ORIGINAL ARTICLE

Effect of Duration and Number of Subjects on Students' Performance in Junior Clerkship

Sahira Aaraj[1], Ayisha Kausar[2], Fareeha Farooqui[3]

ABSTRACT

Objective: In the current study we evaluated the impact of the number of examination subjects and the length of teaching duration on student performance in the fourth professional examination.

Study Design: Comparative cross-sectional study.

Place and duration of Study: Shifa College of Medicine, Islamabad from 1st Jan 2021 to 30th June 2022.

Materials and Methods: The study enrolled 220 students from the batches of year 2021 and 2022. We analysed the effect of duration of the clinical teaching (2 years vs. 3 years) and the effect of number of examining subjects in professional examination (3 subjects vs. 4 subjects) on the students' final scores. The data was analysed by SPSS version 23.0. The mean scores and standard deviation for theory and objectively structured clinical exam (OSCE) were compared using independent sample t-test. The results were also compared for the number of failing students and high scores (> 80 %) between two study cohorts. The *p* value of ≤ 0.05 was considered statistically significant.

Results: No statistically significant difference was found in the scores of ophthalmology theory /OSCE, gynaecology & obstetrics (OB/GYN), ENT theory and pediatric OSCE. The mean scores were significantly better in OB/GYN OSCE (*p* value < 0.015) and ENT OSCE (*p* value <0.001) after 2 years of teaching/ four subjects in professional examination respectively. Pediatrics theory results showed a decline after two years of teaching as compared to three years of teaching (*p* value < 0.001).

Conclusion: The number of years of clinical teaching and the total number of subjects in professional examination have no impact on students' academic performance in fourth professional examination.

Key Words: *Assessment, Clerkship, Gynae, Pediatrics, Quality improvement.*

Introduction

The clerkship model of medical teaching has shown to enhance students' knowledge, skills, attitude and professionalism. They demonstrate their ability to care for patients in hospital setting as well as at community-based clinics.[1, 2] Medical education department of the institutes decides the curriculum and optimal time for clerkships in collaboration with national regulatory body.[3] While each medical school has a slightly different setup, core clinical year rotations are essentially the same everywhere. Shifa college of medicine (SCM) has a 5 years MBBS programme. The Integrated modular curriculum is delivered over the first 3 years of the MBBS programme, and clinical rotations are introduced in 3rd year for integration of clinical teaching with modular curriculum. The junior clerkship starts in 4th year and progresses to senior clerkship in 5th year.

Medical educationists and clinicians have been calling for modifications in curriculum design of undergraduate medical teaching.[4,5] Since its introduction, clerkship programme is under constant reforms as influenced by internal or external factors. However, there are many challenges at each step of making these reforms.[6,7] The family medicine clerkship and elective clinical rotations were introduced to the 5th year MBBS curriculum in the year 2022 after developing learning outcomes of all the clinical disciplines. This curricular modification in the 5th year mandated changes in 4th year clerkships schedule as well. Before 2022, the final year MBBS professional examination was conducted for the disciplines of OB/GYN, pediatrics, medicine and

[1]*Department of Pediatrics/ Ophthalmology[2]/ Surgery[3]*
Shifa College of Medicine,
Shifa International Hospital, Shifa Tameer e Millat University
Islamabad

Correspondence:
Dr Sahira Aaraj
Associate Professor
Department of Pediatrics
Shifa College of Medicine,
Shifa International Hospital, Shifa Tameer e Millat University
Islamabad
E-mail: sahiraaaraj74@gmail.com

Received: December 02, 2023; Revised: August 16, 2024
Accepted: August 21, 2024

https://doi.org/10.57234/jiimc.september24.1925

surgery. The 4th year MBBS students took 4th professional examination in 3 subjects (ophthalmology, ENT and community medicine) as shown in Figure 1. Starting from 2022, the students in 4th year MBBS were required to appear in professional exams for ophthalmology, ENT, OB/GYN and pediatrics. Community medicine was added to the year 3 curriculum (Figure 2). The number of subjects, duration and professional examination for clinical subjects before and after year 2022 are shown in Figure 1 and 2 respectively.

