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Micro RNA as a turnover biomarker for osteoporosis

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The use of biological marker (biomarker) in clinical and basic research as well as in clinical practice has become so common that their presence as primary endpoints in clinical trials is now recognized almost without hesitation.¹ World Health Organization (WHO) has defined a biomarker as “any substance, structure, or process that can be measured in the body or its products and influence or predict the incidence of outcome or disease”.² Specific biomarkers have constantly shown to correctly predict relevant clinical outcomes across a variety of treatments and populations, this use is entirely befitting and pertinent.

The importance of miRNAs in controlling bone homeostasis and metabolism is becoming more recognized. Numerous studies have particularized on the regulation of miRNA expression during osteoblast and osteoclast formation³ and carefully characterized the variance of miRNA expression in primary bone cells.⁴ Other studies have reported phenotypic effects on bone cells after substitution of selected miRNAs using in vitro model systems and, in some instances, reported putative target genes.⁵ Finally, it has been shown that bone-active hormones such as RANKL, or bone morphogenic protein (BMP), impact intracellular miRNA transcription in vitro.⁶

Osteoporosis is focused within this context as it is an agitated skeletal disease. It is characterized by excessive bone resorption and defective bone formation leading to bone loss and conceded microarchitecture that are accompanied with an increased risk of bone fracture.⁷

Two studies have spoken about miRNA expression in osteoporotic bone tissue. One study used an ovariectomized (OVX) mouse model to investigate changes in miRNA and mRNA levels four weeks after surgery. They reported significant effects for 9 miRNAs. Integration of miRNA data with putative mRNA target data revealed that CREB and PPAR γ might be modulated by these miRNAs. Finally, miR-127 and miR-136, which were induced after ovariectomy, also affected osteogenic differentiation in vitro.⁸

The second study described the human miRNome in bone tissue (trabecular component of femoral heads) of osteoporotic versus osteoarthritic patients. Initially bone biopsies of 8 cases and

controls were studied by RT-qPCR arrays to identify 13 potential candidates, which did, however, not overlap with miRNAs reported in OVX mice. After replication in 36 individuals (n ¼ 18 per group), significant up-regulation of miR518f and down-regulation of miR-187 in osteoporotic bone was reported.⁹

To this point, few studies have also addressed the therapeutic usefulness of miRNAs in vivo using different animal models. In 2009, Li et al. were the first to report that the mature miR-2861 expression was absent in bone specimens of two related adolescents with primary osteoporosis due to a homozygous mutation in the precursor miRNA sequence.¹⁰

The role of microRNAs as biomarkers for bone diseases has not been given much attention until recently. Still, given the fact that osteoblasts seem to communicate via shuttling of exosomes, and based on the finding that the exosomal miRNA content is changing during osteoblastogenesis, supports the hypothesis to use extracellular miRNAs as biomarkers of bone metabolism.¹¹

The bone-forming cells, the osteoblasts, play an important role in bone mass acquisition. At this point there is some proof that physiology of bone and as well as the commencement, development and exhibition of age related musculoskeletal disorders might be reflected in changes in circulating miRNA levels.³

The first effort to characterize miRNAs associated with discordant Bone Mineral Density (BMD) status was centered on measuring miRNAs in circulating monocytes. Circulating monocytes are related to bone homeostasis because they can be activated to differentiate into osteoclasts cells to secrete osteoclastogenic factors such as interleukins and TNF- α .

Wang and colleagues analyzed miRNA expression in human circulating blood monocytes in a small cohort of 20 postmenopausal Caucasian females. Of the 365 miRNAs screened, miR-133a expression survived qPCR validation and was found to be expressed in significantly higher levels in women with low BMD than in women with high BMD. Though, in circulating B cells, which were derived from the same study, miR-133a levels were similarly expressed irrespective of BMD.

These results proposed a limited, monocyte specific role of miR-133a in the setting of postmenopausal osteoporosis.¹²

As the density of the regulatory network in differentiation process begins to become identified, proof of identity of changing microRNAs and their interactions with transcriptional networks and, ultimately, cellular regulatory systems, becomes more beneficial.¹³

It now seems that link of miRNA in a cellular pathway or function is a rule rather than an exception, although it will take some time to determine the specific and complicated roles of each miRNA. However, clinical utility of circulating miRNAs in musculoskeletal diseases has not been established because the study designs that has been used so far were not suited to identify such miRNAs that can give a prognosis for future risk of fractures, or predictive of a treatment response.³

Keeping in view above discussions and research work done, more work has to be done to reveal the enigma of miRNA and biomarker developmental programs should be conducted, which does not eliminate miRNA *a priori* but starts by analyzing the full miRNome. Similar to other bone turnover markers, population-based studies will be necessary to determine reference values and to choose over the clinical utility of microRNAs in the management of musculoskeletal disease.⁵

The specific patterns of circulating miRNAs strongly suggest that the study of multiple miRNAs as intricate signs in serum or plasma will progress into an essential biomarker for prognosis, diagnosis and advances in medicine.¹³

Despite these promising first data, more work remains to be done until circulating miRNAs can serve as established and robust diagnostic tools for bone diseases in clinical research, clinical routine and in personalized medicine.²

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Internet addiction among medical students of Rehman Medical College

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ABSTRACT

Introduction: Internet addiction is characterized by poorly controlled urge regarding Internet use that leads to negative health outcomes. It is very alarming for the students, who may face difficulty in normal daily functioning and experience poor mental health due to internet addiction.

Objectives: To document the magnitude and effects of Internet Addiction in medical students of Rehman Medical College.

Materials & Methods: A cross-sectional study on 200 students was conducted in Rehman Medical College, Peshawar, from April to June 2016. Data were collected by convenience sampling technique on a structured questionnaire from students who were willing to participate in the study after informed consent. Data were analyzed for descriptive statistics in SPSS version 15.0.

Results: Only 0.5% reported severe internet addiction whereas 27% showed moderate level of internet addiction; 13% students reported always losing sleep due to excessive internet usage and 7% reported they neglected important household chores and tasks to spend more time online.

Conclusions: Internet Addiction was not severe in the sampled students; however it did affect their lives greatly. Subjects reported ignoring their day to day activities because of excessive internet usage.

Keywords: Depression; Students, Medical; Mental Health; Text Messaging; Addiction.

The authors declared no conflict of interest and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

All authors contributed substantially to the planning of research, questionnaire design, data collection, data analysis and write-up of the article as part of a student research team at RMC. The research work was supervised by Dr. Iftikhar Qayum, Director Department of Medical Research at RMC.

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INTRODUCTION

Internet addiction or Problematic Internet Usage (PIU) is characterized by poorly controlled urge regarding Internet use that leads to negative health outcomes. This condition is being extensively researched and has attracted the attention of media and researchers.¹ The diagnosis is classified as a compulsive-impulsive spectrum disorder that involves computer usage online or offline and consists of three subtypes: excessive

gaming, sexual preoccupation, and email/text messaging. All the variants have four components in common: 1) excessive use, often accompanied with loss of time and neglecting basic needs, 2) withdrawal, feeling anger and stressed when computer cannot be accessed 3) tolerance, including the needs for more hours of use, better equipment and 4) negative repercussions, including

arguments, poor academic or personal achievements, and isolation.²

Internet addiction was first researched in 1996, and findings were presented at the American Psychological Association. The study reviewed over 600 cases of heavy Internet users who exhibited clinical signs of addiction as measured through an adapted version of the DSM-IV criteria for pathological gambling.^{3,4} There are eight diagnostic criteria of having symptoms of internet addiction: cognitive preoccupation with the Internet, increased tolerance, unsuccessful attempts to decrease use, withdrawal symptoms, staying online much longer than needed, lying about online activity, negative emotion resulting from online activity, and use of the Internet to self-medicate. Clearly, an individual with these symptoms will face difficulty in normal daily functioning and may experience poor mental health.⁵

In the latest edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-V), PIU was not officially classified as a clinical disorder, even though considerable evidence shows it is associated with negative health outcomes.⁶ Cross-sectional studies on samples of patients report high comorbidity of Internet addiction with psychiatric disorders, such as affective disorders, anxiety disorders (including generalized anxiety disorder, social anxiety disorder), and attention deficit hyperactivity disorder (ADHD).⁷ According to Young, prior research links internet addiction disorder with existing mental health issues, most commonly depression. Young states that the disorder has significant effects socially, psychologically and occupationally.⁸ A study was done in Korea on the disorder using the Internet Addiction Test, and according to it, pathological use of internet results in negative life consequences like loss of job, unstable personal relationships, debt, and academic failure. Study showed that users who suffer from Internet addiction experience interpersonal difficulties.⁹ China and South Korea identify Internet addiction as a significant public health threat and support education, research and treatment.²

Internet addiction has been extensively researched in the Far East; prevalence rates of Internet addiction range from 6.44% in Shaanxi Province in China¹⁰ to between 2.4% and 5.52% in Hunan province in China.^{11,12} Nearly 1.2 million South Korean high school students are believed to be at risk for addiction and to require basic counseling. In particular, therapists worry about the increasing number of individuals dropping out from school or work to spend time on computers.¹³

A study, I-Cube 2006, conducted by the Internet & Mobile Association of India, covering 65,000 individuals by household survey in 26 cities in India, says that about 38% of Internet users in that country have shown signs of heavy usage (about 8.2 hours per week). Young males, especially college students, form

the major chunk of Internet user base. Indians go online for a number of activities, including e-mail and instant messaging (98%), job search (51%), banking (32%), bill payment (18%), stock trading (15%), and matrimonial search (15%).^{4,14}

Examining the prevalence and factors of Internet addiction and the associated health problems is particularly important in a country like Pakistan where the growth of Internet use is faster than socio-economic development itself. The use of Internet has also accelerated in Pakistan, with the number of Internet users increasing from 0.9 million in 2000 to 34 million in 2016.¹⁵ This unprecedented growth of Internet may pose a variety of health challenges, if proper measures are not taken at the right time.

The objectives of this study were to find the frequency and effects of internet addiction in medical students of Rehman Medical College.

MATERIALS & METHODS

It was a cross sectional descriptive study conducted on first year to final year medical students of Rehman Medical College, Peshawar during April 2016 to June 2016. After getting approval letter from Department of Medical Research, Rehman Medical College, and informed consent from the students, data were collected using self-administered questionnaires which were based on Young's Internet Addiction Scale. The tool comprised of 20 items which addressed the different aspects of Internet Addiction and its effects. The Young's Internet Addiction scale showed four levels of Internet Addiction ranging from Not Addicted, Mild, Moderate and Severe. Participants who scored below 30 were not considered addicted, while those who scored 31-49 were considered as mild internet users. Those with scores of 50-79 were considered moderate internet users while scores above 80 were considered severely addicted.

