Prevalence of Adult Attention Deficit Hyperactivity Disorder among Medical Students, King Faisal University

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KEYWORDS
ADHD, medical students, prevalence, academic performance, mental health, Gulf region.

ABSTRACT

Background: The neurobehavioral disorder known as attention-deficit/hyperactivity disorder (ADHD) is typified by impulsivity, hyperactivity, and difficulty in maintaining focus. According to recent research, it can last into adulthood. Regarding identifying adult ADHD, the fifth edition of the "Diagnostic and Statistical Manual of Mental Disorders" has undergone major alteration. As far as we are aware, few research has been done in the Gulf region on adult ADHD among medical students.

Method: A cross-sectional study was carried out on students of medicine from all academic years in King Faisal University, Hofuf, from December 2023 until June 2024. 279 medical students participated in the study. Self-reported English questionnaires with two sections—a sociodemographic section and a screening scale for adult ADHD based on the DSM5 version—were utilized for the investigation. Outcomes: (14. %) of pupils mentioned having signs of ADHD.

Results: Of the sample, 14% of students exhibited ADHD symptoms, a rate higher than the global prevalence. Female students (13.1%) and first-year students (18.9%) showed significant ADHD symptoms. Psychological comorbidities were present in 28.6% of ADHD-affected students compared to 11.4% of non-affected students. The ADHD group demonstrated mild but notable challenges in concentration, relaxation, and impulsive behavior, with implications for academic performance and stress management.

Conclusion: Our study shows a higher prevalence compared with a worldwide prevalence of i.e., 14%. This difference could be due to community interaction and way of living life style factors. Those individuals may have difficulty in communication and learning which can disturb students' academic efficiency, lengthen their study, and even disturb their development.

1. Introduction

The neurobehavioral illness known as attention-deficit/hyperactivity disorder (ADHD) is typified by impulsivity, hyperactivity, and difficulty in maintaining focus [1]. Until recently, ADHD was mistakenly believed to be limited to young adults and to have little to no effect on an individual's later years. It can continue into maturity, according to recent studies [2]. According to estimates, 3.4% of adults in the US, 7.3% in France, 1.1% in Australia, and 1.8% in Lebanon have ADHD [3, 4].

Furthermore, there is growing evidence of the prevalence of underdiagnosis and/or undertreatment of the illness. According to a US study, the prevalence of adult ADHD is 4.4%. The majority of cases were either mistreated, untreated, or treated for further prevalent co-morbid conditions that frequently co-occur with ADHD, such as alcohol abuse, major depressive disorder, and anxiety disorder [5, 6].

Additionally, even when the co-morbid disorder is being treated, a study conducted among medical students in Riyadh City 2 found that the co-morbid group is generally poor [6]. According to DuPaul et al. [7], at least 25% of college students with impairments have an ADHD diagnosis, and between 2% and 8% of the college population reports clinically significant levels of ADHD symptomatology. 4.4% was the estimated prevalence of modern adult ADHD, according to Kessler et al. [1]. A substantial association was found between being non-Hispanic white, unmarried, male, and having been married in the past.

After conducting a systematic review, Polanczyk et al. [9] reported that the prevalence of ADHD was 5.29%

worldwide. This implies that geographic factors do not greatly influence estimates of the prevalence of ADHD/HD worldwide. On the other hand, lower functional. Emotional, and educational results have been associated with adult ADHD. Additionally, it has numerous detriment effects on the patient's quality of life [6]. Since adult ADHD can progress from high school to college, it may also affect the patient's ability to compete with their partners and decrease their desire to advocate for themselves by getting better grades. Finally, adult ADHD may prolong the patient's time in college [6], which may harm their future career life.

To enhance the overall outcome for those who are more likely to acquire adult ADHD, early intervention with a multidisciplinary strategy should be offered. Adults are being diagnosed with ADHD more frequently. The Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV), which was the previous standard for diagnosing ADHD, was created and approved for use with children and is not appropriate for use with adults [1].

When it came to diagnosing ADHD in adults, the DSM-IV had a number of serious restrictions. For example, some of the specified symptoms (such "has difficulty playing quietly") were unsuitable for adults [1]. But because to a number of important revisions to the DSM-5, doctors can now diagnose disorders more accurately, marking a further advancement in the field. Among these changes is the definition, which now more accurately addresses the individual's experience.

