DOI: 10.7860/JCDR/2022/55170.16822

Original Article

Physiology Section

Effect of Sleep Deprivation on Mood States of Junior Residents in Obstetrics and Gynaecology Department: A Prospective Observational Study

SWATI SAGARIKA PANDA[1], RAKSHA JAIPURKAR[2], RAJESH KUMAR MISHRA[3]

BY-NC-ND

ABSTRACT

Introduction: Junior residents of highly demanding clinical specialties, like, Obstetrics and Gynaecology, are an integral part in the functioning of hospitals. They work round the clock donning the role of caregiver as well as learner and are in a constant state of stress. Any alteration in mood while working in intensive set ups like labour room and operation theatre can adversely affect not only the physician's performance but also patient safety.

Aim: To evaluate the effect of sleep deprivation on mood states of junior residents in Obstetrics and Gynaecology Department during call duty.

Materials and Methods: This prospective observational study was conducted in Department of Obstetrics and Gynaecology at Armed Forces Medical College (tertiary care hospital), Pune, Maharashtra, India, from March 2019 to August 2019. The study included 37 junior residents of Obstetrics and Gynaecology Department, between age range of 25-40 years. Sleep diary was used to record resident's sleep patterns, Karolinska Sleepiness Scale (KSS) was used to assess the day time sleepiness. Profile of Mood States (POMS) score was calculated during precall and postcall duty. This data was used to ascertain any changes in mood postcall due to sleep deprivation. Statistical analysis was done using paired Student's t-test and Wilcoxon's Signed rank test and p-value <0.05 was considered as significant.

Results: Out of 37 participants, 21 were males and 16 females. There was a significant worsening of postcall POMS score (5.24±27.82) from precall score (-6.86±23.70) following call duty associated with a decrease in mean night time sleep (p-value <0.001). Likewise increased KSS score was also noted after call duty (precall score was 3.03±1.65 vs postcall score was 5.73±2.05; p-value <0.001). This signifies that mood states are adversely affected by sleep deprivation in these residents.

Conclusion: The study showed that there was a significant worsening of mood states due to sleep deprivation during call duties. This also mandates review of efficacy and feasibility of current policy regulating work hour schedule of junior residents in India.

Keywords: Cognitive dysfunction, Mood disorders, Patient safety, Shift work schedule

INTRODUCTION

Sleep is vital for sustaining normal functioning of human body, emotional experience and a host of complex cognitive processes. Numerous scientific studies have put forth debates that without adequate sleep nearly every aspect of waking life becomes more arduous, laboured and emotionally less fulfilling [1-4]. Insufficient sleep is often the norm among many professionals, including medical professionals, where the residents face the maximum burnt [5]. Long shift works and on call duties have been an integral part of training program of junior residents, especially of the clinical specialties like Obstetrics and Gynaecology, Medicine, Surgery, Paediatrics and Anaesthesia. The residents play the dual role of caregiver and learner, assisting in the functioning of hospitals round the clock [6,7] .

Repeated shift work and long working hours increase the risk of sleep deprivation, sleep disturbance and poorer sleep quality in residents of clinical specialties as compared to residents of specialties which do not have so many on call duties [8]. Despite researches on effect of sleep deprivation on other medical specialties, there has been very little done in case of Obstetrics and Gynaecology, a specialty that demands round the clock surveillance and surgical procedural intervention [9-11].

Although few studies have been conducted in Western and middle Eastern countries, [7-9] the effect of sleep loss on mood in junior residents is still an unexplored territory in Indian subcontinent.

Even though there is general awareness regarding negative impact of sleep loss, the potential problems and extent of it on the mood states is yet to be defined in detail for residents working in clinical branches in various healthcare facilities of India. Keeping in mind the significance of the mood states of resident doctors while performing duties of patient care in intensive set up such as Intensive Care Unit (ICU), labour room and operation theatre, the present study was designed to explore the effect of sleep deprivation on mood states of junior residents in Obstetrics and Gynaecology Department during call duty using Profile of Mood States (POMS) score, sleep diary and Karolinska Sleepiness Scale (KSS). The present study aimed to measure variety and intensity of moods experienced by the junior residents during on call duties and to know, if the resident doctors are performing their duties in intensive set up in altered mood states.

