

Phc Transformation Through Physiological Literacy-Based Community Education: Integrating Biomedical Understanding, Health Promotion, and Preventive Care for Sustainable Community Health

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ABSTRACT

Primary Health Care (PHC) remains the foundation of global health systems, emphasizing prevention, community participation, and equitable access to healthcare services. However, many PHC interventions continue to face challenges in achieving sustainable behaviour change because health education frequently focuses on recommendations without improving community understanding of underlying physiological mechanisms. This study aims to develop a physiological literacy-based community education model to strengthen PHC transformation by integrating biomedical understanding, health promotion principles, and preventive healthcare strategies. A conceptual synthesis approach was conducted by integrating evidence from primary healthcare, physiological literacy, health promotion theory, behavioural science, and community-based education. Key concepts were analysed to identify how understanding human body functions can improve health awareness, motivation, and long-term behavioural change

INTRODUCTION

Primary Health Care (PHC) is a fundamental approach to achieving universal health coverage, emphasizing health promotion, disease prevention, community participation, equity, and empowerment. The Alma Ata Declaration established community participation and scientifically sound primary health care as central principles, while the Astana Declaration reaffirmed PHC as a foundation for sustainable health systems.

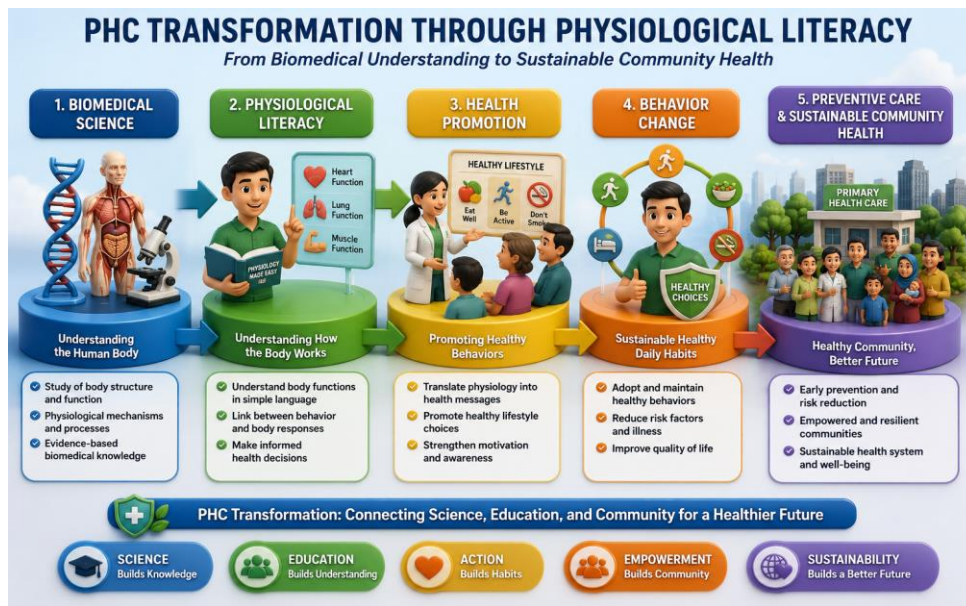
Contemporary PHC therefore extends beyond the delivery of clinical services. WHO defines PHC as a whole-of-society approach that integrates health services, multisectoral action, and the empowerment of individuals, families, and communities across the life course.

However, improving access to health services alone may not be sufficient to achieve sustainable preventive health behaviour. Health literacy encompasses the knowledge and competencies required to access, understand, evaluate, and use health information for appropriate health decisions. Evidence synthesis has demonstrated the importance of health literacy as a component of public health and health-related decision-making (Sørensen et al., 2012).

This challenge highlights the importance of strengthening the connection between health knowledge and biological understanding. Recent scholarship has conceptualised human physiology literacy as a distinct form of literacy concerned with understanding physiological mechanisms, applying evidence-based knowledge, and communicating scientifically grounded health information. The emerging framework particularly emphasizes mechanisms such as homeostasis, system integration, and physiological adaptation.

Accordingly, physiological literacy may provide an important scientific foundation for community health education. Understanding how physical activity, nutrition, stress, sleep, and other behaviours influence physiological processes may help communities move beyond simply knowing what to do toward understanding why it matters.

Integrating physiological literacy into PHC education therefore offers a potential pathway for strengthening health promotion, preventive care, community empowerment, and sustainable health behaviour. This article proposes a Physiological Literacy-Based Community Education Model that connects biomedical understanding with health promotion and community empowerment.