In order to properly represent the category of illnesses initially identified in childhood, adolescence, or infancy, the term "neurodevelopmental disorder" was used. In addition, the diagnosis of adult ADHD now requires the presence of five or more features on each of the nine features in each (17 years and older). However, the researchers and doctors benefited from the addition of instances while keeping the sentences intact.

The age at which certain symptoms first show, which was prior to seven years old, has been shifted to twelve years since most adults remember the onset at that age as opposed to seven.

In addition to determining whether dominant or blended domains constitute the clinical picture and whether there may be a period of remission, specifiers are used to determine the severity of the condition.

Autism spectrum disorder was eliminated as an exclusion criterion [8]. Given the significance of their mental and physical health to provide safe care to community members, medical field students, and practitioners represent one of the vital populations with whom to examine the prevalence of adult ADHD. Based on the adult ADHD self-report scale (ASRS) and Wender Reimherr structured interview (experts' rating), estimates of the prevalence rates of adult ADHD among medical students were 16.5% and 13.4% respectively [10]. This was a substantial increase above the 2012 meta-analysis on adults with ADHD that found 5% of cases [11]. This is due to the possibility that adult ADHD will affect these people's functioning more severely.

Another study on medical students in Kenya found that, according to the WHO-validated ASRS v1.1 (derived from DSM-IV-TR) screener, the prevalence of self-reported ADHD symptoms was 23.7% [12]. In contrast, at Zahedan University of Medical Sciences, 15.4% of medical students reported having symptoms [13]. In 2010 US study on medical students found that 5.5% had received an ADHD diagnosis in the past [14]. A prevalence rate of 16.5% was found in 400 students at the Hamadan Medical Science University in Iran, according to additional research done in various fields [10].

In the Pharmacology Department at Al-Mustansiriya University, Iraq, 400 medical students participated in a second cross-sectional study to screen students using the ASRS screening instrument. The research showed the predominance of 16.6% of people with ADHD symptoms (19.8% of men and 12.1% of women) [15]. The results revealed a predominance of 16.6% of ADHD symptoms (19.8% male and 12.1% female) [15]. Given the recent addition of adult ADHD, the majority of the publications in the study's literature were completed using the DSM-5 criteria. Furthermore, the diagnostic criteria are the same for children, adolescents, and adults; the crucial difference is the quantity of symptoms. For a child or teenager are to be diagnosed with ADHD, they must show six symptoms or more in one or both domains.

However, adults must have five or more symptoms. For any age group, a minimum of six months must elapse before a diagnosis is given. Numerous research studies conducted worldwide emphasize how critical it is to identify the disease early on to minimize its effects and potential to cause harm that could have a recurrent detrimental influence on persons. As far as we are aware, no research has been conducted to bolster the significance of treating the disorder at a younger age. Over the past ten years, Saudi Arabia has not provided data on the prevalence of adult ADHD disorder, nor have any studies been done on the disorder in adults or

medical professionals.

Goals: To determine whether attention-deficit/hyperactivity had any good or poor performance in terms of education, emotion, and quality of life are significantly correlated.

Objectives:

1. To examine whether there is a strong relationship between poor functioning in education, and emotion concerning ADHD.

2. To find out if there is any relationship between culture and geography with ADHD.

3. To find out ADHD patients have low grade of education outcomes.

4. To find out if the Prevalence of ADHD is higher than other country.

5. To examine ADHD patients who have low adjustment in social life.

2. Methodology:

Cross-sectional study with a sample size 279 from King Faisal University, College of Medicine, Al Hofuf, Ahasa, Saudi Arabia. with different age groups from 1 year to 5 years. Randomly collected data were analyzed with the help of SPSS version 26 in order to find out if there is a strong association between poor functioning in education, emotion, and quality of life in relation to ADHD.

Data Collection and Procedure:

The Adult ADHD Self-Report Scale (ASRS v1.1) and scoring system were created in collaboration with the Workgroup on Adult ADHD and the World Health Organization (WHO) to assist medical professionals in screening their adult patients for ADHD. These questionnaires were utilized for data collection. The ASRS v1.1's questions examine how adult ADHD symptoms manifest and align with DSM-IV criteria.

