



Physicians' views on cardiovascular disease risk prevention services by pharmacists and potential for collaboration



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ARTICLE INFO

Article history:

Received 1 April 2021

Received in revised form 10 August 2021

Accepted 26 September 2021

Keywords:

Cardiovascular disease
Risks prevention services
Pharmacist
Collaboration

ABSTRACT

Background: Cardiovascular diseases (CVD) are the leading cause of mortality worldwide. Early identification and management of modifiable CVD risk factors are highly effective in preventing disease onset and/or improving outcomes in CVD. As highly accessible primary health professionals, pharmacists can assume a role in screening and risk factor management in collaboration with physicians; however, such prevention services are not established practice in Saudi pharmacies. Therefore, the aim was to explore physicians' perceptions about the utility of a role in CVD risk screening and management for Saudi pharmacists.

Methods: Qualitative semi-structured interviews were conducted, audio-recorded and transcribed verbatim in Arabic or English. All transcripts were thematically analyzed in an inductive approach after translation into English if required.

Results: A total of 26 physicians recruited from public hospitals and primary healthcare centers were interviewed. Most were unaware of pharmacists' potential to undertake a role in CVD risk prevention. Although there was broad support for the concept, they recommended physician-pharmacist collaborative models, extensive provider pharmacist training, and strict oversight by the Saudi Ministry of Health (MoH)/other official authorities to ensure service quality and sustainability, should implementation occur. Healthcare system reform was considered key to expanding private sector (i.e., community pharmacy) involvement in healthcare, as was incentivizing providers and 'marketing' for patient acceptance.

Conclusion: Physicians were positive about setting up a collaborative community pharmacist-physician CVD risk screening and management service model with the help of an authorized body within the Saudi Arabian healthcare system.

1. Background

Non-communicable diseases (NCDs) are an emerging health concern worldwide. Amongst NCDs, cardiovascular disease (CVD) is currently the dominant cause of death, accounting for almost 30% of global mortality.¹ In Saudi Arabia, NCDs have also taken over from communicable diseases as the major contributor to disease burden.^{2,3} While the prevalence of NCDs has increased, their prevention and control remain challenging^{2,3}; indeed, this is the case globally. New strategies and models of care are now required to ensure that health professionals and patients use evidence-based prevention and treatment measures, particularly in the context of developing economies.⁴

Prevention interventions should be situated in primary care, as this is a more effective and cost-effective approach to delivery.⁵ However, in some countries, the primary healthcare system and workforce are under-

developed compared to the secondary and tertiary healthcare sectors.⁶ Healthcare in Saudi public hospitals and publicly funded primary care centers are state-subsidized.⁷ In contrast, primary care delivered by private practitioners is not subsidized, resulting in underutilization and a substantial burden on the secondary and tertiary healthcare sectors.^{2,8} Thus, there is an urgent need to strengthen primary healthcare to save costs, promote healthy lifestyles, and prevent and manage chronic conditions in the Saudi context. Mostly, the Saudi healthcare system follows the Beveridge model, with a minor element being a combination of the Bismarck and out-of-pocket models as these elements are controlled by the private market.⁹ Further key points about the Saudi healthcare system and pharmacy practice are highlighted in Appendix A (Table 1A).^{2,7,10-13}

Task-shifting or task-sharing is an innovative approach used in healthcare. This approach is recommended by WHO to enhance healthcare services in developing and developed countries.^{14,15} Task shifting is defined

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Table 1
Trustworthiness checklist for high-quality data assurance in interpretive-constructivism qualitative research.⁴²

Quality indicators in qualitative research	Research processes used to meet trustworthiness criteria
Credibility (Disconfirming evidence)	Note-taking, audio recording, data analysis, and compilation by independent research team members validate the 'truth' of our data. Where obtained, conflicting views are presented in the data analysis.
Transferability (analogous to external validity)	Aiming to have as varied a sample as possible to obtain a wide range of views. Further, a clear and comprehensive description of the interview guide and research procedures is provided to ensure repeatability. Thick descriptions where possible are also included in data exemplars.
Dependability (analogous to reliability)	A clear review and detailed discussion were continued between all members of the research team comprising three experienced qualitative researchers and two local (Saudi) co-investigators. Variability in the data was examined during data analysis between participants' responses, such as whether there were differences between general practitioners, specialists, or consultants towards pharmacists.
Confirmability (analogous to objectivity)	A subset (10%) of the transcripts were independently coded by two research team members (HA and BS) to create the coding framework. Then, all the research teams discussed theme derivation and potential thematic structure (including experienced qualitative researchers BS, BC and IK, and Saudi co-investigators and experienced local researchers TA and NA) until agreement was reached.

by WHO as "a process whereby specific tasks are moved, where appropriate, to health workers with shorter training programs and fewer qualifications (non-medical qualifications). Its application leads to more efficient use of existing human resources and easing of bottlenecks in service delivery. Where further additional human resources are needed, task shifting may also involve the delegation of some clearly delineated tasks to newly created cadres of health workers who receive specific, competency-based training.^{14,15}" Two areas in healthcare that are most likely to benefit from this approach are primary care and rural health. The primary healthcare system may become more efficient by shifting non-medical health tasks conventionally provided only by medical practitioners to other suitably trained allied healthcare professionals (HCPs).^{16,17} For example, task-shifting/sharing interventions by allied HCPs such as community pharmacists to manage NCDs such as hypertension could be useful for resource-limited and understaffed health systems.^{15,18}

Building community pharmacy-based healthcare models where pharmacy takes on healthcare roles in partnership with primary health physicians has led to a stronger primary care base in managing chronic diseases in several countries.^{19,20} Community pharmacies, with their long operating hours and wide distribution, are highly accessible to the public. Globally, many collaborative care models between pharmacists and physicians to manage a range of chronic diseases and their risk factors, including non-dispensing pharmacists entrenched within general practitioner (GP) practices, have emerged and demonstrated positive health outcomes.^{21–23} Notably, though the health system in Saudi Arabia differs from countries where such pharmacy research was conducted, in most cited examples, community pharmacy is a private enterprise, as is the case in Saudi Arabia. Of course, medications supplied to the public by community pharmacies may be subsidized via private or nationalized insurance models. The regulatory mechanisms governing community pharmacies may vary across countries; nonetheless, such models serve as relevant case studies.