Figur 1. PHC Transformation Through Physiological Literacy

This article proposes a physiological literacy-based community education model as an approach to strengthen PHC by integrating biomedical understanding, health promotion strategies, and community empowerment.

LITERATURE REVIEW

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METHODOLOGY

Study Design

This study employed a conceptual synthesis and framework-development approach to integrate evidence concerning primary health care (PHC), physiological literacy, community health education, health promotion, and behaviour change. The approach was selected to develop an educational model linking scientific understanding with community empowerment and preventive health practice. This is consistent with contemporary PHC approaches emphasizing integrated services, community empowerment, and health promotion.

Conceptual Development Process

The model was developed through three sequential stages:

Stage 1. Identify PHC Education Gaps

Three major gaps were identified:

- a. Information Understanding Gap: Health messages may provide recommendations without adequately explaining the underlying physiological mechanisms.
- b. Disease Focused Orientation: PHC requires stronger emphasis on prevention, health promotion, self-management, and community empowerment.
- c. Biomedical Community Disconnect: Scientific knowledge is often developed within professional education but is not sufficiently translated into accessible community education.

Stage 2. Define Core Educational Domains

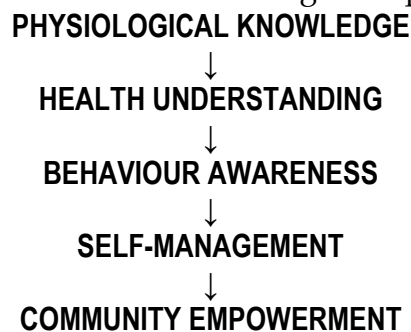
The synthesis identified three interconnected domains:

- a. Biomedical Understanding: Body systems, physiological regulation, disease mechanisms, and lifestyle effects.
- b. Health Behaviour Understanding: Motivation, decision-making, habit formation, and social influences.
- c. Community Empowerment: Participation, self-care, family involvement, and preventive action.

Community participation and empowerment are also recognized as important components of contemporary PHC transformation.

Stage 3. Integrate into a PHC Educational Pathway

The domains were translated into the following conceptual pathway:



This pathway represents the central proposition of the model: PHC education should move from information delivery toward scientifically informed understanding, self-management, and community empowerment.

RESEARCH RESULTS

Physiological Literacy Based PHC Transformation Model

The proposed model consists of five interconnected components designed to transform community health education.

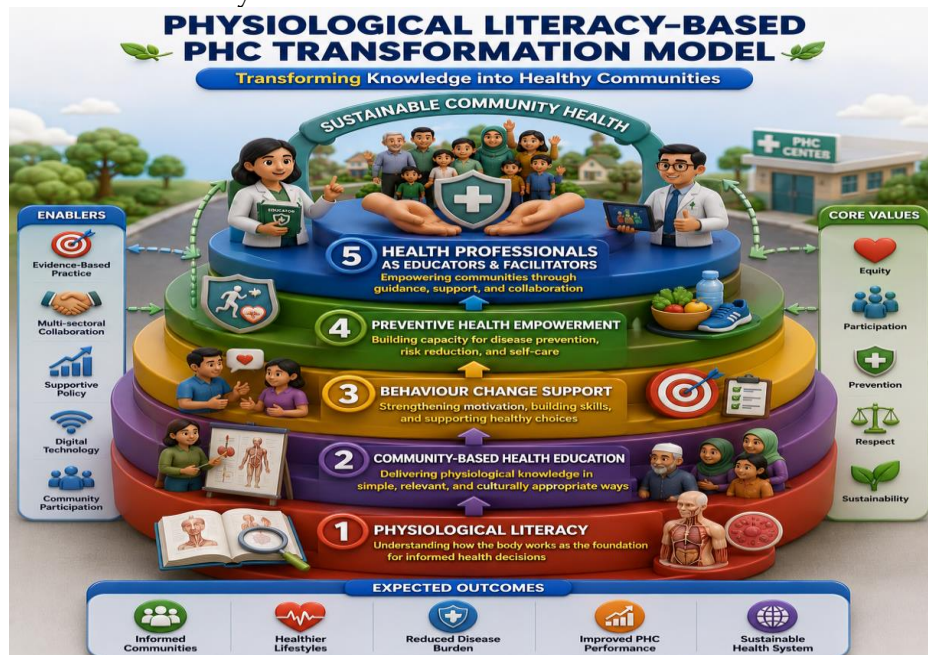


Figure 2. Physiological Literacy-Based PHC Transformation Model

Component Physiological Literacy as the Scientific Foundation

Physiological literacy represents the ability of individuals to understand how the human body functions and how behaviours influence biological processes. This competency includes understanding:

- 1) Cardiovascular responses to lifestyle,
- 2) Metabolism and nutrition,
- 3) Immune system regulation,
- 4) Stress physiology,
- 5) Reproductive health,
- 6) Ageing processes.