MATERIALS AND METHODS

This prospective observational study was conducted in Department of Obstetrics and Gynaecology at Armed Forces Medical College (tertiary care hospital), Pune, Maharashtra, India, from March 2019 to August 2019. The study was approved by Institutional Ethics Committee (Ethical committee approval No: IEC/Oct/2018). Written informed consent was taken from all voluntary participants and complete confidentiality was maintained. The procedures followed were in accordance with the ethical standards of the Institutional committee on human experimentation and with the Helsinki Declaration of 1975 [12]. Total 37 eligible junior residents, as per

inclusion criteria, were included as it was a pilot study in a tertiary care hospital.

Inclusion criteria: All junior residents in the department of Obstetrics and Gynaecology, between age group 25-40 years were included in this study.

Exclusion criteria: Any cases with known history of sleep disorders, pregnant or breast feeding female resident doctors and residents with history of alcohol ingestion 24 hours prior to study were excluded.

Data collection: Equipment were self-filled questionnaires- POMS [13], KSS [14] and sleep diary [15]. The presentation order of tests included sleep diary followed by KSS and POMS which lasted for 8-10 minutes.

Study Procedure

The participants were evaluated on two occasions i.e., precall (previous day of call duty) and postcall day (day after call duty) after a call duty of 24 hours. Data was filled by the residents themselves and was collected between 10 am to 4 pm. Sleep diary was filled to assess sleep accumulated on both days. KSS was filled to assess day time drowsiness on precall and postcall day. POMS questionnaire was filled to assess alterations in mood state and to compare the mood state during precall and postcall.

Participants were divided in to three subgroups:

- First year Junior Resident (JR1)=12 residents
- Second year Junior Resident (JR2)=12 residents
- Third year Junior Resident (JR3)=13 residents

Each resident was evaluated only once.

Profile Of Mood States (POMS)

The questionnaire is a checklist consisting of 65 adjectives which are rated on a 5-point scale that ranges from not at all to extremely [16]. The modified POMS, which is a short form of the POMS, was used in the present study. This modified version of the POMS questionnaire contains 40 self-report items measuring the subscales of depression (7), anger (6), tension (6), confusion (5), fatigue (5), esteem related affect (6) and vigour (5) to which the participants respond using a 5-point Likert Scale which ranges from 0 (not at all) to 4 (extremely) [13].

The higher the score the worse are the subscales. However, in case of vigour and esteem related affect, the higher the score the better is the feeling. Total mood disturbance score is calculated by adding up the scores obtained for depression, anger, tension, confusion, fatigue and then subtracting the vigour and esteem related affect score. An increment in Total Mood Disturbance (TMD) score is an indication of worsening mood. The higher the TMD score, the worse is the mood status [13].

Karolinska Sleepiness Scale (KSS)

This scale measures the subjective level of sleepiness at a particular time during the day. With this scale the subject reflects the psychophysical state experienced in last ten minute. Basically, it measures situational sleepiness which is subject to fluctuations. It is a 9-point Likert scale which ranges from extremely alert to very sleepy. The modified KSS has another additional item i.e., extremely sleepy, falls asleep all time (Score ranging from 1-9). Scores on KSS increases with longer periods of wakefulness and strongly correlates with time of the day. In the present study, the original KSS has been used for assessing day time sleepiness [Table/Fig-1] [14].

Sleep Diary

The sleep diary used in present study was developed by Lough Borough Sleep Research Centre [15,17]. The format of sleep diary used for the present study is a pen and paper questionnaire where the subject fills the data for the last night's sleep. The data contained in this diary require manual aggregations and calculations. This sleep diary contains eight items that are considered to represent different critical parameters i.e., the time of getting into bed, sleep onset latency, number of awakenings during night, duration of awakenings, time of final awakening, final rise time, duration of total night time sleep and sleep quality which was evaluated using a Likert scale ranging from very poor (1) to very good (5). All the parameters were used to calculate the total night time sleep. Total night time sleep is calculated by subtracting total duration of sleep disturbance from total time spent in bed.

Karolinska Sleepiness Scale	Score
Extremely alert	1
Very alert	2
Alert	3
Rather alert	4
Neither alert nor sleepy	5
Some signs of sleepiness	6
Sleepy, but no effort to keep awake	7
Sleepy, but some effort to keep awake	8
Very sleepy, great effort to keep awake, fighting sleep	9

[Table/Fig-1]: Karolinska Sleepiness Scale.

