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ORIGINAL PAPER

Nursing students' perception of the clinical learning environment during the Covid-19 pandemic: a longitudinal study in the Czech Republic

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Abstract

Aim: The study aimed to describe how undergraduate nursing students evaluated the clinical learning environment of their studies during the Covid-19 pandemic. *Design:* Longitudinal cohort study. *Methods:* The research sample of 49 full-time students who completed their first year clinical practice in the academic year of 2018 / 2019 was followed over three years of study. The Clinical Learning Environment, Supervision and Nurse Teacher evaluation scale (CLES+T) was used for data collection. Quantitative data were evaluated using descriptive and inductive statistics. *Results:* Overall, students evaluated the clinical environment throughout their studies as average. Interaction with a tutor received the lowest rating, while relationship with mentor and external factors of the clinical environment (nursing management and nursing care in the workplace) received the highest rating. Second-year students rated the practice environment most highly. Students were satisfied with individual supervision in the first two years. However, due to the Covid-19 pandemic, group supervision prevailed in the third year, resulting in reduced student satisfaction. *Conclusion:* Students' perception of the clinical learning environment changed during their studies. These changes were driven by the quality of certain academic and clinical factors. The Covid-19 pandemic represented a significant impingement on the course and organization of clinical practice.

Keywords: CLES+T, clinical learning environment, Covid-19, nursing, student.

Introduction

The clinical learning environment is a multidimensional entity with a multiform, complex social context affecting students' results and professional growth (Arkan et al., 2018). Some researchers (Jamshidi et al., 2016; Papastavrou et al., 2016; Rodríguez-García et al., 2021) point to the fact that the learning potential of the clinical environment may not be in line with the competencies required of students by the educational institution. During clinical teaching, there may be divergence rather than integration between theory and practice. Oermannová and Gabersonová (2014) state that this may be caused by insufficient structural parameters of the environment (such as lack of staff, time constraints, etc.), as well as fixed patterns of thinking (task orientation and performance, mixed documentation, and implementation of the nursing process in practice and during studies). Conversely, the positive influence of certain clinical environment factors contributes to the better adaptation of graduates to clinical practice (Kaihlanen et al., 2021).

The Covid-19 pandemic significantly affected the quality of clinical teaching and greatly impacted students. On the one hand, this exceptional situation created unique learning opportunities for students. On the other, it put the learning process of nursing students at significant risk of disruption (Kaihlanen et al., 2021; Ulenaers et al., 2021; Velarde-García et al., 2021).

In the Czech Republic, the Covid-19 pandemic appeared in the spring of 2020 and again in the autumn of the same year (Klimovský et al., 2020). The negative impacts of the pandemic were managed by government regulations defining conditions for clinical practice and theoretical teaching of medical students. During this time, in-person teaching at universities changed into a hybrid form, maintaining in-person practical training, while theoretical classes were conducted online.

The complexity and dynamism of the clinical environment, and the multifactorial conditionality of the process by which students acquire clinical experience and competencies reflect the demanding

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character of scientific investigation. One area that can be influenced by teaching institutions is the strategies and methods used by mentors, teachers, and healthcare personnel to guide students, facilitating the learning process in the clinical workplace. For this reason, dozens of qualitative and quantitative studies have been published to assess the clinical environment from a student perspective – i.e., their experience of coping with stressful situations during clinical practice and related factors.

In countries of the European Union, Saarikoski's conceptual framework is most commonly used to evaluate the clinical learning environment, emphasizing organizational aspects (Saarikoski & Leino-Kilpi, 2002). It is based on the dyadic character of the clinical environment, in which, on one hand there are environmental factors such as the atmosphere, the organizational culture of the workplace, and the complexity of healthcare provision in the workplace, and on the other there are relationships between students, mentors, and teachers (Papastavrou et al., 2010; Saarikoski & Leino-Kilpi, 2002). Based on this conceptual framework, the CLES+T tool (The Clinical Learning Environment, Supervision and Nurse Teacher evaluation scale) was developed (Saarikoski et al., 2009). It is the most commonly used tool to evaluate the clinical environment for research purposes in the European context. In teaching practice, it is recommended as an audit tool to evaluate the quality of clinical teaching (Sirka et al., 2015).