Physiological understanding creates a stronger connection between health recommendations and personal relevance.

For example, explaining the physiological relationship between excessive sugar intake, insulin resistance, and diabetes development may provide deeper motivation than simply advising individuals to reduce sugar consumption.

Component Community-Based Health Education Transformation

Traditional health education frequently follows a provider-centred approach where professionals deliver information and communities receive instructions. A physiological literacy approach changes this relationship. Health professionals become:

- 1) Educators,
- 2) Facilitators,
- 3) Interpreters of biomedical knowledge,

4) Partners in community empowerment.

The goal is not only increasing knowledge but improving the community's ability to understand, evaluate, and apply health information.

Component Behaviour Change through Biological Understanding

Sustainable behaviour change requires more than awareness. Individuals are more likely to maintain healthy behaviours when they understand the relationship between their actions and internal physiological consequences. Physiological literacy strengthens:

- 1) Perceived importance,
- 2) Personal responsibility,
- 3) Self-efficacy,
- 4) Long-term motivation.

This approach connects biological understanding with behavioural science.

Component Preventive Health Empowerment

Modern healthcare systems face increasing burdens from preventable diseases. Physiological literacy supports prevention by helping communities recognize early risk factors and understand the importance of maintaining normal body function before disease occurs. The focus shifts from:

“treating disease after symptoms appear”

toward:

“maintaining physiological balance before disease develops.”

Component Health Professionals as Physiological Educators

Future PHC transformation requires redefining the role of health professionals. Doctors, nurses, midwives, nutritionists, public health workers, and other professionals should function not only as healthcare providers but also as translators of biomedical science for communities. This requires changes in health professional education curricula to include:

- 1) Communication of physiological concepts,
- 2) Community education skills,
- 3) Preventive health strategies,
- 4) Behaviour change methods.

TABLE 1. FIVE COMPONENTS OF THE PHYSIOLOGICAL LITERACY-BASED PHC MODEL

NO.	COMPONENT	DESCRIPTION / ROLE	KEY ACTIVITIES	EXPECTED OUTCOMES
1	PHYSIOLOGICAL LITERACY AS THE SCIENTIFIC FOUNDATION	Building the community's understanding of how the human body works and how behaviours influence physiological processes.	- Explaining body functions in simple language - Linking lifestyle to physiological outcomes - Using visual and practical teaching tools - Encouraging questions and curiosity	- Improved understanding of body mechanisms - Better understanding of health risks - Stronger basis for healthy decision-making
2	COMMUNITY-BASED HEALTH EDUCATION	Translating physiological knowledge into relevant, culturally appropriate health education for the community.	- Health education sessions - Group discussions - Community demonstrations - Use of local examples and analogies - Culturally tailored messages	- Improved public health knowledge - Greater relevance and acceptability - Increased community engagement
3	BEHAVIOUR CHANGE SUPPORT	Supporting individuals and families to adopt and maintain healthy behaviours through motivation and practical strategies.	- Goal setting - Self-monitoring - Motivational communication - Peer support - Positive reinforcement	- Stronger motivation - Adoption of healthy lifestyle - Sustained behaviour change
4	PREVENTIVE HEALTH EMPOWERMENT	Empowering communities to take preventive actions and reduce health risks before diseases occur.	- Risk awareness education - Preventive screening promotion - Healthy environment advocacy - Early detection and referral	- Lower risk of disease - Improved early detection - Healthier community lifestyle
5	HEALTH PROFESSIONALS AS PHYSIOLOGICAL EDUCATORS & FACILITATORS	Positioning health professionals as educators, role models, and collaborators in building physiological literacy and community capacity.	- Training as health educators - Community facilitation - Collaborative planning - Continuous mentoring - Professional role modelling	- Stronger community trust - Empowered communities - Sustainable PHC transformation

Together, these five components build a strong foundation for transforming PHC through physiological understanding, empowering communities, and promoting sustainable health for all.

DISCUSSION

Moving Beyond Traditional Health Literacy in Primary Health Care

Primary Health Care transformation requires a shift from conventional information-based education toward deeper understanding-based empowerment. Although health literacy has become an important concept in public health, many approaches emphasize the ability to access, understand, and use health information without sufficiently addressing understanding of biological mechanisms.