Convenience sampling technique was used for collecting data from students. Statistical Analysis was performed using SPSS version 23. Frequencies and percentages were used to find out the magnitude and usage of internet.

RESULTS

Of 200 students sampled, 94(47%) were males and 106(53%) were females. The age of the participants ranged from 18 to 25 years.

Results indicated that 0.5% students were severely dependent on Internet, 27% showed moderate level of Internet addiction, 45.5% showed mild level of Internet addiction and 27% showed normal usage of Internet. The results of the study can be seen in Figure 1.

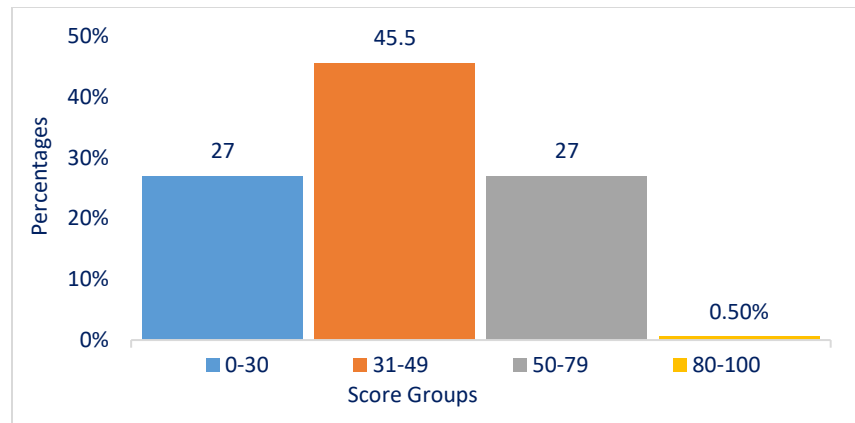


Figure 1: Young's Internet Addiction scores of students (n=200).

Table 1 shows 22.5% participants neglecting household chores and duties to spend time online, while 26% frequently stayed online longer than they intended to. 18.6% subjects often felt

that their life would be boring and empty without the internet. 19.2% of the participants reported frequently losing sleep due to excessive internet usage.

Table 1: Effects of Internet usage on students (n=200).

#	Questions	Not Applicable	Rarely	Occasionally	Frequently	Often	Always
1	How often do you neglect household chores to spend more time online?	6.5%	24.5%	25%	22.5%	14.5%	7%
2	How often do you find that you stay online longer than you intended?	3%	10%	15.5%	26.5%	26%	19%
3	How often do you fear that life without the Internet would be boring, empty, and joyless?	14.6%	17.1%	18.1%	15.6%	18.6%	16.1%
4	How often do you lose sleep due to being online?	13.6%	22.7%	16.7%	19.2%	14.6%	13.1%

DISCUSSION

The total score of the internet addiction test showed that 0.5% of the sample was severely addicted to the internet and 27% was moderately dependent on the internet. While these results are not alarming, they do show that internet usage is very common among the students and that it affects their daily life.

Internet usage is (frequently, often, or always) affecting the sleeping habits of almost 47% students' and results in 44% (frequently, often, or always) students neglecting household activities. Results show that most of the students depend on the internet as a source of entertainment as most of them reported they fear life would be boring and joyless without the internet.

A study done in Islamabad correlating Internet addiction with academic performance showed that Internet addiction negatively affected grades and CGPA.¹⁶ Another study done in Ahmedabad, India which assessed high school students found 11.8% of the students were severely dependent on the internet.¹⁷ A study conducted in Bangladesh among medical and dental students found 3.5% of the sample was addicted to the internet.¹⁸

A study on high school students in Iran showed that excessive usage of internet and using online platforms to communicate mostly affected their interpersonal communication skills greatly and almost 48% of them were addicted to browsing the internet.¹⁹

Another study done in Jordan using the Youngs Internet Addiction scale among 3400 adolescents revealed that 6.6% were severely addicted to the Internet whereas in the current study only 0.5% were severely addicted.²⁰ This difference in results can be attributed to difference in sample size and age of the participants.

CONCLUSION

Internet addiction is not common in medical students; however their life can be affected as they ignore their day to day activities, and lose sleep.

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Lip reading as reinforcement for speech reproduction in deaf children with hearing aids

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ABSTRACT

Introduction: Hearing loss affects the ability to receive and produce spoken language. During speech therapy, lip reading is used to enable speech reproduction; the benefits of lip reading for speech reproduction need further elaboration because simple auditory input produces inferior results.

Objective: To assess the performance of deaf children with hearing aids using lip reading technique against auditory input alone during speech therapy.

Materials & Methods: This quasi-experimental study was conducted at the Centre for Speech and Hearing, Mardan, Khyber Pakhtunkhwa, from May to July 2016 through universal sampling of 49 deaf children with hearing aids actively enrolled in speech therapy. Children were required to reproduce speech after a lip reading session; one week later, the same children were subjected to speech without lip reading. Performance assessment based on correct speech reproduction was done for both sessions. Data were collected on Performa and analyzed by SPSS version 23.0 for descriptive statistics.

Results: All 49 children completed the speech therapy sessions; 55% students scored high on the lip reading session (mean score 8.9 ± 4.37 , range 1-19 out of 25) compared to less than 35% students for the non-lip reading session, (mean score 4.1 ± 4.28 , range 0-16 out of 25). Furthermore, increased duration of lip reading session showed enhancement in speech reproduction, suggesting a positive association of lip reading with hearing.

Conclusion: Lip reading during auditory input provides enhanced learning and speech reproduction in deaf children using hearing aids and appears essential for improving communication skills of the hearing impaired.

Keywords: Hearing Impairment; Speech Therapy; Lip Reading; Speech Reading; Sensory Neural Hearing Loss.

The authors declared no conflict of interest and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

All authors contributed substantially to the planning of research, questionnaire design, data collection, data analysis and write-up of the article as part of a student research team at RMC. The research work was supervised by Dr. Iftikhar Qayum, Director Medical Research at RMC.

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INTRODUCTION

Hearing loss affects the ability to both receive and produce spoken language. When severe or profound hearing impairment occurs early in life, the prognosis for acquisition of intelligible

speech is poor.¹ Although technological devices, such as hearing aids and cochlear implants, enable the child to hear spoken

words, they fail to teach the child how to listen, how to process language or how to talk.²

Speech reading is often used synonymously with the term lip reading. Speech reading is using what you see on the speaker's lips as well as facial expressions and gestures to understand conversation. One reason phone conversations can be particularly difficult for a hard of hearing person is the lack of a face to "read." On the other hand, everyone, even those with normal hearing, uses visual cues.³

People with hearing loss can use speech reading to supplement understanding when they have trouble understanding or hearing speech. Often those speech sounds that are hard to hear are easy to see, like a softly spoken "p" sound. The more severe the hearing loss or the more noisy the environment, the more likely one can benefit from speech reading.³

Lastly, several factors influence whether a person is easy or difficult to speech-read. Someone with a foreign accent, unusual pronunciation, or speech disability will be harder to speech-read. People who barely move their lips when speaking are also difficult to speech-read. Facial expressions, body language, and mouth movement may help, but they can also cause distraction if overdone. Rate of speech is also important. Slightly slower speech will be understood more easily than rapid speech.⁴

Is there any difference between lip-reading and speech-reading? Yes and no. How's that for an answer? Technically, lip-reading is watching the lips to extract whatever speech information you can, while speech-reading is watching the lips, tongue, teeth, cheeks, eyes, facial expressions, gestures, body language and anything else that gives clues as to what the person is saying. Thus speech-reading encompasses lip-reading.⁵

People with mild or moderate hearing losses, wearing hearing aids, maybe depending more on hearing than vision. However, many speech sounds may still not be heard clearly by some people no matter how loud they are made, e.g. 's', 'sh', 'f', 'th'. These sounds are relatively easy to see, so a combination of speech-reading and aided hearing is the most effective method to follow speech. A person with a severe to profound hearing loss may not be able to get sufficient help from a hearing aid to understand speech. The person must depend primarily on speech-reading, sign language or both. Still, anything heard through a hearing aid can help communication even if hearing is not the main communication channel.⁶

Many people are more familiar with the older term lip-reading, which they interpret as the ability to recognize the different sounds of speech by observing movements of lips, tongues and jaw. We prefer to widen the concept and in doing so use the term speech-reading, which we see as the ability to understand a person by watching the movements of the face and body, by using the information provided by the situation and the language. Everyone uses visual information in speech recognition, so even people with essentially normal hearing

utilize speech-reading to some degree in communication. Some circumstances encourage it more than others, e.g. in noisy environments. However, the greater a hearing loss, the more a person tends to rely on vision for understanding speech.⁷

Most children who are born profoundly deaf or who become deaf before the age of 3 fall significantly behind their normal-hearing peers in their mastery of the surrounding oral language in its written, read, spoken, and signed forms.^{1,2,8}

The present study was undertaken to establish if lip-reading plays a part in the process of speech articulation in children with congenital sensory neural loss of hearing and how the dependency on it was more compared to the non-lip reading. Determining this would suggest that the techniques used for speech therapy are more multi-dimensional.

MATERIALS & METHODS

This quasi-experimental study was conducted at the Centre for Speech and Hearing, Mardan, Khyber Pakhtunkhwa, from May to July 2016 through universal sampling of 49 deaf children with hearing aids actively enrolled in speech therapy. Children were required to reproduce speech after a lip-reading session; one week later, the same children were subjected to speech without lip reading. Performance assessment based on correct speech reproduction was done for both sessions. Self-designed speech test was administered with an authentic language-based chart from the speech center and was used to gather the data regarding all variables. To avoid any confounding or difference of perception, all the tests scores were performed by the same individual; the same researcher assessed the hearing and speech reproduction through verbal articulation of words, upon which speech reproduction was scored.

Data were collected on Performa and analyzed by SPSS version 23.0 for descriptive statistics.

RESULTS

Of 49 children tested for lip reading and non-lip-reading speech quantification, 34.7% (n=17) were females and 65.3% (n=32) were males (Table 1).

Table 1: General characteristics of subjects (n=49).	
Variables	Frequency (%)
Gender	
Male	32 (65.3)
Female	17 (34.7)
Type of Hearing Impairment	
Profound Deafness	7 (14.3)
Sensory Neural Hearing Loss	42 (85.7)
Ages	Years
Mode	8
Range (Minimum – Maximum)	5 – 18
Mean \pm SD	10.31 \pm 3.35

Representation of the type of hearing impairment among the 49 children showed that 85.7% were suffering from sensory neural hearing loss, and 14.3% were suffering from profound hearing loss. Mean age of all subjects was 10.31 ± 3.35 years.

Speech therapy duration has been taken in months (Figure 1); 24.5% (n=12) of the children had received 11 months of speech therapy. The mean speech therapy duration was 37.6 ± 50.5 months.