The methods of mentoring students, frequency of supervision, and the length of clinical practice have all been cited as factors that significantly affect the evaluation of the clinical environment from a student perspective (Gurková et al., 2016; Saarikoski & Leino-Kilpi, 2002; Saarikoski et al., 2008, 2013; Warne et al., 2010). The relationship between mentor and student is considered the most important factor in the conduct and management of teaching in clinical settings. However, most previous studies have had a cross-sectional observational study design, which does not capture the dynamics in the perception of the clinical environment. An examination of the development of perceptions of individual areas and influencing factors over the course of nursing studies is the subject of the present study.

Aim

The aim of the study was to determine nursing students' perceptions of the clinical learning environment in a hospital throughout their bachelor study program and to examine factors influencing perceptions of the clinical learning environment during the Covid-19 pandemic.

Methods

Design

Longitudinal cohort study.

Sample

The research sample included all 49 first year full-time undergraduate students of the Bachelor of Science General Nurse course in the academic year 2018 / 2019 who provided informed consent and had completed their year one clinical practice. The following year, these students progressed to the second year of study; the sample now consisting of 45 students. In the next academic year, the sample consisted of 44 third-year students. Students who dropped out in years two and three were not included in the study.

Data collection

Data were collected between January 2019 and March 2021. In year one, students were assigned codes which they used when completing questionnaires in subsequent years. These codes were also used during data processing. Students completed a questionnaire each year after completing their practical nursing training. In the first year, 49% of students met the inclusion criteria, and 100% were women. The return rate of questionnaires was 91.8% (45 respondents). In the second year, 45 female students were included in the group, and the return rate was 86.7% (39 respondents). In the third year, 44 female students met the criteria, and the return rate was 88.6% (38 respondents).

Practical training took place in clinical workplaces providing basic and specialized nursing care. Teaching was performed in blocks of four to seven weeks. The first wave of the pandemic hit students in their first year at the end of their practical training, which was not affected by the situation and proceeded without restrictions. Practical training in year two was affected by the change of some wards into Covid units. Students involved in the care of patients with Covid-19 did so on a voluntary basis. Otherwise, they completed their compulsory practical training in units in which no patients with this diagnosis were treated. In year three, students were ordered to work, providing healthcare in connection with the Covid-19 pandemic (Resolution of the Government of the Czech Republic, 2020 No. 1023).

A tutor, an academic staff member simultaneously teaching theoretical and practical subjects, was

responsible for the organization of practical training in particular workplaces. Students supervised by general nursing mentors worked in a specific unit providing nursing care. To support effective adaptation to the clinical environment, the first and second-year students completed a supervised session at the end of their practical training (Šaňáková & Mazalová, 2015).

Valid and reliable CLES+T questionnaires were used to evaluate the clinical environment. The questionnaire was specially designed to evaluate the clinical environment of nursing students in European countries. It contains 34 items divided into five subscales, representing each component of the clinical learning environment: pedagogical atmosphere on the ward (nine items); the leadership style of the head nurse on the ward (four items); nursing care on the ward (four items); the mentor-student relationship (eight items); and the role of the nursing teacher (nine items). Individual items were rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

For the purpose of our project, we obtained the author's consent to translate and use a Czech version of the CLES+T. The translation of the tool consisted of three phases – in the first phase, two independent Czech translations were made and combined into a single version. In the second phase, two reverse translations into English were made and compared with the original version. The third step involved a panel discussion, including a content validity assessment and pilot testing of the questionnaire. The psychometric analysis of the CLES+T Czech version was published as part of a previous validation study. The principal components method (PCA) was used to evaluate the factor structure of the CLES+T Czech version. Exploratory factor analysis showed a six-factor solution with eigenvalues above 1, which explained 72.5% of the total variance. The first factor (mentor-student relationship) explained the largest percentage of the total variance. The factor loading of items – and thus also the affiliation of specific items to certain dimensions – was in agreement with the original version. The internal consistency (Cronbach's alpha) of individual subscales of the CLES+T Czech version ranged from 0.818–0.951 (Šáteková et al., 2019). The internal consistency (Cronbach's alpha) of individual subscales of the original CLES+T version was 0.77–0.96 (Saarikoski et al., 2009).

