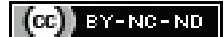


Evaluation of Preparedness and Penetration of Self-directed Learning among First-year Medical Students at a Tertiary Care Teaching Hospital: A Questionnaire-based Cross-sectional Study

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ABSTRACT

Introduction: Self-directed Learning (SDL) for medical students involves taking initiative, setting goals, seeking out resources, reflecting on progress and continuously adapting to the evolving field of medicine.

Aim: To evaluate the preparedness and penetration of SDL concepts among first-year medical students.

Materials and Methods: A questionnaire-based cross-sectional study was conducted in the Department of Anatomy, at Konaseema Institute of Medical Sciences and Research, Amalapuram, Andhra Pradesh, India, from September 2022 to October 2022. The students were exposed to at least two sessions of orientation to the SDL concepts. The questionnaire had three sections with questions on preparedness, methodology and penetration of SDL. It was administered electronically through a secure online platform to ensure convenience and confidentiality. The questions were designed to gather information about the students' prior knowledge and readiness for SDL, their current SDL practices, and their perception of SDL in medical education. Categorical

variables preparedness and penetration were presented as percentages.

Results: Among 150 medical students, 130 students participated in the survey, and excluding the incomplete submissions, 127 responses were considered for analysis. A total of 11 (8.6%) respondents were very familiar and 47 (37%) respondents were somewhat familiar with the concept of SDL. A total of 88 (69.2%) respondents said that they set learning goals with guidance from instructors. Only 21 (16.5%) students used online resources (e.g., medical websites, video lectures) daily. A total of 106 (83.4%) students agreed that SDL will be essential throughout their medical career as lifelong learners.

Conclusion: The present survey showed that though most students are familiar with SDL, students still require faculty guidance for goal setting and expect explanatory videos specially prepared by faculty. Though most students agree that SDL is important in medical education and is essential throughout a medical career, at the same time, fewer than half of the students received formal training regarding SDL.

Keywords: Goal setting, Lifelong learning, Medical curriculum, Ownership of learning

INTRODUCTION

The SDL for medical students refers to the process by which students take primary responsibility for their own education and learning, rather than relying solely on traditional classroom teaching and instructions. In the context of medical education, SDL is an essential skill and approach for students to develop because of the rapidly evolving nature of medical knowledge and the need for lifelong learning in the medical profession [1].

Self-directed learners in medicine have the autonomy to set their learning goals, choose the resources they use, and determine their study schedule. They take ownership of their education and are proactive in seeking out opportunities for learning [2]. SDL involves finding and utilising a wide range of learning resources, including textbooks, online databases, medical journals, clinical guidelines, simulation tools and educational websites [3]. Students may also engage in case-based learning, problem-solving and peer teaching. Self-directed learners often engage in reflection on their learning experiences. They assess their strengths and weaknesses, identify gaps in their knowledge, and adjust their learning strategies accordingly [4].

The SDL involves setting clear, achievable learning goals. Medical students may set short-term goals, such as mastering a specific medical topic, and long-term goals, such as preparing for board

exams or pursuing a particular medical specialty. Effective time management is crucial for self-directed learners. They need to allocate sufficient time for studying, clinical rotations and other educational activities, while balancing personal and professional responsibilities [5]. Self-assessment is an integral part of SDL. Medical students should regularly evaluate their progress, seek feedback from mentors, instructors, or peers, and adjust their learning plans as needed [6].

Self-directed learning in medical education is not limited to the duration of medical school. It prepares students for a lifetime of learning as healthcare professionals. They must stay up to date with the latest research, treatments and technologies throughout their careers [7]. Many medical schools incorporate problem-based learning approaches into their curricula, which encourage students to work together to solve clinical cases and research medical topics independently [8,9]. SDL allows medical students to tailor their learning experiences to their individual interests and needs. This can be especially valuable as students explore various specialties within medicine.

Self-directed learners are accountable for their own education and are responsible for meeting the requirements and standards of their medical programme or training. In summary, SDL for medical students involves taking initiative, setting goals, seeking out resources, reflecting on progress and continuously adapting

to the evolving field of medicine. It is a critical skill that helps medical students become lifelong learners and effective healthcare professionals. In this direction, a self-administered questionnaire study was conducted with the objective of evaluating the preparedness, methodology and understanding of SDL concepts among first-year medical students.

