logical to assume that incidence would vary among different regions or population's ethnicity within the country itself. In Nepal, where we have heterogeneous population of both Indo-aryan and Sino-Tibetian race, it would be logical to assume that the incidence could vary among the population. Our study,aims only to see the age distribution among the general population with NPC and not among specific population groups.

One of the striking feature observed in our study is the histology distribution. The commonest histopathology that was noted was the non keratinising (89.5%). It was similar in both male (89.8%) and female (88.3%). There were no patient with basoloid histology. Basaloid squamous cell carcinoma is quite rare with a frequency of less than 0.2%. In endemic region, the commonest histology is the non keratinising. The aetiological factors of endemic NPC include the Epstein-Barr virus (EBV), environmental risk factors, and genetic susceptibility.[16] The non keratinising histology, irrespective of the ethnicity has shown no prognostic difference between ethnic Asian and non-Asian patients.[17] Our finding of non keratinising histology agrees with findings from high - incidence region of China where 84.6% of all histopathological types was non-keratinizing and keratinizing type was only in 5.8% of all NPC.[18]

The majority of our patients presented in advanced stage (stage III-IVB). Cervical lymphadenopathy is present in up to 87% of patients.[19] Our observation shows similar trend of 82.6% reporting with complaints of neck swelling. Secondly, the symptoms related to presence of tumor mass in the nasopharynx (epistaxis and nasal obstruction) constitutes about 67.5% in our observation as compared to 73% reported in one of the largest series.[20] Thirdly, we have the symptoms due to skull base erosion and palsy of cranial nerves V and VI because of tumor extension superiorly (headache, diplopia, facial pain, and numbness). Lee et al.[20] have observed around 55% presenting with such symptoms. Our observation however shows only 14% presenting with such symptoms.

Upfront metastasis in our population was about 2.3%. This is in accordance to larger series where distant metastasis at presentation was 3%.[20]

This retrospective study shows a bimodal age presentation of nasopharyngeal carcinoma in our region which corresponds to low risk geographic area.However, the predominance of non keratinising histology in our patient would suggest elsewise. Majority of our patient present at advanced stage of the disease, and as such, awareness of nasopharyngeal carcinoma symptoms of growing neck masses could prevent delay in presentation which in turn would lead to early treatment and reduction in morbidity and mortality.

Although an attempt was made to include all the cases of nasopharyngeal carcinoma patients presenting in our center, however, due to lack of proper histology

only 86 patients could be evaluated. While our series may not include patients from other centers, this is one of the first effort in presenting the clinic-pathological status of nasopharyngeal carcinoma in our region.

We strongly recommend that data be continuously gathered and that more centers participate in this process. Efforts by government and private enterprise to make the data more robust would also be of help in the process.

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Original Article

Outcome Of Finger Replantation And Survival : A Study In Kirtipur Hospital

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ABSTRACT

Introduction : This study aims to review the clinical profile, survival rate, and functional outcomes of patients with amputated finger treated with replantation

Methods: In this retrospective study, data was collected for one year between 1st January 2019 to December 31st, 2019 from the hospital records of the patients that were treated for r amputated finger in the Department of Burns, Plastic and Reconstructive Surgery, Kirtipur Hospital. Results were categorized and computed in frequency, mean and tabulated.

Results: A total of 12 finger replantation procedures were conducted in 11 patients with amputated fingers with a mean age of 25.4 years. Among the patients, 9 (81.8%) were male, while 2 (18.2%) were female. Notably, 7 (63.6%) of the patients were employed in blue-collar occupations. The index finger (33.3%) and long finger (33.3%) were the most commonly affected digits in these injuries. Crush injuries were identified as the predominant mechanism of injury. Specifically, 6 (50%) of the amputated fingers were categorized as Tamai III level, and successful replantation was achieved in 10 (83.3%) of these cases. Remarkably, 8 (80%) of the replanted fingers exhibited a Grade I Chen functional outcome, indicating a high level of postoperative function. It is worth noting that vascular complications represented the most frequent postoperative complication encountered.

Conclusion: Survival rate and functional outcome in our study were comparable to studies found in literature.

Key words: *Finger Replantation, Fingertip Replantation, Survival, Functional outcome*

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Conflicting interest: None

Introduction

Hand injuries are prevalent among young adults and middle-aged active people, especially those who are engaged in machinery work. The hand performs a unique and essential mechanical function. Amputation of the fingers may result in multiple, irreversible functional and psychological problems, especially in children and young adults.[1]

The first successful arm replantation was performed by Ronald Malt in 1962.[2] The first successful replantation of a finger was performed by Komatsu

and Tamai in 1965.[3]

The goal of the replantation is to restore circulation and gain sufficient function and sensation of the amputated part to enable the patient to return to work.[4] Initial management of patients with amputation involves stabilization of the patient and ruling out life-threatening injuries, controlling any active bleeding with pressure dressing and elevation. Tetanus prophylaxis is given and the amputated part is wrapped in moist sterile gauze and placed in an ice container during transport or as soon as the patient presents to the emergency department. After an initial evaluation, the wound is debrided, bone shortened based on the degrees to which vessels, nerves, tendons, and skin can be repaired without tension and level contamination of the injured area. The procedure is usually done under Brachial block, axillary block, digital block, wide awake local anesthesia no tourniquet (WALANT), and General anesthesia may be the needed for children. The procedure proceeds to bone fixation, tendon repair, vessel and nerve repair, soft tissue coverage in this order. The postoperative period involves close monitoring of vital signs and circulation of the replanted part and rehabilitation as soon as twound heals.[5,6]

The management requires meticulous preoperative management, microsurgical experience, and continuous postoperative care. The decision to replant a severed part is based on the numerous factors that influence the survival of the part and the functional and aesthetic benefits gained from replantation. The indications and contraindication of replantation are summarized in table 1. If surgery is only relatively contraindicated, according to the patient's desire and cultural belief, the patient is assessed individually and the decision to proceed with replantation was based on the surgeon's knowledge, experience, and clinical expertise and is summarized in table 2.[5,7,8]

The purpose of this study was to review the clinical profile, survival rate, and functional outcome of patients with finger amputation treated with replantation.

