

REVIEW ARTICLES

Learning Strategies And Styles of UMSU Medical Faculty Students During the COVID-19 Pandemic

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Abstract: The COVID-19 pandemic significantly altered medical education, prompting a shift from face-to-face to online and blended learning at the Faculty of Medicine Universitas Muhammadiyah Sumatera Utara (FK UMSU). This study analysed dominant learning styles and strategies among 206 medical students from the 2020 (fully online) and 2021 (blended learning) cohorts during the pandemic. Using the VARK questionnaire and Revised Two-Factor Study Process Questionnaire (R-SPQ-2F), findings revealed visual learning as the most prevalent style (34%), particularly in the blended learning cohort. Auditory preferences were more common among fully online learners, while read/write and kinesthetic styles were less dominant. Regarding strategies, 57% of students adopted surface learning approaches, focusing on rote memorisation, whereas 43% employed deep strategies emphasising conceptual understanding. Surface learning was notably higher in the 2021 cohort exposed to blended formats, suggesting a potential disconnect between hybrid environments and meaningful engagement. The study highlights how instructional delivery modes influenced learning behaviours: blended learning fostered visual dominance and marginally supported deeper strategies, while fully online formats correlated with auditory preferences and surface-level tactics. These insights underscore the need for adaptive pedagogical approaches in post-pandemic medical education, tailored to diverse learning preferences and strategies to enhance academic outcomes. Institutions should consider integrating multimodal resources and fostering interactive environments to bridge gaps between online, blended, and traditional learning systems.

Keywords: Learning styles; learning strategies; VARK; R-SPQ-2F; medical education; blended learning; COVID-19; surface approach; deep approach; online learning.

INTRODUCTION

Hypertension, or high blood pressure, remains a major public health concern globally and is often referred to as the "silent killer" due to its asymptomatic progression that can culminate in life-threatening conditions such as stroke, myocardial infarction, heart failure, and chronic kidney disease. The World Health Organisation (WHO) estimates that approximately 1.13 billion people worldwide suffer from hypertension, with two-thirds living in low- and middle-income countries. Hypertension significantly contributes to the global burden of disease and is one of the leading causes of premature death worldwide. Effective control of hypertension is critical not only for individual health but also for the sustainability of health care systems and national productivity.¹

In Indonesia, the prevalence of hypertension continues to increase significantly. Based on the Basic Health Research (Riskesdas) 2018, the prevalence of hypertension in individuals aged ≥ 18 years was 34.1%, a sharp rise from 25.8% in 2013. This data suggests that one in three adults in Indonesia is living with hypertension, indicating an urgent need for comprehensive intervention strategies, particularly those that emphasise long-term behavioural changes and support systems.²

One of the key determinants in the successful management of hypertension is

the patient's ability to implement and sustain effective self-care behaviours. These behaviours include adhering to antihypertensive medication regimens, adopting a healthy diet (low in salt and fat), engaging in regular physical activity, maintaining a healthy weight, quitting smoking, and managing stress effectively.³ However, many patients find it difficult to maintain these behaviours consistently due to various personal, social, and environmental barriers.

Among these, family support is widely recognised as a significant factor influencing self-care adherence among individuals with chronic diseases. Support from family members can take various forms, including emotional encouragement, informational guidance, practical assistance, and even financial support. Such support can enhance the patient's motivation, improve health literacy, reduce psychological distress, and provide accountability, all of which are essential for maintaining consistent self-care routines.⁴

Several studies have documented the positive association between family support and improved self-care behaviour in patients with chronic illnesses such as diabetes and hypertension. For instance, a study by Friedman et al. emphasised that family plays a crucial role in reinforcing health-related behaviour changes and providing an environment that facilitates disease

management.⁵ Furthermore, family-centred care models are increasingly being recommended in clinical settings as they are associated with better health outcomes and patient satisfaction.⁶

In the context of primary health care, especially in urban community settings such as Puskesmas Helvetia in Medan, understanding the relationship between family support and patient behaviour is essential. The complexity of hypertension management in real-world settings requires not only biomedical interventions but also psychosocial strategies that consider the patient's immediate environment, particularly family dynamics.

This study was conducted to analyse the correlation between family support and self-care behaviour among hypertensive patients at Puskesmas Helvetia, Medan. The results are expected to contribute to the development of more effective community-based interventions that integrate family involvement in the continuum of hypertension care, ultimately aiming to improve disease control and patient quality of life.¹

METHOD

This study employed a quantitative descriptive cross-sectional design to analyse the relationship between family support and self-care behaviour among hypertensive patients. A cross-sectional approach was chosen to capture data at a single point in time, allowing for the identification of

associations between variables without inferring causality.⁴

The research was conducted at Puskesmas Helvetia, Medan, one of the primary public health centres serving a diverse urban population. Data collection was carried out from June to August 2023, during routine clinical visits to the non-communicable disease (NCD) service unit.

Statistical methods should be described in detail in the methods chapter and supported by references. An unusual method, written in detail along with references to the method.