In Saudi Arabia, with the rising prevalence of chronic diseases such as CVD and the substantial pressure on secondary and tertiary health systems,^{8,14} a national policy is needed to support task-shifting/ sharing, which can mobilize the underutilized privately owned allied health infrastructure in the primary care sector. For example, some non-medical tasks such as health screening/health education/health coaching may be shifted

to allied professionals such as community pharmacists.^{15,16,24} This would free up physicians involved in delivering core and specialized medical tasks such as diagnosing and prescribing. The pharmacy education program structure in Saudi Arabia was shifted from 'Bachelor of Pharmaceutical Science (BPharm)' towards 'Doctor of Pharmacy (PharmD)' to allow pharmacy curricula to better focus on patient-centered clinical roles in various Saudi pharmacy schools recently.^{10,12,25–28} However, despite these changes in pre-registration training programs, the implementation of such roles in Saudi pharmacy practice is still limited.²⁵

To effect the task-shifting/sharing strategy, interprofessional practice where clear roles/goals, professional identity issues, shared responsibility, interdependence and team tasks are addressed is important because of the impact on collaboration and patient health outcomes.²⁹ For example, process evaluation of a feasibility trial of UAE pharmacist-led screening services for diabetes and CVD risks based in pharmacy highlighted the need for better integration with primary care physicians to ensure continuity of care following referral of individuals at high risk of CVD or diabetes.³⁰ Clearly, physician support and acceptance of pharmacy-provided services are essential to developing such pharmacy service models. In Saudi Arabia, recent ministerial initiatives lend credence to the development and implementation of pharmacy services – a paradigm shift from the traditional supply-only role of pharmacists.^{2,12,31}

Although pharmacist-led CVD risk screening/management models in Saudi Arabia are a logical step to reducing CVD burden, understanding factors that would likely affect their implementation requires the extensive engagement of physicians as key stakeholders. Hence, this study aimed to examine physicians' views on pharmacists' provision of CVD risk screening and management services and explore optimal pathways for integrating such models in the Saudi primary healthcare system. The specific objectives were to explore physicians' 1) experience and perspectives about CVD risk management and reduction, 2) perspectives on pharmacists' role or activities in managing patients with CVD and particularly in reducing and identifying CVD risk, and 3) experience in working or willingness to collaborate with pharmacists in CVD risk reduction.

2. Methods

2.1. Study design and setting

Using a bilingual interview guide (Appendix B), a qualitative descriptive study using semi-structured interviews (face-face and telephone) was conducted in the period between September – November 2017, with physicians who had at least one year of experience in Saudi Arabia as registered medical practitioners (i.e., with degrees including MBBS or MD) at any level of care, e.g., primary to tertiary.

2.2. Interview design

The interview guide was developed based on a comprehensive search of the literature,^{22,32–37} consultation with experts in the field (pharmacy cardiovascular health services), and the study's objectives.

The interview guide consisted of open-ended questions with prompts and was pilot tested before starting data collection (Appendix B). It was also translated into Arabic by a certified translator. Interviews were planned to be conducted in either English or Arabic depending on participant preference by the primary researcher (HA, MPharm and MPhil, current Ph.D. candidate and experienced in interview conduct through previous research projects). The interviewer was also a Saudi pharmacist and researcher, conversant with both the Saudi pharmacy context and international research on pharmacy roles in CVD risk prevention. We expected that using a Saudi research team member would facilitate physician participants' recruitment and contextualize pharmacist roles within the Saudi healthcare system (i.e., this would enhance the ontological authenticity of the study).³⁸

2.3. Sampling and recruitment

A purposive, convenience sampling approach was used.³⁹ Within the convenience sampling approach, managers at selected public hospitals and primary healthcare centers in Najran [a city in southwestern Saudi Arabia] and Riyadh were contacted via email or phone and requested to assist in study recruitment by inviting physicians within their organization to participate by forwarding relevant project materials. Riyadh is the country's capital city and well-resourced with top-tier central and referral hospitals/medical cities and affiliated clinics, which often house novel collaborative healthcare operations. Najran, a smaller regional city, has a lower density of healthcare and only has public primary care/community health centers and general hospitals. We chose this sampling strategy both from a convenience sampling approach (the researchers lived in or had contacts in these two cities and could approach their contacts) and for ensuring variability in participants' experiences, i.e., participants from two cities that differ in the range of available health services.

We purposively targeted some managers who oversaw physicians known to have had a clinical collaboration with pharmacists or managers whose units' collaborative care clinics were currently in operation. Interested physicians could then contact the researchers directly. Further, pharmacists who had participated in a previous study⁴⁰ were asked to assist in physician recruitment in the current study by forwarding project information to their medical practitioner colleagues in hospitals or primary healthcare centers. Additionally, physicians known to the research team who met the inclusion criteria were directly emailed the project information, and if interested, they could participate by contacting the researchers (convenience sampling). Finally, all physicians who participated were invited to forward project materials to any contacts they deemed to meet the criteria (this was a passive snowballing approach, a well-known convenience sampling technique). While the key sampling approaches focused on recruitment from Najran and Riyadh, participants from other regions/cities sourced via snowballing techniques were also included in the study. An exponential passive snowballing technique was employed. This method allowed the recruitment of participants who were not known to the research team.

The interviews were planned for conduct until data saturation became evident, with a premise that around 20–30 participants would be sufficient to yield thematic saturation. Such a sample size is considered appropriate for qualitative research with a participant group of some common characteristics.⁴¹

2.4. Data collection

Semi-structured interviews were conducted by the primary researcher (HA) with consenting participants on an individual basis. The interviews were audio-recorded and supplemented with field notes at the participant's workplace or other preferred location. All audio recordings were transcribed verbatim (with provisions for any Arabic transcripts to be translated into English with translations cross-checked by a certified translator). Following the verbatim transcription, all data were de-identified by assigning participants a code and using this code for saving audio files, translations and transcripts. After completion of transcription/verification, the coding sheet was destroyed. Further, any words/phrases that could lead to the possible identification of a participant were deleted from the transcript.

2.5. Data analysis

The epistemological approach in the analysis was aligned with an interpretive-constructivism paradigm.⁴² All interviews' transcripts were entered into the QSR NVivo 11 program (QSR International, Cambridge, MA). De-identified interview transcripts were analyzed in-depth and iteratively coded into themes using a method of constant comparison, where the primary coder read each transcript line by line, undertook open coding, and compared each new transcript being coded to initial ones coded. When new codes were added, all transcripts were analyzed again to check if

evolving codes applied to originally coded transcripts. Further in the initial stages of analysis, 10% of the transcripts were independently reviewed by an experienced qualitative researcher (BS), followed by synchronizing codes through discussion and joint development of a coding framework, which was then applied to all transcripts by the primary researcher (HA).⁴³ Emergent themes were derived through the coding framework, initially by the primary researcher and then reviewed by other research team members (BC, BS, and IK) and local Saudi co-investigators (TA and NA). Themes were then meaningfully collated, and similarities or differences between participant sets (i.e., sociodemographic clusters) were specifically considered. A model to collate inductive thematic findings was then developed after team discussion. For quality assurance, a trustworthiness checklist for high-quality data assurance was employed (Table 1). Also, the COREQ checklist was completed for this research study, with most items addressed (Appendix C).⁴⁴

3. Results

3.1. General demographics and participants experiences

A total of 26 physicians from public hospitals and primary healthcare centers in Saudi Arabia were interviewed either face-face ($n = 22$) in clinics or workplaces or via phone ($n = 4$). The interviews ranged between 24 and 52 min in duration. Almost half of the participants were Saudi citizens (50%), and most were male (96%). Only two participants known to the primary researcher were recruited within the convenience sampling approach; others were recruited using the 'hands-off' or snowballing methods. More details about participants' demographics are highlighted in Table 2 below. All interview records were audible, and no repeat interviews were required.