Data analysis

Quantitative data were analyzed using descriptive and inductive statistics. The normality of quantitative data was verified through the Shapiro-Wilk normality test and the calculation of skewness. Values for the CLES+T subscales score indicated a non-normal distribution in nine of the observed variables. The tests of normality were not significant for the other nine monitored variables. Values for the total score of CLES+T showed a non-normal distribution in first-year students. The value of skewness was higher than -1 in six monitored variables. Due to the non-normal distribution of scores for most of the tested parameters, indicated by normality tests, the Wilcoxon Signed Ranks Test, the Mann-Whitney test and the Kruskal-Wallis test were used to compare the differences of mean values in examined items in students in the first, second, and third year of study. The tests were conducted at the statistically significant level of $p = 0.05$. The statistical software for social sciences SPSS version 20 was used for statistical data processing.

Results

Mentoring during three years of study

Throughout their studies, most students worked under the supervision of general nurses providing direct care to patients on the ward on a shift basis. In year one, 97.7% of students received this form of supervision; in year two, 97.4 %; and in year three, 94.7%. The remaining students were under the mentorship of the head nurse; in years one and two, this was the case for only one student (2.2 %, respectively 2.6 %), and in year three, two students (5.3%). In the third year, there were substantial changes in the mentoring method and a reduction in the frequency of the student-mentor meetings. For the first time in the entire study, almost 24.3% of female students completed their practical placement without a designated mentor. For the majority of students (90%), there was a significant reduction in the frequency of meetings with a mentor (Table 1).

Perception of the clinical learning environment during the first three years of study

The mean score of individual CLES+T subscales ranged from 3.05 (SD = 0.74) to 4.25 (SD = 0.51) in year one; from 3.50 (SD = 0.71) to 4.35 (SD = 0.80) in year two; and from 3.15 (SD = 0.50) to 4.02 (± 0.63) in year three. The midpoint on the five-point Likert scale (3.00–3.49) indicates a balanced level of agreement, with all subscales and overall mean scores reaching this value in each year of study. Throughout their studies, students reported the lowest scores for interaction with the tutor. At the beginning of the study, it was 3.05 (SD = 0.74); increasing to 3.50 (SD = 0.71) in the

next year, and reaching 3.15 (SD = 0.50) in the third year. Students perceived the relationship with their mentor most positively, particularly in year two (4.35; SD = 0.80), whereas students in the final year showed least satisfaction with this domain (3.85; SD = 0.91). Other areas positively evaluated by students were the external factors of the clinical environment (management in the workplace, nursing care on the ward). The highest total CLES+T score of 4.03 (SD = 0.80) was reported by students after completing their practical training in the second year of study. Statistically significant differences were found between the total CLES+T score in the first and second years of study (p = 0.003) and the second and third years (p = 0.000). The teaching environment in the first and the third year were comparable (Table 2). The results of the signed-rank tests across the continuum of the three-year study are presented in Table 3. Overall, the results indicate a specific pattern in perceptions of the clinical environment over the course of the study and the importance of receiving individual guidance from mentors in clinical workplaces.

Table 1 Mentoring – additional characteristics

Characteristic	1st year n (%)	2nd year n (%)	3rd year n (%)
Supervisor title			
nurse	42 (93.3)	36 (92.3)	32 (84.2)
specialist nurse	2 (4.4)	2 (5.1)	4 (10.5)
ward manager	1 (2.2)	1 (2.6)	2 (5.3)
Organization of supervision			
none appointed	0 (0.0)	0 (0.0)	9 (24.3)
a personal supervisor, strained relation	3 (6.7)	1 (2.6)	1 (2.7)
changed supervisor	1 (2.2)	0 (0.0)	0 (0.0)
situational supervisor (supervision varied according to the placement / hospital ward)	0 (0.0)	1 (2.6)	13 (35.1)
group supervision	4 (8.9)	2 (5.1)	1 (2.7)
one, functioning relation	37 (82.2)	36 (92.3)	13 (35.1)
Frequency of supervision			
never	0 (0.0)	3 (7.7)	19 (47.5)
1–2 times during practice	1 (2.2)	9 (23.1)	14 (35.0)
< weekly	0 (0.0)	3 (7.7)	1 (2.5)
weekly	3 (6.7)	4 (10.3)	2 (5.0)
more than weekly	41 (91.1)	20 (51.2)	4 (10.0)
Type of hospital department			
1 medical	21 (46.7)	14 (35.9)	5 (12.5)
2 surgical	22 (48.9)	19 (48.7)	5 (12.5)
3 geriatric	2 (4.4)	5 (12.8)	4 (10.0)
4 oncology			14 (35.0)
5 pediatrics		1 (2.6)	1 (2.5)
6 intensive care unit			11 (27.5)