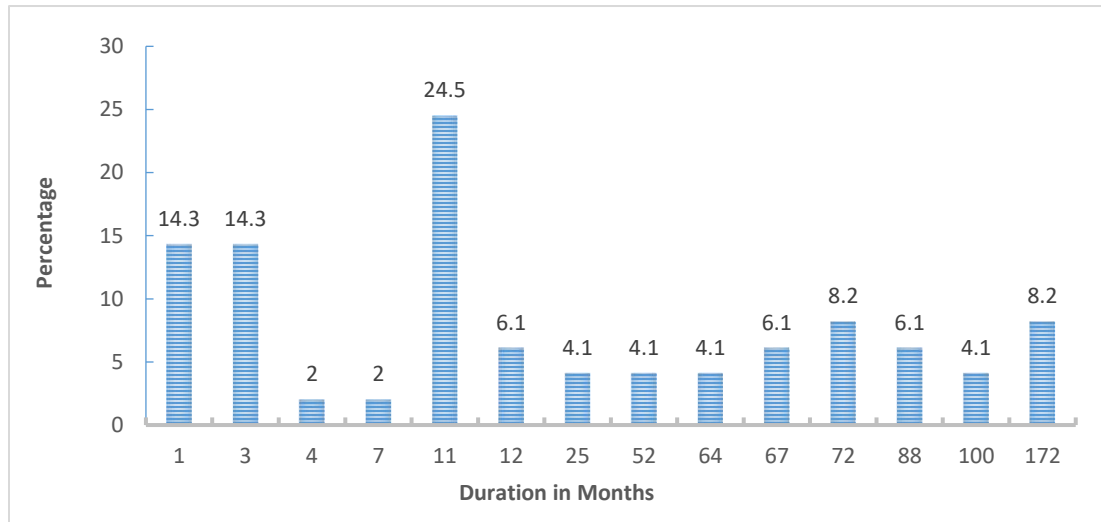


Figure 1: Speech Therapy Duration in Subjects (n=49).

The bar chart (Figure 2) represents subjects' lip reading speech quantification scores. Over 45% subjects scored high on the speech quantification tests, with the average mean score being

8.99 ± 4.36 . The maximum score achieved was 19 out of the total 25.

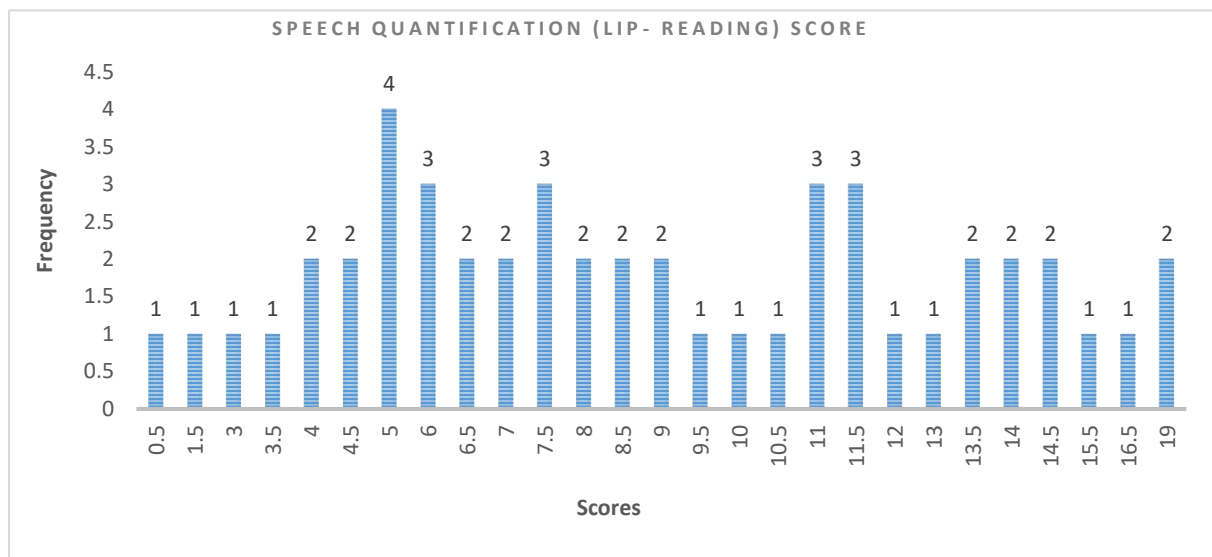


Figure 2: Subject scores on lip reading session of speech therapy (n=49).

The bar chart (Figure 3) represents the subjects' scores with non-lip-reading speech quantification test. Less than 35% of subjects scored high on the speech quantification tests, with the

average mean score being 4.1 ± 4.28 . The maximum scored achieved was 16 out of the total 25.

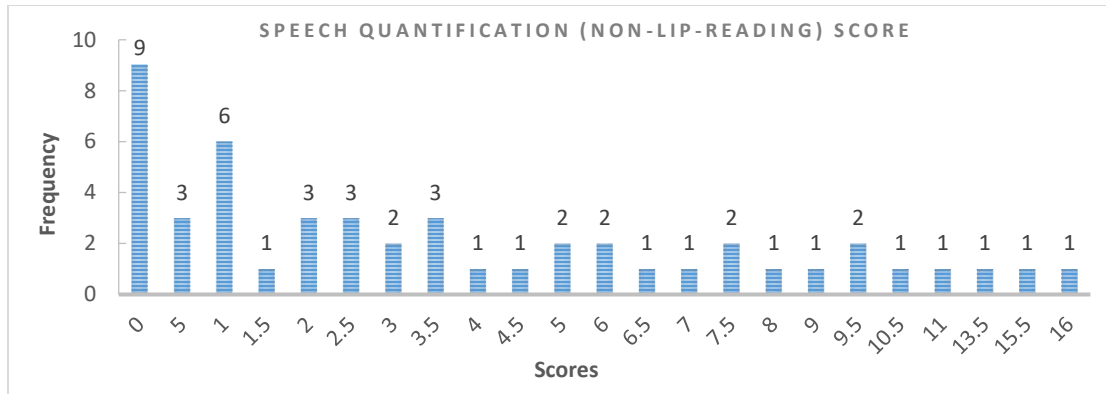
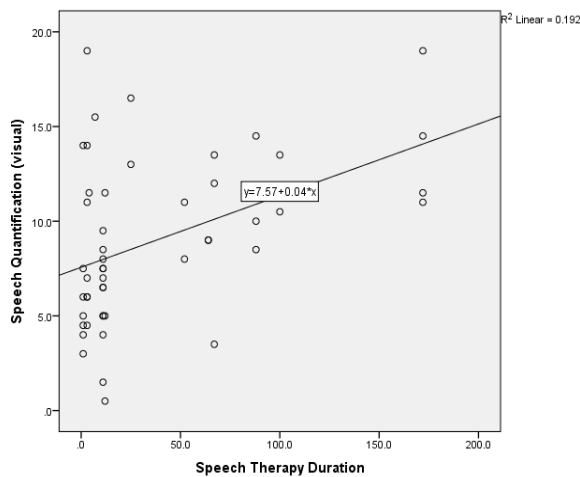


Figure 3: Subject scores on lip reading session of speech therapy (n=49).

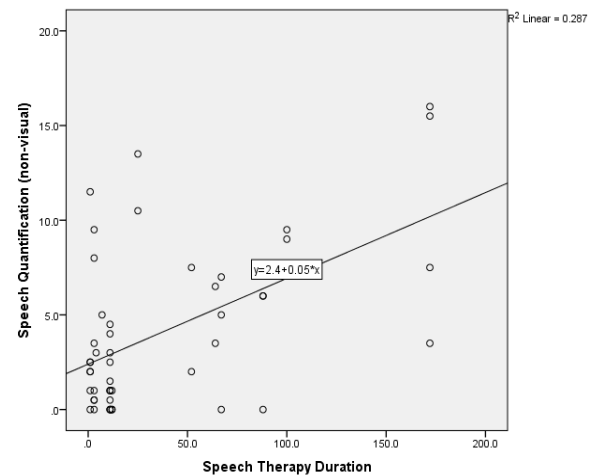
Table 2 is a representation of statistics of the scores in both the lip-reading speech quantification test and the non-lip-reading speech quantification test. Subjects scored significantly higher in the Lip Reading session (Paired Sample T test; $p < 0.001$.)

Table 2: Subjects' mean scores on the lip reading and non-lip reading tests (n=49).			
Statistics	Speech Quantification (lip-reading)	Speech Quantification (non-lip-reading)	p value
Mean \pm SD	8.99 \pm 4.36	4.102 \pm 4.28	<0.001
Range			
Minimum	0.5	0	
Maximum	19.0	16.0	

The scatterplots of speech therapy duration and the visual and non-visual scores (Figure 4) show a positive correlation between these two variables, suggesting that as the duration of speech therapy sessions increase, subjects tend to score higher on the speech reproduction tests; the effect is more pronounced on the non-visual scores. Thus, improvements in speech reproduction take longer if lip reading is not included in the therapy.



Scatterplot (a)



Scatterplot (b)

Figure 4: Scatterplot of duration of speech therapy with a) Visual test scores and b) Non Visual test scores showing a positive correlation (for a, $r = 0.438$, $p = 0.002$; for b, $r = 0.535$, $p < 0.001$).

DISCUSSION

Hearing loss that is bilateral and permanent is estimated to be present in 1.2 to 5.7 per 1000 live births. The typical consequences of this condition include significant delays in language development and academic achievement.

Previous and present research findings suggest that the first year of life, especially the first 6 months, is critical for children with hearing loss. When hearing loss was identified and treated by this time, several independent researchers have reported that, as a group, children demonstrated average language scores that fell within the normal range when they were 1 to 5 years old. Considering this it is critical that all infants with hearing loss be identified by 6 months of age and receive early intervention; universal newborn hearing screening would be an excellent vehicle for achieving this goal.^{1,2,8}

In the current study at Center for Speech and Hearing (CSH), the admission criterion was minimum 4 years of age. As is already

known that severe or profound hearing loss occurs early in life, the prognosis for the attainment of intelligible speech is poor, but even after delayed admission and hearing aid installation, benefits of hearing aid and speech therapy were noted.

White and White,⁹ Robinshaw,¹⁰ Moeller,¹¹ and Apuzzo & Yoshinaga-Itano¹² all have reported significantly better language scores for children whose hearing losses were identified earlier. Unfortunately in our government setup there are no hearing screening for newborns, and by the time parents identify it, it is too late for an early intervention. In the present study, most of the children were above 4 years of age with mean age of 10.31 ± 3.35 years. But more than 45% of the students scored high on the speech quantification tests, the maximum scored achieved was 19.0/25, with the average mean score being 8.99 ± 4.36 , which is appreciable, considering the age of the children.