The revisions as mentioned earlier were made in light of the 2017 effort by Ustun et al. to create a DSM-5 adaptation of the ASRS screening scale: Spencer, T.J., Berglund, P., Gruber, M.J., Faraone, S.V., Ustun, B., Adler, L.A., Rudin, C., Kessler, R.C. (2017). [https://www.ncbi.nlm.nih.gov/pubmed/28384801] The World Health Organization Adult Attention-Deficit/Hyperactivity Disorder Self-Report Screening Scale for DSM-5. JAMA Psychiatry, 74(5), 520-526.

Two scoring methods are available. Initially, you can employ simple scoring (i.e., assign a summary score of 0–24 to each respondent and score each item in the range of 0–4) and utilize the resulting continuous score of 0–24 as a predictor without the need for a clinical threshold.

We tried our best to explain the research goal and gave the questionnaires to the eligible students. After that, we distributed the link to the questionnaires via an official email, WhatsApp group, etc.

Data interpretation With SPSS version 26, a statistical analysis was carried out on the collected data. For every variable, descriptive statistics were computed, such as means, standard deviations, and frequencies.

Hypotheses

1. There will be a strong correlation between GPA with ADHD

2. There will be a notable correlation between geography and culture with ADHD.

3. The grade of schooling results for ADHD patients will be significantly impacted negatively.

4. There will be a strong correlation between psychological illness and ADHD patients.

3. Results

The sample consists predominantly of female medical students (65.6%), with males making up 34.4%. The majority are in their first (39.8%) and second years (34.4%) of medical school, suggesting that the participants are primarily at the early stages of their education. The GPA distribution shows that most students are high achievers, with over half (53.8%) having a GPA between 4.5 and 5. In contrast, a smaller portion has a GPA below 3.5, indicating a generally strong academic performance.

Regarding health, 71% of the respondents report no prior physical illness, while 29% have experienced physical

health issues. Regarding psychological illness, 15.1% have reported a history, with ADHD being present in 14% of the total sample. Child ADHD accounts for 4.3%, and adult ADHD for 5.4%, with the majority of psychological issues (90.3%) falling under "other" conditions, indicating a range of mental health challenges within this group.

Psychological Illnesses (Focus on ADHD):

- Among those with psychological illnesses, ADHD (child and adult forms) is noted in 4.3% and 5.4% of the cases, respectively, with 90.3% falling under other unspecified psychological conditions. The high percentage of "others" might indicate a broader range of mental health issues outside of ADHD, suggesting that further detailed psychological evaluations may be needed better to understand the mental health landscape of this group.

- 14% of the total sample is identified as having ADHD, while the remaining 86% do not. This ADHD prevalence rate is relatively consistent with broader estimates in student populations, but it could warrant attention in terms of academic accommodations and mental health support strategies for these individuals. (Table 1)

		n	%
Gender	Female	183	65.60%
	Male	96	34.40%
Medical Year	Fifth year	3	1.10%
	First year	111	39.80%
	Fourth year	12	4.30%
	Second year	96	34.40%
	Third year	57	20.40%
What is your GPA?	2.5 - 2.99	21	7.50%
	3 - 3.49	18	6.50%
	3.5 - 3.99	33	11.80%
	4 - 4.49	57	20.40%
	4.5 - 5	150	53.80%
Do you have any physical illness before?	No	198	71.00%
	Yes	81	29.00%
Do you have any psychological illness before?	No	237	84.90%
	Yes	42	15.10%
If yes, what are these psychological illnesses?	ADHD (Child Attention-deficit/ Hyperactivity disorder)	12	4.30%
	Adult Attention-deficit/Hyperactivity disorder	15	5.40%
	Others	252	90.30%
Frequencies of ADHD	no ADHD	240	86.00%
	has ADHD	39	14.00%

ADHD

The data reveals that many respondents experience challenges related to concentration and attention. For the question on difficulty concentrating when spoken to directly, the majority report experiencing this either "rarely" (36.6%) or "sometimes" (36.6%), with only 16.1% never encountering this issue. This suggests a potential pattern of mild attentional difficulties among a large portion of the participants. Similarly, for physical restlessness, most respondents (41.9%) never leave their seat in situations where they are expected to remain seated, though some report this behavior "rarely" (33.3%) or "sometimes" (16.1%).