Apparently, the curricular shift decreased the overall duration of study for OB/GYN and pediatrics from 3 years to 2 years. It did not decrease the total number of contact hours for these subjects. After a lot of brainstorming and collective efforts of clerkship directors, students and medical educationists, the institutional learning outcomes (ILOs) were revised for above mentioned clerkships. With an increase in number of examining subjects in 4th year and a reduction in an overall duration for pediatrics and OB/GYN clerkships to 2 years, both the students and faculty felt a definite stress. The literature has described the pressure of time constraint, heavy workload and fear of failure as main sources of stress for medical students. Padmashiri *et al.,*[8] reported overall increase of anxiety scores in students during examination period. Sujatha *et al.,*[9] also reported similar findings.

In the present study, we compared the scores and success rate of students appearing in exams for OB/GYN and pediatrics with a 3 year teaching programme of clinical rotation, junior and senior clerkship vs. 2 years teaching programme of clinical rotation and junior clerkship. We also compared the students' performance with the increased number of examination subjects in 4th professional examination. Currently, the literature, exploring the effect of shortened clerkship duration on student performance is lacking from this part of the world. So, a research was planned to evaluate the impact of the number of examination subjects and the length of teaching duration on student performance in fourth professional examination.

Materials and Methods

This cross-sectional study (IRB # 366-21) was conducted at Shifa Tameer-e-Millat University/Shifa College of Medicine (SCM) from 1st January 2021 to

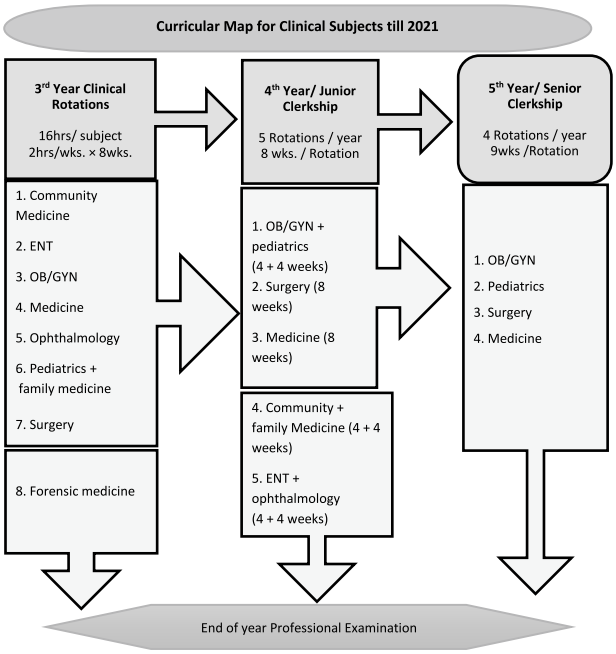

Fig 1: Clinical Clerkship and End of Year Examination Model Year 2021

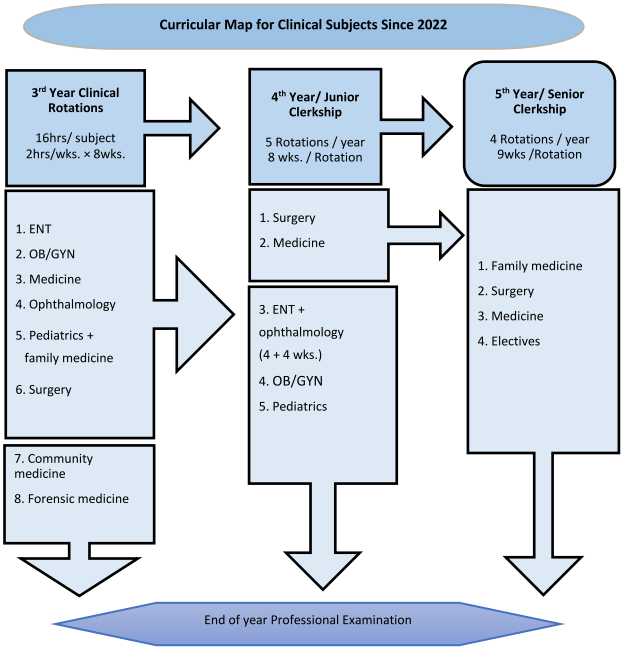

Fig 2: Clinical Clerkship and End of Year Examination Model Year 2022

30th June 2022. The results of the 4th professional examination of students from the batches of 2021 and 2022 were retrieved from examination department. All the students (220) from both batches were included. For the batch of 2021, professional examination included 3 subjects: ophthalmology, ENT and community medicine. For

https://doi.org/10.57234/jiimc.september24.1925

the batch of 2022, the 4th professional examination included 4 subjects: ophthalmology, ENT, pediatrics, OB/GYN.