The most frequently observed CVD risk factors reported by participants included diabetes, hypertension, smoking, obesity, physical inactivity, and dyslipidemia. Screening for CVD risk and/or risk factors was not considered routine practice in Saudi Arabia, apart from some health

Table 2
Participants characteristics.

Characteristics	Variables	N = 26 (100%)
Gender	Male	25 (96)
Age (Years)	25–34	10 (38)
	35–44	9 (35)
	45–54	4 (15)
	55–64	1 (4)
	≥65	2 (8)
Experience (Years)	<2	2 (8)
	2–5	8 (30)
	6–10	8 (30)
	11–15	1 (4)
	16–20	2 (8)
	21–25	2 (8)
	>25	3 (12)
Speciality/WORKPLACE ^a	Cardiology	7 (27)
	Internal medicine	9 (35)
	Emergency medicine	4 (15)
	Primary care	6 (23)
Nationality	Saudi	13 (50)
	Sudanese	3 (12)
	Yemeni	3 (12)
	Egyptian	2 (8)
	Syrian	1 (4)
	American	1 (4)
	Indian	1 (4)
	Jordanian	1 (4)
	Palestinian	1 (4)
Workplace city	Najran (Southern region)	14 (54)
	Riyadh (Central region)	9 (35)
	Dammam and Qatif (Eastern province)	2 (8)
	Jeddah (Western region)	1 (4)

^a Note: these specialty areas were how participants referred to themselves when asked their specialization/or work unit.

promotion advice during a typical physician clinic consult, along with point-of-care testing during public health awareness campaigns by physicians and nurses. Most physicians were not aware of any standardized Saudi guidelines for CVD risk screening and management; hence the guidelines they followed varied.

Most participants stated routine clinical investigations based on presented symptoms were mainly followed to assess and manage CVD risks and complications.

“We [physicians] are following the American Diabetes Association [guidelines] for treating our patients. There is a separate section for treating and controlling the other factors to prevent cardiovascular disease....”

(Dr14, 5 years)

“To be honest, I do not use any screening guidelines or tool for CVD risk, I know there are international guidelines, but I am not aware of any local Saudi guidelines.”

(Dr20, 2 years)

The data analysis yielded four key themes: physicians' perception of pharmacists' role, perception of critical success factors, suggested models of care, and healthcare system reform.

3.2. Theme 1: Physicians' perception of pharmacists' role

Physicians' perceptions of pharmacists' roles were based on current experience, and in their discussions, they also raised potential future roles relevant to the research question.

3.2.1. Current pharmacist roles

Most participants perceived that pharmacist's roles in Saudi Arabia were limited to medication supply, while a few participants noted that some pharmacists participate in health promotion campaigns. Several participants were also aware of patient education programs for people with chronic diseases, including diabetes and hypertension, being provided in a few community pharmacies.

“In Saudi Arabia, the role of the pharmacist is restricted to dispensing medications prescribed by the doctors.”

(Dr1, 2 years)

“They [community pharmacists] sometimes check and screen blood pressure on the machine, but I don't think they do an official referral to doctors....”

(Dr17, 6 years)

“You know some pharmacies such as X and Y [big chain pharmacies] have already started providing initial health education sessions on specific topics such as hypertension and diabetes in a few community pharmacies.....”

(Dr2, 2 years)

3.2.2. Future pharmacist roles

Most participants were positive and supported future CVD risk screening and management services in community pharmacies, and many lauded the novelty and potential utility of such models. They pointed to advantages of community pharmacy such as long opening hours, easy accessibility, and frequent consumer contact, compared with hospitals and primary health-care centers, as reasons for their support.

“They [community pharmacists] can do these screening services because there are some pharmacies open 24 hours, in the health center there is limited opening time but, in the pharmacy, people can go there any time to check, so it is good.”

(Dr13, 22 years)

“They [the public] will love it because from our experience in the campaign, even the pharmacist inside the pharmacy, they measure the blood pressure, height, and weight. The people like it very much, and they ask for it. When we are inside the campaign, you cannot imagine the number of people in queue just to measure their blood pressure....”

(Dr8, 35 years)

Some participants commented on the wider patient catchment that such pharmacy models could service, thereby increasing the chance of identifying those at CVD risk in a timely manner.

“Applying the protocol only inside our hospitals, we will catch only the top of the iceberg of those having risk factors, but if we spread this [screening] protocol to other dimensions, such as community pharmacies, it will cover a new dimension of this target population; i.e., those having CVD risk factors.”

(Dr8, 35 years)

In contrast, some participants did not believe that pharmacists could offer such services and appeared hesitant in accepting possible CVD risk screening in community pharmacies. In addition, a few physicians had unsupportive attitudes and expressed discomfort with the extension of pharmacist services into patient-centered care. The commercial nature of pharmacy premises was perceived as an ethical barrier.

“I don't think even they [community pharmacists] are up to the level that they have been educated to provide such education to the patients.”

(Dr18, 37 years)

“At the beginning, I think they [community pharmacists] will find difficulties from the doctor to accept pharmacist to interfere in their job or in risk screening and management, but in the future if the point become accepted, this will be better.”

(Dr5, 5 years)

“There is no communication between physicians and pharmacists. Physicians wouldn't feel comfortable asking pharmacists. Most physicians would say who is the pharmacist”

(Dr1, 2 years)

“... this service needs legislation, rules and regulations to avoid possible commercial bias in community pharmacy.”

(Dr8, 35 years)

3.3. Theme 2: Perception of critical success factors

In talking about future services, many participants highlighted what, in their view, would be essential initial steps to ensure the success of future pharmacy services for CVD risk prevention and management.

3.3.1. Public acceptance and creating patients demand

Participants suggested that the public must be made aware of the availability and significance of pharmacy-based services to enhance acceptance and participation in these services. Initial resistance to consumer engagement with pharmacy services was predicted, but this may resolve as such services become more commonplace. In addition, it was suggested that role clarity of physicians and pharmacists' tasks within these screening services might lead to more public acceptance and collaboration from physicians. Gender issues were also mentioned, given religious and social mores about gender segregation in Saudi Arabia.

“There needs to be more education for the public to raise awareness of such services and clarify the service model to physicians and what are their roles.”

(Dr7, 7 years)

“Initially you may struggle to get people acceptance and they will have to spend time, till they accept those services in the community pharmacy as they might prefer to receive such services from their GP.”

(Dr21, 35 years)

“I think if there is a good system to control this process, in other words, clear role for pharmacists and clear role for physicians and how they operate together to end up with management and reduction of cardiovascular diseases and risks....”

(Dr19, 7 years)

“May be, here in Saudi Arabia, if the pharmacist is male and person is female, maybe it is difficult to check blood pressure, or she will not accept....”