Table 1. Indications and contraindication of finger replantation[6]

Indications:
Based on type of finger:
Thumb
All fingers in children and women
Patients with career in which hands are seen all times
Based on amputated site
Single digit amputation distal to the FDS insertion
Based on number of fingers
Multiple amputation of 3 or more digits
Based on degree of injury
Clean cut injury
Blunt amputation less favorable
Emphasis of the patient: functional or cosmetic
Based on perspective of functional prognosis
Amputation at the level of proximal interphalangeal joint of the thumb
Amputation of 3 or more fingers at levels of proximal midsection of middle phalanx
Amputation in children in whom continued growth of the fingers is expected

Table 1. Indications and contraindication of finger replantation[6]
Contraindications:
Absolute contraindications
Severe vascular disorder
Mangled finger or crush injury
Segmental amputation
Relative contraindications
Single digit proximal to FDS insertion
Medically unstable patient
Disabling unstable patient
Tissue contamination
Prolonged warm ischaemia time >12 hours

Table 2: Factors for consideration when deciding whether replantation/revascularization should be offered[7]

Patient Factors	Injury Factors	Circumstantial Factors
Medical comorbidity	Level of injury	Time to presentation
Age	Digits involved	Availability of post-replantation care
Physical and occupational demand	Mechanism	
Social factors	Injury adjacent fingers	
Cultural and personal values	Incomplete or complete amputation	
Psychiatric disease		

METHODS

A retrospective descriptive study of patients of digital replantation performed between 1st January 2019 and December 31st, 2019 was conducted in Kirtipur Hospital with the approval of the institutional review committee of Phect-NEPAL. All patients with amputations of a finger with indication mentioned in the Table 1 for replantation operated by the author during the study period were included and patients who underwent replantation with the establishment of arterial inflow and venous outflow at the end of the procedure were included in the study. Procedures that were abandoned after exploration were excluded from the study, other exclusion criteria were subtotal amputations and any amputations at or proximal to the wrist joint. The medical records of all the patients, including emergency, patient files, operative reports, and outpatient summaries, were reviewed.

Demographic patient data of age, gender, hand dominance, occupation, injured hand, injured finger, whether the patient is a smoker or not, and presence of comorbid condition were also recorded.

Mechanism (guillotine, crush, avulsion, or combination), level of injury (according to the Tamai classification) of the involved digit as shown in table 3, method of transport whether it was sent in a proper method which is wrapped in moist gauze piece, and covered in a plastic bag in container with ice, amputated finger brought within 12 hours with warm ischemia time and within 24 hours of cold ischemia time was deemed adequateand recorded. Type of procedure done, number of repaired arteries, veins, and nerves, additional procedure done during replantation, any complications of the procedure and its management was recorded.

Survival of the replanted digit, which was defined as

digit viability for a minimum of 21 days, was used for the assessment of survival rate, and functional outcome was assessed at 6 months postoperative as described by Chen functional scoring system as shown in table 4.[9]

Table 3: Tamai Classification of Digit Amputation	
Level	**Description***
I	Distal to FDP insertion
II	Distal interphalangeal joint to FDP insertion
III	Middle phalanx distal to FDS insertion
IV	Proximal phalanx distal to FDS insertion
V	Metacarpophalangeal joint and proximal
*FDP = flexor digitorum profundus; FDS = flexor digitorum	

Table 4: CHEN FUNCTIONAL SCORING SYSTEM				
• GRADE	**Function**			
	Return To Work	**Range of Motion**	**Sensory Recovery**	**Motor Recovery**
I	Resume original job	>60% of normal	Normal/Near Normal	Grade 4/5
II	Resume suitable work	>40% of normal	Near Normal	Grade 3/4
III	Activities of daily life	>30% of normal	Partial recovery	Grade 3
IV	Almost no function of survived limb			

RESULT

11 patients with 12 finger replantation were evaluable, the mean age of patients was 25.4 years with the youngest being 5 years of age and the oldest 40 yearsof age . The demographic and injury characteristics of the patients are summarized in Table 5 and 6 respectively. The majority of patients were male, working in a blue-collar job and all were right-hand dominant, most commonly injuring fingers in left hand. The mean interval between injury and presentation to the hospital was 4 hours ranging from 1 to 8 hours and most of the amputated fingers were transported adequately. Crush amputation while cleaning the bike chain was the most common mechanism of injury. Index finger and the long finger were the most commonly replanted finger with Tamai III being the most common level of amputation. Only one artery was repaired and a dominant digital artery was preferred for Tamai II and proximal levels, whereas central arteriole anastomosis was performed in fingertip amputation, details of surgical procedure is summarized in Table 7.

Table 5: Demographic characteristics

Demographic characteristics	N-11 n (%)
Age	
0-15 years	2
16-30 years	4
31 – 45 years	5
Gender	
Male	9 (81.8)
Female	2 (18.2)
Hand laterality	
Left	0
Right	11
Occupation	
White collar job	1 (9.1)
Blue collar job	7 (63.6)
Student	3 (27.3)
Smoking habit	
Present	4 (36.4)
Absent	7 (63.6)

Table 6. Characteristics of the amputations/ injuries

Characteristics of Injury	N-12 n (%)
Affected fingers	
Thumb	3 (25)
Index Finger	4 (33.3)
Long Finger	4 (33.3)
Ring Finger	1 (8.3)
Mechanism of Injury	
Crush injury	8 (66.7)
Sharp cut injury	4 (33.3)
Level of Amputation	
Tamai I	2 (16.67)
Tamai II	1 (8.3)
Tamai III	6 (50)
Tamai IV	3 (25)
Tamai V	0 (0)

During the postoperative period, serious complication was seen in 4 patients, vascular complications were seen within the 2nd postoperative day. Re exploration was performed in 3 of the fingers and vein exploration and anastomosis in 2 and arterial exploration and digital artery sympathectomy was required in 1 finger. The fracture of replanted finger sustained during physiotherapy was managed conservatively.

Out of total of 12 replantations performed, 2 failed with the survival of 10 fingers with a success rate of 83.3% as shown in table 8. One patient having 2-finger replantation had one survive while the other failed. The functional outcome assessed with Chen's functional scoring system is summarized in Table 7. Two patients with poorer outcomes were amputated at the level of Tamai III affecting the index and long finger, the possible reasons for poor outcomes were one of the patients had a fracture at the site at replantation during mobilization and was managed conservatively. Prolonged immobilization and poor compliance to post-operative rehabilitation resulted in stiffness of the joints in the finger. While the other patient had amputation and replantation of a long finger, meanwhile index finger was also injured with involvement of the proximal interphalangeal joint and metacarpophalangeal joint which was treated with arthrodesis of metacarpophalangeal joint and proximal interphalangeal joint. The replanted finger had good mobility during follow up, however restricted movement in the index finger and involved joints resulted in less desirable functional outcome of the hand as a whole.