STATISTICAL ANALYSIS

All data were analysed using the Statistical Package for the Social Sciences (SPSS) software package, version 20.0. Data was presented as mean±SD. Normality of the data was checked using Shapiro Wilk test. Paired Student's t-test was performed for parametric and Wilcoxon's Signed rank test was used for the non parametric results to compare the mean. A p-value of less than 0.05 was considered as an indication of statistical significance. Association between sleep and day time sleepiness, between sleep time and mood scores were determined by using Spearman's correlation coefficient. Subgroup analysis was done between JR1, JR2 and JR3 using Friedman's test.

RESULTS

Out of 37 participants, 21 were males and 16 were females. The demographic data of the study population is summarised in [Table/Fig-2].

Demographic parameters	Male	Female
JR1	7	5
JR2	8	4
JR3	6	7
Mean age (years) (Mean±SD)	32.07±2.76	32.80±3.55
Married	18	14
Participants with kids	12	8

[Table/Fig-2]: Demographics of study population.

The duration of total night time sleep was evaluated in minutes during precall (330.73±85.14) and postcall (153.32±64.35). It showed notable decrease in night time sleep during postcall (p-value <0.001). Postcall alertness also remarkably decreased as was evident by increase in KSS score from precall value of 3.03±1.65 to postcall value of 5.73±2.05 (p-value <0.001). The total mood disturbance score was found to be significantly higher on postcall day (5.24±27.82) than precall day (-6.86±23.70); (p-value=0.004) [Table/Fig-3].

Variations observed in different sub scores of POMS revealed that sub scores like fatigue (p-value <0.001), confusion (p-value=0.007) and depression (p-value <0.001) showed significant increase in post call score. On the other hand, there was a decrease in vigour (p-value=0.007) and esteem related affect score (p-value=0.013) as compared to precall score [Table/Fig-3].

Variables	Precall Mean±SD	Postcall Mean±SD	p-value
Tension	3.62±4.29	4.51±4.67	0.306
Anger	2.84±3.99	4.19±4.49	0.060
Fatigue	5.05±4.19	7.49±5.32	<0.001
Depression	2.89±5.56	5.08±6.60	<0.001
Confusion	3.92±3.86	5.46±4.68	0.007
Esteem related affect	15.89±4.23	13.68±4.35	0.013
Vigour	9.16±3.83	6.95±4.16	0.007
TMD	-6.86±23.70	5.24±27.82	0.004
KSS Score	3.03±1.65	5.73±2.05	<0.001
Sleep time(minutes)	330.73±85.14	153.32±64.35	<0.001
Sleep quality	4.14±0.94	2.68±1.15	<0.001

[Table/Fig-3]: Variation of sleep time, KSS and mood scores with call duty.
Paired t-test and Wilcoxon's Signed rank test, level of significant p-value <0.05

Spearman's correlation coefficient showed a negative correlation of sleep time with KSS score (p-value=0.36; r-value=-0.15) and sleep time with TMD score (p-value=0.30; r-value=-0.33) during precall. However, this negative correlation was not statistically significant. On the other hand, a statistically significant negative correlation was found between postcall sleep time with KSS and TMD scores (p-value=0.02; r-value=-0.385 and p-value=0.04; r-value=-0.34 respectively). These findings show worsening of mood with increased TMD score and decreased night sleep time [Table/Fig-4].

Correlation of parameters	Call duty	Spearman's rho	p-value
Sleep time-KSS score	Precall	-0.15	0.36
Sleep time-KSS score	Postcall	-0.385	0.02
Sleep time-TMD score	Precall	-0.33	0.30
Sleep time-TMD score	Postcall	-0.34	0.04

[Table/Fig-4]: Correlation of sleep time with KSS score and TMD score.
Spearman's correlation, level of significant p-value <0.05

On subgroup analysis, a decrease in total night time sleep was observed in JR1, JR2 and JR3 with mean sleep time of 111.67 minutes, 156 minutes and 144.17 minutes on postcall day, respectively. There was an increase in postcall TMD score from precall TMD score for all the subgroups. The KSS score also showed similar increase in values on postcall day compared to precall day. However, when compared among three groups for postcall duty, there were no significant difference. (KSS score, p-value=0.674; TMD score, p-value=0.24 and total night time sleep, p-value=0.119) [Table/Fig-5].