The theory and OSCE scores of ophthalmology, ENT, pediatrics and OB/GYN were compared between the two batches.

The students' scores were analysed by SPSS version 23.0. The Leven's test for equality of variance was used to measure homogeneity of variance between groups. The data was checked for normal distribution by using Kolmogorov-Smirnov test. The independent sample t-test was used to compare the means for normally distributed data (pediatrics theory & OSCE, ophthalmology theory and ENT OSCE) and Mann-Whitney U test was used if the scores did not have a normal distribution (OB/GYN theory & OSCE, ophthalmology OSCE & ENT theory). The Fisher's exact test was used to see if significant difference exists in overall pass/fail rate. The Chi square test was applied to see if significant difference exists between two batches in terms of high scores > 80 %, pass and fail rates. The *p* value of ≤ 0.05 was considered statistically significant.

Results

The total number of students was 220. There were 109 students in the batch of 2021, and 111 in batch of 2022. The mean age of students in the batch of 2021 was 22.87± 0.630 years while for the batch of 2022, it was 23.17± 0.884 years. In cohort of 2021, males were 49 (45%) and females were 60(55%). While in the batch of 2022, males were 42 (38%) and females were 69 (62%). While analysing the effect of duration of clinical teaching on the student scores, scores for pediatrics and OB/GYN were compared. The student's scores in professional examinations for the two academic years are shown in Table I. The mean scores of the batch of 2021 were significantly better (*p* = 0.001) in pediatrics theory as compared to the batch of 2022 and the upper range for scores was also better for these students. The Chi square test showed significant difference in pediatrics theory and there were more (n=13, 11.9%) students with >80 % scores in the batch of 2021 vs none in the batch of 2022 i.e. *p* value < 0.001. (Table II). In OB/GYN OSCE students showed better mean scores after 2 years of teaching.

While analysing the effect of number of examining subjects on the students' final scores, scores of students with 3 subjects in 4th professional examination versus 4 subjects in 4th professional examination, no statistically significant difference was found in the scores of ophthalmology theory, OSCE and ENT Theory. The mean scores of the batch of 2022 (64.25 ± 7.03 vs 74.16 ± 6.38) were better in ENT OSCE *(p* value < 0.001). (Table I). The Fisher's exact test showed no significant difference in overall pass/fail rate in theory and OSCE in ophthalmology, ENT, pediatrics and OB/GYN. The Chi square test showed significant difference in the students' performance in ENT OSCE, *p* < 0.001. There were more students with >80 % scores (n=19, 17.1%) in the batch with four examining subjects. (Table II). The total number of failures (11.71% vs 6.42%) was higher in the batch of 2022 as compared to the batch of 2021. The failure rates in the batches of 2021 & 2022 are shown in Figure 3.

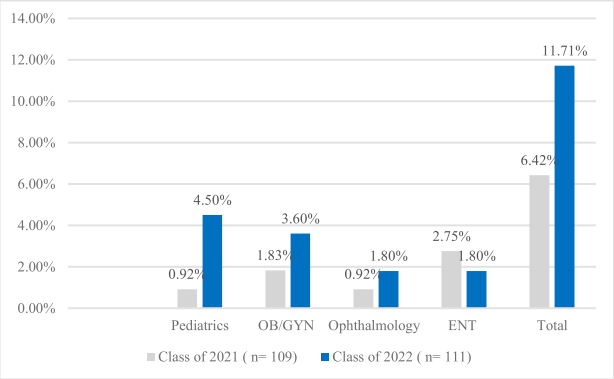

Fig 3: Failure rates in batch of 2021 & 2022

Discussion

A lot of need based changes are being called in undergraduate curriculum by the medical educationists and clinicians.[4] Hence, the clerkship programmes are under continuous reform. This study is an audit of a major reform in the curriculum of 4th and 5th year MBBS which was a new experience for both the students and faculty.