Table 7. Surgical procedure

	N-12 n (%)
Number of artery anastomosis	
One	12 (100)
Number of venous anastomosis	
One	6 (50)
Two	6 (50)
Side of venous anastomosis	
Dorsal Vein	10 (83.3)
Palmar Vein	2 (16.7)
Bone Fixation	
Single K-wire	3 (25)
Double K-wires	9 (75)

Table 8. Complications and Outcome

	N-12 n (%)
Complications	
Artery Occlusion/ complication	1 (8.3)
Venous Occlusion/ complication	3 (25)
Facture	1 (8.3)
Replantation Outcome	
Successful	10 (83.3)
Failed	2 (16.66)
Functional Outcome (Chen functional scoring system)	
Grade I	8
Grade II	0
Grade III	2
Grade IV	0

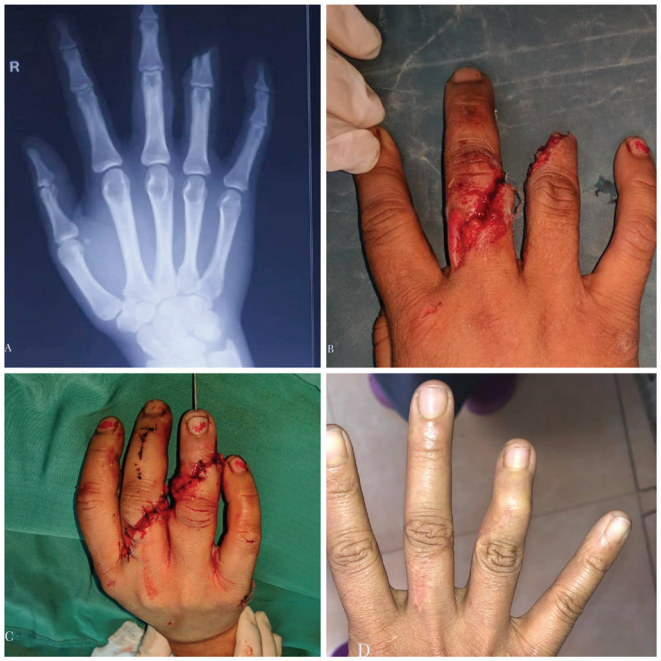

Figure 1: A) Preoperative Xray of amputated finger B) Preoperative picture of amputated right ring finger with at Tamai II level and extensor tendon injury of long finger. C) Immediate postoperative period after replantation of ring finger. D) Replanted finger at 6 months postoperative followup.

Discussion

The restoration of a completely amputated body part is defined as replantation.10 The best outcomes after replantation are related to functional and aesthetic outcomes as well as the success of microvascular anastomosis.[4]

In our study, the success rate was 83.3%, which is similar to studies from Asian countries with an 85% to 100 % rate. The success rate varies greatly in literature with some studies stating the survival rate to be from 60 to 94 % and lower rates in children (69.3%) than in adults (76.3%).[6, 7, 11, 12]

The outcome of replantation that involves survival and function of replanted finger depends on various factors, the reasons that favor a higher survival rate in our study would be that our patients had more proximal finger amputation, lesser ischemia time, and most of them had an adequate method of transportation, fewer number of smokers, affecting younger age group, radial digits involvement, and non had any other comorbid condition affecting peripheral circulation.[11-16]

The study showed that amputation was common mostly among young males working as manual labor affecting radial digits similar to other findings of other studies.[1, 6]

A review of the literature reveals various success rates depending on the mechanism of injury with a higher survival rate for non-crush amputation compared to crush amputation. In our study, most of the replanted finger was from crush injury while cleaning bike chain and the success rate was comparable to other studies which state that a higher survival rate can also be achieved regardless of the mechanism of injury.[11, 13, 15]

Most of the replanted finger in our study was single finger other than the thumb and in Tamai zone III. Weiland et al advised against replanting single digit amputation in 1977 after evaluation of functional results of 86 digital replantation, later Urbaniak et al in a study of the outcome of in 1985 after study of 59 single fingers replant concluded that replantation of single finger distal to FDS insertion was justified while replantation of a single finger amputated proximal to FDS insertion was seldom indicated.[17,18] However, patients' belief in Asian countries is different to the western world, which aligns with Confucian moral values having a greater emphasis on maintaining body integrity. Although the indications in the literature are well known, we believe that strong patient desire is also factored in the decision to replant the finger. Except for definite contraindication for surgery, patients' wishes are also taken into consideration during treatement planning.[10,17,18] Yoshimura et al stated that replanted fingers should have favorable sensory and motor function for single finger replantation to be justifiable.[6] Waikakul et al report all 237 patients with replanted fingers were happy with replantation although the poor function was observed in some patients and culture influenced the decision as to whether a digit should be

replanted.[16] From a medicoeconomic perspective, a single-digit replantation has a higher incremental cost-effectiveness ratio compared with revision amputation.[19]

In our study, most of the replanted finger's bone fixation was done with two k wires and one patient sustained a fracture during an early postoperative period which is slightly lower as compared to the study done by Cho et al who stated bony problems in replanted finger to be between 30 -50%, nonunion rates to be 10-30% and malunion about 20%.[14]

In our study half of replanted fingers had single vein repair and the other half had two, various studies have shown that number of venous anastomosis influences survival rate, and more venous anastomosis has a higher success rate, however, multiple venous anastomoses is not always possible in distal replantation.[1,10,14] While most of our cases had venous anastomosis done on the dorsal side both distal replantation had venous anastomosis on the palmer side as Woo et al states that digital veins distal to distal interphalangeal joint tend to be larger on palmar than on the dorsal aspect and vice versa proximal to it.[8]

In our study only one artery was anastomosed in all cases and at the proximal level dominant digital artery was preferred. Ono et al stated that only one digital artery is enough for the success of replantation and in the thumb, index, long, and ring finger ulnar digital artery is dominant while in small finger radial digital artery is dominant.[4]

To improve postoperative functional outcomes, recovery of a nerve is essential, in our study both digital nerves were repaired and contributed to better functional outcomes as shown in other studies. Other positive factors for better sensory contributing to better functional outcomes in our study were younger age group, no comorbid condition, short ischemia time, early rehabilitation as stated in similar studies.[10,16,20]

The most common postoperative complication in our study was venous insufficiency similar to other studies, Cigna et al state that alteration of Virchow's triad is the mechanism behind venous thrombosis and occurs within 3 postoperative days similar to findings in our study. Surgical technique, type, and mechanism of injury is main prognostic factors for success and post-operative anti-thrombosis regimen is of prime importance to prevent thrombosis in a condition which includes crush or traction injury, use of vessel graft as in some of our cases, an intraoperative finding suggestive of increased risk of thrombosis. Although these methods can never substitute for a properly performed anastomosis.[4,8,11]

The limitation of our study is the small number of cases during the study period.