Method of supervision

The CLES+T, makes it possible to identify different methods of student supervision in clinical workplaces. Students were able to identify their experience of the method of supervision provided by healthcare personnel by choosing from five options (Table 1). Based on the work of Warne et al. (2010), the first three options were considered as ineffective supervision, the fourth and fifth as group supervision, and the sixth as a positive experience of individual supervision (Table 1). A significant number of students reported positive experiences of individual supervision during the first and the second year of study (82.2% to 92.3%, Table 1). However, a change occurred when students completed practical training in their third year and were obliged to work during the further wave of the Covid-19 pandemic. In this period, it was impossible to ensure the traditional model of clinical teaching (mentor – tutor – supervisor). Only 35.1% of students in year three experienced an effective method of individual supervision (Table 1). Next, we looked at the differences in the overall mean CLES+T score and individual subscales of each academic year in terms of experience of supervision (Table 3), or supervision method. Students who reported a positive experience of individual supervision rated the clinical learning environment more highly than students with ineffective supervision or with the group form of supervision (p = 0.035).

However, the statistical significance of this relationship was not confirmed in years two and three

of study. Statistically significant differences were identified mainly in the domain of relationship with a mentor in the first (p = 0.006) and the third year of study (p = 0.037, Table 3). Students who reported a positive experience of individual supervision in year three also rated the method of supervision on the ward more highly than students with ineffective supervision or those with the group form of supervision (p = 0.031).

Table 2 Changes in domains and the overall score of the CLES+T during the three academic years (time of follow-up)

Domain	1st year mean (SD)	2nd year mean (SD)	z	p-value	2nd year mean (SD)	3rd year mean (SD)	z	p-value	1st year mean (SD)	3rd year mean (SD)	z	p-value
Pedagogical atmosphere on the ward	3.89 (0.61)	4.21 (0.52)	-0.32	0.002*	4.21 (0.52)	3.88 (0.57)	-4.15	0.000*	3.89 (0.61)	3.88 (0.57)	-0.78	0.431
Leadership style of the ward manager	3.91 (0.81)	3.97 (0.58)	-0.27	0.786	3.97 (0.58)	4.01 (0.66)	-0.29	0.77	3.91 (0.81)	4.01 (0.66)	-0.19	0.852
Premises of nursing on the ward	4.25 (0.51)	4.26 (0.52)	-0.59	0.953	4.26 (0.52)	4.02 (0.63)	-1.97	0.049*	4.25 (0.51)	4.02 (0.63)	-2.44	0.015*
Mentorship relationship	4.03 (0.99)	4.35 (0.80)	-1.66	0.098	4.35 (0.80)	3.85 (0.91)	-2.86	0.004*	4.03 (0.99)	3.85 (0.91)	-2.24	0.025*
Role of nurse teacher	3.05 (0.74)	3.50 (0.71)	-2.53	0.011*	3.50 (0.71)	3.15 (0.50)	-1.63	0.102	3.05 (0.74)	3.15 (0.50)	-0.16	0.071
CLES+T score	3.74 (0.51)	4.03 (0.46)	-2.95	0.003*	4.03 (0.46)	3.72 (0.56)	-3.54	0.000*	3.74 (0.51)	3.72 (0.56)	-1.04	0.298

*Values are mean and SD; CLES+T scores at each time point were compared; z– value in the Wilcoxon Signed Ranks; *significant at the p < 0.05 level.*

