Journal of Medical and Health Studies (JMHS)
ISSN: 2710-1452
DOI: 10.32996/jmhs
Journal Homepage: www.al-kindipublisher.com/index.php/jmhs

JMHS
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

Responsive Strategy on Healthcare Workforce Transformation Needs in Saudi Arabia: The Case for Innovation in Vocational Education and Training

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| ABSTRACT

Saudi Arabia's Vision 2030 outlines ambitious reforms to establish a sustainable and efficient healthcare system. Central to this transformation is the Model of Care (MOC), which delivers patient- and population-centered services across six systems of care. Yet, persistent workforce shortages and competency gaps among local health practitioners threaten to undermine these goals. Vocational education and training (VET) framed within a functional career shifting approach has emerged as a strategic lever to develop national talent, reduce reliance on expatriates, and provide defined career pathways. This study assesses VET's effectiveness in meeting the Kingdom's healthcare workforce transformation needs. A combination of policy and program analysis comprising: (i) a systematic review of Saudi Vision 2030 healthcare directives, MOC guidelines, and Saudi Commission for Health Specialties (SCFHS) - Health Academy reports (May 2025 data); (ii) comparative case studies of WHO's Treat–Train–Retain model and the EU Quality Assurance Framework for VET; (iii) descriptive statistics on enrolment, graduation, and employment outcomes; and (iv) development of a logic model to map inputs, activities, outputs, and outcomes. Semi-structured interviews with SCFHS officials and private-sector partners enriched the contextual analysis for alignment to the practical relevance within Saudi Vision 2030 health sector transformation program. Towards mid-2025, the Health Academy's VET program had enrolled between 40,000 and 45,000 trainees, and produced 30,000 to 33,000 graduates, with up to 93 percent securing employment in healthcare roles. Five core enablers emerged: (i) capacity building through competency-based and simulation-enhanced curricula; (ii) structured role redefinition underpinned by regulatory support; (iii) ongoing career progression through modular lifelong-learning pathways; (iv) integration of digital tools (telemedicine platforms, AI-driven diagnostic simulations) for flexible training delivery; and (v) robust public–private partnerships aligning curricula with industry needs. Application of the IDEAL model (Initiate, Draw Up, Elevate, Loop, Action) facilitated continuous program refinement. A logic model projects enhanced equitable access, sustainable workforce scaling, and alignment with national healthcare priorities. The findings illustrate that VET, operationalized through functional career shifting, effectively strengthens Saudi Arabia's healthcare workforce in line with MOC and Saudi Vision 2030 objectives. Policy implications include expanding modular VET to underserved regions through digital platforms, deepening public-private partnership governance for co-developed curricula, and leveraging predictive analytics for dynamic workforce planning. Future research should evaluate the long-term impacts on service quality, staff retention, and cost-effectiveness, particularly within decentralized health clusters.

| KEYWORDS

Saudi Arabia, Vision 2030, Healthcare Workforce Transformation, Vocational Education and Training, Functional Career Shifting, Digital Health Technologies

| ARTICLE INFORMATION

ACCEPTED: 25 April 2025 **PUBLISHED:** 12 May 2025 **DOI:** 10.32996/jmhs.2025.6.2.11

Introduction

Reforms in Saudi Arabia's health sector have been instigated by the Vision 2030 initiatives centred on sustainability, equity, and efficiency. The cornerstone of this vision is the Model of Care (MOC), driven by a patient-centered approach to service delivery through six systems of care (SOC), which include keeping well, urgent care, planned procedures, chronic conditions, women and children, and end-of-life care. Accomplishing these goals necessitates overcoming workforce and competency deficiencies through

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strategies such as functional career shifting. In this regard, vocational education and training (VET) has emerged as a key option in meeting the demand for adaptive workforce skills and providing a defined career path.

National Context of Health Sector Transformation with Specific Focus on the 'Model of Care'

Saudi Arabia's healthcare transformation entails a radical shift that aims to establish a feasible, competent, and equitable healthcare system. The main element in this transformation is the MOC, a strategic model proposed to reshape services to be more patient- and population-centered (Mani & Goniewicz, 2024). The MOC is further divided into the SOC, designed to address major health concerns such as chronic care, emergency care, planned procedures, women and children's health, palliative care, and preventative care (Khashan et al., 2021). Each SOC intends to support the continuity, accessibility, and quality of care delivery with the incorporation of public health and wellness approaches to meet the challenge of the rising global noncommunicable diseases (NCDs) burden, which accounts for more than 70% of mortality in the Kingdom (Khashan et al., 2021). As such, the SOC elements are critical in Saudi's healthcare transformation.