CONCLUSION

Finger replantation was performed in the young age group, majorly male patients working in a blue-collar job and suffering from crush amputation in Tamai III level of amputation. The survival rate and functional outcome of replanted fingers in our study were found to be similar to that in the literature.

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Original Article

An Audit Of Outpatient Chemotherapy In A Tertiary Hospital In Nepal

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Abstract

INTRODUCTION: Outpatient chemotherapy refers to administration of anti-cancer drugs in out-patient setting contrary to the usual practice of admitting the patient. The objective of this audit is to evaluate feasibility of this approach in our setting.

METHOD: Data of all patients who received chemotherapy as outpatients in day care unit of Civil Service Hospital from November 2017 to November 2018 were reviewed and analyzed.

RESULTS: Altogether 149 patients received chemotherapy in outpatient basis in one year. There were 65 (43.6%) males and 84 (56.3%) female patients. Median age was 54 years. Most common diagnosis was colorectal, ovaran and hepato-biliary-pancreatic cancers combinedly consisting 42.2% of total cases. Most common intent of chemotherapy was palliative (61.41%) followed by adjuvant (57.38%). Altogether 33 different chemotherapy regimens were used with single drug in 19 (12.75%) and multidrug in 130 patients (87.2%). Most common chemotherapy combination was Pactitaxel/Carboplatin.

CONCLUSION: Outpatient chemotherapy administration is feasible in various types of solid tumor using different chemotherapy regimen. We suggest that outpatient chemotherapy administration should be preferred mode of chemotherapy in solid tumors in our setting.

Keywords : *Chemotherapy, outpatient, audit, day-care*

Introduction

Outpatient chemotherapy refers to administration of anti-cancer drugs in ambulatory or out-patient setting. With consumption of less hospital resources and reduction of waiting period, it is also thought to reduce cross-infections. The downside of outpatient chemotherapy is the reduced quality of life of patients. Authors have suggested that cancer chemotherapy is currently shifting from inpatient admission to the outpatient setting and more complex chemotherapy regimens are being shifted from inpatient to outpatient as inpatient chemotherapy costs four to five times higher than for outpatient chemotherapy. By avoiding in-patient admissions for chemotherapy, turnover can be increased which is very important in resource-limited settings like Nepal.

Clinical Oncology unit was established in Civil Service Hospital in 2012 and day care unit was initiated in June 2014. Day care is a 8-bedded unit and functions on weekdays (six days a week), giving chemotherapy in the out-patient basis. Three nursing staffs, a medical officer provide the service

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with the consultant clinical oncologist on call.

Methods

Patients report to day care with chemotherapy prescription and relevant blood investigations. Patients are assessed by oncologist and infusion order is given. After completion of chemotherapy infusion, they are given date for next cycle. Chemotherapy planning and interval response assessment are done in the OPD.

Data of all patients who received chemotherapy as outpatients in day care unit of civil hospital from November 2017 to November 2018 were reviewed from the patient register. Ethical approval was taken from institute review board.

Patient demography, primary diagnosis, chemotherapy regimen administered and number of chemotherapy cycles were recorded and analyzed. Descriptive analysis was done using Microsoft Excel and IBM SPSS 19.0 software (IBM, Armonk, NY, USA).

Results

Altogether 149 patients received chemotherapy as outpatients in day care facility during the study period. Of the patients recorded, 65 (43.6%) were males and 84 (56.3%) were females.

The youngest patient was 6 years of age and the oldest was 78 years old. The median age was 54 years. Most patients were in the age group 50-59 years. The percentage of elderly population (60 years and older) was 36.2%.

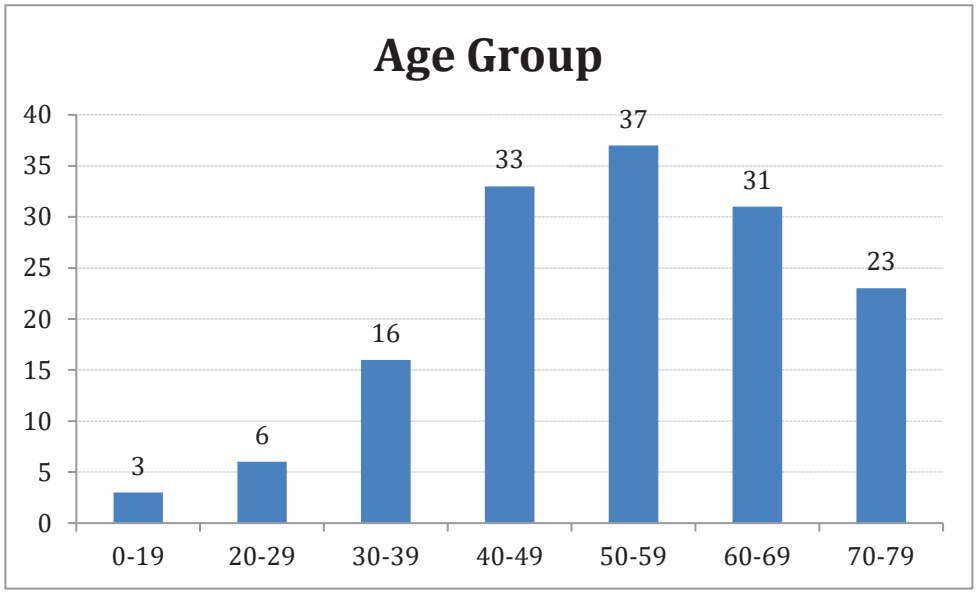

Figure 1: Age Distribution of Cancer Patients Recorded

The most common diagnoses were colorectal, ovarian and hepato-biliary-pancreatic cancers followed by breast and lung cancer and as shown on Table 1.

Table 1: Primary Cancer Diagnosis of Patients Recorded.

Diagnosis	Number	Percent
Ovarian	21	14.09
Colorectal	21	14.09
Hepato Biliary Pancreatic	21	14.09
Breast	14	9.40
Lungs	14	9.40

Diagnosis	Number	Percent
Lymphoma	9	6.04
Other Gynaecological	12	8.05
Genito-Urinary	7	4.70
Others	30	20.13
Total	149	100.00

Considering the advanced stage of patients who presented to us, the intent of chemotherapy was palliative in majority of patients. The intention of chemotherapy was Adjuvant, Definitive and Neo-adjuvant as well, with the following frequencies.