Table 3 Occurrence of supervision and clinical learning environment

Domain	Experience with supervision	1st year p-value	2nd year p-value	3rd year p-value
Pedagogical atmosphere on the ward	unsuccessful supervisory experience group supervision successful supervisory experience	0.114	0.726	0.842
Leadership style of the ward manager	unsuccessful supervisory experience group supervision successful supervisory experience	0.553	0.545	0.031
Premises of nursing on the ward	unsuccessful supervisory experience group supervision successful supervisory experience	0.165	0.610	0.452
Mentorship relationship	unsuccessful supervisory experience group supervision successful supervisory experience	0.006	0.241	0.037
Role of nurse teacher	unsuccessful supervisory experience group supervision successful supervisory experience	0.749	0.458	0.726
CLES+T score	unsuccessful supervisory experience group supervision successful supervisory experience	0.035	0.566	0.193

Discussion

The results of our study provided a unique perspective on how students reflected on the clinical learning environment of their three years of study against the background of the Covid-19 pandemic.

Although overall clinical learning conditions were rated fairly consistently at an average level across all years, differences were found. The factors that determined these differences were the form and quality of supervision. Higher ratings for clinical practice were reported by those students who had an individual mentor. Ineffective supervision or its group form resulted in poorer ratings of the clinical practice environment from students. Very similar experiences and satisfaction with the nursing practice environment were described by nursing students of different years of study from fifteen countries

in Europe, Asia, and Australia (including the countries of the European Union and Slovakia, the closest culturally to the Czech Republic) in a systematic review by Cant et al. (2021). An even higher assessment of the clinical learning environment was expressed by Swedish undergraduate and master's students (Manninen et al., 2022). It should be noted that some studies do not indicate whether and how the Covid-19 pandemic affected the course and implementation of practice, and some research was conducted before this period.

Our results showed that there were noticeable differences when individual years were compared. A positive evaluation of individual supervision was predominantly reported by first-year students (82.2%) and second-year students (92.3%). Practical training was held under standard conditions and managed in the form of individual supervision. The team of practical training tutors worked in an optimal composition and all fulfilled the tasks required of their roles. The tutor was in charge of the organization of practical training, and students worked in shifts together with their mentors. Although there was another wave of the Covid-19 pandemic in year two, the organization of practical training was not disrupted, since there was no work requirement imposed on these students. In year three, in the context of a further wave of the Covid-19 pandemic and the mandated work obligation for final year students, there were significant changes in the usual course of practical training and mentoring. Almost 65% of students were engaged in covid units or worked in workplaces where the nursing staff was constantly changing. For this reason, individual mentoring worked only to a limited extent, the group form of supervision predominated, and mentors also changed frequently. In addition, the contact between tutors and students was not fully functional. There were significant differences when overall clinical learning environment scores were compared for the entire period of study. The clinical learning environment was perceived most positively by year two students. Almost the same level of satisfaction with the clinical learning environment was reported by students of the same year in a Norwegian study by Johannessen et al. (2021).

Our study confirmed poorer ratings for clinical teaching from students during their first practical training and at the end of their study, in year three. A Swedish study by Manninen et al. (2022) confirmed no significant differences in the evaluation of the clinical learning environment between undergraduate and graduate nursing students. The importance of a positive learning experience during practical training for students (especially those in the final year) to the formation of adequate clinical competencies in their future professional careers has been reported in a number of studies (Barisone et al., 2022; Kaihlanen et al., 2021; Yu et al., 2021). A positive experience of practice not only determines successful adaptation to the work environment in the first year after graduation, but is also a factor that influences the further career and work specialization of students in the nursing profession (Kaihlanen et al., 2021). The quality of clinical teaching is a significant predictor of successful adaptation to managing the professional roles of a general nurse after graduation (Sibandze & Scafide, 2018).

When assessing the various factors of the clinical environment, our students' perceptions of their relationship with their mentor were predominantly positive throughout their studies. The nature of the evaluation of the student-mentor relationship is directly related to the supervision model (Gurková & Žiaková, 2018). It has been clearly confirmed that individual supervision leads to positive student perceptions of mentoring, regardless of the impact of the Covid-19 pandemic (Cant et al., 2021; Johannessen et al., 2021; Kaihlanen et al., 2021; Manninen et al., 2022; Pitkänen et al., 2018; Velarde-García et al., 2021). Among clinical factors, the delivery of nursing care and the manner of head nurses in the workplace were positively evaluated. However, students in their final year perceived these components differently than in previous years. They rated the relationship with their mentor less highly and, conversely, they more highly appreciated the approach of the nursing management on the ward, including feedback and evaluation of nurses' work. Changes in their perception of these domains of the clinical learning environment were significant in relation to the supervision model. Due to the pandemic and subsequent changes in clinical conditions, ineffective forms of supervision prevailed.

