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## EDITORIAL

**NEED FOR IMMEDIATE SWALLOWING SCREENING IN POST STROKE PATIENTS**

Faiza Badar: Associate Editor, TRJ

Speech Language Pathologist, Shifa International Hospital, Islamabad Pakistan

Email: [fajza\\_badar@hotmail.com](mailto:fajza_badar@hotmail.com)

Stroke is the leading cause of severe neurological disability in adults and is allied with an array of complications. Dysphagia complicates acute ischemic strokes (AIS) in 42% cases and is more evident during the first week after ischemic stroke. Chest infection complicates AIS in 32% of the cases and 89% of these cases are due to dysphagia<sup>1</sup> Pneumonia in stroke patients is often associated with aspiration. Swallowing assessment at time of admission in stroke patients can help in minimizing risk of pneumonia in stroke patients. A common perception is that Islamabad being the federal capital should be the model which should be replicated, however, despite its small size in both territorial and population terms although being endowed with adequate financial resources the provision of health services in the suburbs is not satisfactory. This situation is not unique to Islamabad; same situation is prevalent in all cities of Pakistan and other developing countries. Visits and interviews conducted in ICT indicated that currently no government or private hospital have any protocol for swallowing assessment at time of admission for stroke patients.

There is ample evidence that best practice in the care of patients with stroke is the early screening and identification of dysphagia as it allows for timely intervention resulting in reduced morbidity, length of stay, and health care expenditures. To ensure early detection of dysphagia, and to prevent dysphagia-related complications, screening of all stroke patients at time of admission for signs of swallowing issues is advisable. When a swallowing screening protocol is implemented, there is a decrease in morbidity over each year that the protocol is in place<sup>2</sup>. Implementation of strict swallowing screening protocol for patients with stroke, can improve clinicians' adherence with screening swallowing before starting oral feed. American Heart Association/American Stroke Association (AHA/ASA) included screening of swallowing before starting oral feed, liquid, or medication in individuals presenting with stroke symptoms as part of their guidelines on the early management of adults with acute stroke. Completion of dysphagia screening prior to administration of oral intake was a Joint Commission (JC) required performance measure for Primary Stroke Center Certification until year 2010<sup>3</sup>.

Many acute care facilities in developed countries have protocols according to which screening for dysphagia will be completed and documented on all ischemic /hemorrhagic stroke patients including warning strokes before food, fluids, or medication are started. Screening methods may include, but are not limited to, (a) water swallow tests, such as the Burke water swallow test or the 3 oz. Water swallow test (Suiter & Leder, 2008); (b) swallowing screening protocols including brief assessments of oral motor and sensory function as well as water swallow tests, such as the Toronto Bedside Swallowing Screening Test or the Simple Standardized Bedside Swallowing Assessment; or (c) clinical (bedside) Swallow examinations.<sup>4</sup>

Developing countries are still busy fighting communicable diseases and are unable to pay much attention to non communicable diseases such as stroke, although the number of stroke patients added to population increase the already existing BOD for these nations many fold. A study was conducted in India with aim to develop a bedside assessment protocol and grading scale for oro pharyngeal dysphagia. The Nair hospital bedside swallowing assessment (NHBSA) and Nair hospital swallowing ability scale (NHSAS) were developed after reviewing related literature. The NHBSA and NHSAS show high reliability and high face and content validity. Comparison with modified barium swallow revealed that the NHBSA appears to show potential in precisely identifying dysphagia and aspiration. 'Wet-gurgly voice quality,' 'cough after/during swallow 'and' weak/absent volitional cough' was the clinical indicators that appeared to properly discover presence of aspiration risk.<sup>5</sup>

Guidelines and Pathways (protocols) are necessary to ensure quality care in health care facilities. The skills and competencies outlined in practice standard guide and protocols are important components in the provision of standardized quality health care. Patients tend to receive the greatest benefit when a number of health-care professionals team up, each bringing his/her own particular expertise to assessment and treatment of dysphagia. According to practice standards and guidelines for dysphagia intervention by speech- language pathologists given by College Of Audiologists And Speech Language Pathologists Of Ontario "Any regulated health professional trained in the clinical assessment of patients/clients (e.g. nurses, physicians, dietitians, physiotherapists, and occupational therapists) may conduct swallowing screening. Speech pathologists, however, can play a fundamental role in making dysphagia screening programs and educating those who conduct screening regarding the appropriate interpretation of findings.<sup>6</sup>

Keeping in view current health care services in our country, planning to have speech pathologist available at all emergency departments for swallowing screen appears to be almost impossible; we will need to train our allied health staff for initial dysphagia screening in emergency departments . All hospitals of Islamabad having emergency departments and catering stroke patients should make an effort to include dysphagia screening in their stroke care protocols at time of admission

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## ORIGINAL ARTICLE

## EFFECTIVENESS OF KINESIO TAPING WITH OROMOTOR EXERCISES IN IMPROVING DROOLING AMONG CHILDREN WITH CEREBRAL PALSY

1. Isra Institute of Rehabilitation Sciences (IIRS), Isra University Islamabad, Pakistan
2. Department of Physical Therapy, Elite College of Professional studies
3. Multan college of Physiotherapy affiliated with University of Health sciences, Lahore Pakistan
4. Department of Speech Language Pathology, National Institute of rehabilitation Medicine, Islamabad Pakistan

## Correspondence

Dr. Waqar Ahmed Awan  
 Assistan Professor, Isra Institute of Rehabilitation Sciences, Isra University Islamabad Campus, Pakistan  
 Email: [wawan01@hotmail.com](mailto:wawan01@hotmail.com)

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**Waqar Ahmed Awan**<sup>1</sup>: Design & conception, analysis & interpretation of data, writing; Revised and Accountable for all aspects  
**Anam Aftab**<sup>1</sup>: Analysis & interpretation of data, writing; Revised and Accountable for all aspects  
**Usman Iqbal Janjua**<sup>2</sup>: Analysis & interpretation of data, and Accountable for all aspects  
**Rehan Ramzan**<sup>3</sup>: Analysis & interpretation of data, writing; Revised and Accountable for all aspects  
**Nasir Khan**<sup>4</sup>: Analysis & interpretation of data, writing; Revised and Accountable for all aspects

## ABSTRACT

**Objective:** To determine the effectiveness of kinesio taping (KT) with oromotor exercises (OME) in improving drooling in children with cerebral palsy. **Material and Methods:** A randomized control trial (RCT) was conducted at National Institute of Rehabilitation Medicine (NIRM). Forty eight CP children, age ranged 4-8 years, having good head control and fair comprehension for verbal commands with drooling severity  $\geq 3$  rated on Thomas Stonells drooling scale were included in the study. The n=48 CP children were equally divided into two groups. Group A (n=24) participants were given an hour time which included taping of orbicularis oris muscle followed by oral motor exercises. Group B (n=24) participants were given the same treatment except there was only application of Kinesio taping of orbicularis oris muscle without oral motor exercises. The participants were assessed 5 times; at week 0 (Baseline) and then during intervention at week 4, week 8, week 12 and finally at week 16 after completion of intervention. Data was collected through Thomas Stonells drooling scale and drooling impact scale. Data was analyzed by using SPSS version 21. For presentation of categorical and demographic variables, mean and standard deviation were used. RM-ANOVA was used to analyze changes within the groups and independent samples t-test was used for differences between the groups. **Results:** The mean age in group A is  $3.93 \pm 1.7$  years and the mean age in group B is  $3.66 \pm 1.26$  years. The result showed significant improvement within both groups ( $p < 0.05$ ). Between groups comparison revealed more significant decrease in drooling severity and its impact in group A (KT+OME) as compared to group B (KT) at  $p < 0.05$ . in case drooling frequency no significant difference was observed. **Conclusion:** The results of the study indicated that kinesio tapping along with oro-motor exercises were more effective management option for drooling severity and impact on CP children life.

**Keywords:** Cerebral palsy, drooling, kinesio tapping, oro-motor exercises, Thomas Stonells drooling scale, drooling impact scale.

