ISSN 2523 - 1316 (Online), ISSN 2409 - 7381 (Print)

AJSMU

Volume 8 Issue 1 January - June 2022

ANNALS of JINNAH SINDH MEDICAL UNIVERSITY

Recognized by the Higher Education Commission, Pakistan in 'Y' category

Indexed and abstracted in Pak Medinet, CAB Abstracts, Global Health UK, Pakistan Science Abstracts and WHO Index Medicus for the Eastern Mediterranean Region (IMEMR)

A J S M U

Volume 8, Issue 1 **January - June 2022**

The AJSMU is published biannually by Jinnah Sindh Medical University.
Editorial Correspondence should be addressed to: Editor-in-Chief, AJSMU, Jinnah Sindh Medical University, Rafiqui H.J. Shaheed Road, Karachi 75510; Tel: 99204776; 35223811-15 Ext:1076, 1087
Email: ajsmu@jsmu.edu.pk; Website: www.ajsmu.com; Fax: 99201372
Annual subscription: Pakistan Rs.450, Bangladesh & India: Rs.600, UK £ 15, U.S.A and other countries: US$ 15
Published by: The Registrar, Jinnah Sindh Medical University, Rafiqui H.J. Shaheed Road, Karachi.

A J S M U

Volume 8, Issue 1 January - June 2022

EDITORIAL

Undergraduate Medical Education in the Post Covid Era

Syed Jaffar Zaidi[1], and Muhammad Shahid Shamim[2]

How to cite this article: Zaidi SJ, Shamim MS. Undergraduate medical education in the post covid era. Ann Jinnah Sindh Med Uni. 2022; 8(1):1-2

DOI 10.46663/ajsmu.v8i1.1-2

The healthcare contingency due to COVID-19 compelled social distancing measures that drastically altered day-to-day education delivery. The education of healthcare professionals was affected the most as they specifically require students to work collaboratively and closely with the patients. However, within this turmoil, the pandemic provided opportunities for institutes, faculty, and students to develop innovative methods for achieving learning outcomes through virtual or remote learning. Thereby, in several institutes, faculty and students adapted to virtual or remote learning methods to minimise the effects of social distancing[1] and attempted to create the "new normal" in healthcare education.

As the Covid pandemic decreases, and the educational activities are revived on campus, it is prudent to suggest if the "new normal" in healthcare education will continue. Therefore, this editorial looks at the potential variables that healthcare educators may contemplate while providing post Covid medical and dental education.

Technology-based Education

During the pandemic, virtual or remote learning has set a precedent in healthcare education and provided a universal learning experience to students and faculty. The students, thus, moved from a face-to-face educational scenario to a virtual learning environment. Furthermore, the move offered a chance to the institutes, the faculty, and the students to ponder how to best achieve the educational outcomes in the given situation. Consequently, the accessibility of various virtual platforms, software applications and digital technologies during the pandemic provided the options for curriculum delivery.

The necessity for optimised Internet connectivity further compelled the institutes and other stakeholders for upgrading the provision. Although, the inequities related to access to Internet persisted in different parts of the country[1], as reliable Internet connectivity and availability was an issue for both teachers and students, the adoption of virtual or remote learning helped in sustaining the education process for many.

Technology-based education, therefore, can help prepare medical and dental students for the changing dynamics of healthcare practice in the "new normal". Thus, proving to be a milestone towards the future healthcare education delivery.

Learning Management

The Covid pandemic opened the doors for broader and consistent use of the Learning Management Systems (LMS) in institutions in Pakistan. Several institutes developed their Virtual Learning Environments (VLE) or switched to Moodle, Google Classroom, or Canvas. Regular use of applications such as Zoom, Google Hangouts, and Teams became a norm in many educational arenas. Some may still be struggling to incorporate the LMS in their institutes[2]. However, there is consensus among all stakeholders that the provision supports education management in multiple ways that help students, faculty, and institutes[4]. It provides the students a 24-hour access to the learning resources, helps faculty in managing their teaching and assessments, and facilitates the institute in organising information about enrolment, curriculum, announcements, and assessment records, to name a few.

Laboratory and Clinical Training

Practical and clinical training is considered an irreplaceable part of medical and dental education. Nevertheless, it involves close contact between peers and patients in hospital and community setups.

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Therefore, the Covid pandemic social distancing requirements halted the delivery of effective skills to students[3]. Subsequently, alternate methods were tried and tested to fill in for the face-to-face skills training with variable success. One such method included fragmention of skills education into three distinct components: description, demonstration, and practice. The initial two were delivered through remote methods, while the third was deferred for face-to-face sessions after the lockdown. The method intended to continue skills training and save students' time during the pandemic. The method not only achieved its intended outcome, but it also proved effective for the delivery of skills education with limited use of faculty and students' time.

Online Courses

Many online courses are available through various websites like Coursera, Udemy, Masterclass, LinkedIn Learning. They offer free and low-cost courses for developing the cognitive skills relevant to the needs of healthcare faculty and students. During the Covid pandemic lockdowns, Pakistan's Higher Education Commission (HEC) provided opportunities for the university faculty and students to acquire certification through online courses. The offer included courses on educational development and delivery, research methodologies, and other topics that can interest healthcare providers[4]. These capacity-building online courses were not popular among healthcare institutes previously[5]. However, many faculty members and students took the courses during the pandemic lockdown.

CONCLUSION

The primary purpose of undergraduate education for healthcare professionals is to ensure that the students are acquiring knowledge, skills, and behaviours that prepare them for a spectrum of functions, including, but not limited to, patient care, public health, collaboration, social interactions, and further education. The content and delivery of education in the knowledge, skills and behaviour domains vary significantly, necessitating various teaching and learning modalities.

As the educational activities are slowly moving towards the pre-pandemic situation, it would be pragmatic to continue certain aspects of virtual learning. The Covid-driven development of remote learning possibilities could add value to the process of education delivery of healthcare education in the post-Covid era. Additionally, the uncertainty of the pandemic situation still prevails as new Covid variants emerge. Therefore, the institutes, faculty, and students need to have contingency plans in place.

Author's contribution: SJZ and MSS Conceptualized the idea and planned the structure of the manuscript; SJZ wrote the first draft of the manuscript; MSS critically revised and added text in the draft; MSS and SJZ reviewed and edited the final draft before submission and did proofreading.

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ORIGINAL ARTICLE

Relationship of Brodsky Tonsillar Grading in Adults with Age, Gender, and Anthropometric Measurements

Ayesha Mehwish[1], Yasmeen Mahar[1], Samia Khalid[1], Rida Rubab[1], Mariya Azam Khattak[1], and Sahal Salman[1]

ABSTRACT

Objective: To determine the association of Brodsky Tonsillar Grading with age, gender, body mass index, and neck circumference in adults

Methodology: A cross-sectional study was conducted at PNS Shifa Hospital, Karachi from January to July 2020. A total of 54 adults with tonsillar hypertrophy were included. History and demographic details of each subject were noted. Both right and left tonsil sizes were graded using Brodsky Grading. Height, weight, and neck circumference was measured. Analysis was done using Statistical Package for Social Sciences 23.0.

Results: Age was associated significantly (p-value 0.0009) with Brodsky Tonsillar Grading for the right tonsil whereas it was insignificant for the left tonsil (p-value 0.25). Insignificant association between clinical grading of tonsils with gender (male n = 29, p-value 0.079 and female n =25, p-value 0.343) was found. Thirty one study participants were found to have normal BMI, 14 were overweight whereas 9 individuals were obese. Significant association was found between Brodsky Grading for right tonsil (p-value 0.014) and BMI. Statistically non-significant association was found between Brodsky Grading for left tonsil (p-value 0.216) and BMI. Regarding neck circumference and clinical grading, significant relationship was found with p-value 0.002 and 0.014 respectively.

Conclusion: Brodsky Tonsillar Grading was associated positively with age and BMI for the right side and with neck circumference for both the sides. Therefore clinical assessment of tonsils by grading and anthropometric measurements are helpful in recognition of patient's condition and treatment.

Key Words: Brodsky grading, body mass index, neck circumference, tonsil

How to cite this article: Mehwish A, Mahar Y, Khalid S, Rubab R, Khattak MA, Salman S. Relationship of brodsky tonsillar grading in adults with age, gender, and anthropometric measurements. Ann Jinnah Sindh Med Uni. 2022;8(1):3-8

DOI 10.46663/ajsmu.v8i1.3-8

INTRODUCTION

Acute tonsillitis is the inflammation of one or both tonsillar tissues with fever, malaise, odynophagia, swelling, and hyperemia of these structures. It may be associated with exudate or cervical lymphadenopathy[1]. It is usually viral in origin and may occur in epidemic form superimposed by bacterial infection, most commonly beta hemolytic streptococcus. Staphylococci, pneumococci, hemophilus influenza and moraxella catarrhalis are also involved in the pathogenesis of the condition[2]. Whereas, chronic infection comprises recurrence of acute attacks, usually five or more attacks of true tonsillitis in a year and persistence of symptoms for about twelve months which include chronic throat discomfort, pain, enlarged tonsils, palpable tender jugulodiagastric lymph nodes, and foetororis[3].

An ultrasonographic study reported that the size of palatine tonsils differs in different age groups[4]. The study reports that the variation in size of palatine tonsils depended upon age, distinctiveness of an individual, and disease status. It also found a prompt increase in the size of tonsils at about fifth or sixth year of age attaining maximum size at adolescence. It further described that tonsil size was associated with anthropometric indices like age, weight, and height, with strongest correlation with height.

Another study depicting the magnitude of otorhinolaryngological illnesses in Pakistani population shows that the greatest frequency of patients who came to the

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hospital and were admitted, included pharyngeal issues with (31.04 %) prevalence, out of whom majority were with tonsillitis (54.54 %); Others reported with nasal disease (29.01 %), ear disease (16.71 %), oral and laryngeal disease[5].

The clinical presentation of patients with acute or chronic inflammation of tonsils differs in etiology, most commonly presenting with fever, difficult or painful swallowing, enlarged and erythematous tonsil. The highest manifestation of hypertrophic tonsil with obstructive symptomatology includes obstructive sleep apnoea (OSA). Therefore clinical examination should include identification of risk factors of OSA such as overweight or obese subjects, increased neck circumference, age above 40 years, nasal obstruction, and hypertrophic tongue. Tonsillar hypertrophy is classified using Brodsky Grading Scale which is a standard method used worldwide. Preoperative assessment of tonsil size via clinical grading was found to be associated with actual tonsil volume measured by physical methods. Furthermore, age and BMI are the independent influencing factors affecting tonsil size[6].

Clinical assessment of tonsils was done in the present study using Brodsky Tonsillar Grading Scale, which is easily performed and clinically practical. A Chinese prospective study evaluated three tonsil grading scales including Brodsky Grading Scale, 3-Grade Scale, and 5-Grade Scale and demonstrated that the Brodsky Tonsillar Grading Scale produced better intra observer and inter-observer reproducibility[7]. A modified 3-Grade Scale had extensive grade interval and therefore can have greater chances of error because of repeated measurements. Providing an actual elucidation is difficult, as we feel that our eyes detect halves and quarters more easily than thirds, the study stressed[7]. Many researches have linked obesity with cardiovascular, renal diseases, diabetes mellitus, and otorhinolaryngological conditions, with raised mortality rates. Mean Body Mass Index (BMI) and obesity has been related with leading inflammatory conditions in otorhinolaryngology involving tonsillitis, rhinosinusitis, and otitis media in adults[8].

Regarding anthropometric measurements, neck circumference has gained importance as it is simpler, easy to measure, and more practical, not influenced by the last meal or clothing. A Pakistani cross sectional study validates the significance of it as a measure of general and central adiposity as a screening tool for determination of obesity[9]. This research found a cut off value of neck circumference for overweight subjects to be greater than 35.5 cm in men and 32 cm in women; Further, collar size correlates well with other anthropometric measurements such as weight, waist circumference, age, hip circumference, waist to hip ratio, and BMI for men and women, the study found[9].

Another cross sectional study revealed neck circumference as a significant risk indicator for metabolic states and may be vital in identification of visceral and central adiposity in healthcare settings primarily, in primary health care units, and in research projects[10]. The study recommended that anthropometric measurements should be assessed when expensive instruments and various equipment are not available. This technique is helpful in measuring in pregnant ladies on whom, traditional measures might become challenging or not possible, it pointed out[10].

Physical examination of upper airway anatomy by an ENT specialist can give a clue to the severity of OSA. Other undervalued variables like age, gender, BMI, collar size, narrowness of anterior pillars, tongue, and tonsillar grading should be considered as they are related with the seriousness of OSA[11].

This research was conducted to study the influencing factors for the association of Brodsky Tonsillar Grading with age, gender, and anthropometric measurements.

METHODOLOGY

This cross sectional study was conducted at the ENT (Ear, Nose, and Throat) and Radiology Departments of PNS Shifa hospital, Karachi from January to July 2020. Ethical approval letter with reference No: ERC 09/2020 was issued by the Ethical Review Committee of Bahria University Medical and Dental College before commencement of data collection.

OpenEpi version 3, which is an Internet source, was used for sample size estimation. At 95% confidence interval, and 5% margin of error, sample size was calculated to be 45 for tonsillar hypertrophy. However, 54 subjects were included with hypertrophic tonsils and age ranges from 18 to 60 years. Exclusion criteria of the study comprised children and subjects above 60 years. Those who gave history of tonsillectomy, trauma, malignancy, Cushing's disease, thyroid disorders, and pregnant and lactating women were excluded from the study.

Informed consent was signed by each participant before enrollment and pro forma was filled by the principal investigator which included a brief history obtained from each subject, demographic data, and physical examination with tonsillar grading by otorhinolaryngologist first and then by the principal investigator to decrease subjectivity.

Brodsky Tonsillar Grading was used in the present study. The morphological features were evaluated while the patients were sitting calmly with spontaneous breathing. Tonsils were graded as follows:

Grade 0: Tonsils within the tonsillar fossa or removed
Grade I: Less than 25% of the oropharynx occupied
Grade II: 25% to 50% occlusion of oropharynx
Grade III: 50% to 75% occlusion of the oropharynx occupied
Grade IV: Greater than 75% of the oropharynx occupied, completely obstructing the airway

Height in meters and weight in kilograms were noted for calculation of BMI. Neck circumference was measured by using non flexible plastic tape, in the midline below the laryngeal prominence and perpendicular to the long axis of the neck. The minimal circumference was recorded to the nearest 0.1 cm, while the subject was asked to look straight with shoulders down but not bent. Care was taken not to include neck/shoulder muscle such as trapezius in the recording of measurement. Cut off values for neck circumference was taken to be 42cm in males and 37.5cm in females.

Data were coded and SPSS version 23 was used for statistical analysis. Results were expressed as mean ± standard deviation for quantitative variables and number (percentages) for qualitative variables. The data was analyzed for normality. Chi-Square test was applied to see the association of tonsil grading with gender and BMI. One Way ANOVA was used to see the association of clinical grading with age and neck circumference. The results were considered as significant when p-value was = 0.05.

RESULTS

In the present study, the maximum number of study participants were males 29 (54%) whereas 25 (46%) were females with mean age of 24.72 years ± 7.9 SD. Tonsillar hypertrophy was graded according to Brodsky Tonsillar Grading. There were 54 reported patients with 108 tonsils out of which 5 (5%) tonsillar tissues were graded as grade I, 60 (56%) grade II, 34 (31%) grade III whereas 9 (8%) as grade IV. Thirty one (57.40%) out of 54 patients had asymmetric tonsils. Maximum number of patients were diagnosed with acute tonsillitis 26 (48.1%), recurrent tonsillitis 22 (40.7%), and with obstructive sleep apnoea 6 (11.1%).