A positive consequence of the situation as a whole was the strengthening of positive relationships between students and general nurse managers in the workplace. As reported by Barisone et al. (2022) and Velarde-García et al. (2021), students working in hospitals during the pandemic experienced considerable insecurity in knowledge and skills in caring for patients with Covid-19 due to the absence of mentors in these workplaces. On the other hand, they felt pride in being acknowledged by other healthcare workers as professionals and were considered full members of the healthcare team. Teamwork was a vital facilitator of students'

learning, and supported the process of adaptation to stress in crisis situations during the pandemic.

Student satisfaction, regardless of year of study, was lowest for the clinical environment component involving the tutor. The tutor's role concerned the pedagogical support of students during their practical training, strengthening the cooperation between the academic and clinical environments, and supporting the of transfer of theoretical knowledge into clinical practice. The question is to what extent students' perceptions and expectations of the role of a tutor were met as a result of the way these of roles were defined by the university and implemented by individual tutors in practice. Here too the Covid pandemic may have had an impact. In particular, it was not possible for students to meet their tutors during practical training due to the isolation of clinical workplaces and restrictions on non-caregivers entering the ward. In addition, a ban was also issued on the presence of students in classes at universities (Resolution of the Government of the Czech Republic dated October 8, 2020, No. 997). During this period, face-to-face teaching at universities changed to a hybrid form. In view of the specific conditions (i.e., the work obligation for third-year students), practical training was maintained in face-to-face form, while theoretical teaching was conducted online. Academics were advised to prioritize working from home. Evaluations of the clinical learning environment by third-year students were predominantly low, particularly in comparison with the previous year, when these students had completed their practical training during the Covid-19 pandemic without interruption, being involved in the care of Covid patients only as volunteers. Low student satisfaction with the role of tutors was also described by Cant et al. (2021) and related to the infrequent or irregular interaction between tutors and students during clinical practice. This corresponds with our results. However, the same authors point to the different content of tutors' roles according to diverse conditions. Ulenaers et al. (2021) note that the disruption of the standard organization of practical training during the pandemic led some students to consider dropping out, particularly those who lacked psychosocial support, appreciation from their tutors, and the opportunity to meet regularly.

Limitation of study

Given that our research was conducted at only one university with a relatively homogenous and small sample of female respondents, the outcomes are of limited use for different contexts and settings. For a higher degree of generalizability, it would be necessary to implement more extensive surveys with heterogeneous sets of respondents. These could be students from universities from various geographical locations and study programs focused on different non-medical health professions, in which not only women but also men are represented.

Conclusion

The results of our research provide a unique assessment of the clinical learning environment by nursing students in the Czech Republic as they perceived it from the first to the final year of study both before and during the Covid-19 pandemic. The clinical practice course was significantly influenced by the government regulation on mandatory work obligations for final-year students. It was necessary for them to be involved in patient care in Covid or non-Covid workplaces. Due to the emergency in healthcare facilities and the ordered closure of universities, the pedagogical provision and organization of practical training by tutors and mentors did not function optimally. This was reflected in differences in students' evaluation of the clinical environment during their study. The research results show the effect of government restrictions on the quality of practical teaching during the pandemic. They emphasize the importance of an effective and balanced connection between the pedagogical and clinical components of the learning environment. Emphasis on an innovative and flexible approach to the organization of practical training placements by academic departments and teaching teams can lead to greater student satisfaction with clinical training.

Ethical aspects and conflict of interest

The study was approved by the Ethics Committee of the Faculty of Health Sciences Palacký University (UPOL-620/1040-2019). Respondents were assured that all data obtained would be anonymous and confidential. We obtained signed informed consent from the respondents. The author declares that there is no conflict of interest.

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Author contributions

Conception and design (EG, LMaz), data collection (LMach, LMaz), data analysis and interpretation (EG,

LMaz), manuscript draft (LMaz, EG), critical revision of the manuscript (EG, LMach), final approval of the manuscript (LMaz).

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