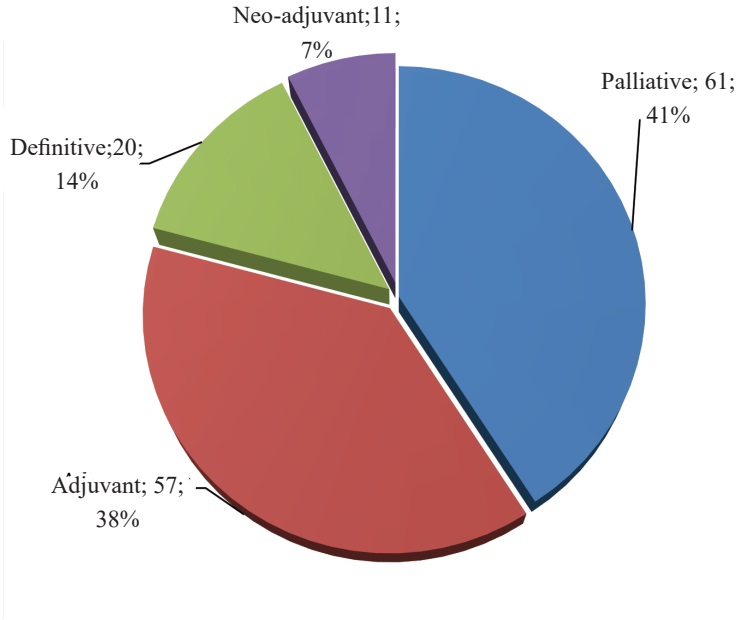

Figure 2: Intent of Chemotherapy administered.

Altogether 33 different chemotherapy regimens were used. Single drug was used in 19 patients (12.75%) while 130 (87.2%) received combination chemotherapy with 2 to 5 drugs.

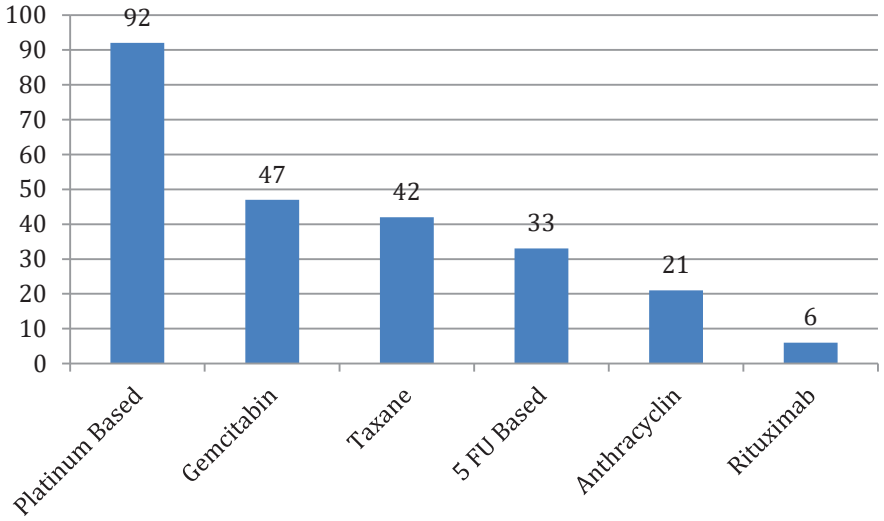

Figure 3: Drugs used in Chemotherapy.

Platinum based regimen was used in majority of patients (61.7%). Other commonly used drugs were gemcitabine, taxanes, 5-Flurouracil, anthracyclins and rituximab.

Platinum based regimens were most commonly used. Carboplatin was preferred due to ease of administration as no pre-hydration is needed. Cisplatin was also given but required adequate hydration.

Most commonly used combination chemotherapy regimens were Paclitaxel/carboplatin followed by Gemcitabin/Carboplatin and Capecitabine/ Oxaloplatin.

Targeted agents like Rituximab was used using proper premedications and using cardiac monitoring device. Infusion of Rituximab can be completed in 90 minutes safely and we could complete the same in all 6 patients.

Discussion:

Outpatient chemotherapy is a relatively new concept in oncology which has been rapidly adopted in practice.

Our study shows that chemotherapy can be administered safely and efficiently in OPD basis in majority of cancer cases. Issues needed to be addressed in OPD chemotherapy administration are proper selection of patients, chemotherapy regimen, time management and effective antiemetic therapy.

Drugs which can be administered rapidly and without hydration are preferred in this setting. Development of oral anti-cancer drugs like capecitabine and temozolamide has made it possible to take cancer medications without hospital admission.

Patients with borderline general condition still need inpatient admission for chemotherapy. Our practice for those patients is to admit patient in first cycle of chemotherapy and if they tolerate it without major adverse effects, we continue further cycles as outpatient chemotherapy.

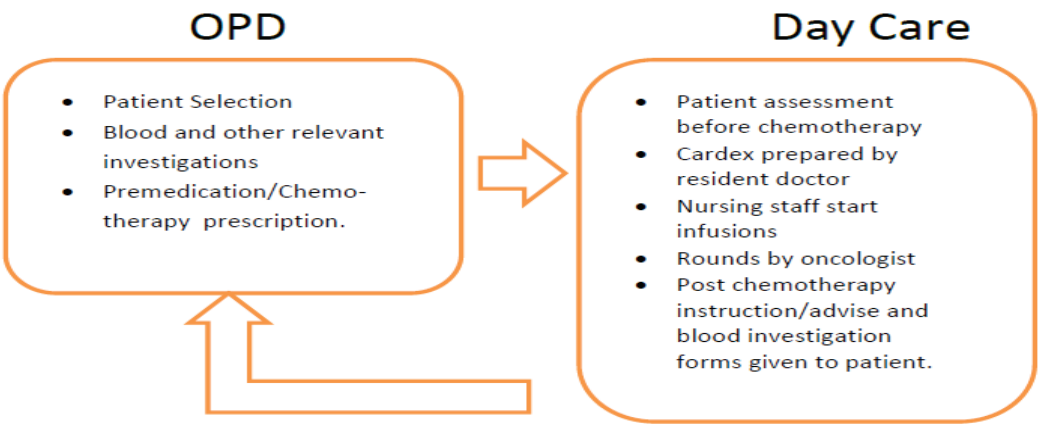

Figure 4: Workflow of Outpatient Chemotherapy.