Among males, 1(3%) had neck circumference = 42 cm whereas 28 (97%) had collar size = 42 cm, regarding females, 8 (32%) individuals had neck circumference = 37.5 cm whereas 17 (68%) had = 37.5 cm. It was found in the present study that age associates significantly (p-value 0.0009) with Brodsky Tonsillar Grading for right tonsil whereas statistical non significance was found for left tonsil (p-value 0.25) as shown in Table 1. There was no statistically significant association between clinical grading of tonsils with gender (male n = 29 and female n =25) (p-value 0.079 and 0.343, respectively), as demonstrated in Table 2. Thirty one study participants were found to have normal BMI, 14 were overweight whereas 9 individuals were obese (Table 3). Significant association was found

Table 1: Association of Brodsky Tonsillar Grading with Mean Age n=54

Brodsky Tonsillar Grading (Right)	Number Sample (n)	Mean age ± SD	p-value
Grade I	3	29.67 ± 10.0	0.009*†
Grade II	32	22.84 ± 5.3	
Grade III	16	29.38 ± 9.7	
Grade IV	3	33.0 ± 7.9	
Brodsky Tonsillar Grading (Left)	Number Sample (n)	Mean age ± SD	
Grade I	2	21.0 ± 1.4	0.25 †
Grade II	28	25.21 ± 7.6	
Grade III	18	26.67 ± 9.2	
Grade IV	6	28.5 ± 1.6	

p-value = 0.05 is considered significant and shown with asterisk*
†-One way ANOVA was applied to see the significance
Unit used-Age in years
n=Total number of study participants

Table 2: Association of Brodsky Tonsillar Grading With Gender n=54

Brodsky Tonsillar Grading (Right)	Number Sample (n)	Female (n=25)	Male (n=29)	p-value
Grade I	3	0	3	0.079 ‡
		0 %	10.3 %	
Grade II	32	13	19	
		52 %	65.5 %	
Grade III	16	11	5	
		44 %	17.2 %	
Grade IV	3	1	2	
		4 %	6.9 %	
Brodsky Tonsillar Grading (Left)	Number Sample (n)	Female (n=25)	Male (n=29)	
Grade I	2	2	0	0.343 ‡
		8 %	0 %	
Grade II	28	12	16	
		48 %	55.2 %	
Grade III	18	7	11	
		28 %	37.9%	
Grade IV	6	4	2	
		16 %	6.9%	

p-value = 0.05 is considered significant
‡- Chi-Square test was applied to see the significance
n=Total number of study participants

Table 3: Association of Brodsky Tonsillar Grading Scale with BMI n=54

Brodsky Tonsillar Grading Right	BMI Normal	BMI Overweight	BMI Obesity	p-value
Grade I	2	1	0	
	6.5 %	7.1 %	0 %	
Grade II	23	7	2	
	74.2 %	50 %	22.2 %	
Grade III	6	4	6	
	19.4 %	28.6 %	66.7 %	0.014*‡
Grade IV	0	2	1	
	0 %	14.3 %	11.1%	
Total	31	14	9	
	100 %	100 %	100 %	
Brodsky Tonsillar Grading Left	BMI Normal	BMI Overweight	BMI Obesity	
Grade I	2	0	0	
	6.5 %	0 %	0 %	
Grade II	18	6	4	
	58.1 %	42.9 %	44.4 %	
Grade III	10	6	2	
	32.3 %	42.9 %	22.2 %	0.216‡
Grade IV	1	2	3	
	3.2 %	14.3 %	33. 3%	
Total	31	14	9	
	100 %	100 %	100 %	

p-value of = 0.05 is significant and shown with asterisk*
‡-Chi-Square test was applied to see the significance
Units used: BMI = body weight in kilograms/height in meters square. Normal BMI, 18.5-24.9; overweight, 25-29.9; and obesity, 30-34.9
n=Total number of study participants

between Brodsky Grading for right tonsil (p-value 0.014) and BMI. Statistically non-significant association was found between Brodsky Grading for left tonsil (p-value 0.216) and BMI. Regarding neck circumference and tonsillar grading, significant relationship was found between them for right and left tonsil with p-value 0.002 and 0.014 respectively as shown in Table 4.

Table 4: Association of Brodsky Tonsillar Grading With Mean Neck Circumference (n=54)

Brodsky tonsillar grading(Right)	Number Sample (n)	Mean Neck circumference ± SD	p-value
Grade I	3	34.00 ± 2.79	
Grade II	32	33.53 ± 2.69	
Grade III	16	35.71 ± 3.83	0.002*†
Grade IV	3	40.57 ± 2.06	
Total	54	34.59 ± 3.45	
Brodsky tonsillar grading (Left)	Number Sample (n)	Mean Neck circumference ± SD	
Grade I	2	32.30 ± 0.00	
Grade II	28	33.83 ± 3.39	
Grade III	18	34.72 ± 2.92	0.014*†
Grade IV	6	38.53 ± 3.36	
Total	54	34.59 ± 3.45	

p-value of =0.05 is significant and shown with asterisk*
†: One Way ANOVA was applied to see the significance
Units used: centimeter (cm) for measurement of neck circumference
n=Total number of study participants

DISCUSSION

Preoperative assessment of tonsil size is important in clinical practice as narrow pharyngeal cavity has critical impact on pathophysiology of pharyngeal diseases such as OSA. Tonsillectomy is regarded as an effective treatment to enlarge pharyngeal cavity. Thus size of tonsillar tissue is an essential parameter for tonsillectomy[12].

There are many methods for evaluation of tonsil size. Brodsky Scale is used widely and is a classical method. The advantage of this scale involves easy implementation and less cost whereas certain factors that affect the accuracy of this scale include entrenched tonsils, subjective assessment of the physician, and nearby anatomical structures. Pre-surgical evaluation of tonsillar tissue can be done by imaging modalities like computed tomography (CT), magnetic resonance imaging (MRI) and ultrasound for multidimensional evaluation of pharyngeal anatomy[13].

Authors of a cross sectional study conducted on adults revealed the coherent correspondence between clinical and objective tonsillar dimensions and added that Brodsky Grading was more effectively linked with OSA severity than actual palatine tonsillar volume. The current study also revealed that patients who were diagnosed with OSA had higher tonsillar grading like grade III and IV[14].

Authors of a recent ultrasonographic study showed that subjective grading and USG volumes had no effect in adults but tonsillar size increases in children with age. The current study involved adult participants and showed insignificant relationship of tonsillar grading with age, as tonsillar size increases in childhood and stabilizes thereafter. Effect of BMI which was considered in their study showed no impact on tonsil volume in children and adults which concurs with the present study findings[15].

In the present study, data was analyzed separately for right and left sided tonsils. Statistically non-significant association with age was found in the present study for the left side whereas significant association was found for the right side. A study conducted in 2019 estimated association of clinical grading in subjects with hypertrophic tonsils, with or without sleep disordered breathing. Non-significant difference was found between subjective tonsil sizes, age, and obesity[16].

Authors of a research showed that tonsil volume augments with age but not with height or weight. Whereas the current study reported significant association of clinical grading with age and BMI for the right side and non-significant for the left side. Therefore, more exploration is required to study the effect of obesity on the size of tonsil[17].

Hypertrophic tonsils and recurrent tonsillitis can cause difficulty in swallowing, OSA, and body growth disturbance. Still, the relationship between BMI and hypertrophic tonsil is controversial. In terms of clinical grading, right tonsil showed significant results in the current study and the left showed non-significant relationship with BMI. Many studies in literature compare tonsillar hypertrophy with BMI in paediatric age group but very few studies have been conducted in adults. Lai et al, have reported that BMI, pharyngeal anatomy, and anthropometric measurements do not reflect the size of tonsils in adults[18].

A study conducted by Venkatesha, Yogeesha, and Asha, reported non-significant correlation of clinical grading with BMI[19]. Therefore more studies are required to resolve this question.

The current study found insignificant association of clinical tonsillar grading with gender. We did not find any study in the literature that determines this association.

Narang et al. have reported that hypertrophic tonsils and anthropometric measurements like neck circumference and height measurements may have predictive ability for OSA and these parameters can be utilized in ambulatory settings in order to screen high risk obese young population[20]. The present study's results remain steady in procuring statistically significant results for relationship between clinical grading of tonsil and neck circumference. Similarly in the current study, subjects diagnosed with OSA had tonsillar hypertrophy of grade III and IV.

Likewise, Ho, Moul, Krishna showed in their retrospective study that neck circumference was significantly linked with OSA patients reporting with tonsillar hypertrophy[21].

Findings of the present study contradict the results of Venkatesha, Yogeesha, and Asha in which they reported non-significant correlation between clinical grading and neck circumference in adults, and propose that these predictive factors might be of significance in OSA subjects in contrast with patients with recurrent tonsillitis[19].

The current research had certain limitations, such as small effective sample size involving 54 reported subjects with 108 tonsils. Therefore, future studies with larger sample sizes are needed to generalize the results. It was a single institution study and enrolled adult participants, whereas more studies are required which involve all age groups for development of better association of studied parameters. Predictive accuracy of clinical grading influenced by various subjective factors therefore, more comprehensive techniques such as multidimensional imaging like MRI, CT, or ultrasound, are needed when assessing patients for better decision-making and treatment of patients.

CONCLUSION

Clinical assessment of tonsils by Brodsky Grading is an essential aspect of evaluation of patients receiving surgical care. Clinical grading was found to be linked with age and BMI for the right side and with neck circumference for both the sides. Therefore, subjective grading along with assessment of anthropometric parameters are helpful for better recognition of patient's condition and treatment.

Conflict of Interest: The authors declare that they have no conflict of interest.

Author's contribution: AM: Conceive the idea, design, data collection, analysis and interpretation, manuscript writing; YM: Data collection, literature search, and manuscript writing; SK: Review and manuscript editing; RR: Statistical analysis, writing of results and critical review of article; MA: Data collection, critical review of manuscript, literature search; SS: Data collection, literature review, editing of manuscript.

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ORIGINAL ARTICLE

A Campaign to Improve Practices of Infection Prevention at Small Shops of Essential Items During the Time of Covid 19 Pandemic

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ABSTRACT

Objective: To determine the effect of masks distribution and awareness pamphlets on practices of social distancing and infection prevention at small shops of essential items during the time of COVID 19 Pandemic
Methodology: This was a quasi-experimental study in which three cycles of observations were carried out at 120 small shops of essential items before, immediately, and two weeks after the intervention during weekdays and weekends. Interventions introduced included the distribution of masks and awareness pamphlets on physical distancing and infection prevention and an educational session with shopkeepers. The main outcome measures were practices of shopkeepers and customers related to wearing masks properly and maintenance of distance of at least three feet. The outcome indicators were compared using the Cochrane Q test. Ê
Results:
Before the intervention on weekdays, only 4.1% of shops had any system of hand hygiene which increased to 19.6% immediately post intervention but reduced to 0% two weeks after the intervention. The practice of wearing a mask with nose covered increased from 13.2% before the intervention to 62.3% immediately after the intervention, however, it dropped to 30.8% two weeks after the intervention. Comparison of distance maintenance between the customers showed that none of the customers maintained three feet distance between themselves before the intervention, which improved to 9.5% immediately after the intervention but reduced to 1.8% two weeks after the intervention.Ê
Conclusion: Practices of infection prevention at small shops were found to be poor, which showed temporary improvement post-intervention. Sustained regulatory and educational measures are needed to improve the practices.

Key words: Covid-19 Pandemic, infection prevention practices, small shops, distance maintaining, wearing masks

How to cite this article: Tariq H, Qadri U, Hussain A, Shaikh S, Rabab U, Mazharullah L, Zaib S, Baig LA. A campaign to improve practices of infection prevention at small shops of essential items during the time of covid 19 pandemic. Ann Jinnah Sindh Med Uni. 2022;8(1):9-14

DOI 10.46663/ajsmu.v8i1.9-14

INTRODUCTION

COVID 19 outbreak has taken the world by storm since it started in Wuhan, China at the beginning of the year 2020[1]. The infection is highly contagious--one person can infect 3 to 3.5 others leading the World Health Organization to change their declaration of COVID-19 from a global public health emergency to a pandemic on 11th March 2020. The disease's potential to spread rapidly has changed lifestyles throughout the world[2]. Recent report of WHO published on 3rd April, 2022 shows 489 million people have been infected globally and almost 6 million confirmed deaths to date[3].

The high rate of spread is believed to be from person to person by contacting each other, through respiratory droplets while sneezing, singing, breathing and coughing, and even through touching contaminated surfaces or objects and then touching one's mouth, nose or eyes. Moreover, the virus can also be transmitted in poorly ventilated indoor settings and because of long-range airborne transmission as aerosol, it can remain suspended in the air and travel farther than conversational distance[4]. The infection has caused a global shutdown of markets and businesses and

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countries that have been more stringent on lockdowns and following protocols of social distancing, have been more successful in reducing the number of cases and deaths[5,6]. After four months of lockdown, almost all countries regardless of where they were in terms of controlling the infection, have reverted to normalcy with essential preventive measures. This includes Pakistan where lockdown was gradually eased as it has been predicted that the infection may turn endemic for a long time to come[7]. Apart from the lockdown, many countries including Saudi Arabia, Pakistan, India, and other Asian regions also launched continuous educational campaigns to increase people's awareness and encourage adherence to the precautionary measures related to infection[8-10].

Although Pakistan is among the countries with low fatality rates, ensuring social distancing measures at points of high interaction between people is important to prevent a catastrophic rise in cases and deaths[11]. Grocery stores of vegetables, fruits, and general items are a major point of interaction between people and a necessity to meet the daily needs of life. It has been observed that preventive practices in these stores are poor due to low awareness, the low fatality of the outbreak, and apathy of people as seen when the markets reopened[12]. The study aimed to gather baseline information and current practices on social distancing at small grocery stores which are high points of contact between people and implement an awareness intervention to observe the change in practices.

METHODOLOGY

This quasi-experimental study was conducted from September 2020 to December 2020 in Karachi, Pakistan. Ethical approval letter with reference No: JSMU/IRB/2020/-344 was issued by Internal Review Board of Jinnah Sindh Medical University before commencement of data collection.

The intervention comprised distribution of surgical masks i.e. one box or 50 masks per shop and awareness pamphlets on practices of social distancing and infection prevention at small shops. The shopkeepers were also given brief sessions on importance of infection prevention practices. Three cycles of observations were carried out in six different towns of Karachi, before, immediately, and two weeks after intervention. From each town, five streets were chosen and four shops were observed in each street including a general store, vegetable and fruit shop, meat shop, and medical store accounting for 20 shops in each town. Two observations were carried out at each shop in the evening of weekday and the afternoon of Sunday in each cycle. Six data collectors were hired to fill the checklist in six different towns. Checklist comprised information of shop, type of shop, system of maintaining a distance of three feet in the shop, system of hand hygiene before entering the shop and practices of physical distancing and infection prevention of shopkeepers and their clients. The surveys were conducted one week before the intervention, immediately after the intervention, and two weeks after the intervention. The observations were recorded during peak rush hours of 5 pm-8 pm during weekdays and 11 am-2 pm on Sundays. Data collection was supervised by the Principal Investigator and forms were checked for completeness. A total number of 120 shops were covered in each phase of the study.

Ethical approval was obtained from the Institutional Review Board of Jinnah Sind Medical University. SPSS version 22 was used to analyze data. The practices of shopkeepers and customers .i.e. maintenance of at least three feet distance between shopkeepers and customers, wearing mask and wearing mask properly with nose covered were compared before, immediately after, and two weeks after the intervention using Cochrane Q Test. A P-value of <0.05 was considered significant.

RESULTS

Table 1 shows the comparison of mechanism of physical distancing and infection prevention at different shops. Before the intervention on weekdays, only 4.1% of shops had any system of hand hygiene at their shops which increased to 19.6% immediately after the intervention but reduced to 0% two weeks after the intervention. Similarly, only 8.3% shops had any system for maintaining distance of three feet at the baseline which increased to 25% after the intervention but reduced to 6.6% two weeks after the intervention.

Table 2 shows a comparison of practices of shopkeepers during three phases. The practice of wearing a mask with nose covered increased from 13.2% before the intervention to 62.3% immediately after the intervention, however, it dropped to 30.8% on observation two weeks after the intervention on weekdays. Trend was similar for weekends as well. Comparison of distance maintenance among the shopkeepers during three phases showed that only 4.7% shopkeepers maintained 3 feet distance from their clients before the intervention which improved to 13.8% immediately after the intervention but reduced to 1.1% two weeks after the intervention on weekdays.

The practices of customers are compared in **Table 3**. The practice of wearing a mask with nose covered increased from 26.8% before the intervention to 61.8% immediately after the intervention, however, it dropped to 35.5% on observation two weeks after the intervention on weekdays. Trend was similar for

weekends as well. Comparison of distance maintenance between the customers during three phases showed that none of the customers maintained three feet distance between themselves before the intervention which improved to 9.5% immediately after the intervention but reduced to 1.8% two weeks after the intervention on weekdays. Similarly, distance maintenance practice between customers and shopkeepers showed that only 9.2% maintained distance of at least three feet which improved to 30.8% immediately after the intervention but reduced to 15% two weeks after the intervention on weekdays.