MATERIALS AND METHODS

A questionnaire-based cross-sectional study was conducted in the Department of Anatomy, Konaseema Institute of Medical Sciences and Research, Amalapuram, Andhra Pradesh, India, from September 2022 to October 2022. The research proposal was approved by the Institutional Ethics Committee (Serial No. of IEC/PR/2021:103/25.10.23). The students were exposed to at least two sessions of orientation to the SDL concepts. During the two introductory sessions, each undertaken for three hours, students were oriented to autonomy, learning resources, goal setting, time management and problem-solving aspects of SDL. The sessions were conducted through coordinated efforts of all three preclinical Departments of Anatomy, Physiology and Biochemistry, under the aegis of the Medical Education Unit.

Inclusion criteria: All students who attended both introductory sessions were offered the opportunity to take the feedback questionnaire.

Exclusion criteria: Students who failed to attend any of these sessions or did not participate in a single SDL activity were excluded from the study.

Study Procedure

The questions were designed to gather information about the students' prior knowledge and readiness for SDL, their current SDL practices and their perception of SDL in medical education. The questionnaire was designed by members of the Medical Education Unit (MEU). The questionnaire had three sections: preparedness for SDL, current SDL methodology and the integration of SDL in medical education, with a total of 15 questions. The questions were initially face-validated by subject experts from the preclinical departments along with MEU members. It was pilot-tested among ten second-year students to avoid bias and prior exposure to feedback from the intended study population. The students who participated in the pilot testing of the questionnaire had exposure to ongoing SDL methods. The questions designed to capture student perceptions had a Likert scale of 1 to 3. The questionnaire consisted of 11 questions under three headings and four open-ended questions for suggestions on improving the SDL process [APPENDIX-1]. The reliability of the responses was checked by

re-testing the questionnaire with the same participants and correlating the scores of the two administrations.

Administration of questionnaire: The questionnaire was circulated in electronic format using Google Forms, and responses were collected. Since this was a questionnaire-based study, participation was voluntary and responses were anonymous.

STATISTICAL ANALYSIS

The perception of students with respect to preparedness, current method and penetration along with suggestions were compiled. Categorical variables of students' perception about preparedness and penetration were presented as percentages.

RESULTS

Among 150 medical students, 130 students participated in the survey, and excluding incomplete submissions, 127 responses were considered for analysis.

Preparedness for SDL: A total of 11 (8.6%) respondents were very familiar and 47 (37%) respondents were somewhat familiar with the concept of SDL, and 31 (24.4%) of them have participated in SDL activities from any of the three first-year departments.

SDL methodology: A total of 88 (69.2%) respondents said they set learning goals with guidance from instructors, while the remaining 39 students set learning objectives independently. Only 21 (16.5%) of students used online resources (e.g., medical websites, video lectures) daily. A total of 59 (46.4%) students said they use online material weekly. Additionally, 43 (33.8%) students mentioned that they rarely used online resources. Four (3.1%) students stated that they never use online material during their studies.

A total of 106 (83.4%) students mentioned that they regularly self-assess and reflect on the learning process. Only 37 (29.13%) of students collaborate with peers during SDL. Additionally, 39 (30.7%) students said they occasionally collaborate with others, while 29 (22.8%) students mentioned that they rarely collaborate with others during SDL activities. The remaining 22 (17.3%) students said they never collaborate with others during SDL.

Penetration of SDL: While 102 (80.3%) students believe SDL is important {extremely important, 62 (48.8%) and very important, 40 (31.4%)} in medical education, 19 (14.9%) students expressed that SDL is somewhat important. Six (4.7%) students said SDL is not important. Although 20 (15.7%) students opined that they received extensive training for SDL within the medical curriculum, less than half of the participants, 59 (46.4%) opined that the training received was limited. Total of 48 (37.7%) students expressed that they have not received any formal training for SDL methodology [Table/Fig-1].