Decentralization of healthcare delivery through the regional health clusters is a key MOC feature. These clusters are divided into three levels of care, namely the primary, secondary and tertiary, and are located in different geographic locations to ensure there is no service overlap (Chowdhury et al., 2021). This model seeks to enhance resource utilization by integrating digital technologies and implementing seamless transfer between the different levels of care (Saudi Commission for Health Specialties, 2024). Inspired by Singapore's cluster model and Switzerland's integrated care systems, the MOC also seeks to realise the principle of equity by tackling the imbalances between rural and urban healthcare systems (Yong & Cameron, 2019). The decentralization approach is vital in ensuring equitable care.

The MOC is driven by the principles of value-based care. Instead of prioritizing fee-for-service models, MOC is based on the quality of delivered services, with emphasis on patients' satisfaction, the time spent on treatment, and the quality of provided care (Salvatore et al., 2021). This approach enhances patient satisfaction and fosters accountability (Chowdhury et al., 2021). By combining financial incentives with performance measures, the MOC guarantees that resources are focused on the areas that promise the greatest return, including early detection and prevention of diseases such as diabetes and cardiovascular illnesses, which are prevalent in Saudi Arabia (Saudi Commission for Health Specialties, 2024). These measures are vital in enhancing health status.

The MOC design features are rooted in digital health technologies and are essential for the growth and sustainability of the healthcare system. Electronic health records (EHRs), telemedicine, and artificial intelligence (AI) have improved decision-making processes, workflow, and data management in healthcare (Khalifa et al., 2024). For instance, by leveraging telemedicine, specialist consultation services have been extended to patients in remote areas, which would have otherwise required patients to be referred at a high cost (Khalifa et al., 2024). Similarly, AI has been employed to assist doctors in making faster and more accurate decisions in areas such as radiology and oncology (Salvatore et al., 2021). Such approaches improve efficiency and address healthcare personnel shortage by automating tasks.

Workforce development is one of the key strategies in the MOC domain, which seeks to address gaps in the Saudi labor market. The reliance on expatriates, especially in specialized positions, underscores hitherto insufficient attention to the development of local talent (Mani & Goniewicz, 2024). The Health Academy, under the Saudi Commission for Health Specialties (SCFHS), plays a central role in shoring up local talent through its vocational training programs, which align with the six SOC. As of mid-2025, these programs have provided specialized training to between 40,000 and 45,000 participants, resulting in 30,000 to 33,000 graduates. Up to 93 percent of graduates have secured employment, underscoring the Academy's success in workforce placement (Saudi Commission for Health Specialties, 2024). The Health Academy, through its initiate, draw up, elevate, loop, and action (IDEAL) model, designs the training curricula with competencies required in the Saudi health sector (see Table 1).

Table 1: *IDEAL Framework*

IDEAL Stage	Objective	Key Activities	Examples in Healthcare Context	Outcomes
Initiate	Assess workforce needs and identify skill gaps.	• Conduct needs assessments to determine critical roles and competencies.	• Identifying shortages in primary care and health informatics. • Evaluating gaps in clinical assistant training programs.	• Clear understanding of workforce priorities. • Identification of target training areas.

		• Analyze labor market trends and healthcare demands.		
Draw Up	Design competency-based curricula tailored to workforce needs.	• Develop learning outcomes aligned with healthcare priorities. • Collaborate with stakeholders to ensure curricula reflect real-world demands.	• Designing modules for chronic disease management in primary care. • Including digital health and telemedicine skills in informatics training programs.	• Comprehensive, market-aligned training curricula. • Improved relevance of training.
Elevate	Deliver high-quality training programs using innovative methodologies.	• Use modern pedagogies such as simulation-based learning and e-learning. • Train facilitators to ensure effective program delivery.	• Using simulation for clinical support training. • Implementing AI-enabled diagnostic tools in informatics courses.	• Enhanced skills acquisition. • Increased trainee engagement and program effectiveness.
Loop	Continuously gather feedback and refine training programs.	• Collect feedback from trainees, employers, and trainers. • Use data analytics to evaluate program outcomes.	• Gathering feedback on the effectiveness of chronic disease modules. • Analyzing job placement data to assess program impact.	• Dynamic improvements in training quality. • Alignment with evolving healthcare needs.
Action	Implement enhancements and align programs with national healthcare priorities.	• Scale programs based on feedback. • Adjust curricula to meet emerging trends such as artificial intelligence (AI) and telemedicine. • Foster public-private partnerships.	• Introducing new modules on value-based care and AI-driven diagnostics. • Expanding partnerships with healthcare employers for job placement.	• Scalable, sustainable training programs. • Graduates equipped with cutting-edge skills.

