JOHCE
Journal of HealthCare Education

Volume 1 Issue 2

Journal of HealthCare Education | JOHCE
Volume 1 Issue 2
ISSN : 3051-5513

ORIGINAL RESEARCH ARTICLE

JOHCE Journal of Health Care Education

Curriculum Analysis of Public Health Component in Medical Curriculum at Eastern University, Sri Lanka

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Received 05 December 2024

Accepted 22 December 2024

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Keywords:
Curriculum
Education
Public Health
Standards
Undergraduate

ABSTRACT

Introduction: The increasing emphasis on preventive healthcare necessitates a robust public health component within undergraduate medical education. This study aimed to analyze the public health component of the Bachelor of Medicine, Bachelor of Surgery (MBBS) curriculum at Eastern University, Sri Lanka (EUSL).

Methods: A qualitative approach was employed, primarily involving an analysis of curriculum documents pertaining to the EUSL MBBS program.

Results: The planned curriculum demonstrated alignment with the educational outcomes expected by the Sri Lanka Medical Council, the Sri Lankan Qualifications Framework, and Subject Benchmark Statements. However, the analysis revealed a need to transition from traditional pedagogies to more effective, student-centered teaching-learning methods.

Conclusion: The findings indicate that the public health component of the EUSL MBBS curriculum is generally aligned with relevant educational standards in Sri Lanka. These findings can inform curriculum improvements to enhance the quality of public health education and improve the learning experience for medical students.

Introduction

Public health education has been increasingly recognized as a crucial component of medical training (Harden, Sowden, & Dunn, 1984). The World Health Organization (WHO, 2011) emphasized the need for adequately trained healthcare workforces in public health, highlighting its global significance (Beaglehole & Dal Poz, 2003). This emphasis is further supported by the General Medical Council (2003), which advocated for the effective integration of public health and related disciplines within undergraduate medical curricula (General Medical Council, 2003).

Recent global health challenges, such as the rising burden of non-communicable diseases, the evolving landscape of infectious diseases, pandemics, environmental threats, and nutritional imbalances, have underscored the critical importance of public health knowledge for all modern medical practitioners (Tyler et al., 2009).

The focus of healthcare has shifted from a primarily curative approach to a more preventive and population-based model (Navinan, Wijayaratne, & Rajapakse, 2011; Wendimagegn & Bezuidenhout, 2019). Consequently, a strong understanding of public health principles is essential for all physicians to effectively address the complex health needs of individuals and communities.

In the context of developing countries like Sri Lanka, the role of public health specialists is particularly crucial. The Bachelor of Medicine, Bachelor of Surgery (MBBS) degree is exclusively offered by state universities in Sri Lanka. The MBBS curriculum must adhere to specific standards and guidelines established by the Sri Lanka Medical Council (SLMC) and the University Grants Commission (UGC) of Sri Lanka. The SLMC is the professional regulatory body for medical practitioners, while the UGC, through the Sri Lanka Qualification Framework (SLQF), provides a national framework for maintaining educational program standards (University Grant Commission, 2015). The UGC has also published Subject Benchmark Statements (SBS) for various disciplines, including Medicine (Quality Assurance Council, 2018). The SBS for Medicine emphasizes that medical graduates must possess adequate competency in population health and health systems, enabling them to recognize the intricate interplay between patients, families, society, and the environment.

Eastern University, Sri Lanka (EUSL), a state higher education institution, has been contributing to medical education since 2006. In 2019, EUSL transitioned its MBBS curriculum to an outcome-based education model (Youhasan, Sivanjali, & Sathaananthan, 2019). Public health concepts are integrated throughout sixteen integrated modules, and students apply this knowledge through primary health care clerkships, field-based projects, family attachments, and research projects. While twelve batches of students have graduated and eighteen are currently enrolled, a comprehensive evaluation of the public health curriculum's effectiveness has not yet been conducted. This study aims to assess the adequacy and effectiveness of the Public Health component within the medical curriculum at Eastern University, Sri Lanka.

Methods

This study employed a document analysis approach to evaluate the public health component within the current MBBS curriculum at the Faculty of Health-Care Sciences (FHCS), EUSL.

The analysis focused on:

- **Program outcomes:** Overall learning outcome or graduate profile of the MBBS program.
- **Module outcomes:** Learning objectives specific to modules related to public health.
- **Intended learning outcomes (ILOs):** Specific knowledge, skills, and attitudes that students are expected to acquire within each public health module.

These outcomes were assessed using established educational frameworks, including:

- **SPICES framework:** A framework for

evaluating the quality of educational programs.

- **Constructive Alignment:** A principle that emphasizes the alignment of learning objectives, teaching methods, and assessment strategies.
- **Teaching-Learning Process:** An examination of how teaching methods and learning activities are designed to facilitate student learning.
- **Assessment:** An evaluation of how student learning is assessed and how these assessments align with the stated learning objectives.

Furthermore, the curriculum was compared with relevant national standards, including:

- **Sri Lankan Quality Framework (SLQF):** A national framework for quality assurance in higher education.
- **Subject Benchmark Statements (SBS) for Medicine:** Guidelines and academic reference points for medical degree programs.
- **Recommendations of the Sri Lanka Medical Council (SLMC):** Professional standards and guidelines for medical education.

Results

1. Curriculum Model

The current MBBS curriculum at the FHCS, EUSL, is an outcome-based model with an integrated disciplinary approach. Courses are organized into integrated modules, primarily based on organ systems.

Graduate profiles define the desired attributes, knowledge, skills, and attitudes that the university aims to cultivate in its graduates. These profiles serve as a foundation for qualification-level attributes and ultimately, learning outcomes. The MBBS program at FHCS has defined the following graduate profiles (FHCS, 2018):

GP-1. Diagnose and manage health and disease relating the normal and deranged structure and function of the human body.

GP-2. Recognize and manage emergency health situations and take preventive measures.

GP-3. Recognize disease outbreaks and epidemics at local, national and global level and take appropriate actions.

GP-4. Carryout basic medico legal procedures including post-mortem examination.