The students showed better mean score in OB/GYN OSCE with 2 years of teaching as compared to the batch with 3 years of teaching (*p* value = 0.015) Table I. One of the factors for improved results with restructured curriculum could be increased student patient interaction in almost all clerkships. We obtained comparable results in OB/GYN theory examination. Edward *et al*.,[10] reported different results. They described that the students' scores

Table I: Student's Scores in Professional Examinations (n=220

Subject	Batch of 2021 (n= 109)	Batch of 2022 (n= 111)	K-S test	*P** value	**Subject**	Batch of 2021 (n= 109)	Batch of 2022 (n= 111)	K-S test	*p** value
	3 yrs. teaching	**2 yrs. teaching**				**3 exam Subjects**	**4 exam Subjects**		
Pediatrics Theory Mean ± SD, Median, Range	71.66 ± 7.88 72.06 45.63 – 87.67	65.01 ± 6.61 65.04 45.45 - 78.09	0.200	**<0.001**	**Ophth Theory** Mean ± SD, Median, Range	67.43 ± 6.82 67.58 48.90 – 81.30	69.14 ± 7.03 69.63 43.95 – 82.24	0.063	0.069
Pediatrics OSCE Mean ± SD, Median, Range	68.11 ± 7.04 68.70 50.0 – 83.8	69.36 ± 7.13 69.98 48.75 – 82.78	0.503	0.192	**Ophth OSCE** Mean ± SD, Median, Range	66.75 ± 7.01 66.85 48.54 – 81.26	67.93 ± 5.57 68.26 47.30 – 80.13	0.048	0.279
OB/GYN Theory Mean ± SD, Median, Range	127.01 ± 12.72 128.41 95.62 – 151.87	126.18 ± 13.11 127.60 73.72 – 149.47	0.038	0.879	**ENT Theory** Mean ± SD, Median, Range	69.20 ± 7.86 70.15 45.30 – 84.05	70.71 ± 7.85 71.98 41.46 – 85.44	0.019	0.155
OB/GYN OSCE Mean ± SD, Median, Range	141.59 ± 15.59 143.84 97.81 – 178.01	146.66 ± 11.38 148.08 109.05 – 172.69	0.000	**0.015**	**ENT OSCE** Mean ± SD, Median, Range	64.25 ± 7.03 64.65 47.50 – 78.90	74.16 ± 6.38 74.80 56.60 - 86.40	0.100	**<0.001**

*The *p* value less than .05 was considered statistically significant.
*Summary: t-test Independent sample/ Mann-Whitney U Test, K-S: Kolmogorov- Smirnov, ophthalmology: Ophth

Table II: Comparison of Student's Performance in Professional Examinations

Disciplines	**Batch of 2021 (n= 109)**	**Batch of 2022 (n= 111)**	**Fisher's exact test *p*-values**	**Batch of 2021 (n= 109)**	**Batch of 2022 (n= 111)**	***p* values Chi-square test**
	<50% score	<50% score		> 80 % score	> 80 % score	
Pediatrics Theory	1 (0.92%)	5 (4.50%)	0.212	13 (11.9%)	-	**<0.001***
Pediatrics OSCE	-	2 (1.8%)	0.498	6 (5.5%)	5 (4.5%)	0.354
OB/GYN Theory	1 (0.92%)	4 (3.6%)	0.369	-	-	0.190
OB/GYN OSCE	1 (0.92%)	-	0.495	9 (8.3%)	7 (6.3%)	0.508
Ophthalmology Theory	1 (0.92%)	1 (0.9%)	1.000	1 (0.92%)	4 (3.6%)	0.409
Ophthalmology OSCE	1 (0.9%)	1 (0.9%)	1.000	1 (0.9%)	1 (0.9%)	1.000
ENT Theory	-	2 (1.8%)	0.498	9 (8.3%)	8 (7.2%)	0.360
ENT OSCE	1 (1.8%)	-	0.244	-	19(17.1%)	**<0.001***

*The *p* value less than .05 was considered statistically significant.

were lower in subject examination when duration of the OB/GYN clerkship was decreased from 8 to 6 weeks.