Parameters		JR1	JR2	JR3	p-value (Friedman's Test)
Sleep time (Minutes)	Precall	246.67	393.5	358.33	0.056
	Postcall	111.67	156	144.17	0.119
	p-value	0.001	<0.001	<0.001	
KSS score	Precall	4.83	3.67	2.67	0.129
	Postcall	7.50	5.67	4.67	0.674
	p-value	0.001	0.119	<0.001	
TMD score	Precall	26.33	-9.6	-18.83	0.07
	Postcall	29.50	4.50	2.67	0.24
	p-value	0.04	0.26	0.08	

[Table/Fig-5]: Subgroup analysis of total sleep time, KSS score and TMD score.
Friedman's test, level of significant p-value <0.05

DISCUSSION

The present study investigated the effect of sleep loss on impairment in mood states among junior residents posted at Obstetrics and Gynaecology Departemnt of a tertiary care hospital. The present study confirms that sleep deprivation has significant adverse effects on mood states in residents. It reports significant changes in fatigue, depression, confusion, esteem related affect and vigour as well as TMD scores on a postcall day after night call shift. Total sleep time during on-call duty is significantly less and it is affecting the mood states of residents on postcall day. This quantification of sleep for Obstetrics and Gynaecology residents has not been reported in any other prior study as per literature review. The increased KSS score indicates that the residents experience marked increase in day time sleepiness as compared to precall day as night time sleep significantly decrease during on call. On subgroup analysis, no significant changes were found in the parameters between JR1, JR2 and JR3 which implies sleep deprivation is affecting all the junior residents irrespective of their residency years.

A study conducted by Martini S et al., reported that Obstetrics and Gynaecology residency have the highest prevalence of burn out of any specialties [18]. The period of sleep deprivation and long night call duties are unavoidable consequences of medical residency training regime of Obstetrics and Gynaecology.

Studies have shown wide range of cognitive decline associated with sleep deprivation such as reduced ability to concentrate, slowing of reaction time, decreased memory, decreased ability to learn new skills. This along with mood disturbances and increased fatigue can lead to injuries and on job errors [19-21]. It has been demonstrated in various research that prolonged wakefulness can cause performance and cognitive impairments equivalent to alcohol intoxication of 0.1% which is beyond legally permissible limits [22]. In a meta-analysis of studies related to sleep deprivation it was noticed that mood was the most affected aspect of cognitive functions [23]. Altered mood of residents may have an adverse effect on colleagues, staff, patient as well as his own personal life. Anger and depression arising from fatigue has been documented to cause detachment and lack of sympathy for the patients. This can also cause strain in family and interpersonal relationships. Alteration in mood can reduce concentration and impinges the decision-making skills of the residents [23].

The elevation in TMD and KSS score observed in this study are consistent with adverse effects of sleep deprivation previously reported in healthcare professionals and residents. A study conducted by Reddy R et al., reported that residents working in intensive care units and intense work setups experience severe sleepiness on postcall day [24]. The contribution of sleep induced fatigue to accidental errors has been increasingly recognised in general population. However, sleep deprivation related distress may have more serious implications for physicians than general population. Fatigue-induced mood impairments can affect task motivation, increased perceived effort required for task completion and the ability to communicate efficiently [25]. A study in Dutch physicians showed that almost half are suffering from work related fatigue and burnout which decrease their work ability [26]. A study by Saadat H et al., on anesthesiologists revealed that all aspects of mood and cognitive tasks are clearly affected after night on call duty [27]. A similar study by Barger LK et al., showed increased risk of accidents due to sleep deprivation in interns [19].

It is well known that effective performance by residents of Obstetrics and Gynaecology require higher level of concentration, rapid judgment, immediate decision making and fine motor skills. Wali SO et al., conducted a study on residents from clinical specialties which included Obstetrics and Gynaecology, and reported worsening of mood on postcall day compared to precall day as indicated by increase in TMD score and day time sleepiness [7]. A study by Kalmbach DA et al., supported the findings of negative mood and its links to insufficient sleep-in residents and interns [28].