(Dr15, 6 years)

3.3.2. Resources and task planning

Clear service protocols, simple screening tools, and guidelines were mentioned as important factors during the planning and implementing such pharmacy services. Also, training for pharmacists for quality assurance was considered essential. Ministerial supervision from the Saudi MoH or other authorized bodies was mentioned frequently by participants. Participants commented about the need to modify pharmacy layout to better accommodate such services – for example, the need for seating areas and private counseling areas were seen as important for patient comfort. Many participants suggested running service pilots in selected areas and, if proven acceptable and effective, then scale up the provision nationally.

“.... If there is some supervision from the Ministry of Health or Saudi FDA on these pharmacies and their tools and their practice, it will be a very nice idea, I totally agree it will be a breakthrough.”

(Dr8, 35 years)

“They [community pharmacists] have to change their way of dispensing, for example in Europe, you will find that customer when he comes, he sits on a chair and then give his medication list. Then the pharmacist goes and collects it and sits with him, has a dialogue as a person to person while in our system, no, it is just like a supermarket...”

(Dr18, 37 years)

“.... The bottom line, it is too early to implement it in pharmacy nationally and plans to do it should be done in small area to be measured and evaluated and shown effective results.”

(Dr19, 7 years)

3.3.3. Legislation and incentivization

From a system's perspective, legalizing the provision of pharmacy services by the MoH or other regulatory bodies was perceived to be a key facilitator, along with media support for successful pharmacy service pilots. Some participants recommended empowering allied HCPs in Saudi Arabia to enable the provision of optimal collaborative patient care. Financial incentives and motivational rewards for pharmacists and pharmacy owners were suggested as essential for the sustainability and quality of pharmacy-based services. This would enhance commitment to service quality by pharmacy owners and pharmacists, an essential first step for winning public trust.

“I think they [pharmacists] should have to get official legal support from Ministry of Health, also they [pharmacists] should have support from the media newspapers, and Twitter, and once that just elicited even awareness for whole society....”

(Dr23, 7 years)

“I think we should review the whole national program for empowering professionals, I would say empowering the pharmacist and empowering the nurse staff, empowering these hidden professionals, I mean, heroes of the health services.”

(Dr8, 35 years)

“.... They [community pharmacists] could receive monetary incentives or any other kinds of overtime incentive.”

(Dr2, 2 years)

“The owner of the pharmacies, those running the business of community pharmacies have to be motivated financially.”

(Dr8, 35 years)

“I think it has to be supported by the government financially and legally.”

(Dr17, 6 years)

3.4. Theme 3: Suggested models of care

Models of care suggested by participants included: 1) pharmacist delivered health education/health promotion (on lifestyle modification and CVD risk reduction) to improve health literacy, 2) point of care testing 3) medication review, 4) being part of the home care visit team - all with clear communication and collaboration with physicians. The participants' care provision formats included Internet and tele-consult models besides face-to-face models delivered in the community pharmacy setting.

“Health literacy is the problem here in Saudi Arabia, you may need somebody in the community pharmacy to educate these people in the society with healthy lifestyle habits”

(Dr21, 35 years)

“Pharmacists should have an effective role in the society by providing consultations to people through the internet on social media and or via the phone.....”

(Dr1, 2 years)

“It will be beneficial if they [community pharmacists] can do BP or BGL or lipid profile tests....”

(Dr24, 1 year)

“As long as there's a pharmacy clinic, patients would bring their medications whether vitamins, herbal medications or whatever and they [pharmacist] will ask how they [patients] them all and [explain] what are their [medications] benefits.... possible contradictions.....”

(Dr1, 2 years)

“It [involving pharmacists within the home care visits team] will be better because they [pharmacists] could go and see how the patient is handling the drugs, how the patient is tolerating the drugs, is he compliant by tablet counting or whatever and is he taking the drugs on a proper time.....”

(Dr18, 37 years)

It was recognized that collaborative (physician-pharmacist) models were not yet the norm in Saudi Arabia. Most participants recommended enhanced collaboration of pharmacists with physicians with clear role definitions for pharmacists. The most common model suggested was a progressive stepped care collaborative service model (Fig. 1). It was

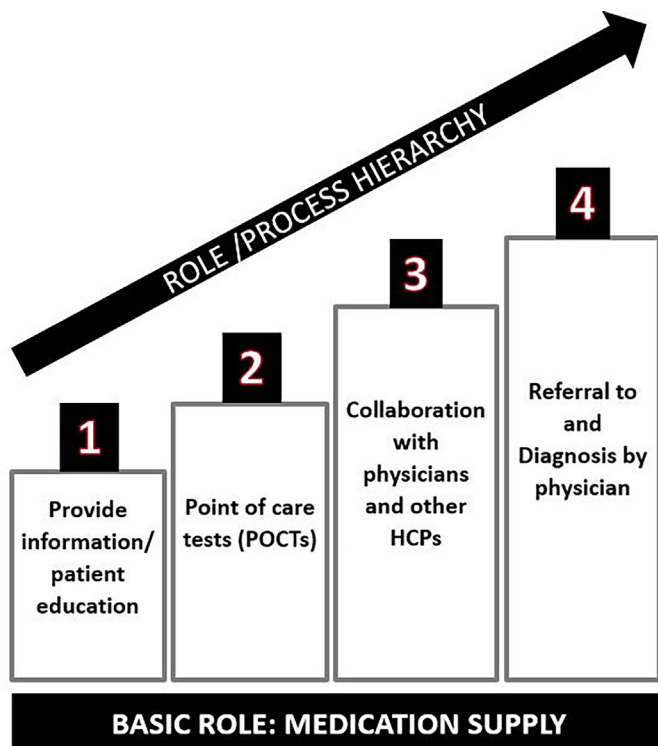


Fig. 1. Suggested models of care.

suggested that pharmacists' risk assessment and education could lead to a pathway for targeted referrals to dietitians, primary and/or tertiary care physicians.

“... Pharmacist and doctor collaboration is still not well established in Saudi Arabia.”

(Dr5, 5 years)

“... They [community pharmacists] will do screening or risk assessment, and what is the pathway after, for example, if GP diagnose a patient with diabetes, what is next? There should be clear in system, what they will do, and how can they handle it. I think it is doable and even time saving and will help us, and this is not that difficult things. It can be done even nationally.”

(Dr23, 7 years)

“If there is good collaboration between pharmacists, general practitioners and cardiologists especially in the screening or risk factor assessment, this will limit costs by the government or by the people themselves...”

(Dr5, 5 years)

While some participants expected community pharmacists to provide a full-service ranging from CVD risk screening, referral, patient education to those with long-term conditions and follow-ups, a few thought community pharmacists' roles should be limited to point of care tests and patient education. Documentation during service provision was thought to be essential for quality assurance and improvement.

“There can be a simplified screening tool the pharmacists could use and once they see a mild-risk no need for referral, moderate-to-severe risk, he has to be referred. So that wouldsave the time for doctors to see moderate-to-high risk rather than seeing only the mild patients.”

(Dr17, 6 years)

“I think providing education to patients is enough for pharmacists. Because if you want to do the scoring, they [pharmacists] have to see the file, but usually

no, especially in the community pharmacy...”