Regarding pediatrics theory examination, the mean scores of the batch with 2 years teaching were less as compared to 3 years teaching, (*p* value < 0.001). In contrast to our observation Lindsey *et al*.,[12] did not find any statistically significant difference (*p* value < 0.322) in USMLE Step 1 scores in pediatrics between groups with traditional vs. shortened teaching duration.[11] According to literature, such curricular modifications involving changes in one whole year of teaching, can decline students' performance. Moreover, each student of the class cannot be expected to retain 100 percent of knowledge from lectures.[13] The self-study habits, revision of the

https://doi.org/10.57234/jiimc.september24.1925

syllabus and ability of clinical application of knowledge varies from student to student.[14, 15] The students' maturity, reasoning skills, and understanding of the subjects and clinical correlation of knowledge increases with spending a whole year in clinical rotations in various disciplines.[16] In pediatrics we had 5 students who were unsuccessful in theory exam in shortened duration cohort (*p* value <0.001). Based on the results of our study, the learning objectives for pediatrics were modified with better integration of pediatrics, family medicine and internal medicine component. Recently, the University of Michigan had published a study of their clinical clerkship curriculum changes. The study showed that a 25% decrease in clerkship length resulted in no significant difference between student performance.[16] Some studies show no difference or even better student satisfaction and clerkship evaluation scores for shortened curricula.[17]

In pediatrics OSCE, the results were comparable for both batches (*p* value = 0.192). The OSCE evaluates the clinical skills of students.[18] Our group of students were given extra classes /sessions for practice of clinical skills. Hence, individual student-patient interaction was increased in pediatric clerkship, resulting in improvement of skills and persistent performance in spite of decreased duration. Many other, individual student trends are also influencing their exam performance like strong motivation, aptitude for study and spending less time in social networking.[19] Similar trend in performance of the cohorts in pediatrics and ophthalmology OSCEs appears to be due to the focus of OSCE on core clinical conditions. Our institution's robust pre-clerkship clinical skills course, case-based discussion, and time spent in clinical patient care enabled our students to perform better in OSCE. Additional factors may be the variety of physicians with whom students interact, observe and learn through different practices and teaching approaches.[20, 21, 22]

There was no change in students' scores in ophthalmology with 3 or 4 subjects in professional examination. The reason for this could be that there was no change in duration of ophthalmology clerkship.

In ENT OSCE 13 students scored >80% (*p* value < 0.001) which was the highest number of students achieving top scores in a subject in that year. This distinction could be due to interest in the subject.[23]

Our study has certain limitations. We compared scores of only one academic year. Comparison of scores of two or more successive years might give a broader perspective of the curricular change. We recommend that further studies should be conducted including student's perspective about shorter duration of clerkship and subjects of interests. Another limitation which can be addressed in future studies is catering for the confounding factors like faculty training and factors affecting student's stress and interest for a speciality.

Conclusion

The number of years of clinical teaching and total number of subjects in professional examination have no impact on students' academic performance in fourth professional exam.

REFERENCES

1. Glaser K. A Process for Assessment and Quality Improvement of the Clerkship Curriculum. *J Med Educ Curric Dev*. 2019 Feb 4; 6:2382120519825873. doi:10.1177/2382120519825873.
2. Uneeb SN, Zainab S, Khoso A, Basit A. Knowledge scores in annual and modular curriculum among medical students from Karachi, Pakistan. *JPMA* .2021 Feb;71(2):681-5. doi:10.47391/JPMA.1416.
3. Latif MZ, Wajid G. Reforming Medical Education in Pakistan through strengthening Departments of Medical Education. *Pak J Med Sci.* 2018 Nov-Dec;34(6):1439-44. doi:10.12669/pjms.346.15942.
4. Kraakevik JA, Beck Dallaghan GL, Byerley JS, Monrad SU, Davis JA, Hammoud MM et al. Managing expansions in medical students' clinical placements caused by curricular transformation: perspectives from four medical schools. *Med Educ Online*. 2021;26(1):1857322. doi: 10.1080/10872981.2020.1857322.
5. Frank A, Baciewicz, Linda Arent, Michael Weaver, Richard Yeastings, Neil R Thomford. Influence of clerkship structure and timing on individual student performance. *Am. J. Surg.* 1990; 159, (2) 265-8. doi:10.1016/S0002-9610(05)80277-6.
6. Abbasi LS, Yasmeen R, Sajjad T. Challenges faced by health professions educationists en route to educational reforms in Pakistan. *J Educ Health Promot.* 2022 Sep 28; 11:315. doi: 10.4103/jehp.jehp_424_22.
7. Khan AW, Sethi A, Wajid G, Yasmeen R. Challenges towards quality assurance of Basic Medical Education in Pakistan. *Pak J Med Sci.* 2020 Jan-Feb;36(2):4-9. doi:10.12669/pjms.36.2.1319.
8. Kudachi PS, Latti RG and Goudar SS. Effect of examination stress on the academic performance of first year medical students. *Biomedicine* 2008;28(2):142-144
9. Sujatha B and Subhalakshmi. Effect of stress on exam going first year medical students of Tirunelveli. *Int. J. Med. Res*., 2016, 5, 1:118-121