GP-5. Apply principles of behavioural sciences, ethics and professionalism in health and promote peace.

GP-6. Use statistical methods and demographic data in practice of health care.

GP-7. Function as an effective member or leader of a health team recognizing their different roles.

GP-8. Carry out research studies in patient care / public health and disseminate the findings.

GP-9. Demonstrate self-learning in education and practice.

GP-10. Counsel and educate patients and their families with empathy

GP-11. Implement health promotion and educational activities to prevent illness and disability at individual and community level.

GP-12. Use information technology in learning and practice of health care.

GP-13. Communicate effectively in English, Sinhala and Tamil with patients, families and health- care team.

2. Alignment of Graduate Profile with the Educational Philosophy of the Institution

The vision of EUSL, is to be "world-class knowledge centre with excellent teaching-learning and research for enhancement of community well-being". Its mission is "producing abled graduates with moral values and enhancing research culture to achieve a sustainable global, national and regional development by creating local and foreign linkages with optimizing the regional resources".

The vision of FHCS is to be "A national center of excellence for higher learning and research with a competitive advantage, responsive to the dynamics of the regional, national, and global conditions." Its mission is "to produce men and women of the highest professional

standards in the practice and delivery of healthcare."

Graduate profiles of an educational programme should align with the institution's vision and mission. Haifa and Houria (2016) emphasized that institutions of higher education have a responsibility to achieve their institutional characteristics through the learning outcomes of every academic program.

Table 1 demonstrates the alignment of the MBBS graduate profiles (GPs) with the educational philosophy of FHCS. Six graduate profiles (GP-1, GP-2, GP-3, GP-8, GP-11, and GP-13) strongly emphasized the educational mission of FHCS. Eight graduate profiles (GP-1, GP-2, GP-3, GP-8, GP-9, GP-11, GP-12, and GP-13) strongly emphasized the educational vision of FHCS.

Table 1: Alignment of Graduate Profile with the Institutional Philosophy

Graduate Profile (GP)	Educational Philosophy of FHCS	
	Vision	**Mission**
GP-1	XXX	XXX
GP-2	XXX	XXX
GP-3	XXX	XXX
GP-4	XX	XX
GP-5	XX	XX
GP-6	XX	XX
GP-7	XX	XX
GP-8	XXX	XXX
GP-9	XXX	XX
GP-10	XX	XX
GP-11	XXX	XXX
GP-12	XXX	XX
GP-13	XXX	XXX

X – Relatively low emphasis *XXX – Relatively high emphasis*

3. Alignment of Graduate Profile with the Sri Lanka Medical Council Guidelines

The SLMC has defined twelve expected outcomes for graduates of the MBBS program (SLMC, 2011):

EO-1. Have acquired a knowledge and understanding of basic, para clinical, clinical and social sciences relevant to the practice of medicine.

EO-2. Be proficient in basic clinical skills such as the ability to obtain patient's history to undertake a comprehensive physical and mental state examination, interpret the findings, arrive at a different diagnosis, identify investigations required to arrive at a diagnosis, and arrive at a patient management plan.

EO-3. Be able to fulfill basic medico legal responsibilities.

EO-4. Demonstrate attitudes necessary for the achievement of high standards of ethical medical practice.

EO-5. Demonstrate competence in information/data handling, retrieval of information, record keeping and IT.

EO-6. Have well developed communication and language skills.

EO-7. Have understanding of the dynamics of teamwork, leadership and show respect for other categories of health

care workers who comprise the health care team.

EO-8. Have the knowledge, attitudes and skills necessary to deliver primary health care.

EO-9. Be able to promote health and prevent disease in the context of the whole individual and his or her place in the family and society.

EO-10. Be appropriately competent in higher order thinking research skills and practice of evidence-based medicine.

EO-11. Personal development and professionalism.

EO-12. Health management.

Alignment with the SLMC guidelines is crucial for any MBBS curriculum. Frank et al. (2020) emphasized the importance of accreditation by the country's medical regulatory body.

Table 2 illustrates the association between the MBBS graduate profiles (GPs) and the SLMC expected outcomes (EOs). All SLMC EOs are aligned with the GPs. Notably, most SLMC expected outcomes (EO-2, 4, 5, 6, 7, 8, 9, 10, 11, and 12) are aligned with multiple GPs.

Table 2: Alignment of Graduate Profile with the SLMC Guidelines

GP	**Expected Outcome (EO) of SLMC Guidelines**											
	EO-1	EO-2	EO-3	EO-4	EO-5	EO-6	EO-7	EO-8	EO-9	EO-10	EO-11	EO-12
GP-1	X	X										
GP-2									X			X
GP-3								X	X			X
GP-4			X	X								
GP-5		X		X			X				X	
GP-6					X							X
GP-7							X					
GP-8					X					X		
GP-9										X	X	
GP-10				X		X		X				
GP-11						X		X	X			
GP-12					X							
GP-13						X						

X – *Relative emphasis*

4. Alignment of Graduate Profile with the Sri Lanka Qualifications Framework

The SLQF serves as a benchmark for measuring graduates' level of qualification. The SLQF defines twelve levels, each with a specific volume of learning measured in total credits. Bachelor's degree programs typically fall under Level 6 of the SLQF. The MBBS program at EUSL has a total credit weight of 183 credits, exceeding the average credit load of 120 credits (or 6000 notional hours) for Level 6 programs.

The SLQF identifies twelve categories of learning outcomes (University Grant Commision, 2015):

1. Subject / Theoretical Knowledge
2. Practical Knowledge and Application
3. Communication
4. Teamwork and Leadership
5. Creativity and Problem Solving
6. Managerial and Entrepreneurship
7. Information Usage and Management
8. Networking and Social Skills
9. Adaptability and Flexibility
10. Attitudes, Values and Professionalism
11. Vision for Life
12. Updating Self / Lifelong Learning

Table 3 demonstrates the alignment of the MBBS GPs with the SLQF learning outcomes. The GPs encompass all twelve categories of SLQF learning outcomes. Notably, most GPs are strongly associated with Outcomes 1 and 2 (Knowledge domain). Conversely, Outcome 9 (Adaptability and Flexibility) is primarily aligned with GP-7 (Function as an effective member or leader of a health team recognizing their different roles).