An article in Journal of Rehabilitation Research & Development showed continued improvement over the entire 8-week duration of training, with performance improving most rapidly at training onset followed by an additional improvement of approximately 2 percent for each doubling of training duration between 1 and 8 weeks.¹³ In current study, it was found that refinement in hearing begins after hearing aid installation, and with passage of time and with the help of speech therapy the children's scores were improving.

Other studies also suggested that speech perception continues to improve for months after an hearing aid fitting.^{14,15,16} Present study shows enhancement in hearing as speech therapy duration increases; also visual cues are necessary for children with hearing disabilities, suggesting that hearing aid installation, visual aids, time, and duration of therapy are key factors in successful rehabilitation.

LIMITATIONS

The small sample size does not allow generalization of results;

moreover, the tests conducted were not sufficiently standardized or pretested to be considered wholly valid or reproducible.

CONCLUSION

Hearing impaired children were more reliant on reproducing sounds by reading lips and could not score well without lip reading, thereby suggesting that without visual aids and proper lip movements, such handicapped children would not reproduce speech properly.

RECOMMENDATIONS

The following measures are recommended based on the study results:

- 1) Early intervention and Hearing Aid Installation for better rehabilitation of the affected person, as it helps with Speech Therapy and the learning curve.
- 2) Properly scheduled and structured speech therapy sessions with effective Lip Reading techniques to improve language processing and tongue movements.
- 3) Standardized speech therapy to optimize language skills which make the affected quality of life better.

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- Dr. Iftikhar Qayum, Director Medical Research.

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Identification and verification of undetected refractive errors in students of Rehman Medical College, Peshawar

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ABSTRACT

Introduction: A staggering 2.3 billion people worldwide are estimated to have some form of refractive error with only 1.8 billion people having access to adequate eye care.

Objective: To determine the magnitude of undetected refractive errors in medical students of Rehman Medical College, Peshawar, Khyber Pakhtunkhwa.

Materials & Methods: The study was conducted on 155 medical students of Rehman Medical College, Peshawar from March to May 2017. Informed consent was taken from the subjects who completed a simple algorithm containing a standard Snellen's test conducted by the researchers, followed by filling a self-administered questionnaire. Verification of identified refractive errors was done by referral to an expert ophthalmologist. Data obtained were then analyzed using SPSS version 20 for descriptive statistics. Comparisons of obtained frequencies were done by the Chi Square test, keeping $p \leq 0.05$ as significant.

Results: Among the subjects, 14(9%) were found to have a visual acuity of less than 6/6 on manual Snellen's chart examination and 7.7% of the students were found to have some form of previously undetected refractive error; a few of whom were suffering from Astigmatism.

Conclusion: Astigmatism was found in few students through autorefractor.

Keywords: Refractive errors; Astigmatism; Myopia; Hyperopia; Students, Medical.

The authors declared no conflict of interest and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

All authors contributed substantially to the planning of research, questionnaire design, data collection, data analysis and write-up of the article as part of a student research team at RMC. The research work was supervised by Sher Bahadur, Senior Research Officer at RMC.

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INTRODUCTION

Of all the senses, sight is the most delightful and plays a vital role in our lives. Vision disorders are the fourth most common disability among medical students all over the world.^{1,2} Refractive Errors are the most common cause of visual impairment, which at the same time, are the most easily avoidable and treatable conditions. Refractive errors, if left undetected and untreated, can lead to permanent vision loss.³

The estimated number of people having refractive errors is 2.3 billion people worldwide, but only 1.8 billion people have access to proper and affordable eye examination procedures and eye care. The remaining 500 million people are deprived of adequate eye care, leaving them with undetected and uncorrected refractive errors causing epidemic proportions of blindness especially in the developing countries.⁴

Refractive errors are categorized into Hypermetropia, Myopia, Astigmatism and Presbyopia. Hypermetropia is the inability of the eye to focus the parallel rays of light entering the eye directly on the retina; rather the image is formed behind the retina leading to blurred image of near objects, but distant objects are visible more distinctly. In Myopia, the images are formed in front of the eye leading to blurred images of distant objects, but near objects are visible more distinctly. Astigmatism is a condition resulting in distorted images due to defect in the lens of the eye caused by a deviation from spherical curvature. Presbyopia occurs in middle and old age people characterized by long-sightedness due to loss of elasticity of the lens of the eye.⁵ The natural visual acuity is written as a 6/6.⁶ Out of the above mentioned refractive errors, Myopia tops the list by being the most common refractive error and its prevalence has been reported to be as 70%-90% in some Asian countries like Singapore with highest Myopia prevalence of 80%, China 31%, Africa 10%-20%, and Europe and USA 30%-40%.^{7,8}

The causes of refractive errors include family history, genetics, high levels of near tasks related to school and college studies, limited time spent outdoors, excess use of electronic gadgets and studying in dim light.³ Symptoms related to refractive errors include blurred vision, difficulty reading up close, headache, double vision, haziness, glare/halos around bright lights, squinting, and eyestrain. Detection of refractive errors does not require a complex procedure. They can easily be detected by Autorefractometer, Phoropter, manually by Snellen's Chart, or corneal topography to study the quality of the corneal surface. Refractive errors can be treated by the use of spectacles, contact lenses or LASIK Surgery.³ The obstacles faced by people of developing countries are: access to detection and correction of refractive errors, lack of knowledge about refractive errors, their complications and benefits of correcting them and the expense and poor quality of available glasses.³

In Pakistan, 11.4% of blindness is due to undetected refractive errors.⁹ The prevalence of Myopia, Hypermetropia, and Astigmatism have been estimated to be 36.5%, 27.1%, 37% respectively, in Pakistan.¹⁰ Undetected refractive errors create a huge barrier for people in leading a successful life as they are not able to carry out simple everyday life activities. It has a huge negative influence on educational abilities, social adjustments and economic survival.¹¹ To avoid these unfavorable circumstances, students should go through a periodic eye examination at least annually.

Detection of refractive errors among students is supposed to encourage early detection, a better prognosis, and reduce eventual disability. Such screening has a very precise meaning in public health as well as in the medical profession. The medical student will be involved in very fine skills in surgical and other procedures which necessitate correction of refractive errors if detected, hence the need to screen undetected refractive errors. The current literature is focused on school children, and

to best of our knowledge, no study has yet been conducted in the region. This study aimed to find out the magnitude of undetected refractive errors and their effects in medical students of Rehman Medical College.

MATERIALS & METHODS

The cross-sectional observational study (screening exercise) was conducted on medical students of Rehman Medical College, Peshawar from March to May 2017. All medical students regardless of age, gender, ethnicity etc. who had not been previously diagnosed with refractive errors (including contact lenses) were included in the study; medical students who were not available for any reasons at the time of study were excluded.

The sample size calculated by WHO formula for $p=25\%$,⁴ $\alpha=5.0\%$, $\beta=7.0\%$ and 95% confidence was 147. Simple random sampling technique was used for the study. After informed consent was taken, the participants were subjected to manual Snellen's test, after which they were asked to fill a questionnaire that comprised students' demographic data and questions related to their study hours, any past eye diseases or surgeries and present visual abnormalities.

Based on the screening tests, students deemed to be suffering from undetected refractive errors were sent to an expert Ophthalmologist for definitive Auto Refraction testing, the results of which were taken as the final diagnosis. Data were recorded on a structured Performa and analyzed for descriptive statistics using SPSS software version 20.

RESULTS

Out of 155 students, 14(9%) were found to have a visual acuity of less than 6/6 on manual Snellen's chart examination (Figure 1).

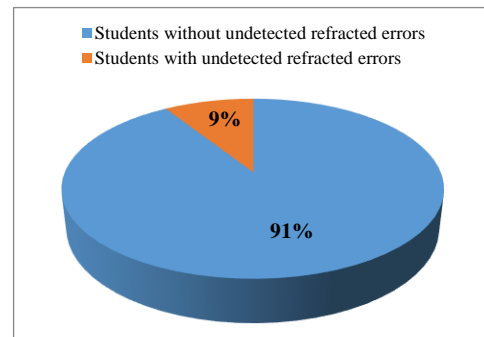


Figure 1: Refractive errors based on manual Snellen's chart examination (n=155).

These 14 students were taken to the Ophthalmology Department for autorefraction by an expert, out of which 12(7.7%) were confirmed and diagnosed to have actual refractive errors, as shown in Figure 2.

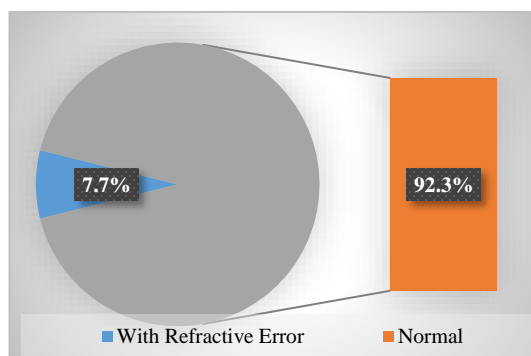


Figure 2: Refractive error based on Auto Refractor (n=155).

Among students with refractive error (n=14), 10(71.4%) originally subjected to testing by an Autorefractor were found to have Astigmatism whereas 2 of the 14 were found to be myopic, whereas 2 were diagnosed as emmetropic (Table 1).

Table 1: Diagnoses based on Auto Refraction (n=155).		
Refractive Error	Frequency	Percent
Myopia	2	1.3
Astigmatism	10	6.4
Normal	2	1.3
Total	14	9

Similarly, 8(57.1%) out of 14 students with visual deficits admitted that their eyes watered after a certain duration of studying, whereas 35(24.8%) out of the 141 students with normal vision also had the same complaint giving us a significant difference ($p=0.010$). Out of 14 students with refractive error, 7(50.0%) said their vision got blurry after a certain time of studying, compared to 26/141(18.4%) indicating a significant difference ($p=0.006$). Out of 14 students, 9(64.3%) with visual deficits had some sort of family history of refractive errors.

Table 1. Distribution of different visual difficulties (n=155).		
History	Visual Deficit	
	Present	Absent
Do you feel your eyes getting watery?		
Yes	8	35
No	6	106
Do you feel your vision getting blurred?		
Yes	7	26
No	7	115
Family history of refractive errors?		
Maternal	1	14
Paternal	4	25
Both	4	25
Nil	5	77

DISCUSSION

The present study was successful in developing a simple algorithm for detecting hidden refractive errors in medical students and identified 9% of the sampled subjects to have such errors; 86% of these identified students were confirmed to have the errors by definitive ophthalmologic testing. Hence such simple measures can be used as valid screening tools.

Moreover, the importance of such studies is highlighted by the fact that though quite a few students had eye symptoms related to refractive errors, they did not themselves opt for an ophthalmological examination; perhaps the symptoms were attributed to workload of studies, late night studying habits, lack of sleep, etc. Even the 9/14(64%) of students having a family history of refractive errors did not seek eye examinations. Incidentally, it appears that refractive errors are more commonly inherited from the paternal side or from both parental sides, as compared to the maternal side.