10. Edwards RK, Davis JD, Kellner KR. Effect of obstetrics-Gynaecology clerkship duration on medical student examination performance. *Obstet Gynecol*. 2000 Jan;95(1):160-2. doi:10.1016/s0029-7844(99)00487-1.
11. Strowd LC, Hartman N, Askew K et al. The Impact of Shortened Clinical Clerkships on Medical Student Performance and Clerkship Assessment. *Med. Sci. Educ*. 2021;31, 1333–41. doi:10.1007/s40670-021-01309-8.
12. Succar T, Beaver HA, Lee AG. Impact of COVID-19 pandemic on ophthalmology medical student teaching: educational innovations, challenges, and future directions. *Surv Ophthalmol*. 2022 Jan-Feb;67(1):217-25. doi:10.1016/j.survophthal.2021.03.011.
13. Al Shawwa L, Abulaban AA, Abulaban AA, Merdad A, Baghlaf S, Algethami A et al. Factors potentially influencing academic performance among medical students. *Adv. medical educ. pract.* 2015; 6:65.
14. Ragab EA, Dafallah, MA, Salih MH et al. Stress and its correlates among medical students in six medical colleges: an attempt to understand the current situation. *Middle East Curr Psychiatry* 2021;28: 86. doi:10.1186/s43045-021-00170-0
15. Zhang JY, Liu YJ, Shu T, Xiang M, Feng ZC. Factors associated with medical students' self-regulated learning and its relationship with clinical performance: a cross-sectional study. *BMC Med Educ*. 2022 Feb 25;22(1):128. doi:10.1186/s12909-022-03186-0.
16. Monrad SU, Zaidi NLB, Gruppen LD, Gelb DJ, Grum C, Morgan HK et al. Does reducing clerkship lengths by 25% affect medical student performance and perceptions? *Acad Med.* 2018;93(12):1833–40. doi:10.1097/ACM.002367.
17. Choi-Lundberg DL, Al-Aubaidy HA, Burgess JR, Clifford CA, Cuellar WA, Errey JA et al. Minimal effects of reduced teaching hours on undergraduate medical student learning outcomes and course evaluations. *Med Teach.* 2020 Jan;42(1):58-65.
18. Reinke NB. The impact of timetable changes on student achievement and learning experiences. *Nurse Educ Today*. 2018; 62:137-142. doi:10.1016/j.nedt.2017.12.015.
19. Berkhout JJ, Helmich E, Teunissen PW, van den Berg JW, van der Vleuten CP, Jaarsma AD. Exploring the factors influencing clinical students' self-regulated learning. *Med Educ*. 2015 Jun;49(6):589-600. doi:10.1111/medu.12671.
20. Tariq S, Khan MA, Afzal S, Shahzad SR, Hamza M, Khan HA et al. Association between academic learning strategies and annual examination results among medical students of King Edward Medical University. *Ann. King Edw. Med.* 2016 May 23;22(2). doi:10.1007/s40670-020-00995-0
21. McCrossan P, O'Donoghue D, Nicholson A, McCallion N. Comparison of medical student performance in summative undergraduate pediatric examinations and a clinician-designed minimum accepted competency (MAC) assessment. *BMC Med Educ*. 2021 Dec;21(1):1-8.
22. Ossenberg C, Mitchell M, Henderson A. Impact of a work-based feedback intervention on student performance during clinical placements in acute-care healthcare settings: a quasi-experimental protocol for the REMARK programme. *BMJ Open*. 2020 Jun 8;10(6): e034945. doi:10.1136/bmjopen-2019-034945.
23. Kaminski A, Falls G, Parikh PP. Clerkship Experiences During Medical School: Influence on Specialty Decision. *Med Sci Educ*. 2021 Mar 31;31(3):1109-14.

CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

Authors have declared no specific grant for this research from any funding agency in public, commercial or nonprofit sector.

DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.