Using this workflow (Figure 4) we were able to manage large number of patients with limited hospital resources, oncologists and nurses.

Studies dating back to 1988 have clearly demonstrated that outpatient chemotherapy is safer, cheaper and not inferior to admission chemotherapy and had predicted de-hospitalization of medical treatment.

In our hospital setting, most outpatient chemotherapy patients complain that they need to come to the hospital twice to receive chemotherapy. They have to come to the hospital for blood tests one day prior to chemotherapy and also on the day of chemotherapy. Study by Peter K.H. Lau et al. has shown that patients prefer same day chemotherapy administration but it demands more resources.

With the rapid turnover of patients in outpatient chemotherapy, the chances of errors increase as well. To reduce the errors, computerized chemotherapy prescription needs to be implemented because they are significantly safer and reduce risk of prescription errors. Other check mechanisms like double verification of the patient identity, the regimen and the doses further reduces the chances of errors.

Majem et al. established an oncology acute toxicity unit (OATU) which was a call-center to manage chemotherapy induced toxicities. With the establishment of OATU, chemotherapy toxicities were managed better and even reduced emergency admissions. Similar telephonic assistance with OATU if established at our center, we could improve our outpatient chemotherapy services.

Conclusion:

Outpatient chemotherapy administration is feasible in various types of solid tumors using different chemotherapy regimen. We suggest that outpatient chemotherapy administration should be preferred mode of chemotherapy in solid tumors in our setting.

Grants – None

Registration number of clinical trial: Not applicable

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Training Of NBMS Resident Fellows & Faculties On Mandatory Modules

Ms Maiya Khadka

Under secretary, NBMS Secretariat, MEC

Specialty and Sub Specialty Program is running under National Board of Medical Specialties as a new aspect of Post Graduate Medical Education in Nepal based on Competency based medical education (CBME) curriculum with the main objective of expanding the opportunity for Post-Graduate medical training outside University and Academia, utilizing the expertise and resources available and to produce skilled manpower through close clinical training in different specialty and sub specialty. As per present situation, it is a huge challenge to run academic program in non-academic institutions and it will need dedication for successful implementation.

To fulfill the objectives of NBMS program, there are certain provisions under curriculum, among them mandatory training on various modules is one of the major component. National Board of Medical Specialties by signing MOU with Nepal Medical Council CPD Unit, conducted training for first year and second year NBMS Resident Fellows and Faculties jointly from March 14 to 17, 2023 in MEC.

The program was conducted as follows-

Day one- CPR Participant 24

Schedule of training: - 8.30 AM to 5 PM 14 to 17 March 2023
Introduction to CPD
• Introduction of Course, • CPR : Basic Life Support, Adult/Pediatric • Post test
• Airway Breathing & Chocking • CPR in Special situation : Hypothermia, Drowning, Pregnancy, COVID1
• ACLS-Adult/PALS, • Drugs & Defibrillation, Crash Cart
• Peri-arrest arrhythmias • Post Resuscitation Care
Post-test and Feedback-All

Day two-Communication skill Participant 24

Topic
• Communication skill in medicine, an Introduction
• Communication in a team, with peers and others health professionals (Presentation and Group Work)
• Communications skill for medical consultation (Core CS) • Breaking Bad News (end stage illness, death, dying and palliative care)
• Communication skills in relations to special situation (Presentation Group work and Role play) • Consultation, referral and note writing (Presentation and Group Work)
• Post test • Feedback All

Day three –Infection Control & Waste Management

Participant 24

Topic
• Introduction to infection prevention and control in health care setting • Standard Precautions
• Hand Hygiene • Antimicrobial resistance
• As Transmission Based Precautions • Personal protective equipment
• Asepsis, antisepsis and disinfection • Waste Management in health care Facility
• Practical Exercise Hand Hygiene Donning and Doffing of PPE
• Post-test and Feedback

CPR	CPD points 10
Communication Skill	6
Infection Prevention	6
Medical Ethics	4
Rationale Use of Drugs	4

Day four- Medical Ethics

Participant 24

Topic
• Principle of Medical ethics
• Code of Ethics and Law
• Ethical dilemmas and methods of resolving them (case discussion)
• Practical & Group work : All
• Post-test and Feedback

Day four- Rational Use of Drug

Participant 24

• Rational use of drugs • Irrational use of drugs • Laws and regulations related to drugs • Antibiotic resistance
• Laws and regulations related to drugs • Feedback, Practical session
• Drug use indicator
• Strategies to improve use of medicine
• Practical & Group work : All
• Post-test and Feedback

Communication, coordination and administrative facilitation was done by NBMS Secretariat.

Journal of Medical Education Commission (JMEC): Instruction to Authors

About the Journal

Publication of JMEC started from July 2020 by Medical Education Commission of Nepal. The aim of JMEC is to promote and provide a common platform to publish the scientific works in the field of medical education as well as to foster the knowledge, disseminate the innovative ideas, technologies, teaching learning techniques in this field.

Publication: It is published biannually; in the month of January and July and is peer reviewed internally and externally.

Languages: JMEC accepts articles both in English and Nepali languages.

Field of Articles:

JMEC publishes articles from the field of medical education, medical and bioethics, teaching–learning methodology, communication skills, student-teacher training methodologies, innovations in medical education, online teaching-learning, telemedicine in medical education, national/international policies in medical education, global standards in medical education and more. Beside this, it also will publish student centered articles in medical ethics and medical education.

Guideline for submission of manuscripts:

JMEC requires that the manuscript submitted are the original work of the authors and it is not submitted anywhere else before submission to JMEC. Authors are solely accountable for their works, views and opinions expressed in the submitted manuscript. Manuscript should be submitted duly signed by authors declaring conflict of interest and funding sources and with a covering letter addressing to the chief editor, JMEC. Electronic submission is encouraged. In case of hard copy submission, the manuscript should be typed in double spaced, only one side A4 size paper, with Times New Roman, font size 12.

The manuscript should mention the corresponding author with full name, designation, corresponding e-mail address and contact number.

JMEC does not charge any fees to the authors.