The most striking finding of the research, however, was the fact that 10/12(83.3%) students initially identified with refractive errors on screening tests, had Astigmatism diagnosed after Auto Refraction. Similar studies carried out among young native American children showed that Astigmatism often goes undetected or uncorrected with potentially detrimental consequences.¹²

The distribution of refractive errors also showed Astigmatism to be the most common error (6.4%) in the sample, followed by Myopia at 1.3%. Since the sample was from young people, Presbyopia was not detected.

A research carried out in 14 states of Mexico between 2014 and 2015 among 676,856 patients aged 6 to 90 years, showed that Myopia was the most common disorder (24.8%) followed by Hyperopia (21.0%) and Astigmatism (13.5%).¹³

This highlights the fact that Astigmatism is not a visual disorder that goes undetected most often, and that it can be detected at earlier age groups, if screened for. It may be noteworthy to mention here that for students, such simple tests can be carried out in routine at the time of admission to the schools, so that these can be corrected well in time before they lead to chronic symptoms of eye disease.

CONCLUSION

A simple screening algorithm for detecting unknown refractive errors was successful in identifying such errors among a sample of medical students. Furthermore, Astigmatism was the major refractive error identified and confirmed through the screening exercise.

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Types of sleep disorders among medical students of Rehman Medical College: a cross-sectional study

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ABSTRACT

Introduction: A sleep disorder can affect an overall health, safety and quality of life. Sleep has a relevant facilitatory role in learning and memory processes. Medical students who suffer from sleep deprivation run a major risk of creating serious medical problems.

Objectives: To determine the magnitude and types of multiple sleep disorders among students of Rehman Medical College, Peshawar, Khyber Pakhtunkhwa, Pakistan.

Materials & Methods: A cross-sectional study on 180 students was conducted in Rehman Medical College, Peshawar, from April to June 2017. Data were collected by convenience sampling technique via a standard questionnaire, and analyzed for descriptive statistics by SPSS version 23.

Results: The students suffering from insomnia were 2.2% males and 7.8% females, while 27.2% males and 15.5% females presented with circadian rhythm disorder; 14.4% males and 16.6% females suffered from psychiatric disorder and needed further medical evaluation according to the grading on questionnaire.

Conclusion: More females were affected by sleep disorders than males. The sleep disorders are interrelated, one can be the leading cause of another.

Keywords: Students Medical; Sleep Deprivation; Movement Disorders; Sleep Apnea Syndromes.

The authors declared no conflict of interest and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

All authors contributed substantially to the planning of research, questionnaire design, data collection, data analysis and write-up of the article as part of a student research team at RMC. The research work was supervised by Dr. Iftikhar Qayum, Director Department of Medical Research at RMC.

Citation: Obaid B, Nathaniel E, Shams L, Ibrahim S. Types of sleep disorders among medical students of Rehman Medical College: a cross-sectional study. J Med Students. 2017;3(1-2):17-20.

INTRODUCTION

Sleep disorder or Somnipathy is a medical disorder of sleep patterns which may be severe enough to interfere with a person's normal physical, mental and emotional functioning.¹ A sleep disorder can affect an overall health, safety and quality of life.² It has been observed that sleep disorder is a very common problem among medical students. Sleep has a relevant facilitating role in learning and memory processes. Conversely, sleep deprivation and/or discontinuity usually impairs these functions.³ Medical students suffering from sleep deprivation run a major risk of creating serious medical errors than those

who have had an adequate amount of rest.⁴ Some of the signs and symptoms of sleep disorders include excessive daytime sleepiness, irregular breathing or increased movement during sleep.⁵ Poor sleep quality that is associated with many sleep disorders can predispose to the development or exacerbation of psychological distress and mental illness.^{2,6} Some common types of sleep disorders include: insomnia, psychiatric disorders, circadian rhythm disorders, movement disorders and parasomnias.⁷

Studies have been done to investigate the association between psychiatric disorders and sleep disturbances in medical students and also to detect the relationship between sleep problems and mental health.²

Late night internet surfing has been described as one of the reasons for sleep deprivation among medical students.⁸ Factors which influence sleep quality, also include worry to fall asleep, the irregular work schedule and rest schedules, worry about examinations, stress, relationships with classmates, self-reported health conditions, the dormitory environment, and late bedtimes.⁹

Physical problems such as sleep apnea can also be a factor for sleep disturbance. One study evaluated risk factors for sleep apnea among Pakistani medical students and reported that 27% of males and 12% of females had disruptive snoring.¹⁰ Furthermore, the authors reported that symptoms of nocturnal choking, waking up with dry mouth, morning headache, and unrefreshing sleep were experienced by 6%, 25%, 10%, and 27% of males, and 5%, 26%, 23%, 27% of females, respectively.¹⁰

The present study was conducted on medical students of Rehman Medical College, a newly built institution with an innovative curriculum that is study-intensive with multiple and frequent formative assessment system. The objectives of this study were to determine the magnitude and types of multiple sleep disorders in medical students of this college.

MATERIALS & METHODS

It was a cross-sectional descriptive study, conducted on 180 medical students from all five MBBS years of Rehman Medical College, Peshawar. The duration of the study was from April to June 2017. Data were collected through convenience sampling. Standard questionnaires were distributed after taking informed consent from students. Data analysis was done for descriptive statistics using SPSS Version 23.0.

RESULTS

The response rate was 90% (180 out of 200 students), of which 90(45%) were males and 90(45%) were females. Their ages were between 17-25 years.

As shown in Figure 1, among males, only 2.22% were graded insomniac, whereas 7.77% females were graded insomniac; 11.10% males and 17.20% females were likely to suffer from insomnia in the near future. A total of 36.60% males and 31.10% females showed normal grading for insomnia.

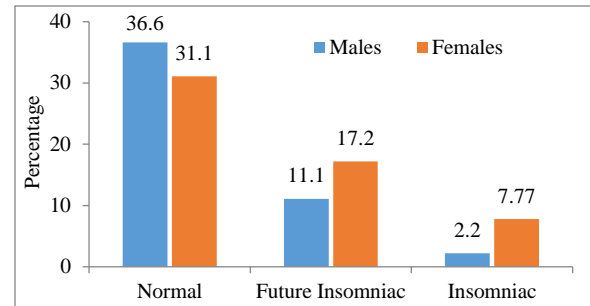


Figure 1: Distribution of Insomnia by gender in medical students (n=180)

Table 1 shows that 13 males and 15 females suffered from psychiatric disorder and needed further medical evaluation, whereas 25 males and 17 females were likely to suffer from psychiatric disorder. The remaining included normal males (52, 28.8%) and females (58, 32.2%).

Table 1: Gender based psychiatry problems among students (n=180).			
Gender	Is the student suffering from psychiatric disorder?		
	Normal	Likely	Suffers
Male	52 (28.8)	25 (13.9)	13 (7.2)
Female	58 (32.2)	17 (9.4)	15 (8.3)
Total	110 (61.1)	42 (23.3)	28 (15.6)

Figure 2 shows 23(12.7%) males and 14(7.7%) females suffered circadian rhythm disorders, whereas 67(37.2%) males and 76(42.2%) females were found to be normal.

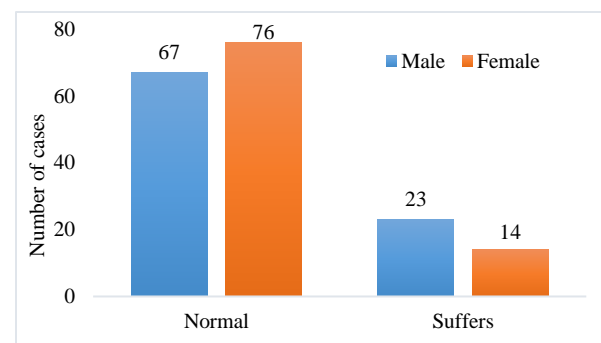


Figure 2: Students suffering from Circadian Rhythm Disorders (n=180).

Figure 3 shows 12(6.7%) males and 10(5.5%) females suffering from limbic movement disorder, whereas 15(8.3%) males and 19(10.5%) females were likely to suffer in the future. The males and females not suffering from limbic movement disorder were 63(35.0%) and 61(33.9%) respectively.

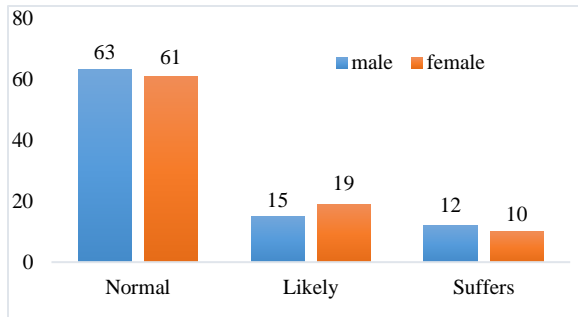


Figure 3: Students suffering from limbic movement disorder (n=180).

Figure 4 shows 17 males and 10 females were likely to develop sleep apnea, whereas 73 males and 80 females were normal.

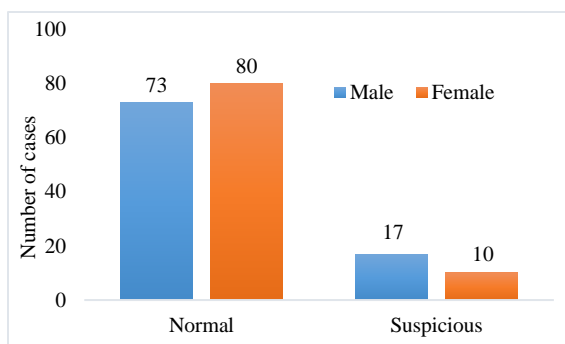


Figure 4: Students suffering from Sleep Apnea (n=180).

DISCUSSION

This study showed that sleep disorder was more common in females than males. Overall, 11% of the medical students were suffering from insomnia, of which male students were 2.2% and 7.8% were females.

A study conducted in Brazil¹¹ showed that 28.2% medical students had insomnia, and females had more difficulty in maintaining sleep than males. The psychiatric disorder was 7.2% in males whereas 8.3% in females.

In a Mexican study, 24% of medical students reported some sleep difficulties in the week prior to the survey and the insomnia symptoms were associated with various measures of psychological health on Symptoms Check List 90 (SCL-90).¹²

Periodic limb movement disorder (PLMD) and restless legs syndrome (RLS) are two sleep disorders characterized by abnormal leg movements and are responsible for deterioration in sleep quality. However, the prevalence of these disorders is not well known in the general population. In one study,¹³ the prevalence of PLMD was 3.9% and RLS was 5.5%. RLS and PLMD were higher in women than in men. The prevalence of RLS significantly increased with age. In the current study, 6.7% males and 5.6% females were found to have periodic limbic movements.