Regarding difficulties with relaxation, a substantial percentage (35.5%) report sometimes struggling to unwind, with 14% reporting this issue "often" and 7.5% "very often," indicating that stress management may be a concern for a segment of the population. Additionally, in conversations, 29% report sometimes finishing others' sentences, which could be indicative of impulsivity, another common ADHD trait. Procrastination also appears prevalent, with 30.1% frequently putting things off until the last minute and 17.2% doing so "very often."

Lastly, the question about relying on others to stay organized shows that 33.3% of respondents never depend on others, but 25.8% do so "sometimes" and 8.6% "often." This suggests that while many participants maintain independence in managing their responsibilities, a significant number may struggle with self-organization and time management. Overall, the responses point to varying degrees of ADHD-related behaviors, such as difficulties with attention, impulsivity, and organization, affecting a portion of the sample. (Table 2)

ADHD questions		n	%
1. How often do you have difficulty concentrating on what people are saying to you even when they are speaking to you directly?	Never	45	16.10 %
	Often	24	8.60

			%
	Rarely	102	36.60 %
	Sometimes	102	36.60 %
	Very Often	6	2.20 %
2. How often do you leave your seat in meetings or other situations in which you are expected to remain seated?	Never	117	41.90 %
	Often	12	4.30 %
	Rarely	93	33.30 %
	Sometimes	45	16.10 %
	Very Often	12	4.30 %
3. How often do you have difficulty unwinding and relaxing when you have time to yourself?	Never	57	20.40 %
	Often	39	14.00 %
	Rarely	63	22.60 %
	Sometimes	99	35.50 %
	Very Often	21	7.50 %
4. When you're in a conversation, how often do you find yourself finishing the sentences of the people you are talking to before they can finish them themselves?	Never	63	22.60 %
	Often	39	14.00 %
	Rarely	78	28.00 %
	Sometimes	81	29.00 %
	Very Often	18	6.50 %
5. How often do you put things off until the last minute?	Never	21	7.50 %
	Often	84	30.10 %
	Rarely	42	15.10 %
	Sometimes	84	30.10 %
	Very Often	48	17.20 %
6. How often do you depend on others to keep your life in order and attend to details?	Never	93	33.30 %
	Often	24	8.60 %
	Rarely	81	29.00 %
	Sometimes	72	25.80 %
	Very Often	9	3.20 %

Demographics and Association with ADHD

			ADHD			P
			no ADHD	has ADHD	Total	
Gender	Female	Observed	159	24	183	0.74
		% within row	86.90%	13.10%	100.00%	
		% within column	66.30%	61.50%	65.60%	
		% of total	57.00%	8.60%	65.60%	
	Male	Observed	81	15	96	
		% within row	84.40%	15.60%	100.00%	
		% within column	33.80%	38.50%	34.40%	
		% of total	29.00%	5.40%	34.40%	
Medical Year	Fifth year	Observed	0	3	3	0.059
		% within row	0.00%	100.00%	100.00%	
		% within column	0.00%	7.70%	1.10%	
		% of total	0.00%	1.10%	1.10%	