## INTRODUCTION

Cerebral Palsy (CP) is a developmental disorder of brain that leads to movement and posture dysfunction. It may affect oral motor skills resulting in speech delay, drooling and troubles with sucking, gulping and biting<sup>1,2</sup>. The sustaining issues of oral motor dysfunction leads to feeding difficulties that results in growth and development retardation<sup>3</sup> while drooling prompts physical issues and affects social improvement<sup>4</sup>. CP is a common disorder throughout the world which accounts for 1.5 to 4 kids for each 10000 living labors. This adds up to around 5000-10000 children born with CP annually in United States. Consistently around 1500 babies are diagnosed to have this disorder every year. The overall prevalence of significant chronic drooling in childhood is put up to 0.6%. The commonest population group with severe and persisting difficulty is children with quadriplegic CP where the prevalence rate is as high as 30%-53%<sup>5</sup>. Symptoms of CP include feeding difficulties, communication difficulties, drooling, spasticity, bowel and bladder dysfunction, constipation and contractures. The overall picture of CP shows disturbances in growth, sensation, communication,

gait and cognition, all contribute to physical and mental dysfunction<sup>6</sup>. As a result of neurodevelopmental delay primary functions such as swallowing, intraoral tongue suction and lip closure are disturbed. 10 to 37% of CP children are estimated to be affected by drooling<sup>7</sup>. CP children do not have neuromuscular control that's why it's not possible for them to manage the posterior drooling of saliva in which the tongue spills back the saliva. This causes children with cerebral palsy having problems with breathing, aspiration into trachea and coughing that all can sometimes leads to recurrent pneumonia<sup>8</sup>.

There are different treatment strategies being used for the management of drooling i.e. surgical, pharmacological, therapeutic exercises for orofacial muscles and intra oral devices. These treatment options for the management of drooling include improving tone of orofacial muscles to develop voluntary control of muscles and increasing sensory awareness. Techniques for orofacial facilitation include manipulation, vibration and brushing<sup>9</sup>.

In the past few years use of Kinesio tape in the treatment of neurological problems has become more wide spread. In children the neurological problems for which the Kinesio



tape is being used includes dysarthria including difficulty in closing mouth with increased drooling, TMJ hypermobility and articulation problems<sup>10</sup>. Kase'et al<sup>11</sup> described various benefits of Kinesio taping that depends on the amount of stretch applied during the application of Kinesio tape. It helps moving exudates towards the lymph duct for removal of edema, 2) alignment of facial tissues, 3) assistance in limitation of motion and providing sensory stimulation, 4) through skin providing a positional stimulus, 5) lifting tissues and fascia over the area of inflammation and pain creating more space. Wearing time of 1 application of Kinesio tape is usually longer than 3 to 4 days. It is composed of 100% cotton that's allows it to quickly dry and evaporation so that without reapplying it can be worn in pool and shower<sup>11</sup>.

On the other hand oral motor exercises include brushing of tongue, upper and lower gums, hard palate and inside of cheeks including vibration of chin and neck<sup>12</sup>. Oral motor therapy includes physiotherapist, speech therapist and patient's family and will definitely have a beneficial effect in oral motor functions in CP child<sup>13</sup>. Different intraoral appliances including sensory-motor activator and regulators are also now being used for the management of drooling and have been found beneficial in controlling the problem<sup>14</sup>.

As there are limited well designed clinical trials on the effectiveness of kinesio taping and its comparison with oral motor exercises for the management of drooling in CP children so this study was conducted to determine this fact.

## MATERIAL & METHODS

A randomized clinical trial was conducted to make comparison in terms of drooling severity in patients presenting with cerebral palsy by using kinesiotaping with and without oromotor exercises. Total 48 CP children were recruited for this study. Both males and females, having age ranged between 4-8 years and drooling rate of  $\geq 3$  rated on Thomas Stonells drooling scale were included in the study. Only those CP patients were included who had good understanding of verbal commands and had good head control. The children who were undergoing any other treatment strategy for drooling like medications, recent surgery, history of intra salivary gland injections, uncontrolled seizures, uncorrected or corrected cleft palate or cleft lip and open wounds around lips or on face were excluded from the study.

The participants were divided into two homogeneous groups. Group A experimental group(n=24) participants were given an hour time which included taping of orbicularis oris muscle followed by oral motor exercises.

Oral motor exercises included brushing on tongue, upper and lower gums, inner cheeks and vibration on chin and neck for about 20 minutes. These sessions were given for 2 days per week and for total of 16 weeks. For the rest of the days of the weeks the parents were guided to follow the same taping procedure and oral motor exercises at home. Group B (n=24) participants were given the same treatment except there was only application of Kinesio taping of orbicularis oris muscle without oral motor exercises. The participants were assessed 5 times; at week 0 (Baseline) and then during intervention at week 4, week 8, week 12 and finally at week 16 after completion of intervention. The study was conducted at National institute of Rehabilitation Medicine (NIRM), Islamabad.

Before collection of data permission was obtained by the institutional review board as well as written consent was taken from the parents after explanation of the study purpose and ensuring confidentiality for inclusion of their children in clinical trial. Non-probability convenience sampling was used to select the participants for the study. Drooling severity scale (DS), drooling frequency (DF) scale and drooling impact (DI) scale was used for follow up assessments.

Technique for taping was, 2 inches cut tape according to the size of orbicularis oris muscle. Length was cut to fit the tape around the fully opened mouth. The tape was attached at the centre of mouth above the upper lip with paper-off (10%) pull or tension. Tape was not on the lips, just outside the lips and tape ended on the corners of the lips. The second piece of tape was laid on the centre of the lower lip. Tape surrounded the mouth following orbicularis oris muscle. The ends of the tape overlapped each other slightly. Taping was applied for a single stretch of 3 to 4 hours per day for 16 weeks.

Data was analyzed by using SPSS version 21. For presentation of categorical and demographic variables, mean and standard deviation were used. RM-ANOVA was used to analyze changes within the groups and independent samples t-test was used for differences between the groups.

## RESULTS

The results of the statistical analysis, carried on the data set, are mentioned here. The factors which are considered during the analysis are Age, Gender, Type of CP, Gross Motor Function Classification System and drooling impact scale.

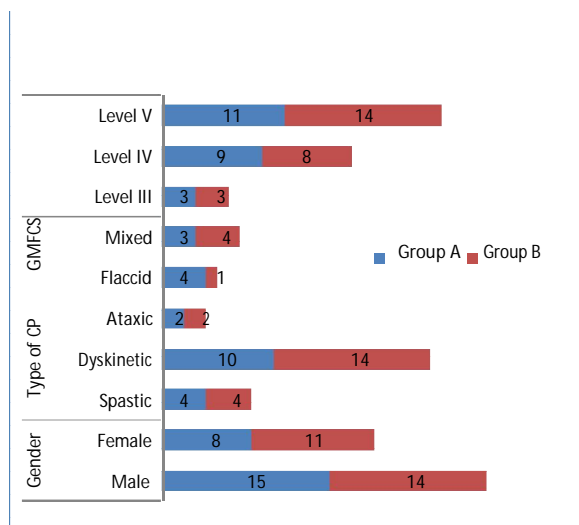


Figure 1: demographic characteristics

The mean age in group A is 3.93±1.7 and the mean age in group B is 3.66±1.26. The detail distribution of demographic characteristics in both groups is shown in figure 1.

The results of study showed significant overall decrease in symptoms of drooling in group A (KT+OME) as well as in group B (KT) with in group changes in term of severity, frequency and impact of drooling ( $p < 0.05$ ) (table 1). But between groups comparison group A (KT+OME) showed more early improvement in the drooling severity (KT+OME mean difference = 1.52 > KT mean difference = 0.04) and its impact on child's life than group B (KT). But between group changes of drooling frequency was not significant (Tables 2,3,4).

Table 1: Within The Group Comparison of Drooling severity & Drooling Frequency DS & DF (Group A&B)

Sessions	KT+OME		KT		
	Mean±SD	p-value	Mean±SD	p-value	
Drooling Severity Scale	Before intervention	4.00±.60	0.00 <sup>a</sup>	3.52±.58	0.00 <sup>d</sup>
	After 1 <sup>st</sup> month	3.56±.58	0.01 <sup>b</sup>	3.08±.70	0.30 <sup>b</sup>
	After 2 <sup>nd</sup> month	3.13±.69	0.02 <sup>c</sup>	2.84±.74	1.00 <sup>c</sup>
	After 3 <sup>rd</sup> month	2.78±.59	0.05 <sup>d</sup>	2.80±1.29	0.88 <sup>d</sup>
	After 4 <sup>th</sup> month	2.47±.66	0.00 <sup>e</sup>	2.48±1.04	0.00 <sup>e</sup>
Drooling Frequency Scale	Before intervention	3.86±.45	0.00 <sup>a</sup>	3.88±.43	0.05 <sup>a</sup>
	After 1 <sup>st</sup> month	3.39±.49	0.01 <sup>b</sup>	3.60±.50	0.02 <sup>b</sup>
	After 2 <sup>nd</sup> month	2.95±.56	0.02 <sup>c</sup>	3.28±.54	0.05 <sup>c</sup>
	After 3 <sup>rd</sup> month	2.60±.58	0.05 <sup>d</sup>	3.00±.40	0.01 <sup>d</sup>
	After 4 <sup>th</sup> month	2.30±.70	0.00 <sup>e</sup>	2.64±.56	0.00 <sup>e</sup>