Types of articles

Authors are required to categorize the articles as original article, review article, case report, short communication, student articles as follows:

- **Original article -** the innovative and scientific works done by medical educators/ researchers /policy makers/ administrators/ health financers/ education financers.
- **Review article -** on critical analysis of works published in scientific literature and policies related to medical education. The source should be mentioned for data collection, selection of data location methods, extraction and analysis of data if any.
- **Case study/report –** on relevant topics particularly medical education. If any photographs are included, separate informed consent is required.
- **Short communication -** expressing author's observations, views on the issues which are debatable and controversial or relevant to current issues with their personal view on specific areas. For example - medical education, ethics etc.
- **Medical education for students / by students -** Articles written by students – medical, dental, nursing, allied science but must comply the terms and conditions as mentioned in general for original article, review article, case report, short communication as well as guideline for manuscript submission and will undergo the peer review process. JMEC encourages student's articles and publishes with priority.
- **Editorials –** Editorials are prepared by the editorial board. Guest editorials are sought by invitation to the experts.

Referencing

Authors are required to follow Vancouver system of referencing. Here are the examples of citation:

Journal article

1. Adhikari B, Mishra SR. Urgent need for reform in Nepal's medical education. Lancet. 2016;388(10061):2739-2740.
2. Dhakal AK, Shankar PR, Dhakal S, Shrestha D, Piryani RM. Medical Humanities in Nepal: Present Scenario. J Nepal Med Assoc. 2014;52(193):751-754.
3. Dixit H. Development of medical education in Nepal. Kathmandu Univ Med J. 2009;7(25):8-10.
4. Baral N, Paudel BH, Das BK, et al. An evaluation of training of teachers in medical education in four medical schools of Nepal. Nepal Med Coll J. 2007;9(3):157-161.

- **Journal article published online ahead of print**

  Atreya A, Acharya J. Distant virtual medical education during COVID-19: Half a loaf of bread [published online ahead of print, 2020 Jun 18]. Clin Teach. 2020;10.1111/tct.13185.

- **Chapter of an edited book**

  Craven R. Why teach Aboriginal Studies?. In: Craven R, ed. by. Teaching Aboriginal studies. 2nd ed. Crows Nest: Allen & Unwin; 2011. p. 18.

Review Process and Publication Policy

All the manuscript received are duly acknowledged by JMEC Editorial Board. They are preliminarily screened for the requirements as they are not simultaneously submitted elsewhere other than JMEC as declared by authors, duly signed cover letter to the chief editor, preferably categorized article by the authors (original article, review article, case report, short communication) fulfilling the requirement as described in types of manuscript. The articles with flaws in technical, scientific or ethical content will not be considered for publication process.

The screened manuscripts are then proceeded for review by external reviewers other than JMEC as a peer review process. JMEC communicates to the author with the reviewer's comments for correction if suggested and has the right to accept, to make re-correction and resubmit or reject the manuscript.

Acceptance of manuscript is communicated to the corresponding author in writing and proceeded for publication process.

Accepted articles are submitted for peer review, grammatical editing, formatting in JMEC style. Page proofs are sent to corresponding authors before publication.

Ethical Clearance

Works involving the humans or data collected with direct involvement of participants will need an ethical clearance letter duly signed by the authorized ethics committee. All the data involving participants should be anonymized.

Size of articles

Category of article	Abstract	Total words (excluding references)	References
Original article	Up to 250 words	Up to 3000 words	Up to 50
Review article	Up to 250 words	Up to 4000 words	Up to 100
Case study/report	Up to 150 words	Up to 1000 words	Up to 15
Short communication	Not applicable	Up to 1500 words	Up to 10

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नेपाल सरकार

चिकित्सा शिक्षा आयोग

सानोठिमी, भक्तपुर

चिकित्सा शिक्षा जर्नलका लागि लेख रचना पठाउने सम्बन्धी जानकारी

यस आयोगबाट 'चिकित्सा शिक्षा जर्नल (Journal of Medical Education Commission-JMEC) २०७६/२०७७ देखि नियमित रूपमा प्रकाशन हुन सुरु भएकाले आगामी अङ्कहरूका लागि देहायबमोजिमका लेखको ढाँचा तथा विधामा उक्त पत्रिकाका लागि लेख रचना प्रकाशनार्थ यस आयोग वा तल उल्लिखित इमेलमा उपलब्ध गराई सहयोग गरिदिनु हुनका लागि सम्बद्ध सबैको जानकारीका लागि अनुरोध गरिएको छ।

तपसिल

१. लेख रचनाको ढाँचा (Format of Articles)

- शीर्षक (Topic)
- लेख सार (Abstract) : १५० देखि २०० शब्दसम्म
- मुख्य शब्दावली (Keywords) : नेपालीमा लेख रचना भए नेपाली र अङ्ग्रजीमा समेत
- विषय प्रवेश (Background)
- विषयवस्तुको विश्लेषण विस्तार (Analysis Expansion of the content/text)
- परिचय, नीतिगत व्यवस्था, नेपालको चिकित्सा शिक्षाका सन्दर्भमा यसको प्रयोग/उपादेयता, भावी दिशासहित लेखरचनाको प्रकृति अनुसार (Use, implications and future direction in Health Profession Education in Nepalese context)
- निष्कर्ष (Conclusion)
- सन्दर्भ सामग्री (Reference materials) APA format अनुसार लेखमा उल्लेख तथा साभार गरिएका मात्र
- लेखकको नाम, कार्यरत कार्यालय, पद, योग्यता, प्रकाशन कृति, सम्पर्क फोन र इमेल ठेगाना

२. लेखकहरूलाई विशेष अनुरोध

(क) लेख नेपाली वा अङ्ग्रेजी भाषामा २, ००० शब्ददेखि ३,००० शब्दसम्म (६ देखि १२ पेजसम्म) टाइप गरेको सफ्ट कपीमा हुनु पर्नेछ।

(ख) लेख नेपालीमा टाइप गरेको भए A4 पेपरसाइजमा Himalli or Preeti मा १४ फन्ट र अङ्ग्रेजीमा टाइप गरेको भए Times New Roman, 12 फन्ट/साइजको अक्षर र लाइन स्पेस १.२ मा टाइप गरेको हुनुपर्ने छ।

(ग) लेख रचना आयोगको इमेल jmec@mec.gov.np वा सवैमा र यस आयोगको ठेगानामा पठाउन सकिने छ। थप तथा अन्य जानकारी चाहिएमा यस आयोगको National Board of Speciality सानोठिमी वा ०१-६६३९३१४ मा सिधै सम्पर्क गर्न सकिने छ।