Table 3 illustrates the relative emphasis of each SLQF learning outcome in the GPs. The emphasis generally decreases from left to right, indicating a stronger emphasis on the initial SLQF learning outcomes (1, 2, and 3).

Table 3: Alignment of Graduate Profile with SLQF Learning Outcome

GP	Categories of SLQF Learning Outcome											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	X	X			X							
2	X	X		X								
3	X	X	X	X				X				
4	X	X										
5	X	X								X	X	
6	X	X					X					
7			X	X		X		X	X		X	
8					X		X				X	X
9					X						X	X
10			X					X		X		
11	X	X	X		X	X		X		X		
12							X					
13			X	X		X		X				

X – *Relative emphasis*

5. Contents of Public Health Curriculum

The Public Health component of the MBBS curriculum at Eastern University, Sri Lanka, comprises 16 modules, scheduled during Phase II of the program. Table 4 outlines the modules and their respective credit weights.

The General Medical Council (GMC, 2003) emphasized the inclusion of the following core courses within public health curricula:

Epidemiology, Demography, Health Economics, Health Systems, Health Policy, Medical Statistics, Sociology, Psychology, and Management Sciences.

Table 4: Module Contents of Public Health Curriculum

Public Health Curriculum of EUSL					Standards	
Phase	**Semester**	**Module Code**	**Credit**	**Module Name**	**GMC**	**SBS**
II (1)	4	PH 01	1	Epidemiology	X	X
		PH 02	1	Demography & Health informatics	X	X
		PH 03	1	Basic Statistics	X	X
		PH 04	1	Research Methodology		
		PH 05	1	Proposal writing		
	5	PH 06	1	Prevention of Communicable diseases		X
		PH 07	1	Environmental & occupational health		X
		PH 16	2	Primary Health Care (clerkship)		X
II (2)	6	PH 08	1	Non-communicable diseases & chronic conditions		X
	7	PH 09	1	Health promotion, health education & community intervention		X
		PH 10	1	Health System	X	X
		PH 11	4	Research & Applied Statistics	X	X
	8	PH 12	1	Nutrition & Diet		
		PH 13	1	Disaster management & injury prevention		X
		PH 14	2	Family health		X
		PH 15	1	Family & Community Attachments (Field based projects)		X

X – Relative emphasis

Similarly, the University Grants Commission's (UGC) Subject Benchmark Statements (SBS) for Medicine (CVCD, 2016) identified the following as mandatory competencies: Demography, Statistics, Epidemiology, Health promotion, Health care planning, Health care management, Health economics, the organization of curative and preventive health services, Health care provision in disaster, International health, Disease prevention, primary care delivery, and liaison with different sectors of the health and social care systems.

Table 4 demonstrates the alignment of EUSL's public health modules with the recommendations of the GMC and the SBS. Four of the GMC-recommended courses (Epidemiology, Demography, Health Systems and Medical Statistics) are directly incorporated into the EUSL curriculum. Two GMC-recommended courses (Health Policy and Management Sciences) are indirectly addressed through modules such as Health System, Primary Health Care (clerkship), Family health, Field-based projects, Disaster management & injury prevention, Environmental & occupational health, and Health promotion, health education & community intervention.

The EUSL curriculum aligns with most of the SBS-recommended competencies. However, health economics is not explicitly incorporated into the EUSL curriculum, despite being emphasised in both the GMC and SBS

guidelines. While the GMC recommended the inclusion of sociology and psychology, the EUSL curriculum does not explicitly incorporate a dedicated behavioural science component. Interestingly, the EUSL curriculum includes a research component within its public health education.

6. Learning Outcome of Modules

Table 5 illustrates the alignment of module outcomes (MOs) with educational domains and Bloom's taxonomy levels.

- **Educational Domains:**
  - The majority of MOs were aligned with the knowledge domain.
  - Twelve MOs demonstrated alignment across all three educational domains.
- **Bloom's Taxonomy:**
  - Eleven out of 29 MOs aligned with the "understanding" level of Bloom's taxonomy, primarily representing lower-order cognitive abilities.
  - Nine out of 29 MOs aligned with "synthesis," the highest level of Bloom's taxonomy.

Table 5: Module Outcomes and Its' Educational Domain & Taxonomies

Module Name	Module Outcome (MO)	K*	S#	A$	Taxonomy
Epidemiology	1. Explain basic concept of health and its social determinants	X			Understand
	2. Apply epidemiological principles in disease prevention	X	X	X	Application
Demography and Health Informatics	1. Describe concepts of demography	X			Remember
	2. Calculate and interpret the demographic rates	X	X		Application
	3. Use health informatics in medical practice	X	X	X	Application
Basic Statistics	1. Explain basic principles of statistics in medical practice including research.	X			Understand
Research Methodology	1. Explain the important features of research proposal	X			Understand
	2. Explain principles of research methodology in medical practice	X		X	Understand
Proposal Writing	1. Develop a research proposal on selected issues in health care	X	X	X	Synthesis
Prevention of Communicable Diseases	1. Explain the clinical significance, basic management principles and prevention of communicable diseases	X			Understand
Environmental and Occupational Health	1. Describe various types of occupational health hazards	X			Remember
	2. Describe the relevant laws and regulations to promote healthy housing	X			Remember
	3. Explain various types of vectors and methods of control	X	X		Understand
	4. Describe various types of environmental pollutants.	X			Remember
NCDs & Chronic Conditions	1. Explain etiology, prevention of non-communicable diseases & chronic conditions	X			Understand
Health Promotion, Health Edu. & Community Inter.	1. Use various methods of health interventions in disease prevention	X	X	X	Application