<sup>a</sup> before intervention vs. after 1st month <sup>b</sup> 1st vs. after 2nd month, <sup>c</sup> 2nd vs. after 3rd month, <sup>d</sup> 3rd vs. after 4th month and <sup>e</sup> before intervention vs. after 4th months

Table 2: Between the Group Comparison of DS & DF (Group A&B)

Sessions	KT+OME	KT	p-value	
	Mean±SD	Mean±SD		
Drooling Severity Scale	Before intervention	4.00±.60	3.52±.58	0.00 <sup>a</sup>
	After 1 <sup>st</sup> month	3.56±.58	3.08±.70	0.01 <sup>b</sup>
	After 2 <sup>nd</sup> month	3.13±.69	2.84±.74	0.17 <sup>c</sup>
	After 3 <sup>rd</sup> month	2.78±.59	2.80±1.29	0.95 <sup>d</sup>
	After 4 <sup>th</sup> month	2.47±.66	2.48±1.04	0.99 <sup>e</sup>
Drooling Frequency Scale	Before intervention	3.86±.45	3.88±.43	0.93 <sup>a</sup>
	After 1 <sup>st</sup> month	3.39±.49	3.60±.50	0.15 <sup>b</sup>
	After 2 <sup>nd</sup> month	2.95±.56	3.28±.54	0.04 <sup>c</sup>
	After 3 <sup>rd</sup> month	2.60±.58	3.00±.40	0.00 <sup>d</sup>
	After 4 <sup>th</sup> month	2.30±.70	2.64±.56	0.07 <sup>e</sup>

<sup>a</sup> before intervention vs. after 1<sup>st</sup> month, <sup>b</sup> 1st vs. after 2<sup>nd</sup> month, <sup>c</sup> 2nd vs. after 3<sup>rd</sup> month, <sup>d</sup> 3<sup>rd</sup> vs. after 4<sup>th</sup> month and <sup>e</sup> before intervention vs. after 4<sup>th</sup> months

Table 3: Within The Group Comparison of Drooling Impact Scale DIS (Group A&amp;B)

		KT+OME		KT	
		M±SD	p-value	M±SD	p-value
How frequently did your child dribble?	Before intervention	8.65±.77	0.00 <sup>d</sup>	8.48±.96	0.08 <sup>d</sup>
	After 1 <sup>st</sup> month	6.91±1.4	0.03 <sup>b</sup>	7.80±1.60	0.01 <sup>b</sup>
	After 2 <sup>nd</sup> month	6.08±1.72	0.01 <sup>c</sup>	7.08±1.63	0.06 <sup>c</sup>
	After 3 <sup>rd</sup> month	5.39±2.03	0.02 <sup>d</sup>	6.12±2.04	0.05 <sup>d</sup>
	After 4 <sup>th</sup> month	4.65±2.38	0.00 <sup>e</sup>	5.56±2.27	0.00 <sup>e</sup>
How severe was the drooling?	Before intervention	6.60±.72	0.00 <sup>d</sup>	6.56±.71	0.00 <sup>d</sup>
	After 1 <sup>st</sup> month	4.91±1.41	0.04 <sup>b</sup>	5.16±1.40	0.04 <sup>b</sup>
	After 2 <sup>nd</sup> month	4.13±1.65	0.05 <sup>c</sup>	4.44±1.60	1.00 <sup>c</sup>
	After 3 <sup>rd</sup> month	3.34±1.11	0.02 <sup>d</sup>	4.44±1.44	0.56 <sup>d</sup>
	After 4 <sup>th</sup> month	2.69±1.06	0.00 <sup>e</sup>	4.04±1.85	0.00 <sup>e</sup>
How many times a day did you have to change bibs or clothing due to drooling	Before intervention	5.34±1.40	0.09 <sup>d</sup>	5.12±1.45	0.13 <sup>d</sup>
	After 1 <sup>st</sup> month	4.47±.79	0.01 <sup>b</sup>	4.36±.90	0.00 <sup>b</sup>
	After 2 <sup>nd</sup> month	4.08±.66	0.10 <sup>c</sup>	3.92±.64	1.00 <sup>c</sup>
	After 3 <sup>rd</sup> month	3.43±.84	1.00 <sup>d</sup>	3.92±1.15	0.01 <sup>d</sup>
	After 4 <sup>th</sup> month	3.47±.73	0.00 <sup>e</sup>	3.36 ±1.38	0.00 <sup>e</sup>
How offensive was the smell of the saliva on your child	Before intervention	3.86±.45	0.00 <sup>d</sup>	3.68±0.69	0.00 <sup>d</sup>
	After 1 <sup>st</sup> month	3.39±.49	0.01 <sup>b</sup>	3.20±0.57	0.04 <sup>b</sup>
	After 2 <sup>nd</sup> month	2.95±0.56	0.02 <sup>c</sup>	2.84±0.55	0.01 <sup>c</sup>
	After 3 <sup>rd</sup> month	2.60 ±.58	0.05 <sup>d</sup>	2.48± 0.58	0.05 <sup>d</sup>
	After 4 <sup>th</sup> month	2.30±.70	0.00 <sup>e</sup>	2.20± 0.70	0.00 <sup>e</sup>
How much skin irritation has your child had due to drooling	Before intervention	3.95±.36	0.01 <sup>d</sup>	3.68±.69	0.00 <sup>d</sup>
	After 1 <sup>st</sup> month	3.56±.58	0.09 <sup>b</sup>	3.20 ±.57	0.04 <sup>b</sup>
	After 2 <sup>nd</sup> month	3.17±.49	0.01 <sup>c</sup>	2.84±.55	0.01 <sup>c</sup>
	After 3 <sup>rd</sup> month	2.65±.64	0.55 <sup>d</sup>	2.48±.58	0.05 <sup>d</sup>
	After 4 <sup>th</sup> month	2.39±.72	0.00 <sup>e</sup>	2.20±.70	0.00 <sup>e</sup>
How frequently did your child's mouth need wiping	Before intervention	8.65±.77	0.00 <sup>d</sup>	8.48±.96	0.08 <sup>d</sup>
	After 1 <sup>st</sup> month	6.91±1.41	0.03 <sup>b</sup>	7.80±1.60	0.01 <sup>b</sup>
	After 2 <sup>nd</sup> month	6.08±1.72	0.01 <sup>c</sup>	7.08±1.63	0.06 <sup>c</sup>
	After 3 <sup>rd</sup> month	5.39±2.03	0.02 <sup>d</sup>	6.12±2.04	0.05 <sup>d</sup>
	After 4 <sup>th</sup> month	4.65±2.38	0.00 <sup>e</sup>	5.56±2.27	0.00 <sup>e</sup>
How embarrassed did your child seem to be about his/her dribbling?	Before intervention	4.00±.60	0.00 <sup>d</sup>	4.44±.82	0.00 <sup>d</sup>
	After 1 <sup>st</sup> month	3.56±.58	0.01 <sup>b</sup>	4.04±.73	0.02 <sup>b</sup>
	After 2 <sup>nd</sup> month	3.13±.69	0.02 <sup>c</sup>	3.72±.84	0.04 <sup>c</sup>
	After 3 <sup>rd</sup> month	2.78±.59	0.05 <sup>d</sup>	3.24±.72	0.05 <sup>d</sup>
	After 4 <sup>th</sup> month	2.47±.66	0.00 <sup>e</sup>	2.96±.88	0.00 <sup>e</sup>
How much do you have to wipe or clean saliva from household items	Before intervention	3.86±.54	0.04 <sup>d</sup>	4.44±.82	0.00 <sup>d</sup>
	After 1 <sup>st</sup> month	3.47±.51	0.17 <sup>b</sup>	4.04±.73	0.02 <sup>b</sup>
	After 2 <sup>nd</sup> month	3.13±.69	0.01 <sup>c</sup>	3.72±.84	0.04 <sup>c</sup>
	After 3 <sup>rd</sup> month	2.73±.54	0.10 <sup>d</sup>	3.24±.72	0.02 <sup>d</sup>
	After 4 <sup>th</sup> month	2.47±.66	0.00 <sup>e</sup>	2.92±.90	0.00 <sup>e</sup>
To what extent did your child's drooling affect his or her life	Before intervention	4.08±.59	0.00 <sup>d</sup>	4.44±.82	0.00 <sup>d</sup>
	After 1 <sup>st</sup> month	3.60±.58	0.01 <sup>b</sup>	4.04±.73	0.02 <sup>b</sup>
	After 2 <sup>nd</sup> month	3.17±.65	0.01 <sup>c</sup>	3.72±.84	0.04 <sup>c</sup>
	After 3 <sup>rd</sup> month	2.78±.59	0.05 <sup>d</sup>	3.24±.72	0.05 <sup>d</sup>
	After 4 <sup>th</sup> month	2.47±.66	0.00 <sup>e</sup>	2.96±.88	0.00 <sup>e</sup>
To what extent did your child's dribbling affect you and your family's life	Before intervention	4.34±.88	0.00 <sup>d</sup>	4.48±.96	0.00 <sup>d</sup>
	After 1 <sup>st</sup> month	3.78±.85	0.00 <sup>b</sup>	4.04±.97	0.00 <sup>b</sup>
	After 2 <sup>nd</sup> month	3.30±.87	0.05 <sup>c</sup>	3.48±.77	0.00 <sup>c</sup>
	After 3 <sup>rd</sup> month	3.00±.79	0.02 <sup>d</sup>	3.08±.70	0.11 <sup>d</sup>
	After 4 <sup>th</sup> month	2.65±.93	0.00 <sup>e</sup>	2.84±.74	0.00 <sup>e</sup>