Table 1: System of Hand Hygiene and Distance Maintaining in the Observed Shops During Three Phases (n=120)

	Pre-Intervention	Immediate after Intervention	One Week Post Intervention	P- Value
DAY 1 (120 shops)				
Hand Hygiene System on Shops	5 (4.1%)	23 (19.6%)	0 (0%)	<0.001
System of Maintaining Three Feet Distance	10 (8.3%)	30 (25%)	8 (6.6%)	<0.001
DAY 2 (120 shops)				
Hand Hygiene System on Shops	3 (2.5%)	6 (5%)	0 (0%)	0.34
System of Maintaining Three Feet Distance	10 (8.3%)	22 (18.3%)	4 (3.3%)	<0.001

DAY 1: Weekdays, DAY2: Weekends

Table 2: Comparison of Practices of Shopkeepers of Wearing Mask and Maintaining Three Feet Distance During Three Phases of the Study

Variables	Pre-Intervention Day 1 (n=219) Day 2 (n=235)	Immediate Post Intervention Day 1 (n=239) Day 2 (n=216)	One Week Post Intervention Day 1 (n=224) Day 2 (n=214)	P-Value
Wearing Mask				
· Day 1	59(26.9%)	182 (76.2%)	91(41.1%)	<0.001
· Day 2	62(26.4%)	155 (71.8%)	82(38.3%)	<0.001
Wearing Mask with Nose Covered				
· Day 1	29(13.2%)	149(62.3%)	69(30.8%)	<0.001
· Day 2	30(12.8%)	117(54.2%)	60(28.0%)	<0.001
Type of Mask				
Day 1				
No mask	160(73.1%)	57(23.8%)	133(59.4%)	
Cloth mask	19(8.7%)	27(11.3%)	28(12.5%)	<0.001
Surgical mask	38(17.4%)	139(58.2%)	62(27.7%)	
N95 mask	02(0.9%)	16(6.7%)	01(0.4%)	
Day 2				
No mask	172(73.2%)	61(28.2%)	132(61.7%)	
Cloth mask	18(7.7%)	20(9.3%)	31(14.5%)	<0.001
Surgical mask	45(19.1%)	129(59.7%)	49(22.9%)	
N95 mask	0(0.0%)	06(2.8%)	02(0.9%)	
Maintenance of Physical Distance				
Day 1				
Close to each other with physical contact	17(26.6%)	6.2%(04)	20.7%(19)	
Close to each other without physical contact	20(31.2%)	43.1%(28)	42.4%(39)	0.02
At least one feet distance	24(37.5%)	24(36.9%)	33(35.9%)	
At least three feet distance	03(4.7%)(03)	09(13.8%)	01(1.1%)	
Day 2				
Close to each other with physical contact	14(18.9%)	4.2%(03)	20.7%(17)	
Close to each other without physical contact	28(37.8%)	47.9%(34)	58.5%(48)	
At least one feet distance	24(32.4%)	22(31.0%)	17(20.7%)	<0.001
At least three feet distance	08(10.8%)	12(16.9%)	0(0%)	

DAY 1: Weekdays, DAY2: Weekends

Table 3: Comparison of Practices of Customers during Three Phases of the Study

Variables	Pre-Intervention Day 1 (n=385) Day 2 (n=292)	Immediate Post Intervention Day 1 (n=319) Day 2 (n=291)	One Week Post Intervention Day 1 (n=310) Day 2 (n=288)	P-Value
Wearing Mask				
Day 1	154(40.0%)	218(68.3%)	46.1% (143)	<0.001
Day 2	123(42.1%)	188(64.6%)	50.3% (145)	<0.001
Wearing Mask Nose Covered				
Day 1	26.8% (103)	197(61.8%)	110(35.5%)	<0.001
Day 2	39.4% (115)	161(55.3%)	113(39.2%)	<0.001
Type of Mask				
Day 1				
No mask	232(60.3%)	31.7%(101)	53.9%(167)	
Cloth mask	35(9.1%)	17.6%(56)	14.8%(46)	<0.001
Surgical mask	98(25.5%)	39.5%(126)	25.5%(79)	
N95 mask	13(3.4%)	7.5%(24)	1.9%(06)	
Other (Abaya/Burqa/Handkerchief)	07(1.8%)	3.8%(12)	3.9%(12)	
Day 2				
No mask	142(48.6%)	103(35.4%)	143(49.7%)	
Cloth mask	61(20.9%)	46(15.8%)	50(17.4%)	<0.001
Surgical mask	72(24.7%)	110(37.8%)	72(25.0%)	
N95 mask	10(3.4%)	23(7.9%)	08(2.8%)	
Other (Abaya/Burqa/Handkerchief)	07(2.4%)	09(3.1%)	15(5.2%)	
Maintenance of Distance between Customers				
Day 1				
Close to each other with physical contact	11(15.3%)	05(5.3%)	10.5%(12)	
Close to each other without physical contact	32(44.4%)	42(44.2%)	42.1%(48)	0.012
At-least one feet distance	29(40.3%)	39(41.1%)	52(45.6%)	
At-least three feet distance	0(0%)	09(9.5%)	02(1.8%)	
Day 2				
Close to each other with physical contact	05(9.4%)	04(6.9%)	18(9.7%)	
Close to each other without physical contact	22(41.5%)	28(48.3%)	93(50.3%)	0.50
At-least one feet distance	19(35.8%)	21(36.2%)	65(35.1%)	
At-least three feet distance	07(13.2%)	05(8.6%)	4.9%(9)	
Maintenance of Distance between Customers and Shopkeepers				
Day 1				
Close to each other with physical contact	11(9.2%)	02(1.7%)	24(20.0%)	
Close to each other without physical contact	35.8%(43)	21(17.5%)	20(16.5%)	<0.001
At-least one feet distance	45.8%(55)	50.0%(60)	58(48.3%)	
At-least three feet distance	9.2%(11)	30.8%(37)	18(15%)	
Day 2				
Close to each other with physical contact	18(15.0%)	05(4.5%)	16(13.3%)	
Close to each other without physical contact	23(19.2%)	26(21.7%)	49(40.8%)	<0.001
At-least one feet distance	65(54.2%)	63(52.5%)	42(35.0%)	
At-least three feet distance	14(11.7%)	26(21.7%)	13(10.8%)	

DAY 1: Weekdays, DAY2: Weekends

DISCUSSION

The findings of this study show that mechanisms of infection prevention which include a system of maintaining hand hygiene and maintaining distance were found in the range of 2.5% to 8.3% of shops. Similarly, the practice of maintaining at least three feet distance at shops ranged from 4.7% to 10.8% among the shopkeepers and 0% to 13.2% among the customers at baseline. These numbers are strikingly similar to a study in India[13]. The practices of maintaining distance showed slight improvement post-intervention and returned to baseline levels on observation two weeks after the intervention. This shows that market surveillance of observation of SOPs was extremely weak and shops were allowed to operate without observance of SOPs of infection prevention. While awareness campaigns may result in short term behaviour change, strict market surveillance is needed for a sustained effect.

Although the mass media awareness messages on infection prevention continuously run on television and social media, the practices of wearing masks properly with noses covered by shopkeepers and customers ranged from 12.8% to 39.4%. This finding is similar to a recent study in India where the use of masks among the shopkeepers was also found to be very low i-e 14%[13]. Low usage of masks among shopkeepers was also reported in a study from Kathmandu, Nepal[14]. Other studies on general public in India and US have shown up to 90% wearing masks[15,16]. However, both were self-reported surveys and could therefore depict a different picture than directly observed behaviours. The usage of masks increased to 54.2% to 62.3% immediately after the intervention, however this change was short-lived as the observations two weeks after the intervention showed a decline to either baseline levels or to numbers which were slightly better than pre-intervention. This shows that easy availability of masks at points of contact increases their usage whereas people do not buy masks in the long run possibly due to financial constraints.

Based on the findings of the study, following recommendations are made. While educational campaigns may help in the short term, facilitation for adoption of behaviours can result in a sustained effect. This includes continuous provision of masks and sanitizers at contact points like small shops. After facilitation, second most important thing is surveillance for observance of infection prevention practices. The shops not following the practices can be initially warned and can be fined on non-compliance post warning. Moreover, educational and facilitation intervention in this study was carried out by medical students of a university which guides that the young force of university students can be utilized to carry out such campaigns and monitor the compliance.

This study has a few limitations. The study lacks a control group which could have provided a better picture of effectiveness of the intervention. Sample size is relatively low, however, data from six different towns was gathered to ensure that study captures variability according to different socioeconomic strata. In future, such a study may be conducted with cluster randomization and on a larger scale.

CONCLUSION

Practices of infection prevention at small shops were found to be poor which showed temporary improvement post intervention. They can be improved through sustained educational, facilitative and regulatory measures.

Conflict of Interest: The authors declare that they have no conflict of interest.

Acknowledgment: The authors are thankful to all the data collectors who spared their valuable time to survey preventive practices of Shopkeepers and the customers of small shops; Also grateful to Jinnah Sindh Medical University for funding the supplies for the intervention.

Authors' contribution: HT: Study design, data collection, analysis, writing of manuscript; UQ: Data collection, Data Entry, Review of manuscript; AH: Data collection, analysis, writing of manuscript; SS: Supervision in study design, methodology and analysis; UR: Worked on statistical analysis and data collection; LM: Data Collection and intervention material gathering; SZ: Data collection and data entry; LAB: Expert review and supervision in study design and implementation.

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ORIGINAL ARTICLE

Perceptions of First and Second Year Medical Students to Improve Structured Viva Voce as an Assessment Tool

Ambreen Khalid[1] and Ayesha Sadiqa[1]

ABSTRACT

Objective: To determine the perceptions of 1st and 2nd year MBBS Students about structured Viva Voce

Methodology: This cross sectional study was conducted at Shalamar Medical and Dental College Lahore, on 92 students. Duration of study was from July to December 2018. A questionnaire (based on 5 point Likert scale) was generated in Google forms and link was shared with the participants. The analysis was done by using SPSS version 21, frequencies and percentages were calculated, and Chi-Square Test was applied.

Results: Out of total 92 students, 32% belonged to the 1st and 68% to 2nd year MBBS. Majority of the 2nd year students (50.8%) showed their satisfaction regarding fairness and coverage of wide range of critical areas by Viva Voce as compared to the 1st year students. Greater percentage of students from both years consider that viva voce covered wide range of critical areas and were satisfied with level of difficulty and logical sequencing of viva voce questions. More than half of the participants from both classes consider it a valid assessment tool. Majority of 1st (65%) and 2nd year (63.1%) students thought that this tool of assessment highlighted their weaknesses and significantly higher number of 2nd year students consider that viva can highlight their strengths regarding the topic.

Conclusion: Majority of students from both years showed their satisfaction regarding various aspects of Viva Voce. However, significantly greater number of 2nd year students were satisfied with the capability of Viva Voce in highlighting their strengths as compared to 1st year students.

Key Words: Assessment, MBBS students, response, viva voce

How to cite this article: Khalid A, Sadiqa A. Perception of first and second year medical students to improve structured viva voce as an assessment tool. Ann Jinnah Sindh Med Uni. 2022;8(1):15-19

DOI 10.46663/ajsmu.v8i1.15-19

INTRODUCTION

Viva voce has been serving the purpose of oral assessment since 1815. Viva Voce is a Latin term, meaning "with the living voice[1]." More specifically, it is a compulsory component in the examination process in all Undergraduate Medical Colleges in Asian Countries like Pakistan and India[2,3]. Through Viva Voce, the examiner can assess the knowledge of the examinee with logical reasoning. This technique is also helpful for the assessor in order to judge the concepts in a particular subject alongwith its theoretical application, although at the same time subjectivity in the form of biases of the examiners is difficult to ignore[4-6].

Other skills and qualities of the student such as communication, body language, confidence level, and attitude can be assessed through face-to-face oral examination, which would otherwise not be possible to assess either through MCQs (Multiple Choice Questions), SEQs (Short Essay Questions) or LEQs (Long Essay Questions). Undoubtedly an objective Viva Voce can only be ranked the best in terms of its efficacy and usefulness[3].

Literature supports the notion that advanced cognitive abilities like critical thinking, decision making, and

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problem solving of an individual can be well recognized through Viva Voce, thus it is ranked as more difficult in comparison to written assessment[2]. High face validity alongwith flexibility is undoubtedly considered the strengths of Viva Voce[1].

On the other hand, subjectivity is considered the primary flaw with respect to conventional Viva Voce. Other drawbacks may include frequency of the questions in each viva sitting, their range of difficulty, and also the time granted to answer each question. Moreover, certain other related factors such as its inconsistent nature, low reliability and non-uniform behaviour, all are also considered as its major drawbacks[7].

Hence, according to the view point of global researchers, the traditional oral assessment has been criticized mainly because of its inconsistent approach to assess or evaluate an individual's knowledge[4,5,8]. The aim of the current cross-sectional research is to compare the perception of first and second year MBBS students of Shalamar Medical and Dental College, Lahore, regarding Structured Viva Voce as a method of assessment in the subject of Physiology through feedback questionnaire.

METHODOLOGY

This study was conducted at Shalamar Medical and Dental College (SMDC), Lahore from July to December 2018. The study was approved by the Institutional Review Board of SMDC (IRB Number 0167). It was a cross-sectional study conducted on the students of first and second year MBBS after taking informed written consent from the participants. Convenience sampling technique was used to collect data. For data collection, a self-designed structured eleven-item questionnaire was developed, for determining the effectiveness of Structured Viva Voce.

Each item in the survey form was ranked on a 5-point Likert scale, with responses ranging from "Very Satisfied" to "Very Dissatisfied". To establish content validity, expert validation of this questionnaire was done by a panel of experts (including both subject specialists i.e. physiologists and medical educationists) at The University of Lahore. Reliability of the items was established through pilot testing by the authors of the questionnaire.

The responses were taken by generating the questionnaire in Google forms; the link was shared with the 300 respondents (150 students of 1st year and 150 students of 2nd year MBBS class). Chi-square test (with p-value <0.05 considered statistically significant) was applied on the frequencies and percentages of the recorded data by using SPPS version 21. Here chi-square test was used to compare the obtained results from 1st and 2nd year classes and p-value for each item showed the level of significance of that comparison.

RESULTS

The participants of the study were students of 1st (38%) and 2nd year (62%) MBBS, out of whom 47 were male and 45 were female students. Regarding fairness of the Viva Voce, majority of the 2nd year students (50.8%) showed their satisfaction as compared to 1st year students, some remained neutral while only few were dissatisfied. However, the results were not significant (Table 1).

Majority (59.75%) of the participants from second and first year MBBS were satisfied with the coverage of wide range of critical areas by Viva Voce, few (17.4%) students from both years showed dissatisfaction regarding this construct. The difference in the opinion in this regard is not significant (p-value 0.55).

Majority of students of both classes were satisfied with the level of difficulty of viva questions, the difference in the opinion regarding level of difficulty among both years was not significant (0.13). Time to answer the viva question was considered appropriate by majority of the students of both years. Difference in the opinion of 1st and 2nd year students was not significant (p-value 0.23).

Though more 2nd year students (21.0%) remained neutral as compared to 1st year (11.4%) yet majority of the participants of both classes considered that the viva questions were logically sequenced. Non-significant difference was found among students of both year (p-value 0.07) (Table1).

Almost similar response on each category of Likert scale was observed regarding efficacy of viva as an assessment tool from the students of 1st and 2nd year MBBS (p-value 0.68), because the similar percentage of students showed satisfaction (53%) and dissatisfaction regarding this construct.

Fifty seven and fifty eight percent of 1st and 2nd year MBBS students were satisfied with the validity of viva as an assessment tool respectively. More first year students (34.2%) were dissatisfied as compared to second year student (19.2%) however, the difference was non-significant (p-value 0.15) (Table 1).

Among first year students, 76.9% and 69% among second year students found Viva Voce a stressful experience while 11.4% first year and 14% second year students did not experience stress during Viva Voce. However the difference in the opinion is non-significant (p-value 0.78).