Physiological literacy expands this perspective by helping individuals understand why specific behaviours influence health outcomes.

For example, recommendations regarding nutrition, physical activity, sleep, stress management, and preventive screening become more meaningful when communities understand their relationship with metabolism, hormonal regulation, cardiovascular function, immunity, and cellular health. Physiological literacy does not replace health literacy but strengthens it by adding a biomedical foundation for informed decision making.

Physiological Literacy as a Bridge between Biomedical Science and Community Practice

A major challenge in healthcare systems is the separation between scientific knowledge and community understanding. Biomedical science is traditionally taught extensively to healthcare professionals but rarely translated into practical knowledge accessible to communities. This creates a knowledge gap where individuals receive health advice without understanding the biological reasoning behind the recommendation.

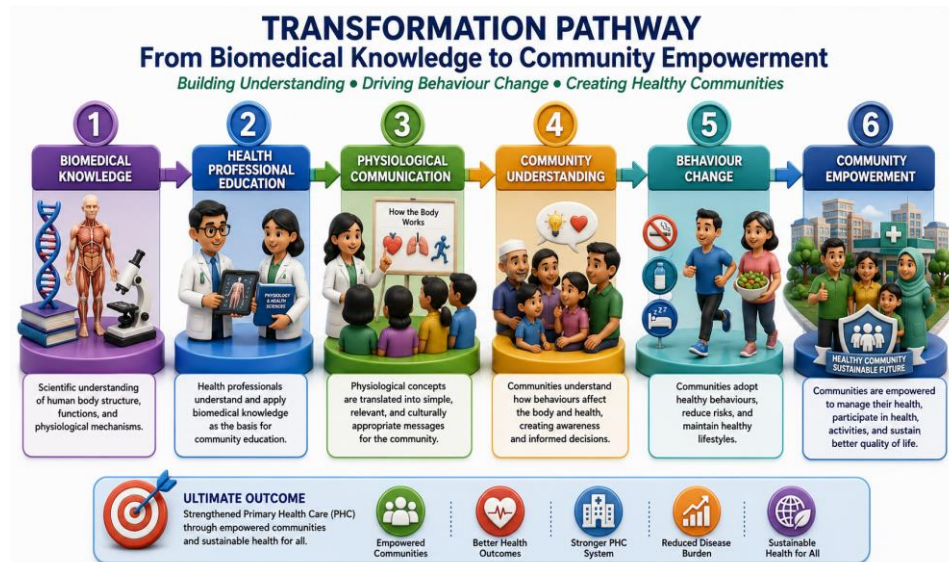


Figure 3. Transformation Pathway from Biomedical Knowledge to Community Empowerment

The physiological literacy approach creates a bridge between:

Biomedical Science



Health Professional Education



Community Education



Behaviour Transformation

Through this approach, complex physiological concepts can be transformed into understandable explanations that empower individuals and families.

Strengthening Preventive Healthcare through Physiological Awareness

The increasing global burden of non-communicable diseases demonstrates the importance of prevention-oriented healthcare. Many chronic diseases develop gradually through long-term physiological changes before clinical symptoms appear. Understanding these mechanisms allows individuals to recognize the importance of early prevention. For example:

- 1) Understanding insulin resistance may improve motivation for dietary modification,
- 2) Understanding vascular function may support cardiovascular prevention,
- 3) Understanding stress physiology may improve mental health practices,
- 4) Understanding immune function may encourage healthier lifestyles.

Thus, physiological awareness strengthens preventive behaviour by connecting daily decisions with internal biological processes.

Redefining the Role of Health Professionals in Community Education

The transformation of PHC requires healthcare professionals who can function beyond traditional clinical roles. Future health professionals should become:

- 1) Biomedical translators

- 2) Community educators
- 3) Behaviour change facilitators
- 4) Preventive health leaders

This requires changes in health professional education. Curricula should not only prepare graduates to diagnose and treat disease but also prepare them to communicate physiological knowledge effectively to communities. The ability to simplify scientific information without losing accuracy will become an essential competency.

Integration with Digital Community Health Education

Digital transformation creates new opportunities for expanding physiological literacy. Digital platforms can support:

- 1) Interactive health education,
- 2) Visual explanation of body mechanisms,
- 3) Personalized health information,
- 4) Community engagement,
- 5) Continuous learning.

