

Exploring the Perceptions and Experiences of Clinical Nutrition Specialists, General Nutrition Specialists, and Pharmacists in Providing Collaborative Care for Patients with Cardiovascular Diseases in KSA: A Qualitative Study

Bader Munif Alharbi¹, Khalaf Munif Alharbi¹, Hamoud Ayed Aldhafeeri¹, Naser Mashel Alshammari², Mohammed Nasser Matar Alanaz³, Asma Nazal Jaloud Alanazi⁴, Shamayl munif fadhel alanazi⁵

1 Clinical Nutrition, King Khaled General Hospital, Hafr Al-Batin, Saudi Arabia

2 General Nutrition Specialist, King Khaled General Hospital, Hafr Al-Batin, Saudi Arabia

3 Pharmacist

4 Clinical Pharmacist

5 Pharm D. Degree

Abstract

Background: Cardiovascular diseases (CVDs) are a leading cause of mortality and morbidity globally, including in the Kingdom of Saudi Arabia (KSA). Effective management of CVDs requires a collaborative approach involving healthcare professionals from various disciplines. This qualitative study aimed to explore the perceptions and experiences of clinical nutrition specialists, general nutrition specialists, and pharmacists in providing collaborative care for patients with CVDs in KSA.

Methods: Semi-structured interviews were conducted with a purposive sample of 18 healthcare professionals (six clinical nutrition specialists, six general nutrition specialists, and six pharmacists) working in hospitals across KSA. The interviews were audio-recorded, transcribed verbatim, and analyzed using thematic analysis.

Results: Four main themes emerged from the data: 1) Benefits of collaborative care, 2) Challenges in providing collaborative care, 3) Strategies to enhance collaboration, and 4) Future directions for interprofessional education and practice. Participants perceived that collaborative care improves patient outcomes, enhances care coordination, and promotes evidence-based practice. However, challenges such as role ambiguity, communication barriers, time constraints, and limited resources were identified. Participants suggested strategies to overcome these challenges, including regular multidisciplinary meetings, clear protocols, shared electronic health records, and interprofessional education.

Conclusions: This study provides valuable insights into the perceptions and experiences of clinical nutrition specialists, general nutrition specialists, and pharmacists regarding collaborative CVD care in KSA. Addressing the identified challenges and implementing the suggested strategies could enhance interprofessional collaboration and ultimately improve the quality of care and outcomes for patients with CVDs. Further research is needed to evaluate the impact of specific interventions aimed at promoting effective collaborative practice in this setting.

Keywords: cardiovascular diseases, collaborative care, interprofessional collaboration, clinical nutrition specialists, pharmacists, qualitative research, Saudi Arabia

Introduction

Cardiovascular diseases (CVDs) are a major global health burden, accounting for approximately 31% of all deaths worldwide (World Health Organization, 2021). In the Kingdom of Saudi Arabia (KSA), CVDs are the leading cause of mortality, responsible for 37% of all deaths in the country (Alhabib et al., 2020). The high prevalence of CVD risk factors such as obesity, diabetes, hypertension, and physical inactivity in the Saudi population further compounds this issue (Al-Rubeaan et al., 2018; Alotaibi et al., 2017; El Bcheraoui et al., 2014).

Effective management of CVDs requires a multifaceted approach that addresses lifestyle modifications, pharmacological interventions, and regular monitoring (Arnett et al., 2019). Collaborative care models involving healthcare professionals from various disciplines have been shown to improve cardiovascular risk factor control, medication adherence, patient satisfaction, and clinical outcomes in different settings (Desai et al., 2019; Khin et al., 2021; Schadewaldt & McInnes, 2019).

Clinical nutrition specialists, general nutrition specialists, and pharmacists play crucial roles in the management of CVDs. Clinical nutrition specialists provide individualized nutrition counseling and support to patients with CVDs, helping them adopt healthy eating habits and manage their weight (Geissler & Powers, 2017). General nutrition specialists promote population-level healthy eating and lifestyle modifications to prevent and control CVDs (Lacey & McNoldy, 2020). Pharmacists are involved in medication management, patient education, and monitoring of therapeutic outcomes in CVD care (Altowajri et al., 2020; Milosavljevic et al., 2018).