Health System	2. Explain the Health system in Sri Lanka	X			Understand
	3. Relate the Sri Lankan health system with global health related goals and targets	X	X		Evaluation
Research & Applied Statistics	1. Conduct research	X	X	X	Synthesis
	2. Disseminate research finding	X	X	X	Synthesis
	3. Interpret the analyzed data	X	X		Evaluation
Nutrition & Dietetics	1. Explain the management of various nutritional disorders	X			Understand
	2. Explain the process of nutritional assessment	X	X		Understand
	3. Plan nutritional interventional programmes for different target groups	X	X	X	Synthesis
Family Health	1. Explain various primary care interventions in family practice	X	X		Understand
Disaster Management & Injury Prevention	1. Formulate management plan during disaster and emergency	X	X	X	Synthesis
	2. Explain various types of disasters and their impact on health.	X	X		Evaluation
Field based projects	1. Perform health interventions on common health issues in a particular community	X	X	X	Synthesis
Primary Health Care Clerkship	1. Implement preventive, curative and rehabilitative measures in the community in regards to Communicable diseases, Non-communicable diseases and Disabilities	X	X	X	Synthesis
	2. Educate and improve nutritional status and reproductive health in the community				
	3. Practice effective doctor patient relationship and interaction with other health professionals	X	X	X	Synthesis
		X	X	X	Synthesis

[*]K - Knowledge [#]S-Skill [$]A-Attitude

7. Alignment of Module Outcome with Graduate Profile

To ensure effective learning, a strong alignment between graduate profiles and module outcomes is crucial.

- **Module Outcome Alignment:** Each module outcome was aligned with at least two graduate profiles.
- **Graduate Profile Emphasis:** Each graduate profile was emphasized by at least four module outcomes.

This alignment, as depicted in Table 6, demonstrates a robust connection between the broader learning objectives of the program and the specific learning objectives of individual modules.

8. Teaching Learning Process

The teaching-learning methods employed in the Public Health curriculum include lectures, discussions, project work, assignments, self-directed learning (SDL), practical demonstrations, seminars, tutorials, problem-based learning (PBL), role-play, and clinical practice. Lectures emerged as the most frequently used teaching-learning method, utilized in 10 out of 16 modules.

Other significant methods included discussions, assignments, and SDL. Table 7 provides a detailed overview of the teaching-learning methods employed in each module.

Table 6: Alignment of Module Outcome with Graduate Profile

Module Name	MO	Graduate Profile												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Epidemiology	1		X	X		X					X	X		
	2		X	X		X		X			X	X		
Demography and Health Informatics	1			X			X		X					
	2						X		X					
	3			X			X		X				X	
Basic Statistics	1						X		X					
Research Methodology	1					X	X		X				X	
	2					X	X		X				X	
Proposal Writing	1						X	X	X	X			X	
Prevention of Communicable Diseases	1	X	X	X		X		X			X	X		
Environmental and Occupational Health	1		X	X		X		X				X		
	2		X					X						
	3			X		X		X				X		
	4		X					X						
Non-Communicable Diseases & Chronic Conditions	1		X				X	X			X	X		
Health Promotion, Health Education & Community Intervention	1					X				X	X	X		
Health System	1			X		X	X						X	
	2			X		X	X	X	X				X	
Research & Applied Statistics	1					X	X	X	X	X			X	
	2						X		X				X	
	3								X	X			X	
Nutrition & Dietetics	1	X												
	2	X						X			X	X		
	3	X						X			X	X		
Family Health	1		X			X		X			X	X		
Disaster Management & Injury Prevention	1		X	X	X	X		X			X			
	2		X	X	X	X		X			X			
Field based projects	1					X		X	X		X	X	X	X
Primary Health Care Clerkship	1	X	X					X		X	X	X		X
	2	X						X		X	X	X		X
	3	X						X			X	X		X

X – Relative emphasis

9. Assessment

Knowledge-based assessment methods, such as Multiple-Choice Questions (MCQs) and Structured-Essay Questions (SEQs), were predominantly used, assessed 12 out of 16 Public Health modules. These methods primarily assessed lower-order cognitive skills

within Miller's framework, specifically "Knows" and "Knows How."

- **Higher-Order Skills:**
  - Assessment methods like Proposal Writing and Field-Based Projects assessed higher-order skills, reaching the "Shows How" level of Miller's framework.
  - Portfolio and Research reports, utilized in the Primary Health Care Clerkship and Research & Applied Statistics modules, assessed the highest level of Miller's framework ("Does"), signifying application of knowledge and skills in real-world settings.

Table 7: Teaching-Learning Methods in Public Health and Its' allocation of time.

Module Name	Credit	Teaching Learning Methods (in hours)										
		Lecture	Discussion	Project work	Assignment	SDL	Practical & Demonstration	Seminar	Tutorial	PBL	Role-play	Clinical Practice
Epidemiology	1	8	4	-	1	2	-	-	-	-	-	-
Demography and Health Informatics	1	6	3	-	-	1	4	1	-	-	-	-
Basic Statistics	1	7	2	-	-	-	-	-	6	-	-	-
Research Methodology	1	7	3	-	2	2	1	-	-	-	-	-
Proposal Writing	1	-	-	-		15	-			-	-	-
Prevention of Communicable Diseases	1	5	4	-	2	1	-	-	-	3	-	-
Environmental and Occupational Health	1	6	3	-	2	1	-	-	-	3	-	-
Non-Communicable Diseases & Chronic Conditions	1	6	4	-		1	-	-	-	4	-	-
Health Promotion, Health Education & Community Intervention	1	4	6	-	2	1	-	-	-	-	2	-
Health System	1	5	8	-		2	-	-	-	-	-	-
Research & Applied Statistics	4	-	-	60	-	-	-	-	-	-	-	-
Nutrition & Dietetics	1	6	5	-	2	2	-	-	-	-	-	-
Family Health	2	6	5	-	2	2	-	-	-	-	-	-
Disaster Management & Injury Prevention	1	9	3	-	2	1	-	-	-	-	-	-
Field based projects	1	-	-	15	-		-	-	-	-	-	-
Primary Health Care Clerkship	2	-	-	-	-	5	10	-	-	-	-	15

Table 8 provides a detailed overview of the assessment methods employed in each module and their corresponding levels within Miller's framework.

Table 8: Assessment Methods and Millers' framework level.