<sup>a</sup> before intervention vs. after 1<sup>st</sup> month, <sup>b</sup> 1<sup>st</sup> vs. after 2<sup>nd</sup> month, <sup>c</sup> 2<sup>nd</sup> vs. after 3<sup>rd</sup> month, <sup>d</sup> 3<sup>rd</sup> vs. after 4<sup>th</sup> month and <sup>e</sup> before intervention vs. after 4<sup>th</sup> months

Table 4: Between the Group Comparison of DIS (Group A&amp;B)

		KT+OME		p-value
		Mean±SD	KT Mean±SD	
How frequently did your child dribble?	Before intervention	8.65±.77	8.48±.96	0.49
	After 1 <sup>st</sup> month	6.91±1.4	7.80±1.60	0.04
	After 2 <sup>nd</sup> month	6.08±1.72	7.08±1.63	0.04
	After 3 <sup>rd</sup> month	5.39±2.03	6.12±2.04	0.22
	After 4 <sup>th</sup> month	4.65±2.38	5.56±2.27	0.18
How severe was the drooling?	Before intervention	6.60±.72	6.56±.71	0.81
	After 1 <sup>st</sup> month	4.91±1.41	5.16±1.40	0.54
	After 2 <sup>nd</sup> month	4.13±1.65	4.44±1.60	0.51
	After 3 <sup>rd</sup> month	3.34±1.11	4.44±1.44	0.00
	After 4 <sup>th</sup> month	2.69±1.06	4.04±1.85	0.00
How many times a day did you have to change bibs or clothing due to drooling	Before intervention	5.34±1.40	5.12±1.45	0.58
	After 1 <sup>st</sup> month	4.47±.79	4.36±.90	0.63
	After 2 <sup>nd</sup> month	4.08±.66	3.92±.64	0.38
	After 3 <sup>rd</sup> month	3.43±.84	3.92±1.15	0.10
	After 4 <sup>th</sup> month	3.47±.73	3.36 ±1.38	0.71
How offensive was the smell of the saliva on your child	Before intervention	3.86±.45	3.68±0.69	0.27
	After 1 <sup>st</sup> month	3.39±.49	3.20±0.57	0.22
	After 2 <sup>nd</sup> month	2.95±0.56	2.84±0.55	0.47
	After 3 <sup>rd</sup> month	2.60 ±.58	2.48± 0.58	0.45
	After 4 <sup>th</sup> month	2.30±.70	2.20± 0.70	0.61
How much skin irritation has your child had due to drooling	Before intervention	3.95±.36	3.68±.69	0.08
	After 1 <sup>st</sup> month	3.56±.58	3.20 ±.57	0.03
	After 2 <sup>nd</sup> month	3.17±.49	2.84±.55	0.03
	After 3 <sup>rd</sup> month	2.65±.64	2.48±.58	0.33
	After 4 <sup>th</sup> month	2.39±.72	2.20±.70	0.35
How frequently did your child's mouth need wiping	Before intervention	8.65±.77	8.48±.96	0.49
	After 1 <sup>st</sup> month	6.91±1.41	7.80±1.60	0.04
	After 2 <sup>nd</sup> month	6.08±1.72	7.08±1.63	0.04
	After 3 <sup>rd</sup> month	5.39±2.03	6.12±2.04	0.22
	After 4 <sup>th</sup> month	4.65±2.38	5.56±2.27	0.18
How embarrassed did your child seem to be about his/her dribbling?	Before intervention	4.00±.60	4.44±.82	0.03
	After 1 <sup>st</sup> month	3.56±.58	4.04±.73	0.01
	After 2 <sup>nd</sup> month	3.13±.69	3.72±.84	0.01
	After 3 <sup>rd</sup> month	2.78±.59	3.24±.72	0.02
	After 4 <sup>th</sup> month	2.47±.66	2.96±.88	0.06
How much do you have to wipe or clean saliva from household items	Before intervention	3.86±.54	4.44±.82	0.00
	After 1 <sup>st</sup> month	3.47±.51	4.04±.73	0.00
	After 2 <sup>nd</sup> month	3.13±.69	3.72±.84	0.01
	After 3 <sup>rd</sup> month	2.73±.54	3.24±.72	0.00
	After 4 <sup>th</sup> month	2.47±.66	2.92±.90	0.06
To what extent did your child's drooling affect his or her life	Before intervention	4.08±.59	4.44±.82	0.09
	After 1 <sup>st</sup> month	3.60±.58	4.04±.73	0.03
	After 2 <sup>nd</sup> month	3.17±.65	3.72±.84	0.01
	After 3 <sup>rd</sup> month	2.78±.59	3.24±.72	0.02
	After 4 <sup>th</sup> month	2.47±.66	2.96±.88	0.04
To what extent did your child's dribbling affect you and your family's life	Before intervention	4.34±.88	4.48±.96	0.09
	After 1 <sup>st</sup> month	3.78±.85	4.04±.97	0.03
	After 2 <sup>nd</sup> month	3.30±.87	3.48±.77	0.01
	After 3 <sup>rd</sup> month	3.00±.79	3.08±.70	0.00
	After 4 <sup>th</sup> month	2.65±.93	2.84±.74	0.00

## DISCUSSION

The objective of the study was to determine the effects of kinesio taping in improving symptoms of drooling cerebral palsy children. It was hypothesized that kinesio taping along with oromotor exercise was effective management for drooling in CP children; on the basis of results  $H_0$  was rejected.

Kinesio Tapping is assumed to have beneficial therapeutic effects in aligning the tissues and fascia in its desired position, it lifts the skin above the areas of pain & inflammation and increases the stimulation of skin mechanoreceptors to stimulate movement or limit movement, thus providing a positional stimulus to skin, and decreases pressure above the lymphatic channels which will provide a path for the removal of exudates.

Kinesio taping is effective in hypo tonic or over stretched orbicularis oris muscles, which is the cause of poor mouth closure. Hence in the present study kinesio taping technique was incorporated and the effect seen by the tape application may be due to the delay in the fatigue level of the orbicularis oris muscle which is over stretched due to poor mouth closure or can be contributed to the mechanoreceptors of skin which facilitates the muscle and provides accurate information about the joint position and movement.<sup>15</sup>

There are three fundamental classes for oral motor exercises that are utilized as a part of clinical practice: active exercises, passive exercises and sensory applications<sup>16</sup>. Active exercises incorporate, however are not restricted to, dynamic movements, stretching and strengthening activities. These activities are utilized to build muscle strength, power and endurance through the recruitment of extra motor units as muscle fibers are amplified<sup>17</sup>. Passive exercises may incorporate rubbing, stroking, tapping, vibration and passive activities, which are performed with the help of or completely by external force. These methods are perceived to give tactile information, enhance circulation and upgrade muscle flexibility. These strategies normalize feeding patterns by decreasing anomalous oral reflexes, encouraging normal muscle tone and desensitizing the oral area. Sensory or tactile applications comprise the use of warmth, ice electrical stimulation, high frequency vibration or different agents to muscle tissue. Some (e.g. cold) applications may be utilized to increase tactile awareness to start swallowing response while others (e.g. electrical stimulation) are utilized to reinforce the swallowing musculature.<sup>18</sup>

An experimental study was conducted by Shukra Abhyaraj M to evaluate the effectiveness and benefits of Kinesio taping in CP children for drooling management. He took a sample of 40 children and compared Kinesio taping with oral motor exercises. His results indicated that Kinesio taping is effective and safe method<sup>19</sup> which supports the current study results that combination therapy of Kinesio taping and oral motor exercises proved to be more effective than Kinesio taping alone.