Recently,¹⁴ elevated rates of parasomnias and psychiatric disorders were reported, suggesting medication usage was only one of many risk factors, associating with parasomnias. A strong association exists between mental disorder and parasomnias which is not fully explained by medication.

CONCLUSION

More female students were affected by sleep disorders than males. The sleep disorders are interrelated, one can be the leading cause of another.

RECOMMENDATIONS

Further research on a larger scale should be conducted, spanning more settings, and covering a lot more study participants, to see how prevalent the problem is.

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Perception of undergraduate medical students towards research in Rehman Medical College

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ABSTRACT

Introduction: In present times, research is said to play a vital role in the field of Medicine, hence training of undergraduate (UG) medical students in research methodology is an important, yet neglected, part of the medical curriculum in Pakistan.

Objective: To assess the perceptions of students of Rehman Medical College, Peshawar, regarding medical research.

Materials & Methods: A cross-sectional descriptive study was conducted at Rehman Medical College Peshawar, Pakistan, from August to September 2016, on 150 medical students from all five MBBS years, selected by simple random sampling. Data were collected through questionnaires and were analyzed for descriptive statistics using SPSS version 21.

Results: Of 150 students, 83.3% perceived that research was beneficial in the medical field while 58.7% said research should be included in the curriculum; 69.3% thought research activities helped in better understanding of the subject, while 83.4% said research is important for updated knowledge in the clinical field. Majority (80.7%) of the students were involved in research activities, while 53.3% students thought that poor research output was because it was not part of the curriculum.

Conclusion: There were different opinions of students regarding research. The students considered research useful and stressful at the same time.

Keywords: Perception; Students, Medical; Research Design; Curriculum.

The authors declared no conflict of interest and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

All authors contributed substantially to the planning of research, questionnaire design, data collection, data analysis and write-up of the article as part of a student research team at RMC. The research work was supervised by Dr. Iftikhar Qayum, Director Medical Research at RMC.

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INTRODUCTION

Training of undergraduate (UG) medical students in research methodology is an important but highly neglected part in the medical curriculum in Pakistan.¹ In western countries, high importance is given to research as compared to Pakistan where the importance of research is not completely understood. It is necessary to train the undergraduate students in order to yield more advancement in this field of Medicine.

The undergraduate students though motivated toward research, are not involved in research projects in medical colleges due to the lack of awareness about the research activities, lack of time, lack of appropriate guidance, funding and many other factors around them.² The core curriculum must ensure that relevant and appropriate research expertise is attained by all graduates who are then provided with a suitable foundation from which they

can develop such specialized research skills as may be required in their careers. The research is beneficial to the student as well, because educational and healthcare institutions in foreign countries will prefer students who have conducted multiple research projects.³

Rehman Medical College (RMC) is one of the few colleges in Pakistan that have included research teaching and training in the MBBS curriculum since inception in 2010-11. The objective of this study was to assess the perception of RMC medical students about research.

MATERIALS & METHODS

A cross sectional descriptive study was conducted at Rehman Medical College, Peshawar from August to September 2016. All students of RMC were included in this study while absent students were excluded. A sample of 30 students per class (30%)

was selected by simple random technique generated by SPSS to get a final sample size of 150 students who were included after obtaining informed consent. Structured questionnaires were distributed to be filled out by the sampled students after providing instructions. The data were analyzed using SPSS version 21 for descriptive statistics.

RESULTS

Total 150 students answered the questionnaire and hence the response rate was 100%. The survey revealed that 80.7% of undergraduate students were involved in research activities out of which 58.7% had completed some research project. Very few (22%) students had published an article in a journal. Majority (80.7%) agreed to have awareness sessions on research at undergraduate level. According to 58.7% students, research training should be a part of undergraduate curriculum (Table 1).

S.#	Questions	Yes	No
1	Ever participated in research article project?	80.7%	19.3%
2	Have you completed any research project?	58.7%	41.3%
3	Ever published an article in a journal?	22%	78%
		Agree	Neutral
4	There should be awareness about research at undergraduate level?	80.7%	12%
5	Research will benefit you at your undergraduate level?	65.3%	22.7%
6	Research will benefit you at your professional level?	86%	11.3%
7	Research helps in better learning?	69.3%	24.4%
8	Research updates and advances knowledge?	83.4%	13.3%
9	Research is important to discover new things?	80.7%	18%
10	Research training should be a part of undergraduate curriculum?	58.7%	35.3%

Regarding reasons for not conducting research at undergraduate level, most (76%) of the students agreed that less time availability in schedule is the reason for lack of conducting research at undergraduate level; 52.7% said that performing research was an extra burden, while 53.3% agreed with the

reason that research is not included in the curriculum which causes lack of research participation (Table 2).

S.#	Questions	Agree	Neutral	Disagree
1	Less time availability in schedule is the reason for lack of conducting research at undergraduate level	76%	16.7%	7.3%
2	It is an extra burden upon medical students to perform research?	52.7%	30.6%	16.7%
3	Performing research is a complex subject?	57.3%	37.4%	15.3%
4	Research isn't part of curriculum is the reason for lack of conducting research at undergraduate level?	53.3%	27.4%	19.3%

DISCUSSION

Positive attitude of students towards research can be achieved when facilitators try methods to convert the research theme into more positive attitudes.⁴ The results in this study are diverse and similar to previous studies which reported differences in students' perception towards research.

The first factor assessed in this study was that 80.7% students participated in research project which is a positive attitude as compared to the study having only 40% of research participation.^{5,6} Advanced countries showed good results of students who had published an article in a journal, while in this study only 22% published their work, showing the lack of opportunities for undergraduate students to publish their articles.⁷ Similar study shows that the biggest factor of conducting less research projects by undergraduate students was less time availability in the schedule.⁸

Studies show that most of the students found research to be a complex subject which is the major reason behind negligence of undergraduate students towards research.^{9,10}

Regarding inclusion of research teaching, 58.7% students said that research training should be a part of undergraduate curriculum of MBBS, while 16% disagreed.¹¹ College research program directors should strive to create incentives to collaborate with undergraduate students and promote faculty awareness so that undergraduates can contribute to their research.^{12,13}

CONCLUSION

There was variation in the opinions of students towards research. Although the students considered research useful, but they considered it stressful at the same time.

RECOMMENDATION

It is the responsibility of all medical educators to reiterate the importance of research and inculcate research attitude among students. The policymakers should integrate research activities in the undergraduate curriculum and make participation mandatory.

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Compliance of type 2 diabetes mellitus patients with dietary guidelines at tertiary care hospitals of Peshawar

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ABSTRACT

Introduction: Diabetes mellitus (DM) is a major health problem around the globe. Even though adherence to medications leads to beneficial outcomes, it is often poor. Compliance is essential for controlling the disease.

Objective: To assess the compliance of diabetic patients with dietary guidelines provided to them at a tertiary care hospital of Peshawar, KP.

Materials & Methods: A cross-sectional descriptive study was conducted from March to May 2017 on diabetic patients visiting outpatients department of Rehman Medical Institute (RMI) and Hayatabad Medical Complex (HMC), Peshawar. A pretested questionnaire was administered for data collection. Data were analyzed using SPSS version 20 for descriptive statistics.

Results: Although 75% diabetic patients were advised by physicians for dietary guidelines, only 28% of them were fully compliant to their diet; however, 40% of educated patients were fully compliant.

Conclusion: Education and good income source can be factors to determine the compliance of diabetic patients to their dietary guidelines.

Keywords: Diabetes mellitus, Type 2; Medication Adherence; Exercise; Diet; Blood Glucose.

The authors declared no conflict of interest and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

All authors contributed substantially to the planning of research, questionnaire design, data collection, data analysis and write-up of the article as part of a student research team at RMC. The research work was supervised by Sher Bahadur, Senior Research Officer at RMC.

Citation: Khan MI, Raj A, Ullah N, Ahmad A, Faizan M, Khan O, et al. Compliance of type 2 diabetes mellitus patients with dietary guidelines at tertiary care hospitals of Peshawar. J Med Students. 2017;3(1-2):24-7.

INTRODUCTION

Diabetes mellitus (DM) is a major health problem around the globe. In 2011, 366 million people worldwide had diabetes and it is predicted that by 2030, this figure will be 552 million.¹ Diabetes mellitus is currently among the top five causes of death in most high-income countries and resulted in 4.6 million deaths globally in 2011. Majority of cases of diabetes mellitus are type 2, and the greatest numbers of people with this disease are aged from 40 to 59 years.² A study conducted in January 2011 in Rawalpindi has shown higher prevalence of Type 2 DM (T2DM) as compared to previous studies in Pakistan.³

Even though adherence to medications leads to beneficial outcomes, it is often poor. Reasons for poor adherence include age, social and psychological factors, education and a lack of understanding of the long-term benefits of treatment, the complexity of the medication regimen, cost of medication and negative treatment perceptions. Poor communication between doctor and patient, adverse outcomes such as weight gain and hypoglycemia, and failure of clinicians to modify medications appropriately can also affect adherence. Despite evidence for the benefits of exercise, adherence to long-term exercise

programs can vary between 10% and 80%, particularly in the long term.⁴

A study conducted by American Diabetes Association showed that compliance of the study group was 74.8%, with an average of 79% in the case of a dose once daily and 38% in the case of a dose three times daily. The predominant type of noncompliance in all groups was dose omissions. However, more than one-third of the patients used more doses than prescribed. Overconsumption is a frequently made mistake by patients on a one-dose daily schedule.⁵

A study conducted in the United States showed a compliance rate between 70-80 percent to medications (Oral hypoglycemic) in the study group.⁶

Other factors attributed to non-compliance are the complexity of treatment, barriers to access, a negative social environment, and the degree to which the patient's everyday life is affected, especially in chronic diseases like diabetes.⁷

A study conducted in 2014 at Nishtar Hospital Multan had shown that the overall non-compliance rate was 36%. Compliance with diet was much better than compliance with medication and visits. Factors that showed significant association ($p \leq 0.05$) with non-compliance were age groups (above 55 years of age and below 55 years of age), education status, duration of disease, dosage regimen, diet & follow-up visit frequency.⁸

A study conducted in 2007 at Khyber Teaching Hospital, Peshawar showed that 68% of patients with type 2 DM had good compliance with pharmacotherapy.⁹ This study does not give an insight into the factors that play a role in compliance. A study conducted in 2001 in Lahore showed that only 40% of patients had good compliance. Main reasons for stopping the drugs in 97 non-compliant patients were carelessness (51.6% and the belief that diabetes was cured when there were no symptoms or when blood glucose became normal (50.5%).⁹ Many patients were not told about the chronic nature of the disease by the treating

doctor (28.9%) and cost of treatment was also among the reasons for stopping the drug (25.8%).¹⁰ A study conducted in India showed that dietary prescriptions were followed regularly by 37% of patients,¹¹ while in a study in the United States about half (52%) followed a meal plan.¹²

A study in Canada of patients with type 2 diabetes randomly selected from provincial health records reported few respondents participating in informal (37%) or organized (7.7%) physical activity programs.¹³ A survey in the United States found that only 26% of respondents followed a physical activity plan.¹⁴

In the province of Khyber Pakhtunkhwa, no research has been done to evaluate all three aspects of therapy in T2DM patients, i.e. dietary modifications, regular exercise and antidiabetic medication. It is important to identify the factors that affect the compliance of DM patients to therapy in our population in order to devise a strategy for comprehensive control of T2DM.