Source: (Saudi Commission for Health Specialties, 2024)

Functional Career Shifting: A Comprehensive Approach to Workforce Transformation in Saudi Arabia

Justification for the Term 'Functional Career Shifting'

Functional career shifting redefines the traditional task-shifting concept to encompass a structured approach to workforce development, skills enhancement, and career ladder within the health sector. While the traditional task-shifting approach entailed the temporary reassignment of tasks to less specialized workers, functional career shifting is a sustainable human resource solution that aligns with strategic healthcare objectives (World Health Organization, 2007). This approach aligns with the World Health Organization (WHO) and the European Union (EU) framework, which supports sustainable workforce models that build on capability without compromising the quality of care (World Health Organization, 2007; World Health Organization, 2008). The strategy aligns with the MOC for workforce transformation, entailing capacity and role enhancement.

Global Frameworks Supporting Functional Career Shifting

Functional career shifting is based on the WHO's Treat, Train, Retain (TTR) model and the EU's Quality Assurance Framework for VET (see Table 2). The TTR framework focuses on healthcare workers' well-being, enhancement of training, and the retention of the existing workforce (Baine et al., 2018). The EU framework supports lifelong learning and flexible training to enhance

employability (World Health Organization, 2007). These frameworks promote the integration of role definition, skills enhancement, and policy compliance into workforce planning.

Table 2: *Functional Career Shifting Framework*

Aspect	WHO's Treat, Train, Retain Model	EU Quality Assurance Framework for Vocational Education and Training
Primary Objective	Address healthcare workforce shortages through well-being, training, and retention initiatives.	Enhance employability through lifelong learning and quality assurance in vocational education and training (VET).
Focus Areas	• Treat: Ensure healthcare workers' physical and mental well-being. • Train: Provide structured training programs. • Retain: Offer incentives to reduce attrition.	• Lifelong Learning: Promote continuous skills development. • Flexibility: Allow modular training for career adaptability. • Quality Assurance: Standardize vocational training.
Key Standards or Clauses	• Promote healthcare worker safety with institutional support (for example, PPE and stress management). • Implement competency-based training for rapid workforce scaling. • Provide financial incentives, career progression, and safe work environments to retain staff.	• Use EQAVET indicators to monitor training outcomes (for example, graduation and placement rates). • Ensure flexible learning pathways with credit accumulation systems. • Mandate feedback loops from employers and trainees.
Policy Integration	• Advocate for national policies that clearly define roles for healthcare workers engaging in task-shifting. • Ensure compliance with international healthcare standards (for example, WHO guidelines for safe task delegation).	• Align VET curricula with the European Qualifications Framework for transparency and transferability across member states. • Require employer involvement in curriculum design.
Application in Saudi Arabia	• Supports the redefinition of healthcare roles to align with the MOC. • Provides a blueprint for implementing functional career shifting through national task delegation policies and structured training.	• Offers insights into building flexible, competency-based VET programs in healthcare. • Promotes adaptability and lifelong learning in the Saudi workforce through modular training pathways.
Key Implementation Tools	• Competency-based frameworks for task delegation (for example, WHO's Global Health Workforce Strategies). • Guidelines for strengthening worker retention (for example, financial incentives and professional development).	• EQAVET Framework: Focused on quality assurance in VET with specific indicators. • Use of learning management system platforms for digital and flexible learning in vocational education.

Source: (World Health Organization, 2007)

Core Components of Functional Career Shifting

Capacity Building Through Vocational Training

The foundation of functional career shifting is vocational training that prepares workers for new roles requiring new skills. The Health Academy in Saudi Arabia delivers more than 55 practice-oriented programs vital to primary care, chronic disease management, and health-informatics. By mid-2025, the Academy has trained 40,000 to 45,000 individuals under this framework, producing 30,000 to 33,000 graduates, up to 93 percent of whom have gone on to employment in healthcare roles (Saudi Commission for Health Specialties, 2024). This approach demonstrates that through structured training, it is possible to transform the workforce by integrating individual talents and potentials with healthcare system needs.