Sajjan Kumar additionally conducted a similar study and the outcomes demonstrated significant improvement in drooling frequency, severity score, jaw control and lip control scores after oral motor stimulation treatment in diminishment of drooling. MOT et al. led an investigation on 25 spastic CP children and concentrated on utilization of tapping, firm pressure, tongue stretching and mobility and their joined impact in decreasing drooling through jaw and lip control. He likewise utilized exercises to strengthen oral musculature which resulted in significant

improvement in oral motor skills. The similar results were obtained in the current study where the children were treated with Kinesio taping treatment around the orbicularis oris muscle for eight weeks. The significant results showed in both studies<sup>20</sup>.

Trish Martin described the taping technique for orbicularis oris muscle. In this technique orbicularis oris muscle which is debilitated due to poor mouth closure and poor positioning of head and neck is tapped. The present method of Kinesio tape application was comparable to Trish Martin study where similar method was utilized along with oral motor exercises and reported to be beneficial in lessening of drooling which demonstrated statistically significant improvement. The conceivable reason behind that was, kinesio tape gives cutaneous input and stimulates the muscle henceforth in this way enhancing mouth closure and reduction in drooling<sup>8</sup>.

Romana et.al was also conducted a study at Armed Forces Institute of Rehabilitation Medicine (AFIRM) Rawalpindi, Pakistan n=30 CP children with age between 2-6 years with moderate to severe drooling were included in the study. Kinesio tape was applied on each child for 45 minutes per session, 5 days per week for two months continuously. Data was collected through Thomas-Stonell and Greenberg drooling scale to measure frequency and severity of drooling and drooling impact scale on 1st day and finally on 8th week within the same group. The results of the study indicated, that the kinesio taping has an important role for reducing drooling in cerebral palsy children and proved one of the safest treatment option for management of drooling in cerebral palsy children.<sup>21</sup>

It is also important to mention here that the kinesio tape is not widely available in Pakistan. It is very expensive and affordability of kinesio tape is the issue.

## CONCLUSION

The results of the study indicated that the kinesio tapping along with oro-motor exercises and kinesio tapping alone significantly improve drooling severity, frequency its impact on CP children. The combination of kinesio tapping and oro-motor exercises were more effective for drooling severity and its impact than kinesio tapping alone. It is suggested that a future study should be conducted with oro-motor exercises group alone, so effects of oro-motor exercises can be compare. As the affordability in Pakistan is the issue, incorporation of oro-motor exercises may be effective for the management of drooling in CP.

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## ORIGINAL ARTICLE

## FREQUENCY OF OTITIS MEDIA WITH EFFUSION IN CHILDREN PRESENTING WITH CLEFT PALATE

Jawwad Ahmed<sup>1</sup>: Design & conception, analysis & interpretation of data, writing; Revised and Accountable for all aspects  
 Ghulam Saqulain<sup>1</sup>: Design & Conception, Statistical analysis & interpretation of data, and accountable for all aspects

1. ENT Department, Capital Hospital, CDA, Islamabad, Pakistan

**Correspondence**  
 Dr. Ghulam Saqulain,  
 Head of Department of ENT, Capital Hospital,  
 Islamabad, Pakistan  
 Email: [ghulam\\_saqulain@yahoo.com](mailto:ghulam_saqulain@yahoo.com)

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**Abstract**

**Objective:** The objectives of the study was to determine the frequency of otitis media with effusion in children presenting with cleft palate in our setup **Methods:** Study Design was cross sectional. Patients with cleft palate who presented in the Department of Otolaryngology, Capital Hospital, Islamabad over a period of 5 years were included in the study by Non-Probability, Consecutive Sampling. These included 102 (n=102) children of both genders, aged 2- 12 years, who presented with untreated cleft palate and fulfilled the criteria for selection and consented for the study. Study population was subjected to Otoscopy and Impedance measurements, to detect the presence or absence of otitis media with effusion. Collected data was entered and analyzed by SPSS version 20. **Results:** The age range of patients was 2 - 12 years with a mean of 7.71±3.38 years. Majority of the patients were aged between 10-12 years (47.0%), followed by 2-5 years (27.5%) and 6-9 years (25.5%). Gender distribution showed a male preponderance with male to female ratio M:F = 1.83:1. Otitis Media with Effusion was noted in 74 (72.5%) cases with no statistically significant difference in the frequency of OME across age (p=0.988) and gender (p=0.956) **Conclusion:** The frequency of otitis media with effusion was found to be 72.5% in children presenting with cleft palate with no statistically significant difference in the frequency of OME across age and gender groups. This indicates a huge burden of hearing and speech disabilities which will occur if this is left unidentified and untreated.

**Keywords:** Cleft palate, otitis media, effusion

**INTRODUCTION**

Cleft palate (CP) is a developmental splitting or gap in the palate<sup>1</sup>. It results in eustachian tube dysfunction and possible otitis media with effusion (OME). OME is defined as non-purulent effusion of the middle ear, with no sign and symptoms of acute infection<sup>2</sup>. The purpose of the present study was to determine the incidence of otitis media with effusion in children who present with cleft palate. Otitis media with effusion is a common cause of hearing impairment in children with factors like, the amount and viscosity of middle ear fluid<sup>3</sup>, duration, and /or the extent to which middle ear becomes filled with fluid<sup>4</sup>, which influences the degree hearing loss. As the hearing loss is fluctuating in nature it is suggested that its impact may be greater than that of permanent hearing loss<sup>5</sup>. This hearing loss might cause adverse effects on speech and language development leading to learning and behavioral issues<sup>4</sup>. Thus, it is very important to establish the incidence/ frequency of OME in children with cleft palate in our setup which can in turn help formulate policy for early identification of cases of OME with CP and timely treatment and rehabilitation of otologic, audiological, speech & language impairments and handicaps.

Interestingly 82% of the infants born with cleft lip and palate (CLP) do not have OME at birth<sup>6</sup>, however, they get it within first 06 months of life<sup>7</sup>. Later, OME is seen frequently in children presenting with cleft palate and it also results in chronic otitis media<sup>8</sup>, conductive hearing loss (CHL) and sensorineural hearing loss (SNHL)<sup>9</sup>. Existing literature shows great disparity in the frequency of OME among cleft palate children ranging from 7.14%<sup>11</sup> to

76.1%<sup>10</sup>. Considering this disparity in the existing literature this study was conducted in the Department of Otolaryngology, Capital Hospital, Islamabad to obtain local statistics which could provide baseline statistical data about the magnitude of the problem, enabling early diagnosis and intervention to prevent hearing and speech language handicaps.

The objective of this study was to determine the frequency of OME in children in cases which present to us with cleft palate.

**MATERIAL & METHODS**

In this Cross-sectional study, study population comprised of cases who presented in the Department of Otolaryngology, Capital hospital, Islamabad with Cleft palate over a period of five years from 1<sup>st</sup> May 2007 to 30<sup>th</sup> April, 2012. Cases were collected by Non-Probability, Consecutive Sampling technique. Sample size was calculated using 95% confidence level and 5% margin of error, taking an expected frequency of OME to be 7.14% (least among all) among children with cleft palate using the Kish Leslie's formula for cross sectional studies<sup>11</sup>.

One hundred and two (102), cases comprising of both gender, aged between 2 to 12 years, who presented with cleft palate were included in the study. Children who received a course of antibiotic before presentation, diabetics and cases using long term steroids for any underlying condition were excluded from the study.

After approval of institutional ethical research committee study was initiated. A parental informed consent was

taken for data collection for research, following which otoscopy followed by impedance measurements were done in all patients, and presence or absence of otitis media was noted. Data collected was entered and analyzed through SPSS version 20 and statistical tests were applied. Numerical variable i.e., Age was presented by Mean  $\pm$ SD and categorical variables like Gender and Otitis Media were presented by Frequency and Percentage. Data was stratified for Age and Gender to address effect modifiers. Post-stratification chi-square test was applied taking p value  $\leq$ .05 as significant.

## RESULTS

The study population comprised of N=102 cases of cleft palate. Their age ranged from 2 years to 12 years with a mean of 7.71 $\pm$ 3.38 years. Majority of the patients were aged between 10-12 years (47.0%), followed by 2-5 years (27.5%) and 6-9 years (25.5%) Gender distribution showed a male preponderance with 66 males (64.7%) and 36 females (35.5%) with male to female ratio M: F = 1.83:1 (Table 1). In the 102 cases of cleft palate, otitis media with effusion was diagnosed in 74 (72.5%) cases. There was no statistically significant difference in the frequency of OME across age (p=0.988) and gender (p=0.956) groups as shown in Table 2.