	First year	Observed	90	21	111	
		% within row	81.10%	18.90%	100.00%	
		% within column	37.50%	53.80%	39.80%	
		% of total	32.30%	7.50%	39.80%	
	Fourth year	Observed	9	3	12	
		% within row	75.00%	25.00%	100.00%	
		% within column	3.80%	7.70%	4.30%	
		% of total	3.20%	1.10%	4.30%	
	Second year	Observed	29	3	32	
		% within row	90.60%	9.40%	100.00%	
		% within column	36.30%	23.10%	34.40%	
		% of total	31.20%	3.20%	34.40%	
	Third year	Observed	54	3	57	
		% within row	94.70%	5.30%	100.00%	
		% within column	22.50%	7.70%	20.40%	
		% of total	19.40%	1.10%	20.40%	
What is your GPA?	2.5 - 2.99	Observed	15	6	21	0.39
		% within row	71.40%	28.60%	100.00%	
		% within column	6.30%	15.40%	7.50%	
		% of total	5.40%	2.20%	7.50%	
	3 - 3.49	Observed	12	6	18	
		% within row	66.70%	33.30%	100.00%	
		% within column	5.00%	15.40%	6.50%	
		% of total	4.30%	2.20%	6.50%	
	3.5 - 3.99	Observed	27	6	33	
		% within row	81.80%	18.20%	100.00%	
		% within column	11.30%	15.40%	11.80%	
		% of total	9.70%	2.20%	11.80%	
	4 - 4.49	Observed	51	6	57	
		% within row	89.50%	10.50%	100.00%	
		% within column	21.30%	15.40%	20.40%	
		% of total	18.30%	2.20%	20.40%	
	4.5 - 5	Observed	135	15	150	
		% within row	90.00%	10.00%	100.00%	
		% within column	56.30%	38.50%	53.80%	
		% of total	48.40%	5.40%	53.80%	
Do you have any physical illness before?	No	Observed	171	27	198	0.882
		% within row	86.40%	13.60%	100.00%	
		% within column	71.30%	69.20%	71.00%	
		% of total	61.30%	9.70%	71.00%	
	Yes	Observed	69	12	81	
		% within row	85.20%	14.80%	100.00%	
		% within column	28.70%	30.80%	29.00%	
		% of total	24.70%	4.30%	29.00%	
Do you have any psychological illness before?	No	Observed	210	27	237	<.001
		% within row	88.60%	11.40%	100.00%	
		% within column	87.50%	69.20%	84.90%	
		% of total	75.30%	9.70%	84.90%	
	Yes	Observed	30	12	42	
		% within row	71.43%	28.57%	100.00%	
		% within column	12.50%	30.77%	15.05%	
		% of total	10.80%	4.30%	15.05%	

4. Discussion

Our study aims to determine the prevalence of ADHD among medical students, at King Faisal University, Medical students, Alhasa which is the eastern province. Compared with previous studies, our study shows a higher prevalence compared with the worldwide prevalence of ADHD in the previous studies. This difference could be due to social and cultural factors. Approximately, half of the students who scored high on ASRS were females. According to the National Comorbidity Survey Replication [5], 38% of adults with ADHD were female, which is much lower than our findings. More than half of the students who scored high on ASRS were first-year and 4-year students.

Findings show that further detailed psychological evaluations may be needed for a better understanding of the mental health landscape of this group. Because 14% of the total sample is identified as having ADHD, while the remaining 86% do not. Child ADHD accounts for 4.3%, and adult ADHD for 5.4%, with the majority of psychological issues (90.3%) falling under "other" conditions, indicating a range of mental health challenges within this group. This ADHD prevalence rate is relatively consistent with broader estimates in student populations, but it could warrant attention in terms of academic accommodations and mental health support

strategies for these individuals.

The data also reveals that many respondents experience challenges related to concentration and attention. For questions like difficulty in concentrating when spoken to directly, the majority report experiencing this either "rarely" (36.6%) or "sometimes" (36.6%), with only 16.1% never encountering this issue. This also suggests a potential pattern of mild attentional difficulties among a large portion of the participants. Similarly, for physical restlessness, most respondents (41.9%) never leave their seats in situations where they are expected to remain seated, though some report this behavior "rarely" (33.3%) or "sometimes" (16.1%).

Regarding difficulties with relaxation, (7.5%) responded ‘very often’ struggling to unwind, with 14% reporting this issue "often", regarding relaxation indicating that stress management may be a concern for a segment of the population. Additionally, 29% reported this could be indicative of impulsivity, another common ADHD trait. Procrastination also appears prevalent, with 30.1% frequently putting things off until the last minute and 17.2% doing so "very often."

Lastly, such questions that rely on others to stay organized show that 33.3% of respondents never depend on others, but 25.8% do so "sometimes" and 8.6% "often depend on others. This suggests that while many participants maintain independence in managing their responsibilities, a significant number may struggle with self-organization and time management. Overall, the responses point to varying degrees of ADHD-related behaviors, such as difficulties with attention, impulsivity, and organization, affecting a portion of the sample.

However, cross-tabulation analysis shows that there is statistical significance seen in P-values of ADHD prevalence concerning gender, medical year, GPA, and history of physical or psychological illness. For gender, both females (13.1%) and males (15.6%) show similar ADHD prevalence, with no statistically significant difference ($p = 0.74$). In terms of medical year, first-year students have the highest ADHD rate (18.9%), followed by fourth-year students (25%), but the overall difference across years is not statistically significant ($p = 0.059$). GPA shows no significant association with ADHD ($p = 0.39$), though students with lower GPAs (2.5-2.99) tend to have higher ADHD rates.