Role Redefinition and Regulatory Support

Role redefinition is a key enabler of functional career shifting. Markedly, if there is no clear distinction in roles and responsibilities, task redistribution could have a negative effect on the quality of care and staff motivation (Ferrinho et al., 2012). The WHO highlights that efficient task shift must be underpinned by policies that promote accountability and safety (World Health Organization, 2007). A notable case is Ethiopia's approach that focuses on training community health workers on the administration of antiretroviral therapy while leveraging supervision and quality control (Lehmann et al., 2009). Based on successful models in

Ethiopia, Saudi Arabia can learn how to establish new healthcare roles for functional career shifting and incorporate a workforce transformation plan. As such, role definition and regulatory support represent a key opportunity for enhancing functional career shifting.

Career Progression and Lifelong Learning

Functional career shifting encompasses the active process of career transition that focuses on ongoing career growth. Lifelong learning allows healthcare workers to progress through the career ladder and fill skills gaps within the scope of their current workforce plans (Glenton et al., 2020). The EU's approach to the modular training system is an excellent example of a step-by-step learning process, which helps workers improve their positions in their career pathways (Lehmann et al., 2009). These models can be implemented in Saudi Arabia to mitigate workforce shortages in rural and underprivileged areas, thus promoting progression patterns. For instance, preparing community health workers for more refined diagnostic duties or care coordination roles addresses shortages and encourages employee longevity by defining career progression paths. Essentially, career progression and lifelong learning represent a critical pillar in functional career shifting.

Integration of Digital Tools

Digital technologies are instrumental in supporting functional career shifting, as they enhance the training and management of personnel. Telemedicine platforms provide an opportunity for community health workers to offer consultations under specialists' supervision, thus increasing healthcare accessibility, especially in areas with inadequate experts (Beer & Mulder, 2020). Intelligent diagnostic tools also reduce physician workload, allowing clinicians to concentrate on the more intricate care aspects (Kruszyńska-Fischbach et al., 2022). In the Kingdom of Saudi Arabia context, digital tools can be used to adopt new roles while ensuring that the quality of care is not compromised. These technologies also enable off-site training, which enhances healthcare workers' skills. Essentially, digital tools represent a key element in enhancing equitable care.

Vocational Education and Training: A Strategic Intervention for Functional Career Shifting in Saudi Arabia's Health Sector Transformation

VET aligns with Saudi Arabia Vision 2030, which seeks to improve the healthcare system. Focusing on workforce needs and skills training enables VET to support the MOC's SOC (Rintala & Nokelainen, 2020). The SOC depends on qualified employees who can deliver quality care in the SOC stages (World Economic Forum, 2023). The MOC's emphasis on the expansion of primary care suggests that the health system requires more workers capable of handling preventive and ambulatory care.

Vocational Education and Training: A Foundation for Workforce Transformation

VET is defined by the focus on vocational education and training and its relevance to the labor market. VET development in the Saudi healthcare system addresses workforce shortages and the MOC's complexity (McGrath et al., 2020). The Health Academy offers specialized training to meet the workforce shortage in primary care, chronic diseases, and health informatics in the Saudi healthcare system (Saudi Commission for Health Specialties, 2024). For example, the Academy has addressed workforce challenges by training clinical assistants and health-informatics professionals to improve productivity (Saudi Commission for Health Specialties, 2024). By mid-2025, the Health Academy's VET programs had enrolled between 40,000 and 45,000 trainees and produced 30,000 to 33,000 graduates. Up to 93 percent of those graduates have since secured employment in healthcare roles (Saudi Commission for Health Specialties, 2024). The approach aligns with other international standards, such as the German dual system, which focuses on learning and workplace training (Li & Pilz, 2023). In essence, the VET is a foundation for workforce transformation.

Competency-Based Training: The Core of Functional Career Shifting

Competency-based training has a critical role in functional career shifting in VET. Such training develops the skills and competencies required in new job positions. The Health Academy curriculum is competency-based and aligns with the European Qualifications Framework (Li & Pilz, 2023). Competency-based training fosters progressive learning in the sense that the trainee must sequentially progress through the various competency levels (Hassan et al., 2024). For instance, healthcare workers are exposed to a broad understanding of diagnostic procedures and then advance to other certification levels (Hassan et al., 2024). The approach enhances career progression and fosters workforce flexibility, which is a key consideration in functional career shifting in the MOC framework.