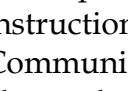
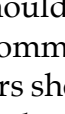
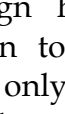
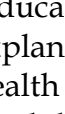
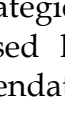
However, digital tools alone are insufficient. Technology must be combined with accurate biomedical content and effective communication strategies. The future of PHC depends on the integration of physiological understanding, digital innovation, and community empowerment.

Implications for Primary Health Care and Health Professional Education

The proposed physiological literacy-based approach has several implications.

TABLE 2. IMPLICATIONS FOR CURRICULUM AND PRIMARY HEALTH CARE PRACTICE

Integrating Physiological Literacy for Stronger Education and Health System Transformation

DOMAIN	IMPLICATION FOR PHC PRACTICE	CURRICULUM INTEGRATION	LEARNING OUTCOMES FOR STUDENTS	EXPECTED IMPACT
1 PHYSIOLOGICAL LITERACY 	- Strengthen health education with scientific explanations of body functions - Improve community understanding of how behaviours affect health - Support evidence-based communication 	- Integrate physiology across all health courses - Use case-based learning related to daily life - Link physiology with health promotion and disease prevention 	- Explain physiological mechanisms clearly - Connect behaviour with physiological outcomes - Apply physiological knowledge in health decision-making 	- Improved scientific reasoning - Better health literacy in communities - Stronger foundation for preventive care 
2 HEALTH PROMOTION 	- Design effective health promotion programs based on behaviour change theories - Use persuasive and culturally appropriate communication - Promote healthy lifestyles in communities 	- Integrate health promotion models and theories - Training in communication and behaviour change techniques - Use community-based learning methods 	- Develop communication and counselling skills - Plan and implement health promotion interventions - Evaluate behaviour change strategies 	- Increased community motivation - Improved adoption of healthy behaviours - Reduced risk factors for chronic diseases 
3 PREVENTIVE CARE 	- Strengthen risk assessment and early detection - Implement screening and preventive services - Empower families for disease prevention 	- Integrate epidemiology and preventive medicine - Case studies on prevention and early intervention - Field practice in PHC settings 	- Conduct risk assessment - Plan preventive programs - Apply early detection strategies 	- Earlier detection of diseases - Reduced disease burden - More efficient use of health resources 
4 COMMUNITY EMPOWERMENT 	- Encourage community participation and ownership - Build community capacity for health improvement - Strengthen collaboration with local stakeholders 	- Service-learning and community engagement - Participatory learning approaches - Interprofessional collaboration training 	- Facilitate community participation - Build leadership and collaboration skills - Empower communities for health action 	- Stronger community ownership - Increased program sustainability - Healthier and resilient communities 
5 BIOMEDICAL TRANSLATION & PROFESSIONAL ROLE 	- Health professionals act as educators, advocates, and facilitators - Translate biomedical knowledge into simple messages - Strengthen ethical and professional practice 	- Professional ethics and communication - Role modeling and mentoring - Training as health educators and advocates 	- Communicate science effectively - Demonstrate professional responsibility - Act as a change agent in communities 	- Stronger trust in health professionals - More effective health education delivery - Sustainable PHC transformation 

OVERALL IMPACT: Integrating physiological literacy into curriculum and PHC practice strengthens education, improves community health behaviours, and accelerates the transformation of Primary Health Care.

- 1) PHC programs should redesign health education strategies from instruction-based communication toward explanation-based learning. Community members should not only know health recommendations but also understand the physiological reasons behind them.
- 2) Healthcare education institutions should strengthen curriculum components related to:

- Physiological communication,
- Community-based education,
- Health promotion,
- Preventive medicine.
- Healthcare systems should recognize health professionals as educators who translate scientific knowledge into practical community action.

Physiological literacy should become an important component of future public health strategies, particularly in addressing chronic diseases and promoting sustainable lifestyle changes.

CONCLUSION AND RECOMMENDATION

Primary Health Care transformation requires innovative approaches that strengthen community understanding, empowerment, and sustainable behaviour change.

This article proposes physiological literacy-based community education as a strategy to bridge biomedical science, health promotion, and preventive healthcare. By improving understanding of how lifestyle behaviours influence human physiology, communities can develop stronger motivation, responsibility, and capacity for maintaining health.

Physiological literacy provides a pathway for transforming PHC from a disease-centred system toward a prevention-oriented, knowledge based, and community-empowered model. Future health professional education should integrate physiological literacy competencies to prepare healthcare workers capable of leading community health transformation.

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