**Table 1: Demographics of the study sample**

Characteristics	Participants (n = 102)
Age (Years)	7.71 $\pm$ 3.38 (2 - 12)
Age Categories	
• 2 – 5 years	28 (27.5%)
• 6 – 9 years	26 (25.5%)
• 10 – 12 years	48 (47.0%)
Gender	
• Male	66 (64.7%)
• Female	36 (35.3%)

**Table 2: Frequency of OME in children with cleft palate**

Characteristics	Participants (n = 102)	p-value
Overall	74 (72.5%)	-
Age Groups		
• 2 – 5 years	20/28 (71.4%)	0.988
• 6 – 9 years	19/26 (73.1%)	
• 10 – 12 yrs	35/48 (72.9%)	
Gender		
• Male	48/66 (72.7%)	0.956
• Female	26/36 (72.2%)	

## DISCUSSION

This study comprised of one hundred and two (n=102) children with cleft palate with an age range of 2 - 12 years

(Mean of 7.71 $\pm$ 3.38 years). Majority were aged between 10-12 years (47.0%), followed by 2-5 years (27.5%) and 6-9 years (25.5%). Gender distribution showed a male preponderance (M: F = 1.83:1). The frequency of otitis media with effusion was found to be 72.5% (n=74) with no statistically significant difference in the frequency of OME across age (p=0.988) and gender (p=0.956). This study had limitation since surgical confirmation of OME was not done.

Otitis media with effusion is a common cause of hearing impairment in children. The sequelae of OME can result in chronic otitis media<sup>8</sup>, conductive and sensorineural hearing loss<sup>9</sup>. OME commonly develops within first 06 months of life<sup>7</sup>. However, OME is very common before first birthday i.e., occurs at least once in 90% of CLP population<sup>12</sup>, and occurs in 97% till the age of 2 years<sup>13</sup>. Since wide disparity exists in the existing literature regarding frequency of OME from 7.14%<sup>11</sup> to 76.1%<sup>10</sup>. Therefore, it was imperative to establish the incidence/frequency of OME in children with cleft palate to obtain basic statistical data about magnitude of problem in our setup. This will in turn help in early diagnosis and intervention and thereby reduce burden of disability.

In a Chinese study, Kwan et al., (2011) reported a mean age of 7.34 $\pm$ 2.95<sup>10</sup>, which is in line with our study (Mean age 7.71 $\pm$ 3.38). As regards presentation in different age groups [10 – 12 years (n=48, 47.1%), 2 -5 years (27.5%) and 6 -9 (25.5%)], almost similar age group distribution was reported by Narayanan et al., (2013) in a study on Indian children<sup>14</sup>.

A male preponderance was noted (M : F = 1.83 : 1), with slight variation to ours in studies done by Kwan et al.,<sup>10</sup> in a Chinese study (1.66:1), Jajja et al.,<sup>15</sup> in a Pakistani study (1.47:1), and Ahmed et al.,<sup>16</sup> in a Indian study (2:1). However, an equal gender distribution (1:1) was reported by Viswanathan et al.(2008) in an Indian study<sup>17</sup>. In contrast to our study female preponderance was reported by Khan et al.,<sup>11</sup> (1.2:1) in Indian study, Bukhari et al.,<sup>18</sup> (1:1.4) and Elahi et al.,<sup>19</sup> (1:1.2) in a Pakistani study.

OME was diagnosed in 74 (72.5%) children who presented with cleft palate, with no statistically significant difference in the frequency of OME across age (p=0.988) and gender (p=0.956) groups. Our results are in conformity with those of Chen et al.,<sup>20</sup> (71.92%), Kwan et al.,<sup>10</sup> (76.1%) in Chinese population, Narayanan et al.,<sup>14</sup> (68.2%) and D'Mello et al.,<sup>21</sup> (75%) in Indian and Yabe et al.,<sup>22</sup> (69%) in Japanese population. Much higher frequency (90%) of OME has been reported previously by Lau et al.,<sup>23</sup> and much lower frequency of 7.14% has been reported by Khan et al., in India<sup>11</sup>. The findings of the present study are in line with those of previous studies in other populations<sup>20-22</sup>. OME

thus appears a frequent finding in children presenting with cleft palate with a frequency of 72.5%, in our setup, therefore routine screening and management of this complication in such patients is very important to reduce the associated morbidity and hearing handicap, which if not catered to at this stage can result in hearing and speech language impairment and handicaps.

Due to fluctuating nature of hearing loss associated with OME, the impact may be greater than that of permanent hearing loss<sup>5</sup> and it might lead to other sequelae like adverse effects on speech, language, development, balance and culminating in learning and behavioral problems<sup>4</sup>. This study has clinical relevance to rehabilitation because without knowing the true incidence/ frequency of OME with cleft palate in our setup, timely initiation of Eustachian tube rehabilitation (ETR) and other surgical and medical treatment of OME cannot be initiated in a timely manner. The study has also implications for future research, and further study is required on the timing of Eustachian tube rehabilitation (ETR) in cleft palate cases.

## CONCLUSION

The incidence of otitis media with effusion was found to be 72.5% in children presenting with cleft palate. There was no statistically significant difference in the frequency of OME across age ( $p=0.988$ ) and gender ( $p=0.956$ ) groups. This indicates a huge burden of hearing and speech disabilities which will occur if it is left unidentified and untreated. Therefore timely identification and intervention is essential to reduce the burden hearing and speech disabilities.

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## ORIGINAL ARTICLE

## ASSOCIATION BETWEEN PRIMARY DYSMENORRHEA AND DEPRESSION LEVEL AMONG STUDENTS

1. Department of Physiotherapy, University of Hail Riyadh Saudi Arabia
2. Department of Sociology, Allama Iqbal Open University Islamabad Pakistan
3. OASIS Rehabilitation Center Islamabad Pakistan.
4. Shaheed Zulfiqar Ali Medical University, Islamabad Pakistan

## Correspondence

Dr. Raheela Kanwal  
Visiting Lecturer, Department of Physiotherapy  
University of Hail, Riyadh: KSA  
Email: [raheela.kanwal@yahoo.com](mailto:raheela.kanwal@yahoo.com)

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**Raheela Kanwal**<sup>1</sup>: Design & conception, analysis & interpretation of data, writing; Revised and Accountable for all aspects  
**Syed Imran Haider**<sup>1</sup>: Analysis & interpretation of data, writing; Revised and Accountable for all aspects  
**Keenjhar Soomro**<sup>1</sup>: Analysis & interpretation of data, and accountable for all aspects  
**Hina Butt**<sup>2</sup>: Interpretation of data, revised and accountable for all aspects

## Abstract

**Background:** Primary dysmenorrhea (PD) is a highly prevalent health related problem because of its effects on different aspects of physical and mental health. **Objectives:** To find association of primary dysmenorrhea with depression. **Methodology:** A correlational study was conducted at Royal group of colleges Gujranwala, Pakistan. Ninety-nine female students with confirmed diagnosis of primary dysmenorrhea were included with age range between 16-25 years. The data was collected through non-probability convenience sampling technique. The data was collected using numeric pain rating scale, daily record of severity of problems (DRSP) and patient health questionnaire (PHQ-9) for depression. Linear regression and chi square test have been used to observe association between variables. **Results:** The mean age was 21.06+2.59 years, age at menarche 13.15+1.03 years. The results showed significant association among pain, depression and severity of symptoms associated with primary dysmenorrhea ( $p \leq 0.00$ ). **Conclusion:** The intensity of pain and associated symptoms was moderate in majority of subjects. There is positive association of pain and symptoms of dysmenorrhea with depression level. Increasing depression can cause difficulty in work, getting along with others and take care of other things.

**Keywords:** Primary dysmenorrhea, depression, DRSP, Numeric pain rating scale, PHQ-9.

## INTRODUCTION

"Dysmenorrhea" is derived from a Greek word which describes difficult menstrual flow. Primary dysmenorrhea (PD) is crampy pain occurring immediately before or during menstruation after the establishment of ovulatory cycles but without any pelvic pathology. It is due to myometrial activity which produces pressure exceeding 60 mm Hg, resulting in uterine ischemia. This myometrial activity is augmented by prostaglandin synthesis which stimulates contractions in the uterine and intestinal walls (1). The symptoms of primary dysmenorrhea include mild ache or pain or feeling of pressure in the lower abdomen, radiating to the hips, lower back, and inner thighs. Associated symptoms are: upset stomach, loose stools, vomiting, and feeling of tiredness, fatigue, depression, lower metabolic rate, and acne. 30 - 90% women present with menstrual pain having varying intensities (2). PD depicts health problems but there is a lack of evidence. The high prevalence of PD and its impact on health, and activities of daily living have been described in certain studies that conclude that primary dysmenorrhea has an unfavorable effect on productivity (3). In one study data on adolescent dysmenorrhea was collected from different cultures where attitudes about menstruation and gender differ from one another. Despite this, dysmenorrhea had high prevalence and poorly managed symptoms in young females who experience it (4).