Integration of Digital Tools in Vocational Education and Training

Digital technologies are critical in enhancing the efficiency of VET programs by facilitating creative training approaches and optimizing the management of human resources. In Saudi Arabia, telemedicine platforms and AI-driven tools are used in VET curricula to expose trainees to digital health (Obiekwe et al., 2024). Additionally, simulation-based digital training has been a critical VET enabler. The use of simulations offers trainees a safe space to perform intricate procedures (Obiekwe et al., 2024). Moreover,

e-learning platforms offer a vast array of materials, whereby trainees can always update their knowledge and skills according to current practices (Romli et al., 2022). As such, digital tools are vital in VET programs.

Public-Private Partnerships in Vocational Education and Training Implementation

Partnerships between the public and private sectors are mandatory for effective delivery of VET in Saudi Arabia (see Table 3). These partnerships involve the engagement of private sector partners to improve the quality of training (Cedefop, 2015; Ali et al., 2023). Such partnerships are also vital in curriculum design to ensure that training programs align with industry standards (Al-Alawneh, 2020). This approach enhances VET systems and fosters functional career shifting objectives.

Table 3: *Public-Private Partnerships*

Aspect	Public Sector Role	Private Sector Role	Joint Activities	Frameworks/Standards
Policy and Governance	Develop regulatory frameworks to ensure vocational education and training (VET) aligns with national priorities like Vision 2030. Establish policies promoting workforce integration into the healthcare sector.	Provide compliance with regulatory requirements. Contribute to shaping policies based on industry insights and emerging trends.	Co-develop policies and strategies to align vocational training programs with industry needs and national healthcare goals.	The United Nations Educational, Scientific and Cultural Organization Guidelines on public-private partnerships for VET Vision 2030 framework
Curriculum Design	Define competency-based standards and learning outcomes tailored to the healthcare sector. Ensure curricula align with national labor market demands.	Provide input on specific technical skills and emerging technologies required in healthcare roles.	Collaborate to design training programs that integrate theoretical knowledge with practical, industry-relevant skills.	European Qualifications Framework
Training Delivery	Provide institutional facilities and funding to support training programs. Offer access to public sector trainers and mentors.	Supply subject matter experts, advanced equipment, and on-the-job training opportunities.	Deliver training through a blended model, combining classroom instruction with hands-on, real-world application.	ISO 29993:2017 (Learning Services Outside Formal Education)
Workforce Placement	Develop national workforce placement strategies, such as job-matching platforms. Facilitate employment policies that encourage hiring VET graduates.	Absorb qualified VET graduates into their organizations. Offer internships and career progression pathways.	Jointly establish job placement programs and partnerships to ensure graduates meet employer needs.	EQAVET Indicators (for example, placement and employment rates)
Digital Transformation	Invest in infrastructure for e-learning platforms and digital tools for training delivery. Provide policies to support digital adoption.	Introduce and implement advanced technologies (such as artificial intelligence and telemedicine) into VET programs. Provide industry-specific digital tools for training.	Co-create digital curricula and integrate technology-driven training programs to meet future healthcare demands.	ISO/IEC 40180:2017 (E-Learning Standards)
Quality Assurance	Monitor and evaluate program outcomes using performance	Participate in evaluations to ensure training programs meet	Conduct joint reviews and improvements to ensure continuous	EQAVET Framework

	indicators and trainee feedback. Ensure alignment with global quality standards.	evolving industry standards. Share feedback for program refinement.	alignment with healthcare and industry requirements.	
Funding and Sustainability	Provide financial support through subsidies and public grants for training programs. Support VET program scalability through national initiatives.	Co-invest in training initiatives and sponsor specific programs tailored to private sector needs. Offer scholarships and apprenticeships.	Develop sustainable co-financing models and establish cost-sharing agreements to expand access to VET programs.	OECD Guidelines on Financing VET

Future Directions for Vocational Education and Training in Saudi Arabia

Saudi Arabia should enhance its support to new training methods, technologies, and collaborations. Some of the measures that can support VET efforts include expanding the delivery of VET programs in rural areas, improving cooperation with private sector partners, and integrating big data into the labor market forecasting process. Furthermore, incorporating VET programs with the new healthcare models, such as precision medicine and the use of AI in diagnosis, will equip the workforce to address emerging challenges. Table 4 shows the logic model to enable future directions.