Module	End Module Assessment	Millers' frame work level
Epidemiology	15 MCQ & 4 SEQ	Knows & Knows How
Demography and Health Informatics	15 MCQ & 4 SEQ	Knows & Knows How
Basic Statistics	15 MCQ & 4 SEQ	Knows & Knows How
Research Methodology	15 MCQ & 4 SEQ	Knows & Knows How
Proposal Writing	Proposal Evaluation - 60% Presentation - 40%	Shows How
Prevention of Communicable Diseases	15 MCQ & 4 SEQ	Knows & Knows How
Environmental and Occupational Health	15 MCQ & 4 SEQ	Knows & Knows How
Non-Communicable Diseases & Chronic Conditions	15 MCQ & 4 SEQ	Knows & Knows How
Health Promotion, Health Education & Community Intervention	15 MCQ & 4 SEQ	Knows & Knows How
Health System	15 MCQ & 4 SEQ	Knows & Knows How
Research & Applied Statistics	Evaluation of Research Report & Presentation	Does
Nutrition & Dietetics	15 MCQ & 4 SEQ	Knows & Knows How
Family Health	15 MCQs, 4 SEQs, Report & Presentation	Knows, Knows How & Shows How
Disaster Management & Injury Prevention	15 MCQ & 4 SEQ	Knows & Knows How
Field-based projects	Field activity report & presentation	Shows How
Primary Health Care Clerkship	Portfolio & Presentation	Does

Discussion

This study demonstrated that the graduate profiles of the MBBS program at EUSL align with the institution's educational philosophy, emphasizing the importance of aligning program outcomes with institutional vision and mission (O'Neill, 2015). This finding aligns with the assertion by Haifa and Houria (2016) that institutions of higher education are responsible for achieving their institutional characteristics through the learning outcomes of their academic programs.

The analysis revealed strong constructive alignment between intended learning outcomes of public health modules and the graduate profiles, a cornerstone of effective outcome-based education (Spady, 1988). This finding supports the recommendation by Harden, Crosby, and Davis (1999) that learning outcomes at all levels (phases, courses, units, learning activities) should align with and contribute to the overarching program objectives. Moreover, the integration of knowledge, skills, and attitudes within the learning outcomes enhances their educational impact (Bloom, Krathwohl, and Masia, 1984).

The MBBS graduate profiles at EUSL were found to align with the expected outcomes defined SLMC, emphasizing the importance of accreditation by the national medical regulatory body (Frank et al., 2020). Furthermore, the graduate profiles aligned with the learning outcome categories outlined in the SLQF, demonstrating a broader alignment with national educational standards.

Basu and Roberts (2012) highlighted the importance of developing public health competencies in undergraduate medical education, including understanding health inequalities, empowering communities, and evaluating healthcare program effectiveness. They emphasized the significance of core public health courses such as epidemiology, health promotion, and health protection. While the EUSL curriculum incorporates many of these core courses as recommended by the General Medical Council (2003) and the UGC Subject Benchmark Statements, notable gaps were observed in the areas of health economics and behavioural sciences.

This study identified a disparity between the stated pedagogical approach and actual classroom practice within the EUSL curriculum. While the curriculum promotes student-centered learning, lectures were observed as the dominant teaching-learning method, reflecting a teacher-centered approach. The World Health Organization (WHO, 2011) recommends incorporating student-centered and practice-based learning approaches in public health education. To foster lifelong learning, Kwan (2004) suggested integrating problem-based learning approaches instead of relying solely on didactic teaching methods. Furthermore, Bobby et al. (2004) emphasized the effectiveness of combining small group discussions with presentations.

While knowledge-based assessments (MCQs and SEQs) were widely used, the inclusion of portfolio and project reports strengthens the assessment system. This finding is supported by research in the United States, which identified knowledge-based assessments as common practices in preventive medicine education while emphasizing the importance of community-based skill experiences in assessment (Garr, Lackland, & Wilson, 2000). Blue et al. (2015) highlighted the importance of assessing students' competence in public health knowledge, skills, and attitudes.

Conclusion

This curriculum analysis revealed that the public health curriculum at EUSL demonstrates substantial alignment with key educational principles, institutional guidelines, and national and international quality assurance frameworks. However, a discrepancy was observed between the planned curriculum and the implemented curriculum. The implemented curriculum, encompassing teaching-learning methods and assessment strategies, appeared to deviate from the principles of student-centered learning and the discipline-specific requirement of a practice-based approach.

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SCOPING REVIEW

JOHCE Journal of Health Care Education

Impact of stress among students during Nursing Education

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Received 30 November 2024

Accepted 22 December 2024

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Keywords:
Stress
Well-being
Nursing education
Undergraduate

ABSTRACT

The demanding and competitive nature of nursing education can lead to high levels of stress, affecting students' mental and physical well-being. The article highlights the unique stressors faced by nursing students, including heavy workloads, clinical placements, cultural expectations, and social and economic factors. Understanding these stressors is essential for developing targeted interventions to support student well-being and academic success.

The article also explores the influence of stress on learning, emphasizing the negative effects of stress on memory, motivation, and academic achievement. It discusses the Yerkes-Dodson Law, which suggests that moderate levels of stress can enhance focus and learning, while excessive stress impairs cognitive function. Stress management techniques and coping mechanisms are highlighted as important strategies for optimizing learning potential.

The article concludes by emphasizing the need for further research to explore effective stress-reduction strategies within educational settings and to identify individual differences in stress responses among nursing students. By addressing stress and promoting well-being among nursing students, this research aims to contribute to the development of a healthier and more resilient nursing workforce in Sri Lanka, ultimately improving patient care.

Introduction

In contemporary education, students must negotiate a challenging and complicated academic environment (Harrison & Owens, 2018). Even though education can lead to both professional and personal improvement, it can also be a major cause of stress (Chernomas & Shapiro, 2013). WHO (2023) defined stress as a state of worry or mental tension caused by a difficult situation.

The demanding and competitive educational environments cause stress among students which has detrimental effects on students' mental and physical health (Cook & Crewther, 2019). Understanding the prevalence and sources of this stress is crucial for developing effective interventions to foster a positive learning environment and promote student success (Moscaritolo, 2009).