(Dr18, 37 years)

“Pharmacists have to document everything to facilitate these services and that will help evaluating them.”

(Dr22, 1.5 years)

3.5. Theme 4: Healthcare system reform

Participants noted several issues with the limited structure of the primary healthcare system. Most people lacked family physicians with the generic help-seeking pattern for most issues being presentations at a tertiary hospital – where medical care was publicly funded. Also, participants felt that community pharmacies operated separately from the public primary healthcare system. Thus, participants suggested that a system-wide linkage may improve the public perception of the importance of primary healthcare, including their family physicians and pharmacists. For instance, a national electronic health record system was needed; it should be accessible to community pharmacists and other HCPs and used nationally with better patient record management and seamless transitions between health settings.

“Other point, our GP system is weak here in Saudi Arabia. There is no GP-patient connected directly to the consultant and specialists. There is no clear structure for GP in Saudi Arabia”

(Dr23, 7 years)

“I think community pharmacy should be connected by a system to primary care centers and hospitals.....”

(Dr20, 2 years)

“They [policymakers] should reform the current health service situation towards a community-oriented health providing services. This means they should do some form of legislation for all health services.....”

(Dr8, 35 years)

“So, they [health consumers] tend not to go to the primary healthcare clinic anymore, and I think that is an issue we are having with our health system.”

(Dr20, 2 years)

“They [MOH] will do all of that with the national system connected by the Saudi ID. The United Health files.”

(Dr12, 16 years)

Many participants suggested that given that community pharmacies operated privately, there should be a public-private mixed model approach in the Saudi healthcare system, requiring system reform. Involving community pharmacies with publicly operated primary healthcare centers might increase public awareness and enhance primary care service use in Saudi Arabia.

“That is what we are trying in PHCs [Primary Health Centres] to provide another model of care including the community and at least the whole community including all health services, all health providers including community pharmacies to be involved in a good well-built national protocol to deal with this as a national tragedy.....”

(Dr8, 35 years)

4. Discussion

This is the first study that has explored physicians' views on CVD risk screening and management services by community pharmacists in Saudi Arabia. Our results indicate that participating physicians generally

perceived the current role of pharmacists to be mainly medication supply, with a few participants suggesting minor roles in patient education, which they believed were currently provided only in few community pharmacies. Most participants were positive about the idea of pharmacists enacting future roles in CVD risk screening and management by pharmacists. However, perceived critical factors that would support the feasibility and success of such roles included the need for wider public acceptance, thorough resource and task planning, legislative frameworks, and financial or other motivational awards for such pharmacist providers. The gist of the discussions with these participants highlighted that their thinking aligned with a hierarchical model of care with medicine/medical providers allocated leadership positions in patient care. Within this vertically linear model, participants perceived that pharmacists could take on a brief initial assessment of CVD risk and refer patients to primary care or specialist physicians, with the referral chain being mono-directional, i.e., pharmacist to physicians only. Healthcare reform that allows and recognizes pharmacy service provision in collaborative or public-private partnership models was perceived to be needed to develop pharmacists' services in the area of cardiovascular health in Saudi Arabia. Perhaps only such shared care models embedded in the system can facilitate collaborative care provision by pharmacists for patients with CVD risk. The thematic architecture developed from the data presents a pragmatic way to improve CVD risk screening and management services, as highlighted in Fig. 2. It may be suggested that given Saudi Arabia is a high-income developing country with a complex health system, the findings of this research are transferable to many similar countries, for example, in Asia, South America, and of course in the Middle East.

At a 'macro' level, our participants highlighted many current Saudi primary healthcare system limitations. A lack of system-imposed structure where people start their healthcare journey through primary care and the known shortage of family physicians/GPs were clear barriers identified by participants. Patients typically by-passed primary care presenting directly at tertiary hospitals, often for minor health concerns as has previously been reported.^{45,46} The Saudi MoH is reforming primary healthcare, which is one of its key contributions towards Saudi Arabia's 'Vision 2030'.⁴⁷ Involving community pharmacies with their privately owned and sustained infrastructure in providing public health services could potentially add value to the primary healthcare system. This would require changing public perception about the importance of primary healthcare, including their

family physicians and pharmacists. Also, a national electronic health record system was suggested to optimize patient care that is accessible by community pharmacists and other HCPs and used nationally for patient care continuity.^{48,49} Further recommendations included task-shifting non-medical tasks, such as CVD risk screening and health education to patients with CVD risk, which would be beneficial both clinically and economically.^{16,50} Thus, policies that allow task-shifting interventions and services for CVD risk reduction and management are needed. Such changes should be system-supported and incrementally established using key principles of implementation science.

The next layer of change needed would be at the level of medical professionals who have been conventionally charged with providing most roles in healthcare in Saudi Arabia. Overall, the potential of pharmacists in delivering health services was underestimated; this has been shown in other studies.^{51,52} When participants tendered ideas around collaboration in CVD, it was clear that participants wanted patients referred to them and did not voice intentions of referring patients to pharmacists for counseling/follow-up/health education. This phenomenon of medical dominance has been reported by similar research in Saudi Arabia²⁵ and other countries, including those with highly developed and differentiated pharmacy workforce set up.⁵³ In contrast, physicians have reportedly supported pharmacists' roles in CVD risk reduction services, as in our study.^{54,55} Interestingly, a survey of Malaysian physicians reported that more than half the participants favored community pharmacist's roles in general patient education. Still, only a third were positive regarding comprehensive smoking cessation roles provision by community pharmacists.⁵⁶ This aligns with the physician participants in our studies and implies that while at a generic level, collaboration is espoused as a value, but when specific clinical roles are discussed, physicians may be rather unsure of pharmacists' capabilities.

Clearly, there is a possible gap between how medical professionals 'think' and how systems are set up for them to actually 'enact' collaborative shared care for patients with CVD risk. This would be the case for such settings in Saudi Arabia. Hofstede's 6D© model of 'culture' clearly identifies Saudi Arabian culture as hierarchical, where hierarchical structures are established and accepted, and decision-making power is centralized.⁵⁷ Apart from a culturally fed system of the medical hierarchy, a lack of well-established pharmacist-physician collaboration may lead to underestimating pharmacists' role and ability, both in hospitals and