Table1: Comparison of Structured Viva Voce Feedback Responses of First and Second Year Medical Undergrads Through Five Degree Likert Scale Questionnaire

Efficacy of Structured Viva Ranked By 1st Year and 2nd Year Medical Undergrads Through Likert Scale Feedback Questionnaire First Year (35)

Sr. No.	Class (n)	First Year (35)					Second Year (57)					Chi Square Value (X^2)	Critical value	P-value
	Items	A=Very Satisfied n (%)	B = Somewhat Satisfied n (%)	C = Neutral n (%)	D = Somewhat Dissatisfied n (%)	E = Very Dissatisfied n (%)	A = Very Satisfied n (%)	B = Somewhat Satisfied n (%)	C = Neutral n (%)	D = Somewhat Dissatisfied n (%)	E = Very Dissatisfied n (%)			
1	It was fairest	7 (20)	12 (34)	8 (22.8)	6 (17.1)	2 (5.7)	7 (12.28)	29 (50.8)	5 (8.77)	10 (17.54)	6 (10.53)	6.34		0.175
2	Had covered wide range of Critical areas	11 (31.43)	16 (45.7)	4 (11.43)	4 (11.43)	0 (0)	13 (22.8)	25 (43.85)	7 (12.28)	10 (17.54)	2 (3.5)	3.02		0.55
3	Satisfied with difficulty level of questions	9 (25.7)	17 (48.57)	2 (5.7)	5 (14.28)	2 (5.7)	15 (26.3)	23 (40.35)	13 (22.8)	3 (5.26)	3 (5.26)	7.0		0.135
4	Appropriate time to answer each question	12 (34)	8 (22.8)	3 (8.57)	7 (20)	5 (14.28)	14 (24.56)	22 (38.6)	9 (15.78)	8 (14)	4 (7)	5.59		0.23
5	Had logical sequencing in questioning	10 (28.57)	12 (34)	4 (11.43)	7 (20)	2 (5.7)	10 (17.54)	30 (52.63)	12 (21)	4 (7)	1 (1.75)	8.55	9.49	0.07
6	Was an effective tool to assess knowledge	9 (25.7)	10 (28.57)	8 (22.8)	5 (14.28)	3 (8.57)	10 (17.54)	21 (36.8)	14 (24.56)	5 (8.77)	7 (12.28)	2.28		0.68
7	Was an valid tool to assess knowledge	6 (17.1)	14 (40)	3 (8.57)	10 (28.57)	2 (5.7)	9 (15.78)	25 (43.85)	12 (21)	7 (12.28)	4 (7)	6.73		0.15
8	Was stress-full	18 (51.43)	9 (25.7)	4 (11.43)	2 (5.7)	2 (5.7)	23 (40.35)	17 (29.8)	8 (14)	5 (8.77)	4 (7)	1.71		0.78
9	I was satisfied with it	7 (20)	12 (34.28)	4 (11.43)	6 (17.1)	6 (17.1)	9 (15.78)	26 (45.6)	12 (21)	5 (8.77)	5 (8.77)	5.47		0.24
10	Highlighted my weakness in subject	12 (34)	11 (31.43)	5 (14.28)	5 (14.28)	2 (5.7)	15 (26.3)	21 (36.8)	16 (28)	3 (5.26)	2 (3.5)	4.72		0.32
11	Highlighted my strength in subject	10 (28.57)	10 (28.57)	4 (11.43)	9 (25.7)	2 (5.7)	11 (19.3)	30 (52.63)	10 (17.54)	5 (8.77)	1 (1.75)	11.23		0.024*

p-value of = 0.05 is significant and shown with asterisk*

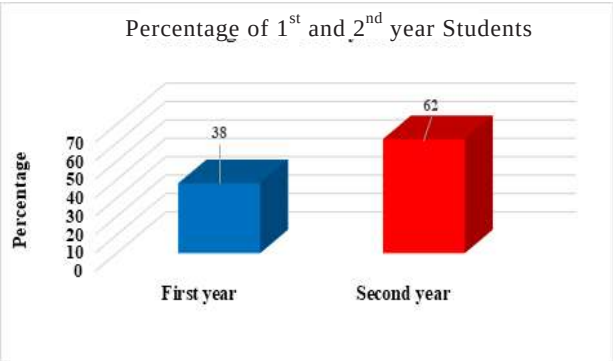

Figure 1: Percentages of First Year and Second Year Students Involved in the Study

The level of satisfaction regarding Viva Voce was higher among the second year students (61.3%) as compared to first year (54.2%) students. However, only 17.4% second year and 34.2% first year students were dissatisfied with this mode of assessment while, 21% second year and 11.4% first year students remained neutral (Table 1).

Majority of 1st (65%) and 2nd year (63.1%) students thought that this tool of assessment highlighted their weaknesses, 14.8% 1st year and 28% 2nd year students remained neutral and 11.1% while 20% 1st year and 8.7% 2nd year students did not agree with this. However, the difference isn't significant (p-value 0.32).

Seventy one percent 2nd year and 57% first year students consider that viva highlighted their strengths regarding the topic, only 17.5 students of 2nd and 11.4% students of first year remained neutral while 10.45 students of 2nd year and 13.4% students of 1st year did not agree with this. The difference in the responses of 1st and 2nd year students is statistically significant regarding this construct (p-value 0.02).

DISCUSSION

The primary objective of the assessment of students is to evaluate their learning and understanding of the academic content. The entire process of assessment comprises various tools of examination, in order to achieve maximum transparency and accuracy of assessment procedure. This is because every tool of assessment has its own drawbacks and strengths[4,5]. Various kinds of examination tools have been used to assess medical undergrad students over the years. These include short essay questions, long essay questions, Viva Voce, objectively structured oral assessment, and objectively structured clinical assessment. Each is used with specific intention to assess certain attribute in the student[9].

This study assessed the perception related to only one mode of examination i.e. Viva Voce, which is perfectly defined by Joughin as "Assessment in which a student's response to the assessment task is verbal, in the sense of being expressed or conveyed by speech instead of writing[1]". Conventional way of Viva Voce has been regarded as one of the compulsory parts in the final summative assessment, in all medical undergraduate institutes of Asia, more profoundly in India and Pakistan. This is primarily due to certain core strengths of viva voce, such as its high face validity, compliance, and

flexibility. Many other benefits have also been associated with oral assessment as high cognitive knowledge that can be assessed by this mode of examination. Similarly the attribute of attitude, confidence and interpersonal ability can easily be assessed through oral examination[10].

In accordance with global research, it has been suggested that in routine oral assessment the assessors are themselves confounders, due to many subjective traits, that can be ruled out from unstructured Viva Voce. Such traits are; the temperament of the examiner, his/her level of expectations, limitations, depth of knowledge in the related subject, accessibility in terms of time, and last but not the least the local environment of surroundings for Viva Voce[2].

A US study also declared that most of the medical schools/colleges in the US, had rejected the use of traditional unstructured oral assessment, mainly because of its weak validity and reliability. That is the reason that in the US, customary oral assessment has been limited only to exceptional and border-line undergrad students[11]. Another research on the same lines also suggested that 79% medical and 70% engineering students rated the Viva Voce as a strongly biased way of examination. They have built their opinion due to many subjective features of Viva Voce like its "halo effect", favouritism, varying difficulty level of questions from one student to another, and also the pattern of questioning[2]. In contrast, 54.3% 1st year and 63% 1st year MBBS students are satisfied with the fairness of the Viva Voce in our study.

A study on fourth year medical students of a public sector medical college from Islamabad, Pakistan found that 70% of their students agree that structure viva voce covered almost all the topics[3]. In the same lines, the present study revealed that 77% of 1st year students and 67% of 2nd year students agreed that structured Viva Voce covered a wide range of critical areas. The same study also claimed that their 97% students felt that the structured viva was less stressful. Contrary to this, our study explored that 76.9% of 1st year and 69.0% of 2nd year students found structured Viva Voce a stressful experience.

A paucity has been observed in previous literature in terms of perceptions of conventional as well as structured Viva Voce with respect to medical undergraduates[12,13]. Although our results were found to be consistent with the available data in this regard, as our studied group of medical undergraduates students also placed Viva Voce at moderate satisfactory level in terms of its effectiveness and not rated it at strongly satisfactory level on Likert scale. A previous study on account of effectiveness of Viva Voce also suggested that using Viva Voce, only theoritical knowledge has used to be assessed, which has already been examined through written assessment[8].

Many previous studies have recommended the use of objectively structured oral examination in place of unstructured Viva Voce, which can help to reduce its subjectivity, but this can only be planned with the passionate contribution of a committed faculty[7,13].

Availability of time is the most important hurdle in the whole process of standardization for structured Viva Voce[14]. Time given to answer the viva question was considered appropriate by majority (62%) of the medical students of both years. A similar study from KSA in 2020 also displayed that majority (75%) of their medical students were satisfied with the time given to answer the question in their structured Viva Voce[15]. The same study revealed that 64% students were satisfied with the difficulty level of questions while in our study, 70% of students from both years were satisfied with the difficulty level of questions.

Objectives of medical curricula have been listed by Pakistan Medical and Dental Council and in general consensus, assessment must be aligned with these objectives, in order to reduce the factor of anxiety and prejudice from the minds of students and also to develop more motivation in them to focus on curriculum. However, in Pakistan the field of Medical Education as in its early stages, unable to implement structured standardized viva as a part of summative assessment in every medical undergraduate institute[16].

CONCLUSION

Majority of students from both years showed their satisfaction regarding various aspects of Structured Viva Voce. However, greater number of 2nd year students was satisfied with the capability of Viva Voce in highlighting their strengths as compared to 1st year.

Present study was conducted with a small sample size; with larger sample population, more realistic results can be drawn. Moreover, other items such as gender bias and any language barrier in the questionnaire should be included in future studies in the same regard, which were neglected in the current study.

Conflict of Interest: The authors declare that they have no conflict of interest.

Authors' contribution: AK: Wrote the results of the article, statistical analysis and critically revised the manuscript; AS: Helped in literature searching and wrote the introduction, discussion, did statistical analysis, and collected data.

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ORIGINAL ARTICLE

Print or Electronic: Preferences of the New Generation of Medical and Dentistry Students

Sarah Amin Charania[1], Gati Ara[2] , Asaad Khalid Khan[1], Arsalan Altaf Shaikh[1], Manisha Devi[1], and Aarish Lalani[1]

ABSTRACT

Objectives: To assess the preference for print or electronic media among undergraduate students of medical and dental colleges of Karachi and to compare the students of public versus private medical and dental colleges according to the study methods they prioritize

Methodology: A cross-sectional survey was conducted over a period of more than a year. At the confidence level of 95% and bound on error of 5%, a minimum sample size of 384 was calculated and sample size of 477 was finalized after allowing for a non-response rate of 24%. The convenience sampling technique was employed to select medical students. Data was collected using a structured, self- administered questionnaire in English language after a written Informed Consent was obtained from each participant. Data was analysed using SPSS version 20. The quantitative variables were represented as mean and standard deviation. The qualitative variables were represented as frequencies and percentages. Chi-square test of significance was applied for finding any significant differences. P-value of less than 0.05 was taken as significant.

Result: The mean age of n=477 students was 21+/- 2 years. Majority were MBBS students, with 53% from public institutes. We found that 52% students preferred print medium, whereas 26% students preferred screens. There was an association between public sector colleges and preferring print medium (p= 0.0001). A significant association was found between gender and method of study (p=0.0001). Age was associated with preference for print medium (p=0.02), also higher level of study was associated with preferring print medium (p=0.001). Most students prioritized books (71%) but retained better with videos (63%). Most students (56%) preferred textbooks over reference books. Dr. Najeeb's videos were the most preferred videos (75%), furthermore, the most used site was Wikipedia (48%). Internet was the top source for preparing for PBLs (50%).

Conclusion: The study showed that majority students still prefer print medium and prioritize books over other methods. Students claimed that they retain best with videos and books. So, increasing the use of videos for teaching is recommended. The Pandemic has necessitated the increased use of online teaching modalities. Students should be encouraged to use more reliable websites.

Key words: Print, electronic, medical students, study methods

How to cite this article: Charania SA, Ara G, Khan AK, Shaikh AA, Devi M, Lalani A. Print or electronic: preferences of the new generation of medical and dentistry students. Ann Jinnah Sindh Med Uni. 2022;8(1):20-25

DOI 10.46663/ajsmu.v8i1.20-25

INTRODUCTION

Medical education is a basic pillar of clinical medicine.[1] Modernization, accessibility, and reliability has rendered technology as essential in the field of medicine for both students and the educators. However, this has posed problems in developing countries owing to limited access to technology[2,3]. In 2014, a research done by the US Coast Guard Leadership Development Centre showed that 63% of colleges reported using e-textbooks, while 27% planned to do this in the near future[4]. Health science libraries are at the centre of knowledge dissemination. With the reported decrease in books circulation and increasing popularity of e-books, studies show that efforts are being made towards producing more e-books and materials[5-8]. The medical library of the University of Lausanne, has confirmed that book circulation is on a downward trend[9]. It has also been observed that students engage in different

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learning strategies with digital devices that might help in quicker comprehension than printed material[10,11]. Students, however, prefer to base their examination preparation on handouts provided in their courses, possibly because of the pressure to pass in standardized examinations[9].

This topic has been widely discussed and researched on in the developed world. According to a 2013 survey in the United Kingdom by the National Literacy Trust on students aged 8 to 16, 52% preferred reading on electronic devices whereas 32% preferred print.[12] According to John Douglas, the Director of the National Literacy Trust, those who read books online were three times less likely to enjoy reading[11,12]. In a research conducted by Nishtar Medical College, Multan, Pakistan, on postgraduate medical students in 2014, almost 99.4% used the Internet[13]. Respondents mentioned that lack of information and searching skills caused problems in searching authentic information on the Internet. They also mentioned that the speed of the Internet was very slow which obstructed searching for information[13]. This study clearly states one of the major issues faced by developing countries in utilizing e-learning for multiple purposes. McCann et al studied the e-teaching and learning preferences of dental and dental hygiene students and identified students' preference for electronic technology for learning and teaching[14]. Other researchers have shown that students prefer textbooks over digital media[12]. The contradicting results seen among different studies prove that this topic needs to be further researched and solutions need to be found and implemented especially when the pandemic has made online teaching the new norm. Not much has been studied in this regard in the developing world. Medical Education is still developing in our part of the world. Evidence is necessary for the progress of Medical Education. Thus, the rationale for this study is the need for evidence in order to devise recommendations for Medical Education. The objective of this study was to assess the preference for print or electronic medium among undergraduate students of medical and dental colleges of Karachi and to compare the students of public and private medical colleges with regard to the study methods they prefer. This study also compares male versus female medical students with regard to the study methods that they prefer and measures the study methods preferred by students of first three academic years in medical colleges. To the best of our knowledge, this is the first study to provide data on the study preferences of medical students in Pakistan.

METHODOLOGY

A cross-sectional survey was conducted from 1st Jun 2018 to 1st Nov 2019. Sample size was calculated through open epi sample size calculator. The hypothesized frequency of outcome in population (p) is unknown, so was taken at 50% as no previous estimates were available from similar populations. At the confidence level of 95% and bound on error of 5%, we obtained a minimum sample size of 384. Considering a non-response rate of 24%, the adjusted sample size of 477 was finalized. Data was collected from purposefully selected seven public and private sector medical colleges on the basis of feasibility. The convenience sampling technique was employed to select medical students from each study site or medical college. A variable number of students were recruited from each medical college due to limited availability or differences in response rates at different study sites. Students of both genders from 1st to 3rd year MBBS/BDS participated. Data was collected using a structured questionnaire in English language. It was self-administered after a written, Informed Consent was obtained from each participant.

Permission for the study was taken from Ziauddin University. Complete confidentiality of all respondents was ensured and data was used for academic purposes only.

Data was analysed using SPSS version 20. The quantitative variables were represented as mean and standard deviation. The qualitative variables were represented as frequencies and percentages. Chi-square test of significance was applied for finding any significant differences among the students. P-value of less than 0.05 was taken as significant.

RESULTS

A sample size of n= 477 students was taken with the mean age of students of 20.4+ 1.6 years. Total of n=303 (63.5%) were females and n=174 (36.4%) were males. Total 77% were MBBS students and 23% in BDS. Students were from public sector colleges were n= 252 (53%) and from private sector colleges 225 (47%). Out of the total number of students participating in this research, n=116 (24%) were students of 1st year, n=170 (36%) of 2nd year and n= 191(40%) of 3rd year of college.

The major reasons cited for preferring print media were that 'it was easy to understand' n=215 (45%) and 'reliable' n=147 (31%). Only n=173 (36%) found print feasible and n=181(38%) easily accessible. Students who preferred print (255), explained that they believed screens were less reliable n=72 (28%).

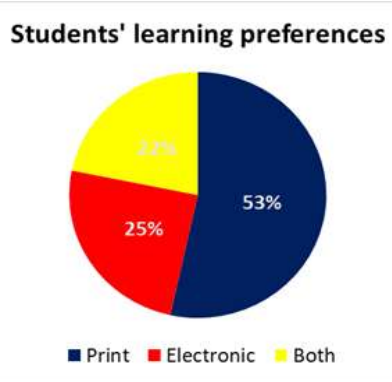

Figure 1: Preference of print or screening, n=255 (53%) students preferred print medium while n=118 (24%) preferred screening and n=104 (22%) preferred both media.

From the 118 students who preferred screens for studies, the most frequently given reason was n=41 (35%) it being easily accessible, n=41 (35%) found it easy to understand and n=26 (22%) found it feasible. Out of the students who preferred screening modalities for studies, only n=18 (15%) students thought screens were reliable.

When inquired about the prioritized method for studies, most students replied that they prioritised books n=347 (72%), n=295 (62%) prioritized videos, n=131 (26%) prioritized lecture slides, and n=159 (33%) internet.