The table also examines physical and psychological illness history. While there is no significant difference in ADHD prevalence based on physical illness history ($p = 0.882$), but there is a strong association with psychological illness ($p < .001$). Students with prior psychological illnesses have significantly higher ADHD rates (28.6%) compared to those without psychological illnesses (11.4%), indicating a potential link between ADHD and comorbid psychological conditions. (Table 3)

So, from Table 1,2,3 we can conclude that ADHD symptoms can disturb academic efficiency, lengthen their study, and even disturb development ADHD is associated with lower levels of education. People with ADHD symptoms, particularly attention deficit disorders, have difficulty in communication and conversation; in addition, many of these patients suffer from learning impairments [16-20].

We proved the 2, 3 & 4 hypotheses that Students with prior psychological illnesses have significantly higher ADHD rates (28.6%) compared to those without psychological illnesses (11.4%). By hypothesis 1 there is no strong significant relationship between academic performance with ADHD, but there is somehow a negative impact on the student's performance.

5. Conclusion

ADHD is increasingly being diagnosed in adulthood, where most of the cases were either untreated, mistreated, or treated for other common co-morbid disorders. The estimated prevalence of ADHD among adults is 3.4% in the United States, 7.3% in France, 1.1%in Australia, and 1.8% in Lebanon. Our study shows a higher prevalence compared with a worldwide prevalence i.e.,14%. This difference could be due to lifestyle and culture Those individuals may have difficulty in communication and learning which can disturb students’ academic efficiency, lengthen their study, and even disturb their development. People with ADHD symptoms, particularly attention deficit disorders, have difficulty in communication and conversation; in addition, many of these patients suffer from learning impairments.

6. Recommendation

1. The development of a universal diagnostic strategy to detect adult ADHD symptoms is greatly needed for both clinical and public health purposes.

2. Large-scale epidemiological investigations with high quality are called for to address the magnitude of adult ADHD across the whole globe.

3. Support strategies for these students/individuals in terms of academic accommodations and mental health.

7. Limitations

This study, conducted among 279 medical students from King Faisal University, focuses on a single institution, limiting the generalizability of the findings to students in other academic fields or regions. Additionally, the reliance on self-reported data through the ASRS v1.1 questionnaire introduces the possibility of response bias, such as underreporting or over reporting symptoms due to recall errors or social desirability. The cross-sectional nature of the research provides only a snapshot in time, making it difficult to establish causal relationships between ADHD symptoms and academic outcomes or other factors. While the study acknowledges the presence of other psychological conditions, it does not delve deeply into their potential impact on ADHD diagnoses, which may confound the results. Longitudinal studies that explore comorbidity and other impairment in the students of medicine with ADHD will be necessary for addressing these limitations. Furthermore, the cultural and social factors unique to the region are not fully analyzed, leaving open questions about how these dynamics influence ADHD symptoms or the accuracy of the self-reported data.

Recommendations

1. Future research should expand the sample to include students from multiple universities and academic fields to enable cross-institutional comparisons and improve the generalizability of the results.

2. Conducting longitudinal studies would provide deeper insights into how ADHD symptoms develop over time and their impact on academic performance and personal well-being. Incorporating clinical assessments alongside self-reported questionnaires could improve the diagnostic accuracy and address the limitations of self-reported bias. Further exploration of comorbid psychological conditions is essential to better understand the interplay between ADHD and other mental health challenges, which may affect students' functioning.

3. As per the college curriculum, first three years are dedicated for basic sciences and clinical activities starts from fourth year. It is assumed that the reason for highest rate on ASRS for the first-year and fourth- year can be attributed to their first exposure to the basic sciences and clinical activities. Further investigation required to verify this.

4. It will be better to conduct separate studies on the rate of Attention Deficit and the rate of Hyperactivity among medical students that can provide valuable insights, as they represent different symptom profiles and impacts.

5. Lastly, universities should implement tailored support programs, including academic accommodations and mental health services, to address the needs of students with ADHD, promoting their academic success and well-being.

Declaration of conflicting interests

The authors declare that there is no conflict of interest regarding the publication of this article. Consent for publication Informed consent was obtained from all the participants.

Acknowledgement

The authors acknowledge the Deanship of Scientific Research at King Faisal University for obtaining financial support for research (GRANT KFU242272)

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