Question	Responses, n (%)			
	Very familiar	Somewhat familiar	Not familiar	X
How familiar are you with the concept of Self-directed Learning (SDL) before entering medical school?	11 (8.6) Very familiar	47 (37) Somewhat familiar	69 (54.3) Not familiar	X
Have you participated in any SDL activities or courses prior to entering medical school?	31 (24.4) Yes	96 (75.5) No	X	X
How do you typically set your learning goals and objectives for your medical studies?	88 (69.2) With guidance	39 (30.7) Independently	X	X
How often do you use online resources (e.g., medical websites, video lectures) to supplement your learning?	21 (16.5) Daily	59 (46.4) Weekly	43 (33.8) Rarely	4 (3.1) Never
Do you engage in self-assessment and reflection on your learning progress?	106 (83.4) Yes	21 (16.5) No	X	X
How do you manage your study time effectively?	88 (69.2) Structured schedule	39 (30.7) No schedule	X	X
Have you collaborated with peers for SDL activities or group discussions?	37 (29.13) Frequently	39 (30.7) Occasionally	29 (22.8) Rarely	22 (17.3) Never
To what extent do you believe SDL is important in your medical education?	62 (48.8) Extremely important	40 (31.4) Very important	19 (14.9) Somewhat important	6 (4.7) Not important
Do you feel that your medical program encourages SDL practices?	96 (75.5) Strongly encourages	29 (22.8) Somewhat encourages	1 (0.78) Neutral	1 (0.78) Discourages

Have you received any formal training or guidance on SDL within your medical program?	20 (15.7) Yes, extensive	59 (46.4) Yes, limited	48 (37.7) No formal training	X
Do you believe SDL will be essential throughout your medical career as a lifelong learner?	44 (34.6) Strongly agree	62 (48.8) Agree	17 (13.3) Neutral	4 (3.1) Disagree

[Table/Fig-1]: Responses expressed by the participants in terms of frequency and percentages.

For the open-ended question about the skills or access to resources in medical education, three students suggested access to certain web sources, including a video atlas of human anatomy and commercially available video lectures and illustrations. One student requested access to a Three-dimensional (3D) human model to explore the relations better.

Regarding an open-ended question about specific challenges, many students opined that new terminology in topics is difficult to decipher without lecture classes. Of particular importance among suggestions for improvement of SDL are: video lectures by faculty, discussion of topics in class/small groups after SDL by faculty, and formal training regarding SDL, especially about goal setting and resources.

Seven students expressed additional insights into SDL in medical education. Out of these, four students opined that SDL sessions prepare them to be lifelong learners and are very important for keeping updated with advances in medical science. Of particular importance, one student suggested that SDL topics should be outside the curriculum of the first-year topics, so that it provides an opportunity to explore other related topics. Another student opined that SDL sessions can be clubbed with a mentor-mentee program. There was one suggestion to include seniors/repeater batch students in SDL sessions so that freshers get more orientation towards resources and methods of learning.

DISCUSSION

The current study shows that although most students are familiar with SDL and have participated in SDL, students still require faculty guidance for goal setting. It is suggested that short and explanatory videos, specially prepared by faculty, be used to explain specific SDL requirements. While most students agree that SDL is important in medical education, there is no formal training provided regarding SDL.

Supporting these findings in a commentary, it is stated that SDL in medical education helps build a strong self-regulated learning environment. The authors advocate for extensive training programs to teach and evaluate SDL. It is suggested that SDL should aim to provide learning opportunities with core concepts such as the promotion of self-confidence, risk-taking, uncertainty, and surprise [9]. A meta-analysis concluded that SDL will improve knowledge domains compared to traditional methods, and SDL may be effective in skills and attitudes domains as well [10]. SDL components and utilisation have gained particular importance during the Coronavirus Disease 2019 (COVID-19) pandemic crisis, and many universities across the world have resorted to this concept directly or indirectly [11].

In a similar study evaluating SDL utilisation in physiology among first-year students, authors noted that the majority of students were more prepared and aware of their learning strengths and took ownership of their learning [3]. In a study among first-year students of King Saud Medical University, using a tailor-made SDL readiness scale, authors have shown that the study population considered had fairly good readiness for SDL [12]. In a study utilising this scale in a medical school in Nepal, it was noted that first-year medical students had a high degree of readiness for SDL [13]. As the intended participants of the present study had exposure to very few SDL activities, the use of such a readiness scale was not considered.

In a questionnaire-based study among 616 nurses and midwives in Brunei, it was noted that graduate nurses have the highest preparedness for SDL. It was also noted that age, marital status, and experience increase SDL among nurses [14]. In a similar study with first-year medical students, where 74 participants undertook a

questionnaire, it was concluded that facilitators should be strongly aware of students' capabilities of SDL and students must monitor their learning progress [15]. In another questionnaire study involving 309 Lithuanian students, it was noted that students are only partially prepared for SDL. The current study revealed that students were prone to procrastination and considered themselves least competent in stress management [16].