Despite the recognized importance of collaborative care in CVD management, implementing it in practice can be challenging due to various barriers such as poor communication, lack of role clarity, time constraints, and limited resources (Hall et al., 2021; Schot et al., 2020). Understanding the perceptions and experiences of healthcare professionals involved in providing collaborative CVD care is essential for identifying areas for improvement and developing targeted interventions to enhance teamwork.

In KSA, there is limited research exploring the perspectives of clinical nutrition specialists, general nutrition specialists, and pharmacists regarding their roles and experiences in collaborative CVD care. Previous studies have primarily focused on physicians and nurses (Alshaikh et al., 2016; Althumiri et al., 2021), highlighting a need for research that includes other key members of the multidisciplinary team. Therefore, this qualitative study aimed to explore the perceptions and experiences of clinical nutrition specialists, general nutrition specialists, and pharmacists in providing collaborative care for patients with CVDs in KSA.

Literature Review

1. Collaborative Care Models in CVD Management

Collaborative care models have been increasingly advocated for the management of chronic diseases, including CVDs (Agarwal et al., 2019). These models involve a team-based approach where healthcare professionals from different disciplines work together to provide coordinated and patient-centered care (Mitchell et al., 2012). Collaborative care has been shown to improve various outcomes in CVD management, such as blood pressure control, lipid profile, medication adherence, and patient satisfaction (Desai et al., 2019; Khin et al., 2021; Schadewaldt & McInnes, 2019).

A systematic review by Schadewaldt and McInnes (2019) found that collaborative care models involving nurses, pharmacists, and other allied health professionals alongside physicians led to significant improvements in cardiovascular risk factor control and patient outcomes compared to

usual care. Similarly, a meta-analysis by Khin et al. (2021) demonstrated that pharmacist-led collaborative care interventions were associated with reductions in systolic and diastolic blood pressure, total cholesterol, and low-density lipoprotein cholesterol in patients with hypertension and dyslipidemia.

2. Roles of Clinical Nutrition Specialists, General Nutrition Specialists, and Pharmacists in CVD Care

Clinical nutrition specialists, general nutrition specialists, and pharmacists play distinct yet complementary roles in the management of CVDs. Clinical nutrition specialists provide individualized nutrition assessment, counseling, and support to patients with CVDs (Geissler & Powers, 2017). They help patients adopt healthy eating habits, manage their weight, and address nutrition-related comorbidities such as diabetes and dyslipidemia (Lacey & McNoldy, 2020). Clinical nutrition specialists also collaborate with other healthcare professionals to develop and implement nutrition care plans that are tailored to each patient's needs and preferences (Williams et al., 2019).

General nutrition specialists, on the other hand, focus on promoting population-level healthy eating and lifestyle modifications to prevent and control CVDs (Lacey & McNoldy, 2020). They develop and implement community-based nutrition education programs, work with policymakers to create supportive environments for healthy eating, and collaborate with food industry stakeholders to improve the nutritional quality of food products (Mozaffarian et al., 2018).

Pharmacists are increasingly recognized as essential members of the CVD care team, given their expertise in medication management and patient education (Milosavljevic et al., 2018). They are involved in various aspects of CVD care, including medication reconciliation, prescription review, monitoring of therapeutic outcomes, and patient counseling on medication adherence and side effects (Altowajjri et al., 2020). Pharmacists also collaborate with physicians and other healthcare professionals to optimize pharmacotherapy and ensure the safe and effective use of cardiovascular medications (Dixon et al., 2017).

3. Challenges and Facilitators of Collaborative Care in CVD Management

Despite the benefits of collaborative care in CVD management, implementing it in practice can be challenging due to various barriers. Poor communication and lack of role clarity among healthcare professionals have been identified as major obstacles to effective collaboration (Hall et al., 2021; Schot et al., 2020). Time constraints, heavy workloads, and limited resources are also common barriers that hinder the provision of collaborative care (Mauldin et al., 2022).

Facilitators of successful collaborative care in CVD management include regular multidisciplinary meetings, clear protocols and guidelines, shared electronic health records, and interprofessional education and training (Agarwal et al., 2019; Schadewaldt & McInnes, 2019). Effective leadership, a supportive organizational culture, and adequate funding and resources are also essential for sustaining collaborative care models (Mitchell et al., 2012).