Restrictions on working hours of residents are in place in various countries including United Kingdom (since 1996) and United States of America (since 2003) [29,30]. Similarly, Supreme Court of India has passed a judgment in writ petition no. 348-352 in 1985 that "junior doctors should ordinarily work for 48 hours per week

and not more than 12 hours at a stretch". However, this is not implemented strictly in many parts of India resulting in prolonged work hours for Gynaecology residents without adequate sleep. This leads to accumulation of sleep debt and fatigue forcing them to work on altered mood states in intense work set-ups. Acute sleep deprivation related to on call shift work results in dose dependent impairments of mood states and increased day time sleepiness and fatigue making this population more vulnerable to depression as evident in increased postcall depression sub score.

Limitation(s)

The study was conducted in a single-centre, hence, the sample size was limited. Recall bias regarding previous night's sleep may be another limitation for the study. The questionnaires are subjective tools, and hence, less reliable than polysomnography.

CONCLUSION(S)

The present study highlights the various negative mood effects due to sleep deprivation after on call duty in Obstetrics and Gynaecology residents. The gradual decrease in night time sleep duration from precall to postcall day is reflected in increased total mood disturbance score and increased Karolinska sleepiness score. It is suggestive of a positive correlation between altered mood states and day time sleepiness. More longitudinal multicentric studies are needed to investigate the impact of altered mood states on their performance and its potential effects on patient safety and healthcare delivery to minimise unwarranted fatigue related errors. The present study also mandates for need of reassessment of efficacy and feasibility of current policy, regulating work hour schedule of junior residents by capping the duration of working hours and increasing number of residents working which will ensure circadian synchronisation and a better healthcare delivery.