The objective of the study was to assess the compliance of Type 2 Diabetes Mellitus patients' to dietary guidelines provided to them at two tertiary care hospitals of Peshawar, Khyber Pakhtunkhwa, Pakistan.

MATERIALS & METHODS

It was a cross sectional descriptive study conducted in Rehman Medical Institute (RMI) and Hayatabad Medical Complex (HMC) from March to May 2017. Using convenience sampling a total of 100 diagnosed Type 2 DM patients were selected. Data were collected using the questionnaire obtained from the website of the Stanford University USA. Consent was taken from the patients. Data were analyzed by SPSS 15 for descriptive statistics.

RESULTS

Out of 100 participants, only 18 males and 10 females were fully compliant. Most (28, 52%) old aged patients were non-compliant; 18 educated patients were non-compliant as compared to 16 uneducated fully compliant patients (Table 1).

Factors	Non-compliant patients	Mildly compliant	Moderate compliant	Fully compliant
Gender				
Male	15 (24%)	13 (20%)	16 (26%)	18 (29%)
Female	5 (13%)	9 (24%)	14 (37%)	10 (26%)
Ages (years)				
<35 years	1 (50%)	0	1 (50%)	0
35-55 years	16 (36.3%)	6 (13.6%)	8 (18.1)	14 (31.8)
>55 years	28 (52%)	4 (7%)	5 (9%)	17 (31%)
Education				
Primary	10 (43%)	3 (13%)	5 (22%)	4 (17%)
High school	4 (29%)	2 (14%)	3 (21%)	5 (35%)
College	4 (20%)	5 (25%)	3 (15%)	8 (40%)
Uneducated	18 (41%)	5 (12%)	4 (9%)	16 (37%)

Figure 1 shows that 75% patients were advised by their physicians for diet, 10%, 11% were directed by the dietician and both physician and dietician respectively. Only 4% were not given any advice regarding their diet.

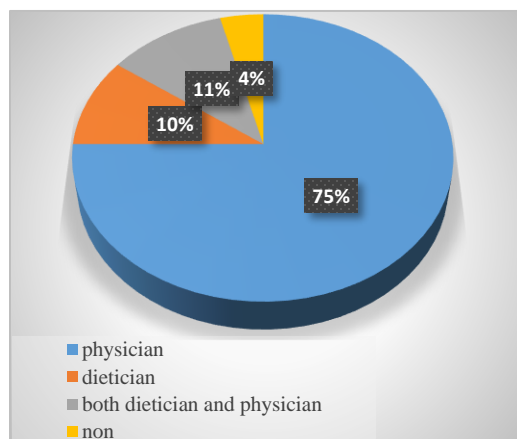


Figure 1: Source of the dietary advice to patients.

Figure 2 shows that 30% patients were moderately compliant, while 28%, 22% and 20% were fully, mildly and non-compliant respectively.

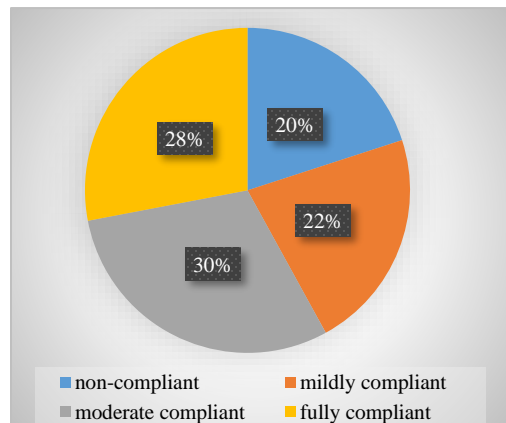


Figure 2: Percentages of patients with compliance to diet.

Patients (46%) with income of up to 20 thousand rupees had poor compliance.

Those (31%) with income of up to 80 thousand rupees had non-compliance while those (23%) with income above 80 thousand rupees had good compliance.

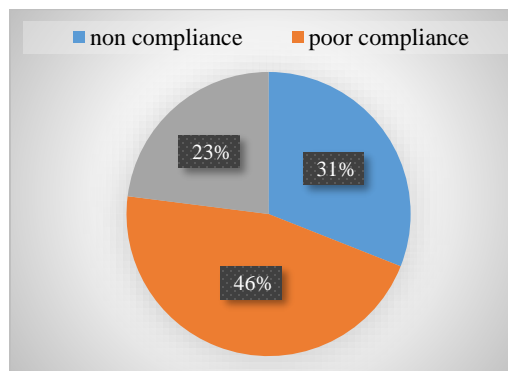


Figure 3: Compliance in relation to income of groups of patients.

DISCUSSION

It is difficult to measure the degree of compliance of diabetic patients because several factors such as dietary recommendations, medications, exercise, and socioeconomic factors play an important role in determining it.

The present study showed that most diabetic patients had no compliance in the age group above 55 years. In a study of India, the majority of diabetic patients were in the age group of 45-65 years.¹⁵ In this study, educated patients were more compliant than uneducated patients, which is similar to another study of Multan, Pakistan.¹⁶ Studies show significant relationship between education and compliance rate.¹⁷ In the present study, males were more compliant to diet than females, similar to study conducted in Saudi Arabia.¹⁸

CONCLUSION

Education and income source can be factors to determine the compliance of type 2 diabetic mellitus patients.

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SUGGESTED READING FROM PUBMED

1. **Fogarty J, Loughrey C. Hyponatraemia in Hospitalised Adults: a Guide for the Junior Doctor. *Ulster Med J.* 2017 May;86(2):84-89. Epub 2017 May 20.**

ABSTRACT

Hyponatraemia is common and often a source of confusion for junior doctors. It is infrequently dangerous, but when it is, is a medical emergency and requires urgent treatment to avoid life-threatening cerebral oedema. Treatment of acute hyponatraemia is also potentially hazardous; it is therefore important to be able to recognise when urgent management is not indicated, and to investigate appropriately. This paper focuses on these issues, which are most likely to be the cause of consternation for the junior doctor. Recommendations are largely based on the 2014 joint European clinical practice guidance for management of hyponatraemia; the 2010 GAIN (N Ireland) guidance and 2013 American guidance are also referenced.

2. **Bittner MJ, Routh JM, Folchert MD, Woessner NE, Kennedy SJ, Parks CC. Hand Hygiene Among Health Care Workers: Is Educating Patients and Families a Feasible Way to Increase Rates? *WMJ.* 2017 Jun;116(2):79-83.**

ABSTRACT

Background: The Centers for Disease Control and Prevention has recommended teaching patients to remind health care workers to disinfect their hands. However, cognitive impairment among patients may hamper such efforts.

Methods: The St. Louis University Mental Status (SLUMS) Examination was administered to randomly selected inpatients at the Omaha VA Medical Center in Omaha, Nebraska. We asked patients and their families about attitudes toward reminding health care workers to disinfect their hands: willingness, feeling comfortable, and feeling responsible.

Results: Of 143 patients, 94 completed SLUMS; 9 had normal mental status and appropriate attitudes. Overall, 16 encounters involved patients or family who were well-suited for giving reminders.

Conclusion: Programs to encourage hospitalized adults to remind staff to perform hand hygiene may encounter barriers related to cognitive impairment and attitudes.

3. **Stoklosa H, Lyman M, Bohnert C, Mittel O. Medical education and human trafficking: using simulation. *Med Educ Online.* 2017;22(1):1412746. doi:10.1080/10872981.2017.1412746.**

ABSTRACT

Healthcare providers have the potential to play a crucial role in human trafficking prevention, identification, and

intervention. However, trafficked patients are often unidentified due to lack of education and preparation available to healthcare professionals at all levels of training and practice. To increase victim identification in healthcare settings, providers need to be educated about the issue of trafficking and its clinical presentations in an interactive format that maximizes learning and ultimately patient-centered outcomes. In 2014, University of Louisville School of Medicine created a simulation-based medical education (SBME) curriculum to prepare students to recognize victims and intervene on their behalf. The authors share the factors that influenced the session's development and incorporation into an already full third year medical curriculum and outline the development process. The process included a needs assessment for the education intervention, development of objectives and corresponding assessment, implementation of the curriculum, and finally the next steps of the module as it develops further. Additional alternatives are provided for other medical educators seeking to implement similar modules at their home institution. It is our hope that the description of this process will help others to create similar interactive educational programs and ultimately help trafficking survivors receive the care they need.

Abbreviations: HCP: Healthcare professional; M-SIGHT: Medical student instruction in global human trafficking; SBME: Simulation-based medical education; SP: Standardized patient; TIC: Trauma-informed care.

Keywords: Violence; human trafficking; medical education; patient-centered outcomes; simulation.

4. **Hailesilassie H, Kerebih H, Negash A, Girma E, Siebeck M, Tesfaye M. Attitude of Medical Students towards Psychiatry: The case of Jimma University, Southwest Ethiopia. *Ethiop J Health Sci.* 2017 May;27(3):207-214.**

ABSTRACT

Background: The inability to attract medical graduates to specialize in psychiatry has always been a serious challenge to psychiatry training programs. Therefore, the aim of this study was to assess the attitude of medical students towards psychiatry.

Methods: A comparative cross-sectional survey was conducted among 122 fourth year medical students of Jimma University. The attitude of medical students towards psychiatry was measured by Attitude toward Psychiatry - 30 (ATP-30). The collected Data were analyzed by SPSS version-20 using independent samples t-test plus bivariate and multivariate logistic regression. The level of significance was determined at 95% confidence interval.

Results: Medical students who did not take psychiatry clinical rotation had a higher ATP-30 mean score 55.52(±15.2) indicating positive attitude towards psychiatry

than those who completed psychiatry clinical rotation (mean= 49.75 ±10.67). Female medical students had significantly more positive attitude towards psychiatry than males (OR=9.23, 95% CI: 2.32; 36.76). Medical students who did not take psychiatry clinical rotation had more positive attitude towards psychiatry than students who completed the psychiatry clinical rotation (OR=7.58, 95% CI: 2.02; 28.37). Subjective experience of mental illness and reported family history of mental illness significantly predicted positive attitude toward psychiatry.