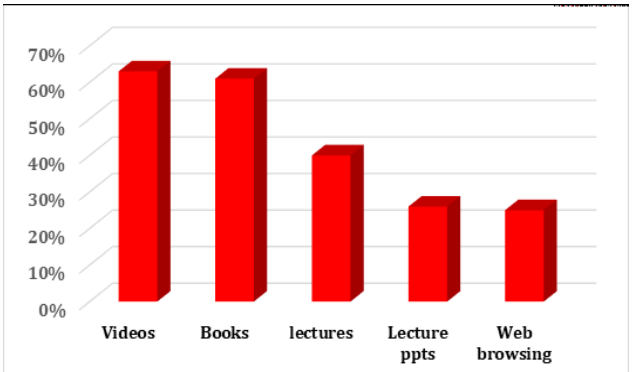

Figure 2: Methods of study that lead to best retention of the topics according to the students.

Over all, books and videos are considered best for retention by most students. Most students shared that they retain best with videos n=300 (63%).

Internet websites were the top source for preparing for PBLs n=282 (59%). Online Videos were viewed by n=119 (25%) and lecture slides were referred by n=164 (34%) for PBL preparation. Total n=230 (48%) students use books for PBLs.

Text books recommended by the university were used by n=327 (68%) as compared to short books n=262 (55%) (Table 1)

Table 1: Comparison of the Study Methods Prioritized by the Students of Public Versus Private Medical Colleges

Learning preferences		Public College		Private College		P-value
		N	%	N	%	
Print	Yes	266	55.7	211	44.3	0.009
	No	191	40	286	60	
Screen	Yes	214	44.9	263	55.1	0.0001
	No	320	67	157	33	
Attending lectures	Yes	214	44.9	263	55.1	0.0001
	No	320	67	157	33	
Going through lecture ppts	Yes	133	27.9	344	72.1	0.0001
	No	323	67.7	154	32.3	
Books	Yes	256	53.7	221	46.3	0.001
	No	311	65.3	166	34.7	
Short books	Yes	215	45	262	55	0.0001
	No	345	72.4	132	27.6	
Textbooks	Yes	265	55.5	212	44.5	0.006
	No	282	59.1	195	40.9	
Videos	Yes	250	52.4	227	47.6	0.001
	No	306	64.1	171	35.9	
Internet	Yes	247	51.7	230	48.3	0.003
	No	283	59.4	194	40.6	

Videos too were highly preferred in both the sectors, 67% in private and 58% in public. Among videos, the videos by Dr. Najeeb were the most preferred n=342 (75%) followed by the Kaplan videos n=204 (43%) and other animated videos n=187 (39%). YouTube tutorial videos were watched by n=11 (2%) (Table 1).

Dr. Najeeb videos were preferred equally in both sectors: 72% in private and 71% public. Kaplan was watched more in private at 56% than in public at 30%. Internet preference was low in both sectors (Table 1).

Among websites, Wikipedia was found to be the favourite site n=228 (48%), overshadowing the use of authentic medical literature such as WebMD n=140 (29%), Medscape n=132 (28%) and MayoClinic n=90 (19%), (Table 1).

Regarding testing themselves before examinations, it was found that 81% of medical students from public colleges based their examination preparations on past examination papers whereas only 67% of private medical students used past examination papers. Questions from BRS (Board Review Series) was used more by private sector students (49%) than public (19%). On a larger scale, 33% used BRS and 75% used past examination papers to test themselves. Online apps were seldom used (25%).

As many as 94% of the private college students said they receive study guides from their institutions compared to 46% of the public sector colleges.

Table 2: Comparison of the learning preferences among male versus female medical students with regard to the study methods that they prefer

Learning Preferences		Male		Female		P-value
		N	%	N	%	
Print	Yes	98	73	186	77	0.042
	No	36	27	57	23	
Screen	Yes	70	51	109	45	0.001
	No	65	49	134	55	
Attending lectures	Yes	64	47	117	48	0.0001
	No	71	53	126	52	
Going through lecture ppts	Yes	35	26	70	29	0.001
	No	100	74	173	71	
Books	Yes	104	77	178	73	0.001
	No	31	23	65	27	
Short books	Yes	83	62	132	54	0.001
	No	52	38	111	46	
Textbooks	Yes	88	65	171	70	0.001
	No	47	35	72	30	
Videos	Yes	89	66	152	63	0.001
	No	46	34	91	37	
Internet	Yes	47	35	92	38	0.001
	No	88	65	151	62	

When questioned about which method they retained better with, 43% females and 37% males claimed that they retained better through attending lectures. There was no significant association of gender with using the Internet for PBLs (Table 2).

Comparison of students in various years of MBBS:

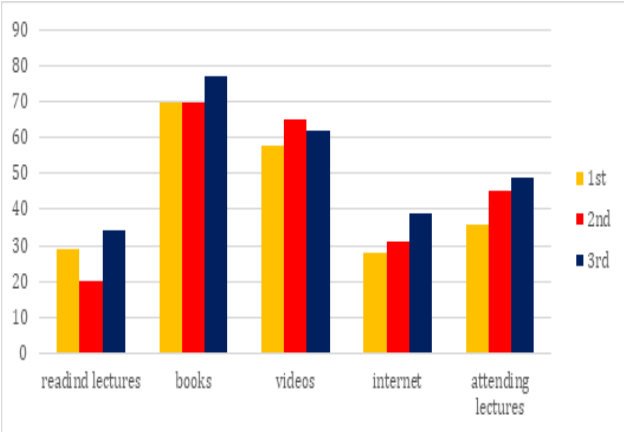

Figure 3: Prioritized study methods in various years

Higher year of study was associated with preference for print medium (p=0.001). It was observed that as years of college progressed, so did the perceived retention capacity of students from various sources (Figure 3).

With the progression of years and age, students used knowledge from lectures to solve their PBLs. The 1st years were 28%, 2nd years were 32% and 3rd years were 40% (Figure 3).

As the years at college progressed, an increase was seen in the using of books, videos and lectures as more helpful methods for retaining purposes (Figure 3).

Book use for PBL preparation increased significantly as the years of education progressed. However, the Internet still remained the top source to search for PBL sessions, among all students.

DISCUSSION

The study has yielded interesting results. With daily advancement in technology, things such as annotation of text, highlighting and use of sticky notes has made on screen text easier to use. Despite the current technology and widespread use of screening, the majority of students still prefer print over screens in both public and private sector colleges. However, the students from public sector colleges are more likely to prefer print. A study conducted by Jolanda E. et al, in 2016 found similar results in a survey in which they concluded that print on paper is the preferred medium for most medical students of the medical faculty of the University of Lausanne[9]. Myberg et al believe the reason was that technology does not respond to the shortcomings of screens[14]. The study conducted in Nishter Medical college found that the majority of postgraduate students relied on print format.[13]. According to Naomi Baron, about 90% of university students sampled in the United States, Germany and Japan, prefer hard copy or print for school work. Baron also states that digital reading makes it easier for students to get distracted and multitask[15].

Muller et al report that students showed higher recall and conceptual scores when studying handwritten notes as compared to electronic note taking[16]. Mangen et al recorded that students who used hard copy texts had greater frequencies of higher scores for both multiple choice recall and short answers that measured comprehension[17]. Students from our research also preferred printed books and considered them better for understanding and retention of topics.

The methods that helped medical students to build their basic concepts are the most important in building their clinical reflexes. The students felt that videos helped better retention of topics. A unique finding in our study was the increased use of videos for learning, understanding and retaining purposes, currently no other research has been done in this regard. Dr. Najeeb's videos topped the chart. Other sites such as random

YouTube videos, Kaplan videos, 3D anatomy tutorials were also used significantly, majorly because they gave students a better insight of how and what to learn. Students reported better retaining with these tools. Although no structured examination was performed to confer with these findings and all findings were subjective, it can be recommended that universities make more use of videos and other visuals as teaching methods.

We found a significant difference between students of public and private sector colleges with respect to the study methods they prefer. There was an association between public sector students and preferring print medium (0.009). It was found that 56% students from public sector colleges chose printing compared to 44% of students from private colleges. Students from public colleges were more likely to prioritise books for studying (0.001). Moreover, there was a significant difference in the students in public and private medical colleges in preference of textbooks and short books. While a higher percentage of medical students in public colleges preferred textbook, the higher number of private college students preferred short books (Table1). These are noteworthy findings.

The student preference for attending lectures was lower in the public sector 44%, however it was found to be relatively higher at 55% in the private sector. The factors responsible need to be assessed further.

More private college students used lecture slides (72%) as compared to the public sector with only 27% of students using lecture slides and preferring self-study. This shows that the students from public sector colleges spent more time self-studying than students from the private sector, however, further research is recommended.

Despite both genders preferring printed versions, more males were found to be using the e-medium as compared to females. This was consistent with other researches in which a significant difference was seen between the two genders, for example in a research done by Daniel Hernandez et al, "First Year medical students' learning style preferences and their correlation with performance in different subjects within the medical course"[18]. Contradictory to this, a survey performed in the UK in 2021 showed that more females tended to use and buy printed versions as compared to their male counterparts.[19]

A research conducted by Apuke et al concluded that Internet sources enabled students to perform research work ahead of time[20]. We found that most students relied on the Internet for PBL preparation. But although the Internet and e-learning were helpful for working speedily and on time, students, however, trusted print medium more. From our findings, we noted that Wikipedia was the highest used website, overshadowing the use of authentic medical literature such as WebMD, Mayo Clinic and Medscape. Our research also showed that many students were unaware of these websites. Studies have concluded that Internet is more of an information seeking tool. Zhou et.al in their research claimed that Internet serves as a hands on library for the purposes of being adept and improving decision making skills[21]. Research indicates that with the help of a Personal Digital Assistant (PDA), medical or health professionals seek required information and find answers for better patient safety and decision making[14,15]. On the contrary, R. Bhatti et.al, in their research "experience of internet utilization by postgraduate students at Nishtar medical college, Multan, Pakistan" share that postgraduate students majorly faced difficulty in finding authentic information on the Internet[11]. Our findings coincide with the former researches, as about 59% students in our study used the Internet for Problem Based Learning sessions, for the reason that it was easy and quick to use.

The accessibility of the Internet and the multitude of available learning media in higher education have an increasing impact on the way students access information for learning[22]. This has become amplified in a post-Covid world in which students were forced to move to e-learning. Morehead et al has concluded that the key attentional differences exist between longhand note-taking and photo-taking that impact learning—knowledge that is easily and conveniently acquired in a snap may not be better remembered.[23]

Poonam et al, in their research, stated that majority of the students preferred kinaesthetic mode of learning that included visualisation, hand written notes, lectures, problem based and audio learning[24]. Piolat et al determined that from a purely behavioural standpoint, both readers and writers performed better when working in Page than in Scroll.[25] As quoted by developmental psychologist and cognitive scientist Maryanne Wolf of Tuft University, "As we lurch into digital reading– and move forward perhaps with too little reflection, I would like to save the best of the older forms but know when to use the new"[26].

The limitation is that, although an equal percentage of students from all colleges and universities of both public and private colleges according to their respective student strength was approached, the response rate from different colleges was varied. Therefore, a disproportionate number of participants from different colleges was included in the study. This research was

completely based on students' memories and their own ability to judge their progress, no validated tests or quizzes were taken to judge their performances. The research was done pre Covid-19, hence the latest usage of electronic medium post pandemic has not been taken into consideration.

CONCLUSION

While the use of screens has increased and is more accessible, it has not replaced print as students finds books (print) and videos (electronic) to be the best methods for studies. The use of reliable websites still remains scarce. It was also found that there was a vast difference in preference of study methods between the public and private medical universities.

Conflict of interest: The authors declare that they have no conflict of interest

Authors' contribution: SAC, AAS, MD & AL: Worked on Data collection, discussion and questionnaire and introduction, GA: Worked on Methodology, Data Analysis and results, AKK: Worked on Data collection, and discussion. All authors participated in final proofreading of the manuscript.

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ORIGINAL ARTICLE

Gender-Based Frequency and Associated Disability of Rheumatoid Arthritis: A Cross-Sectional Study

Ramsha Khalid[1], Komal Yasmeen[1], Aimen Shouket[1] and Saira Jahan[1]

ABSTRACT

Objective: To determine the frequency and associated disability of rheumatoid arthritis in male and female patients

Methodology: This was a cross sectional survey conducted at the National Institute of Rehabilitation Science, Pakistan Institute of Medical Science and Pakistan Railways Hospital for one year from February 2019 to February 2020. Study includes diagnosed cases of both genders with ages between 30 to 60 years and fulfilling the 1987 American College of Rheumatology (ACR) criteria. Patients with disabilities due to other reasons were excluded. Sample size of the study was calculated to be 143 using Epi-tool. Sampling technique was non-probability purposive sampling technique. For this study WHODAS-2.0 screening tool was used.

Results: Out of 143 patients, 52 (36.4%) were males and 91(63.6%) were females. The mean age of both males and females was 43.41 ± 8.605 SD. We found that 18 (34.6%) male patients presented with mild disability. While in females, 54 (59.3%), 32 (35.16%), 5 (5.49%), and 0 (0%) patients out of 91, reported with mild, moderate, severe, and extreme disabilities respectively.

Conclusion: RA is more prevalent in females than in males with the majority of the patients reporting mild disability and more female patients disabled than men.

Key Words: Disability, functional activities, rheumatoid arthritis, WHODAS-2.0

How to cite this article: Khalid R, Yasmeen K, Shouket A, Jahan S. Gender-based frequency and associated disability of rheumatoid arthritis: a cross-sectional study. Ann Jinnah Sindh Med Uni. 2022;8(1):26-29

DOI 10.46663/ajsmu.v8i1.26-29

INTRODUCTION

The term Rheumatoid Arthritis was first coined by A.B. Garrad who was a French medical student in 1858[1]. Rheumatoid arthritis is a chronic hypersensitivity response that differs from other diseases due to its massive involvement of synovial membrane[2]. The cytokines are released from synovial membrane that causes cartilage and loss of bone[3]. It usually includes little diarthrodial joint[4] and is marked by consistent inflammation in the joints causing ache, soreness, and rigidity of the joints, eventually leading to joint demolition, dysfunction, and poor quality of living[5]. Most of the time, the exact etiology of this disease is idiopathic but sometimes it is considered to be multi-factorial. It can be genetic, environmental, and can be due to the involvement of immune system[6].

The effect of this disease is considered to be more common in younger to middle age individuals than in the elderly[7].

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Disability stands for the condition in which someone is unable to perform daily activities of life. The pathway starts from pathology, impairment, functional limitation, then leads to disability. Verbrugge states that life activities are classified into three groups: Obligatory activities, committed activities, discretionary activities[8].

Rheumatoid arthritis joint inflammation can prompt extreme disability. RA is said to be associated with more than seven-fold chances of disablement, which in turns compares with adults in the same community. RA not only exerts its effects on joints but also affects the behaviour of individual[7].

One of the common related problems is low confidence and low self-esteem that forces the individuals to pull back from their family and surroundings. Individuals prefer to isolate rather than choose gatherings and also restrict their social contacts[4]. RA fits in the model of ICIDH (International Classification of Impairment, Disability and Handicaps) described by Verbrugge and Jette[7].

The prevalence of RA is considered more common in females and is rated to be 2 to 3 times more common in women than in men until the age of 65 years. After 65 years, the rate of incidence becomes the same in

both genders. The reason why women suffer more from RAis hormones and genes[1].

Worldwide frequency of rheumatoid arthritis is approximately 0.3-1.2 %. One study shows global effect of approximately 0.5% to 1% in adults[6]. In India, the frequency of rheumatoid arthritis is 0.75%[9]. According to one study in Pakistan, the incidence of RA was 0.14% and in male patients it was from 0.14% to 1.08% while in females 0 to 2.80%[1]. One study showed that RA is common in Northern Areas where the incidence was 0.55% and 0.142% in Karachi population[5]. Genetic and ethnic factors also contribute to the prevalence of rheumatoid arthritis[5].

In Pakistan, the prevalence of RA, disability associated with this disease and how much it influences patient's physical, mental, and social well-being has not been studied well. Few studies have been carried out on the incidence of RA and the impact of disability on a patient's life, so there is a need to conduct more studies to determine the incidence of RA, as it may help to demonstrate the exact cause of disease and to prevent disease related disability[1,10]. This study was conducted with the aim to determine the frequency and associated disability of rheumatoid arthritis in both genders.