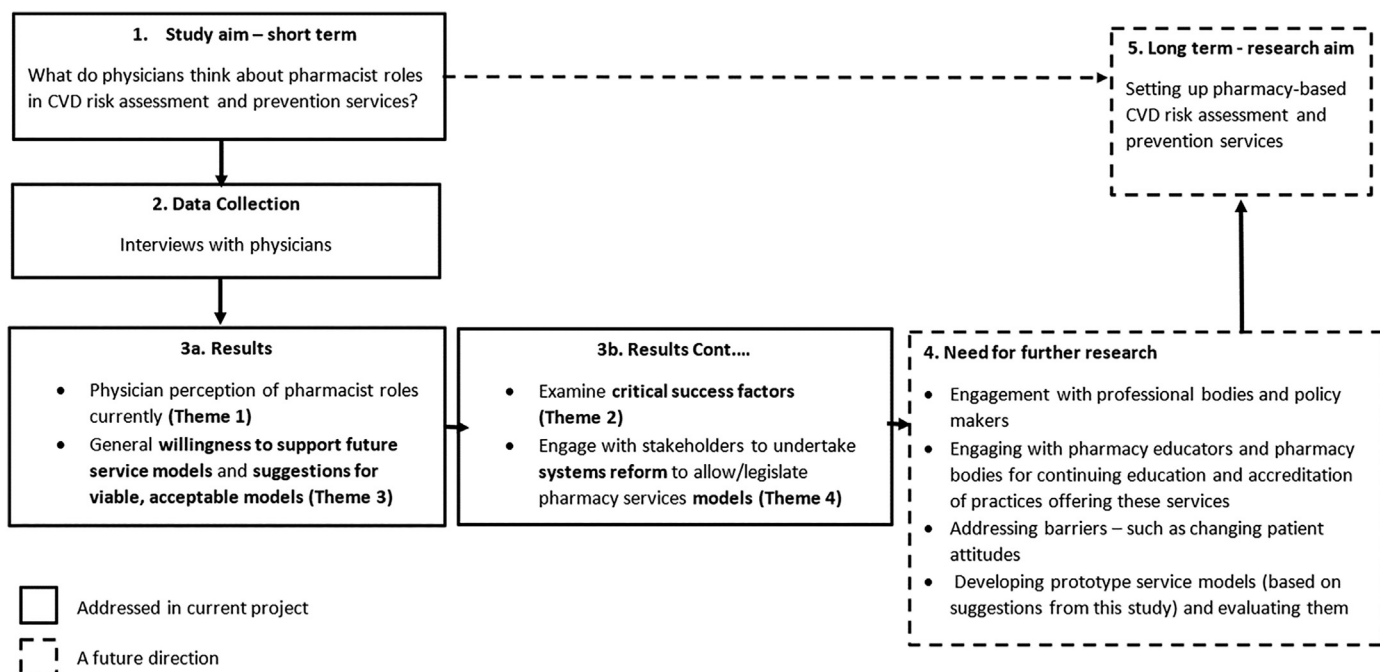


Fig. 2. Thematic architecture.

particularly in community pharmacy settings. Similarly, a need for pharmacists' roles recognition by other HCPs was reported in recent Saudi research that focused on exploring facilitators and barriers of expanding Saudi pharmacists' roles.²⁵ Thus, interprofessional education connecting pharmacists and physicians may increase physicians' awareness of pharmacists' potential roles and services, particularly in community pharmacy settings, which would optimize interprofessional collaboration.⁵⁸

"Wasfaty" is a recently introduced initiative funded by the government and is gradually being implemented in Saudi Arabia. It has several aims related to improving the quality use of medicines in Saudi Arabia. For example, the scheme supports having a nationally linked electronic medication dispensing-healthcare records system.⁵⁹ Such initiatives can be used for 'back-referrals' to the pharmacist, particularly after 'Wasfaty' has been well entrenched in the healthcare system. Another way to scaffold the implementation of new service models by community pharmacists as suggested by some study participants would be to have strategic and powerful social marketing campaigns by the pharmacy profession to create awareness and acceptance of the level of pharmacist training, as well as their demonstrable capabilities and willingness in healthcare delivery. These would be useful both for the public and other HCPs. Similar recommendations were made in other Saudi research studies on community pharmacists' immunization and overall patient-centered care services.^{60,61}

Finally, intra-professional changes (at the professional level) are needed within the pharmacy profession as well. Key issues the profession needs to resolve are resources, task planning, supportive frameworks (legislative, competency, and professional), and remuneration pathways for health services to be performed. Having these frameworks in place would enhance public or other health professional trust in future pharmacy services.⁶² Standardized training and education (competency frameworks) for pharmacists and pharmacy students should be established and implemented across Saudi Arabian pharmacy colleges and practices.^{12,63} Such standards/framework should include skills and competencies for pharmacy services provision to optimize pharmacists' and graduates' abilities to expand their scope of practice, especially in primary care settings such as community pharmacy. Our study participants also highlighted resources and tasks planning for future pharmacy services as essential in defining clear roles for pharmacists, physicians, and other HCPs. Defining clear roles for community pharmacists in Saudi MoH regulations and pharmacy education shifts towards patient-centered care approaches were important in expanding community pharmacy practice in recent Saudi research.^{25,60} Resources include professional training for pharmacists, patient education materials, and systems for documenting information provided. Within pharmacies, allocating a private space for consultation, delegating staff to work on services, and managing service provision while routine activities are in operation would be factors to consider.⁶⁴ The actual health service design needs to clearly identify roles for different professionals⁶⁰ and optimal referral pathways. Further, as pointed out by our participants, financial remuneration and oversight of service delivery by the MoH or other authorized bodies should be important considerations.

The strength of this study is that it provided insight into physicians' views of current and future pharmacy services using CVD risk screening and management as a case study. The results may inform the development of enhanced interprofessional roles between pharmacists, physicians, and other HCPs in Saudi Arabia and similar countries. As a result of our intention of obtaining as varied a sample as possible, our final sample set included participants of different age groups, experience levels, specialties/workplace settings from different cities, and varied nationalities. More participants were recruited from the capital city, Riyadh, and a relatively less developed regional city, Najran, in the south of Saudi Arabia; hence not having a sample that represented rural/remote areas may be a limitation. Another limitation may be the limited participation of female physicians in the study; possibly one reason was that the primary researcher who conducted interviews was male. Another reason for lower female physician representation could be that the snowball sampling started with male physicians who probably forwarded referrals only to their male colleagues. As a result, elaborated views about gender issues in pharmacy services may not

have been obtained. Also, since all participants in this study represented the public sector, data obtained may not have reflected the views of private-sector physicians whose operational dynamics may be different. As this research study presents only physicians' views, it would be strategic to involve other stakeholder groups to maximize the utility of exploratory findings in developing or implementing future pharmacy services. Given that the research team comprised pharmacy researchers, a professional bias may have affected the interpretation of the results. The researchers were aware of this potential bias, and independent checks of the data were used to minimize this as much as possible. Further, the mixed views highlighted in the results section (i.e., positive and negative perspectives from participants across several themes) showcase an open-minded and complete interpretation of data. While evidence from previous research around pharmacists' roles in CVD risk assessment/management services was used to inform the interview guide, a theoretical framework was not explicitly used to guide data collection or analysis in this study. Finally, we did not have participants involved in verifying their transcripts or in co-analyses of data. All participants were offered the opportunity to opt in to receiving a summary of the results, but none took up this option, perhaps due to work-related time pressures. For future research, some recommendations are presented here. Before implementing CVD risk prevention and management in the Saudi community pharmacy setting, it might be worthwhile to conduct a national survey of pharmacists and other HCPs. Such a survey should be informed by the results of this study and collect data from a widely representative sample so that results are generalizable. In such a survey, sampling could include participants from various geographic areas belonging to both main genders and working in private and the public sectors.