Since the nursing profession is a noble calling, demanding both intellectual and deep compassion, the path to becoming a nurse is often accompanied with stress. Nursing students face a multitude of challenges, from demanding academic coursework to the emotional intensity of clinical placements. This constant pressure can take a significant toll on their mental and physical well-being (Evans & Kelly, 2004). Nursing students around the world face a demanding academic environment, but the specific stressors they encounter can vary depending on cultural and educational contexts. In Sri Lanka, aspiring nurses navigate a unique set of challenges that contribute to high-stress levels (Jagoda & Rathnayake, 2021).

Two different studies at the University of Peradeniya and the University of Sri Jayewardenepura suggested a significant prevalence of stress among Sri Lankan nursing students, with studies reporting moderate to severe levels in a majority of participants (Damayanthi, 2014; Nasath & Ilankoon, 2022). This highlights the need for a focused exploration of the factors contributing to stress reference to the Sri Lankan Nursing students.

Several factors within the Sri Lankan nursing education system likely contribute to student stress (Jagoda & Rathnayake, 2021). The nursing curriculum demands a heavy workload and extensive theoretical knowledge acquisition. Additionally, cultural expectations of academic excellence can add significant pressure on students. Beyond academics, Sri Lankan nursing programs often place a strong emphasis on clinical placements, where students confront real-world patient care scenarios. This exposure can be emotionally demanding, especially for those encountering challenging medical situations or ethical dilemmas for the first time (Jagoda & Rathnayake, 2021). Furthermore, social and economic factors specific to Sri Lanka might exacerbate stress. Financial constraints, limited access to resources, and a competitive educational environment can all add to the burden faced by students (Pulido-Martos, Augusto-Landa, & Lopez-Zafra, 2011).

This review explores the conceptualizing of stress among nursing students and how stress influences on their learning.

Influence of Stress on Learning

Stress is highly prevalent among students in the context of higher education. Exams, deadlines, and interpersonal conflicts can all contribute to heightened stress levels, which research suggests can significantly impact the learning process (Bayram & Bilgel, 2008).

Existing evidence highlights the detrimental effects of stress on learning. Stress hormones like cortisol can impair memory consolidation, making it difficult to retain new information (Wolf, Atsak, de Quervain, Roozendaal, & Wingenfeld, 2016). Studies suggest that stress disrupts the formation of new memories and the retrieval of existing ones, potentially leading to academic underperformance (Sandi & Pinelo-Nava, 2007).

Chronic stress can also lead to decreased motivation and engagement in learning. Students experiencing learned helplessness, a feeling of powerlessness in the face of perceived uncontrollable stressors, may exhibit reduced effort and a decline in academic achievement (Sandi & Pinelo-Nava, 2007).

Stress Threshold

The Yerkes-Dodson Law (1908) proposes an inverted U-shaped relationship between stress and performance. Moderate levels of stress can enhance focus and learning, while extreme stress has the opposite effect. This suggests that a certain level of stress might be beneficial, motivating individuals to focus and prioritize learning tasks. However, exceeding this threshold leads to a decline in cognitive function (Corbett, 2015).

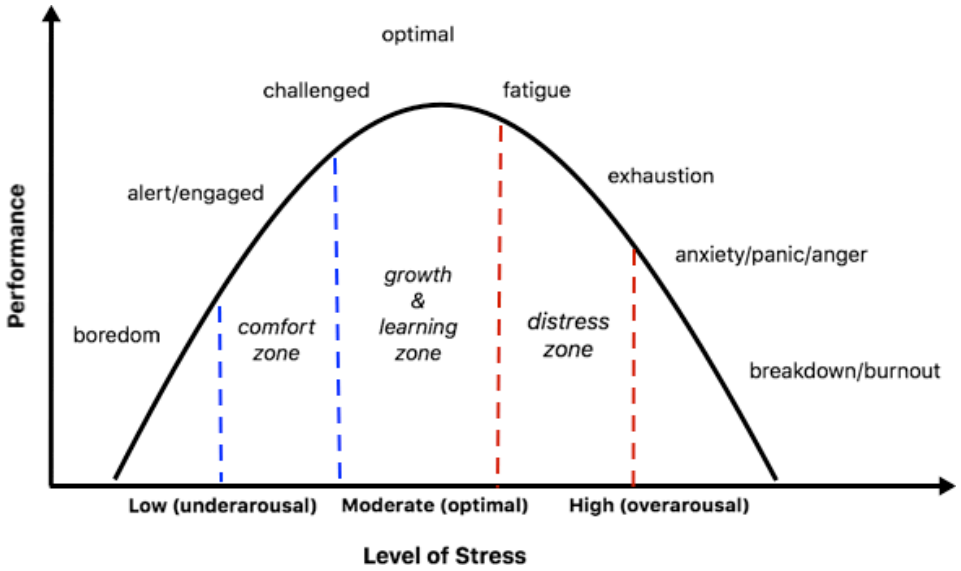

Figure 1: Yerkes-Dodson Law

Importance of Stress Management

Given the negative impacts of stress on learning, research emphasizes the importance of stress-management techniques for students and educators alike. Developing healthy coping mechanisms like exercise, relaxation techniques, and time management can help individuals maintain stress within a manageable range, optimizing their learning potential (Berger, 1994).

Stress poses a significant challenge to learning and academic achievement. Understanding the mechanisms by which stress disrupts memory and motivation can inform the development of educational practices that promote stress management and foster a more supportive learning environment. Further research is needed to explore effective stress-reduction strategies within educational settings and to identify individual differences in stress responses (Quaedflieg, Stoffregen, Sebalo, & Smeets, 2019).

Prevalence of stress level among nursing students

Psychosocial stress is a reality for nursing students in the workplace. Based on an analysis of 15 publications with a sample size of 9202, the average stress score for nursing students was 3.70. According to this study, the majority of intern nursing students had moderate levels of stress (Zheng, 2022). A Chinese study revealed that nursing students perceived medium-level stress. In addition to that, they found that female students had more stress than males (Zheng et al., 2022).