REFERENCES

[1] Killgore WDS. Effects of sleep deprivation on cognition. In: Progress in brain research. Elsevier. 2010;185:105-29.
[2] Buysse DJ. Sleep health: Can we define it? Does it matter? Sleep. 2014;37(1):09-17.
[3] Alkadhi K, Zagaar M, Alhaider I, Salim S, Aleisa A. Neurobiological consequences of sleep deprivation. Curr Neuropharmacol. 2013;11(3):231-49.
[4] Spiegelhalder K, Regen W, Nanovska S, Baglioni C, Riemann D. Comorbid sleep disorders in neuropsychiatric disorders across the life cycle. Curr Psychiatry Rep. 2013;15(6):364.
[5] Baldwin Jr DC, Daugherty SR. Sleep deprivation and fatigue in residency training: Results of a national survey of first-and second-year residents. Sleep. 2004;27(2):217-23.
[6] Defoe DM, Power ML, Holzman GB, Carpentieri A, Schulkin J. Long hours and little sleep: Work schedules of residents in obstetrics and gynecology. Obstet Gynecol. 2001;97(6):1015-18.
[7] Wali SO, Qutah K, Abushanab L, Basamh R, Abushanab J, Krayem A, et al. Effect of on-call-related sleep deprivation on physicians' mood and alertness. Ann Thorac Med. 2013;8(1):22-27.
[8] Veasey S, Rosen R, Barzansky B, Rosen I, Owens J. Sleep loss and fatigue in residency training: A reappraisal. JAMA. 2002;288(9):1116-24.
[9] Rose M, Manser T, Ware JC. Effects of call on sleep and mood in internal medicine residents. Behav Sleep Med. 2008;6(2):75-88.
[10] Neuschwander A, Job A, Younes A, Mignon A, Delgoulet C, Cabon P, et al. Impact of sleep deprivation on anaesthesia residents' non-technical skills: A pilot simulation-based prospective randomized trial. BJA Br J Anaesth. 2017;119(1):125-31.
[11] Banfi T, Coletto E, d'Ascanio P, Dario P, Menciassi A, Faraguna U, et al. Effects of sleep deprivation on surgeons dexterity. Front Neurol. 2019;10:595.
[12] Shephard DA. The 1975 Declaration of Helsinki and consent. Can Med Assoc J. 1976;115(12):1191.
[13] Grove J. Abbreviated POMS Questionnaire (40 items). Int J Sport Psychol. 1992;23:93-109.
[14] Shahid A, Wilkinson K, Marcu S, Shapiro CM. Karolinska sleepiness scale (KSS). In: STOP, THAT and One Hundred Other Sleep Scales. Springer. 2011; p. 209-10.
[15] Carney CE, Buysse DJ, Ancoli-Israel S, Edinger JD, Krystal AD, Lichstein KL, et al. The consensus sleep diary: Standardizing prospective sleep self-monitoring. Sleep. 2012;35(2):287-02.
[16] McNair DM, Lorr M, Droppleman LF. Manual profile of mood states. San Diego, CA: Educational and Industrial Testing Services. 1971.
[17] Blake J, Kerr D. Development of an online sleep diary for physician and patient use. Knowl Manag E-Learning An Int J. 2010;2(2):188-02.
[18] Martini S, Arfken CL, Churchill A, Balon R. Burnout comparison among residents in different medical specialties. Acad Psychiatry. 2004;28(3):240-42.
[19] Barger LK, Sullivan JP, Blackwell T, O'Brien CS, St. Hilaire MA, Rahman SA, et al. Effects on resident work hours, sleep duration, and work experience in a randomized order safety trial evaluating resident-physician schedules (ROSTERS). Sleep. 2019;42(8):zsz110.
[20] Landrigan CP, Rothschild JM, Cronin JW, Kaushal R, Burdick E, Katz JT, et al. Effect of reducing interns' work hours on serious medical errors in intensive care units. N Engl J Med. 2004;351(18):1838-48.
[21] Basner M, Dinges DF, Shea JA, Small DS, Zhu J, Norton L, et al. Sleep and Alertness in Medical Interns and Residents: An observational study on the role of extended shifts. Sleep. 2017;40(4):01-08.
[22] Williamson AM, Feyer AM. Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. Occup Environ Med. 2000;57(10):649-55.
[23] Kiernan M, Civetta J, Bartus C, Walsh S. 24 hours on-call and acute fatigue no longer worsen resident mood under the 80-hour work week regulations. Curr Surg. 2006;63(3):237-41.
[24] Reddy R, Guntupalli K, Alapat P, Surani S, Casturi L, Subramanian S. Sleepiness in medical ICU residents. Chest. 2009;135(1):81-85.
[25] Durmer JS, Dinges DF. Neurocognitive consequences of sleep deprivation. In: Seminars in neurology. Copyright© 2005 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New . 2005.; p.117-29.
[26] Ruitenburg MM, Frings-Dresen MHW, Sluiter JK. The prevalence of common mental disorders among hospital physicians and their association with self-reported work ability: A cross-sectional study. BMC Health Serv Res. 2012;12(1):01-07.
[27] Saadat H, Bissonnette B, Tumin D, Thung A, Rice J, Barry N, et al. Time to talk about work-hour impact on anesthesiologists: The effects of sleep deprivation on Profile of Mood States and cognitive tasks. Pediatr Anesth. 2016;26(1):66-71.
[28] Kalmbach DA, Fang Y, Arnedt JT, Cochran AL, Deldin PJ, Kaplin AI, et al. Effects of sleep, physical activity, and shift work on daily mood: A prospective mobile monitoring study of medical interns. J Gen Intern Med. 2018;33(6):914-20.
[29] Pickersgill T. The European working time directive for doctors in training. BMJ. 2001;323(7324):1266. Available from: https://pubmed.ncbi.nlm.nih.gov/11731377.
[30] Education AC for GM. Accreditation Council for Graduate Medical Education Common Program Requirements. 2011.

PARTICULARS OF CONTRIBUTORS:
1. Senior Resident, Department of Physiology, Armed Forces Medical College, Pune, Maharashtra, India.
2. Professor, Department of Physiology, Armed Forces Medical College, Pune, Maharashtra, India.
3. Assistant Professor, Department of Obstetrics and Gynaecology, Armed Forces Medical College, Pune, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Raksha Jaipurkar,
Professor, Department of Physiology, Armed Forces Medical College, Solapur Road, Pune, Maharashtra, India.
E-mail: rakshukarade@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Jan 29, 2022
- Manual Googling: Jun 08, 2022
- iThenticate Software: Aug 23, 2022 (15%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Jan 27, 2022**
Date of Peer Review: **Mar 03, 2022**
Date of Acceptance: **Jun 10, 2022**
Date of Publishing: **Sep 01, 2022**