Conclusion: The findings suggest that doing psychiatry rotation might have affected the attitude of medical students towards psychiatry. Future research should assess the experiential factors during psychiatry training of medical students that affect their attitudes. Also, future research needs to evaluate the attitudes of fourth year medical students before and after their psychiatry clinical rotation.

Keywords: Attitude; medical students; medical training; psychiatry.

5. Villareal DT, Aguirre L, Gurney AB, Waters DL, Sinacore DR, Colombo E, Armamento-Villareal R, Qualls C. Aerobic or Resistance Exercise, or Both, in Dieting Obese Older Adults. *N Engl J Med.* 2017 May 18;376(20):1943-1955. doi: 10.1056/NEJMoa1616338.

ABSTRACT

Background: Obesity causes frailty in older adults; however, weight loss might accelerate age-related loss of muscle and bone mass and resultant sarcopenia and osteopenia.

Methods: In this clinical trial involving 160 obese older adults, we evaluated the effectiveness of several exercise modes in reversing frailty and preventing reduction in muscle and bone mass induced by weight loss. Participants were randomly assigned to a weight-management program plus one of three exercise programs - aerobic training, resistance training, or combined aerobic and resistance training - or to a control group (no weight-management or exercise program). The primary outcome was the change in Physical Performance Test score from baseline to 6 months (scores range from 0 to 36 points; higher scores indicate better performance). Secondary outcomes included changes in other frailty measures, body composition, bone mineral density, and physical functions.

Results: A total of 141 participants completed the study. The Physical Performance Test score increased more in the combination group than in the aerobic and resistance groups (27.9 to 33.4 points [21% increase] vs. 29.3 to 33.2 points [14% increase] and 28.8 to 32.7 points [14% increase], respectively; P=0.01 and P=0.02 after Bonferroni correction); the scores increased more in all exercise groups than in the control group (P<0.001 for between-group comparisons). Peak oxygen consumption (milliliters per kilogram of body weight per minute) increased more in the combination and aerobic groups (17.2 to 20.3 [17%

increase] and 17.6 to 20.9 [18% increase], respectively) than in the resistance group (17.0 to 18.3 [8% increase]) (P<0.001 for both comparisons). Strength increased more in the combination and resistance groups (272 to 320 kg [18% increase] and 288 to 337 kg [19% increase], respectively) than in the aerobic group (265 to 270 kg [4% increase]) (P<0.001 for both comparisons). Body weight decreased by 9% in all exercise groups but did not change significantly in the control group. Lean mass decreased less in the combination and resistance groups than in the aerobic group (56.5 to 54.8 kg [3% decrease] and 58.1 to 57.1 kg [2% decrease], respectively, vs. 55.0 to 52.3 kg [5% decrease]), as did bone mineral density at the total hip (grams per square centimeter; 1.010 to 0.996 [1% decrease] and 1.047 to 1.041 [0.5% decrease], respectively, vs. 1.018 to 0.991 [3% decrease]) (P<0.05 for all comparisons). Exercise-related adverse events included musculoskeletal injuries.

Conclusions: Of the methods tested, weight loss plus combined aerobic and resistance exercise was the most effective in improving functional status of obese older adults. (Funded by the National Institutes of Health; LITOE ClinicalTrials.gov number, NCT01065636.).

6. Schöner M, Alizadeh S, Jamalabadi H, Abraham A, Pawlitzki A, Gais S. Decoding material-specific memory reprocessing during sleep in humans. *Nat Commun.* 2017 May 17;8:15404. doi: 10.1038/ncomms15404.

ABSTRACT

Neuronal learning activity is reactivated during sleep but the dynamics of this reactivation in humans are still poorly understood. Here we use multivariate pattern classification to decode electrical brain activity during sleep and determine what type of images participants had viewed in a preceding learning session. We find significant patterns of learning-related processing during rapid eye movement (REM) and non-REM (NREM) sleep, which are generalizable across subjects. This processing occurs in a cyclic fashion during time windows congruous to critical periods of synaptic plasticity. Its spatial distribution over the scalp and relevant frequencies differ between NREM and REM sleep. Moreover, only the strength of reprocessing in slow-wave sleep influenced later memory performance, speaking for at least two distinct underlying mechanisms between these states. We thus show that memory reprocessing occurs in both NREM and REM sleep in humans and that it pertains to different aspects of the consolidation process.

7. Xiao F, Zheng R, Yang D, Cao K, Zhang S, Wu B, Shao Y, Zhou B. Sex-dependent aortic valve pathology in patients with rheumatic heart disease. *PLoS One.* 2017 Jun 29;12(6):e0180230. doi: 10.1371/journal.pone.0180230. eCollection 2017.

ABSTRACT

Background: Rheumatic heart disease is an autoimmune disease caused by group A streptococci infection and

frequently affects the aortic valve. Sex differences are common in the disease progression, treatment, and outcome. However, little is known about the sex differences in the pathology of aortic valves in rheumatic heart disease.

Design: We studied the end-stage calcific aortic valves from male versus female patients to reveal the sex-dependent pathology differences and molecular changes associated with requiring valve replacement.

Methods: Aortic valves from 39 patients with rheumatic heart disease (19 males and 20 females) were collected at the time of aortic valve replacement for comparative pathology, immunohistochemistry, and gene expression analyses. Clinical characteristics were also analyzed and compared between the two groups.

Results: Aortic valves from female patients exhibited increased expression of collagens, infiltration of monocytes/macrophages and neovascularization. Aortic valves from female patients also had increased expression of inflammatory genes involved in the NF κ B pathway (phosphorylated NF κ B p65 subunit, IL8, and NOS3) and Th1 cytokine genes (IFN α and IL12B). The severe valve pathology in female patients was correlated with a higher serum level of anti-streptolysin O antibodies.

Conclusion: Inflammation is more prominent in aortic valves of female patients with rheumatic heart disease. This sex difference may contribute to the severe valve pathology and worse outcome of female patients.

8. *Caie PD, Harrison DJ. Next-Generation Pathology. Methods Mol Biol. 2016;1386:61-72. doi: 10.1007/978-1-4939-3283-2_4.*

ABSTRACT

The field of pathology is rapidly transforming from a semiquantitative and empirical science toward a big data discipline. Large data sets from across multiple omics fields may now be extracted from a patient's tissue sample. Tissue is, however, complex, heterogeneous, and prone to artifact. A reductionist view of tissue and disease progression, which does not take this complexity into account, may lead to single biomarkers failing in clinical trials. The integration of standardized multi-omics big data and the retention of valuable information on spatial heterogeneity are imperative to model complex disease mechanisms. Mathematical modeling through systems pathology approaches is the ideal medium to distill the significant information from these large, multi-parametric, and hierarchical data sets. Systems pathology may also predict the dynamical response of disease progression or response to therapy regimens from a static tissue sample. Next-generation pathology will incorporate big data with systems medicine in order to personalize clinical practice for both prognostic and predictive patient care.

Keywords: Cancer pathology; Histopathology; Image analysis; Integrative pathology; Multi-omics; Predictive models; Spatial heterogeneity; Systems pathology.

9. *Kumwenda S, Niang EHA, Orondo PW, William P, Oyinola L, Bongo GN, Chiwona B. Challenges facing young African scientists in their research careers: A qualitative exploratory study. Malawi Med J. 2017 Mar;29(1):1-4.*

ABSTRACT

Background: Africa accounts for 14% of world's population, and the economies of most African countries are considered to be growing, but this is not reflected in the amount of research published by Africans. This study aimed at identifying the challenges that young African scientists face in their career development.

Methods: This was a qualitative exploratory study involving young researchers who attended the Teaching and Research in Natural Sciences for Development (TReND) in Africa scientific writing and communication workshop, which was held in Malawi in September 2015. A semi-structured questionnaire was sent to all workshop participants who consented to taking part in the survey. In total, 28 questionnaires were sent via email and 15 were returned, representing a response rate of 53.6%. Data were analysed using thematic analysis.

Results: Young Africans develop their research interests various ways. The most common career-promoting factors identified by the study participants included formal classroom learning, aspirations to attain academic qualifications, work satisfaction, and the desire to fulfill parents' dreams. Challenges cited by survey respondents included a lack of mentorship, funds, and research and writing skills. Lack of interest in research by policymakers, lack of motivation by peers, and heavy workload (leaving little time for research) were also reported as challenges. Respondents suggested that grants specifically targeting young scientists would be beneficial. Participants also urged for the establishment of mentorship programmes, increasing motivation for research, and more frequent training opportunities.

Conclusions: There is need for improved funding for institutional and research network strengthening in Africa, with particular attention given to expanding opportunities for young researchers.

10. *Andre C, Deerin J, Leykum L. Students helping students: vertical peer mentoring to enhance the medical school experience. BMC Res Notes. 2017 May 2;10(1):176. doi: 10.1186/s13104-017-2498-8.*

ABSTRACT

Background: Effective mentoring is an important component of medical student professional development.

We provide a description of the mentoring program at our institution.

Methods: Our institution UTHSCSA implemented a student-advising program (Veritas) with clinical faculty mentors and senior students (MiMs). The MiMs provided vertical peer mentoring to more junior students as an adjunct to faculty advising. The MiMs lead small group discussions that foster camaraderie, share academic and career information and promote professional identity. An optional MiM elective more intensively develops mentorship and leadership skills through a formal curriculum. The authors used annual survey data of all students as well as student mentors to evaluate program effectiveness.

Results: Overall, student perception of the program improved each year across multiple domains, including feeling more prepared, supported and satisfied with their overall experience in medical school. Student mentors also found the process rewarding and helpful to their future careers as physicians.

Conclusions: The authors suggest implementing a vertical peer-mentoring program can be an effective adjunct to faculty mentoring.

Keywords: Career advising; Medical students; Mentoring; Peer mentoring; Vertical peer mentoring.

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INSTRUCTIONS FOR AUTHORS

The journal follows the guidelines of Uniform Requirements for Manuscript Submission as recommended by the International Committee of Medical Journal Editors (ICMJE) available on the website www.icmje.org, including all updates (Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals, Updated December 2016).

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10. The Discussion is a most important part of an article and should not be used to describe the results as a repetition; rather it is meant to explain and interpret the results and provide readers with a comprehensive picture of how the researchers have viewed their results in light of their objectives. It should be mentioned how the results strengthen a hypothesis or help in making a decision regarding the null hypothesis. A recommended technique is to discuss the main findings of the study first, giving reasons for the plausibility or otherwise of the findings. Demographic and other supportive data should be used to further the discussion and should not be used to discuss unimportant aspects of the profiles of subjects. An important component of discussion is to compare and contrast the findings of the study with other similar studies starting from the local level and proceeding to national, regional and international levels, as indicated. References for comparisons should also be recent studies with similar objectives and/or study designs; preferably studies with large random samples and strong statistical analyses should be selected for discussion.
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