Table 4: *Logic Model*

Inputs	Activities	Outputs	Outcomes
• Government funding for vocational education and training (VET) initiatives. • Advanced digital technologies (artificial intelligence or AI, telemedicine, simulation tools). • Public-private partnerships (PPs). • Workforce data and predictive analytics tools. • Expertise from global frameworks like WHO and EQAVET.	• Develop innovative training programs aligned with emerging healthcare trends (such as AI-driven diagnostics and precision medicine). • Expand VET programs to rural areas using digital platforms. • Strengthen PPPs for co-developing curricula and offering on-the-job training. • Use predictive analytics for workforce planning and alignment with healthcare demands. • Introduce modular, competency-based training for lifelong learning.	• Increased number of VET programs tailored to advanced healthcare roles. • Improved access to VET in underserved areas. • Enhanced private sector participation in VET delivery. • Workforce strategies informed by predictive analytics. • High-quality, industry-aligned curricula.	• Sustainable and adaptive healthcare workforce. • Reduced healthcare disparities in underserved areas. • Greater national workforce participation, reducing reliance on expatriates. • Improved adoption of healthcare technologies. • Alignment with Vision 2030 healthcare transformation goals.

Conclusion

VET is an effective way of achieving Saudi Vision 2030 healthcare objectives. By adopting the MOC and implementing functional career shifting, VET addresses the skills gap by fostering sustainable workforce development. Integrating competency-based training, digital technologies, and partnerships ensures that the healthcare workforce is prepared for emerging challenges. As the

Kingdom of Saudi Arabia prioritizes healthcare transformation, VET is a viable model for establishing a qualified and competent workforce that will enhance the quality and accessibility of healthcare services.

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References

[1] Al-Alawneh, M. K. (2020). Quality assurance (QA) criteria's implementation: The case of vocational education and training (VET) centers in Jordan. *Multicultural Education, 6*(5). https://doi.org/10.5281/zenodo.4308501

[2] Ali, R. J. I., Alenezi, T. M. A., ALdhafeeri, N. A. O., Alenezi, N. M. A., Alkhatami, M. F. W., Alanazi, H. A. M., & ALjehani, A. M. S. (2023). Saudi Arabia's New Care Model and the Transformation of Health Care Kingdom's Vision 2030. *International Journal of Medical Science and Clinical Research Studies*, *3*(12), 3187-3195.https://ijmscr.org/index.php/ijmscrs/article/download/1351/1157

[3] Baine, S. O., Kasangaki, A., & Mugisha Baine, E. M. (2018). Task shifting in health service delivery from a decision and policy makers' perspective: A case of Uganda. *Human Resources for Health, 16*(20). https://doi.org/10.1186/s12960-018-0282-z

[4] Beer, P., & Mulder, R. H. (2020). The effects of technological developments on work and their implications for continuous vocational education and training: A systematic review. *Frontiers in Psychology*, *11*, 918. https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00918/pdf

[5] Cedefop. (2015). *Ensuring the quality of certification in vocational education and training.* Publications Office of the European Union. https://doi.org/10.2801/25991

[6] Chowdhury, S., Mok, D., & Leenen, L. (2021). Transformation of healthcare and the new Model of Care in Saudi Arabia: Kingdom's Vision 2030. *Journal of Medicine and Life, 14*(3), 347-352. https://doi.org/10.25122/jml-2021-0070

[7] Ferrinho, P., Sidat, M., Goma, F., & Dussault, G. (2012). Task-shifting: Experiences and opinions of health workers in Mozambique and Zambia. *Human Resources for Health, 10*(34). https://doi.org/10.1186/1478-4491-10-34

[8] Glenton, C., Colvin, C. J., & Rashidian, A. (2020). *Task-shifting strategies for optimizing healthcare worker roles.* Cochrane Effective Practice and Organisation of Care. https://epoc.cochrane.org/

[9] Hassan, I. S., Elamin, M. E. M., Awad, A. H. M., Abdelgadir, M. M. M., Ahmed, M. A. I., Ayyad, F. A. A. A., & Ishag, R. M. A. (2024). The engagement chasm: Time for competency-based training in employee engagement for healthcare and beyond. *Work*, *77*(4), 1075-1087. https://journals.sagepub.com/doi/pdf/10.3233/WOR-230215