(घ) प्राप्त भएका लेख रचनाहरूलाई लेखकले पठाएकै पाण्डुलिपिमै मूल्याङ्कन, पुनरावलोकन गरेर मात्र सम्पादन र प्रकाशन गरिने छ। त्यसैले भाषागत र विषयवस्तुको शुद्धता, प्रमाणिकता, अद्यावधिकतामा विशेष सतर्क हुन अनुरोध छ।

(ङ) लेख रचना प्रकाशन गर्ने वा नगर्ने र काँटछाँट गर्ने अधिकार सम्पादक मण्डलमा रहने छ। अप्रकाशित लेख रचनाहरू लेखकलाई फिर्ता गरिने छैन।

(च) प्रकाशित हुने लेख रचनाको प्रतिलिपि अधिकार आयोगमा रहने छ। तर लेखमा प्रयुक्त विचार र अवधारणा लेखकका निजी विचार हुने र तिनले आयोगको प्रतिनिधित्व गर्ने छैनन्।

३. लेख रचनाका क्षेत्रहरू

१. चिकित्सा शिक्षा सम्बन्धी नीति, योजना, कार्यक्रम तथा सो सम्बन्धी समसामयिक विषयवस्तु,

२. चिकित्सा शिक्षा सम्बन्धी राष्ट्रिय तथा अन्तर्राष्ट्रिय अभ्यास सम्बन्धी अध्ययन, खोज, अनुसन्धान तथा समसामयिक विषयवस्तु,

३. चिकित्सा शिक्षा आयोगका कार्य क्षेत्रका वर्तमान तथा भावी कार्य, समस्या र चुनौती तथा समाधानका उपायहरू

४. चिकित्सा शिक्षा सम्बन्धमा भए गरेका नेपालका मौलिक अनुभव र अभ्यासहरू

५. चिकित्सा शिक्षाका उपयुक्त अन्य विषयवस्तुका विधागत क्षेत्रहरू (Potential areas for article) जस्तै:

- चिकित्सा शिक्षाका शिक्षक/कर्मचारी तालिम र पेसागत विकास (Teacher/Management Training and Professional Development in Health Education Profession)
- चिकित्सा शिक्षामा सुशासन (Good Governance in Health Education Profession)

- चिकित्सा शिक्षामा व्यवस्थापन गतिशीलता (Management Dynamics in Health Education Profession)
- चिकित्सा शिक्षामा वित्तीय व्यवस्थापन (Financial Management in Health Education Profession)
- चिकित्सा शिक्षामा शिक्षक शिक्षा (Teacher Education in Health Education Profession)
- चिकित्सा शिक्षामा मूल्याङ्कन प्रणाली (Educational Evaluation in Health Education Profession)
- चिकित्सा शिक्षाका जल्दाबल्दा मुद्दाहरू (Potential and Crosscutting Issues in Health Education Profession)
- चिकित्सा शिक्षामा गुणस्तर (Quality in Health Education Profession)
- चिकित्सा शिक्षामा विश्वव्यापीकरण तथा स्थानीयकरण (Globalization and Localization in Health Education Profession)
- चिकित्सा शिक्षामा विधागत/विषयगत शिक्षण सिकाइका विधि, प्रक्रिया, अनुभव तथा अनुसन्धानहरू (Theme/Subjectwise teaching learning methods, strategies, experiences and research outputs in Health Education Profession)
- चिकित्सा शिक्षासँग सम्बन्धित सोध तथा अनुसन्धानहरू (Research Reports related to Health Education Profession)
- चिकित्सा शिक्षाका विभिन्न शैक्षिक परियोजना, योजना तथा कार्यक्रमहरू (Different projects, plans and programs in Health Education Profession, etc.)

४. लेख रचनाको ढाँचा र अन्य पक्ष

१. लेख रचनाहरू चिकित्सा शिक्षा सम्बन्धी नीति, योजना, कार्यक्रमको विश्लेषण तथा खोज अनुसन्धानमा आधारित हुनुपर्ने
२. विचारमूलक, विश्लेषणात्मक र अनुसन्धानात्मक लेखहरूलाई प्राथमिकता दिइने
३. लेखमा सन्दर्भ सामग्री तथा तथ्य तथ्याङ्कहरूको स्रोत स्पष्टसँग उल्लेख हुनुपर्ने
४. लेख रचनाको ढाँचा अनुसन्धानमूलक हुनुपर्ने
५. विचारमूलक तथा विश्लेषणत्मक लेख रचनामा न्यूनतम- (१) कार्यकारी सारांश, (२) पृष्ठभूमि वा परिचय वा विषयप्रवेश, (३) सैद्धान्तिक वा नीतिगत पक्षको विश्लेषण, (४) समस्या, चुनौती र समाधान, (५) निष्कर्ष र (६) सन्दर्भ सामग्री जस्ता पक्षमा ध्यान दिनुपर्ने
६. चिकित्सा शिक्षा पत्रिकाका लागि चिकित्सा शिक्षाका नीतिगत तहदेखि कार्यान्वयन तहसम्मका शिक्षाको विकासको विद्यमान अभ्यास तथा भावी कार्यदिशामा केन्द्रित अनुसन्धान, अनुभव, सिद्धान्त र अभ्यास, सूचनामूलक तथ्यहरूलाई समेत समेटेर लेख रचना तयार गर्न अनुरोध गरिएको ।
७. लेख रचनासँगै लेखकले आफ्नो अद्यावधिक गरिएको व्यक्तिगत विवरण (CV) संलग्न गरी पठाउन सुझाव गरिएको ।
८. प्राथमिक तथ्याङ्कमा आधारित लेख रचनालाई बढी प्रथमिकता दिइनेछ । प्रति पृष्ठ १५ प्रतिशतभन्दा बढी मौलिक नभई अरूका कुरा उद्धरण भएका (Copied) र प्रायस हुवहु सारिएका लेख रचनाहरूलाई सुरुकै छनौट प्रक्रियाबाटै हटाइने भएकाले लेखरचना तयार गर्दा यसतर्फ विशेष ध्यान दिन अनुरोध गरिएको छ ।

Acknowledgement

JMEC would like to acknowledge the immense contribution made by the Authors, Reviewers, Editors and the JMEC Secretariat for bringing this issue in this form upto your desk.

It expects similar valuable contribution in the forthcoming issues as well.

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MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

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078/79 **March 13, 2022**

Government of Nepal,
Medical Education Commission,
Bhaktapur

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Thanking you in advance for your kind co-operation in this matter, I remain.

Yours sincerely,

(Basanta Raj Pantha)
Library Officer
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Lalitpur

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पुस्तकालयमा गएर पढ्ने बानी बसालौं ।