PD is strongly associated with depression and anxiety but it is unclear if depression is caused by or is a consequence

of chronic pelvic pain. Menstrual characteristic and PMS may be mediated psychologically as well as biologically. There has been an association between severity of dysmenorrhea and severity of PMS. More than half of those with PMS have a history of anxiety or mood disorders. Although psychological factors are not the cause of PD, but their association can cause non-responding to medical therapy and can cause increase in the perception of intensity of pain. A study done in MGH center found a correlation between depression and dysmenorrheal, therefore special attention should be given to mental health screening and including psychotherapy (5, 6). Management of menstrual cramps includes both pharmacological and non-pharmacological strategies. (7). Medical management consists of Aspirin or any other analgesic, Oral contraceptives, and local anaesthetics but pharmacological control has several side effects. Non-pharmacological treatment comprises of physical therapy, acupuncture, acupressure, microwave diathermy, placebo and toftness techniques (8). However, cultural variables and personality traits have been more influencing than psychological elements in the management of menstrual cramps. The impact of primary dysmenorrhea has been poorly researched. Studies have focused mainly on western populations with small sample sizes. Some studies describe the negative effects of the problem on social interactions such as absenteeism, but do not describe the full spectrum of disease-related loss of productivity at work (9). Very few studies have reported association of PD with mental health so this study has been done to observe the impact of primary dysmenorrhea on depression level.



## MATERIAL & METHODS

Descriptive cross sectional study was conducted at Royal group of colleges Gujranwala. Subjects with diagnosed PD were recruited through non-probability convenience sampling technique by following the selection criteria. Inclusion criteria comprised: 16-25 years of age, non-athletes, nulliparous, free from any neuromuscular disorders. Subjects either having pain or any symptom of dysmenorrhea were included. Subjects showing any symptoms of complication or secondary dysmenorrhea, athletes, individuals with neuromuscular problems, married females were excluded.

Structured questionnaire was used for demographics; numeric pain rating scale was used to assess the pain. It is a 11 point scale with 0 indicating no pain, 1-3 shows mild pain, 4-6 for moderate pain and 7-10 represents severe pain. Daily record of severity of problems (DRSP) was used to assess the associated symptoms of primary dysmenorrhea. It consists of 21 items which make 11 domains. Minimum score is 11 and maximum is 66. 11 represent "no symptoms at all" and 66 represent "extreme symptoms". For depression level "patient health questionnaire" (PHQ-9) scale consisting of 09 items was used. Every item is given numbers according to their severity then all items are added and depression level is categorized into none, mild, moderate, moderately severe and severe. Subjects were guided on how to report answers. Following instructions participants were asked to fill the numeric pain rating scale and PHQ-9 during the days of menstruation but reported every item only one time. For DRSP every item was reported for 4 days and average of each item was taken to calculate total score for every subject.

Data is described in form of frequencies and tables while linear regression has been taken for prediction. Chi square has been used for categorical data.

## RESULTS

The age categories of subjects shows that n=35(35.4 %) subjects were from age range of 16-20 years and n=65(64.6%) were from 21-25 years. Age at menarche showed that n=77(76.8%) subjects were from age range of 13-14 years at menarche, n=17(17.2%) were from 11-12 years and n=6( 6.1%) were from 15-16 years. It was observed that n=8(8.1%) were of low socioeconomic status, n=70(69.7%) of medium and n=22(22.2%) were of high socioeconomic status. Put of ninety nine subjects n=13(13.1%) were Sindhi, n=84(83.8%) were Punjabi and 2(1.8%) were Balochi. All of them were non-smokers. Mean and standard deviation of age, age at menarche, weight, BMI, pain, DRSP and depression can be observed in table 1.

**Table 1: characteristics of study participants**

	Mean±SD
Age(years)	21.06±2.59
Age at menarche(years)	13.15±1.03
Weight(kg)	54.27±5.69
BMI(kg/m <sup>2</sup> )	21.47±3.21
Pain	6.29±2.03
DRSP	40.66±7.88
Depression level (PHQ)	10.74±3.80

Frequency of subjects according to severity of pain, DRSP and depression level within age, age at menarche and BMI categories can be observed in Table 2

**Table 2: Patient's distribution according to severity of pain, DRSP and depression in relation to age, age menarche and BMI**

	Age at menarche in years			Age of subject in years		BMI in kg/m <sup>2</sup>		
	11-12	13-14	15-16	16-20	21-25	Under	Healthy	Over
<b>Pain</b>								
No	5	9	1	11	2	5	8	2
Mild	5	27	3	12	23	7	26	2
Moderate	7	40	2	12	27	8	36	5
Severe	0	0	0	0	0	0	0	0
<b>DRSP</b>								
Mild	1	7	0	3	5	2	5	1
Moderate	10	44	5	20	39	7	47	5
Severe	6	22	1	12	17	10	7	2
Extreme	0	3	0	0	3	1	1	1
<b>Depression</b>								
None	1	5	2	4	4	3	5	0
Mild	2	25	3	12	18	8	20	2
Moderate	9	34	1	15	29	7	33	4
Moderately severe	5	11	0	4	12	2	11	8
Severe	0	1	0	0	1	0	1	0

**Associations:**

The results of study showed that pain and DRSP were significantly associated with Depression. Depression can increase 9 times with increase in severity of pain by 30 units. It can increase 6.9 times with increase in DRSP and

with every unit raise of DRSP, 26 units of depression level will increase. However increase in depression level can cause difficulty in work or take care of things and also in getting along people 6 times by 25 units. R value, r square, beta coefficient and p values can be seen in Table 2.

**Table 3: Associations among pain, DRSP and depression level**

	<i>r</i>	<i>r</i> <sup>2</sup>	<i>B</i>	<i>p</i> -value
Pain - Depression	0.30	0.09	0.30	0.00
DRSP - Depression	0.26	0.06	0.26	0.00
Depression- Difficulty in work, take care of things and get along people	0.25	0.06	0.25	0.01

Frequency of subjects with pain and DRSP severity categories showing their depression level can be seen in table 4 Value of chi square for pain and depression is 13.132 and for DRSP and depression are 18.961.

**Table 4: Frequency Of Subjects According To Pain And DRSP Severities With Depression Categories**

Pain	Depression Categories				
	No	Mild	Moderate	Moderately Severe	Severe
No	4	5	5	1	0
Mild	3	12	16	4	0
Moderate	1	13	23	11	1
<b>DRSP</b>					
Mild	3	1	4	0	0
Moderate	5	22	22	9	1
Severe	0	7	16	6	0
Extreme	0	0	2	1	0

**DISCUSSION**

According to results of present study depression is associated with primary dysmenorrhea including pain and associated symptoms. Within present study 50% of females were suffering from moderate intensity of pain, 35% from mild pain but no one reported severe intensity of pain. 60% of females showed moderate intensity of associated symptoms of primary dysmenorrhea, 29% showed severe intensity, 8% were with mild intensity, and 3% showed extreme intensity of symptoms. "Depression is the most common psychiatric disorder associated with pain," but it is unclear if depression is caused by or is a result of chronic pelvic pain. In present study 45% subjects had moderate depression and as pain level increased, the depression level also increased by 9 times and showed association 6.9 times with symptoms of PD. In one study positive correlation between anxiety or depression and dysmenorrhea was found (6). There is no study which reported association of pain along with associated symptoms of primary dysmenorrhea with depression. In one case control study association of depression and anxiety with PD was assessed by using beck depression inventory scale for depression and Taylor Manifest Anxiety Scale (TMAS) and Spielberger State-Trait Anxiety Inventory (STAI) for anxiety that included 424 girls with age of 14-20 years. Results of this study found high scores of depression

and anxiety as compared to control group. Moderate depression was more prevalent like present study with 15.9% in primary dysmenorrhic females as compared to control group (6.2%) and severe depression with ratio of 1.8% to 0% ( $P < .003$ ). High anxiety was also more prevalent in adolescents with primary dysmenorrhea as shown by TMAS (44% vs. 9.9%;  $P < .001$ ) and STAI scores (68.9% vs. 25.0%;  $P < .001$ ) (5). One study was done to quantify the impact of primary dysmenorrhea on physical and mental health status and work-related aspects in the adolescent population of Tbilisi Georgia. It used EuroQol five dimensions questionnaire (EQ-5D). Mobility, self-care, usual activities and pain/discomfort along with anxiety/depression reported significantly lower value for quality of life as compared to healthy controls ( $p < 0.05$ ). (10). In Taiwan a focus group discussion was done which reported reduced physical activity, modification in diet, and depression (11).