Associated factors in the development of stress among nursing students

In a study conducted in Iran, gender differences in stress levels among nursing students were observed, with female students reporting higher levels of stress compared to male students. This finding underscores the importance of considering demographic factors in understanding stress among nursing students (Jafari et al., 2019).

Chronic stress can lead to physical, psychological, emotional, and behavioral changes that compromise well-being. It is also thought to be a major risk factor for cardiovascular disease. As a result, in recent decades, several studies have proposed to investigate the physical and psychological

symptoms, coping modes, and factors associated with stress in various contexts and population groups. Stress arises from an individual's interaction with environmental factors when he perceives challenging situations as exceeding his capacity for coping (Bublitz et al., 2016).

Five factors associated with the development of stress among nursing students are environmental factors; intrapersonal factors; academic factors; clinical factors and interpersonal factors (Sharma & Kaur, 2011). Environmental factors emphasize the perceived stress level because of living conditions, insufficient telephone facilities, improper safety and security, lack of accessibility for food and absence of recreational facilities. The term intrapersonal facilities refers changes in eating pattern, getting marriage or engagement, home sickness, altered sleep patterns, having new responsibilities for parent's expectations, financial problems and altered religious beliefs. Few vacations, lack of leisure time, heavy burden with study, inability to concentrate in studies, scoring low due to poor academic performances etc. can be considered under the academic factors. As well pressure on performing procedures, fear of doing mistakes, limited time, facing different kind of patients and lack of experiences are considered under the clinical factors. Interpersonal factors are social activity changes, fight with close ones, inadequate cooperation with peers, lack of intimacy etc. (Gomathi & Jasmindebora, 2017).

Labrague et al., (2017) found that academic-related stressors, such as workload and examinations, were significant contributors to stress in Philippines. Similarly, Saipanish (2003) investigated stress among nursing students in Thailand and identified clinical-related stressors, such as patient care responsibilities and fear of making mistakes, as prominent sources of stress.

The impacts of stress among nursing students

Regardless of physical, mental, and behavioral problems, stress causes restrain the ability of a nursing student to meet their academic objectives. Chronic stress or long-term stress among nursing students can lead to a variety of health issues, including burnout, chest pain, an irregular heartbeat, difficulty in concentrating during studies, and sleep disturbances (Khamisa, Oldenburg, Peltzer, & Ilic, 2015).

Stress can affect the learning process of a nursing student in various ways - lack of attention; decreased self-esteem; less confidence; disorganized thoughts; diminished sense of meaning in life; lack of control or the need for too much control. Furthermore, the behaviors of the victims can be altered as poor socialization, substance abuse, eating too much or too little, injuries due to carelessness (Gomathi & Jasmindebora, 2017).

Conclusion

Nursing education is a demanding journey, and nursing students worldwide experience significant stress. However, research suggests that Sri Lankan nursing students face a unique set of stressors compared to their international counterparts.

Studies conducted in Sri Lanka report that majority of nursing students experienced moderate to severe levels (Damayanthi, 2014; Nasath & Ilankoon, 2022). This indicates a critical issue requiring focused attention through new research.

Moreover, existing literature reveal that unmanaged stress can have detrimental effects on students' mental and physical health, leading to burnout, decreased academic performance, and potentially impacting the quality of future patient care. Understanding the factors influencing stress is crucial to developing interventions that promote student well-being and academic success.

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MINI REVIEW

Journal of Health Care Education

Enhancing Clinical Reasoning Skills in Medical Education: A Comprehensive Perspective

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Received 02 February 2024

Accepted 04 September 2024

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Keywords:
Critical thinking
Cognitive
Healthcare professional
Bedside teaching
Evidence based medicine

ABSTRACT

Clinical reasoning is an indispensable cognitive process in healthcare which plays a crucial role in shaping competent healthcare professionals. It encompasses the art and science of interpreting clinical data, integrating various sources of knowledge, and analyzing nuanced details to formulate well-informed decisions, extending beyond the textbook knowledge and requires a higher level of cognitive synthesis of clinical experience and available evidence pertaining to the patient's condition. Critical thinking is an indispensable skill that need to be developed by the healthcare professionals to perform good clinical reasoning. It also demand interdisciplinary collaboration and a cohesive approach to medical education with a thoughtful blend of pedagogical strategies to effectively train undergraduates. Objective structured clinical examinations remain a valuable tool, enabling the standardized assessment of clinical reasoning across various competencies. Resource constraints, both in terms of faculty and technology, necessitate strategic investments to create an environment conducive to effective training of the healthcare professionals. This comprehensive perspective aims to delve into the definition of clinical reasoning, the rationale for teaching it, strategies for improvement, barriers to education, teaching methodologies at the bedside, effective assessment approaches, and the broader impact on medical education.

Introduction

Clinical reasoning, an indispensable cognitive process in healthcare, demands an in-depth exploration to grasp its intricate facets fully. This comprehensive perspective aims to delve into the definition of clinical reasoning, the rationale for teaching it, strategies for improvement, barriers to education, teaching methodologies at the bedside, effective assessment approaches, and the broader impact on medical education. By examining these aspects, we gain a holistic understanding of the multifaceted nature of clinical reasoning and its crucial role in shaping competent healthcare professionals.

Clinical Reasoning Defined

Clinical reasoning, as the cognitive backbone of healthcare, involves a multifaceted process where healthcare professionals navigate a complex web of patient information. It encompasses the art and science of interpreting clinical data, integrating various sources of knowledge, and analyzing nuanced details to formulate well-informed decisions (Croskerry, 2003). This process extends beyond textbook knowledge, requiring practitioners to synthesize their clinical experience, patient interactions, and the latest evidence to arrive at a comprehensive understanding of a patient's condition. It is not merely a mechanical application of learned facts but a dynamic, adaptive skill that evolves with each patient encounter. Clinical reasoning, in essence, is the synthesis of knowledge, experience, and critical thinking, forming the foundation of effective and personalized healthcare.