METHODOLOGY

This cross sectional study was carried out with the approval of Riphah College of Rehabilitation Sciences' Ethical Review Committee (RIPHAH/RCRS/REC/00635), Riphah International University Islamabad, Pakistan in collaboration with the Pakistan Institute of Medical Sciences, National Institute of Rehabilitation Medicine, Islamabad and Pakistan Railways Hospital, Rawalpindi. The study duration was one year from February 2019 to February 2020. Sample size was calculated using Epi tool keeping 95% confidence interval, desired precision was taken as 2 and assumed population standard deviation was taken as 12.2. Non-probability purposive sampling technique was used for the selection of sample. Both male and female patients in ages between 30 and 60 years who fulfilled the 1987 American College of Rheumatology (ACR) criteria, were included. Patients with diagnosed cases of RA were recruited in this study. Patients with disabilities due to other conditions, history of current infection, and current primary inflammatory joint disease, and patients with comorbidities were excluded from the study. After sample selection, we used WHODAS-2.0 tool for scoring purposes. According to the result of the study conducted on validity and responsiveness of WHODAS-2.0 in RA patients, Cronbachs' alpha of the total score was 0.91[11]. This tool assesses the level of health and disability and contains six important components of functionality with 36 items and can either be marked as 0, 1, 2, 3, and 4, in which 0 means 'no difficulty', 1 means 'mild difficulty', 2 means 'moderate difficulty', 3 means 'severe difficulty' and 4 is 'extreme difficulty', in performing different tasks mentioned in all six components of the WHODAS tool. In order to find the percentage of disability, we compiled percentage values of all six domains and scored disability in the range of 0-100% in which 0=No disability and 100=Extreme disability. In order to label the disability in mild, moderate, severe, and extreme forms, we further categorized 0-100% range in the following values i.e. (0%=No disability, 1-25%=Mild disability, 26-50%=Moderate disability, 51-75%=Severe disability, 76-100%=Extreme disability). According to the achieved results, the patients were then divided into categories depending on their level of disability. We ensured that the participants of the study are not emotionally and physically harmed and that all data collected shall not be disclosed to anyone. All the queries regarding the activities were answered to them. Descriptive analysis was conducted to determine the mean, standard deviation, and p value for age and body mass index. Data was analyzed using SPSS 22. Chi-square test was conducted to determine the association between gender of RA and overall disability. P-value less than 0.05 was taken to mean that we will reject the null hypothesis.

RESULTS

In our study, out of 143 patients, 52 (36.4%) were males and 91(63.6%) were females (Table 1). The targeted age group was 30-60 years of patient. The mean age of patients was 43.41 ± 8.605 SD (Table 2). We usedWHODAS-2.0 questionnaire to figure out the impactof disability (Table 3 and 4). The mean of overall disability was 2.64 ± 0.737 SD

Table 1: Gender-based Frequency of Rheumatoid Arthritis Patients

Gender	Frequency (%)	P value
Male	52 (36.4%)	0.002
Female	91 (63.6%)	
Total	143 (100.0%)	

Table 2: Age-based Frequency of Rheumatoid Arthritis

Age in years	Frequency (%)
30-35	29 (20.27%)
36-40	35 (24.47%)
41-45	25 (17.48%)
46-50	33 (23.07%)
51-55	14 (9.79%)
56-60	15 (12.48%)

By applying chi-square test, we determined the association between gender and overall disability. We found that 18 (34.6%) out of 52 male patients presented with mild disability, 21 (40.38%) presented with moderate disability, 11 (21.1%) patients fell in severe disability, and 2 (3.84%) had extreme disability. In females, 54 (59.3%), 32 (35.16%), 5 (5.49%), 0 (0%) patients out of 91 reported with mild, moderate, severe, and extreme disabilities respectively with 0.002 p value.

with the age and gender adjusted general population. The result showed that HAQ scores were greater for those between 30 and 79 years old with rheumatoid arthritis (in which 17-45% were females and 7-32% were males) than those having the same age and gender in the general population. Thus indicating that more females patients with RA are disabled than men with RA. This result is in favour of the present study.

Table 3: Frequency of Disability in Functional Activities Among RA Patients

	Understanding and Communicating n (%)	Mobility n (%)	Self-care n (%)	Getting Along n (%)	Life Activities n (%)	Participation in Society n (%)
None	20 (14)	8 (5.6)	41 (28.7)	61 (42.7)	8 (5.6)	3 (2.1)
Mild	78 (54.5)	40 (28)	48 (33.6)	54 (37.8)	60 (42.0)	43 (32.2)
Moderate	26 (18.2)	42 (29.4)	26 (18.2)	16 (11.2)	64 (44.8)	67 (46.9)
Severe	16 (11.3)	41 (28.7)	22 (15.4)	9 (6.3)	7 (4.9)	30 (21)
Extreme	3 (2.1)	12 (8.4)	6 (4.2)	3 (2.1)	4 (2.8)	0 (0)

Table 4: Total Disability in Rheumatoid Arthritis Patients

0-100%	Frequency (%)
None	0 (0)
Mild	72 (50.3)
Moderate	53 (37.1)
Severe	16 (11.2)
Extreme	2 (1.4)

DISCUSSION

The current study was designed to determine the gender-based frequency and associated disability of rheumatoid arthritis. A previous cross sectional study was conducted in District Narowal, Pakistan in the year 2016 and likewise in a tertiary care hospital in Karachi in the year 2015, both of which also showed high prevalence of RA in females than males[1].

Another previous study in France in the year 2001, also concluded that RA is more common in females as compared to males[12].

In the present study, the second objective was to find disability associated with RA and the result showed that 50.3% patients had mild disability and more women were disabled than men which is in line with the previous studies. A study indicated that even in its early stages, rheumatoid arthritis has a profound effect on work status and causes work disability[7]. Another study held in China indicated that the occurrence of functional disability in patients with rheumatoid arthritis is common in China[9]. In Finland, a study compared the functional disability in rheumatoid arthritis patients

As the present study only sought to find out the frequency and disability associated with rheumatoid arthritis and had a small sample size, so further extensive researches with large sample sizes and studies to find out the impact of RA on quality of life are required in future. It is recommended that additional extensive researches are carried out to find the prevalence and impact of disability of RA. Studies are required to determine the association between RA and social or cognitive functioning. Further interventional studies are also needed to slow down the progress of this disease.

CONCLUSION

The results of our study show that prevalence of rheumatoid arthritis is more common in females than in males. Half of all patients had mild disability and overall disability was also found to be more common in females than in males.

Conflict of Interest: The authors declare that they have no conflict of interest.

Authors' contribution: RK: Carried out data collection, data entry, analysis and interpretation, wrote the introduction, results and conclusion and contributed to manuscript revisions; KY: Helped in literature search, wrote introduction, discussion and conclusion; AS: Worked on literature search, data collection, data entry and referencing, wrote the introduction; SJ: Supervised and critically revised manuscript, Wrote the introduction, data analysis. All authors conceptualized and designed the study.

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ORIGINAL ARTICLE

Association of Elevated Oxidized Low Density Lipoprotein to Low Density Lipoprotein Ratio (Ox LDL/LDL) with Sub Clinical Atherosclerosis in Patients Receiving Maintenance Haemodialysis

Sadia Rehman[1], Santosh Kumar[2], Kashif Nisar[3], Zara Sami[4], Fatima Mehboob[1], and Suniya Rehman[5]

ABSTRACT

Objective: To assess the oxidized low density lipoprotein (ox-LDL) to low density lipoprotein (LDL) ratio as an indicator of subclinical atherosclerosis in haemodialysis patients

Methodology: This case control study was carried out at Jinnah Post Graduate Medical Center Karachi, from January to December 2018. The haemodialysis patients were selected from the dialysis center (group B) whereas the controls were recruited from normal healthy population (group A). To access the status of atherosclerosis, doppler ultrasonography technique was employed to detect the intima media thickness (IMT) ratio of common carotid artery of study subjects as well as controls. Lipid peroxidation was detected by serum oxidized LDL (ox-LDL) levels.

Results: The mean of carotid artery intima thickness in group A was 0.43±0.02, the mean intima thickness of group B samples was 1.0±0.09. The mean ratio of Ox-LDL/LDL in group A was 0.003±0.001. While in group B the mean of Ox-LDL: LDL was 0.012±0.002. Ox-LDL was found to have a positive linear relationship with mean carotid artery intima media thickness ratio (r=0.8) in haemodialysis group.

Conclusion: Ox-LDL to LDL ratio is much enhanced in patients on maintenance haemodialysis showing increased lipid peroxidation. Ox-LDL has a positive linear relationship with mean carotid artery intima media thickness ratio which is a marker of sub clinical atherosclerosis. Early detection of elevated Ox-LDL will help nephrologists in early detection and treatment of sub clinical atherosclerosis.

Key Words: Atherosclerosis, haemodialysis, lipid peroxidation, oxidized LDL,

How to cite this article: Rehman S, Kumar S, Nisar K, Sami Z, Mehboob F, Rehman S. Association of elevated oxidized low density lipoprotein to low density lipoprotein ratio (ox ldl/ldl) with sub clinical atherosclerosis in patients receiving maintenance haemodialysis. Ann Jinnah Sindh Med Uni. 2022;8(1):30-35

DOI 10.46663/ajsmu.v8i1.30-35

INTRODUCTION

Atherosclerosis is the major cause of mortality and morbidity in haemodialysis treated end stage renal disease patients. As estimated by European Registry of patients on renal replacement therapy, the likelihood of cardiovascular complications amongst patients on renal replacement therapy is 35-50 times more in comparison to the broad population[1,2]. To initiate the process of atherosclerosis, the LDL molecule undergoes certain biochemical modifications which initiate the typical cellular and inflammatory reactions that are characteristic of this disorder. To initiate the process of atherosclerosis, LDL can get converted into oxidized or glycated form[3,4].

Phospholipase A2 that catalyzes lipid oxidation in LDL is secreted by the inflammatory cells[5,6]. A heme protein called myeloperoxidase which is secreted by the activated phagocytes catalyzes the oxidation of L-tyrosine residue, present in the apolipoprotein B100 to tyrosyl radical. This oxidation of apolipoprotein initiates the process of lipid peroxidation in LDL molecule[7]. This results in the formation of aldehydes

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that substitute lysine residues in the apolipoprotein B-100 moiety[8]. Lipid oxidation alongwith protein oxidation in LDL results in the generation of oxidized LDL[9,10].

Oxidative Stress also leads to decreased availability of Nitric oxide which causes endothelial dysfunction[11,12]. Thus the vascular tone is directly affected. LDL cholesterol enters into the tunica intima layer of the blood vessel, where it undergoes an oxidization process and is converted into ox-LDL which is an atherogenic molecule that initiates the development and progression of vascular inflammatory process[13,14]. Other inflammatory molecules, such as macrophages, and platelets accumulate in the subendothelial area[15,16].

Several mechanisms have been proposed to explain the endothelial dysfunction and atherosclerotic plaque formation, by Ox-LDL. Initially, the induction of the expression of intercellular adhesion molecule-1 and vascular-cell adhesion molecule-1 takes place which causes the chemotactic aggregation of the macrophages and their activation and proliferation in the arterial wall, thus causing their binding to the endothelial cells of the blood vessel. The uptake of Ox-LDL by macrophages takes place leading to the formation of foam cells. The next step is stimulation of the expression of growth factors, such as fibroblast growth factor and platelet-derived growth factor by the macrophages and endothelial cells[16-18].

All these events promote the accumulation of macrophages, cholesterol, and other lipids at the site leading to formation of a plaque; hence elevated levels of Ox-LDL are associated with accelerated atherogenesis and cardiovascular disorders[19,20].

Oxidative stress induced by haemodialysis is one of the possible reasons for atherosclerotic changes in these patients[19]. In the past few years, focus has grown on the risk factors that are connected with the risk of cardiovascular events in patients with chronic renal failure such as inflammation, oxidative stress, and high C Reative Protein levels[20].

It is known that atherosclerosis represents a state of high oxidative stress characterized by the oxidation of lipids and proteins in the walls of blood vessels. Reactive oxygen species, have a causatory role in atherosclerosis and other vascular diseases[20].

This study was designed to find out the levels of oxidized Low density lipoprotein to low density lipoprotein ratio in patients receiving maintenance haemodialysis and its association with subclinical atherosclerosis. This study will help the nephrologists in identification of cardiovascular events in these patients and also help in development of treatment regimes to lower the oxidative stress in this group of patients.

METHODOLOGY

This case control, hospital based study was carried out in the Nephrology Department Ward no 22 and Radiology Department of Jinnah Post Graduate Medical Centre Karachi from January to December 2018. Ethical approval No. F.2-81-IRB/2018-GENL/5173/JPMC was obtained from the ethical review board of JPMC, Karachi. Data obtained from the study subjects was kept confidential.

Sample size was calculated from open EPI website calculator using prevalence of atherosclerosis in haemodialysis patients using a reference study carried out on haemodialysis patients to estimate intima media thickness ratio using simple random sampling technique, carried out in Shanghai China with a sample size of 84 controls and 31 subjects[21].

A sample size of 120 subjects was calculated which was further divided two groups. Group A included 60 normal controls from healthy population and group B included 60 patients receiving maintenance haemodialysis for more than two years.

Inclusion criteria was both male and female subjects with ages between 18 and 50 years, receiving haemodialysis therapy due to chronic renal failure for more than two years and not taking supplementary antioxidants. Exclusion criteria was patients suffering from malignancy, patients receiving haemodialysis due to acute renal failure, subjects having history of any previous cardiac disease or event, and all those not willing to participate in the study.

Non probability consecutive sampling technique was used for the recruitment of study subjects. Biochemical parameters were measured in both the study groups.

High resolution B mode ultrasonography was used for detection of the thickness of tunica media and tunica intima of common carotid artery.

Serum Ox-LDL levels were analyzed using CEA527Hu Human oxidized low density lipoprotein, Ox-LDL ELISA Kit.

BMI was calculated using the formula for BMI i.e. weight (kg)/height (m^2)

Data obtained was analyzed using SPSS version 23.0. The mean and standard deviation for the variables age, BMI, BP, and Lipid profiles were reported in both the

study groups. Linear regression analysis was utilized to detect relationship of carotid intima media thickness with lipid peroxidation. Independent sample t-test was utilized for the comparison of mean levels between the study groups. A P-value of = 0.05 was considered to be significant.

RESULTS

Figure 1 reports the mean age of group A participants was 34.67±7.73, mean BMI was 23.47±3.26, mean systolic blood pressure was 107.33±9.80, mean diastolic blood pressure was 66.33±8.09, mean weight was 66.10±7.75, and mean height was 1.69±0.12 meters whereas group B patients had mean age 43.20±4.66 years, mean BMI was 22.21±4.21, mean systolic blood pressure was 159.0±12.42, mean diastolic blood pressure was 93.67±10.66, mean weight was 64.67±6.13 and mean height was 1.63±0.12.

Figure 2 reports the mean comparison of serum Ox-LDL across studied groups, in group A mean Ox-LDL was 24.87±5.23 while in group B samples mean Ox-LDL was 63.77±6.77. All group mean differences were found statistically significant with p-value < 0.05.

Table 1 reports the mean and standard deviation of intima media thickness across selected patients of from the two groups, the mean of right common carotid artery of group A samples was 0.45±0.04, left common carotid artery was 0.42±0.01, and mean intima thickness was 0.43±0.02, the mean of right common carotid artery in group B was 0.93±0.09 and mean of left common carotid artery was 1.07±0.14 while the mean intima thickness of group B samples was 1.0±0.09. There was significant mean difference obtained across the studied groups for mean intima media thickness, and right, left common carotid artery outcomes with p-value < 0.01.

Table 1: Mean Comparison of Intima Media Thickness Across Studied Groups

	Group A (controls) (n=60)		Group B (haemo-dialysis group) (n=60)		p-value
	Mean	SD	Mean	SD	
Right common carotid artery -(intima media thickness mm)	0.45	0.04	0.93	0.09	<0.01*
left common carotid artery (intima media thickness mm)	0.42	0.01	1.07	0.14	<0.01*
Mean intima media thickness	0.43	0.02	1.00	0.09	<0.01*

P < 0.05 was considered as significant.

Figure 3 shows a scatter plot which estimates the correlation between oxidized LDL and mean intima media thickness ratio. A positive association of Ox-LDL with mean intima thickness was seen.