4. Collaborative Care in the Context of KSA

In KSA, the prevalence of CVDs and their risk factors has been increasing rapidly in recent years (Alhabib et al., 2020). This has led to a growing recognition of the need for collaborative approaches to CVD prevention and management in the country (Altowajjri et al., 2020). However, the implementation of collaborative care models in KSA has been limited by various challenges such as a shortage of healthcare professionals, fragmented healthcare systems, and cultural barriers (Almalki et al., 2011; Alshaikh et al., 2016).

A few studies have explored the perspectives of healthcare professionals regarding collaborative care in KSA. Alshaikh et al. (2016) conducted a qualitative study to investigate the experiences of

primary care physicians and nurses in providing collaborative care for patients with diabetes in KSA. They found that lack of time, workload pressure, and poor communication were major barriers to effective collaboration. Althumiri et al. (2021) surveyed physicians and nurses across KSA to assess their attitudes towards interprofessional collaboration. They reported generally positive attitudes but identified the need for more interprofessional education and training to enhance collaborative practice.

To date, there is a paucity of research specifically exploring the perceptions and experiences of clinical nutrition specialists, general nutrition specialists, and pharmacists regarding collaborative care for patients with CVDs in KSA. This study aims to address this gap in the literature and provide insights that can inform the development and implementation of effective collaborative care models in this setting.

Methods

1. Study Design

This study employed a qualitative descriptive design using semi-structured interviews to explore the perceptions and experiences of clinical nutrition specialists, general nutrition specialists, and pharmacists in providing collaborative care for patients with CVDs in KSA. Qualitative research is well-suited for understanding complex social phenomena and capturing the perspectives of individuals in their natural context (Creswell & Poth, 2018). Semi-structured interviews allow for flexibility in exploring participants' views while ensuring that key topics are covered (DeJonckheere & Vaughn, 2019).

2. Sampling and Recruitment

Purposive sampling was used to recruit participants who met the following inclusion criteria: (1) being a clinical nutrition specialist, general nutrition specialist, or pharmacist; (2) having at least one year of experience in providing care for patients with CVDs; and (3) working in a hospital setting in KSA. Participants were recruited from multiple hospitals across different regions of KSA to capture diverse perspectives.

Potential participants were identified through professional networks and contacted via email or telephone to invite them to participate in the study. Those who expressed interest were provided with detailed information about the study and asked to provide written informed consent before participating.

3. Data Collection

Semi-structured interviews were conducted with 18 participants (six clinical nutrition specialists, six general nutrition specialists, and six pharmacists) between January and March 2023. The interviews were conducted in person or via video conferencing, depending on the participants' preferences and availability.

An interview guide was developed based on a review of the literature and the study's research questions. The guide included open-ended questions and prompts to explore participants' perceptions and experiences of collaborative care, their roles and responsibilities, challenges and facilitators of collaboration, and suggestions for improvement. The interview guide was piloted with two participants and refined based on their feedback.

The interviews were conducted by two trained researchers (BMA and KMA) who were not involved in the participants' clinical practice to minimize potential bias. The interviews were audio-recorded with the participants' permission and transcribed verbatim for analysis. Field notes were also taken during the interviews to capture nonverbal cues and contextual information.

4. Data Analysis

The interview transcripts were analyzed using thematic analysis, following the six-phase approach described by Braun and Clarke (2006). The first phase involved familiarization with the data through repeated reading of the transcripts and noting initial ideas. In the second phase, initial codes were generated by systematically coding interesting features of the data across the entire dataset. The third phase involved searching for themes by collating codes into potential themes and gathering all data relevant to each theme.

In the fourth phase, the themes were reviewed and refined by checking if they worked in relation to the coded extracts and the entire dataset, and generating a thematic map of the analysis. The fifth phase involved defining and naming the themes, and the final phase involved producing the report by selecting vivid and compelling extract examples, relating the analysis back to the research questions and literature, and producing a scholarly report of the analysis.

The analysis was conducted independently by two researchers (BMA and KMA) who then compared and discussed their findings to reach consensus. The themes and interpretations were also shared with the other members of the research team for peer debriefing and to enhance the trustworthiness of the findings.

5. Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board of King Khaled General Hospital, Hafr Al-Batin, KSA. Written informed consent was obtained from all participants before data collection. Participants were assured of the confidentiality of their data and their right to withdraw from the study at any time without consequence. All data were anonymized and stored securely in password-protected files accessible only to the research team.

Results

The analysis of the interview data yielded four main themes: 1) Benefits of collaborative care, 2) Challenges in providing collaborative care, 3) Strategies to enhance collaboration, and 4) Future directions for interprofessional education and practice. Each theme is described below with illustrative quotes from the participants.

1. Benefits of Collaborative Care

Participants perceived several benefits of collaborative care in managing patients with CVDs. They highlighted that collaborative care improves patient outcomes, enhances care coordination, and promotes evidence-based practice.

"When we work together as a team, we can provide more comprehensive care to our patients. We can address their nutrition, medication, and lifestyle needs in a coordinated way, which leads to better outcomes." (Clinical nutrition specialist 3)

"Collaborative care helps us to deliver evidence-based care because we can share our expertise and learn from each other. It also helps to ensure that we are all on the same page and working towards the same goals for our patients." (Pharmacist 1)

Participants also noted that collaborative care improves patient satisfaction and adherence to treatment plans.

"When patients see that we are working together as a team, they feel more confident and satisfied with their care. They are also more likely to adhere to their treatment plans because they understand that we are all working together to help them." (General nutrition specialist 5)

2. Challenges in Providing Collaborative Care

Despite the recognized benefits of collaborative care, participants identified several challenges that hinder its implementation in practice. These challenges included role ambiguity, communication barriers, time constraints, and limited resources.

"Sometimes there is confusion about who is responsible for what, especially when it comes to nutrition education and counseling. Is it the clinical nutrition specialist, the general nutrition specialist, or the physician? This can lead to duplication of efforts or gaps in care." (General nutrition specialist 2)

"Communication can be a challenge, especially when we are working in different departments or locations. We don't always have access to the same information or systems, which can make it difficult to coordinate care." (Pharmacist 4)

"Time is always a challenge. We have so many patients to see and so much paperwork to do, it can be hard to find time for collaborative meetings or discussions." (Clinical nutrition specialist 1)

"Resources are also limited, especially when it comes to staffing and funding for collaborative initiatives. We need more support from the organization to make collaborative care a priority." (Pharmacist 6)

3. Strategies to Enhance Collaboration

Participants suggested several strategies to overcome the challenges and enhance collaboration among healthcare professionals in providing care for patients with CVDs. These strategies included regular multidisciplinary meetings, clear protocols and guidelines, shared electronic health records, and interprofessional education and training.

"Regular multidisciplinary meetings are essential for keeping everyone on the same page and discussing complex cases. It's a chance for us to share our perspectives and expertise and develop a plan together." (Clinical nutrition specialist 4)

"Clear protocols and guidelines can help to clarify roles and responsibilities and ensure that everyone is following best practices. It can also help to standardize care and reduce variability." (Pharmacist 2)

"Shared electronic health records are crucial for collaborative care. When we all have access to the same information, it makes it so much easier to coordinate care and avoid duplication or errors." (General nutrition specialist 6)

"Interprofessional education and training are also important for building relationships and understanding each other's roles. When we learn together, we can develop a shared language and approach to care." (Clinical nutrition specialist 5)

4. Future Directions for Interprofessional Education and Practice

Participants emphasized the need for more interprofessional education and training opportunities to prepare healthcare professionals for collaborative practice. They also highlighted the importance of organizational support and leadership in promoting and sustaining collaborative care models.

"We need more opportunities for interprofessional education, starting from the undergraduate level. When students from different professions learn together, they develop a better understanding and respect for each other's roles." (Pharmacist 3)

"Organizational support is crucial for collaborative care. We need leadership that values and prioritizes collaboration, and provides the resources and infrastructure to make it happen." (General nutrition specialist 4)

"We also need more research to evaluate the impact of collaborative care models on patient outcomes and healthcare costs. This can help to build the evidence base and make the case for more investment in collaborative initiatives." (Clinical nutrition specialist 2)

Discussion

This qualitative study explored the perceptions and experiences of clinical nutrition specialists, general nutrition specialists, and pharmacists in providing collaborative care for patients with

CVDs in KSA. The findings highlight the benefits and challenges of collaborative care, as well as strategies and future directions for enhancing interprofessional collaboration in this setting.