[10] Khalifa, M., Albadawy, M., & Iqbal, U. (2024). Advancing clinical decision support: The role of artificial intelligence across six domains. *Computer Methods and Programs in Biomedicine Update*, 100142. https://www.sciencedirect.com/science/article/pii/S2666990024000090

[11] Khashan, H., Abogazalah, F., Alomary, S. (2021). Primary health care reform in Saudi Arabia: Progress, challenges, and prospects. *Eastern Mediterranean Health Journal, 27*(10), 1016-1026. https://doi.org/10.26719/emhj.21.042

[12] Kruszyńska-Fischbach, A., Sysko-Romańczuk, S., Napiórkowski, T. M., Napiórkowska, A., & Kozakiewicz, D. (2022). Organizational e-health readiness: How to prepare the primary healthcare providers' services for digital transformation. *International Journal of Environmental Research and Public Health*, *19*(7), 3973. https://www.mdpi.com/1660-4601/19/7/3973/pdf

[13] Lehmann, U., Van Damme, W., Barten, F., & Sanders, D. (2009). Task-shifting: The answer to the human resources crisis in Africa? *Human Resources for Health, 7*(49). https://doi.org/10.1186/1478-4491-7-49

[14] Li, J., & Pilz, M. (2023). International transfer of vocational education and training: A literature review. *Journal of Vocational Education & Training, 75*(2), 185-218. https://doi.org/10.1080/13636820.2020.1847566

[15] Mani, Z. A., & Goniewicz, K. (2024). Transforming healthcare in Saudi Arabia: A comprehensive evaluation of Vision 2030's impact. *Sustainability, 16*(8), 3277. https://doi.org/10.3390/su16083277

[16] McGrath, S., Ramsarup, P., Zeelen, J., Wedekind, V., Allais, S., et al. (2020). Vocational education and training for African development: A literature review. *Journal of Vocational Education & Training, 72*(4), 465-487. https://doi.org/10.1080/13636820.2019.1679969

[17] Obiekwe, S. J., Omaga, I. B., Ukadike, M. M., Edeh, C. G., Iheanyi, C. E., Anisiobi, P. U., & Obi, E. (2024). The integration of artificial intelligence in healthcare: A cross-sectional study on the knowledge, perception, and readiness of medical students at a tertiary institution in Nigeria. *Apollo Medicine*, 09760016241287301. https://journals.sagepub.com/doi/pdf/10.1177/09760016241287301

[18] Rintala, H., & Nokelainen, P. (2020). Vocational education and learners' experienced workplace curriculum. *Vocations and Learning*, *13*(1), 113-130. https://doi.org/10.1007/s12186-019-09229-w

[19] Romli, M. H., Wan Yunus, F., Cheema, M. S., Abdul Hamid, H., Mehat, M. Z., Md Hashim, N. F., & Jaafar, M. H. (2022). A meta-synthesis on technology-based learning among healthcare students in Southeast Asia. *Medical Science Educator*, *32*(3), 657-677. https://link.springer.com/content/pdf/10.1007/s40670-022-01564-3.pdf

[20] Salvatore, F. P., Fanelli, S., Donelli, C. C., & Milone, M. (2021). Value-based health-care principles in health-care organizations. *International Journal of Organizational Analysis*, *29*(6), 1443-1454. https://www.emerald.com/insight/content/doi/10.1108/IJOA-07-2020-2322/full/pdf

[21] Saudi Commission for Health Specialties. (2024). *Health Academy Profile.*

[22] World Economic Forum. (2023). *Future of Jobs Report.* World Economic Forum. https://www.weforum.org/publications/the-future-of-jobs-report-2023/
[23] World Health Organization. (2007). *Task shifting to tackle health worker shortages.* https://chwcentral.org/wp-content/uploads/2013/07/Task-shifting-to-tackle-health-worker-shortages.pdf
[24] World Health Organization. (2008). *Task shifting: Rational redistribution of tasks among health workforce teams.* https://iris.who.int/bitstream/handle/10665/43821/9789241596312_eng.pdf?sequence=1&isAllowed=y
[25] Yong, L. M. O., & Cameron, A. (2019). Learning from elsewhere: Integrated care development in Singapore. *Health Policy*, *123*(4), 393-402. https://pubmed.ncbi.nlm.nih.gov/30579625/