5. Conclusion

Our study explored physicians' views about CVD risk screening and management services by pharmacists in Saudi Arabia. The comprehensive results can guide future pharmacy service planning in Saudi Arabia. The study has also highlighted the need for stakeholder engagement at inception in the future development, implementation, and evaluation of Saudi community pharmacist services in CVD risk assessment and management services. Most participants were positive about setting up a collaborative community pharmacist-physician CVD risk screening and management service model with the help of an authorized body within the Saudi Arabian healthcare system. In addition, healthcare system reforms were recommended to address primary care system issues and introduce private-public partnerships.

Ethics approval and consent to participate

Ethics approval for the study was obtained from the University of Sydney Human Research Ethics Committee (HREC) (2017/614). Participants' consent was obtained before each interview.

Availability of data and materials

All materials, including the data collection guide and COREQ checklist used during this study, are included in this article and additional files in the appendix B and C.

Consent for publication

Not applicable.

Funding

No funding received for this study.

Authors contributions

All authors were involved in the design of the study. HA, BS, BC, and IK participated in interview guide design and content. HA conducted data collection. HA and BS performed data analysis and interpretation of the findings and preparation of the manuscript. All authors have read, edited, and approved the final manuscript.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

Not applicable.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.rcsop.2021.100077>.

References

- Abubakar I, Tillmann T, Banerjee AJL. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015;385(9963):117–171.
- Al Asmri M, Almalki MJ, Fitzgerald G, Clark M. The public healthcare system and primary care services in Saudi Arabia: a system in transition. *E Mediterr Health J* 2019;25.
- Ministry of Health. *Strategic plan of Ministry of Health 2010–2020 - Saudi Arabia*. Riyadh: Ministry of Health. 2010 <https://www.moh.gov.sa/en/Ministry/About/Pages/Strategy.aspx> (accessed 11 March 2021).
- Budreviciute A, Damiani S, Sabir DK, et al. Management and prevention strategies for non-communicable diseases (NCDs) and their risk factors. *Public Health Front* 2020;8:788.
- Varghese C, Nongkynrih B, Onakpoya I, McCall M, Barkley S, Collins TE. Better health and wellbeing for billion more people: integrating non-communicable diseases in primary care. *BMJ* 2019;364.
- Rao M, Pilot E. The missing link—the role of primary care in global health. *Glob Health Action* 2014;7(1):23693.
- Alraga S. Comparative analysis of three different health systems Australian, Switzerland and Saudi Arabia. *Qual Prim Care* 2017;25(2):94–100.
- Hazazi AM, Chandramohan S. Strengthening the health care system to address the new challenge of non-communicable diseases in the kingdom of Saudi Arabia: a systematic review. *Int J Sci Study* 2017;5(7):114–120.
- Gamaledeen S. *Assessment of Saudi Arabia's healthcare system: A need to decentralize*. Bakersfield: California State University. 2015.
- Al-jedai A, Qaisi S, Al-meman A. Pharmacy practice and the health care system in Saudi Arabia. *Can J Hosp Pharm* 2016;69(3):231.
- Al-Sakkak MA, Al-Nowaiser NA, Al-Khashan HI, Al-Abdrabulnabi AA, Jaber RM. Patient satisfaction with primary health care services in Riyadh. *Saudi Med J* 2008;29(3):432.
- Badreldin HA, Alosaimy S, Al-jedai A. Clinical pharmacy practice in Saudi Arabia: historical evolution and future perspective. *J Am Coll Clin Pharm* 2020;3(5):920–929.
- Ajabnoor AM, Cooper R. Pharmacists' prescribing in Saudi Arabia: cross-sectional study describing current practices and future perspectives. *Pharm* 2020;8(3):160.
- Abdullahi LH, Smit I, Engel ME, Watkins DA, Zühlke L. Task sharing to improve the prevention, diagnosis and management of rheumatic heart disease: a systematic review protocol. *BMJ Open* 2018;8(2), e019511.
- Anand T, Joseph LM, Geetha A, Prabhakaran D, Jeemon P. Task sharing with non-physician healthcare workers for management of blood pressure in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Glob Health* 2019;7(6):e761–e771.
- Al Hamareh YN, Johnston K, Marra CA, Tsuyuki RT. Pharmacist prescribing and care improves cardiovascular risk, but is it cost-effective? A cost-effectiveness analysis of the Rx EACH study. *Can Pharm J* 2019;152(4):257–266 (1715163519851822).
- Seidman G, Atun R. Does task shifting yield cost savings and improve efficiency for health systems? A systematic review of evidence from low-income and middle-income countries. *Hum Resour Health* 2017;15(1):1–13.
- Joshi R, Alim M, Kengne AP, et al. Task shifting for non-communicable disease management in low and middle income countries—a systematic review. *PLoS One* 2014;9(8), e103754.
- Bradley F, Elvey R, Ashcroft DM, et al. The challenge of integrating community pharmacists into the primary health care team: a case study of local pharmaceutical services (LPS) pilots and interprofessional collaboration. *J Interprof Care* 2008;22(4):387–398.
- Pottie K, Farrell B, Haydt S, et al. Integrating pharmacists into family practice teams: physicians' perspectives on collaborative care. *Can Fam Physician* 2008;54(12):1714–1717. (e1715).
- Proia KK, Thota AB, Njie GJ, et al. Team-based care and improved blood pressure control: a community guide systematic review. *Am J Prev Med* 2014;47(1):86–99.
- Tan EC, Stewart K, Elliott RA, George J. Pharmacist services provided in general practice clinics: a systematic review and meta-analysis. *Res Social Adm Pharm* 2014;10(4):608–622.
- Freeman C, Cottrell WN, Kyle G, Williams I, Nissen LJ. Integrating a pharmacist into the general practice environment: opinions of pharmacists', general practitioner's, health care consumer's, and practice manager's. *BMC Health Serv Res* 2012;12(1):229.
- Strand MA, Davidson KM, Schulze N. Linking pharmacists to the delivery of public health services. *J Am Pharm Assoc* 2017;57(6):742–746.
- Mohammed E, Khanal S, Jalal Z, Cheema E, Abutaleb MH, Paudyal V. Perceived barriers and facilitators to uptake of non-traditional roles by pharmacists in Saudi Arabia and implications for COVID-19 pandemic and beyond: a qualitative study using Theoretical Domain Framework. *J Pharm Policy Pract* 2021;14(1):1–16.
- Aljadhey H, Asiri Y, Albogami Y, Spratto G, Alshehri M. Pharmacy education in Saudi Arabia: a vision of the future. *Saudi Pharm J* 2017;25(1):88–92.
- Almeman AA. Strategic analysis of clinical pharmacy education in Saudi Arabia. *Tropical J Pharm Res* 2020;19(6):1303–1311.
- Almaghaslah D, Alsayari A, Almodeer L, et al. A qualitative study exploring pharmacy education in a Saudi pharmacy school running two entry-level pharmacy programmes. *Pharm Edu* 2019;19:93–99.
- Reeves S, Xyrichtis A, Zwarenstein M. Teamwork, collaboration, coordination, and networking: why we need to distinguish between different types of interprofessional practice. *J Interprof Care* 2018;32(1):1–3.
- Alzubaidi HT, Chandir S, Hasan S, McNamara K, Cox R, Krass I. Diabetes and cardiovascular disease risk screening model in community pharmacies in a developing primary healthcare system: a feasibility study. *BMJ Open* 2019;9(11), e031246.
- Alharbi MF. An analysis of the Saudi healthcare system's readiness to change in the context of the Saudi National Health-care Plan in vision 2030. *Int J Health Sci* 2018;12(3):83.
- Horgan JM, Blenkinsopp A, McManus RJ. Evaluation of a cardiovascular disease opportunistic risk assessment pilot ('Heart MOT' service) in community pharmacies. *J Public Health (Oxf)* 2010;32(1):110–116.
- Lowres N, Neubeck L, Salkeld G, et al. Feasibility and cost-effectiveness of stroke prevention through community screening for atrial fibrillation using iPhone ECG in pharmacies. The SEARCH-AF study. *Thromb Haemost* 2014;111(6):1167–1176.
- Okada H, Onda M, Shoji M, et al. Effects of lifestyle intervention performed by community pharmacists on glycemic control in patients with type 2 diabetes: the community pharmacists assist (compass) project, a pragmatic cluster randomized trial. *Pharmacol Pharm* 2016;7:124–132.
- Peterson GM, Fitzmaurice KD, Kruup H, Jackson SL, Rasiyah RL. Cardiovascular risk screening program in Australian community pharmacies. *Pharm World Sci* 2010;32(3):373–380.
- Tsuyuki RT, Al Hamareh YN, Jones CA, Hemmelgarn BR. The effectiveness of pharmacist interventions on cardiovascular risk: the multicenter randomized controlled Rx EACH trial. *J Am Coll Cardiol* 2016;67(24):2846–2854.
- Willis A, Rivers P, Gray LJ, Davies M, Khunti K. The effectiveness of screening for diabetes and cardiovascular disease risk factors in a community pharmacy setting. *PLoS One* 2014;9(4), e91157.
- Morrow S. Quality and trustworthiness in qualitative research in counselling psychology. *J Counsell Psychol* 2005;52(2):250–260.
- Moser A, Korstjens I. Series: practical guidance to qualitative research. Part 3: sampling, data collection and analysis. *Eur J Gen Pract* 2018;24(1):9–18.
- Almansour HA, Mekonnen AB, Aloudah NM, et al. Cardiovascular disease risk screening by pharmacists: a behavior change wheel guided qualitative analysis. *Res Social Adm Pharm* 2020;16(2):149–159.
- Creswell JW. *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, California: Sage. 1998.
- Lincoln YS, Guba EG. *Paradigmatic controversies, contradictions, and emerging confluences*. In: *Denzin NK, Lincoln YS, eds. The Handbook of Qualitative Research. 2nd ed. Beverly Hills, CA: Sage; 2000. p. 163–188*.
- Leech NL, Onwuegbuzie AJ. Beyond constant comparison qualitative data analysis: using NVivo. *Sch Psychol Q* 2011;26(1):70.
- Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19(6):349–357.
- Sanitan M, Alhaiti AH, Gillespie J. Patient satisfaction and experience of primary care in Saudi Arabia: a systematic review. *Int J Qual Health Care* 2018;30(10):751–759.
- Alyasin A, Douglas C. Reasons for non-urgent presentations to the emergency department in Saudi Arabia. *Int Emerg Nurs* 2014;22(4):220–225.
- Al-Aqeel S. Health technology assessment in Saudi Arabia. *Expert Rev Pharmacoecon Outcomes Res* 2018;18(4):393–402.
- Mooranian A, Emmerton L, Hattingh L. The introduction of the national e-health record into Australian community pharmacy practice: pharmacists' perceptions. *Int J Pharm Pract* 2013;21(6):405–412.
- Nelson SD, Poikonen J, Reese T, El Halta D, Weir C. The pharmacist and the EHR. *J Am Med Inform Assoc* 2017;24(1):193–197.
- Uthman OA, Hartley L, Rees K, Taylor F, Ebrahim S, Clarke A. Multiple risk factor interventions for primary prevention of cardiovascular disease in low-and middle-income countries. *Cochrane Database Syst Rev* 2015;8.
- Bajorek B, LeMay K, Gunn K, Armour C. The potential role for a pharmacist in a multidisciplinary general practitioner super clinic. *Australas Med J* 2015;8(2):52.