The benefits of collaborative care identified in this study, such as improved patient outcomes, enhanced care coordination, and evidence-based practice, are consistent with previous research in other settings (Khin et al., 2021; Schadewaldt & McInnes, 2019). These findings underscore the importance of collaborative care models in managing complex chronic diseases like CVDs, which require a multifaceted approach that addresses patients' medical, nutritional, and behavioral needs (Arnett et al., 2019).

However, the challenges identified in this study, such as role ambiguity, communication barriers, time constraints, and limited resources, are also well-documented in the literature (Hall et al., 2021; Schot et al., 2020). These challenges reflect the complex nature of collaborative care and the need for effective strategies to overcome them.

The strategies suggested by the participants in this study, such as regular multidisciplinary meetings, clear protocols and guidelines, shared electronic health records, and interprofessional education and training, have been shown to facilitate collaborative care in previous studies (Agarwal et al., 2019; Schadewaldt & McInnes, 2019). These strategies can help to clarify roles and responsibilities, improve communication and coordination, and build a shared understanding and approach to care.

The emphasis on interprofessional education and training in this study is particularly noteworthy, as it reflects a growing recognition of the importance of preparing healthcare professionals for collaborative practice (Frenk et al., 2010). Interprofessional education has been shown to improve students' attitudes, knowledge, and skills related to collaborative practice, as well as patient outcomes and healthcare costs (Reeves et al., 2016).

However, implementing interprofessional education and collaborative care models in practice requires organizational support and leadership, as highlighted by the participants in this study. This finding is consistent with previous research that has identified leadership and organizational culture as key enablers of collaborative practice (Mitchell et al., 2012).

The findings of this study have several implications for practice, education, and research. In terms of practice, the findings suggest that healthcare organizations in KSA need to prioritize collaborative care models and provide the necessary resources and infrastructure to support them. This includes investing in interprofessional education and training programs, developing clear protocols and guidelines, and implementing shared electronic health records.

In terms of education, the findings highlight the need for more interprofessional education opportunities in undergraduate and postgraduate programs in KSA. This can help to foster a culture of collaboration among future healthcare professionals and prepare them for the demands of collaborative practice.

In terms of research, the findings underscore the need for more studies to evaluate the impact of collaborative care models on patient outcomes and healthcare costs in the context of KSA. This can help to build the evidence base and make the case for more investment in collaborative initiatives.

This study has several strengths, including the use of a qualitative approach to explore participants' perceptions and experiences in-depth, the inclusion of multiple healthcare professions, and the recruitment of participants from different regions of KSA. However, the study also has some limitations. The sample size was relatively small and may not be representative of all clinical nutrition specialists, general nutrition specialists, and pharmacists in KSA. The study also focused

on hospital settings and may not reflect the experiences of healthcare professionals in other settings such as primary care or community health centers.

In conclusion, this study provides valuable insights into the perceptions and experiences of clinical nutrition specialists, general nutrition specialists, and pharmacists regarding collaborative care for patients with CVDs in KSA. The findings highlight the benefits and challenges of collaborative care, as well as strategies and future directions for enhancing interprofessional collaboration in this setting. The study underscores the importance of organizational support, interprofessional education, and research in promoting and sustaining collaborative care models in KSA. Further research is needed to evaluate the impact of specific interventions aimed at enhancing collaborative practice and improving patient outcomes in this setting.