Rationale for Teaching Clinical Reasoning

The rationale for integrating clinical reasoning into medical education transcends the acquisition of individual skills. Beyond the immediate benefit to healthcare providers, teaching clinical reasoning serves as a strategic investment in the overall healthcare system. Accurate diagnoses and effective treatment plans, products of robust clinical reasoning, contribute to a higher quality of patient care, reducing the burden on the healthcare system and improving patient outcomes (Pelaccia et al., 2011). Furthermore, as healthcare continuously evolves with technological advancements and shifting demographics, healthcare professionals equipped with strong clinical reasoning skills are better positioned to adapt, innovate, and lead transformative changes in the industry.

Strategies for Improving Clinical Reasoning

A comprehensive approach to enhancing clinical reasoning involves weaving a tapestry of interconnected strategies. Educational programs should incorporate dynamic and interactive learning modules, encouraging students to actively engage with realistic case scenarios that mimic the complexities of real-world healthcare. Feedback mechanisms play a crucial role, providing timely and constructive insights that guide learners in refining their reasoning skills (Eva, 2005). Inter-professional collaboration becomes a cornerstone, exposing future healthcare professionals to diverse perspectives and fostering a holistic understanding of patient care. Integrating technology into education, such as virtual patient simulations and data analytics tools, not only enhances technical proficiency but also cultivates a familiarity with the digital landscape of modern healthcare. Continuous learning opportunities, facilitated through regular updates, workshops, and access to the latest research, ensure that clinical reasoning remains adaptive and aligned with the forefront of medical knowledge. Reflective practice, where individuals critically analyze their own decision-making processes, serves as a metacognitive tool for refining and honing clinical reasoning skills over time (Charlin & Boshuizen, 2007). Exposure to real-world experiences, perhaps through early clinical exposure or immersive rotations, anchors theoretical knowledge in practical scenarios, bridging the gap between classroom learning and authentic patient care.

Barriers to Teaching Clinical Reasoning

Identifying and overcoming barriers to effective clinical reasoning education is pivotal for nurturing the next generation of healthcare professionals. Limited time within curricula is a persistent challenge, demanding a re-evaluation of educational priorities to ensure that sufficient emphasis is placed on developing robust clinical reasoning skills. Resource constraints, both in terms of faculty and technology, necessitate strategic investments to create an environment conducive to effective teaching. Faculty training is paramount, addressing not only their expertise in clinical reasoning but also their ability to impart this knowledge effectively to students (Norman, 2005). The challenge of designing comprehensive and valid assessment tools requires collaborative efforts to develop standardized metrics that accurately measure clinical reasoning proficiency. Curricular integration issues, such as aligning clinical reasoning education with other disciplines, demand interdisciplinary collaboration and a cohesive approach to medical education (Higgs et al., 2008). Recognizing and addressing cognitive biases among educators and learners is a critical step, emphasizing the importance of self-awareness in clinical reasoning. Resistance to change, a common hurdle in educational institutions, requires a cultural shift towards recognizing the dynamic nature of healthcare and adapting teaching methodologies to suit evolving needs.

Teaching Clinical Reasoning at the Bedside

Bringing clinical reasoning to life at the bedside involves a thoughtful blend of pedagogical strategies. Problem-solving exercises, where students tackle real-life clinical dilemmas, allow for the practical application of theoretical knowledge. Patient case discussions, facilitated by experienced educators, create a dynamic learning environment where students can explore the complexities of individual cases, emphasizing the importance of context in clinical reasoning. High-fidelity simulation exercises immerse students in realistic clinical scenarios, providing a safe space to refine their reasoning skills without compromising patient safety. Role-playing scenarios, where students take on the roles of both healthcare provider and patient, encourage empathy and a holistic approach to patient care (Bowen, 2006). Bedside teaching, with experienced clinicians guiding students through patient interactions, bridges the gap between theoretical knowledge and practical application, fostering a seamless integration of clinical reasoning into everyday practice.

Assessing Clinical Reasoning

The evaluation of clinical reasoning proficiency demands a sophisticated and varied toolkit. Case-based examinations, comprising realistic scenarios, assess a learner's ability to apply theoretical knowledge to complex clinical situations. Simulated patient encounters, whether in controlled environments or through virtual platforms, provide insights into a learner's decision-making process and interpersonal skills (Schmidt & Rikers, 2007). Structured observations during clinical rotations offer a real-world assessment, allowing educators to gauge a student's clinical reasoning abilities in diverse and authentic settings. Objective Structured Clinical Examinations (OSCEs) remain a valuable tool, enabling the standardized assessment of clinical reasoning across various competencies (Ten Cate & Regehr, 2019). Additionally, incorporating self-assessment and peer-assessment mechanisms fosters metacognition and collaborative learning, creating a reflective feedback loop that supports ongoing development in clinical reasoning proficiency.

Expanding Perspectives on Clinical Reasoning

Beyond the foundational considerations, acknowledging cultural competence and understanding patient perspectives elevates clinical reasoning to a broader context. Cultural competence in healthcare involves recognizing and respecting diverse cultural backgrounds, enabling healthcare professionals to navigate the intricacies of healthcare decision-making in a multicultural

society. Understanding patient perspectives goes beyond the medical model, considering the individual's values, beliefs, and preferences in the decision-making process (Mamede et al., 2008). By integrating these perspectives into medical education, future healthcare professionals develop a nuanced understanding of how socio-cultural factors impact healthcare choices. This expanded viewpoint not only enhances the cultural sensitivity of healthcare providers but also contributes to improved patient communication, trust, and ultimately, better health outcomes.

Conclusion

In conclusion, a comprehensive understanding of clinical reasoning involves recognizing its intricate nature, addressing barriers, and implementing effective teaching and assessment strategies. By fostering clinical reasoning skills, medical education not only contributes to the competence of individual healthcare professionals but also enhances the overall quality of patient care and outcomes. This exploration serves as a guide for educators, institutions, and healthcare systems seeking to prioritize and enhance clinical reasoning in the ever-evolving landscape of medical education, ensuring that healthcare professionals are well-equipped to meet the challenges of contemporary healthcare.

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