52. Ilardo ML, Speciale A. The community pharmacist: perceived barriers and patient-centered care communication. *Int J Environ Res Public Health* 2020;17(2):536.
53. Kenny D, Adamson B. Medicine and the health professions: issues of dominance, autonomy and authority. *Aust Health Rev* 1992;15(3):319–334.
54. Loffler C, Koudmani C, Bohmer F, et al. Perceptions of interprofessional collaboration of general practitioners and community pharmacists - a qualitative study. *BMC Health Serv Res* 2017;17(1):224.
55. Vinterflod C, Gustafsson M, Mattsson S, Gallego G. Physicians' perspectives on clinical pharmacy services in Northern Sweden: a qualitative study. *BMC Health Serv Res* 2018;18(1):35.
56. Azmi S, Nazri N, Azmi A. Extending the roles of community pharmacists: views from general medical practitioners. *Med J Malays* 2012;67(6):577–581.
57. Hofstede insights Saudi Arabia. <https://www.hofstede-insights.com/country/saudi-arabia/> 2020 (accessed 15 Feb 2021).
58. Bollen A, Harrison R, Aslani P, van Haastregt JC. Factors influencing interprofessional collaboration between community pharmacists and general practitioners—a systematic review. *Health Soc Care Commun* 2019;27(4):e189–e212.
59. Wasfaty. <https://wasfaty.sa/> 2020 (accessed 5 Jan 2021).
60. Rasheed MK, Alqasoumi A, Hasan SS, Babar ZUD. The community pharmacy practice change towards patient-centered care in Saudi Arabia: a qualitative perspective. *J Pharm Policy Pract* 2020;13(1):1–9.
61. Al Aloola N, Alsaif R, Alhabib H, Alhossan A. Community needs and preferences for community pharmacy immunization services. *Vaccine* 2020;38(32):5009–5014.
62. McMillan SS, Kelly F, Sav A, King MA, Whitty JA, Wheeler AJ. Australian community pharmacy services: a survey of what people with chronic conditions and their carers use versus what they consider important. *BMJ Open* 2014;4(12), e006587.
63. Bajis D, Moles R, Hosp D, Chaar B. Stakeholders' perspectives on quality assurance of pharmacy education in the eastern mediterranean region. *Am J Pharm Educ* 2018;82(10).
64. Sim TF, Wright B, Hattingh L, Parsons R, Sunderland B, Czarniak P. A cross-sectional survey of enhanced and extended professional services in community pharmacies: a pharmacy perspective. *Res Soc Adm Pharm* 2020;16(4):511–521.