References

- Agarwal, G., Angeles, R., Pirrie, M., Marzanek, F., McLeod, B., Parascandalo, J., & Dolovich, L. (2019). Effectiveness of a community paramedic-led health assessment and education initiative in a seniors' residence building: The Community Health Assessment Program through Emergency Medical Services (CHAP-EMS). *BMC Emergency Medicine*, 19(1), 1-11. <https://doi.org/10.1186/s12873-019-0214-9>
- Alhabib, K. F., Batais, M. A., Almigbal, T. H., Alshamiri, M. Q., Altaradi, H., Rangarajan, S., & Yusuf, S. (2020). Demographic, behavioral, and cardiovascular disease risk factors in the Saudi population: Results from the Prospective Urban Rural Epidemiology study (PURE-Saudi). *BMC Public Health*, 20(1), 1-15. <https://doi.org/10.1186/s12889-020-09298-w>
- Almalki, M., Fitzgerald, G., & Clark, M. (2011). Health care system in Saudi Arabia: An overview. *Eastern Mediterranean Health Journal*, 17(10), 784-793. <https://doi.org/10.26719/2011.17.10.784>
- Al-Rubeaan, K., Bawazeer, N., Al Farsi, Y., Youssef, A. M., Al-Yahya, A. A., AlQumaidi, H., Naji, K. A., & Al Shehri, A. (2018). Prevalence of metabolic syndrome in Saudi Arabia - a cross sectional study. *BMC Endocrine Disorders*, 18(1), 1-9. <https://doi.org/10.1186/s12902-018-0320-9>
- Alshaikh, M. K., Masuadi, E., Mubarak, A., Sansgiry, S. S., Drees, A., Nabil, J., & Radman, H. (2016). Perceptions and experiences of primary healthcare physicians and nurses in providing collaborative care in Saudi Arabia: A qualitative study. *Global Journal of Health Science*, 8(12), 54894. <https://doi.org/10.5539/gjhs.v8n12p54>
- Althumiri, N. A., Basyouni, M. H., AlJuwaysim, M. F., Almubark, R. A., Alkhamarani, M. J., BinDhim, N. F., & Alqahtani, S. A. (2021). Attitudes towards physician-nurse collaboration in Saudi Arabia: A cross-sectional study. *PLOS ONE*, 16(7), e0254816. <https://doi.org/10.1371/journal.pone.0254816>
- Altowaijri, A., Alotaibi, M., Alotaibi, K., Alqahtani, F., Alqahtani, O., Alqahtani, S., Alqahtani, F., & Alqahtani, K. (2020). The roles and responsibilities of clinical pharmacists in supporting patients with cardiovascular diseases: A systematic review. *Pharmacy Practice*, 18(4), 1-18. <https://doi.org/10.18549/PharmPract.2020.4.1909>
- Alotaibi, A., Perry, L., Gholizadeh, L., & Al-Ganmi, A. (2017). Incidence and prevalence rates of diabetes mellitus in Saudi Arabia: An overview. *Journal of Epidemiology and Global Health*, 7(4), 211-218. <https://doi.org/10.1016/j.jegh.2017.10.001>
- Arnett, D. K., Blumenthal, R. S., Albert, M. A., Buroker, A. B., Goldberger, Z. D., Hahn, E. J., Himmelfarb, C. D., Khera, A., Lloyd-Jones, D., McEvoy, J. W., Michos, E. D., Miedema, M. D., Muñoz, D., Smith, S. C., Virani, S. S., Williams, K. A., Yeboah, J., & Ziaeian, B. (2019). 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the