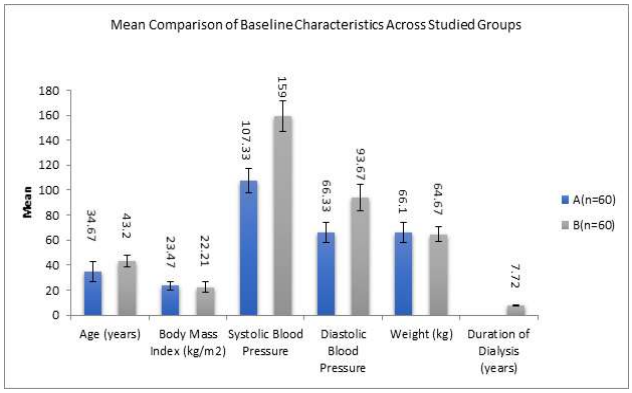

Figure 1: Comparison of Anthropometric Variables Among Study Groups

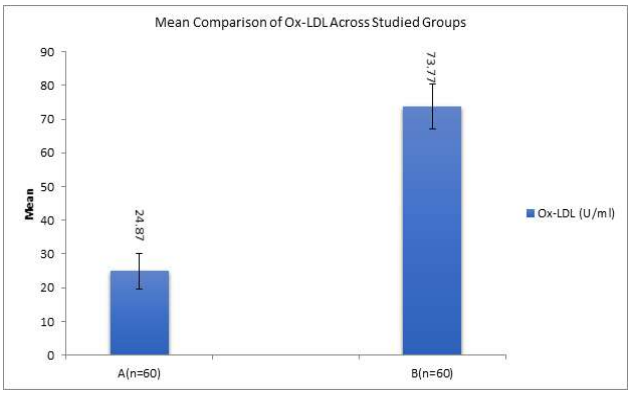

Figure 2: Mean Comparison of Ox-LDL Among Study Groups

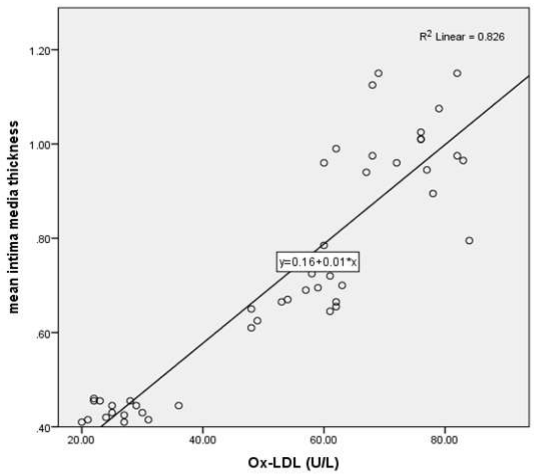

Figure 3: Correlation Between Ox-LDL and Mean Intima Media Thickness Ratio

DISCUSSION

Cardiovascular disease is the leading cause of mortality in haemodialysis patients. Oxidative stress is the major factor related to dialysis associated cardiovascular complications in these patients. In this study, we aimed to find out the correlation between oxidized low density lipoprotein to low density lipoprotein ratio with atherosclerotic changes in patients receiving maintenance haemodialysis.

No significant difference in the mean ages among the two groups was found. A significant decrease in the weight and BMI was seen between the haemodialysis patients. The decreases in BMI may be due to protein energy wasting and restricted diet in haemodialysis patients.

No significant difference in the mean ages among the two groups was found. A significant decrease in the weight and BMI was seen between the hemodialysis patients. This is similar to the findings of Rysz[22].

We found a significant increase in the mean systolic BP and diastolic BP of the haemodialysis patients as compared to the control group. This increase in BP which can be due to fluid overload, overactivity of renin angiotensin system, erythropoietin administration, and enhanced stimulation of the sympathetic nervous system. Our results are similar to the findings of Wang[23] who reported a mean SBP of 143.2 ± 32.7mmHg and mean DBP of 79.0 ± 15.9 mmHg among haemodialysis patients.

Our study showed an increase in levels of serum oxidized LDL in subjects on maintenance haemodialysis (63.77±6.77) as compared to controls (24.87±5.23). Wagner[17] reported a mean level of Ox-LDL in haemodialysis patients as 74.6 ± 28.1 U/L[14]. Hou[18] also reported increased levels of Ox-LDL (89.15± 12.3 U/L) in haemodialysis treated patients. This increase in levels of oxidized LDL is due to increased oxidative stress after multiple cycles of haemodialysis resulting in increased lipid peroxidation[16].

Significant results were obtained on Doppler ultrasonography. Significant mean difference was obtained across the two studied groups for mean intima media thickness, and right, left common carotid artery outcomes with p-value less than 0.01.

The mean of intima thickness in group A was 0.43±0.02, while the mean of intima media thickness in group B was 1.0±0.09. This signifies that patients receiving dialysis are at greater risk of developing atherosclerosis. This is in accordance with the published work of Manabe who reported a maximum IMT of = 1.5 mm in haemodialysis patients[24].

Our results are also similar to Mahmoud who also showed increased carotid artery IMT (1.0 ±0.7) in haemodialysis patients[25]. These findings suggest that patients on haemodialysis are subjected to oxidative stress that leads to the formation of oxidized LDL and generation of inflammatory mediators that lead to development of atherosclerotic heart disease. The carotid artery intima media thickness ratio is a non-invasive indicator and predictor of atherosclerotic heart disease and has been discussed in many previous studies[21].

The ox-LDL to LDL ratio was significantly raised in the haemodialysis group indicating increased oxidized fraction of LDL as compared to the native LDL in haemodialysis patients. This imbalanced ratio is because of excess lipid peroxidation in the haemodialysis patients[22,23].

Our results are similar to Mahmoud who also found that carotid artery intima media thickness is correlated with inflammatory processes in haemodialysis patients[25]. These findings suggest that patients on haemodialysis are subjected to oxidative stress that leads to the formation of oxidized LDL and generation of inflammatory mediators that lead to development of atherosclerotic heart disease. The carotid artery intima media thickness ratio is a non-invasive indicator and predictor of sub clinical atherosclerotic heart disease and has been discussed in many previous studies[24,25].

Oxidative stress in haemodialysis patients is caused due to poor dietary intake of antioxidants, formation of oxidized molecules, and loss of antioxidants during haemodialysis[25]. These factors are linked to the development of atherosclerosis and chronic inflammation and lead to cardiovascular complications in these patients. The administration of antioxidants plays a protective role against oxidative stress by neutralizing the harmful effects of oxidative molecules, however it has still not been adopted as a regular treatment protocol in clinical practice. More prospective studies are required to elaborate on the protective role of antioxidant administration in oxidative stress that can improve the cardiovascular mortality rate in haemodialysis treated end-stage renal disease. Moreover, the oxidative stress parameters in these patients need to be monitored to avoid the possible outcomes of oxidative stress. Dietary guidelines should also be developed to ensure the intake of adequate vitamins and minerals in these patients. The limitations of this study were that it was a single centered study

so the sample size was restricted, and the other parameters of oxidative stress were not monitored due to budget constraints.

CONCLUSION

Our study concluded that ox-LDL/LDL ratio is significantly elevated in haemodialysis treated patients and serves as a marker for the detection of sub clinical atherosclerosis. This study will help nephrologists in early detection and prevention of cardiovascular changes in haemodialysis patients.

Conflict of Interest: The authors declare that they have no conflict of interest.

Authors' contribution: SR: Conceived the idea and worked on research; SK: Worked on data collection and supervised the research; KN: Worked on literature review and write up; ZS: Worked on data collection and drafting; FM: Worked on literature review and final approval of draft; SR: Did statistical analysis.

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ORIGINAL ARTICLE

Prevalence of Carpal Tunnel Syndrome Among Dentists Working in Tertiary Care Hospitals of Peshawar, Pakistan

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ABSTRACT

Objective: To determine the prevalence of Carpal Tunnel Syndrome among dentists working in tertiary care hospitals of Peshawar

Methodology: A cross-sectional survey was conducted on 132 dentists working in tertiary care hospitals of Peshawar, Pakistan. The data was collected from four public and three private tertiary care hospitals via convenience sampling technique. A standard Boston Carpal Tunnel Questionnaire, Kamath and Stothard Carpal Tunnel Questionnaire, Numeric Pain Rating Scale and Phalen's Test were used. The data was collected and analyzed by using SPSS version 25. Frequency and percentage were calculated for categorical variables and chi-square test was applied to find the association between variables.

Results: A total of 132 dentists participated in this research out of whom 65 (49.2%) were males while 67 (50.8%) were females. Twenty-eight (21.2%) respondents reported the symptoms of Carpal Tunnel Syndrome. Fifteen (11.4 %) respondents had mild pain and 13 (9.8%) had moderate pain. The participants' ages ranged between 25 and 30 years (66.7%), and 107 (81.1%) had a working experience of less than 10 years. Ninety-one (68.9%) dentists were working for 6-8 hours per day and 57 (43.2%) of the participants had a normal body mass index (BMI) ratio.

Conclusion: Dentists who work in hospitals of Peshawar appear to suffer from Carpal Tunnel Syndrome. Dentists who have more hours of contact time with patients per day have increased risk of CTS symptoms but no association was found between gender and CTS symptoms. Furthermore, the symptoms of CTS increased with age.

Keywords: Carpal tunnel syndrome, Median neuropathy, Dentist, Tertiary Healthcare

How to cite this article: Zubair M, Khan P, Ahmad U, Abidin SZ, Shah SU, Kazmi A. Prevalence of carpal tunnel syndrome among dentists working in tertiary care hospitals of Peshawar, Pakistan. Ann Jinnah Sindh Med Uni. 2022;8(1):36-41

DOI 10.46663/ajsmu.v8i1.36-41

INTRODUCTION

Carpal Tunnel Syndrome (CTS) affects more than eight million Americans[1]. Workers who perform their jobs using their upper extremities like hands, wrists, and fingers are more prone to CTS. This disorder widely affects dental professionals which in turn affects their efficiency and their lives. Dental practitioners work in a static posture for a prolonged period during a normal day. Their job demands that they stay in one place to handle small dental instruments with precision, instead of changing their posture frequently[1]. Carpal Tunnel Syndrome is a neuromuscular disorder of the median nerve compression in the wrist[2]. CTS is the most common entrapment neuropathy of the median nerve and accounts for 90% of the neuropathies[3]. Common signs and symptoms of CTS include numbness and a tingling sensation[4]. On the Phalen's Test, it will show pain, numbness, and tingling like sensations in the thumb, index, and middle finger[5]. Historically, it was thought that injury due to the repetitive movements cause nerve damage and may make one prone to developing CTS[6].The most common work-related risk factors to CTS are forceful excursion, awkward wrist/hand postures, repetitive movements, and vibrating tools[7]. A study shows that workers who have CTS lose their grip strength[8]. Another study shows that a higher risk for CTS is in lifting heavy objects[9,10]. The well-known fundamental related risk factors with CTS are diabetes mellitus, hypothyroidism, old wrist fracture, and rheumatoid arthritis[11].

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The first-line diagnostic test for CTS is electromyography (EMG) or ultrasound but EMG is the gold standard[12]. Nerve conduction study (NCS) is considered a powerful confirmatory test due to its high specificity[4]. The commonest provocative tests are Tinel's Test, Phalen's Test, and Durkan Test[13].

According to several studies, Carpal Tunnel Syndrome is common among dentist population and the prevalence of CTS in dentists, hairdressers and computer users were reported in Kelantan Malaysia (21.2 %)[14], Iran (16.7%)[15], Saudi Arabia (30.5%)[16], and Lahore, Pakistan (15.5%)[17]. Another study was conducted in Karachi, Pakistan which shows that the prevalence of CTS among dentists was 10.13%[18].

In Pakistan, very limited data are available on the prevalence of CTS. CTS affect daily activities so the impact of this research on society is that dental professionals will become aware and could potentially reduce the incidence of CTS. Prevention of CTS would result in better quality dental services. Therefore, this study was designed to determine the prevalence of Carpal Tunnel Syndrome among dentists working in tertiary care hospitals of Peshawar.

METHODOLOGY

A cross-sectional study was conducted at the tertiary care hospitals of Peshawar. The four public hospitals included Hayatabad Medical Complex, Khyber Teaching Hospital, Lady Reading Hospital, and the Khyber College of Dentistry, and three private hospitals were Northwest General Hospital, Sardar Begum Dental Hospital, and Rehman College of Dentistry, Peshawar. The study was approved by IRB (Institutional Research Board) of the Northwest Institute of Health Sciences (Ref.#: 02/11/06/NWIHS-COPT/IRB/2020). The calculated sample size was 132 using W.H.O. sample size calculator with prevalence of carpal tunnel syndrome (30.5%)[16], margin of error (d)=7.9%, and confidence level (C.I) = 95%. A non-probability convenience sampling technique was used to recruit participants. The inclusion criteria were: male and female dentists with ages between 25 and 45 years, at least one year's experience of working as a dentist, and working for more than six hours per day. The exclusion criteria were: dentists with pregnancy related obesity, known cases of diabetes, arthritis of hand, thyroid gland disease, and any recent trauma such as wrist fracture.

Data was collected via Kamath and Stothard Carpal Tunnel Questionnaire, Boston Carpal Tunnel Questionnaire, Phalen's Test and Numeric Pain Rating Scale. Kamath and Stothard's Questionnaire is based on nine questions for conducting survey and the authors suggest that this Questionnaire can be used as a substitute for NCS. This survey has sensitivity of 85% and 92% for NCS with a positive predictive value of 90% for the scored survey and 92% for NC studies[19]. The Boston Carpal Tunnel Questionnaire (BCTQ) Score is a patient-revealed questionnaire that inspects symptom severity and by and large useful status of patients with CT disorder. The Symptom Severity Scale (SSS) with 11 inquiries is scored on a Likert measure of 1-5 and the Functional Status Scale (FSS) with 8 inquiries is scored from 1-5 with 1 as no trouble and 5 as troublesome.

According to a systematic review by Leite et al, BCTQ is considered to be a legal, dependable, satisfactory, and approachable instrument and ought to be used as an essential result measure in CTS preliminaries[20]. Phalen's Test is utilized to survey for CT disorder. The positive manoeuvre while flexing the wrist to 90 degrees for 1 moment inspires manifestations in the MN nerve dissemination. People with CT disorder will encounter numbness and tingling in the fingers inside 60 seconds. Phalen's Test has a sensitivity and specificity of 67.2% and 92.9% respectively[21]. Numeric Pain Rating Scale (NPRS) is a fragmented numeric interpretation of the Visual Simple Scale (VAS) in which a defendant chooses an entire number (0–10 whole numbers) that best mirrors the severity of his/her pain. The NPRS is tied down by positions portraying the seriousness limits of the torment. According to a systematic review, NPRS is the recommended tool to measure pain intensity on the basis of higher compliance rates, ease of use, better responsiveness, and good applicability[22]. All data were entered and analysed using Statistical Package for Social Sciences (SPSS) version 25. A categorical variable like gender, marital status, pain, and Carpal Tunnel Syndrome was calculated in the form of frequency and percentages. Chi-square test was used to find the association between variables.

RESULTS

The total of 132 dentists participated in this study. Among them, 21.2% reported the symptoms of Carpal Tunnel Syndrome, 78.8% of participants were asymptomatic, 11.4 % dentists had mild pain, and 9.8% dentists had moderate pain, while no severe pain was reported in our study.

Out of 132 dentists, 65 (49.2%) were male while 67 (50.8%) were female. As many as 88 (66.7%) participants were 25-30 years of age while 14 (10.6%) were =41 years. Most of the participants, 107 (81.1%)

had a working experience of 1-9 years. Ninety-one (68.9%) dentists were working for 6-8 hours per day. Total 57 (43.2%) participants had a normal body mass index (BMI) ratio, while 28 (21.2%) were underweight. The rest of the frequency and percentage of demographics are mentioned in Table 1.

Table 1: Showing Percentage and Frequency of Demographic Data of Dentists

Variables	Frequency (n = 132)	Percentage
Age range		
25-30	88	66.7
31-40	30	22.7
41-45	14	10.6
Working experience		
01-09 yrs	107	81.1
10-18 yrs	11	8.3
19-25 yrs	14	10.6
Working hours/week		
6-8 hrs	91	68.9
9-15 hrs	41	31.1
Gender		
Male	65	49.2
Female	67	50.8
Marital status		
Married	67	50.8
Unmarried	65	49.2
BMI		
Normal	59	44.7
Underweight	28	21.2
Overweight	27	20.5
Obese	18	13.6
Phalen's Test		
Positive	22	16.7
Negative	110	83.3

Table 2 shows that 116 (87.9%) dentists had scored less than 3 base on Kamath and Stothard CTQ which indicates 100% negative NCS. Four (3%) dentists scored in the range 3 or 4, which indicates that participants should undergo the NCS. Only 12 (9.1%) respondents had a score in the range of 5 or more, which indicates a positive NCS (limitations are mentioned according to questionnaire.)

Base on NPRS, 94 (71.2%) dentists had no pain, while 25 (18.9%) had mild pain at the time of data collection. The data of previous week showed that 77 (58.3%) dentists had no pain, while 38 (28.8%) had mild pain (table 2).

Base on BCTQ, the scores of symptoms severity scale show that 104 (78.8%) participants were asymptomatic, 15 (11.4%) were mild, while 13 (9.8%) were moderate.