Data was collected from one area so it cannot represent the whole community as compared to community based studies. Depression was assessed only during symptomatic days. So it cannot give any comparison with asymptomatic days. Further community-based studies should be conducted with larger sample size. Depression level should be compared in symptomatic and asymptomatic days. Impact on mental health should also be assessed.

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## CONCLUSION

Majority of subjects lie within moderate severity of pain and associated symptoms intensity. There is positive association of pain and symptoms of dysmenorrhea with depression level. Increasing depression can cause difficulty in work, getting along with others and take care of other things.

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## ORIGINAL ARTICLE

## PERCEIVED LEVEL OF STRESS AMONG ALLIED HEALTH SCIENCES STUDENTS AT UNIVERSITY OF HAIL

1. Department of Physiotherapy, University of Hail Riyadh Saudi Arabia
2. Isra Institute of Rehabilitation Sciences, Isra University Islamabad Campus.
3. Tameem International School Taif. Saudi Arabia

## Correspondence

Dr. Raheela Kanwal  
Visiting Lecturer, Department of Physiotherapy  
University of Hail, Riyadh. KSA  
Email: [raheela.kanwal@yahoo.com](mailto:raheela.kanwal@yahoo.com)

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**Junaid Ameen**<sup>1</sup>: Design & conception, analysis & interpretation of data, writing; Revised and Accountable for all aspects  
**Sundus Iftikhar**<sup>2</sup>: Analysis & interpretation of data, writing; Revised and Accountable for all aspects  
**Raheela Kanwal**<sup>1</sup>: Analysis & interpretation of data, and accountable for all aspects  
**Waqas Ahmed Sheikh**<sup>3</sup>: Interpretation of data, revised and accountable for all aspects

## Abstract

**Background:** Health education is very challenging and demands an extensive commitment. Perceived stress (PS) among healthcare students worldwide is a recognized problem

**Aims:** The primary aim of this study was to evaluate the stress levels among under-graduate applied medical college students. **Methods and materials:** A cross-sectional survey was conducted in which 85 undergraduate allied health sciences (AHS) students at University of Hail participated. Purposive sampling technique was used. Data was collected using a Perceived Stress Scale (PSS). The study was conducted over period of three months. **Results:** The mean  $\pm$  SD age of the participants (N=85) were  $22.55 \pm 1.96$  years. No significant difference in perceived stress was observed across gender, department and years of study. Overall perceived level of stress ( $20.6 \pm 5.68$ ) among all students was slightly higher than average. **Conclusion:** Perceived level of stress among all healthcare students at University of Hail was found slightly higher than average.

**Keywords:** Healthcare Students, Perceived level of stress, University of Hail, Perceived Stress Scale.

## INTRODUCTION

Stress generally refers to psychological perception of pressure, and the body's response to it. <sup>1</sup> Stress is not only the psychological health which is affected by stress, various physiological studies have confirmed that stress can affect the blood cells parameters, endocrine, hemopoietic and immune systems.<sup>2</sup>

College students are at a high risk for increased stress. Strenuous academic pressure and limited social and personal time can add to the normal stress of life and begin to have a negative effect on a person. College students suffer high levels of stress during their education experiences. Those who dwell on life events suffer higher stress.<sup>3</sup> An estimated 75-90 percent of all primary healthcare providers see patients with stress related problems. Research supports that students in higher education have higher stress levels than the general public.<sup>4</sup>

Perceived stress (PS) among healthcare students worldwide is a recognized problem.<sup>5</sup> It is commonly observed that healthcare students undergo tremendous amount of stress and psychological distress during various stages of undergraduate training. High level of stress may have a negative effect on different aspects of student's life which

may lead to poor physical health and emotional well being. Stress reduces the student's self esteem and disturbs the cognitive functioning. It can affect the memory and learning skills, although, an optimal level of stress can be considered, that some stress in medical school is needed for learning.<sup>6</sup>

The studies showed that examinations in medical schools are stressful enough to produce changes in blood cells parameters. In the long term stress may have negative impact on student's health, patient's lives and in turn on the community's health as a whole.<sup>7,8</sup> The primary aim of this study was to evaluate the stress levels among under-graduate applied medical college students.

## MATERIAL &amp; METHODS

A cross-sectional survey was conducted on 85 students at University of Hail (College of Applied Medical Science). Purposive sampling technique was used to collect the data through Perceived Stress Scale (PSS) over a period of three months. Questionnaire was self administered to all the registered students (Male & Female) of College of Applied Medical Science at University of Hail with prior informed consent. The data was analyzed by SPSS IBM 21. Categorical variables were presented as frequency and percentages, whereas continuous

variables were presented as Mean±S.D. Independent samples t-test and One-way ANOVA was used to compare groups.

## RESULTS

The mean ± SD age of the participants (N=85) were 22.55 ± 1.96 years. (Table 1) the results of the study showed no significant difference between the scores of males and females, physiotherapy, diagnostic radiology, clinical nutrition, clinical laboratory sciences and 2nd year, 3rd year, 4th year. (Table 2)

**Table 1: Demographics of students**

		Mean ± SD/n(%)
Age		21.5 ± 1.96
Gender	Male	56(65.9)
	Female	29(34.1)
Department	PT	31(36.5)
	RAD	17(20)
	CLN	18(21.2)
	LAB	19(22.4)
Year	2nd Year	29(34.1)
	3rd Year	34(40)
	4th Year	22(25.9)

**Table 2: Perceived level of stress among students**

		Total Score (PSS)	
		Mean±SD	P-value
Gender	Male(n=56)	19.8±6.2	0.09
	Female(n=29)	22.1±4.3	
Department	PT(n=31)	20.7±4.03	0.22
	RAD(n=17)	22.9±6.5	
	CLN(n=18)	19±6.1	
	LAB(n=19)	19.9±6.8	
Year	2nd Year(n=29)	20±6.4	0.42
	3rd Year(n=34)	20.2±5.4	
	4th Year(n=22)	22±5.3	

## DISCUSSION

The objective of the study was to evaluate the perceived level of stress among undergraduate allied health sciences students of University of Hail kingdom of Saudi Arabia. The results showed slightly higher than average perceived level of stress among AHS student.

A study of Sweden concluded that Medical students had higher depression rates than the general population, and women students had higher rates

than men.<sup>9</sup> Higher Perceived Stress Scale Scores are associated with higher levels of stress. Medical students had higher depression rates than the general population.<sup>10</sup> A study conducted in Pakistan suggested that higher level of perceived stress exists among students.<sup>11</sup> A study of Malaysia concluded that the prevalence of psychological stress among medical students was high.<sup>12</sup>

The current study did not show gender based differences in perceived level of stress among students. The study was supported by Birks Y. et al. that also showed no significance difference between male and female in relation to perceived level of stress among health care students.<sup>5</sup> But study conducted by Archer and colleagues found that female students reported higher levels of stress than male medical students.<sup>13</sup>

The results of current study showed that no significant difference was found between perceived level of stress according to year of study. Level of stress varies with the year of study. A study conducted in Pakistan showed that prevalence of Anxiety and Depression was high among newly entered students as compared to subsequent year.<sup>14</sup> While a study in Thailand showed that the prevalence of stress was highest among third-year medical students.<sup>15</sup> Some studies suggest that most stress occurs during the transition from preclinical to clinical training.<sup>16,17</sup> Others suggest higher levels of stress in first-year medical students due to the tremendous change in lifestyle, or in the penultimate clinical year.<sup>18,19</sup>

A study showed high level of stress among nursing students<sup>20</sup>. But current study showed no significant differences in measured perceived stress across student faculties of different departments. A prospective cross-sectional study was conducted at Sri Aurobindo Medical College and P. G. Institute, Indore, (M. P.) India. The study showed no significant difference between physiotherapy and MBBS students.<sup>21</sup>

There were multiple limitations that may mask the results of the study including single centered study with small sample size, so generalizability of the study was compromised. In this study no data was obtained regarding contributing factors of stress.

These factors may be academic and personal etc that can contribute in development of stress in students.

## CONCLUSION

The results of the study indicated that Perceived level of stress among all healthcare students at University of Hail (College of Applied Medical Science) was found to be slightly higher than average. It is recommended that further studies including evaluation of contributing factors of stress should also be studied. It is also recommended that nationwide study from different Universities should be conducted so results can be generalized to all over the Kingdom of Saudi Arabia.

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