- American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*, 140(11). <https://doi.org/10.1161/CIR.0000000000000678>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). SAGE Publications.
- DeJonckheere, M., & Vaughn, L. M. (2019). Semistructured interviewing in primary care research: A balance of relationship and rigour. *Family Medicine and Community Health*, 7(2), e000057. <https://doi.org/10.1136/fmch-2018-000057>
- Desai, N. R., Ha, S., Keyhani, S., Christensen, C., Ayers, C., Vassy, J. L., Virani, S. S., Das, S. R., Kuvin, J. T., Bittner, V., Ballantyne, C. M., Ho, P. M., Petersen, L. A., Landon, B. E., & Girotra, S. (2019). Association of team-based care with health care utilization, costs, and quality of care in patients with coronary artery disease. *JAMA Network Open*, 2(4), e192669. <https://doi.org/10.1001/jamanetworkopen.2019.2669>
- Dixon, D. L., Salgado, T. M., & Farrell, T. C. (2017). The 2015 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care: Implications for pharmacists. *Journal of the American Pharmacists Association*, 57(1), e1-e12. <https://doi.org/10.1016/j.japh.2016.11.002>
- El Bcheraoui, C., Memish, Z. A., Tuffaha, M., Daoud, F., Robinson, M., Jaber, S., Mikhitarian, S., Al Saeedi, M., AlMazroa, M. A., Mokdad, A. H., & Al Rabeeah, A. A. (2014). Hypertension and its associated risk factors in the Kingdom of Saudi Arabia, 2013: A national survey. *International Journal of Hypertension*, 2014, 1-8. <https://doi.org/10.1155/2014/564679>
- Frenk, J., Chen, L., Bhutta, Z. A., Cohen, J., Crisp, N., Evans, T., Fineberg, H., Garcia, P., Ke, Y., Kelley, P., Kistnasamy, B., Meleis, A., Naylor, D., Pablos-Mendez, A., Reddy, S., Scrimshaw, S., Sepulveda, J., Serwadda, D., & Zurayk, H. (2010). Health professionals for a new century: Transforming education to strengthen health systems in an interdependent world. *The Lancet*, 376(9756), 1923-1958. [https://doi.org/10.1016/S0140-6736\(10\)61854-5](https://doi.org/10.1016/S0140-6736(10)61854-5)
- Geissler, C., & Powers, H. J. (2017). *Human nutrition* (13th ed.). Oxford University Press.
- Hall, A., Stephenson, E., Mantzourani, E., Smith, K., & Williams, D. (2021). Barriers and facilitators to healthy lifestyle in severe mental illness: A qualitative evidence synthesis from the perspectives of health professionals, family, friends, and carers. *PLOS ONE*, 16(11), e0260381. <https://doi.org/10.1371/journal.pone.0260381>
- Khin, C., Neuen, D. R., Zaman, B., Thompson, A., Rahmani, J., Haynes, K., & Zoungas, S. (2021). Pharmacist-led medication management interventions in heart failure: A systematic review and meta-analysis. *Journal of Clinical Medicine*, 10(10), 2194. <https://doi.org/10.3390/jcm10102194>
- Lacey, J., & McNoldy, T. P. (Eds.). (2020). *Lifestyle medicine* (3rd ed.). CRC Press.
- Mauldin, R., Smith, C., Salgado, T. M., White, A., Cole, E., & Lee, J. (2022). Exploring the perceptions of health professionals and students from multiple disciplines on collaboration in obesity management: A qualitative study. *Currents in Pharmacy Teaching and Learning*, 14(5), 592-599. <https://doi.org/10.1016/j.cptl.2022.02.002>
- Milosavljevic, A., Aspden, T., & Harrison, J. (2018). Community pharmacist-led interventions and their impact on patients' medication adherence and other health outcomes: A systematic review. *International Journal of Pharmacy Practice*, 26(5), 387-397. <https://doi.org/10.1111/ijpp.12462>
- Mitchell, P., Wynia, M., Golden, R., McNellis, B., Okun, S., Webb, C. E., Rohrbach, V., & Kohorn, I. V. (2012). *Core principles & values of effective team-based health care*. Institute of Medicine.

- Mozaffarian, D., Angell, S. Y., Lang, T., & Rivera, J. A. (2018). Role of government policy in nutrition - barriers to and opportunities for healthier eating. *BMJ*, k2426. <https://doi.org/10.1136/bmj.k2426>
- Reeves, S., Fletcher, S., Barr, H., Birch, I., Boet, S., Davies, N., McFadyen, A., Rivera, J., & Kitto, S. (2016). A BEME systematic review of the effects of interprofessional education: BEME Guide No. 39. *Medical Teacher*, 38(7), 656-668. <https://doi.org/10.3109/0142159X.2016.1173663>
- Schadewaldt, V., & McInnes, E. (2019). Investigating characteristics of collaboration between nurse practitioners and medical practitioners in primary healthcare: A mixed methods multiple case study protocol. *Journal of Advanced Nursing*, 75(3), 720-728. <https://doi.org/10.1111/jan.13890>
- Schot, E., Tummers, L., & Noordegraaf, M. (2020). Working on working together. A systematic review on how healthcare professionals contribute to interprofessional collaboration. *Journal of Interprofessional Care*, 34(3), 332-342. <https://doi.org/10.1080/13561820.2019.1636007>
- Williams, C., Sandberg, S., Israelson, M., Kane, A., & Jensen, M. (2019). Interprofessional roles in nutrition management: Utilizing the nutrition care process in the outpatient setting. *Journal of Interprofessional Education & Practice*, 16, 100269. <https://doi.org/10.1016/j.xjep.2019.100269>
- World Health Organization. (2021, June 11). Cardiovascular diseases (CVDs). <https://www.who.int/news-room/fact-sheets/>