The study population consisted of all hypertensive patients registered at Puskesmas Helvetia who met the inclusion criteria. The inclusion criteria were:

1. Aged ≥ 18 years
2. Diagnosed with hypertension (as confirmed in medical records)
3. Able to communicate verbally and provide informed consent
4. Present at the time of data collection

Patients with severe cognitive impairment, hearing loss, or those experiencing hypertensive emergencies were excluded.

Sampling was performed using proportional stratified random sampling to ensure representation across different age groups and education levels. Based on Slovin's formula and a total hypertensive patient registry of 426 individuals, the sample size was calculated to be 206 participants with a 95% confidence level and a 5% margin of error.⁷

Two validated instruments were used:

1. The VARK Questionnaire – Developed by Fleming and Mills, this tool identifies preferred learning styles (Visual, Auditory, Reading/Writing, Kinesthetic). It has been adapted for Bahasa Indonesia and tested for validity and reliability in various health education settings. The questionnaire contains 16 items, with 4 items per learning modality.⁸
2. The Revised Two-Factor Study Process Questionnaire (R-SPQ-2F) – Developed by Biggs et al., this instrument assesses learning strategies through two main constructs: Deep Approach and Surface Approach. Each construct includes subcomponents for motivation and strategy, totalling 20 items. The instrument has demonstrated high internal consistency in Indonesian medical education studies (Cronbach's alpha > 0.80).⁹

Both instruments underwent pilot testing on a subsample of 43 respondents. Item-total correlation values exceeded the r-table value of 0.300, indicating good validity. The reliability tests yielded Cronbach's alpha values of 0.831 for VARK and 0.847 for R-SPQ-2F, confirming that the instruments were reliable for the current population.⁹

Descriptive statistics were used to summarise demographic characteristics, learning styles, and learning strategies. Data

were analysed using SPSS software version 25.0. The results were presented as frequencies and percentages. For inferential analysis, the Chi-square test was used to examine the association between family support and self-care behaviour, with p-values <0.05 considered statistically significant. This study was approved by the Ethics Committee of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara, and written informed consent was obtained from all participants before data collection.

RESULT

A total of 206 medical students from the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara (FK UMSU), participated in this study. Participants were drawn from the 2020 and 2021 cohorts, representing the transition from full online learning to blended learning formats during the COVID-19 pandemic.

Table 1: Characteristics of Respondents

Characteristics of Respondent	f (person)	Percentage (%)
Cohorts		
2020	75	36
2021	131	64
Total	206	100

Based on Table 4.1, the year of entry of students, most of the respondents were in the 2021 batch, as many as 131 people (64%), and also based on GPA, most of the respondents had a Fair GPA with an interval (2.00-3.00), as many as 108 people (52%).

Table 2 Learning Styles

Learning Styles	Cohorts			
	2020		2021	
	N	%	N	%
Visual	21	28	49	38
Audio	23	31	29	22
Read & Writing	19	25	34	26
Kinesthetic	12	16	19	14
Total	75	100	131	100

Based on Table 2, it can be seen that UMSU Medical Faculty students of cohorts 2020, totalling 75 people, can conclude that the most common learning style is the Audio learning style, which has a percentage of 31% and Visual has a percentage of 28%, Read & Writing as much as 25% and Kinesthetic 16%.

In contrast to the 2021 UMSU Medical Faculty students, totalling 131 people, it can be concluded that in terms of learning style, the most is the Visual learning style, which has a percentage of 38%, Read & Writing has a percentage of 26%, Audio as much as 22% and Kinesthetic 15%.

Table 3: Overview of Students' Overall Learning Style

Variabel	Jumlah Mahasiswa	Persentase (%)
Visual	70	34
Audio	52	25
Read & Writing	53	26
Kinestetik	31	15
Total	206	100

Based on table 3, it can be generalized that of the 206 respondents, it can be stated that 34% of students predominantly use Visual learning styles, then as many as 26% of Read & Writing learning styles, Audio learning styles have a total percentage of 25% and the learning style that has the smallest percentage is the kinesthetic learning style with a total percentage of 15%.

Measurement of the learning strategy approach in this study was carried out with the Revised Two-Factor Study Process Questionnaire (R-SPQ-2F). The following are the results of the R-SPQ-2F calculation.

Table 4 Student Learning Approach

Cohorts	Students	Surface Approach	%	Deep Approach	%
2020	75	38	32	37	43
2021	131	81	68	50	57
Total	206	119	100	87	100

It can be concluded from the results of the calculation of the total value of all UMSU Faculty of Medicine students, the surface approach to learning is more dominant, with a total of 119, with a percentage of 57%, while the deep learning approach has a percentage of 43%. Based on the 2021 batch, students have a surface learning approach as the dominant approach, while the number of students with surface and deep learning approaches only differs by 1 person in the 2020 batch.