The internet provides an extensive and diverse pool of educational resources, including websites, blogs, video tutorials, online courses, forums and research databases. SDL allows learners to explore this abundance and select resources that align with their learning goals and preferences. SDL through the internet offers flexibility in terms of when and where learning occurs. Learners can access materials and engage in learning activities at their convenience, accommodating various schedules and learning styles [17].

YouTube is a powerful and versatile platform that has become an invaluable resource for SDL. They can choose when and where to access content, enabling flexible and personalised learning experiences [18]. In the present study, 14 students suggested the development of curated, in-house video lectures of faculty directed to the topic of SDL. One student opined that videos of faculty addressing the objectives of SDL are very helpful in understanding and retention of the concepts.

Library resources play a crucial role in SDL for medical students. Libraries provide access to a wealth of academic materials, including textbooks, journals, databases and reference materials, making them indispensable for self-directed medical education [19,20]. For the open-ended question in the present study regarding opinions about library resources, students expressed the desire for professional guidance and support in identifying appropriate library books for SDL. Especially with digital content, students seek assistance in screening and selecting only those resources relevant to the medical fraternity, and excluding non scientific content.

Limitation(s)

Participants in the current study have been exposed to a minimal number of SDL sessions, and therefore, there may be shortcomings in the overall opinions of the students regarding preparedness towards SDL. The small sample size of the study hinders generalisation of the study outcomes.

CONCLUSION(S)

Overall, the present survey showed that although most students are familiar with SDL and have participated in SDL activities, students still require faculty guidance for goal setting. Specifically, short and explanatory videos specially prepared by faculty discussing the specific SDL requirements are recommended. Two-thirds of the students have a structured study schedule, while one-third of students rarely use online resources. While most students agree that SDL is important in medical education and is essential throughout a medical career, less than half of the students have received formal training on SDL.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Feb 05, 2024
- Manual Googling: May 24, 2024
- iThenticate Software: May 30, 2024 (3%)

ETYMOLOGY: Author Origin

EMENDATIONS: 8

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: **Feb 05, 2024**

Date of Peer Review: **Mar 11, 2024**

Date of Acceptance: **May 31, 2024**

Date of Publishing: **Jul 01, 2024**

APPENDIX-1

Questionnaire

Section 1: Preparedness for SDL

1. How familiar are you with the concept of Self-directed Learning (SDL) before entering medical school?
 - Very familiar
 - Somewhat familiar
 - Not familiar at all
2. Have you participated in any SDL activities or courses prior to entering medical school?
 - Yes
 - No

Section 2: Current SDL Methodology

3. How do you typically set your learning goals and objectives for your medical studies?
 - With guidance from instructors
 - Independently
4. How often do you use online resources (e.g., medical websites, video lectures) to supplement your learning?
 - Daily
 - Weekly
 - Rarely
 - Never
5. Do you engage in self-assessment and reflection on your learning progress?
 - Yes
 - No

6. How do you manage your study time effectively?
 - I have a structured study schedule
 - I study when I feel like it

7. Have you collaborated with peers for SDL activities or group discussions?
 - Frequently
 - Occasionally
 - Rarely
 - Never

Section 3: Penetration of SDL in Medical Education

8. To what extent do you believe SDL is important in your medical education?
 - Extremely important
 - Very important
 - Somewhat important
 - Not important
9. Do you feel that your medical program encourages SDL practices?
 - Strongly encourages
 - Somewhat encourages
 - Neutral
 - Somewhat discourages
 - Strongly discourages
10. Have you received any formal training or guidance on SDL within your medical program?
 - Yes, extensive training
 - Yes, limited training
 - No formal training

11. Are there specific SDL skills or resources you would like to have access to in your medical education?
12. Do you believe SDL will be essential throughout your medical career as a lifelong learner?
 - Strongly agree
 - Agree
 - Neutral
 - Disagree
 - Strongly disagree
13. What challenges, if any, have you encountered in practicing SDL within your medical studies?

Suggestions for Improvement
14. Do you have any suggestions for how your medical program can better support SDL among students?
15. Are there any additional comments or insights you would like to share regarding SDL in medical education?