Table 2: Showing Pain Intensity on Numeric Pain Rating Scale (NPRS) at the Time of Survey

Variables	Frequency	Percentage
NPRS at the time of survey		
No pain	94	71.2
Mild	25	18.9
Moderate	13	9.8
Severe	0	0
Very Severe	0	0
NPRS in previous week		
No pain	77	58.3
Mild	38	28.8
Moderate	16	12.1
Severe	1	.8
Very Severe	0	0
BCTQs		
SSS Score		
Asymptomatic	104	78.8
Mild	15	11.4
Moderate	13	9.8
Severe	0	0
Very Severe	0	0
FSS Scoring		
Asymptomatic	109	82.6
Mild	10	7.6
Moderate	13	9.8
Severe	0	0
Very severe	0	0

* NPRS = Numeric Pain Rating Scale

Functional status of dentists shows that approximately 109 (82.6%) were asymptomatic, 10 (7.6%) were mild, while 13 (9.8 %) were moderate (Table 2). According to Phalen's Test results, 22 (16.7%) participants had positive Phalen's Test while 110 (83.3%) had negative Phalen's Test (table 2).

Table 3: Association of SSS Score with Demographics

Demographic	Asymptomatic	Mild	Moderate	p-Values
Age				
25-30	74	12	2	
31-40	24	0	6	.000
41-45	6	3	5	
Gender				
Male	52	10	3	.067
Female	52	5	10	
Working Hours				
6-8	76	11	4	.007
9-15	28	4	9	
Working Experience				
1-9	91	12	4	
10-18	8	0	3	.000
19-25	5	3	6	

*Applied Chi-square test

Table 3 shows the association of symptom severity scores with demographics. Statistical difference was found between symptom severity and age, working hours and working experience of dentists (P<0.05). Table 4 shows the frequency and percentage of the sub-domains of functional severity scale. Most of the dentists had a little difficulty in writing (9%), buttoning (8%), holding book (13%), and gripping (6%).

Table 4 : Frequency and Percentage of FSS

FSS Questions	No Difficulty	Little Difficulty	Moderate	Intense Difficulty	Cannot Perform
Writing	117 (88.6%)	12 (9.1%)	3 (2.3%)	0 0	0 0
Buttoning	117 (88.6%)	11 (8.3%)	4 (3.0%)	0 0	0 0
Holding a book	111 (84.1%)	18 (13.6%)	3 (2.3%)	0 0	0 0
Gripping	116 (87.9%)	8 (6.1%)	7 (5.3%)	1 (0.8%)	0 0
Opening jars	118 (89.4%)	8 (6.1%)	6 (4.5%)	0 0	0 0
Household Chores	119 (90.2%)	6 (4.5%)	6 (4.5%)	1 (0.8%)	0 0
Carrying Objects	116 (7.9%)	10 (7.6%)	4 (3.0)	2 (1.5%)	0 0
Bathing	119 (90.2%)	7 (5.3%)	5 (3.8%)	1 (0.8%)	0 0

DISCUSSION

This study was conducted to assess the prevalence of Carpal Tunnel Syndrome among dentists working in tertiary care hospitals of Peshawar. The findings of present study are that 21.2% of dentists reported the symptoms of Carpal Tunnel Syndrome. Out of these, 78.8% of participants were asymptomatic, 11.4% had mild pain and 9.8% had moderate pain, while no severe pain was reported in our study.

A study conducted in Chennai, India by Deepika et al. in 2020 using BCTQ on 120 dentists, reported that 25.7% of respondents were diagnosed with CTS, out of whom 15% lied in the mild category of CTS, 9.1 lied in moderate category, and 1.6% were in severe category of CTS[23]. Another study conducted in India by Ravi et al. using BCTQ on 100 dentists, reported that assessment on the symptoms severity scale of the wrist indicated that 63% of the participants were asymptomatic, 18% had mild symptoms, 10% had severe symptoms while 5% had extremely severe symptoms[24]. Similarly, another study conducted in Riyadh by Faisal et al. in 2019 using the BCTQ on 179 dentists, reported that 30.5% dentists had experienced the symptoms of CTS[16]. A study conducted in Lahore, Pakistan by Muhammad et al. in 2013, reported a 15.5% frequency of CTS among dentists, while the same type of study conducted in Karachi by Khan et al. found 10.13% prevalence of CTS among dentists[17,18].

The present study shows that a significant association exists between the CTS symptoms and dentists' experience (P < 0.05) and significant association is also seen between working hours and CTS symptoms (P < 0.05) (Table 8). A study conducted on 240 dentists in Isfahan by Abbas et al., reported that dentists with more working hours per week and having more experience, were more prone to CTS[15].

Another study conducted in Riyadh by Al Hussain et al. using BCTQ on 223 dentists, reported that CTS symptoms were greater among female dentists than in male dentists (90). In the current study, there is no significant association between genders and CTS symptoms (P > 0.05) (Table 8).

In another study conducted in Kelantan Malaysia using Kamath and Stothard CTQ on 109 dentists, the author reported that the prevalence of probable CTS among dentists was 21.2% based on Kamath and Stothard (2003) Questionnaire scoring of 3 or above[14]. Whereas, the current study concludes that the prevalence of CTS based on Kamath and Stothard was 12.1%. A study conducted by Dananton et al. in the United States, reveals that increasing age showed higher risks to develop CTS[25]. Present study also shows that there is

a strong significant association between age and CTS symptoms.

Our survey was conducted on a small sample size. Future research should be conducted on a larger sample and should find the risk factors of CTS development among dentists. Future research should focus on intervention and prevention measures for dentists to work safely and efficiently.

CONCLUSION

In conclusion, dentists who work in hospitals of Peshawar appear to suffer from Carpal Tunnel Syndrome. Dentists having longer duration work are at increased risk of CTS. Dentists who have more hours of contact time with patients per day have increased risk of CTS symptoms but no association was found between gender and CTS symptoms. Furthermore, the symptoms of CTS increased with age.

Conflict of interest: The authors of the current study declare no conflict of interest.

Acknowledgment: The authors are thankful to the dentists from Hayatabad Medical Complex, Khyber Teaching Hospital, Lady Reading Hospital, Khyber College of Dentistry, Northwest General Hospital, Sardar Begum Dental Hospital and Rehman College of Dentistry for providing research facilities and support throughout.

Authors' contribution: MZ: collected data and wrote manuescript, PK: Collected and analyzed data and helped in writeup, SS: Performed statistical analysis and proofreading, UA: Conceptualized and designed study layout, revised and approved manuscript for publication, SZA: Conceptualized and designed study layout, revised and approved manuscript for publication, AK: Data analysis and Manuscript preparation.

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CASE REPORT

Primary Malignant Melanoma of The Small Intestine: A Rare Case Reported

Umm-e-Habiba Abdul Rauf[1], Karim Rizwan Nathani[1], Mujeeb-ur-Rehman Malik[1], and Summaya Saeed[1]

ABSTRACT

Primary small intestinal melanoma is a rare malignant neoplasm, for which scarce literature offers limited evidence for optimal management. We present a case of a 60-year-old female with primary melanoma of ileum. She presented with left sided abdominal pain, decreased appetite, and history of diarrhoea for 15 days. She developed absolute constipation during her preoperative investigations, in which CT scan revealed ileoileal intussusception. She underwent laparotomy for the resection of intussuscepted bowel segment, which revealed a greyish brown mass attached to bowel, later confirmed by histopathology as melanoma. Postoperative detailed clinical investigation revealed no primary cutaneous, hepatic, pulmonary, ocular, or cranial melanotic lesion. Hence, the lesion was classified as primary small bowel melanoma. She was referred to oncologist who started her on adjuvant chemotherapy. The patient expired of cardiopulmonary arrest three months after her diagnosis due to post Chemotherapy side effects.

Key Words: Gastrointestinal melanoma, gastrointestinal tumour, ileal melanoma, primary melanoma

How to cite this article: Rauf UH, Nathani KR, Malik MR, Saeed S. Primary malignant melanoma of the small intestine: a rare case reported. Ann Jinnah Sindh Med Uni. 2022;8(1):42-44

DOI 10.46663/ajsmu.v8i1.42-44

INTRODUCTION

Small bowel melanoma is an infrequent tumour, which makes the diagnosis difficult and often presents late[1]. When found, it is usually a metastatic lesion from a primary cutaneous lesion[4]. However, rarely primary melanomas of the small intestines have been reported[1,5].

Primary GI melanomas are most commonly reported in anorectal and oropharyngeal regions[2]. Due to very low incidence, the primary small intestine melanomas have very limited clinical data available[2]. This impedes concluding any specific management as guideline for the disease. Differentiating between primary and secondary melanoma of the small intestine yet remains another concern.

We present a rare case of primary malignant melanoma of the small intestine and discuss relevant literature.

Case

A 60-year-old female came with the history of left sided abdominal pain for two weeks, which increased in intensity two days prior to her presentation in emergency department. The pain was colicky in nature, of moderate to severe intensity, aggravated by taking small meals, and relieved temporarily by antispasmodic medication. Patient also complained of decreased appetite and history of diarrhoea, which were watery in consistency without any foul smell or blood, for the last 15 days. She developed constipation associated with bilious vomiting in the previous two days.

On arrival in emergency department, she was dehydrated with pulse of 102 bpm, blood pressure of 160/60 mmHg, and afebrile temperature. Her abdomen was distended, with generalized deep tenderness and exaggerated gut sounds. On digital rectal examination faecal staining was present with no fresh blood or melena. The rest of the examination was unremarkable. No sign of anaemia, jaundice, cyanosis, or lymphadenopathy was observed. The patient was admitted with diagnosis of subacute intestinal obstruction for further management.

Laboratory investigations revealed Hb 13.1 g/dl, WBCs 7.8 $x10^{12}$/L, platelets 206, and CRP 168 mg/L, in

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addition to normal UCEs and LFTs. Her chest X ray was normal, but abdominal x ray observed air fluid levels in dilated small bowels (fig. 1a and b).

fig. 1a

fig. 1b

Fig. 1a: Abdominal X-Ray Supine Showing Dilated Small Bowel
Fig. 1b: Abdominal X-Ray Erect Showing Air Fluid Levels

CT scan depicted ileoileal intussusception with soft tissue thickening and proximal small bowel dilatation. Concurrent hepatomegaly was also observed (fig 2a and b).

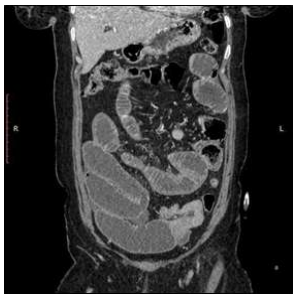

fig. 2a

fig. 2b

Fig. 2a and 2b: CT Scan Abdomen Transverse and Coronal Section Showing Ileoileal Intussusception

During preoperative investigations, the patient developed absolute constipation. In view of her worsening condition, exploratory laparotomy was performed and an ileoileal intussusception was found with a dark brown nodule over it. The mass 4x4 cm in size and was covered by serosa extending and involving the mucosa. The involved area was resected and cut ends were exteriorised as double barrel ileostomy (fig. 3a and b).

fig. 3a

fig. 3b

Fig. 3a and 3b: Surgical Specimen of Resected Ileoileal Intussusception

Histopathology of the surgical specimen reported the mass as malignant melanoma with immunohistochemical stains positive for S-100, Hmb45 and Melan A. It contained five lymph nodes, out of which three were positive for nodal metastasis. The tumor-free ileum extended 7 cm proximally and 8 cm distally from the site of melanoma mass (fig. 4a,b,c and d).

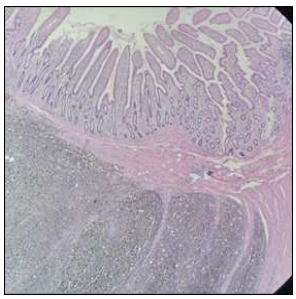

fig. 4a

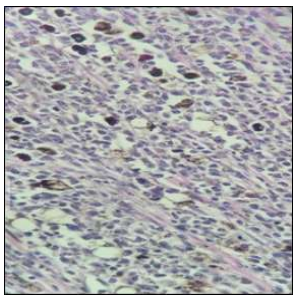

fig. 4b

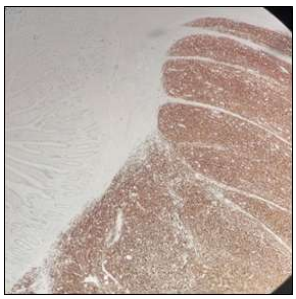

fig. 4c

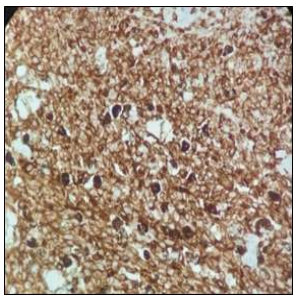

fig. 4d

Fig. 4a and 4b: H&E stain showing wall of intestine showing neoplastic lesion composed of sheets of spindles to epitheloid cells having marked nuclear pleomorphism, hyperchromasia, abundant cytoplasm, and prominent eosinophilic nucleoli. Tumour (hyper pigmented area) is involving dermis but mucosa is uninvolved. Large and small asymmetric tumours with distinct nucleoli and large tumour cells with melanin deposition were observed. Fig. 4c and 4d: Immunohistochemical staining reveals that the tumour is S-100 (+), HMB-45 (+), Melan-A (+).

After the diagnosis of melanoma was established, the patient underwent a clinical and radiological evaluation. The examination of skin, eyes, and anus was negative for any primary lesion. Chest CT scan was performed along with review of abdominopelvic CT scan, which excluded any pleuropulmonary, hepatic, adrenal, or bony lesion, whether primary or metastatic. Therefore, it was concluded that the intestinal mass was primary melanoma of small intestine.

The patient was discharged with ileostomy care counselling and instructions. She was referred to oncologist for adjuvant chemotherapy. She was started on monthly dacarbazine 450mg for five days. After third cycle of dacarbazine patient developed brown pigmented lesions all around the body (fig. 5). Before she could undergo the fourth cycle of her chemotherapy regime, the patient expired due to cardiopulmonary arrest.

Fig. 5: Brown Pigment Lesions Following the Third Cycle of Chemotherapy

Discussion

Malignant melanoma is a common skin neoplasm which can be rarely observed in other body sites. Primary melanoma of the gastrointestinal tract is uncommonly found in clinical practice; therefore, no definite guidelines exist for its optimal management. The literature has only been able to offer limited case studies as evidence to guide the treatment of the disease.

Primary mucosal melanoma can arise at any site along the GI tract. M.C. Cheung et al. reviewed the available literature and observed that the common sites for presentation include oropharyngeal (32.8%), anal (31.4%), and rectum (22.2%)[1,4]. However, the small intestines account for only 2.3% as the site of primary melanoma[1,4].

Authors have even argued on the possibility of primary melanoma of the small intestine. Although some have defined it as a symptomatic metastatic lesion from a regressed primary cutaneous lesion, few hypotheses have attempted to explain it as a primary disease. Migration of neural crest cells to distal ileum via omphalomesenteric canal offers a justification for distal ileum to be the most common site of the primary melanoma in small intestines. Another rationale can be the origin of tumour from enteric neuroendocrine non-cutaneous tissue in the form of amine precursor uptake decarboxylase cells that have undergone neoplastic transformation1. The latter can also interpret the non-ileal intestinal malignant melanomas[3].

A criterion was proposed by Blecker et al. for the diagnosis of primary intestinal melanoma[1]. It included absence of melanoma or atypical melanocytic lesion of skin, absence of extraintestinal metastatic spread of melanoma, and presence of intramural lesions in overlying or adjacent intestinal epithelium[1,3]. Our patient fulfilled all the conditions of the above recommended criteria in addition to the histopathology, which allowed us to diagnose it as primary melanoma of ileum.

The presentation of primary small intestinal melanoma is dependent on the location and size of the tumour. It can be observed with non-specific signs, like weight loss and anaemia, or intestinal obstruction, which was the primary finding in our case. The primary management for the disease remains surgery in all cases, which may be followed by adjuvant chemoradiotherapy. M.C. Cheung observed no survival benefit of radiotherapy, whereas sufficient data was not available to comment on chemotherapy[2]. Our patient was recommended chemotherapy as the only adjuvant treatment for the disease.

Primary melanoma of the small intestine is shown to have poor prognosis compared to that of skin. M.C. Cheung et al. observed high rates of mesenteric lymph node metastasis, and sixteen months of median survival[4]. Similarly, Hadjinicolau AV also showed only 50% one-year postoperative survival of these patients, and high tumour recurrence[3]. The case presented here by our team will contribute to the knowledge of the disease and assist in decision making for its optimal management.

In conclusion, our case fulfilled the criteria of available literature to be classified as primary small intestinal melanoma. The patient was disease free till four months of postoperative follow up. Reversal of ileostomy was planned after completion of chemotherapy, but the patient expired prior to it.

Conflict of Interest: The authors declare that they have no conflict of interest.

Author's contribution: SS and UHAR conceptualized and supervised the current study; KRN: performed the experimental work and collected the required data; UHAR: wrote the first draft of the article; KRN and MRM: critically revised the manuscript, helped with statistical analysis, and wrote the discussion portion of the article.

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