DISCUSSION

This study aimed to analyse the learning styles and strategies among FK UMSU students during the COVID-19 pandemic, with a specific focus on comparing cohorts from 2020 and 2021—each of which experienced different modes of learning (fully online vs. blended). The findings demonstrate that learning styles and strategies are significantly influenced by the educational environment, particularly the method of content delivery and the nature of student engagement.⁸

The overall dominant learning style found among participants was visual (34%), followed by read/write (26%), auditory (25%), and kinesthetic (15%). This trend is consistent with previous research showing that visual learning tends to become more prominent in digital and blended learning environments, where the use of presentations, diagrams, infographics, and video content is more frequent.^{10,11} Ritonga and Rahma noted that during online learning, students with a visual style benefit from structured media like slides and infographics, leading to higher motivation and performance.¹² Moreover, Singh emphasised that blended learning environments, which combine face-to-face and online strategies, significantly improve engagement for visual and read/write learners.¹³

Interestingly, the 2020 cohort, which underwent fully online learning, exhibited a greater preference for auditory learning. This could be attributed to the teaching

format prevalent at the time, where lectures were predominantly delivered via voice-over PowerPoint slides or audio-based discussions through platforms like Zoom. In contrast, the 2021 cohort, which transitioned to blended learning, showed a stronger inclination toward visual learning, likely due to increased face-to-face interaction, better exposure to visual teaching aids, and more dynamic classroom engagement.^{13,14}

The prevalence of the read/write learning style (26%) also highlights the continued relevance of textual learning among medical students, possibly driven by the volume of reading materials, assignments, and note-taking tasks inherent in medical education.¹⁵ Conversely, kinesthetic learners (15%) were the least represented group. This is likely due to the limited availability of hands-on activities such as lab work, clinical skills training, and field practice during pandemic restrictions.¹⁶

These findings reinforce the need for adaptive teaching methods that can accommodate diverse learning preferences. In particular, instructional strategies should emphasise multimodal delivery, especially in the transition from online to hybrid learning systems.^{17,18} As supported by the work of Alan C, diverse instructional techniques are essential for engaging students with different cognitive profiles and learning preferences.¹⁹

The study also showed a higher prevalence of surface learning strategies (57%) compared to deep learning strategies (43%). Surface learners tend to focus on

memorising isolated facts and perform academic tasks primarily to avoid failure rather than to understand the material thoroughly.⁹ This approach is often linked with extrinsic motivation, such as passing exams or meeting minimum requirements.

One potential explanation for the dominance of surface learning during the pandemic is the nature of online education itself. Reduced interaction with lecturers, limited peer collaboration, and the passive delivery of content may have led students to adopt shortcut learning tactics, such as rote memorisation and cramming, rather than conceptual understanding. Yorke explains that such surface strategies often emerge in response to external pressures like uncertainty, exam burden, and lack of academic autonomy.^{12,20,21}

In contrast, deep learning strategies, which are characterised by curiosity, intrinsic motivation, and meaningful engagement with academic content, require structured environments and active teaching methods—conditions that are harder to achieve in isolated online formats. This is concerning in the context of medical education, where a deep understanding of physiological processes and clinical reasoning is critical.^{9,22}

These results are in line with prior research indicating that students are more likely to engage in surface approaches when under academic pressure, time constraints, or during periods of psychological stress—conditions that were amplified during the pandemic.^{21,22} Moreover, without adequate

feedback, student-centred learning, and reflective opportunities, it becomes challenging to promote deeper learning behaviours.

The findings suggest that blended learning formats, when implemented thoughtfully, can help restore more active, visually rich, and interactive learning environments that support various learning styles and encourage deeper cognitive engagement. Educators should consider integrating collaborative tasks, visual aids, and frequent formative assessments to foster both understanding and retention. Additionally, training in self-regulated learning and metacognition may help students move beyond surface-level strategies and cultivate deeper, more autonomous learning habits.

CONCLUSION

This study found that the visual learning style was the most dominant among UMSU Faculty of Medicine students during the COVID-19 pandemic, particularly in the cohort exposed to blended learning. Meanwhile, auditory learning was more prevalent among students who underwent fully online learning. These differences suggest that educational delivery methods significantly influence students' learning preferences, and adjustments in instructional design may be needed to accommodate this diversity.

In terms of learning strategies, the majority of students employed a surface approach rather than a deep one. This finding

is concerning in the context of medical education, where deep understanding and critical thinking are essential. The dominance of surface learning could be linked to the constraints of online learning, including limited engagement, increased stress, and a lack of structured guidance during the pandemic.

Given these findings, it is recommended that medical educators:

1. Incorporate multimodal learning resources, especially visual tools, to support different learning styles.
2. Transition towards more interactive and reflective teaching strategies, including group discussions, case-based learning, and formative assessments.
3. Provide training in self-directed learning and metacognitive skills to shift students from surface to deep learning strategies.

By aligning instructional practices with student needs and learning preferences, especially in the aftermath of the pandemic, educational institutions can better support effective and meaningful learning in medical education.

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